EU4Digital

EU4Digital: supporting digital economy and society in the Eastern Partnership

New organisational forms in support of ICT innovation: policy recommendations: Azerbaijan

June 2020

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1 Background

The EU4Digital Facility (a programme under the umbrella of the EU4Digital Initiative) was launched by the European Commission in January 2019. The EU4Digital Facility aims to extend the benefits of the European Union's Digital Single Market to the Eastern partner states – Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova (hereinafter – Moldova) and Ukraine. The Facility focuses its support across six key policy areas, including ICT innovation. The activities in the ICT Innovation policy area are aimed to support reforms and actions favouring the development of ICT research, start-ups & innovation ecosystems across the Eastern Partnership region, drawing from the EU experience and best practices.

In 2019 - the first half of 2020, the Facility focused its work to identify and share at the regional level the best EU practices for regulation in the policy areas pre-selected by the Eastern partner countries:

- Intellectual property rights management for digital innovations (Armenia);
- New organisational forms for supporting ICT Innovation (Azerbaijan);
- Digital innovation SMEs' access to finance (Georgia, Ukraine);
- ICT innovation ecosystems for start-ups and scale-ups (Moldova);
- Digitising industry (digital transformation of SMEs in traditional sectors) (Belarus).

This report provides the results of the gap analysis related to the policy area 'New organisational forms in support of ICT innovation' in Azerbaijan, and the recommendations for the development of relevant innovation policy. The recommendations formed the basis for elaboration of the national policy implementation action plan for Azerbaijan.

2 Results

The scope and the information type sought during the gap analysis is explained by the scope of the EU4Digital Facility, as well as by the intervention logic of the Facility. Being one of the first endeavours of the EU assistance to the Eastern partner countries in harmonising digital market, the objectives of the EU4Digital Facility at this stage are to **identify the major gaps between the EU and the Eastern partners** and to reveal the directions in which the interested stakeholders can take further active steps to overcome the gaps.

Based on the gap analysis and in tight cooperation with stakeholders, the **recommendations were developed** and can be used as the basis for further activities and possible joint projects. The EU4Digital Facility aims to keep the recommendations as practical and implementable as possible.

These recommendations formed the basis for elaboration of the **national policy implementation action plans** for each Eastern partner country. The action plans identified specific stakeholders in the Eastern partner countries, specific EU tools, platforms, practices that can be mastered by Eastern partner country stakeholders and possible counterparts in the EU countries.

The other activities of the Facility (training, study visit, networking events, promotion activities, etc.) will **support the interested stakeholders in their further activities** on overcoming the gaps.

3 Methodological note

The EU4Digital Facility identified the best EU practices for regulation in the policy areas selected by the Eastern partner countries. These best practices were systematised and formed the basis for analysis of the progress and gaps in the Eastern partner countries.

The gap analysis was performed by comparing the best EU practices and tools with those existing in the Eastern partner country, within the framework of the policy area selected by the country. The national experts in each Eastern partner country collected the field data by means of desk research (study of existing reports and documents), field research (collecting and analysing raw data in Internet space) and interviews with national experts from state bodies and relevant digital innovation ecosystem organisations (see Annex 1. List of organisations and experts consulted during verification processAnnex 1. List of organisations and experts consulted during verification process).

Further analysis of the gaps and development of the recommendations was performed by the EU4Digital Facility expert team and aligned through consultations with national stakeholders.

4 Introduction to a framework supporting the development of new organisational forms in support of ICT innovation

Ecosystem for digital innovations is seen as the one formed by people, start-ups and companies in their various stages of development, and various types of organisations interacting as a system to create and support digital innovations. The goal of the innovation ecosystem is to enable the high level of innovative companies' productivity in the ecosystem through delivery of certain required services.

Policy towards innovation ecosystem development draws from the understanding that the main productivity sources of ecosystems are the quality of institutions (quality of regulation and framework conditions for innovations in the country), quality of the actors (through building competencies and skills of ecosystem actors) and the quality of links (through networking and developing relevant organisational forms) among them.

Various organisational forms can support digital innovations beyond classical techno parks, business incubators and technology transfer offices: accelerators, competence centres, digital innovation hubs. Cluster support organisations maintain innovative clusters as distributed forms of partnerships, including public-private partnerships. The goal of the innovation ecosystem is to enable the high level of innovative companies' productivity in the ecosystem through delivery of certain required services. Thus, **new organisational forms** are the logical step in the development of ecosystem via specialisation, because their structure and functions fit better to provide necessary services (fulfil necessary functions) in the innovation ecosystem.

Creation of a united ecosystem, networking and clustering business incubators, accelerators and other ecosystem actors is a necessary 'second pillar' maintaining innovations in the demand-driven innovation system. The connected ecosystem, which clearly defines the roles of the innovation process participants, needs to be developed, which allows for covering the needs of innovation development from ideation to market. Each stage of innovation policy and ecosystem should create favourable conditions for the development of innovations and entrepreneurship at the next stages. The innovation ecosystem needs to be transparent to facilitate the quick identification of competences and expertise, teambuilding among the sectors and exchange of information about projects to achieve faster development.

This explains the logic and the structure of the policy recommendations for the topic 'New organisational forms in support of ICT innovation':

- Section 6 describes the vision of the innovation support services and organisations in the national innovation system in Azerbaijan.
- Section 7 studies the current status of new organisational forms supporting innovations in Azerbaijan, including innovative cluster organisations, accelerators, competence centres, digital innovation hubs and public-private partnerships. Within the EU4Digital study, relevant stakeholders were mapped; the availability of framework definitions in the policy documents was checked; the status was examined on whether clarifications and recommendations are published within the country including advice on the establishment of the new organisational forms for support of innovations, provision of their legal status, different models of their operation and best principles of their development. An expert view on the major obstacles for development of new organisational forms in support of ICT innovation in the country was also analysed.
- Section 8 studies the external framework for development of new organisational forms supporting innovations: it checks the availability of online platform(s) for mapping of various ICT innovation ecosystem actors and reviews the available training opportunities for development of new organisational forms for digital innovations in Azerbaijan. It also identifies the gaps related to R&D collaboration, technological infrastructure and funding hampering the development of new organisational forms for digital innovations.

The structure of the policy recommendations within this report is a framework of four elements:

- the suggested actions are listed and elaborated where needed (answering the question what is to be done (*What?*);
- the reason why these actions are important is explained in terms of a broader context of the innovation ecosystem development (*Why?*);
- relevant EU organisations are suggested as potential partners exercising the good practice in the considered area;
- possible counterparts in the Eastern partner country are indicated as the parties potentially interested in taking over of the suggested EU best practices and in performing the recommended actions.

5 Summary of recommendations

Following the status and gap analysis, the recommendations were developed, linked to the EU best practices, on how the further ecosystem development in Azerbaijan could be directed. The summarised recommendations in Table 1 are further elaborated in sections 6-8. The order of the recommendations in the below summary corresponds to the recommendations numbering in the sections.

Table 1. Summary of recommendations

Summary of recommendations
1. National policy framework related to new organisation forms in the innovation infrastructure
1.1. Organise an action to clarify the framework for operation of new organisational forms of innovation ecosystem by: a. preparing and publishing the basic definitions and description of typical functions from the best EU (world) practice (see for example the Italian Startup Act clarification); b. issuing by the profile ministry of guidelines (recommendations) on the establishment of the new organisational forms for support of innovations, provision of their legal status, different models of their operation and best principles of their development, including sample Code of Practice (sample Agreement); c. organising a wide proactive campaign on public discussion of the suggested framework with existing accelerators, incubators, start-ups and other ecosystem actors, as for the suggested definitions, incentives, as well as their roles and potential actions that they can take and might need assistance from the regulatory bodies.
1.2. For the purposes of facilitating the development of ICT innovation ecosystem, fix the basic definition of the innovation infrastructure organisation and its services as a general (inclusive) term in the national legislation, including 'innovation infrastructure organisation', 'innovation support services', 'innovation advisory services'.
1.3. Assign to innovation infrastructure organisations (organisations delivering the innovation advisory and support services) the right to be subject to special regulation on state aid for research, development and innovation.
1.4. Determine the size and forms of state aid that can be allocated to those organisational forms which perform the functions of the innovation infrastructure organisations and fix it in respective regulative documents.
1.5. Revise the setup of the innovation policy and implement good governance via steps suggested in recommendations**.**
2. Specific organisational forms – Innovative clusters
2.1. Revise the vision of an innovative cluster composition, the role of cluster organisations and state aid to innovative clusters (detailed explanations in the recommendations).
2.2. Consider the EU definitions set in the EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01) in Section 1.3(s) for innovation clusters (please refer to the recommendations).
2.3. Support innovative cluster organisations as innovation infrastructure organisations and allow them to use the state aid.
2.4. Increase engagement in facilitating vertical (subcontracting) and horizontal (complementing resources for joint projects) collaboration of different types of ecosystem players in the country, as a first step in identification and development of clusters.
2.5. Register the mapped by EU4D Facility and emerging clusters in Azerbaijan at the EU platforms and establish links with selected clusters organisations.
3. Specific organisational forms – Accelerators
3.1. Implement the modern definition of accelerator in non-binding policy documents, for the purposes of awareness-raising, promotion and "authorising" such centres to emerge and self-identify themselves in the country.
3.2. Consider accelerators as part of the innovation infrastructure and extend to them the action of the regulation on the relevant state aid, if they perform some of the following types of activities: innovation support services and innovation advisory services.

Summary of recommendations
3.3. Negotiate joining the EIC Accelerator Pilot, part of the Enhanced European Innovation Council pilot.
3.4. Map existing and emerging accelerators in Azerbaijan on multiple EU and world platforms, where most of start-ups look for funding.
3.5. Develop the "dual mentorship" programme for deeptech start-ups by twinning with leading accelerators.
3.6. Build the capacity of individual mentors and business angels (training and networking) is recommended as a main tool for consolidation and increase the success rate of Azerbaijani accelerators.
4. Specific organisational forms – Competence centres
4.1. Perform an internal "inventorisation" of the existing competence centres in Azerbaijan across diverse thematical fields.
4.2. Facilitate the inventorisation of competence centres including the expertise available in the business sector (beyond Academy of Sciences and universities) by accepting the definition that competence centres can exist in various forms.
4.3. Map such competence centres (publish their list/database in an easily searchable way per keywords/thematic areas) on the leading online resource in the country.
4.4. Establish a strategic programme for development of capacities for the existing competence centres and nurturing the new centres.
5. Specific organisational forms – Digital innovation hubs
5.1. Organise the study of the concept and practice of work of existing and emerging digital innovation hubs in the EU by existing most active digital ecosystem actors, including both regulators and accelerators.
5.2. Introduce pilot projects aimed at testing innovative solutions as a most efficient tool facilitating networking of diverse stakeholders around specific selected topic of specialisation (core of the future digital innovation hub).
5.3. Establish one of the outreach European Digital Innovation Hubs.
6. Specific organisational forms – Private-Public Partnership-based projects
6.1. Study the mechanism of work of existing PPPs in digital markets in the EU in-depth and consider their applicability, including Design-Build (DB) and Design-Build-Finance-Maintain-Operate (DBFMO) models, on digital markets, including via internships.
6.2. Review and apply EU experience on PPP in the development of regulations for digital markets through consultations with consolidated business associations.
6.3. Develop the legal framework and implementation practices for institutionalised PPP allowing for wider involvement of private sector already at the stage of design of innovative projects in the area of digital markets.
6.4. Consider including the main components of PPP agreements foreseen in Horizon 2020 practice, when developing the legal framework for concessions, based on a contractual arrangement between the public and industry partners allowing for closing deals with residents.
6.5. Consider EU experience on PPP in the development of policy for digital markets.
6.6. For business associations to be more visible to the regulators, establish the working groups on the specific topics, digital markets, involve multiple businesses and stakeholders into discussion; collect the voices of individual businesses and develop a consolidated position of a business community that is perceived by ministries as an unbiased general position, not as lobbying of individual business interests.
7. Mapping online of clusters, accelerators, innovation hubs and other types of actors for potential users to find them within the country
7.1. Map the Azerbaijani ecosystem actors and start-ups on the existing EU and world platforms.
7.2. Consider the creation of a joint web-resource (digital platform) with functionality of linking the digital innovation ecosystem with most important partner markets.
7.3. Propose to the ecosystem actors an easy tool for self-mapping on the online platform describing a range of basic functions that need to be performed in the innovation ecosystem.

Summary of recommendations
7.4. *Map the landscape of services provided by ecosystem actors* (marketplace of services), using the data updated by EU4Digital Facility, to facilitate their quick search by start-ups and SMEs, and to foster competition among the suppliers of services for increase of their quality.
7.5. *Consider the* advanced *functions of the similar EU platforms.* Consider the international partnerships of the platform and the possibility to exchange the data via open API with the existing big-scale platforms, to ensure both the national data ownership and international visibility.
7.6. Within a platform-operating company, foresee the function of tracking the popularity and functionality of relevant foreign platforms in order to timely develop the international partnerships and improve the functionality of the national platform.
8. R&D collaboration between business and universities as well as between business and policy makers
8.1. Perform awareness-raising activities to promote R&D activities of applied character linked to start-up culture at school and university students.
8.2. Equip university innovation labs and technoparks with modern tools and technologies, make them open for all students and linked to practical tasks of enterprises in the country and in the wider region.
8.3. Identify existing digital communities in the country; foster their development; establish more specialised networks and consortia (consortium of accelerators, incubators competence centres, etc.).
8.4. Introduce innovation vouchers tool to support organisations wishing to drive the development of thematic communities and deliver innovation support and advisory services (both NGOs and profit-oriented companies).
8.5. Provide small grants on a competitive basis for funding of services to coordinate the expert community by an existing legal entity, plus additional grants for networking events.
8.6. See further recommended actions on facilitating the development of expert communities in the topic 'ICT innovation ecosystems for start-ups and scale-ups'.
9. Specific training and consultations within the country about the organisational forms in support of ICT innovation
9.1. Introduce training programme of management and staff of ecosystem builders and particular organisational forms (including educating the relevant organisations and/or staff on whole process of registering, accelerating, certification, pitching as well as intellectual property rights mechanism, with focus on start-ups).
9.2. Organise TWINNING of accelerators across the borders.
9.3. Introduce institutional capacity building programme for existing and proto-digital business associations in EaP region, to help them become an integral part of the EU business community and international associations and extract more value out of these memberships.
9.4. Join the specialised EU training programmes for development of cluster managers and innovation ecosystem builders.
9.5. Review the policy recommendations on 'Intellectual property rights management for digital innovations'; 'Digital innovation SMEs access to finance' ICT innovation ecosystems for start-ups and scale-ups'; consider them for adjustment and applying in Azerbaijan, as well as the list of training sources on digital innovation, developed by EU4Digital Facility.
10. Technological infrastructure
10.1. Inventorise the existing technological infrastructure that is available at universities and public R&D organisations (funded by public funds), and make them accessible by inventors, start-ups and SMEs for research, testing, prototyping, manufacturing at early stages, for free (to start-ups) or at acceptable rates (for SMEs). Publish the registry of available infrastructure.
10.2. Support successful ecosystem actors wishing to replicate their activities in the regional centres across the country (i.e. by providing them premises in the regions, access to digital infrastructure, co-funding training of trainers for the regions).
10.3. Review the possibility of using EaP Connect project facilities for providing access to a number of services to innovation ecosystem actors, starting from those belonging to educational and research system.

Summary of recommendations
11. Funding
11.1. Provide small grants on a competitive basis for funding of services to coordinate the expert community by an existing legal entity, plus additional grants for networking events.
11.2. Maintain an actual overview of funding sources for which Eastern partner country stakeholders are eligible and make the list public.
11.3. Review the topic 'Digital innovation SME's access to finance' (policy recommendations developed for Georgia and Ukraine) and consider its application in Azerbaijan (adaptation may be required) for development of the full cycle funding for the innovation process.

Source: Developed by EU4Digital Facility

6 Framework for operation of innovation support organisations

Before studying the current status of concrete organisational forms supporting innovations (innovation cluster organisations, accelerators, competence centres, digital innovation hubs and public-private partnerships), the general vision of the innovation support services and organisations in the national innovation system in Azerbaijan needs to be outlined, as understood in the policy documents.

Status

The national innovation system of Azerbaijan is on its development stage. Since in 2013 the UNECE recommended to support the establishment of innovation intermediaries and SME support institutions in Azerbaijan (UNECE, 2013), there are a number of actors appeared in this role. ICT Innovation Study (2018) has mapped 5 incubators, 4 accelerators, 1 co-working space, 3 ICT training centres, 3 high-tech parks, 1 technology transfer office, 1 fablab in Azerbaijan, as of end 2017.

