Digital Business Model and SMART Economy Sectoral Development Trajectories Substantiation

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Abstract. Tendencies and perspectives of sectoral development in SMART economy have been shown. Digitalization and IoT development levels have been given. The necessity of precedence development in sectors that create a base for telecommunications industry has been substantiated. Original schema of substantiation of sectoral development trajectories in SMART economy based on identification of gaps between current and required levels of sectoral development and the usage of complex of transformable business models as a tool for overcoming this gaps have been proposed. The analysis of current state of electronic components manufacturing industry in Republic Bashkortostan has been conducted; low level of compliance with the requirements of SMART economy and sectoral target indexes has been identified. The digital business model of electronic components manufacturing industry development oriented on creation of integrated production manufacturers maintaining all stages of creation, production, selling the product (Integrated Device Manufacturers, IDM), and realizing as virtual integrator technology (VIDM) has been formed. The matrix of sectoral development substantiation in SMART economy based on criteria of production-technological and market readiness and digitalization levels has been built. Three basic trajectories of sectoral development (vertical, horizontal and mixed) based on different schemas of transformations of business models depending on available resources and government support level have been identified.

Keywords: SMART economy · Telecommunications and electronic components manufacturing industry · Digital business model · Development trajectory

1 Sectoral Development Trends in SMART Economy

Nowadays, the SMART or the digital economy is the key trend that defines the prospects for sectoral developement. The digital technologies evolution [2]:

– allows to significantly reduce costs of economic and social transactions for enterprises, individuals and the public sector;

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- rapidly improves efficiency – existing activities and services are becoming cheaper, faster, more convenient:
- stimulates the searching for new solutions, since the maximum level of efficiency can be reached when transactions are performed automatically without the personal participation (specific search engines, e-commerce, online payments, crowd funding platforms, new supply models etc.);
- allows individuals to get access to previously inaccessible services.

According to McKinsey data [15] the real prospects of the digital economy development are:

- increase in labor productivity in technical professions due to various labor automation aspects up to 45–55% more;
- equipment idle time – 30–50% less;
- maintenance costs reduction on 10–40%;
- stocks storage costs reduction on 20–50%;
- increase in forecasting accuracy up to 85 ± 5%;
- reduction of time before the product accesses the market – on 20–50%.

This can be achieved because of [9, 16]: digitalization of products and services; digitalization and integration of vertical and horizontal value creation chains; application of new digital business models improving client communication and access, client service process based on serving complex solutions in single digital ecosystem.

IoT (Internet of Things) which can be described as a system of integrated telecommunication networks and physical world objects (Things) packed with sensors and software for collecting and exchanging their data with a remote and automated [3] control ability is the technological basis of the digital economy. IoT technologies are widely used in such industry segments as «smart houses», «smart transport», «smart city». IoT spread analysis in different industry segments done by Capgemini Consulting и MIT Sloan School of Management [19] is showing that high-tech, banking and retail industries are having the highest profits from the «digitalization»; after them with a little lag there are telecommunications and hospitality industries, after - power production and housing industries. The lowest positions in this rating are hold by pharmacy, industrial production and consumer goods production.

According to IDC (International Data Corporation), company specialising on IT markets researches, IoT worldwide expenditure by the end of 2016 are estimated in $737 billion. This amount includes infrastructure and equipment costs, software and services costs, communication costs etc. IDC forecasts IoT market growth up to $1.7 trillion by 2020. Annual average growth rate during 2015–2020 is estimated at 15.6%. Machina Research and Cisco have given the more «forward» forecast – according to them, IoT market value in 2025 estimated at $4.3 trillion; also according to Accenture analysts IIot (Industrial IoT) market value will top $14 trillion [3] by 2030.

Thereby, despite the differences between the mentioned forecasts, their results and the results of many other researchers are showing the growth of digital maturity as a stable trend of sectoral development.

