



Review of Industrial Transition of Bulgaria:

Draft Final Report

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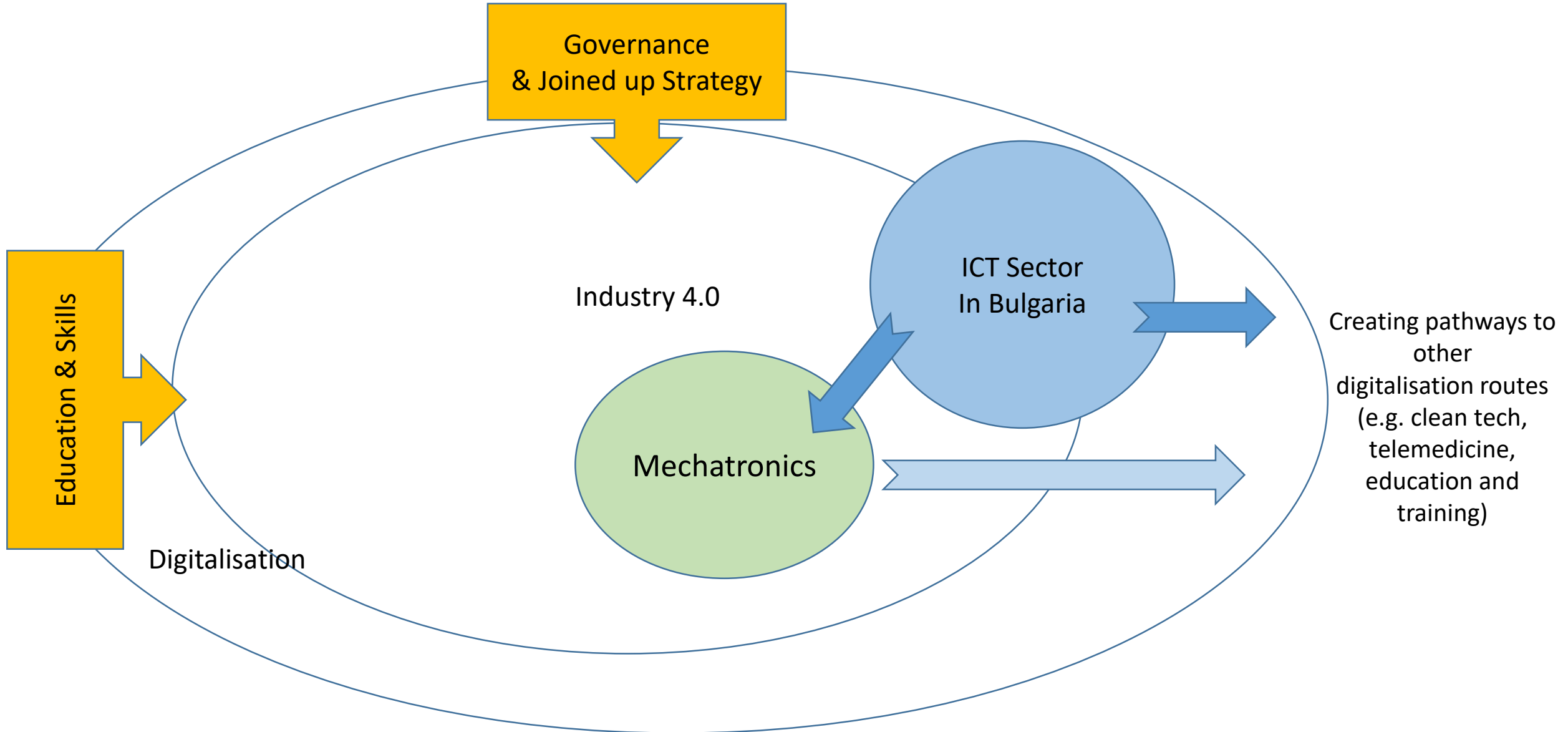
Key challenges of Bulgaria