There are no legal restrictions that prohibit the establishment of new organisational forms supporting ICT innovation in Azerbaijan. However, the *definitions and roles of actors in the national innovation system, including innovation intermediaries and support organisations are not clearly determined*, and the policy framework for their operation is still under development.

The Law of the Republic of Azerbaijan 'On Science' was approved on 14 June 2016 and defines main principles of the state policy in the field of organization, management and development of scientific activities, objectives of the science and scientific-innovation activity; funding mechanisms for the science and stimulation of scientific achievements. This Law introduces the definitions of:

- "national innovation system – a set of organisations engaged in the production and sale of scientific knowledge and technology on a commercial or non-commercial basis within the country";
- "technological incubator – a legal entity that provides scientific, production, personnel, legal, marketing, leasing, consulting and other services to the subjects of innovation activity";
- "scientific innovation subjects – legal entities and individuals whose main functions and purpose are to create and implement progressive innovations";
- "scientific innovation – the innovative nature of the content and means of scientific activity (research methods, techniques, etc.), scientific results and products, as well as technologies and methods of their application";
- "technopark – a structural (territorial) or legal entity with advanced technologies that comprehensively implements the creation and mastering of new technologies, production of modern equipment, devices and facilities and their implementation on a commercial basis";
- "technopolis – a multidisciplinary, developed industry and infrastructure, scientific research and educational complexes, "brain centres", factories, firms and companies, created for the development and application of new technologies and high-tech products in production, scientific-industrial complex or industrial town with territory".

Article 4 of this Law sets that state policy in the field of scientific innovation includes creation and development of scientific innovation subjects - integrative science, education and entrepreneurship centres (zones), technopolies, science technology parks, technological incubators, innovation funds, information bank on innovations.

Thus, in the current law, various types of innovation support/advisory services delivered to start-ups/innovative SMEs are generalized under the definition of the technological incubator, without any specification per evolutionary stages of the innovation process, and *the specialization of organisations delivering such services is not envisaged*. There is no definition of accelerators, technology transfer centres, competence centres, innovation hubs contained in the Law. There is *no definition of innovation support or advisory services*.

The development of a separate Law on innovation and innovation policy was recommended by EDF (2017) which stresses that "in different legal and regulatory acts, there are very fragmentary provisions on the promotion and regulation of innovation activity, and state principles in this field", but it is not announced by the government. OECD marks that a single national innovation policy is currently being developed in Azerbaijan; however by late 2019 "governmental actions in this area remain scattered across several programmes and policy documents" (OECD, 2020).

In order to increase efficiency and ensure coordination in the field of innovative development in the Republic of Azerbaijan, the Decree 'On ensuring coordination in the field of innovative development in Azerbaijan' was signed by the President of the Republic of Azerbaijan in 10 January of 2019. This Decree orders to *appoint the*

coordinator responsible for innovative development based on the development, presentation and use of products, services, technologies, processes and solutions based on scientific achievements, knowledge and digital innovations (at the level of the deputy head or other person represented in the governing bodies of the institution). Following this Decree, an *Innovation Strategy* of the country is currently being prepared (this status was confirmed in June 2020), led by the Administration of the President of the Republic of Azerbaijan. The Ministry of Transport, Communications and High Technologies actively participate in this process.

Two agencies that are named by respondents within EU4Digital Facility study as the leading actors currently driving the development of cooperation in the innovation ecosystem in Azerbaijan, are the Innovation Agency and SME Development Agency (SMEDA).

Small and Medium Business Development Agency was established by the Decree of the President of the Republic of Azerbaijan in late 2017 as a public legal entity "to support the development of micro, small and medium entrepreneurship in the country, participate in regulation of entrepreneurial activity, protect the interests of Small and Medium Enterprises (hereinafter referred to as SMEs) and solve their issues, provide SMEs with a number of services, ensure coordination of services rendered by government bodies and private entities to SMEs that support and a range of services to entrepreneurs, as well as coordinates and regulates public services in this area" (Decree of the President of Azerbaijan of June 26, 2018.).

The Innovation Agency was established in late 2018 under the Ministry of Transport, Communications and High Technologies of the Republic of Azerbaijan in accordance with Decree № 325 of President of the Republic of Azerbaijan. The Innovation Agency assists local businesses in acquiring modern technologies and technological solutions, organizes their transfer, supports innovation-oriented scientific research and encourages innovative projects, including start-ups by funding them through grants, concessional loans and venture capital fund. Activities set out in the Charter of the Innovation Agency include "to make proposals on the establishment of funds or establish funds, technology parks, incubators, innovation centres, research centres, laboratories, technology and knowledge transfer centres and other institutions which are the main elements of innovation infrastructure".

The challenges emphasised in the interviews with representatives of governmental agencies include:

- lack of horizontal synergy between actors of the ICT ecosystem in Azerbaijan: existing projects, plans, initiatives of various ministries (AgroTech, FinTech, GovTech, EcoTech and EnergoTech) are not integrated as parts of the overall ecosystem;
- lack of vertical synergy among educational institutions and related organisations facilitating R&D environment and opportunities for ecosystem actors and enabling the bringing of R&D results to market.

Thus, there is a need to revise the setup of the innovation policy in Azerbaijan with account of leading international experience and develop a clearer vision of roles and "handshakes" among the actors.

Gaps

Drawing from the desk research and expert interviews, it was revealed that there are no legal restrictions that prohibit the establishment of any of the four types of new organisational forms supporting ICT Innovation in Azerbaijan.

However, the gaps are that:

- There are no clear definitions in the national regulation of the terms related to innovation infrastructure and innovation support.
- There is no focus on the specific policy framework or legislation that defines innovative cluster, accelerator, competence centre, and digital innovation hub. Therefore, it is hard for policymakers and for the organisations themselves to identify where they belong to.
- Consequently, innovation infrastructure organisations and organisations delivering the innovation advisory and support services are not subject to special regulation on state aid for research, development and innovation (special taxation regime or other aid).

In the absence of clear definitions, it would be useful to have recommendations from a relevant ministry, explaining and clarifying how the innovative clusters, competence centres, innovation hubs can operate in the framework of existing legislation, but such recommendations are not available in Azerbaijan.

Recommendations

❖ What?

1. Organise an action to clarify the framework for operation of new organisational forms of innovation ecosystem by:

   a. preparing and publishing the basic definitions and description of typical functions from the best EU (world) practice (for example, see the report clarifying the Italy's Startup Act (Italian Ministry of Economic Development, 2017);
   b. issuing by the profile ministry of guidelines (recommendations) on the establishment of the new organisational forms for support of innovations, provision of their legal status, different models of their operation and best principles of their development, including sample Code of Practice (sample Agreement), that are clear and easy to follow by stakeholders wishing to act as an innovative cluster organisation, accelerator, competence centre, innovation hub operator etc.;
   c. stating officially that there are no legal restrictions for establishment of such forms;
   d. explaining how these forms can operate under the available legal framework (i.e. how multiple companies can perform projects in consortium; how cluster organisation can raise money for its services as a coordinating body; how accelerators can conclude agreement with start-ups on taking a share in their assets as a compensation of incubation and mentoring services, etc.);
   e. organising a wide proactive campaign on public discussion of the suggested framework with existing accelerators, incubators, start-ups and other ecosystem actors, as for the suggested definitions, incentives, as well as their roles and potential actions that they can take and might need assistance from the regulatory bodies.
2. For the purposes of facilitating the development of ICT innovation ecosystem, fix the basic definition of the innovation infrastructure organisation and its services as a general (inclusive) term in the national legislation. Relevant EU practice includes the following definitions:
   a. innovation support services – "the provision of office space, data banks, libraries, market research, laboratories, quality labelling, testing and certification to develop more effective products, processes or services";
   b. innovation advisory services – "consultancy, assistance and training in the fields of knowledge transfer, acquisition, protection and exploitation of intangible assets, use of standards and regulations embedding them" (COM 2014/C 198/01).
3. Assign to innovation infrastructure organisations (organisations delivering the innovation advisory and support services) the right to be subject to special regulation on state aid for research, development and innovation. The EU state aid rule for research and development and innovation (COM 2014/C 198/01) including the new General Block Exemption Regulation (GBER) can be recommended as a successfully acting practice in the EU.
4. Determine the size and forms of state aid that can be allocated to those organisational forms which perform the functions of the innovation infrastructure organisations and fix it in respective regulative documents. Make a disclaimer that the government is open to consider even new organisational forms beyond those mentioned as the valuable elements of the ecosystem, innovation support and advisory services of which can potentially be eligible for state aid.
5. Revise the setup of the innovation policy and implement good governance via following steps:
   a. **Evidence-based assessment.** Perform internal assessment of current roles distribution via the framework of a well-equipped structure of the innovation ecosystem; identify the areas with gaps, market and governance failures, overregulations.
   b. **New innovation policy framework design.** Design the vision of a new innovation policy framework, its tools and functions distribution, with reference to relevant EU policy design practices. The expertise of UNECE may be sought to reveal the system failures. The Oslo Manual is to be used when structuring the indicators for innovation policy monitoring. The PAXIS Manual is to be used when structuring the set of tools of the innovation policy. Specific setting of state aid and assistance should be based on the prior study of the existing coverage of the market by financial services and scope of market failures in the specific country.
   c. **Discussion.** Facilitate the discussion among stakeholders to enable the successful distribution of roles as an important prerequisite of implementation of the innovation ecosystem development.
   d. **White paper.** Develop a policy document at the level of Concept or Strategy, defining (based on best practices in this area) the types, roles and responsibilities of ecosystem participants, including regulators, their subordinate agencies, and independent actors of the ecosystem; mechanisms of their interaction, exchange of opinions, decision-making, and collaboration, including the right for experimentation, autonomy and PPP; principles of fair access to R&D&Innovation infrastructure, financial resources, state aid, grants, tax facilitation, etc.

e. **Stakeholder consultations.** Conduct wider stakeholder consultations on economic and social effects.
f. **Capacity building of policymakers and implementers** via:
    i. mastering REFIT toolbox on better (evidence-based) regulation;
    ii. mastering the 'Skills for evidence-informed policy-making: continuous professional development framework" (Joint Research Centre, 2017);
    iii. mastering the registry of policy case studies;
    iv. study visits and internships to the EU policy making organisations and innovation agencies for transfer of approaches to governance, public consultations, decision-making, collaboration with business and academia.
g. **Implementation of a new policy framework** backed up with resources.
h. **Monitoring** of effectiveness and efficiency.
i. **Evaluation** and policy revision, if needed.

Some key principles of an efficient innovation policy governance, drawn from the analysis of the EU best practice, are suggested below (in support of recommendation 5):

- For the government, it is important to build relations with cluster support organisations, accelerators, digital innovation hubs, as independent counterparts. While these new organisational forms perform some functions (play some roles) in the national innovation system, and have responsibilities towards their tenants and partners within the contractual law, it has to be acknowledged that those entities are mostly private entities and the government cannot assign responsibilities to them directly, unless it is agreed mutually on contractual terms linked with financial aids, grants or other means of government support.
- Most government intervention in the technology area is directed to correcting market failures (the tendency of the private sector to underinvest in technology development due to the inability of firms to capture all of the benefits from such investments (knowledge spillovers)); correcting systemic failures (lack of interaction between the actors in the system, mismatches between basic research in the public sector and more applied research in industry, malfunctioning of technology transfer institutions, and information and absorptive deficiencies on the part of enterprises), and enhancing the innovative capacity of firms.
- The following types of knowledge and information flows need to be ensured in the innovation policy:
    - interactions among enterprises, primarily joint research activities and other technical collaborations;
    - interactions among enterprises, universities and public research institutes, including joint research, co-patenting, co-publications and more informal linkages;
    - diffusion of knowledge and technology to enterprises, including industry adoption rates for new technologies and diffusion through machinery and equipment;
    - personnel mobility.
- Having a clear mandate and objectives and adequate resources is critical for implementing the innovation policy.
- There is no single model for an ideal innovation agency. Institutional arrangements that work for one country may not be transferable. The important questions are what role innovation agencies should play, and how these roles can best respond to the contextual challenges that the country is facing.
- What matters for policy implementation capability is not 'form' but 'function'.
- In order to help grow innovation systems, governments should always seek to work with the private sector in the design, implementation, and governance of innovation policy instruments, while avoiding capture. It is critical to involve the private sector in the governance of innovation policies, ensuring the accountability of government policies while having strong processes to avoid capture and the influence of vested interests.
- Good relationships cannot be mandated. They will always depend on personalities and other contingencies. But institutions do have a role in creating the conditions that enable good relationships to flourish and mitigate the consequences when they do not.
- Governments should seek the creation of markets in their interventions. For example, a major secondary benefit of providing innovation support to companies is that it increases demand for inputs

such as knowledge and advice – a market for innovation – that becomes deeper, broader, and less reliant on government over time. Governments interventions should also seek to strengthen the supply of business advisory services.

- Besides institutions and agencies that generally have a mandate to design and/or implement innovation policies, there are also specialised entities that deliver innovation-related services, like public research organisations (PROs), technology and R&D centres, and other agencies that provide services or research.
- "Public administrations are increasingly aware that they can overcome their limitations in policy delivery by working with programme and service users, empowering them to develop solutions as equal partners. Public administrations do not hold the monopoly on the delivery of public services, and can benefit from interaction with other stakeholders, including but not only public-private partnerships: "in some cases, organisations from civil society may be better placed in terms of local knowledge and specialisation to deliver services. Contemporary governments facing complex problems do not hold all the answers: strength comes through collaboration and co-responsibility" (EC, 2017). Delegating the authority of delivery of public services or performing the functions in the innovation ecosystem to the private sector of NGOs may increase ownership and user-centricity.
- Good innovation policy practices can be learned provided there is a framework for innovation policy cooperation.
- Excellent innovation systems offer a policy mix and must involve all partners in the innovation value chain.
- The main elements of effective ICT-centric innovation policy include policy experimentation, user centricity, developing common language, private sector leadership, efficient resource utilisation, engagement of stakeholders, focus on good practices, replicability, sustainability and predictability.
- The good policy should be evidence informed.
- Policymakers should have outcomes-based accountability.
- Capacity building of policymakers is needed.
- There are proven principles and tools for making regulation more efficient and effective while reducing burden, embracing policy planning; impact assessment (including financial programmes and instruments and Risk assessment and management); preparing proposals, implementation and transposition; monitoring; evaluation and fitness check; stakeholder consultations, that need to be mastered by policy-makers.

❖ Why?

To enable a common understanding of what innovation support and advisory services are; to incentivise the organisations to deliver them (share their expertise) and to open the ground for further development of ecosystem organisations.

❖ Relevant EU policy and guidelines (non-exhaustive list):

- COM 2014/C 198/01 – Communication from the Commission – Framework for state aid for research and development and innovation (OJ C 198, 27 June 2014, pp. 1-29 including the new General Block Exemption Regulation (GBER)) – are recommended as a successfully acting practice in the EU when assigning to innovation infrastructure organisations (organisations delivering the innovation advisory and support services) the right to be subject to special regulation on state aid for research, development and innovation.
- **Framework for Skills for Evidence-Informed Policy-Making** (JRC, 2017) – mapping of skills essential for researchers and policymakers active in the science-policy interface. The professional development framework consists of eight skills clusters with each cluster addressing a specific part of the collective skillset required to increase the impact of research evidence on policymaking.
- **Bridging The Digital Innovation Divide: A toolkit for strengthening ICT centric ecosystems** (ITU, 2017) – This toolkit reflects the framework, tools and methodology ITU has developed to analyse information and communications technology (ICT)-centric innovation ecosystems. This information is being shared in order to enable ecosystem stakeholders to analyse their ecosystems, including mapping the stakeholders, reviewing their needs, setting agendas, and developing policy and project recommendations. These processes are provided both as individual tools to allow for single steps to be undertaken, and in the context of a full country review, to allow for a more comprehensive analysis.

- A Practitioner's Guide to Innovation Policy: Instruments to Build Firm Capabilities and Accelerate Technological Catch-Up in Developing Countries (World Bank, 2020) – This guide aims to reduce the large information gap about what works in developing countries to improve the design and implementation of innovation policy instruments and increase their effectiveness. The document concentrates on instruments that target firm-level innovation and that focus on the firm as the prominent target group. This guide examines the different types of instruments available and defines them using a typology that combines the mechanisms of intervention in public policy with innovation policy objectives. In total, the guide includes 21 instruments grouped in 10 sets of related instruments.

❖ Potential counterparts in Azerbaijan:

- Ministry of Transport, Communications and High Technologies;
- Ministry of Taxes;
- Agency of the Republic of Azerbaijan for Developing Small and Medium Enterprise;
- Innovation agency.