Being the one of leaders in digitalisation, telecommunication industry requires the specific material base from electronic industry to proceed it's development. Therefore, the lag of industrial manufacturing in modern Russia can cause serious problems and lead to irreversible lagging in SMART economy. According to experts from Boston Consulting Group [10], nowadays Russia exports about 90% of hardware and 60% of software. High export and investment stoppage led to the stagnation of the digital economy share in GDP since 2014.

In 2015 the share of digital economy was 2.1% of GDP, that is 1.3 times higher than 5 years before but 3–4 times lower than the leaders. The lag of Russia in general digitalization rating from the leaders is estimated at the level of 5–8 years. Without the adders-based stimulation of digital economy this lag estimation will grow to the level of 15–20 years in next 5 years [10].

The process of decreasing a current gap in condition of limited resources requires to define the sectoral development priorities correctly. Due to the impossibility of SMART economy «flagship» branches like IT and Telecommunications development without the appropriate material base procurement, special attention should be payed to various industrial sectors the progress in which is necessary for building a reliable foundation for digital economy in Russia. The example of that kind of industrial sectors is electronics manufacturing. It's specificity in SMART economy is that:

1. this industry provides the technological foundation of digital economy;
2. it's level of digital maturity and abilities to operate in new conditions are poor in Russia in general or in specified federal regions and do not satisfy requirements to complete the task;
3. the progress in this field should be conducted not only by the manufacturing technologies, but also the management practices.

Therefore, the feasibility studies in field of industries that provide the basis of digital economy, demand to develop new methodological approaches and analytical and decision-making tools.

2 Research Design

The relevance of developing new management instruments designed for completing tasks specific to sectoral development in SMART economy has been proven by researches [20]. According to the results of analysis of more than 400 companies from different industries four types were identified: digital leaders (Digirati), followers of «fashion» (Digital Fashionistas), beginners (Digital Beginners) and conservatives (Digital Conservatives). Companies that actively use digital technologies and new management methods (Digirati) get avg. 26% of income than their competitors. More conservative companies (Digital Conservatives) that perform only management upgrades increase their income on 9%. Digital Fashionistas, investing a lot in digital technologies while paying less attention to management, are not able to get the synergetic effect and create significant additional value based on digital applications; they get 11% lower in the financial indicators. Finally, companies that use digital technologies potential and management potential insufficiently get avg. 24% less income.

In this research the focused analysis of sectoral gaps that was chosen to become a basis for sectoral development trajectory rationalisation; it presumes (Fig. 1):