- Low labour productivity and related low levels of income
- Shortage of labour due to migration (demographic crisis)
- Digitalisation at very low level across economy and society
- High concentration of economic and R&I activity in capital city
- Low level of (strategic) interactions in the system between public and private sector
- Despite overarching bodies such as Council of Ministers still fragmented policies
- Government strategies and decisions not consistently implemented

The thematic focus of this review

- *The linkage between mechatronics and the Bulgarian ICT sector in order to open up new pathways for digitalisation in society and manufacturing*
- Topic matches well with the government's ambitions for 2030 and in line with priorities of Smart Specialisation Strategy (RIS3)
- Combination of sectors can open up opportunities to upgrade value chains and support the wider need for digitalisation
- To achieve these ambitions asks for a coherent set of policies and closer alignment of public and private investments

Focus of the thematic case Bulgaria



Current state-of-play

- Bulgaria strong history in both mechatronics and ICT
- ICT sector showed steady growth in last 20 years and export oriented
- Mechatronics has relatively high level of R&D and innovation activity
- Promising mix of multinational, indigenous and start-up companies
- Nevertheless:
 - Labour shortage important bottleneck for growth
 - Overall level of digitalisation low in business, education and society
 - In mechatronics: stuck in low-value segments of international value chains
 - Not a strong domestic market for both industries
 - Strong concentration in the Sofia region

SWOT Orientation and planning

Strengths	Weaknesses
<ul style="list-style-type: none"> • Multiple strategic documents converging on EU priorities and on the chosen industrial transition theme of mechatronics, clean tech and digitalisation. • Established STI and RIS3 governance structure. • Clear leadership of the Council of Ministers together with the Ministry of Economy and Ministry of Education and Science. • Improved capacity of the Managing Authorities responsible for the main funding mechanisms, the operational programmes for innovation and for science and smart growth. 	<ul style="list-style-type: none"> • Lack of independent national political leadership and tradition in industrial policy constrain transition planning and orientation. • There is no permanent operational unit or body at the Council of Ministers level tasked with implementing RIS3 and capable of pulling in swiftly resources wherever needed. • Persisting silos between Ministry of Economy and Ministry of Education and Science. • Brain drain and tight labour market affecting the implementation capacity of the public administration across all levels and functions. • Lacking strong local support capacity • Lack of monitoring and evaluation frameworks
Opportunities	Threats
<ul style="list-style-type: none"> • Adoption of a whole-of-government approach to industrial transformation. • The continuing stability of EU policy and funds' framework, including the focus on RIS3. • The planned creation of a national innovation agency combining policy – making and funding capacity. • Increase in the available resources for technical assistance and the entering in the third planning cycle of EU funds. • Involvement of more private sector leaders and participants. • Creation of regional orientation and planning capacity around the Regional Innovation Centres, Centres of Excellence and Centres of Competence. 	<ul style="list-style-type: none"> • Slow decision-making due to continuous negotiations with the EU on OP implementation. • Reversal of globalisation trends, resulting in abrupt changes in export demand for the mechatronics, clean tech and ICT sectors. • Political instability or stale-mate in the face of the lack of common understanding on priorities among parliamentary political parties.