7 Specific organisational forms

7.1 Innovation clusters

Status

Definition

The Law of the Republic of Azerbaijan 'On Science', approved on 14.06.2016, provides a definition of "science-education and innovation complex (cluster) - an innovation structure that combines fundamental and applied research, experimental design, education and entrepreneurship in order to carry out the production and sale of science-intensive products". This definition of a cluster is unclear because it can also imply realisation within one legal entity of all the stages of the scientific research and innovation, which does not correspond to both classical and modern understanding of an innovative cluster. It does not emphasize the distributed nature of the cluster including SMEs, universities and R&D institutions as well as importance of vertical, horizontal and informal linkages among them as well as the role of a cluster forming organization.

In a number of further policy documents, the word 'cluster' is used in a context of innovation economy development but without specification of a definition.

In the Development Concept of Azerbaijan - 2020, development of the economy on the basis of clusters is seen as a relevant framework for building a "complex consisting of oil and gas refineries and petrochemical factories", which will help to "establish a production chain up to the manufacture of the end product, increase the competitiveness of finished products and expand export".

In the State Program on the development of industry in the Republic of Azerbaijan in 2015-2020, clusters are considered as equivalent to high technology parks and industrial districts. This Program refers to creation of industrial clusters as one of the measures and best practices to promote innovations, and has foreseen the construction works, formation of infrastructure, the establishment and the organisation of the functioning in 2015-2018 of High Technologies Park, Sumgait Chemical Industrial Park, Balakhani Industrial Park, Industrial Park in Mingachevir. Additionally, the initiative by Azerbaijan National Academy of Sciences on establishing High Technology Park is considered as a step towards the creation of innovative cluster, which aims to enhance academy-industry partnership for the implementation of science and technology policy.

On 1 January 2019, the following definitions related to clusters came into force in the amended Tax Code of the Republic of Azerbaijan (last amended on 8 May 2020):

- "**SME cluster company** – a legal entity that meets the criteria established by the authority (structure) defined by the relevant executive authority and supports the development of micro, small and medium-sized entrepreneurship, to which, in agreement with the authority (structure) identified by the relevant executive authority, a certificate of an SME cluster company was issued";
- "**SME cluster member** – a legal entity or an individual who has entered into an agreement with a SME cluster for activities in the SME cluster, supporting the development of micro, small and medium-sized enterprises, to which the body (structure) identified by the relevant executive authority issued a certificate of participation in the SME cluster";
- "**Start-up** – an entrepreneurial activity that meets the criteria established by the body (structure) defined by the relevant executive body, supports the development of micro, small and medium-sized

enterprises, and is carried out on the basis of an innovative initiative by persons to whom a Start-up certificate was issued by the body (structure) determined by the relevant executive body".

These definitions have been introduced together the **support incentives for SMEs** that are **certified as cluster companies**. In particular, the Tax Code envisages that part of the income received by an individual entrepreneur, who is a member of the SME cluster, for goods (works, services), contracted with the SME cluster company, and directed to capital investments, is exempt from the income tax (Art. 102.1.32). The profit of the SME cluster company is not taxed for 7 years from the date of registration of the SME cluster company in the Register of cluster companies (Art. 106.1.21). Part of the profit received by a legal entity participating in the SME cluster, on goods (works, services) contracted with the SME cluster company and directed to the capital investments is not taxed for 7 years (Art. 106.1.22). VAT is not charged from import by SME cluster company of equipment and constructions for manufacturing or processing purposes for 7 years from the date of registration of the SME cluster company in the Register of cluster companies (Art. 164.1.40). SME cluster companies are exempt from property tax payments for property used in cluster activities of the SME as well as from payment of land tax for land, being in their possession or use, for a period of 7 years with the date of their registration in the Register of MSP cluster companies (Art. 199.15; Art.207.6).

The Board of the Ministry of Taxes of Azerbaijan has approved the criteria for the SME cluster company:

- a private legal entity whose charter spells out the obligation to coordinate important decisions with the SME Development Agency (KOBIA);
- a legal entity planning to become an SME cluster company should, under the SME cluster project, have transactions with ten different micro, small and medium-sized enterprises that are not related to each other, and the raw materials for goods manufactured within the cluster should be by 50% provided by cluster members;
- a cluster company needs to carry out its activities in the field of creating new competitive products that are not manufactured in Azerbaijan, or products for which 50% of consumption is currently imported to the country (import-substitution policy), as well as in the accommodation sector (hotels, motels, camping, etc.).

The criteria also determine the minimum amount of investment for the project that will be implemented by the SME cluster company depending on the city (i.e. in Baku it equals to €2,732,546).

Such entrance criteria are restricting start-ups from using the beneficial taxation regime by SME cluster membership. They need to be part of a consortium of the established SMEs with big investment projects. Additional tax incentives, that might be relevant for start-ups, are provided via the 'Start-up Certificate'. The start-up is defined as "an entrepreneurial activity that meets the criteria established by the body (structure) defined by the relevant executive body, that supports the development of micro, small and medium-sized enterprises, and is carried out on the basis of an innovative initiative by persons whose body (structure) is determined by the relevant executive body, and to whom Startup certificate is issued" (Tax Code of the Republic of Azerbaijan, Art.13.2.80). Startups Certificate is issued by the Agency of the Republic of Azerbaijan for Developing Small and Medium Enterprise (criteria for start-up certificate are established by Ministry of Taxes). Revenues from the innovation activities of start-ups, which are registered as the subject of micro or small business or functioning as individual entrepreneurs, from the date of receipt of the Startup certificate, are exempt from personal income tax for 3 years. However, due to the fact that the process of obtaining this certificate it is very complex (it takes 9 government agencies to approve the certificate), there is no single company that was able to receive this certificate for the past 1,5 years.

To conclude, on the one hand, there are significant incentives introduced for certified SME cluster companies. On the other hand, the certification criteria are rather rigid and more suited to medium-sized companies than to start-ups; complex certification process of start-ups restricts their participation in the cluster projects.

In the acting legislation in Azerbaijan, there is *lack of definitions of an 'innovation cluster' and 'cluster support organisation'*, which leads to unnecessary barriers both at the level of innovation policy builders and implementers.

There is a *reduction of definitions of a cluster company and a start-up*, that are defined as those to which a certificate was issued by an authorised body. Herewith, the criteria for issuing a certificate of an SME cluster company are very rigid and do not promote the collaboration of SMEs and knowledge centres that cannot correspond to such criteria.

There is also *lack of definitions of a 'cluster project' or a 'cluster initiative'*. Thus, SME cluster (though not specially defined) is perceived to be a form of economic cooperation of SMEs for a certain large-scale project with certain criteria. Herewith, many opportunities of innovation-related cooperation within innovation clusters that can be enabled by the innovation cluster support organisation, are not envisaged in the existing legal

framework: for example, the possibility of cooperation of SMEs beyond this project, the possibility of SMEs cooperation seen by them as a long-term cooperation without minimal borders of total investments, the possibility of SMEs to cooperate with a large enterprise and knowledge centres (universities, R&D centres), the possibilities of cooperating organisations to establish the special innovation support centres within their network. This reflects the general situation of the insufficient development of horizontal and vertical cooperation between organisations that are actors of the ICT ecosystem in Azerbaijan.

Hence, wide economic effects from vertical and horizontal collaboration of SMEs with knowledge centres cannot be supported in a framework of current innovation policy.

Mapping

An example of the *evolving innovation cluster* is Azerbaijan Innovations Export Consortium (AZINNEX), which is jointly established by leading internationally recognised companies of Azerbaijan in ICT innovations field. AZINNEX is a recent actor of the innovation ecosystem that targets on export of purely national innovative, competitive and high-quality IT products and services from Azerbaijan to global markets. AZINNEX's products range from e-health to e-government. It helps in identification of gaps in Azerbaijan and guide the local ICT companies to address these gaps by providing competitive products and services.

Several existing structures could be considered as potential *innovation cluster support organisations* in Azerbaijan, around which the genuine innovation clusters can evolve.

For instance, the Experimental Industrial Plant of ANAS is the platform where innovative and knowledge-based R&D and production take place. It is also considered as one kind of knowledge hub, while at the same time ANAS is building a High Technologies Park (HTP), which is expected to perform the functions of the innovation cluster organisation. Its goals are:

- to encourage technology innovation, research and its commercialisation in Azerbaijan;
- to diminish economic dependence on oil and gas, whereas increase the influence of science and innovation;
- to enhance technology-based thinking in the context of trending innovative products;
- to promote the selling potential of inventions by its residents and start-ups;
- to exchange the experience of scientific and technological innovation with other countries for the aim of ecosystem development in the country.

Similar framework for innovative clusters is expected to be provided by the Pirallahi High Technologies Park and Mingachevir High Technologies Park, being created by the Innovation Agency under the Ministry of Transport, Communications and High Technologies. These high-tech parks have objectives to enhance the sustainable development of ICT sector, facilitate the expansion of ICT activities based on modern science and education system, implementation of scientific research, and establishment of new technology infrastructure.

The accelerator Innoland of the Innovation Centre under the State Agency for Public Service and Social Innovations under the President of the Republic of Azerbaijan, provides technical support for IT in different sectors of industry ranging from finance to education both in public and private sector.

The Development Centres of SME Development Agency (SMEDA) can be seen as (potential) innovative cluster organisations, as they are planned to coordinate the interaction of SMEs with start-ups, scientific and educational centres, with clusters, industrial and technological parks, with investment and financial entities in a single space.

Table 2. Mapping (potential) innovation cluster support organisations

Organisation name	Type of self-identification	Relevant functions performed/services delivered	Scope of organisation's work as a cluster organisation
Innovation Agency	Legal entity that actually performs the functions of the innovation cluster organisation and is perceived as such by other stakeholders.	• enhancing the sustainable development of ICT sector; • expansion of ICT activities based on modern science and education system; • implementation of scientific research and establishment of new technology infrastructure;	Establish a number of agencies: • Pirallahi YTP; • Mingachevir YTP; • Business incubation and acceleration centre; • Innovation house;

Organisation name	Type of self-identification	Relevant functions performed/services delivered	Scope of organisation's work as a cluster organisation
		• high technology parks, Business Incubation Centre, Innovation House, and Laboratories.	• laboratories.
The Innovations Centre, under the State Agency for Public Service and Social Innovations under the President of the Republic of Azerbaijan.	Legal entity that actually performs the functions of the innovation cluster organisation and is perceived as such by other stakeholders.	• technical support for IT in different sectors of industry ranging from finance to education both in public and private sector; • Innovation centre, IT services, Innoland (accelerator); • Azerbaijan Innovation Export Consortium (AZINNEX) as a tool for entrepreneurship development.	Main bodies: • Innovation centre; • IT services; • INNOLAND; • ASAN Kommunal; • AZINNEX; • ASAN Learning.
Experimental Industrial Plant of ANAS	Legal entity that actually performs the functions of the innovation cluster organisation and is perceived as such by other stakeholders.	Platform where innovative and knowledge-based R&D and production take place.	Nine partners
High Technologies Park (HTP) by ANAS	Non-legal entity that actually performs the functions of the innovation cluster organisation and is perceived as such by other stakeholders.	• encouraging innovation, research and commercialisation of technology; • increasing the potential of science and innovation; • technology-based thinking for leading innovative products; • promoting potential-selling inventions by its residents and start-ups; • exchanging scientific and technological innovation experience with other countries.	Ten start-ups as its residents.

Source: Data collected by EU4Digital Facility

There are very few references to projects supported by existing ecosystem organisations, and SMEs whose collaboration is facilitated. The published cases of SMEs clusters (in case of innovative clusters empowered by knowledge centres) are lacking. Thus, the mapped ecosystem organisations rather can be considered the proto-forms, or potential cluster organisations.

None of the existing organisations are registered at European Cluster Collaboration Platform or any other international ecosystem mapping tool.

Gaps

The identified gaps that can be addressed using the EU best practice include:

- In the acting legislation, there is lack of definitions of an innovation cluster and cluster support organisation, which leads to unnecessary barriers both at the level of innovation policy builders and implementers.
- There is a reduction of definitions of a cluster company and a start-up, that are defined as those to which a certificate was issued by an authorised body. Herewith, the criteria for issuing a certificate of an SME cluster company are very rigid and do not promote the collaboration of SMEs and knowledge centres that cannot correspond to such criteria.
- There is also lack of definitions of a cluster project or a cluster initiative. Thus, SME cluster (though not specially defined) is perceived to be a form of economic cooperation of SMEs for a certain large-scale project with certain criteria. Herewith, the possibility of cooperation of SMEs beyond this project, the possibility of SMEs cooperation seen by them as a long-term cooperation without minimal borders of total investments, the possibility of SMEs to cooperate with a large enterprise and knowledge centres

(universities, R&D centres), the possibilities of cooperating organisations to establish the special innovation support centres within their network are not envisaged.

- Hence, wide economic effects from vertical and horizontal collaboration of SMEs with knowledge centres are not supported in a framework of current innovation policy.
- There are very few references to projects supported by existing ecosystem organisations, and SMEs whose collaboration is facilitated. The published cases of SMEs clusters (in case of innovative clusters empowered by knowledge centres) are lacking. Thus, the mapped ecosystem organisations rather can be considered the proto-forms, or potential cluster organisations.
- None of the existing organisations are registered at European Cluster Collaboration Platform or any other international ecosystem mapping tool.

Recommendations

❖ What?

1. Revise the vision of an innovative cluster composition, the role of cluster organisations and state aid to innovative clusters:
    a. The definition of a cluster, cluster company and cluster member and criteria of being a cluster should be softened and unlock the potential of such form of cooperation (combining multiple vertical and horizontal formal agreements with informal linkages and networking) to wider stakeholders.
    b. Registration of clusters themselves should be abolished – the organisations and businesses across the country should have right to establish their cluster collaborations without prior registration.
    c. Registration may be kept only for cluster projects and initiatives that receive the state aid, and even in this case, the registration procedure rather serves the purposes of keeping a database of the public funding expenditures, and should follow automatically after the decision of state funds allocation has been made, without additional efforts from the applicants.
    d. For the rest of cluster projects and initiatives, the self-mapping opportunity on a dedicated online resource should be offered, for the purposes of making partner organisations visible to potential other partners within the country or across the country borders – only such voluntary form of “registration” should be proposed.
    e. While the approach to criteria of a cluster project may be further used in case of cluster projects or cluster initiatives co-funded by the state budget, such criteria should be withdrawn in case of joint projects funded by companies themselves. The cluster members should be considered as independent entities. The definition of cluster projects and initiatives should acknowledge that they may also include educational and R&D organisations, NGOs, physical entities, and be undertaken as a consortium, with a certain organisation performing as a lead partner.
    f. R&D agreements and technology transfer agreements concluded within innovative cluster projects and consortia with an innovative project should be exempted from anti-monopolistic regulation (should not be treated as a regular monopolistic cartel or syndicate in the traditional market) – otherwise it will block innovations. Relevant EU practice is contained in the Commission Regulation (EU) No 1217/2010 and Commission Regulation (EU) No 316/2014.

In particular, consider the following vision for the future improvement of policy structure:

Figure 1. Improvement of policy structure

Clusters - *groups of firms, related economic actors, and institutions* that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills. Clusters should be considered as *regional ecosystems of related Industries and competences* featuring a broad array of inter-industry interdependencies.

Cluster members are *independent* parties (such as *innovative start-ups, small, medium and large enterprises, as well as research and knowledge dissemination organisations, non-for-profit organisations and other related economic actors*) designed to stimulate innovative activity by promoting sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organisations in the cluster

Cluster projects are the defined set of activities, budget and roles, in which preparation and implementation the cluster members are involved, combining their resources, economic effects.

Many cluster projects are run without state aid if they have market value

Cluster organisations are the *legal entities* that support the strengthening of collaboration, networking and learning in innovation clusters and act as innovation support providers by providing or channeling specialised and customised business support services to stimulate innovation activities, especially in SMEs.[6] They are usually the actors that facilitate strategic partnering across clusters

Cluster initiatives are *organised efforts* to support the competitiveness of a cluster and thus consist of practical actions related to the capacity of these clusters to self-organise and increasingly to pro-actively shape the future of the cluster. They usually follow a bottom-up approach, are implemented through a Competitive process, and are often managed by specialised SME intermediaries, such as cluster organisations. Cluster initiatives not only connect firms, they organise joint actions among them and provide services to firms in the cluster.