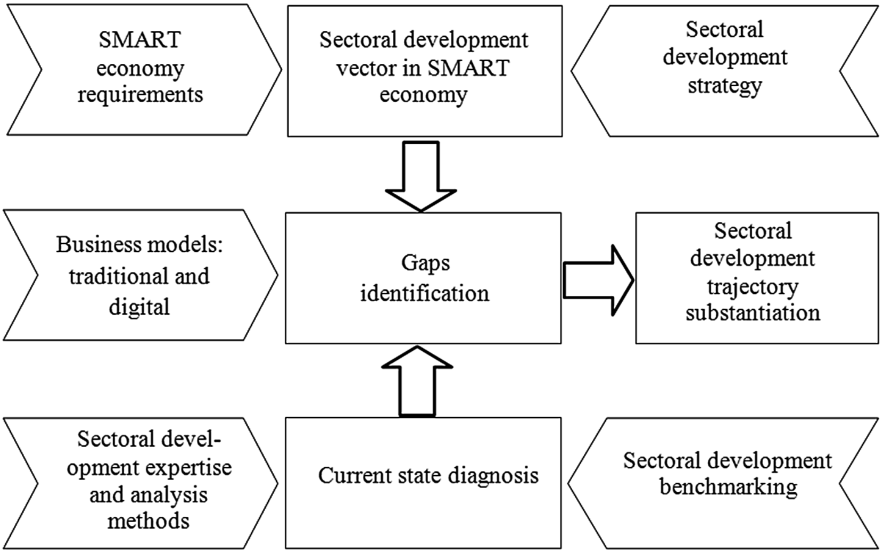

Fig. 1. Sector development in SMART economy rationale scheme

1. current state of sector diagnosis based on complex expertise and analytical scoring [6], including resources, processes and results of the chosen sector development. Strategy analysis and expertise scoring methods, matrix and factor analysis, sectoral development benchmarking – all this tools and methods should be used to complete diagnostic activities;
2. researches on sector development vector based on matching the strategy (or program) and the SMART economy requirements;
3. identification of strategic gaps and determination of sector development. Also, the correlation-regression analysis is used for the determination of prioritized vectors and projects of sector development.

Step-by-step trajectory is forming for the sake of overcoming detected sectoral development gaps. As a toolset for growth management we consider business models [6, 11, 14] by which we mean the way of creation customer value and get profit. According to experts [10] digital economy has an enormous influence on conservative business models; there are quite many researches on IoT business models or digital business models. However the necessity of counting of special aspects and maturity level requires to clarify contents of the model in case of electronic components manufacturing.

3 Sectoral Development Diagnostics and Gap Identification: Electronic Components Manufacturing

Nowadays, manufacturers located in Saint Petersburg and Moscow are leading in electronic parts manufacturing. Their share in overall amount of this industry production – 12.5% and 15.8% respectively. After the mentioned there go manufacturers from Sverdlovskaya and Samarovskaya regions – 4.6% and 3.2%.

Let us describe the state and perspectives of electronic components manufacturers on the example of Republic Bashkortostan (RB).

Industry Development Results in RB. Today contribution of companies located in RB to overall amount of sector production is quite humble – about 1.17% [7, 8]. The share of «electronic equipment, electronics and optical equipment» in manufacturing industry of RB equals 1.75%; of overall amount of shipped by RB manufacturing – 1.34%. This indexes are lower than in Russia or other world where the share of this high-tech manufacturing grows permanently and reaches 5–7% and 10–15% accordingly [7].

Sector Resources Analysis. Condition of the material base is characterised by the following marks: average age of equipment and it's deterioration are higher than same in overall industrial manufacturing (25.6 and 23 years accordingly), capital productivity of fixed assets is lower (2.15 RUB/RUB and 2.56 RUB/RUB) due to high levels of wearout (>50%) and incomplete usage of production capacity (about 60%).

Labor productivity in considered sector is losing to labor productivity in overall industrial manufacturing (1126 thous RUB/person and 1700 thous RUB/person accordingly). Value of this index is 1.5–2 times lower then in Russia, 4 times lower than in EU and 6 times lower than in USA; also, the growth rate of labor productivity is falling.

Processes Analysis. From the point of sectoral development the key processes are investing and investment implementation. Main investing vectors are: modernisation and renewal of production assets – more then 90%, investment projects on prior scientific and technical directions – less than 5%, others – 5%. The character of investments of sector's companies is chaotic, «patchy». The main emphasis is on the existing resource base and it's simple reproduction. All this reveals the lack of wide-scale targeted investment projects and will not lead to the transition to SMART economy.

Innovational product share in the sector was less than 1.8%. The sector does not accomplish the «high-tech» status.

On the other side, the government program «Electronics and electronic components manufacturing industry development program for 2014–2015» (approved by Russian Government decree at 15.04.2014, № 329) defines the following targeted markers for the sector:

- financial income increase 5.7 times in 2025 from the level of 2014;
- increase Russian-made electronic components share in the domestic market from 19% in 2014 to 30% in 2020 and 35% in 2025;

- sector production export level increase to 2025 on more than 3.5 times from the level of 2014;
- increase of production per 1 sector worker 4.4 times to 2025 from the level of 2014; the salary should become 2.6 times bigger;
- creation of 30 thou. new high-tech workplaces.