SWOT Resource mobilisation

Strengths	Weaknesses
<ul style="list-style-type: none"> • EU funds are likely to continue to increase in 2021 – 2027 and be focused on priorities identified in the S3 2014 – 2020: mechatronics, ICT and digitalisation. • Private education, business-led initiatives have stepped in the gap left by years of declining quantity and quality of education and education – business needs mismatch. • (Knowledge intensive) Employment in ICT and Mechatronics has been on the rise. Bulgaria among the top countries in the EU in growth of the number of ICT experts and of their share in total employment. • The private sector provides more than half of the R&D funding in the country, which in a development setting indicates strong potential for further enticing businesses to co-finance public R&D funding. 	<ul style="list-style-type: none"> • Bulgaria's population is shrinking fast. Education results in the secondary and higher education remain below average. • Bulgaria's fixed capital formation has shrunk since 2009 and is now one of the lowest in the EU. • Limited non-banking finance culture and practice. • Lack of understanding and coordination of available resources to stimulate systemic transformation. EU funding is concentrated in traditional STI, without drawing in funds for other purposes, like human resources, infrastructure, regional development, etc. • Vocational training remains limited in view of the high industry demand for higher quality human resources.
Opportunities	Threats
<ul style="list-style-type: none"> • Public funds for systemic change could be increased to leverage more competitive funding from EU programmes and to better target development goals. . • The Bulgarian government could broaden the framing of policy action even outside the S3, in view of the specific challenges of industrial transition in a development setting. • Strong focus of the secondary and higher education system on ICT and computer science. Emergence of many new schools, including such in close cooperation with businesses. • Leverage the created national and regional institutions for high-quality talent concentration (CoCs, CoEs, Tech Park, RICs). Bulgaria could benefit from investing larger share of its EU and national spending in non-R&D innovation investments. 	<ul style="list-style-type: none"> • Inability of the newly created CoCs, CoEs, Tech Park and RICs to leverage regional private sector competences and skills to meet global demand and gear the economy towards higher value added. • Continuing brain drain and inability to retain highly qualified experts due to the overall less favourable life and work environment. • COVID-19 could impact negatively the capacity of businesses to support viable industrial transformation by squeezing or displacing altogether economically viable companies under normal economic conditions. • Continuing deepening of regional disparities in human resources, which could further dampen equitable growth and lead to a vicious circle of relative decline.

SWOT Production

Strengths	Weaknesses
<ul style="list-style-type: none"> • Traditions in ICT and mechatronics in Bulgaria date back to the 1980s. • A decade of continuous strong growth in value added, employment and productivity in ICT services and hardware sectors and mechatronics, have created a number of successful examples of local companies and international investors, which can provide models for emulation. • ICT and mechatronics have established cluster initiatives, which allow companies in the country to develop cooperative initiatives, meet demands that outstrip the individual companies' capacity, and agree on common positions. • Both ICT and mechatronics sectors have continued influx of emerging dynamic start-ups, which enrich the competitive environment and the product mix supply. 	<ul style="list-style-type: none"> • Small national market. Shortage of technical and engineering personnel, both in terms of quantity and quality. • Lack of inter-relation between the ICT and mechatronics sub-sectors; both exist for export with not enough internal collaboration and links. • Unmet capacity in terms of non-R&D innovation, such as internationalisation, modern methods of marketing, and advertising, including further development of organisational-managerial capacity and business models. • Strong concentration of ICT business in Sofia. All other NUTSII&III regions have been losing population in the past decade. This could also be perceived as many opportunities for transformation development outside Sofia.
Opportunities	Threats
<ul style="list-style-type: none"> • The COVID-19 pandemic is likely to push demand for ICT and mechatronics higher and also prompt EU producers to shift their supply chains closer to home and away from China. • Identification of joint actions of common interest by business associations in mechatronics and ICT, and of regulatory and other interventions that could catalyse the transition. • Newly created CoC and CoE are concentrated in ICT and mechatronics and will create new opportunities and support for production • Increasing the local embeddedness of ICT companies in other sectors, including mechatronics and clean tech. Further integrating digitalisation in the educational process across different majors, thus preparing the economy for the wider use of digital skills. 	<ul style="list-style-type: none"> • Declining number of high-grade specialists, which can deliver more complex R&D tasks, over and above outsourcing. • Stopping or reversing of the pace of globalisation and the inception of trade wars, which can harm the country's growth prospects. • COVID-19 has further disrupted the global supply chains and is likely to accelerate further trade tensions, in particular between Europe and China. • Too quick and formalistic rebalancing of national policies towards green growth agenda without considering the possibility of linkages to digitalisation and to mechatronics and ICT.