Can be performed in public-private partnership

Cluster policies are an expression of political commitment, composed of a set of specific government policy interventions that aim to strengthen existing clusters and/or facilitate the emergence of new ones.
Cluster policies are a framework policy that opens the way for the bottom-up dynamics seen in clusters and cluster initiatives.
Its goal is not to create or back winners.
Instead, **modern cluster policies** aim to put in place a favourable business ecosystem for innovation and entrepreneurship in which new winners can emerge and thus support the development of **new industrial value chains** and **'emerging industries'.**

State aid for innovation clusters can be granted if its aim is to tackle market failures linked to coordination problems hampering the development of clusters or limiting the interaction and knowledge flow within clusters. State aid can either support investment in open and shared infrastructure for innovation clusters, or support the operation of clusters, so that collaboration, networking and learning is strengthened

Source: Developed based on definitions from Smart Guide to Cluster Policy

2. Consider the EU definitions set in the EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01) in Section 1.3(s) for **innovation clusters** as "structures or organised groups of independent parties (such as innovative start-ups, small, medium and large enterprises, as well as research and knowledge dissemination organisations, non-for-profit organisations and other related economic actors) designed to stimulate innovative activity by promoting sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organisations in the cluster".
3. Support innovative cluster organisations as innovation infrastructure organisations and allow them to use the state aid. The EU practice of state aid for innovative clusters (the EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01) includes:
    a. investment aid to cover several costs in tangible and intangible assets;
    b. operating aid to cover personnel and administrative costs, which also includes overhead costs, in association with:
        i. facilitation of collaboration, information exchange and channelling support of specialised and personalised business support services to the clusters;
        ii. support of the cluster in its marketing to increase active partaking of new undertakings or organisations, as well as its visibility;
        iii. effective management of facilities of the cluster;
        iv. organising training programmes, workshops and conferences for supporting knowledge exchange, networking and transnational collaboration.
    c. increasing the intensity of aid for innovative clusters in the EU ranges from 50% to 65% contingent to the region and size of supported businesses, including large enterprises.
4. Increase engagement in facilitating vertical (subcontracting) and horizontal (complementing resources for joint projects) collaboration of different types of ecosystem players in the country ((for example, Innovation Agency, Accelerators – Innoland, SUP, Barama, and other), as a first step in identification and development of clusters. Such facilitation can be organised in various forms: conferences for targeted audience and topics; working groups for work on issues of shared concern; pilot projects for testing the proposed tools, etc.

5. Register the mapped by EU4Digital Facility and emerging clusters in Azerbaijan at the EU platforms and establish links with selected clusters organisations. Register Azerbaijani cluster organisations and clusters supported by them at the EU platforms, identify the EU cluster organisations with relevant specialisations, establish direct contacts with them and involve actively into matchmaking events, TWINNING, joint projects of partners.

❖ Why?

Related to recommendations 1-2 "Definition of innovative clusters and innovative cluster organisations". Extending the vision of innovative clusters is important to take into account those "constellations" (partnerships) of enterprises and knowledge organisations which organically emerge in the economic life of the country or have the potential to emerge and bring joint ventures. Important is to accept, that cluster linkages act as complementary – they link organisations with a different place in the economic system, which together constitute a supply chain and support services.

There is no need for a legal definition of the cluster organisation; rather there is a need for a definition of activities targeted at development of the innovation cluster, which can be supported by the state aid.

As the new types of such organisations are emerging dynamically (for example, accelerator, innovation hubs, competence centres, fab labs), it makes no legal sense to introduce the legal definition for each of them. Rather, in EU legislation, the following definitions are used to distinguish activities that are covered by the state aid (EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01):

- '**innovation support services**' – the provision of office space, data banks, libraries, market research, laboratories, quality labelling, testing and certification for the purpose of developing more effective products, processes or services;
- '**innovation advisory services**' – consultancy, assistance and training in the fields of knowledge transfer, acquisition, protection and exploitation of intangible assets, use of standards and regulations embedding them.

Related to recommendation 3 "Support of innovative cluster organisations as innovation infrastructure organisations". Under the new EU framework, **state aid for innovation clusters** can be granted if it "aims at tackling market failures linked with coordination problems hampering the development of clusters or limiting the interactions and knowledge flows within and between clusters. State aid could contribute to resolving this problem, first by supporting the investment in open and shared infrastructures for innovation clusters, and second by supporting, for no longer than ten years, the operation of clusters for the enhancement of collaboration, networking and learning" (Communication from the Commission — Framework for State aid for research and development and innovation, OJ C 198, 27.06.2014, pp. 1-29).

Related to recommendation 4 "Activities facilitating vertical and horizontal collaboration in the country". These activities will allow the existing ecosystem actors to observe and identify the existing networks, to reveal the specific constraints for development of the networks into projects/joint ventures and assist them on this way by facilitating access to knowledge and resources, mediation in case of conflicts of interest, coordination of efforts (the mission of cluster organisations). Only actual performance of such activities will transform the existing organisations into genuine innovative cluster organisations – not an official (self-)naming.

Related to recommendation 5 "Map existing and emerging clusters in the EU and establish links with selected clusters organisations". This is necessary to enable the learning by cluster organisations on how to support innovative clusters. This is necessary to enable the targeted matchmaking of businesses and nodes of knowledge. For instance, Azerbaijani oil and gas clusters would be able to raise the interest of EU businesses, investors and knowledge centres and lead to joint EU-funded projects.

❖ Relevant EU organisations (non-exhaustive list):

- European Cluster Collaboration Platform (ECCP) is the central EU platform for cluster organisations and initiatives, including tools and information on key European initiatives, actions and events for clusters and their SMEs. It is open for registration of EaP cluster organisations.
- The European Cluster Observatory – contains information, mapping tools and analysis of the EU clusters and cluster policy.
- European Observatory for Clusters and Industrial Change provides statistical and trend analysis of clusters (including value chains, gazelles, start-ups and scale-ups); identifies favourable framework conditions and bottlenecks for the development of clusters and industrial modernisation, provides customised policy advice to 12 selected regions with a specific problem or societal challenge, so they can become in the future a model for other regions with the same concerns, provides advisory support

services to European Strategic Cluster Partnerships and supports mutual cluster policy learning and transnational cooperation.

- European Stress Test for Cluster Policy is a self-assessment tool that offers a preliminary analysis of whether cluster policies are geared towards improving framework conditions and supporting cross-sectoral cluster collaboration with a view to facilitating structural change and the development of emerging industries.
- European Strategic Cluster Partnerships (ESCPs) are launched by the European Commission through financial incentives (under COSME programme) to encourage clusters from Europe to intensify collaboration across regions and sectors.
- The European Cluster Management Excellence programme run by European Secretariat for Cluster Analysis (ESCA), that has developed methodologies and tools to support cluster organisations to improve their management capacities and capabilities, through benchmarking and quality labelling of cluster management organisations worldwide.

❖ Potential counterparts in Azerbaijan:

- Ministry of Economy;
- Ministry of Transport, Communications and High Technologies;
- Innovation Agency;
- Innovations Centre;
- Experimental Industrial Plant of ANAS;
- High Technologies Park (HTP) by ANAS.

7.2 Accelerators

Status

Definition

Definition of accelerators is not established in policy documents or regulations in Azerbaijan.

Drawing from the actual activities of accelerators in Azerbaijan, the respondents of the EU4Digital analysis develop a definition for an accelerator as a platform for start-ups, business ventures to grow through the support in terms of working space, access to finance, mentorship, and networking throughout the conception up to the development of workable demo product (Minimum Viable Product).

Mapping

The following organisations acting as accelerators have been identified by EU4Digital Facility.

Table 3. Mapping accelerators in Azerbaijan

Organisation name	Description	Functions performed/services delivered
Baku Business Factory	Platform for young people to realise their ideas, get mentorship assistance and financial support, trainings (while it has not been specified which kind of trainings), and working space.	• networking; • events; • office-space; • competition; • education; • mentoring; • financing.
Barama innovation and entrepreneurship centre	The start-ups in the basis of Barama can get IT, legal, financial, marketing and business development consultations from corporate sector, such as Azercell, which is the leading telecom operator in Azerbaijan.	• pre-acceleration; • pre-incubation; • mentorship; • access to finance; • networking;

Organisation name	Description	Functions performed/services delivered
		• coworking space.
Business Incubation and Acceleration Centre	Acceleration programme covers 3-months period and is supported by 30 local and international mentors. Incubation programmes last for three-six months and include mentorship, networking and office space. Its IT training and education programme mainly cover bootcamp training, such as Full Stack Python coding course, through which students are taught python programming language and other web technologies	• incubation; • acceleration; • co-working and virtual residency; • IT training and education centre.
SUP	Intensive accelerator programme helps start-ups to learn different practices applied in international environment, while the programme is finalised with Demo Day, where start-ups can meet potential investors. SUP provides local start-ups with access to capital, mentorship, customer acquisition and product development	• incubation; • acceleration; • co-working and virtual residency; • IT training and education.
INNOLAND	INNOLAND Incubation and Acceleration Centre was established to develop the private sector, promote innovation and expand the start-up movement in Azerbaijan and abroad. INNOLAND consists of Coworking, Incubation, Acceleration and IT Training Centre. The Coworking Centre is a profitable and multi-faceted workplace for start-ups, programmers, and those working in a single or small team in the field of innovation.	• incubation; • acceleration; • co-working and virtual residency; • mentorship; • IT training and education centre
Youth Inc – Entrepreneurship Program	Youth Inc. Started is a business support programme supported by the Ministry of Youth and Sport of the Republic of Azerbaijan, Coca-Cola Company and the "Debate in Civil Society" Public Union (DVC). The purpose of the program is development of small and medium enterprises in Azerbaijan, increase of awareness in traditional and innovative entrepreneurship. Therefore, Youth Inc. directs its time, experience, appropriate resources on increase of financial literacy and wider use of disruptive technologies in our life. Also, Youth Inc. is awarded by The Ministry of Youth and Sport of Republic Azerbaijan in 2017 and by Young Entrepreneurs of the European Union (JEUNE) as 'The best initiative in 2019 for Young Entrepreneurs Supporting' in 2019.	• team fishing; • mentorship; • co-working & Incubation; • networking; • access to finance. • entrepreneurship education

Source: Data collected by EU4Digital Facility

Gaps

The identified gaps that can be addressed using EU best practice include:

- Despite the palette of services proposed on the websites, acceleration and incubation centres in Azerbaijan mainly operate as coworking spaces, while very few of them guide start-ups through all stages from ideation to access-to-market, including access to finance, access to talent and training. They lack effective training programmes to increase the level of professionalism of start-ups.
- None of the mapped organisations performing the functions of accelerators are registered at European Cluster Collaboration Platform or other major international ecosystem mapping tools, thus the potential of linkages with venture capital is underexploited. Also, the start-ups that usually look for funding on international platforms may be not informed about existence of accelerators within their own country.

Recommendations

❖ What?

1. While there is no need for a legal definition of accelerators, it is recommended that the modern definition is used in non-binding policy documents, for the purposes of awareness-raising, promotion and

"authorising" such centres to emerge and self-identify themselves in the country. The following definition may be considered: accelerators are "fixed-term, cohort-based programmes that include seed investment, connections, sales, mentorship, educational components, and culminate in a public pitch event or demo day to accelerate growth"[1].

2. Consider accelerators as part of the innovation infrastructure and extend to them the action of the regulation on the relevant state aid (relevant regulation is EU 'Framework for State aid for research and development and innovation', Commission Communication 2014/C 198/01), if they perform some of the following types of activities:
    a. '**innovation support services**' – the provision of office space, data banks, libraries, market research, laboratories, quality labelling, testing and certification for the purpose of developing more effective products, processes or services;
    b. '**innovation advisory services**' – consultancy, assistance and training in the fields of knowledge transfer, acquisition, protection and exploitation of intangible assets, use of standards and regulations embedding them.
3. For policymakers – negotiate joining the EIC Accelerator Pilot, part of the Enhanced European Innovation Council pilot.
4. Map existing and emerging accelerators in Azerbaijan on multiple EU and world platforms, where most of start-ups look for funding (see the list in Annex 2. Top EU and world platforms for digital innovation start-ups and funding). Use these platforms to establish links with other accelerators and VC funds for experience exchange and integration into a global innovations pipeline.
5. Develop the "dual mentorship" programme for deeptech start-ups by twinning with leading accelerators, e.g. with EIT Digital Accelerator, to increase the chances of these start-ups integration in the EU and globally.
6. Build the capacity of individual mentors and business angels (training and networking) as a main tool for consolidation and increase the success rate of Azerbaijani accelerators, as these work directly with business angels, and the level of expertise of mentors directly impacts the success of start-ups. This activity can benefit from the following opportunities:
    a. the Guide for emerging markets (WB, 2014) provides basic instructions on BA community-building, also involving diaspora;
    b. a range of training opportunities for BAs identified by EU4Digital Facility;
    c. Best Business Angels in the country might consider becoming Accredited & Qualified Global Mentors (AQGM) of World Business Angel Investment Forum. Further, requests for a mentorship by WBAF Mentors can be spread among EaP start-ups;
    d. the national translations of the draft shareholders agreements for business angels can be prepared in partnership with local lawyers (developed through open call for interest and contest) and used by the business angels association as services for local business angels;
    e. building communities with local and international lawyers and bridging BAs with them could become an essential service from business angels association;
    f. becoming the partner of an international 'ESIL – Local leaders' label would mean being a recognised selected organisation which develops the seed investment ecosystem.

❖ Why?

Accelerators can only be successful and lead their mentored companies to success if they are the part of the wide market saturated with funding opportunities at further stages of business development. In case of small domestic markets as in the Eastern Partner region, Eastern Partner accelerators and their partner business angels need to be integrated with the wider networks of similar actors (for sharing experience and driving bigger projects up to revenues and exit) and venture capital funds (up to IPO). In today's digital world, such integration starts by being mapped and visible on digital platforms and should be maintained by establishment of personal contacts.

Support of accelerators by introduction of their naming into official policy documents and extension to them of the state aid for innovation infrastructure organisations is needed because the innovation ecosystem develops through specialisation. New organisational forms emerge in the global innovation ecosystem because their structure and functions fit better to provide necessary services (fulfil necessary functions). If they help to

1 Cohen, Susan. 'What Do Accelerators Do? Insights from Incubators and Angels'. Innovations. 8 (3–4): 19-25. doi:10.1162/inov_a_00184. Retrieved 6 March 2014.

overcome the market failures, they need to be acknowledged as the equal actors of the innovation infrastructure, as more traditional forms like technoparks and incubators have once been acknowledged to be its members eligible for state support.

❖ Relevant EU organisations (non-exhaustive list):

- List of the EU platforms (Annex 2. Top EU and world platforms for digital innovation start-ups and funding) – for registration.
- Accelerator assembly is an industry-led network, created by the European Commission, that connects accelerators, entrepreneurs and policy makers.
- Start-up Europe Partnership Investors forum provides investors and accelerators with business opportunities for their portfolio companies (POC, license, procurement contracts with large corporations), strategic opportunities for their portfolio companies (exit & co-investment opportunities), facilitates dialogue between investors from all over Europe and the European Commission, European Investment Fund, and European Investment Bank.
- Accelerator at EIT Digital provides tailor-made growth support for European tech scale-ups in securing international customers; raising Series A-B funding; joining the leading European innovation ecosystem; scaling up internationally, via its 12 months programme of international business growth services.
- Training opportunities for Business Angels and accelerators *(non-exhaustive list)*:
    - Altfinator. This course introduces the key models and approaches related to raising finance from sources alternative to bank lending (crowdfunding, invoice trading, venture capital, business angels, fintech platforms).
    - Venture University. Admission is open to experienced professionals, angel investors, family offices, new fund managers, founders and entrepreneurs, current and recent undergraduates and graduate students, with a preference for those that have evidence of extraordinary abilities and a track record of exceptional achievement.
    - EBAN Knowledge Centre. Since its inception, EBAN always dedicated its efforts to providing first class documentations, resources, statistics, and many more papers to its members. The robustness and the credibility of these documents were built on several years of experience and expertise in the early stage investing market. Thanks to this, EBAN could assemble a combination of the most important tools needed when it comes to investing, informing, coaching or training about Business Angels, start-ups, SMEs and the early-stage investors.
    - World Business Angel Investment Forum Business School. As a global organisation, the World Business Angels Investment Forum is bringing together key players of the equity market to discuss the benefits of and the challenges to the angel investment community's achieving successful growth for their businesses and to discuss what more can be done to connect the early-stage market ecosystem.
    - WBAF Business School helps investors to study the best practices of negotiating deals for early-stage investment. It offers a variety of training programmes, educational webinars and certification programmes through 48 international faculty members from 26 countries with a successful international entrepreneurial background. WBAF Business School offers Certification of Qualifications 'QBAC+ Angel Investor Course & Bootcamp. It also delivers the world's only proficiency test for angel investors 'Proficiency Test for Angel Investors'.

❖ Potential counterpart(s) in Azerbaijan:

- Baku Business Factory;
- SUP;
- Barama innovation and entrepreneurship centre;
- INNOLAND;
- Youth Inc – Entrepreneurship Programme.