Due to overcome detected gaps in quantitive indicators and growth quality and fit the demands of SMART economy we need new development trajectories based on current business model development, the last's adaptation to digital.

4 Sectoral Development Digital Business Model Design

4.1 Traditional Sector Development Business Models Analysis

Choosing a complex development model focused on professional segments is justified in a mentioned above «Electronic components industry development strategy in Russia to 2030». The priority status goes to special purpose electronic parts manufacturing and import substitution of key special hardware and equipment with a decrease of customer electronics share.

In the context of sector development in Republic Bashkortostan, this exact vector should be considered as a sector development focus because companies located there are working mainly in the fields of professional and special purpose electronics [6].

In the worldwide management practices, the following business models support a basis in the segments of professional electronics and differ by coverage of value creation chain:

- integrated production manufacturer supporting all three stages of creating, manufacturing and selling products (Integrated Device Manufacturers);
- contract developers (Fabless) – doing all the RnD cycle and stand as customers of contract manufacturers;
- contract manufacturers (Foundry, Original Equipment Manufacturer, Original Design Manufacturer) - differ by scopes of contract work, by manufactured production type and by originality and licensing;
- contract Assembly and QA (testers).

Table 1 gives a brief comparative characteristic of mentioned business models considering their role in scientific-and-technical and manufacturing chain.

The existent sector business model in Republic Bashkortostan is the model with a prevalence of company types M2, M3 and M4. It can be described as an incorporation in sectoral and global production chains. Today more than 70% RB companies are integrated in vertical-integrated holdings. Besides, the analysis of traditional business models (Table 2) shows that they do not fit the tasks of region development and Russia in SMART economy and occur transitional.

The key criteria for choosing a sectoral development business model is it's ability to ensure the accomplishing of strategic targets. As seen in Table 2, the complete realisation of all objectives can be provided only on IDM model exploitation, the modification of which in digital economy is a virtual integrator model (VIDM).

Table 1. Traditional sectoral development business models characteristics

Indexing criteria	IDM (M1)	Fabless (M2)	Foundry (M3)	Assembly (M4)
1. Fullness of value creation chain coverage	All stages	Development	Production	Assembly
2. RnD investments level and RnD reserve value	High	High	Low/medium	Low
3. Production-technological potential	High	Low	Medium	Low/medium
4. Existence of competences through the whole value creation chain	High	Low	Medium	Low
5. Market potential	High	Low	Medium	Low
6. Investment capacity	High	Low	Medium	Low
7. Costs level	High	High	Medium	Low
8. Production and innovational infrastructure levels	High	Low	Low/medium	Low
9. Added value level	High	Low	Medium	Low

Table 2. Comparative analysis of sectoral development business models

Comparsion criteria	IDM (M1)	Fabless (M2)	Foundry (M3)	Assembly (M4)
1. Ability to ensure high sectoral (current sector + «customer» sectors) growth rates	+	–	–	–
2. Sufficiency of existent production-technological potential for the development	+	–	+/–	+/–
3. Ability for production capacity upbuilding with a considering of abilities of innovational and digital economy	+	+	+	+/–
4. Ability of model realization in current investment and financial conditions	–	+	+/–	+
5. Ability to overcome sectoral technological lags from world tendencies	+	+/–	+/–	–
6. Maneuvering and adaptation to unstable outer conditions abilities	+	–	+/–	–

In the process of forming the development trajectories the following must be considered:

1. sectoral development resource contradiction. On the one hand, the sector potential does not allow to realize integrated models, on the other hand, exactly this type of business models is needed for accomplishing strategic targets and multiplied growth;
2. separate companies cannot achieve technical-economical level that can be achieved with a cooperative functioning of participants with resource and competence cooperation [1, 5].