SWOT Consumption

Strengths	Weaknesses
<ul style="list-style-type: none"> • EU and national funds for procurement are predictable and can serve as market pull factor. • Bulgaria's access to EU markets is an important factor for demand growth. • High coverage with high speed broadband for households and enterprises can be used to increase online consumption of goods and services. • Continuing commitment of substantial funds towards the development of e-government. • 100% connectivity of all schools in Bulgaria to the Internet. • High level of use of electronic public services by the business. 	<ul style="list-style-type: none"> • No coordinated government procurement policy in any of the areas: digitalisation, etc. • Low (though rising) domestic intermediate and final demand. • Low level of digital literacy of the population compared to the EU average. • Low level of usage of the internet and internet-based services. • Low implementation and use of ICT by SMEs in other industrial sectors. • Low level of e-commerce development compared to the EU average.
Opportunities	Threats
<ul style="list-style-type: none"> • Government digitalisation policies can be used to nurture demand for ICT services and hardware, if focused on major challenges for Bulgarian industry/mechatronics. • Though COVID-19 will hurt already low incomes, it could spur a cultural shift towards more online consumption and demand patterns, which might open new opportunities for digitalisation. • Combine EU and national public procurement and define targets for product and services development on national level through procurement policies. • Coordinate eGovernment spending with citizens' digital literacy measures and ICT integration in enterprises. • Work on internationalisation and demand from global growth markets through the provided EU funds. 	<ul style="list-style-type: none"> • Slowdown or reversing of the globalisation, which would decrease demand for Bulgarian goods and services. • Change in the political priorities on EU and subsequently Bulgarian level away from the identified transition areas. • Slowing of demand growth in Bulgaria.

National strategic objectives

- Multiple documents, governed by separate line ministries: fragmentation
- Trend towards streamlining:
 - Innovation Strategy for Smart Specialisation 2014 - 2020
 - National Development Programme: Bulgaria 2030
 - Digital Transformation of Bulgaria for the Period 2020 – 2030
 - Concept of Digital Transformation of the Bulgarian Industry (Industry 4.0)