7.3 Competence centres

Status

Definition

There is no common legal definition for a competence centre in Azerbaijan.

However, this term is used in practice (i.e. UNDP aims to "strengthen the operational capacities of the Ganja State Vocational Education Centre on Industry and Technology to convert it into a modern Regional VET Competence Centre on Industry and Technology meeting labour needs of the industry" (UNDP, 2017)).

Mapping

Several organisations can be referred to as centres of competence in Azerbaijan relevant to digital innovations.

Table 4. Mapping competence centres on digital innovations in Azerbaijan

Organisation name	Relevant functions performed /services delivered
Oxuyuruq.biz	• platform for educational multimedia tools for secondary school; • interactive games, visualisations, video-materials in seven languages; • interactive chemical laboratories and other; • educational tools for children with special needs are also available.
Small and Medium Business Development Agency Development Centres	• enhance knowledge and skills of entrepreneurs with trainings, consultations, information, appropriate support, services and opportunities to participate in international exchange programmes; • support for business structures' innovative activities and successful entrepreneurs with business ideas and ambition to launch start-ups; • assistance to entrepreneurs intending to appropriate new technologies and introduce inventions; • promotion of a widespread use of e-services by entrepreneurs; • development of proposals aimed at enhancing the practice of attracting regional investments; • improving social environment to ensure promotion of entrepreneurship.
Social Innovations Lab (SIL)	• founded with an ambition of building first unicorn start-up born out of Azerbaijan by 2025; • main emphasis on the development of entrepreneurship in Azerbaijan; • startupazerbaijan.az online platform as a directory for entrepreneurs on Azerbaijan Start-up ecosystem regarding tax, incorporation, patents, licenses, as well as incubators, tech schools, co-working spaces, competitions.
Step IT Academy	• international educational platform for children and adults; • 57000 students; 95 branches; 2700 teachers; 125000 graduates across 20 countries.

Source: Data collected by EU4Digital Facility

Besides that, EU and UNDP launched first industrial workshop in Ganja, as part of the EU-funded project for the establishment of Regional Industrial Vocational Education and Training (VET) Competence Centre (planned in 2020). The overall objective is to modernise the vocational education and training system in Azerbaijan, enhance quality, relevance, equality, and access in line with European standards and practices. One of the noticeable expected results is the reinforcement of partnership with private sector. This kind of VET Competence Centre can be also applied to the ICT innovation sector.

Besides, a number of scientific research institutes exist in Azerbaijan, possessing specific thematic competence that can be used by start-ups applying digital technologies in traditional industries:

- Azerbaijan National Academy of Sciences;
- Azerbaijan National Academy of Sciences of History Institute;
- Azerbaijan National Aerospace Agency;
- Centre for Economic and Social Development;
- Centre for Strategic Studies under the President of Azerbaijan;
- Economic Research Centre;
- Institute of Caucasus Studies;
- Institute of Manuscripts of Azerbaijan;
- Institute of Physics Azerbaijan National Academy of Sciences;

- Institute of Radiation Problems.

Other concentrations of research competence can be found among the universities:

- Academy of Public Administration (Azerbaijan);
- Azerbaijan Medical University;
- Azerbaijan State Agricultural Academy;
- Azerbaijan State University of Culture and Arts;
- Azerbaijan State University of Economics;
- Azerbaijan State University of Oil and Industry; Azerbaijan Technical University;
- Azerbaijan University of Architecture and Construction;
- Azerbaijan University of Languages;
- Baku Academy of Music;
- Baku Slavic University;
- Baku State University;
- Khazar University;
- Lankaran State University;
- Nakhchivan State University;
- Western Caspian University.

Within ANAS structure, the Institute of Information Technology is the centre specialised on digital technologies with the following research directions:

- information society;
- information culture;
- internet governance;
- information security;
- application of the Azerbaijani language in virtual environment;
- e-government;
- e-science;
- biometric technologies;
- information and knowledge-based economy;
- multi-aspect problems of Internet science formation;
- ecological and socio-economic problems of e-wastes;
- scientometrics;
- high performance computing;
- social network analytics;
- internet-geography;
- information-warfare;
- terminological informatics;
- e-health;
- big data analysis;
- artificial intelligence and socioinformation technologies.

Gaps

The existing centres with deep industries-related expertise are not mapped on one resource with inventorisation of their competence areas, which could increase their visibility to the start-ups wishing to launch a digital innovation product/service applicable in the traditional industries. This provokes limited usage of domestic expertise and market strengths by digital start-ups.

Recommendations

❖ What?

1. Perform an internal “inventorisation” of the existing competence centres in Azerbaijan across diverse thematical fields (the list of basic thematic areas on digital economy as well as suggested framework for data collection is suggested in Annex 3. Suggested framework of data collection for inventorising existing competence centres).
2. Facilitate the inventorisation of competence centres including the expertise available in the business sector (beyond Academy of Sciences and universities) by accepting the definition that competence centres can exist in various forms:
    a. “repositories of knowledge and resource pools for multiple business areas” (Gartner, 2015) acting under a framework of certain legal entity (like Fraunhofer Institutes in Germany);

   b. associations that are based on innovative cooperation between the public authorities, research and development institutions and enterprises;
   c. a consortium of several research groups internationally recognised in their field of research.

3. As a next step, map such competence centres (their list/database can be published in an easily searchable way per keywords/thematic areas) on the leading online resource in the country (for example, Innovation Agency website), for the purposes of their better visibility for businesses searching for specific thematic expertise. A contact person should be identified during inventorisation, who will be assigned the function to discuss with enterprises and start-ups the possible consultations in thematic area (not a name of director should be given, as directors tend to have no time for communication with start-ups' representatives). For example, opening of competence centres in the oil industry or aerospace agency to start-ups as "first customers" might facilitate a quick global growth of Azerbaijani start-ups in these complex industries.
4. Establish a strategic programme for development of capacities for the existing competence centres and nurturing the new centres should be approached as a strategic task. The critical activities that are recommended to support the development of competence centres for digital innovations are outlined below:
   a. **Role of digital innovations for strategic areas.** Determine the strategic priorities of the national economy development (the industries that are planned to be the most export-oriented and bringing foreign currency; the areas of burning social and ecological problems, etc), and determine the role that mastering of digital technologies can play in these areas (both for product-, process-, and organisational innovations; both of radical and incremental change; both as new to market and new to the firm). Set the targets, select the relevant intervention tools, construct and deploy the tools.
   b. **Training the staff for competence centres.** Launch a programme of generous support of best students for education, training and internships abroad within the selected strategically important areas of competence, and provide them with a well-equipped workplace (laboratory, decision-maker position, budget to hire a team of executors, support in realisation of innovative ideas and transfer of best practices), to facilitate their further work at competence centres (education, R&D, policy think tank, etc).
   c. **Adopt frameworks of competences in education and labour market**. Review the existing Pan-European and international frameworks that map various competences related to digital economy; their structure, applications, complementarity to each other, training packages (i.e. European e-Competence framework for ICT professions; SFIA for ICT professions; DigiComp for citizens at their workplaces; European Entrepreneurship Competence Framework for start-ups and enterprises). Consider using them as a basic framework for revision, restructuring and development of the training programmes at educational establishments of different level.
   d. **Dual and agile education complementary to classic education.** Develop (at the request and with contribution of enterprises) a mass-scale VET training and retraining for professionals to compensate for the weaknesses of the formal educational system; aim at 'dual education' approach; put emphasis on training at the crossroad of IT and traditional industries (not only coding or testing).
   e. **Inputs from corporate business.** Negotiate with leading corporations (Samsung, Palo Alto, Microsoft, etc.) the equipment (with hardware, software, intellectual property licences, training materials, etc.) of laboratories and units at national competence centres (typically done within corporate social responsibility programmes or within marketing budgets of these corporations). Make them publicly accessible for purposes of demonstrating the technological opportunities (excursions; 'dual education').
   f. **Wider access to public infrastructure.** Switch universities and R&D organisations to an 'open university' concept, by stipulating that equipment and facilities that have been purchased by public funds, are to be made accessible for experimentation, prototyping, testing. Launch a micro-innovation vouchers for physical persons to co-fund the costs of equipment usage, consumables, energy needed for such innovation tests.
   g. **Demand for strategic solutions from competence centres via (co-)funded projects.** Target the activity of competence centres towards the identified targets, by support of concrete projects with various timeframe (from short-run, projects to be funded via fast track; to long run, projects to include collaboration of many stakeholders).

h. **Project funding opportunities.** Launch project funding opportunities for employees of the competence centres for realising partnerships among themselves and with the other types of organisations from any sectors of economy, to facilitate fast knowledge sharing across sectors, and trust-building. Provide grants for project proposals preparation for Horizon 2020 (experience of Finland, UK).

i. **Support demand for knowledge from industry.** Introduce the innovation vouchers scheme to facilitate the transfer of knowledge (from basic consultations to the technological solution) from competence centres to innovation-friendly entrepreneurs (see the description in the EU best practice document to this topic).

j. **Prestige of teachers and scientists.** Within a 2-3 year time, increase the level of basic wages for teachers and scientists several times; equip them with tools increasing their efficiency; free them from bureaucratic work and increase the level of competition for a position of a teacher and researcher; thus raising the status of teachers and scientists and making these professions more attractive for youth.

k. **Easily accessible knowledge for innovations.** Promote widely the new philosophy of the country, as an innovation-oriented life-long-learning economy; make the information about easily available and promoted competence centres and learning opportunities in the country.

l. **Landscape of ICT** innovation **services along the business lifecycle.** Further build the ecosystem for innovations by developing the system of private suppliers of services for start-ups and SMEs wishing to introduce innovations of any type, including workplace innovations.

❖ Why?

Mapping of competence centres is necessary for innovative companies to understand where they can source the necessary thematic expertise. This is a prerequisite for the next stage of digital innovations ecosystem development – formation of digital innovation hubs. Development of the capacity of competence centres is the next ambitious task in the development of a more competitive innovation ecosystem, which should be linked both to current needs of the economy, and its strategic prospects.

❖ Relevant EU organisation (non-exhaustive list):

- Smart Specialisation Platform – (S3 Platform) provides advice to the EU countries and regions for the design and implementation of their Smart Specialisation Strategy by providing guidance material and good practice examples, informing strategy formation and policy-making, facilitating peer-reviews and mutual learning, supporting access to relevant data and training policy-makers. There are also non-EU countries registered at S3 platform, including Moldova and Ukraine.
- COMET – Competence Centres for Excellent Technologies – the competence centre programme in Austria established in 2007, which aims to intensify and concentrate cooperation between science and industry. The COMET programme is open to any field of research, as have been the preceding programmes. However, the vast majority of all competence centres are active in various fields of technology and natural sciences, which is mainly due to the focus on science-industry-co-operation (rather than a more open understanding of 'practice partners').
- Kompetenznetzwerk Mittelstand – Competence Network for Small and Medium-Sized Enterprises is a network of organisations in Germany that are members of the Federal Association of Small and Medium-Sized Businesses and possess competences in the following areas: corporate law and restructuring; export advice and organization; it solutions for small and medium-sized companies; business consulting for company pension schemes; corporate communication, advertising and PR; strategic personnel solutions; negotiation training and purchasing management; factory and logistics planning, process organization; development and sales of communication software, apps and tools on mobile devices.

❖ Potential counterpart(s) in Azerbaijan:

- Social Innovations Lab (SIL);
- Step IT Academy;
- Oxuyuruq.biz;
- Small and Medium Business Development Agency.

7.4 Digital innovation hubs

Status

There is no common legal definition for an innovation hub in Azerbaijan.

On practical level, the programme 'Azerbaijan Digital HUB' (ADH) carried out in a public-private partnership consortium with the participation of AzerTelecom is believed to become the first digital hub in Azerbaijan. The Consortium aims to "develop the infrastructure for cross-border e-services, contribute to application of advanced digital services and infrastructure in the Azerbaijan and support the digital transformation of the country". In particular, AzerTelecom is aiming to create a digital telecommunications corridor between Europe and Asia, known as the Digital Silk Road between Asia and Europe. One of the crucial segments of the ADH programme is the Trans-Caspian project, which addresses laying fibre-optic cables between Azerbaijan and Central Asian countries along the bottom of the Caspian Sea. As part of the ADH, a regional Data Centre will be created in Baku with a goal of "turning Azerbaijan into a regional Digital Hub for the Caucasus, Commonwealth of Independent States (CIS) region, Central and South Asia, the Middle East and surrounding regions". Yet, this infrastructure is not oriented toward start-ups and SMEs, covering their needs at early stages of development – rather, this is a large-scale telecommunication infrastructure project.

Small and Medium Business Development Agency with a support of SME Development Centres can provide a basis for development of the innovation hub.

Yet, the 'Azerbaijan Digital HUB' is rather a programme of building a strong telecommunication node in Azerbaijan, differing from the EU understanding of a digital innovation hub as a new organisational form serving as a gateway of SMEs to various digital technologies and competencies supporting them in digital transformation.

Gaps

The identified gaps that can be addressed using the EU best practice include:

- There is no definition of innovation hubs as specific organisational form supporting innovations in the national policy documents.
- There are no digital innovation hubs in Azerbaijan in the sense of Digital Innovation hubs as specific organisational forms supporting SMEs in digital transformation.

Recommendations

❖ What?

1. Organise the study of the concept and practice of work of existing and emerging digital innovation hubs in the EU by existing most active digital ecosystem actors, including both regulators and accelerators (i.e. via TAIEX and TWINNING instruments). Based on that, the digital innovation hub can be developed as a distributed node of expertise specific and highly developed in Azerbaijan (oil industry might be a specialisation of choice for such hub).
2. Introduce pilot projects aimed at testing innovative solutions as a most efficient tool facilitating networking of diverse stakeholders around specific selected topic of specialisation (core of the future digital innovation hub).
3. With the development of partnership with the EU, consider the possibility of establishing one of the outreach 'European Digital Innovation Hubs', defined by the EU Resolution COM(2018)0434 – C8-0256/2018 – 2018/0227(COD) as the legal entity for "providing directly or ensuring access to, technological expertise and experimentation facilities, such as equipment and software tools to enable the digital transformation of the industry, as well as facilitating access to finance. European Digital Innovation Hub shall be open to business of all forms and sizes, in particular to SMEs, midcaps, scale-ups and public administrations across the Union".

❖ Why?

Development of manifold nodes of expertise needs to be linked with actual practical work. Innovation hubs evolve from the actual collaboration and achievements. As experience of EIT Innovation Hubs shows, the Innovation Hubs focus on developing innovative products, services and training in a specific area of their Innovation Community, taking targeted actions to help overcome key challenges in that field. Innovation Hubs build on the existing labs, offices or campuses of some of the Innovation Community's core partners, which serve as clusters for a particular region, discipline or task".

❖ Relevant EU policy/organisation(s) (non-exhaustive list):

- European Parliament legislative resolution of 17 April 2019 on the proposal for a regulation of the European Parliament and of the Council establishing the Digital Europe programme for the period 2021-2027 (COM (2018)0434 – C8-0256/2018 – 2018/0227(COD).
- Digital innovation hubs catalogue contains comprehensive information on the digital innovation hubs in Europe to help networking between them.
- DIH service examples – an indicative list of industrial case examples of services offered to SMEs, specialising in a wide range of technology sectors and addressing several industry markets, by several DIHs around the EU to support them with their digital transformation.
- Smart Factories in new EU Member States is a project that has trained 34 organisations in 13 EU countries to become Digital Innovation Hubs (DIHs). The programme has provided training resources including a "Technical Assistance Toolkit" needed to develop the underpinning knowledge required to produce a business plan for a new DIH; mentoring programme and peer learning programme to promote the exchange and sharing of knowledge, experiences and practices among the selected DIHs.
- EIT Digital Innovation Hub is a "leading European digital innovation and entrepreneurial education organisation driving Europe's digital transformation" "through a pan-European ecosystem of over 200 top European corporations, SMEs, start-ups, universities and research institutes, where students, researchers, engineers, business developers and entrepreneurs collaborate in an open innovation setting".

❖ Potential counterpart(s) in Azerbaijan:

- Ministry of Transport, Communications and High Technologies;
- Agency of the Republic of Azerbaijan for Developing Small and Medium Enterprise;
- Innovation agency.

7.5 Private-Public Partnership-based projects ("federated" projects with multiple stakeholders)

Status

Legal basis is available for establishing public-private partnerships (PPP) in Azerbaijan.

The core legal framework for concessions, based on a contractual arrangement between the public and industry partners, is defined in the Civil Code of the Republic of Azerbaijan as well as the Law of the Republic of Azerbaijan on the Protection of Foreign Investments (Foreign Investments Law) (1992). Concession agreements are mainly referred to as a type of commission agreements. The Article 40 of Foreign Investment Law limits concession agreements to only natural resources, whilst a concessionaire can be only foreign investor. In addition, the predictable disputes can be resolved in accordance with international arbitration.