4.2 Electronic Parts Manufacturing Digital Business Model Design

Today there are many publications on researching of business models transformation in IoT ecosystem [12, 13, 17, 21, 22]. The main attention is given to interaction dynamics between business model components and necessity of fundamental revision of value creation and value capture principles. The ecosystem business model designing approach based on value network is being developed [13, 17, 21]. Realization of business models on this level is determined by the abilities of SMART economy technological platforms.

The basis of forming a digital business model for electronic components manufacturing sector is built on Osterwalder-Pigneur model [18]. The model is represented by two interconnected aspects: customer (Table 3) and industrial and technological (Table 4). Informative part of this model is transformed considering the requirements of SMART environment and key targets of sector development. All in all, full business model is realizing the VIDM concept.

Key business model transformations within the customer aspect in SMART economy:

1. key trend in SMART economy is a time-based competition which requires high speed of decision making and significant decrease of product's time-to-market type;
2. intellectual property, information and competences are the key resources and products;
3. radical changes in end-product structure: increase of intellectual property or rights on using it, research results share to 60–90% of overall profit and corresponding decrease of product share to 10–40% what leads to loss-profit structure changes;
4. expansion of SMART tools, instruments and client interaction mechanisms: digital communication channels, platform-style solutions, crowd-based technologies etc.;
5. border erasure between «key partners» and «key customers». Customer becomes a participant and investor of production process. Partners become a part of customer concept.

Key transformations within the industrial and technological aspect:

1. accents shifting to RnD activities (RnD, engineering, scientific consulting);
2. radical changes in industrial processes' principles: speed and agility become the key aspects;
3. disaggregation tendencies in industrial sector, reorientation to medium and small enterprises. Small business is building on a basis of existing development centres, which integrate «niche development» into global solutions and push them to the market;
4. value creation chain defragments to separate levels, growth of outsourcing approach;
5. resource dispositions damping with assist from virtual companies and virtual industrial clusters;
6. rate of innovation generating and it's commercialisation increasing due to dynamically growing clusters and business accelerators; changes in cluster's structure and character. In SMART economy clusters are represented as VIC - virtual industrial clusters, with an aim to provide access to remote unique resources.

Table 3. Customer aspect of VIDM model

Value for customer **(VP)**	Product (**P**)/Customer segments (**CS**)	Customer relations (**CR**)/Sales channels (**C**)	Revenue (**RS**)
Complex personified offering and integrated maintenance **VP1**-Product provisioning time (speed) **VP2**-High-Tech Competitive Product **VP3**-Providing high income to the consumer for a long time **VP4**-Providing long-term technological advantages **VP5**-Long life cycle with short stages of recession and curtailment of production **VP6**-Ability to modify and develop the product **VP7**-Comprehensive solution of the problem «on a turn-key basis» - accompaniment, maintenance, consulting **VP8**-Low cost of ownership (low operating costs) **VP9**-High level of customization **VP10**-Exclusive ownership of IP, embodied in the product **VP11**-Impossibility of copying by competitors **VP12**-The opportunity to participate in product development	**Products** **P1-**Professional electronics **P2-**Components, electronic base **P3-**Special technological equipment **P4-**Licenses **P5-**Rights (IP) **P6-**Engineering **P7-**Franchise **P8-**Competences **P9-**Staff leasing **P10-**RnD results **Customer segments** **CS1-**Final product manufacturers in RB, Russia, EU, countries of BRICS, SCO **CS2-**Cooperation chain partners **CS3-**Contractors **CS4-**Developers **CS5-**Enterprises implementing individual stages of the production cycle **CS6-**Engineering companies **CS7-**Electronic base developers **CS8-**Cluster members **CS9-**Subcontractors **CS10-**Outsourcers	**Customer relations** **CR1-**Virtual industrial cluster (VIC) **CR2-**Digital platforms: crowdfunding, technological exchange markets **CR3-**Virtual enterprise (corporation) **CR4-**Cooperative design and development **CR5-**Joint venture **CR6-**Digital order processes **Sale channels** **C1-**Automatic product transfer channels **C2-**Digital channels **C3-**Digital platforms **C4-**Internet platforms and communities **C5-**Wholesale **C6-**Order-based **C7-**Joint networks **C8-**Cluster channels **C9-**Government orders	**RS1-**From the sale of products, components, equipment **RS2-**From engineering **RS3-**From outsourcing **RS4-**From outstaffing **RS5-**From license sales **RS6-**From rights sales **RS7-**From participation in the authorized capital as owner of IP **RS8-**From scientific consulting **RS9-**From RnD **RS10-**From sales of competences **RS11-**From expertise **RS12-**From whole business selling **RS13-**From securities, crowd investment **RS14-**From crowdfunding platforms **RS15-**From e-commerce **RS16-**From franchise **RS17-**From advertising

