

## **ROMANIA'S INDUSTRIAL POLICY TOWARDS THE 2020 STRATEGY<sup>1</sup> CASE STUDY – MECHATRONICS**

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### ***Abstract:***

*Within the 2020 Strategy, the European Commission launched in 2010 a new industrial policy strategy that outlined the actions needed in order to strengthen Europe's competitiveness and attractiveness, as a place for investment and production, including the commitment to monitor regularly the implementation of these policies.*

*One should note that the current industrial policy is very different from what the Commission proposed in 2007, when the crisis had not yet been felt [COM. no.374/2007]. Compared with the industrial policy in 2007, current programs have been adapted to meet the realities trying to keep the overall objectives of the development strategy of the Lisbon Agenda.*

*In 2012, the Commission notes that in the case of Romania [COM. no.582], it "specializes in sectors that require low innovation and education", and that on national level there is a "chronic lack of investments" in innovation and R&D; this is due to lack of national strategy, without which there is no coordination and integration of "industrial and innovation policies", furthermore the cooperation between responsible institutions is very low.*

*Given the current state of affairs in Romania, our work aims to draw attention to the opportunities represented by the interdisciplinary field of Mechatronics, based on experience and tradition in our country.*

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<sup>1</sup> This paper is based on research conducted under the Project INOVCLUSTER II, Coordinator: Institute of Economic Forecasting, 2011-2012

*To this end, the authors present some of the results and conclusions of a foresight exercise conducted on this field. Conclusions express, on a smaller scale, all the inconveniences of the Romanian industry, but also emphasize the positive outlook of this field in full ascent.*

**Key words:** industrial policy, clusters, foresight exercises, Strategy 2020

EU industrial policy is aimed at increasing competitiveness as a basis for achieving several goals: high standard of living, low unemployment, accelerated adapting to structural changes, encouraging an environment favorable to initiative, enterprise development and industrial cooperation across the Union, better exploitation of the industrial potential of policies for innovation and development of research and technologies. Within the 2020 Strategy, the European Commission launched in 2010 a new industrial policy strategy that outlined the actions needed in order to strengthen Europe's competitiveness and attractiveness, as a place for investment and production, including the commitment to monitor regularly the implementation of these policies.

Commissions Communications "An Integrated Industrial Policy for the Globalization Era" [COM 614/2010] and the "State of the Innovation Union" [COM 849/2011] are flagships of the new European strategy, where the role of clusters in developing industry becomes more evident. In addition to their communication strategy, we have another Communication "A Stronger European Industry for Growth and Economic Recovery. Industrial Policy Communication Update" [COM 582/2012] which sets out the Commission's approach and actions to be undertaken in order to achieve the objectives set out in previous communications. This is accompanied also by "European Competitiveness Report – Reaping the Benefits of Globalization" [SWD 299/2012]. One aspect that should be noted is that the current industrial policy is very different from what the Commission proposed in 2007, when the crisis had not yet been felt (COM. no.374/2007). Compared with the industrial policy in 2007, current programs have been adapted to meet the realities trying to keep the overall objectives of the development strategy of the Lisbon Agenda. In this regard, it is expressly stated that Europe needs a strong industry, competitive and innovative clusters and networks based on clusters.

In 2012, the Commission notes that in the case of Romania [COM. no.582], it "specializes in sectors that require low innovation and education", and that on national level there is a "chronic lack of investments" in innovation and R&D; this

is due to lack of national strategy, without which there is no coordination and integration of “industrial and innovation policies”, furthermore the cooperation between responsible institutions is very low. The Communication concludes that “in the long term, the challenge will be to ensure a paradigm shift away from unskilled labor and energy intensive sectors towards more smart, low-carbon and resource-efficient activities. Upgrading productive capacities and processes, investing in environmentally friendly, eco-efficient technologies, increasing the innovative potential of enterprises, and upgrading labor force skills and improving vocational and higher education and training will be essential for the future competitiveness of the Romanian industry”

Industrial policy in Romania was in the shadow of confusion, for a long period after 1990, between the desire to promote certain priority industries (often ad-hoc criteria) and trends of interventionism in the economy under the pressure of certain interested groups. Along with the defining of the first economic development strategy (for medium term, in 2000) – under the context of initiated reforms due to the start of the negotiations for accession in the European Union – one can speak for the first time, in post-revolutionary economic history, about that shaping of policy for industry, in Romania, and even more, about a more systematic and consistent approach to policies related to industry, in general. In Romania, the industrial policy related to stimulation of growth for potential innovative enterprises, especially for small and medium enterprises, along with improving technology transfers and business support infrastructure (business incubators, technology transfer centers, industrial parks, clusters, etc.), can be found in a series of programmatic documents, as follows:

- National Reform Program, 2011-2013 (PNR);
- Regional Development Plans, between 2007-2013;
- National Strategic Reference Framework, 2007-2013 (CSNR);
- National Competitiveness Strategy of Romania, 2012-2020;
- National Strategy for Research, Development and Innovation, 2007- 2013 (SNCDI);
- Government Strategy for the Development of SMEs, 2009-2013;
- Government Strategy for Improving Business Environment, 2010-2014;
- National Strategy for Sustainable Development of Romania. Horizons 2013-2020-2030 (SNDD);
- National Export Strategy 2011-2015(SNE).