The PPP for institutionalised PPP has been introduced in Azerbaijan quite recently. In 2016, the Law on the 'Implementation of Special Financing for Investment Projects in Connection with Construction and Infrastructure Facilities' has been adopted. The specific regulatory framework approved by Presidential Decree (On the Activity of the Small and Medium Business Development Agency of the Republic of Azerbaijan, June, 2018) includes the rules that entail:

- conditions that are suitable for implementing major investment projects;
- requirements on the type of construction and infrastructure facilities, which are specific for investors;
- rules that determine the cost of goods and services;
- terms & conditions of agreements when collaborating with potential investors.

However, the experts from governmental bodies in Azerbaijan emphasise that there is a **lack of legal and regulatory mechanism that enforces the implementation of PPP in the country**, clearly **defines roles and responsibilities** of public and private sides of the partnership, **guarantees** that projects funded by private sector partners will be completed without restrictions and regulatory challenges, while the public sector will support the project throughout its phases. Among the public sector organisations, only the role of the Ministry of Economy in PPP is defined, while the roles of other entities are not determined. This can lead to procedural and bureaucratic interruptions. Other state entities that order the construction of infrastructure facility by private funds through PPP model have little impact over supervision during contract term that could potentially lead to the poor quality of deliverables.

One example of **organisations acting to support PPP** in Azerbaijan is the Small and Medium Business Development Agency of the Republic of Azerbaijan launched in 2017. One of the areas of activity of the Agency is the establishment of Public-Private Partnership Centre. Its main goals are:

- to ensure successful implementation of PPP projects, improve investment environment, and introduce the best experience related to worldwide PPP projects;
- to ensure ideal distribution of risks and responsibilities for the aim of provision of public services amongst public and private sectors;
- to improve public infrastructure and social services quality;
- to promote the inflow of investments into the country.

In 2019, the Small and Medium Business Development Agency of the Republic of Azerbaijan has requested the European Bank for Reconstruction and Development (EBRD) to provide technical assistance in support of the government in the context of assessing the existing system pertinent to PPP projects, planning and drafting the advanced PPP policy and/or a concept of the potential legal and regulatory framework, as well as the PPP law with particular amendments to primary legislation where relevant (EBRD 2019).

Additionally, Small and Medium Business Development Agency is tasked to establish ten development centres throughout the regions of Azerbaijan. The main strategy is towards outsourcing of main activities to the private sector. However, only one of these centres will be devoted to ICT innovation.

A PPP Consortium has already been established in partnership with 'AzerTelecom', which is the backbone Internet operator connecting Azerbaijan to the global network. The Consortium is to support the improvement of Azerbaijan's position as Digital Hub in the region, with enhancement of various digital technologies within the framework of 'Azerbaijan Digital HUB' programme. It aims to help the country to become a digital centre for the regions of Caucasus, Middle East and South Asia, and other regions by implementing wide-ranging infrastructure projects in the ICT sector. The agreement on the Consortium was signed for the first time with Asan Imza (electronic signature).

The potential of PPP in the country is still underemployed because current PPP practices in the country are mainly based on the Build-Operate-Transfer (BOT) model, such as:

- construction and operation of waste-to-energy plant executed by CNIM Group;
- state-owned company Tamiz Shahar JSC, which is dedicated to utilising solid municipal waste of Baku city;
- management contract-based PPP project: Management of Central Clinic within ten years period by Ay-Med Medical Yatirim Danishmanlik Ticaret (Turkish company);
- management contract-based PPP project: Management of Shahdag Ski Resort in partnership of PGI Management and Azerbaijan's Shahdag Winter-Summer Tourism Complex, part of the State Tourism Agency.

Thus, the potential of other models beyond the BOT model, such as Design-Build (DB) and Design-Build-Finance-Maintain-Operate (DBFMO), is not utilised.

Also, the PPP based on the BOT model in Azerbaijan mainly covers the construction and infrastructural projects; there is still room for expansion of the partnership across ICT projects. Reflecting this, the Asian Development Bank's (ADB) country partnership strategy in line with 'Azerbaijan, 2019-2023 – Promoting Diversified and Inclusive Growth', emphasises that strengthening governance through ICT can be done via the private sector participation in improvement of ICT infrastructure and services, as well as public service delivery.

The research undertaken by EU4Digital Facility shows, that implementation of PPP in ICT sector will tackle lack of ICT experts, ICT-specific legislation concerning the ICT risks, assets, tax regulations/reductions (for stimulating companies to be actively involved in ICT projects in the country).

In addition, the major obstacles for concessions are the lack of best practices and lack of sustainability of programmes/policies/regulations in action, which means that if a certain programme is undertaken, there is no guarantee that the project's outcome and its feasibility will be evaluated efficiently, and insights will be taken for further improvement.

Gaps

The identified gaps that can be addressed using the EU best practice include:

- There is lack of legal and regulatory mechanism that enforces the implementation of PPP in the country, clearly defines roles and responsibilities of public and private sides of the partnership.

- The potential of other models beyond the Build-Operate-Transfer (BOT) model, such as Design-Build (DB) and Design-Build-Finance-Maintain-Operate (DBFMO) models, is not utilised.
- The potential pf PPP in improvement of ICT infrastructure and services is underemployed.
- Implementation of PPP in ICT sector tackles lack of ICT experts, ICT-specific legislation concerning the ICT risks, assets, tax regulations/reductions.
- There is a need to study in-depth both the regulation and the mechanism of work of existing PPPs in digital markets from foreign best practices.

Recommendations

❖ What?

1. Study in-depth the mechanism of work of existing PPPs in digital markets in the EU and consider their applicability, including Design-Build (DB) and Design-Build-Finance-Maintain-Operate (DBFMO) models, on digital markets, including via internships.
2. Review and apply EU experience on PPP in the development of regulations for digital markets through consultations with consolidated business associations.
3. Develop the legal framework and implementation practices for institutionalised PPP allowing for wider involvement of private sector already at the stage of design of innovative projects in the area of digital markets, including the following forms:
    a. establishing mixed capital entities, which aim to perform services of general (economic) interest;
    b. guaranteeing the involvement of private firms in existing public companies that perform such tasks.
4. Consider including the main components of PPP agreements foreseen in Horizon 2020 practice, when developing the legal framework for *concessions*, based on a contractual arrangement between the public and industry partners allowing for closing deals with *residents*:
    a. general and specific objectives of the partnership;
    b. substantial commitments by the private partners at a comparable level to the forecasted public contribution, which may also include the administrative costs of the PPP as well as industry-funded initiatives, such as demonstration, training, clustering, awareness-raising and monitoring activities;
    c. key performance indicators (KPIs) and expected outcomes, as well as the impacts coming from exploitation in the related region;
    d. indicative financial envelope for the public contribution in the specified period;
    e. monitoring and reviewing instrument, with the use of KPIs and with possible adjustments;
    f. possibility to terminate the partnership by both sides in case the other partners fall short on their commitments;
    g. governance structure, which also includes the instrument of consultations and decision-making between public and private partner.
5. Consider EU experience on PPP in the development of policy for digital markets. Referring to existing examples when the ministries communicate with business community, reiterate such forms of PPP by involving the business communities into discussions of regulatory changes (specifically digital market regulation), social challenges, concepts, strategies and programmes of country development. Consider wider usage of an organisational form of inter-agency working groups for discussion of complex topics involving both the ministries and the business associations.
6. For business associations to be more visible to the regulators, establish the working groups on the specific topics, digital markets; to involve multiple businesses and stakeholders into discussion; to collect the voices of individual businesses and develop a consolidated position of a business community that is perceived by ministries as an unbiased general position, not as lobbying of individual business interests.

❖ Why?

A mechanism of PPPs provides a legal structure to pool financial, human and infrastructure resources and to gather critical mass and scale of research and innovation “needed to address critical societal challenges and major EU policy objectives” [EC]. While implementation of these distributed forms of partnership in projects involving both private and public stakeholders is a complex challenge in digital market, the first task to be done

is to observe in practice how this is implemented in advanced markets (what are the roles distribution, mechanism of implementation, communication and decision-making, incentives and KPI framework, etc.), and compare with alternative implementation forms (i.e. clusters).

- Relevant EU policy/organisation(s) (non-exhaustive list):
  - Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Public-private partnerships in Horizon 2020: a powerful tool to deliver on innovation and growth in Europe (COM(2013) 494 final,10.07.2013).
  - Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM(2005) 569) on Public-Private Partnerships and Community Law on Public Procurement and Concessions.
  - Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC (Official Journal L 347, 20.12.2013, pp. 104-173).
  - Ongoing Public Private Partnerships: Cybersecurity; Photonics; High Performance Computing; Robotics; Future internet (5G); ECSEL (electronic components and embedded software); Factories of the Future; Sustainable Process Industry; Advanced 5G networks for the Future Internet.
- Potential counterpart(s) in Azerbaijan:
  - Ministry of Economy;
  - Ministry of Transport, Communication and High Technologies;
  - Small and Medium Business Development Agency of the Republic of Azerbaijan;
  - Public-Private Partnership Centre.

8 External framework for development of clusters, accelerators, digital innovation hubs, etc.

8.1 Mapping of clusters, accelerators, innovation hubs and other types of actors for potential users to find them online

Status and gaps

Currently a number of websites are operational or under development in Azerbaijan, which can be used for mapping cluster organisations, accelerators, innovation hubs and other types of actors.

Table 5. Websites under development in Azerbaijan for potential mapping of cluster organisations, accelerators, innovation hubs and other types of actors

Online platform	Operating organisation	Relevant functions performed/services delivered by the online platform	Scope of the platform (indicative number of organisations listed)
Startup.az	Startup Azerbaijan	An online directory providing information on start-ups (ranging from Lifestyle to Medicine), list of acceleration & incubation centres, and other for aspiring entrepreneurs on Azerbaijan Startup Ecosystem (tax, incorporation, patent, license, incubators, tech schools, co-working spaces, competitions, funds, and so on).	Total 12 start-ups mapped in the resource. Further mapping is planned in 15 categories. Besides that, 18 ecosystem actors are in the resource, such as Baku Business Factory, The State Fund for Development of Information, High-tech park, Barama Innovation and Entrepreneurship Centre and other.
Amea YTP	High Technologies Park	A resource where legislation (decrees, statements, resolutions, accreditation) information can be found. Also, the start-ups that are under the High Technologies Park can be found.	Nine residents and ten start-ups. Website is under development.
Startupazerbaijan.az	Azerbaycan Startup	A resource/guide that gathers useful information for young entrepreneurs. It contains a list of incubators, acceleration	Ten incubators, four investors, four tech-schools, seven funds, 21 start-ups

Online platform	Operating organisation	Relevant functions performed/services delivered by the online platform	Scope of the platform (indicative number of organisations listed)
	Ekosistemi (ASE)	centres, technoparks, co-working centres, funds and grants useful for start-ups, start-up competitions in Azerbaijan, firm registration, tax and patenting, licencing, declarations on innovation and entrepreneurships.	

Source: Desk research of EU4Digital Facility

As emphasised by the expert from the Ministry of Transport, Communications and High Technologies, "c*reation of a united ecosystem, networking and clustering business incubators, accelerators and other ecosystem actors* is a necessary "second pillar" maintaining innovations in the demand-driven innovation system, where government performs as a first customer of innovations. The innovation ecosystem needs to be transparent to facilitate the quick identification of competences and expertise, teambuilding among the sectors and exchange of information about projects to achieve faster development" (from the interview with respondent)" (from the interview with respondent).

As of June 2020, a draft *Rule for maintaining an open register of innovative projects and start-ups* has been prepared by the Ministry of Transport, Communications and High Technologies together with Innovation Agency (not published yet). Definitions of innovation, innovative project, innovation cluster, innovation ecosystem actors, start-up, start-up passport, funded scientific research are suggested in the Rule. This register will inventorise all innovation projects, including start-ups in Azerbaijan and list a range of innovation support services across all development stages of start-ups. Start-ups will get identified with their start-up-ID after acceptance of the Rule of registry. This platform will map innovation ecosystem actors and act as data platform. Data platform includes data on innovation clusters, start-up-ID, development stage of start-ups, innovation ecosystem actors, etc. Such platform would be considered as an enabling tool for teambuilding and search for partners with complementary competencies in innovations.

Gaps

The identified web resources have limited functionality and are not acting as platforms – their format of presenting the stakeholders is that of a "gallery", and no database search and no B2B matching services are implemented in the websites. No mapping of innovation clusters, competence centres, accelerators is published.

Recommendations

- What?

1. Map the Azerbaijani ecosystem actors and start-ups on the existing EU and world platforms.
2. Consider the creation of a joint web-resource (digital platform) with functionality of linking the digital innovation ecosystem with most important partner markets.
3. Propose to the ecosystem actors an easy tool for self-mapping on the online platform describing a range of basic functions that need to be performed in the innovation ecosystem (Annex 4. Taxonomy of services, tools and infrastructures (ICT Innovation Service Map)) provides a suggested list of services to be used as a framework, see more in the ICT Innovation Study (2018)).
4. Map the landscape of services provided by ecosystem actors (marketplace of services), using the data updated by EU4Digital Facility, to facilitate their quick search by start-ups and SMEs, and to foster competition among the suppliers of services for increase of their quality.
5. Consider the advanced functions of the similar EU platforms. Consider the international partnerships of the platform and the possibility to exchange the data via open API with the existing big-scale platforms, to ensure both the national data ownership and international visibility.
6. Within a platform-operating company, foresee the function of tracking the popularity and functionality of relevant foreign platforms in order to timely develop the international partnerships and improve the functionality of the national platform.

- Why?

Mapping of ecosystem actors is the tool which makes these actors visible to each other and allow them to quickly identify relevant partners with minimal transaction costs. Mapping is also used for provoking competition and revealing the market gaps.

As shown in the ICT Innovation Study (2018), "the innovation ecosystems can be considered as *comprehensive*, if they offer businesses the services covering the complete value chain and complete lifecycle of innovative

businesses: offering companies the resources to generate first sales of their products and services at new markets, to expand the sales within the respective countries and regions, and finally to prepare for further expansion of the business activities.

The ecosystems can be considered as *mature*, if they offer basic services on a competitive basis, that is, there are several organisations offering basic services on a continuous basis. Measuring the degree of ecosystem maturity is possible by means of measuring the number of organisations delivering such services (in absolute and relative terms).

The ecosystems can be considered as *innovative* (at the world, regional, country level), if some services offered by them have not existed before (at the world, regional, country level); per definition, there will be only one or a few organisations delivering such services".

Mapping of digital innovation ecosystem service landscape and equipping the mapping platform with proper functionality helps in practice to *improve the accessibility of the existing infrastructure organisations by start-ups and innovative businesses* in the Eastern partner countries and to *improve the quality of services provided by ecosystem actors*. It can serve "as a one stop shop website for start-ups to find a specific service through business lifecycle stages with functionalities for infrastructure organisations to register and independently update their information and for businesses to vote for existing and lacking services" (ICT Innovation study, 2018).

Because of small domestic markets in the Eastern partner countries (and hence the suboptimal size of the innovation ecosystem and impossibility to provide a full scope of service at the world level), it is advisable that the platform is equipped with the functionality of dynamic data exchange with advanced international platforms.

❖ Relevant EU policy/organisation(s) (non-exhaustive list):

- List of platforms in Annex 2. Top EU and world platforms for digital innovation start-ups and funding
- Approaches to mapping of local ecosystems via websites:
    - EDCI – European Digital City Index describes how well different European cities support digital entrepreneurship. For start-ups and scale-ups, it provides information about the strengths and weaknesses of local ecosystems; for policy makers helps to identify existing and promising hubs of activity, in order to learn from their practices.
    - Startup Heatmap Europe – a heatmap on the attractiveness of start-up hubs in Europe, mapping cities' perceived attractiveness and patterns.
    - European Startups data platform – uniting 128 thousand start-ups, 5409 investors and 22 thousand corporates across EU. The platform contains heatmaps and chart builder empowering the policymakers with data; matching tool for start-ups and investors as well as mapping of accelerators, universities and service providers.
- Startup Europe Networks under Startup Europe Initiative includes Startup Europe Central and Eastern Europe Network and Startup Europe Western Balkans Network, which map the selected ecosystem actors in the region, share business and policy insights from the covered countries and regions and advise decision-makers to create better framework conditions for entrepreneurial ecosystems.
- Startup Commons is an initiative providing an "open standard framework, innovation entrepreneurship education and training, ecosystem development consulting and enable start-up ecosystem operators to drive digital transformation to connect, visualise and make data flow within and between start-up ecosystems globally". In the future, it is seen as a "global network of digital start-up ecosystems, operated and co-owned locally, connected by open standard data models, global API infrastructure and shared licensing. Where all data belongs to their rightful owners" (Startup Commons, 2020).
    - For *ecosystem developers*, Startup Commons offers key knowledge, workshops, consulting and related software applications and digital infrastructure for connecting, benchmarking and KPI's about entrepreneurship, innovation, support functions and projects for data driven ecosystem development.
    - For *ecosystem operators*, Startup Commons offers key ecosystem applications and digital ecosystem architecture development for ecosystem connectivity and enabling data-flow & sharing. Digital transformation and team development support to get ecosystem operator setup, operational and connecting with other ecosystems.
    - To *support an open architecture of start-up ecosystems*, Startup Commons offers EcosystemOS, with user accounts and APIs with documentation for user data portability, API connections, data models and data sharing principles to develop applications for start-up ecosystems.