Only the virtual integrator business model (VIDM) fully corresponds to characteristics given in Tables 3 and 4. Other models described in Table 1 corresponds this characteristics partly only. The accordance of business models to SMART economy requirements is shown in Table 5.

Table 4. Industrial and technical aspect of VIDM model

Key processes	Key partners	Key resources	Expenses
KA1-RnD **KA2-**Production **KA3-**Sales **KA4-**Service **KA5-**Supply chain management **KA6-**Production processes management **KA7-**Internet commerce **KA8-**Internet platforms administration **KA9-**Investor attraction **KA10-**Stock market work **KA11-**PR-GR management **KA12-**Security and protection of IP **KA13-**New productions designing **KA 4-**Offset transactions **KA15-**Startups acquisition	**KP1-**Design centers **KP2-**Crowdfunding platforms **KP3-**Internet platforms **KP4-**Contract manufacturers (foundry) **KP5-**Contract assemblers and testers (assembly) **KP6-**Service companies **KP7-**QA organizations **KP8-**ICT providers **KP9-**Component Providers **KP10-**Patent attorneys **KP11-**Banks **KP12-**Private investors **KP13-**Government investors **KP14-**Cluster members **KP15-**Virtual bank **KP16-**Competence providers **KP17-**Developers	**KR1-**Intellectual property **KR2-**Unique competences **KR3-**Organizational competences **KR4-**Products and technologies **KR5-**Production areas (ability to access)	**CS1-**For production **CS2-**For product placement **CS3-**For buying licenses and IP rights **CS4-**For creating and maintaining of Internet platforms **CS5-**For creation and maintenance of a database and knowledge base **CS6-**For RnD **CS7-**For creation of new enterprises **CS8-**For technologies transfer **CS9-**Networking costs **CS10-**For project expertise **CS11-**For securing and protecting IP rights **CS12-**Credits **CS13-**Competences rent **CS14-**Personnel rent **CS15-**For freelancing

So, the models M2–M4 are considered as transitional steps (transitional business models) of sectoral «ascending» to a new level, fulfilling the SMART economy requirements.