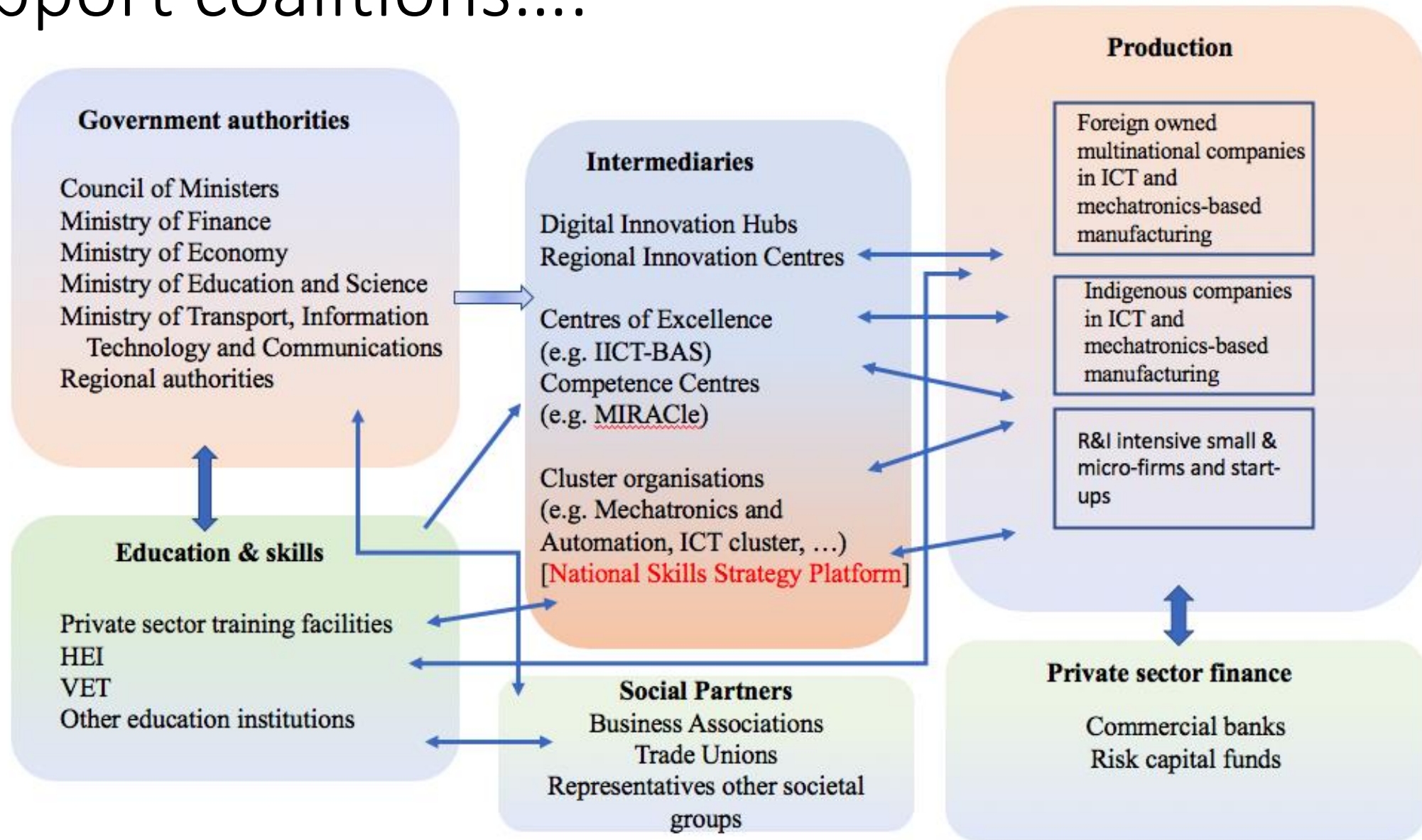
What could be some more general headline targets?

- GDP per capita in PPS relative to the EU average, % , baseline 51.2 -> target 75
- Digital Economy and Society Index (DESI), 36.2 -> 52.2
- Variation in GDP per capita (in PPS) by region, %, 37.5 -> 34
- Population (aged 25-64) participating in education and training, % , 2.5 -> 7
- Share of low performers in the Programme for International Student Assessment (PISA) (average for the three subjects of the study) 46 -> 25
- R&D expenditure, % of GDP 0.8 -> 2.5
- Integration of Digital Technology, DESI, %, 18.1 - > 50
- Share of high-tech exports in total export, %, 5.9 -> 15
- Ultra-fast broadband take-up, DESI, % , 9.7 -> 40
- 5G readiness, DESI, %, 0 -> 80

Pathways for the future

- Governance in government: joined up policies and more implementation capacity to support a 'smart industry'
 - Less focus on (digital) infrastructure, more focus on 'soft' innovation skills
- Education and training: raising quality and quantity of pupils, students and graduates with ICT, electronics and engineering competences
- Better alignment of education with business and societal needs
- Business sector: increasing the digitalisation capacities and business models to raise productivity and competitiveness
 - Identifying the business cases for closer interaction ICT and mechatronics
- Better stakeholder coordination across the entire system
- Demand side: public investment in digital competences, infrastructures, products and services

Support coalitions....



Recommended key actions

- Reinforce implementation capacities of (regional) government authorities and particularly the Council of Ministers
- Continue implementing planned activities RIS3 and ensure they are business oriented
 - Intermediary organisations (in particular Digital Innovation Hub, Cluster organisations, Competence Centres)
 - Regional Innovation Centres
 - Centres of Competence
- Set up National Skills Strategy Platform with representatives from government, business and educational sectors
 - Engage with new Skills Agenda for Europe
- Experiment with joint R&I actions between ICT Cluster (Digital Innovation Hub) and Mechatronics related clusters