❖ Potential counterpart(s) in Azerbaijan:

- Ministry of Transport, Communications and High Technologies;
- Agency of the Republic of Azerbaijan for Developing Small and Medium Enterprise;
- Innovation agency;
- Startup.az;
- Amea YTP;
- Startupazerbaijan.az.

8.2 R&D collaboration between business and universities, between business and policy makers

Status and gaps

According to the Executive Opinion Survey (World Economic Forum, 2018), Azerbaijan takes the 34th place out of 137 countries in university-industry collaboration in R&D.

The Innovation Agency in Azerbaijan aspires to build the network of actors interested to contribute in the work of communities, to strengthen it, to connect all incubation and acceleration centres, to stop the practice of 'the same" competitions (from interviews with respondents).

However, according to experts' opinions, the gaps to be covered are still significant:

- There is still lack of R&D collaboration between business and universities as well as between business and policy makers, which remains one of the biggest issues in the country yet. R&D activities are currently executed in Azerbaijan by one organisation – Azerbaijan National Academy of Sciences, and its institutes. Universities do not possess strong expertise in R&D (see section 7.3 for an overview of competence centres).
- The other gap is that most of undertaken R&D studies are not at the stage of applied research and cannot be used practically. Private sector is not heavily involved in R&D activities. There is a need to back up the applied research and developments with necessary skills and infrastructure, as well as to bring together the nodes of complementary competences via expert communities.
- Poor networking among ICT innovation experts and policymakers in the country leads to the very limited skills and knowledge exchange related to policies as well as best practices for the ecosystem development.
- There is lack of the critical mass of the ecosystem actors interested to contribute in the work of expert communities.

Recommendations

❖ What?

1. Perform awareness-raising activities to promote R&D activities of applied character linked to start-up culture at school and university students.
2. Equip university innovation labs and technoparks with modern tools and technologies, make them open for all students and linked to practical tasks of enterprises in the country and in the wider region.
3. Identify existing digital communities in the country; foster their development; establish more specialised networks and consortia (consortium of accelerators, incubators competence centres, etc.), would help to the overall ICT ecosystem development in Azerbaijan.
4. Introduce innovation vouchers tool to support organisations wishing to drive the development of thematic communities and deliver innovation support and advisory services (both NGOs and profit-oriented companies).
5. Provide small grants on a competitive basis for funding of services to coordinate the expert community by an existing legal entity, plus additional grants for networking events.
6. See further recommended actions on facilitating the development of expert communities in the topic 'ICT innovation ecosystems for start-ups and scale-ups'.

❖ Why?

Networking is a tool enabling stakeholders with diverse expertise and needs to find each other with a strategic goal of establishment of collaborative partnerships apropos resources, activities and products (services). Networking is useful both in the mature ecosystems with a big number of stakeholders, and in the early-stage

ecosystems, where the identification of those interested in innovations and bringing them together needs to be done. Developing more targeted and sustainable networks through building communities is one of the major vehicles of the innovation ecosystem.

❖ Relevant EU organisations (non-exhaustive list):

A wide range of EU organisations and practices identified in the topic 'ICT innovation ecosystems for start-ups and scale-ups', including:

- The Knowledge and Innovation Communities led by the European Institute of Innovation and Technology (EIT). The EIT's Innovation Communities are partnerships that bring together businesses, research centres and universities. EIT Innovation Communities are the largest innovation networks in Europe – and some of the largest in the world. Since 2010, eight Innovation Communities have been launched, each focusing on a different societal challenge. One of them – EIT Digital, a pan-European network of co-location centres in Berlin, Eindhoven, Helsinki, London, Paris, Stockholm, Trento, as well as in Budapest and Madrid. EIT Digital also has a hub in Silicon Valley. Its head office is located in Brussels. EIT Digital provides Pre-incubation services and Scaleup acceleration.
- The EIC Community Platform[2] is a virtual meeting-place where companies funded by the European Innovation Council (EIC) pilot can connect, share their experiences and leverage potential businesses partnerships. The Community brings together all people that interact around the EIC. They can also find investors through the Find investors ScaleUp EU tool.
- Beyond the EU, the Startup Canada Communities experience, the flagship programme of Startup Canada, is highly recommended for its operational mechanism on developing start-up communities across the regions as well as on building a coast-to-coast network diverse in community size, demographics, and industry sectors.

❖ Potential counterpart(s) in Azerbaijan:

- Small and Medium Business Development Agency (SME Development Centres);
- Innovation Agency., not for publication.

8.3 Specific training and consultations within the country about the organisational forms in support of ICT innovation

Status

There is a number of training programmes for youth and businesses related to digital innovation development and bringing to market.

Table 6. Training programmes for youth and businesses related to digital innovation in Azerbaijan

Organisations delivering training and/or consultations	List of and reference to training programmes
Small and Medium Business Development Agency (SME Development Centres)	Planned training programmes: • development centres are expected to give 200 hours of trainings for 100 business subjects a year (minimum KPI); • continuous training programmes for firms (3 to 30 million turnover) in groups of 20-30 people; • online training platform is to be launched soon (is ready but not published). There will be 30-hour training programmes available for businesses (e.g., finance, HR practice) with video and text materials. It will also allow third parties to put their training resources in the system on the paid and non-paid basis.

2 For the moment the Community is open for EIC pilot-funded small companies under Fast Track to Innovation, Pathfinder, EIC Accelerator, and investors. The platform will soon also include Horizon Prizes, Coaches, Corporates, Evaluation Jury Members, Key Account Managers and Project Officers.

Organisations delivering training and/or consultations	List of and reference to training programmes
Innovation Agency	• *STEM courses*. Training programmes related to promotion of engineering and programming among the young generation, such as Robotics, Programming, Engineering, Digital Art, and so on. • *Digital Academy*. Education and training on system administration, programming, 3D modelling, visualisation, graphic and web design, digital marketing and so on. • *Data analytics course*. Data analytics and statistics for strengthening the data analyst, business analyst, and reporting analyst skills. • *Great 30 (G30)* – a project that gives the 30 most capable and talented young people a chance to work in the leading companies of the country.
Innovation Agency Business Incubation Centre	• To turn the potential and skilful youth to become parts of leading start-ups in Azerbaijan. • 'i2b – Idea to Business'. The project that covers the regions (Baku, Ganja, Sumgait, Mingachevir and other) for realisation of innovative ideas by start-ups.
IKT Lab Tətbiq və Tədris Mərkəzi (on the basis of MCTHT)	The main aim of the ICT Lab is to improve public and private sector's ICT usage skills, level of professionalism: • programming and coding; • electronic government; • general IT skills; • cybersecurity; • robotics and Internet of Things (IoT). It also has e-training platform.
AppLab – Innovative Mobile Developing Center	In cooperation with Qualcomm, the programme aims to provide effective tools to entrepreneurs and application developers to help accelerate their ideas and create innovative turn-key mobile applications for local and global markets.
Barama Innovation & Entrepreneurship Centre	Start Up Exchange Programme.
Innovations Centre (asan learning)	Multi-functional and interactive Training of high-skilled experts, planning of their career development, creation of innovative ecosystem to meet public and private sector needs.
MIT-Azerbaijan Global Startup Lab Program	30 students among different higher education institutions are selected and provided with 7-week intensive courses: • development of start-ups based on mobile/web-based applications (new technology and innovative ideas); • private partnership; • intensive courses for students in entrepreneurship and computer programming; • opportunities to meet with investors, representatives of Start-up and Development Centres in country's start-up ecosystem; • participation in MIT global start-up and idea contests.
Social Innovation LAB – ClimateLaunchpad Program	• the biggest cleantech accelerator with participation of 35 countries; • educating and aspiring entrepreneurs on the essential of entrepreneurship through up-to-date approaches, tools and methodologies, inspiring them through success stories related to innovation environment; • entrepreneurship education for building sustainable ventures with access to global opportunities.

Source: Data collected by EU4Digital Facility

Only Small and Medium Business Development Agency (SME Development Centres) is planning to launch training of entrepreneurs enabling them to establish public unions and new professional business associations.

Barama Innovation and Entrepreneurship Centre has received support from the Innovation Agency in terms of expertise.

Gaps

The identified gaps that can be addressed using the EU best practice include:

- Trainings and consultations within the country about the organisational forms in support of ICT innovation (e.g. cluster management, PPP in innovative projects) are not available.
- Lack of strong knowledge on intellectual property rights mechanism, particularly for accelerators and competence centres, as well as their residents being mostly start-ups and scale-ups. For example, for crowdfunding platforms there is a concern of start-ups (expressed by respondents during interviews) that if the project team or newly established firm announce their products or services to attract investment trough the platform, their ideas will not be copied or stolen by others, and they need knowledge how to protect their ideas.
- Lack of personalities driving the establishment of such organisations. Since the ecosystem is fragmented, it is difficult for personalities with some initiatives to build a team sharing the vision and ready to implement the activities. That is why even if some personalities exist, they are difficult to become visible for the others. For example, INNOLAND and Innovation Agency have different objectives and goals; in experts' opinions, they cooperate insufficiently, while Innovation Agency is expected to network all stakeholders.
- Lack of competent staff with skills of networks development and management. Lack of competent staff is applicable to almost all four organisational forms. There is lack of competitions that actually contribute to the development of competent staff, skills and expertise through challenges. "There is a certain number of skilful experts who just move from one competition to another. All are the same people, same faces, and same contexts" (from interview with a respondent).
- Lack of practical experience of the staff and knowledge of practical problems of start-ups and scale-ups. Mostly in Accelerators and Competence centres. "Accelerators desperately need to be developed and need capacity-building for themselves" (from interview with a respondent). As accelerators emerged via agreeing about franchises with international networks, they try to attract this international expertise into their programmes, but do not have a well-planned strategy due to lack of funding. Also, accelerator managers do not have a vast practical experience, they mostly apply their own limited track record when providing acceleration services.
- Insufficient development of collaboration with international networks mostly affects innovation clusters. Only accelerators in Azerbaijan collaborate to some extent with international networks, but their activity of collaboration is rather limited.

Recommendations

❖ What?

1. Introduce training of management and staff of ecosystem builders and particular organisational forms (including educating the relevant organisations and/or staff on whole process of registering, accelerating, certification, pitching as well as intellectual property rights mechanism, with focus on start-ups).
2. Organise TWINNING of accelerators across the borders.
3. Introduce institutional capacity building for existing and proto-digital business associations in EaP region, to help them to become an integral part of the EU business community and international associations and extract more value out of these memberships.
4. Join the specialised EU training programmes for development of cluster managers and innovation ecosystem builders.
5. Review the topics on 'Intellectual property rights management for digital innovations'; 'Digital innovation SMEs access to finance', 'ICT innovation ecosystems for start-ups and scale-ups'; consider them for adjustment and applying in Azerbaijan, as well as the list of training sources on digital innovation, developed by EU4Digital Facility.

❖ Why?

- Development of new organisational forms for support of innovations requires special skills, approaches and tools, organised in a framework. Elaboration of common language (common understanding of terms, definitions, problems, tools) is helpful for ecosystem actors to lower the costs of interaction.
- For enabling a wide international stage for start-ups from small countries, national training programmes should be linked to diverse training programmes across the world.

- Besides, training opportunities should be provided through multiple channels, enabling the remote training.

❖ Relevant EU policy/organisation(s) (non-exhaustive list):

- The Global Cluster Leadership Program at the Cluster collaboration platform. A programme to build capacity for cluster management through online learning & development programme for cluster leadership, developed by Strategy Tools.
- StartupCommons Online certification academy – Growth Academy for Business Creators, Growth Academy for Support Providers, Growth Academy plus Certification programme (individual trainer), Ecosystem development academy for Ecosystem Developers, Support Providers, Business Creators.
- DIHELP – DIH Enhanced-Learning Programme – DIHELP is a programme launched by the European Commission to support Digital Innovation Hubs (DIHs) in developing and/or scaling-up their activities. They will be offered a coaching and mentoring programme for nine months. Includes Webinars, e-learning portal and on-demand coaching.

❖ Potential counterpart(s) in Azerbaijan:

- Small and Medium Business Development Agency (SME Development Centres);
- Innovation Agency.

8.4 Technological infrastructure

Status

While the modernisation of the existing technological infrastructure at universities and public R&D organisations is ongoing, and a very good progress is observed in the telecommunication infrastructure in Azerbaijan, there is a need for further modernisation of equipment for research, testing, prototyping for digital innovations.

World Bank study marks the following challenges related to research and innovation infrastructure in Azerbaijan:

- *"Uneven availability of modern research equipment is observed across Azerbaijan's HEIs.* Although about 5% of the public budget for R&D is spent on equipment, this level is typically insufficient for the development and maintenance of complex research equipment. Although a number of investments in modern research equipment have been pursued in recent years, a considerable number of universities still require additional investment and replacement of outdated research infrastructure.
- *A crucial challenge is the lack of widely accessible information on the existing research infrastructure in Azerbaijan.* ANAS, as the main player in R&D, has 360 scientific laboratories. Moreover, recent investments in new R&D solutions have been made at some universities, technoparks, and other locations. Yet, not all research system stakeholders are fully aware of the existing capacities. As a result, a number of scientists and enterprises claim a lack of access to modern R&D equipment. At the same time, modern research infrastructure is often underutilized due to restrictive high educational institutions' internal procedures that limit the access to the infrastructure by outside users" (World Bank Group, 2018).

The Decree 'On ensuring coordination in the field of innovative development in Azerbaijan' of the President of the Republic of Azerbaijan in 10 January of 2019, has assigned to the Cabinet of Ministers of the Republic of Azerbaijan the role to:

- prepare together with the Azerbaijan National Academy of Sciences the procedure for compiling and maintaining the register of scientific research centres and laboratories (research infrastructure) equipped with advanced technological equipment available in the country and approve it in coordination with the President of the Azerbaijan Republic;
- prepare and submit to the President of the Republic of Azerbaijan the proposals on the use of R&D results developed at the research infrastructure owned by the state or created at the expense of state funds;
- prepare and submit to the President of the Republic of Azerbaijan the proposals on the *application of innovations* and the financing of scientific research of a certain part of the annual profits by the public organisations (except for the central executive authorities and the Azerbaijan National Academy of Sciences).

The inventorisation of technological infrastructure and equipment for digital innovations should be undertaken as part of this process, to make it accessible for inventors, start-ups and SMEs pursuing digital innovations.

Intellectual Property Agency of the Republic of Azerbaijan COPAT develops in TWINNING the Intellectual and Cultural National Digital Aggregator and is preparing the reform of patent and trademark system (PENA).

While the 'Azerbaijan Digital HUB' launched by AzerTelecom will allow using the full potential of telecommunication technologies, the lack of access to other advanced technological infrastructure is believed to be the main issue for accelerators and competence centres, specifically for those privately-owned.

Gaps

The identified gaps that can be addressed using EU best practice include**:**

- An inventory of the existing technological infrastructure at universities and public R&D organisations is not publicly available, which limits access to it by start-ups and SMEs pursuing digital innovations.
- There is lack of advanced technological infrastructure and equipment, especially relevant for accelerators.
- The lack of funding significantly hampers the modernisation of technological infrastructure.

Recommendations

❖ What?

1. Inventorise the existing technological infrastructure that is available at universities and public R&D organisations (funded by public funds), and make them accessible by inventors, start-ups and SMEs for research, testing, prototyping, manufacturing at early stages, for free (to start-ups) or at acceptable rates (for SMEs). Publish the registry of available infrastructure.
2. Support successful ecosystem actors wishing to replicate their activities in the regional centres across the country (i.e. by providing them premises in the regions, access to digital infrastructure, co-funding training of trainers for the regions).
3. Review the possibility of using EaP Connect project facilities for providing access to a number of services to innovation ecosystem actors, starting from those belonging to educational and research system.

❖ Why?