Table 5. Accordance of business models to SMART economy requirements

Components	M2 (fabless)	M3 (foundry)	M4 (assembly)
Customer aspect			
Value for customer (**VP**)	VP1-VP2-VP3-VP4-VP5-VP6-VP10-VP11-VP12	VP1-VP6-VP8-VP9-VP12	VP1-VP8
Product (**P**)	P1-P2-P3-P4-P5-P6-P8-P10	P1-P2-P3-P7-P8-P9	P1
Customer segments (**CS**)	CS1-CS2-CS3-CS5-CS8-CS9	CS1-CS2-CS3-CS4-CS6-CS7-CS10	CS1-CS3-CS5-CS8-CS10
Customer relations (**CR**)	CR1-CR2-CR3-CR4-CR5-CR6	CR1-CR2-CR3-CR4-CR5-CR6	CR1-CR3-CR5-CR6
Sales channels (**C**)	C1-C2-C3-C4-C6-C7-C8-C9	C1-C2-C3-C4-C5-C6-C7-C8-C9	C5-C6-C7-C8-C9
Income (**RS**)	RS1-RS2-RS5-RS6-RS7-RS8-RS9-RS10-RS11-RS12-RS17	RS1-RS2-RS3-RS4-RS7-RS10-RS12	RS1-RS7-RS10-RS12
Production-technological aspect			
Key processes (**KA**)	KA1-KA3-KA7-KA8-KA9-KA11-KA12-KA14	KA2-KA3-KA4-KA5-KA6-KA7-KA8-KA9-KA10-KA11-KA13-KA14	KA2-KA3-KA6
Key partners (**KP**)	KP1-KP2-KP4-KP5-KP6-KP7-KP8-KP10-KP11-KP12-KP13-KP14-KP15-KP16	KP3-KP4-KP5-KP6-KP7-KP8-KP9-KP11-KP12-KP13-KP14-KP15-KP16	KP4-KP6-KP7-KP9-KP14-KP16
Key resources (**KR**)	KR1-KR2	KR3-KR4-KR5	KR3-KR4-KR5
Expenses (**CS**)	CS3-CS5-CS6-CS8-CS9-CS10-CS11-CS12-CS13-CS15	CS1-CS2-CS3-CS4-CS5-CS7-CS8-CS9-CS12-CS14	CS1-CS9

5 «Sectoral Development Trajectory in SMART Economy» Matrix Rationale

The analysis of current condition of electronic components parts manufacturing industry in Republic Bashkortostan showed that the potential of region does not allow to realize fully the IDM model. Due to rationale of sectoral development trajectory the positioning matrix was developed (Table 6).

Combining of business models signifies the consistent integration of a company into vertical and horizontal value creation chains or in realization of the co-ordinated partnership model.

As it was shown in [20], effective functioning of a company depends on two constituents: digital intensity characterising investing in digital initiatives with a purpose to change company's operating activities and the deepness of management intensity transformations. Therefore the development of company defining the sectoral progress must be considered with both digital and management transformations.

Table 6. «Sectoral development trajectory in SMART economy» matrix rationale

Sector digitalization level	High	M2&M3 or M2&M3&M4	M1 (VIDM)	M1 (VIDM)
	Medium	M2	M2&M3 or M2&M3&M4	M1 (IDM)
	Low	M2 or M4	M3 or M4	M2&M3 or M2&M3&M4
		Low	Medium	High
	The level of industrial-technological and market sectoral readiness (of enterprises)			

According to the matrix (Table 6) there are three types of sectoral development trajectories:

1. Vertical trajectory (revolutionary scenario) – gap overcoming by using a combination of digital and management tools and instruments with a scope on digital. Visually it can be described as a direction from lower left quadrant to upper right: (M2 or M4) → (M2&M3 or M2&M3&M4) → (M1). Assumes development of unique competences through the whole value creation chain. Resource potential grows due to usage of partners' resources.

   Digital transformations and tools: virtual enterprises, network communities, virtual industrial clusters, crowdfunding platforms, IoT technology stack. Management transformation tools: technological stock markets, technology transfer systems, business acceleration.

   To make this scenario real the government support is needed strongly in fields like: investments in RnD stimulation, education development, building an infrastructure for RnD results commercialisation, special tax credits etc.
2. Horizontal trajectory (evolutionary scenario) – gap overcoming provided by a combination of digital and management tools with a scope on management. Assumes the prime upbuilding of management competences with a progressive transition on digital technologies: (M2 or M4) → (M3 or M4) → (M2&M3 or M2&M3&M4) → (M1).

   Management transformations and it's realisation tools are: manufacturing and technological modernisation, production processes automation, production models, mass customisation models, building of agile and adaptive production and competence centres, private-public partnerships, technological stock markets. Digital transformations: virtual industrial clusters, crowd-investing platforms.
3. Mixed transformation (base scenario)
   Gap overcoming due to combination of digital and management tools with an advance in digital technologies. Except the investments in production and technical modernisation, investments in human capital or filling the deficit a.o. virtual cluster

or virtual production personnel. Development of production powers can be also achieved with using a cooperation potential, licensed production development and outsourcing [4].