By analyzing Romania's performance in industrial competitiveness, we can say that Romania's economy is primarily based on manufacturing, which is characterized by factors such as:

- Skilled labor, especially in sectors like textiles, knitwear, yarn and fiber, leather;
- Heavy machinery or equipment, especially in areas such as fiber and yarn, mill, cement;
- Energy intensive approach, valid for almost all branches.

The result is: an industry with relatively low skilled labor and low levels of the triad research, development and innovation. We can also see some of the results from the structural changes, however their paces is below those in the EU area, therefore appear less visible in Romania. These structural changes occur in:

- High technology (radio-TV);
- Dominant industries (cars, wires&cables);
- In areas dominated by knowledge and higher education level (communications, software).

As a result, the structural changes are associated with the reduction in traditional specialization in Romania. The economic crisis of recent years has emphasized these structural changes. Romania is classified as a modest innovator, in accordance with the findings in the documents of 2010, way below the EU average, partly due to the relatively low share of innovative enterprises and low investment in research and development by companies. However, in terms of growth, Romania is among the leaders, including here the group of countries called "countries with ongoing catching-up".

#### **Case study - Mechatronics**

One of the industrial branch that contribute to industrial catching-up, recorded in Romania, is mechatronics, due to the fact of its location on the border of several sciences. Located in a trend, similar to that in developed European economies, the field of mechatronics stirs interest among Romanian specialists, coming from different disciplines, presenting clear opportunities for future development of interdisciplinary activities, but also for the manufacturing, as a

whole. In the current form, „Mechatronics<sup>2</sup> represents a trans disciplinary field of engineering, a synergistic combination, between precision mechanics, and electronic systems for computerized command and control, that helps design, implement and commission intelligent automated systems”.

The Romanian industrial sector of Mechatronic is a young sector, developed through technological processing coming from two well-defined components of manufacturing, before 1990: precision mechanics and electrical engineering. Further integration of electronics and computer science has led to new openings, diversification and shaping new profiles within the manufacturing sector, mainly as a response coming from the horizontal industrial requests for mechatronic products.

Some of the most interesting characteristics of this field are:

- It makes an extremely important contribution to the creation of qualitative competitiveness and added value for all products and services of the domestic industry as a result of determined characteristics of the sector:

- High share of smart products;
- High degree of multidisciplinary connections, automation and miniaturization applied on all offered products and services ;
- Ensuring a high degree of monitoring industrial processes;
- Adaptability and flexibility conferred to industrial applications;
- The presence of natural resources required to cover intermediate consumption;
- It benefits from highly skilled personnel and expertise that support the industry through competence, modern management, adaptability to low labor costs, creating also appetite for foreign investments;
- Tradition of specialized school and recognized experience, along with the EU requirements.

Through the complex areas within the structure of industry and through its integrative nature, Mechatronics helps to develop synergies and high capability to direct and support the development of innovative SMEs.

Given the increasing interest shown around this area, Romanian specialists have investigated the prospects of its development – through various studies or specialized events. We decided to presents a series of results obtained during a

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<sup>2</sup> According to specialists from National Institute of Mechatronics, Inovcluster II Project, 2011-2012

public foresight exercise conducted to identify possible ways of development on this field, in Romania, based on the promotion of innovative clusters – as an instrument of the new industrial policy promoted by the European Commission.

### **Foresight of Mechatronics in Romania**

On the 26<sup>th</sup> of June 2012, a symposium was held, regarding "Clusters, drivers of the innovative development of industrial sectors", in which besides the seminars for textiles and machinery, there was held also a foresight seminar in the field of mechatronics-electrical engineering, based on a specific methodology.

Among the participants were approximately 12 experts representing research institutes, academia, and firms.

The SWOT analysis was based on the studies conducted by the Institute for Research and Development in Mechatronics (INCDMTM) and the Institute for Electrical Engineering (ICMET), each containing broad SWOT analyses. In the moderated discussions, the following factors, outlined in the following table, imposed themselves:

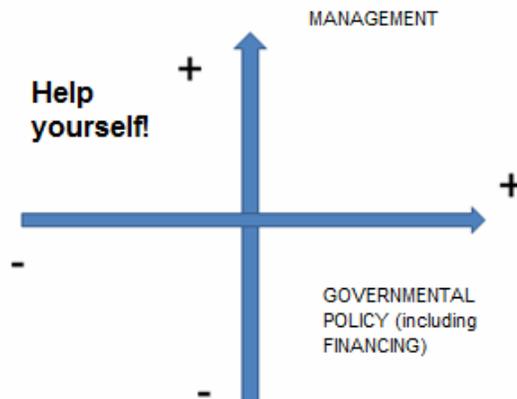
<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>- Branch with rich tradition, including education</li> <li>- Electrical engineering is a net exporter on the EU market</li> <li>- RDI intensive sectors</li> <li>- Skilled staff</li> <li>- High technology fields</li> </ul>	<ul style="list-style-type: none"> <li>- Low value-added products</li> <li>- The strict specialization of enterprises vs. Integrated demand provided by large consumers</li> <li>- Small number of firms in the field</li> <li>- Low investment</li> <li>- Lack of a coherent policy in the field</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>- Increase of productivity and of added value</li> <li>- Increasing domestic demand</li> <li>- The emergence of clusters that integrate the offer along the value added chain</li> <li>- Dedicated European programs</li> <li>- Convergence with EU policies</li> <li>- Capitalization of innovation results</li> </ul>	<ul style="list-style-type: none"> <li>- Decrease of RDI expenses</li> <li>- Strict regulations in the field</li> <li>- Workforce decrease/aging</li> <li>- Imports greater than exports</li> <li>- Rising energy costs</li> <li>- Asian competition</li> </ul>

Based on the SWOT analysis, the following trend, on which the shaping of the scenario later focused, was issued. The emergence of innovative clusters in the field of mechatronics/electrical engineering, that integrate firms along the value

chain, that build based on tradition and qualified personnel, that resort to existing European programs, that capitalize on the domestic demand and on the innovative potential, in order to combine the strict specialization of firms and to handle the integrated demand, to counteract the competition from Asia, the decrease in and aging of the workforce and the rising energy costs. Following the moderated discussion, key factors influencing the area of analysis were identified. These factors were then ordered by relevance/degree of uncertainty. Usually, the participants distribute a limited number of points in two different colors to indicate those elements considered important and/or uncertain. Each participant had to divide three votes between the proposed factors, both in terms of relevance and uncertainty. Two factors were retained, in the order of the score obtained by multiplying the previous results.

Factor	Relevance	Uncertainty	Score
<b>Governmental policy</b>	<b>9</b>	<b>8</b>	<b>9x8 = 72</b>
Involvement of local public authorities	0	0	0
Collaboration between education-research-development	1	1	1
Research and technological development in firms	2	3	6
Joint marketing of the SMEs in the cluster	0	0	0
Financing RDI	7	6	42
Infrastructure	4	4	16
Promoting associative concepts (cluster)	1	0	0
Competence of decision makers	0	3	0
Number and density of SMEs	0	0	0
<b>Management</b>	<b>7</b>	<b>4</b>	<b>28</b>
Communication and trust between cluster members	1	0	0

In order to establish a scenario matrix, the so-called critical uncertainties would be selected (usually 2, to limit the space of the scenario to a two-dimensional plane). Critical uncertainties are the elements with influence (key factors), while also being the most uncertain, as well as the most important. The matrix was designed according to the figure below.



The first (government policy) and the third factor (management) were chosen for analysis because the participants believed that the second factor, namely financing RDI, would be, to some extent, included in the first factor, thus losing some of its relevance. The participants chose to develop the scenario in the second frame (governmental non-interference, but with performing cluster management). Several titles were retained: "Through ourselves", "Help yourself", "Performance through intelligence". There is a strong will to develop innovative clusters in this field, but a lack of resources. As a result, clusters will develop around certain companies manufacturing products with low costs and the investments will be low. There will be difficulties in capitalizing the innovative potential. The problem of labor (brain drain and aging) will persist. The management will be forced to find innovative incentive solutions. Alternative funding sources will be accessed (including EU funds) and market niches will be sought (e.g. wheelchairs for the disabled, small engines for household appliances, wind turbines). An aggressive international marketing will be practiced and mergers will take place on specific market niches.

### Conclusions

1. Industry is one of the main sectors of the economy. For this reason, the overall objective of the industrial policy is to increase competitiveness and performance of Romanian industry within the global and European context. This can only be achieved by encouraging sustainable development, supporting research and development, innovation and entrepreneurship.

2. Industrial policy is implemented at national, regional and local level through various governmental documents, as well as programs and strategies. The vast majority of these have as main objective to improve the business environment by supporting SMEs, in terms of technological renewal, by promoting innovation, research and technological development, the development of networks and clusters, especially those who are innovative, and also improved access to finance.

3. For Romania, which is currently specializing in the textile, footwear, cement and metal area, on the long run, the challenge is to switch to smart activities with low carbon emission and efficient in terms of resource use, which also enables a way to overcome the present situation that is characterized by low skilled labor and energy intensive sectors.

4. One of the industrial branches in Romania, which is able to attract the attention of investors and policy makers alike, is the interdisciplinary field of mechatronics.

5. Based on a foresight exercise carried out in a research project (INOVCLUSTER II, Project), the authors try to outline the prospects for the development of mechatronics based on promoting clusters, well appreciated by the European institutions, as a necessary tool of the new industrial policies, and further more as a catalyst for innovation and economic efficiency.

6. Following this foresight exercise, some ideas were synthesized:

- Despite of a strong will to develop innovative clusters in this field, there is a lack of resources
- Alternative funding sources will be accessed (including EU funds)
- There will be a search after specific market niches.

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