Digital innovation needs good computing power, access to reliable cloud facilities, access to software and programming platform, specific tools, devices and technologies (robotics, IoT, AR, VR, Big Data, AI). For a start-up, equipping itself fully with the set of technological infrastructures may be prohibitively expensive, that is why access to existing infrastructure is provided as a public good, to allow start-ups test their ideas. It is important that incubators, accelerators and other actors supporting innovations can direct their tenants into the competence centres where the relevant technological infrastructure is available. Innovation cluster organisations and digital innovation hubs evolve based on linking together the complementary competences and infrastructure.

❖ Relevant EU policy/organisation(s) (non-exhaustive list):

EaP Connect is a project coordinated by the GÉANT Association, bringing together the research and education communities from the EU and Eastern partner countries. Entering the second phase from 1 July 2020, EaPConnect2 project will "extend the network infrastructure to scale-up scientific exchange across borders, increase the use of services implemented under EaPConnect and offer new services to enhance international research and education cooperation, and strengthen the position of EaP national research and education networks (NRENs) in their national R&E ecosystems".

❖ Potential counterparts in Azerbaijan:

- Small and Medium Business Development Agency (SME Development Centres);
- Innovation Agency.

8.5 Funding

Status

Funding for support of new organisational forms:

R&D in Azerbaijan is primarily funded through institutional financing, out of which about 70% covers salaries. Within the institutional funding for R&D, 51% financing is channelled to fundamental (basic) research, 16% – to scientific and technological services, 14% – to applied research, 9% – to design works for construction , 6% – to researcher development and technological works and 5% – to product samples, batch, products (World Bank Group, 2018).

The Law of the Republic of Azerbaijan 'On Science' (Art. 34) states that financing of scientific and scientific-technical activity can be carried out at the expense of means of the state budget, own means of subjects of scientific activity, means of the state funds, credits, grants, donations and other legal sources, including at the expense of funds attracted by scientific institutions and organizations from international organizations, financial institutions and foundations on the basis of contracts, competitions and grants, as well as from the sale of scientific products and services. Financing of scientific and scientific-technical activity at the expense of the state budget is carried out in the forms of base financing; programme-based funding; grant financing. Scientific institutions and organizations have the right to freely use the extra-budgetary funds received for strengthening the material and technical base, improving the scientific infrastructure, financial incentives for employees and other purposes.

Art. 35-36 clarify that subjects **basic financing** of scientific activity are *state* scientific institutions and organizations, scientific research institutes and laboratories of state higher education institutions, other scientific institutions fulfilling state orders for scientific activity. The list of scientific institutions and organizations that are the subjects of basic funding is approved by the relevant executive authority.

Programme-based funding of scientific activity is carried out on a competitive basis or beyond competition by the decision of the relevant executive authority, focusing on the conduct of strategically important scientific work of state importance; all subjects of scientific activity and their relevant structures, *regardless of the type of ownership*, have equal rights when participating in the competition for programme-based funding. However, in practice NGOs, other institutions and individuals have received only 1% of competitive funding (World Bank Group, 2018).

While public funding (basic and programme-based) is well provided to public agencies and public organisations such as ANAS High Tech Park (according to World Bank study, ANAS receives 74,5% of competitive funding), ICT fund (Fund for Development of Information Technologies), the privately owned accelerators and innovation cluster organisations have very limited opportunities to get public funding of their activities. Also, no tax incentives are provided in the Tax Code and no state aid is envisaged to the organisations providing innovation support activities or advisory services (like innovation cluster organizations or operator of the distributed digital innovation hub), since there is *no definition of innovation support or advisory services*. Only SME cluster companies can receive tax incentives (see section 7.1).

The Charter of the Entrepreneurship Development Fund of the Republic of Azerbaijan (Decree of the President of the Republic of Azerbaijan No. 224 of July 31, 2018) envisages that the purpose of the Fund's activity is to provide financial support for the development of entrepreneurship in the Republic of Azerbaijan, in particular, to participate in the development, implementation and financing of programmes (including state programmes) in the field of entrepreneurship development support. However, its funds are focused on the needs of entrepreneurs to access preferential financial resources, not at the operation of business support organisations.

While Azerbaijan is eligible for Horizon 2020 programme that launches many calls supporting the innovation ecosystem development, the Horizon 2020 National Contact Point in Azerbaijan has only a Facebook page (no website), which makes it difficult to track the actual eligibility of the country in the open Horizon 2020 calls and publish this information to the innovation ecosystem actors in Azerbaijan.

Funding of the innovation process:

There is a need for a development of a full cycle funding for innovations in Azerbaijan and making the available funding more visible to start-ups and SMEs:

- **Crowdfunding platforms.** While the global popularity of crowdfunding platforms grows as a potential source of alternative financing for business ventures and innovative start-ups, it is not widespread in Azerbaijan. An example of such platform is Pitchapitch which has only six campaigns, while their investment rates are very low, which shows that crowdfunding culture has not been established in Azerbaijan yet. The 'Enterprise Azerbaijan' portal created to support the development of SMEs in the country aims to increase the investments into local businesses and diversify the alternative financing.
- **Expansion of Business Angel (BA) Associations**. From interview results, it was found that business financing by angel investors remains a topical issue in Azerbaijan. There is still no legislation that covers the roles and responsibilities of angel investors/associations, types of activities that can be sponsored by this type of financing. Establishment of BA association(s) in Azerbaijan could strengthen the positioning of other organisational forms supporting ICT innovation as well. These associations can bring together potential investors, ecosystem actors and fuel the ICT innovation projects and start-ups/scale-ups with faster investments.
- **Venture financing** is highlighted by the experts as not existing in Azerbaijan. There is lack of policy framework or legislation on venture capital and other forms of funding for ICT innovation ecosystem

actors, which could help to provide finance to the business ventures that are in the initial stages of corporate existence, while they show promising potential for growth and expansion. The demand for insurance and guarantee mechanisms backing venture financing was emphasised, as venture financing is believed to be a riskier investment comparing to grants and concessional loans.

- **More active participation of private sector in a form of investments in R&D** needs to be achieved (traditional innovation policy instruments). This is important to move the risk to private organisations that can faster decide on more perspective (better) innovative projects which can be objects of investment.

Gaps

The identified gaps that can be addressed using EU best practice include:

- Lack of funding for support of work of the office (operating body) for the innovation cluster organisations, digital innovation hubs beyond public organisations, for networking and coordination of collaboration among universities, R&D organisations and businesses, for development of expert communities. Lack of a regularly actualised and published overview of funding sources for which the country stakeholders are eligible.
- A need for a development of a full cycle funding for innovations in Azerbaijan, embracing investments in R&D of private sector, crowdfunding, business angel investments, venture capital investments, and including both the development of regulation, and the development of practice and linkages throughout different stages of funding of the innovation process.

Recommendations

❖ What?

1. Provide small grants on a competitive basis for funding of services to coordinate the expert communities by an existing legal entity, plus additional grants for networking events.
2. Maintain an actual overview of funding sources for which Eastern partner country stakeholders are eligible and make the list public. This is a clear case for public service (may be subcontracted by the public authority to a scientific institute or technology transfer centre) – otherwise the organisations need to spend much more time in parallel on trying to identify their eligibility, which significantly reduces the amount of applications and increases the transactions costs within economy.
3. Review the topic ‘Digital innovation SME’s access to finance’ (policy recommendations developed for Georgia and Ukraine) and consider its application in Azerbaijan (adaptation may be required) for development of the full cycle funding for the innovation process.

❖ Why?

On their development path, SMEs face different needs both in the size and the type of investment funds. The EC helps SMEs to access finance in all phases of their lifecycle – creation, expansion, or business transfer. The goal of a good policy practice is to compensate for weaknesses in the financial markets by working to access finance from various financial institutions.

❖ Relevant EU policy/organisation(s) (non-exhaustive list):

A wide range of EU stakeholders in the topic ‘Digital innovation SME’s access to finance’.

❖ Potential counterparts in Azerbaijan:

- Small and Medium Business Development Agency (SME Development Centres);
- Innovation Agency.

Annex 1. List of organisations and experts consulted during verification process

Organisations	Experts
Ministry of Transport, Communications and High Technologies	Head of Department on Innovative Development of the Information Society and e-Governance
Ministry of Transport, Communications and High Technologies	Project Consultant
Ministry of Agriculture	Head of Innovation of ASAN
Small and Medium Business Development Agency	Head of Innovation Department, Deputy CEO
UNDP Azerbaijan	Head of Exploration
UNDP Azerbaijan	Head of Solutions Mapping
UNDP Azerbaijan	Head of Experimentation
High Teck Park Azerbaijan LLC	Member of Board
Regional Innovative Technologies Academy (R.I.T.A)	Director
Chashioglu MMC (owner of oxuyuruq.biz online education platform)	President
Innoland	Managing Director

Annex 2. Top EU and world platforms for digital innovation start-ups and funding

Name	Target Stakeholders	Relevance and size
F6S	Incubators	3,584,024 total members 1,000,000 tech founders 800,000 start-ups
	Business Angels	
	Start-ups	
	Techno parks	
	Public Administrations	
	SMEs	
	Venture Capitalists	
Enterprise Europe network	SMEs	3,000 experts 600 members organisations
	ICT experts	
	Techno parks	
	Incubators	
	Universities	
	Public Administrations	
	Business associations	
Start-up network	Start-ups	4,480 start-ups
	Business Angels	
	Venture Capitalists	
	SMEs	
	ICT experts	
ESN (European start-up network)	Start-ups	28 national start-up ecosystems, stakeholders and experts More than 30,000 accessed start-ups
	Business associations	
	ICT experts	
	Scale-ups	
Funders club	Start-ups	23,000 members More than 270 start-up professionals
	Business Angels	
	Venture Capitalists	More than 300 start-ups founded
Seedrs	Business Angels	N/A
	Venture Capitalists	
	Public Administrations	
	Start-ups	
	SMEs	
	ICT experts	
Our crowd	Business Angels	39,000 registered investors 183 countries represented 10,000 companies vetted
	Venture Capitalists	
	Start-ups	
	SMEs	
	ICT experts	
Onevest	Start-ups	More than 355,000 entrepreneurs
	ICT experts	
	Entrepreneurs	
	SMEs	
	Business Angels	
	Venture Capitalists	
Gust	Start-ups	More than 800,000 founders 85,000 investment professionals
	Business Angels	
	Venture Capitalists	
	Incubators	
We Funder	Start-ups	348 start-ups funded
	Business Angels	
	Venture Capitalists	

Name	Target Stakeholders	Relevance and size
	ICT experts	
Angel Kings	Start-ups	N/A
	Business Angels	
	Venture Capitalists	
SeedInvest	Start-ups	N/A
	Business Angels	
	Venture Capitalists	
Start engine	Start-ups	More than 300 companies funded 200,000 prospective investors
	SMEs	
	Business Angels	
	Venture Capitalists	
Glass dollar	Start-ups	N/A
	SMEs	
	Techno parks	
	Incubators	
	Business Angels	
	Venture Capitalists	
Republic	Start-ups	More than 850 investors More than 250,000 users
	Business Angels	
	Venture Capitalists	
	SMEs	
	ICT experts	
AngelList	Start-ups	More than 130,000 start-ups
	SMEs	
	Venture Capitalists	
	Business Angels	
	ICT experts	

Name	Target Stakeholders	Relevance and size
Investor Hunt	Business Angels	40,000 investors
	Venture Capitalists	
	Start-ups	
	SMEs	
Startup Europe Partnership	Start-ups	N/A
	Scale-ups	
	SMEs	
	Business Angels	
	Venture Capitalists	
	ICT experts	
SEMED	Start-ups	N/A
	Business Angels	
	Venture Capitalists	
	Public Administrations	
	Incubators	
	Techno parks	
	ICT experts	
	SMEs	
Business Angels Europe	Business Angels	13 members States 250 structured angels networks 40,000 business angels
	Start-ups	
	investors	
	Venture Capitalists	
EuroQuity	Start-ups	1,500 investors
	SMEs	
	Business Angels	
	ICT experts	
	business partners	

Name	Target Stakeholders	Relevance and size
	Companies	
	Investors	
	Venture Capitalists	
European cluster collaboration platform	Start-ups	N/A
	Business Angels	
	Venture Capitalists	
	Public Administrations	
	Incubators	
	Techno parks	
	ICT experts	
	SMEs	
Startup Europe Central and Eastern Europe Network	Start-ups	7 countries (founders, members and partners)
	Entrepreneurs	
	Incubators	
	Techno parks	
	Business association	
	Accelerators	
	Start-ups	

Name	Target Stakeholders	Relevance and size
Startup Europe Western Balkans Network	Entrepreneurs	6 countries (founders, members and partners)
	Incubators	
	Techno parks	
	Business association	
	Accelerators	
Startup Europe Partnership (SEP) Investors Forum	Business Angels	N/A
	Venture Capitalists	
	Public Administrations	
	Start-ups	
	Business association	
	Investment funds	
Startup Europe Universities Network	Entrepreneurs	3,000 entrepreneurs
	Academia	
	Start-ups	
	Incubators	
	Accelerators	
	SMEs	

Annex 3. Suggested framework of data collection for inventorising existing competence centres

Axe 1: Data on organisations: name of organisation, legal form; specialised department or body (i.e. working group); contact person and data; reference to projects.

Axe 2: List of thematic fields:

Key enabling technologies	Digital technologies	Trust and security	Digitising industry	Digitising economy
1. Advanced manufacturing sectors; 2. Advanced materials; 3. Digital technologies; 4. Industrial biotechnology; 5. Micro-electronics; 6. Nanotechnology; 7. Photonics and photonics-based manufacturing.	1. Artificial intelligence (AI); 2. Big data; 3. Blockchain and distributed ledgers, smart contracts; 4. Cloud computing and cloud-based architectures; 5. Data mining and predictive analytics; 6. IoT; 7. Machine learning; 8. Quantum technology; 9. Smart modelling, simulation, and optimisation; 10. Virtual and augmented reality (VR/AR).	1. Availability, integrity, and security management; 2. Cryptography; 3. Cybersecurity; 4. Data management; 5. Data network management; 6. Incident response; 7. Information security architecture; 8. Information security policy; 9. Malware analysis; 10. Management of risks; 11. Security of information systems and data networks; 12. Software development; 13. Software management; 14. System administration; 15. System analysis; 16. System architecture; 17. Technical regulation and standardisation of IT; 18. Trust services; 19. Vulnerability management.	1. Cyberphysical systems: cognitive autonomous systems and human-robot interaction; 2. Enterprise architecture; 3. Industrial IoT; 4. Laser-based equipment in advanced and additive manufacturing; 5. Machine learning; 6. Robotics; 7. Sensors; 8. Smart manufacturing; 9. CAD/CAM.	1. Autonomous logistical systems; 2. Autonomous vehicles; 3. Business process management; 4. Digital commerce; 5. Digital forensics; 6. Digital transport corridors; 7. Digital twins; 8. Distributed registry; 9. Energy efficiency; 10. Fintechs; 11. Flexible and wearable electronics; 12. Geographic information systems; 13. Marking and traceability; 14. Open data & open science; 15. Project, programme, portfolio management; 16. Smart city; 17. Smart contracts; 18. Strategic planning and policies.

Annex 4. Taxonomy of services, tools and infrastructures (ICT Innovation Service Map)

Resource base:

1. Human resources;
2. Technologies;
3. Digital Infrastructure;
4. Data as a resource;
5. Office premises;
6. Production & R&D facilities;
7. Finance:
    a. Access to public support (regional/national programmes, innovation vouchers, etc.);
    b. Access to private funding (connecting to investors, seed-capital, venture-capital, crowdfunding, etc.).
8. Reputation and trust:
    a. Labelling as a quality mark;
    b. Certification as a quality mark.
9. Visibility.

Seed stage (idea):

10. Trend-scouting and technologies foresight (ideas for innovative projects);
11. Identify customers and develop value proposition;
12. Building a balanced team and finding partners with complementary competencies.

Start-up stage (product):

13. Product development;
14. Research and development;
15. Value proposition and business concept testing and validation;
16. Intellectual property management;
17. Product and Corporate Design.

Entering the market:

18. Marketing products and services;
19. Distribution channels and sales;
20. Innovation Management / Support of innovation processes (internal, external);
21. Accompaniment after entering the market.

Scale-up, Scope-up, Speed-up:

22. Business services for growing and accelerating companies;
23. Business scoping up;
24. Business scaling up.

Business transformation and strategy:

25. Support to existing SMEs in managing the structural transformation and in developing business models;
26. Thematic expertise.

Networking and collaboration (for innovation infrastructure organisations):

27. B2B networking (business to business);
28. B2G networking (business to government);
29. B2A networking (business to academia);
30. I2I networking (infrastructure to infrastructure).

Web-based platforms.

Source: ICT Innovation Study (2018)