Digital transformations and tools: network communities, virtual industrial clusters, crowd funding and crowd-investment platforms. Management transformations and tools: outstaffing, personnel lease, outsourcing, license purchasing, licensed production creation.

6 Conclusion

Currently we can observe a strong unevenness of digitalization as in different countries and regions, as in different economy sectors. However for a development of SMART economy's «flagships» – telecommunications and IT – things like in-advance development of such base sectors as, at first, electronic components manufacturing are necessary for the whole sector development.

SMART economy development requires to only the wide digital technologies implementation, but the changes in management tools and instruments. Traditional business models should be changed fundamentally in the aspect of radical revision of value creation and appropriation principles, «value network» formation. As a digital business model the integrated device manufacturers or IDM model should be considered, supporting all stages of creation, manufacturing and selling the production, embodying the technology of virtual integrator (VIDM).

Current development level of electronic components manufacturing industry in most Russian regions does not meet the requirements of SMART economy.

The choice of sectoral development trajectory in SMART economy depends on three factor groups: current industrial-technical and market readiness levels, sector digitalization level and amount of government support. To substantiate a choice, the sectoral positioning matrix was developed, according to that the transition from current to objective state is carried out on the basis of consistent transformations of traditional business models into digital. Transformation process is oriented at the industrial-technological potential upbuilding and/or digitalization level depending on a chosen development focus (digital or management [20]), available resources and government support level.

There are three basic development trajectories:

– vertical trajectory (revolutionary scenario) – gaps overcoming by using a combination of digital and management tools and instruments with focus on digital. Presumes the development of unique competences through all the stages of value creation chain. Provides maximal results in the shortest time, but can not be realized without the government support and investments in RnD stimulation, education development, RnD results commercialisation infrastructure creation, special tax credits etc.;
– horizontal trajectory (evolutionary scenario) – gaps overcoming by using a combination of digital and management tools and instruments with focus on management. Presumes the prime accent on production-technical potential development

and limited by enterprise's investing capability. Possible to integrate in current chains or enterprises' entry in integrated sectoral structures due to overcome the technological and management competences deficit;
- mixed trajectory – presumes a higher priority of intellectual competences linked to production RnD, maximisation of digital technologies and virtual structure forming platforms (including integrated) usage. In order to overcome the deficit in management competences staff from a virtual enterprise or virtual cluster can be used. Productive capacity development can be also provided by using a cooperation potential, licensed manufacturing and outsourcing. Realisation difficulties of this trajectory are highly connected to the necessity of changes in management style and methods, risks linked to it and lack of appropriate management competences.

The advancing in sectoral development can be possible only on a vertical development trajectory basis based on complexed government support and investments in RnD stimulation, education development, creation of RnD results commercialisation infrastructure, special tax credits etc.

According to the results of current and expected conditions of the electronic components manufacturing industry the conclusion was made: in current conditions the only development trajectory that can be realised is horizontal, which implies way less growth rates and will not allow to achieve targeted development index values within the planned period.

Within the chosen development trajectory following recommendations on electronic components manufacturing industry in Republic Bashkortostan are formed:

- creation of cooperative enterprises as with CIS countries, as within the SCO and BRICS arrangements; mastering new sectoral directions with a scope on professional electronics segment.
- incorporation in technology chains as a supplier of unique competences (production, engineering, project design) as on regional, as on a global level;
- «soft integration» with intangible assets to technological chains of corporations and holdings;
- licensed production development, franchised technologies (buying and selling franchises);
- development of small business zones around big investor companies (i.e.g. CG Rostech)
- creation of a closed exchange market for technologies and patent bases interchange between enterprises.

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