

Research-development and innovation in small and medium-sized enterprises in Romania

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Abstract. *Within the withdraw of the welfare state from its classic functions of providing a decent quality of life for citizens, the individual's role in supporting their living standard is increasing. Personal accountability in the current socio-economic context marked by labour force mobility, economic competitiveness, international economic exchanges, demographic challenges, active aging, and the emergence of some new and atypical employment forms (part-time work, teleworking, self-employment, etc.) reconfigure the role that accessing and maintaining a job plays. The article analyses private small-and medium-sized Romanian enterprises' capacity to integrate research-development and innovation (RD&I) elements within their ordinary activity. The research hypothesis is that despite these actions taken by Romanian SMEs the innovation process as a whole is still not well represented within their current activities in the meaning of limited openness towards the innovation process. The research methodology is based on a secondary analysis of the data collected within the 2004-2018 White book of SMEs in Romania. 15 yearly editions collected data were focused on SMEs' innovations and characteristics of SMEs digitalization process. In terms of findings, the openness of Romanian SMEs towards innovation can be characterized by innovation activities and ways of achieving innovation. Investment in Romanian SMEs' innovation is rather the desired direction as it only occupied the top position in 2007. The main information sources for SMEs' innovative processes are "customers and consumers, own organisation, and journals and specialized magazines". As a promising track is recorded in Romania in the last years towards integrating RD&I in ordinary SMEs' activities, medium, and long term complementary national public policies should welcome and further push these sustainable development directions.*

Keywords: digitalisation, innovation, small- and medium-sized enterprises, Romania

JEL Codes: O32, O35, M15,

1. Introduction

Acknowledged at the European Union' level, innovation was promoted by the Lisbon Strategy as well as Europe 2020 Strategy. Besides, the year 2009 was proclaimed as the European Year of Innovation and Creativity at the level of EU member states. Current international established goals (e.g. UN Sustainable Development Goals or European Green Deal) emphasize the key role played by research-development and innovation (RD&I) strategies in achieving economic and social goals as reducing poverty or clean environment-related actions in order to stop global warming.

The article assumes as a starting point that modern society "is characterized by innovation institutionalization, respectively by the expansion of systematic activities of searching, generating, applying and disseminating at as high paces as possible the innovation in all sectors of the social system" (Vlăsceanu, 1993, p. 302).

The emphasis on promoting innovative elements triggered the research question of the present paper: to what extent the Romanian small and medium-sized enterprises are open to the innovation process. In order to answer this question, secondary analyses based on information about innovation in SMEs, and the

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characteristics of SMEs' digitalization, according to the 15 editions of the SME White Book in Romania was accomplished. The yearly research initiative of Romanian SMEs enterprises is welcome by the academic area as it benefits by the support of the Romanian National Council of Small- and Medium-Sized Enterprises in partnership with the former Ministry for Business Environment, Commerce and Entrepreneurship (current Ministry of Economy, Energy, and Business Environment).

In terms of structure, the first part of the article approaches the concept of “innovation”. The second part of the paper details the main results related to RD&I elements as perceived by the Romanian representatives of SMEs. The last part brings a series of conclusions and recommendations for improving the future integration of innovation-related elements.

2. Research Elaboration

The research methodology consists of secondary data analysis of 15 yearly editions of “White book of small and medium-sized enterprises in Romania” for the 2005-2018 period conducted by the National Council of Private SMEs in Romania in collaboration with both public and private stakeholders. For example, the 2018 edition was run in collaboration with the Romanian Ministry of Business Environment, Trade, and Entrepreneurship, while private actors supported different stages of the research process.

Based on both research of the “innovation” concept and data-based evidence, the paper explores innovation activities within SMEs, ways of achieving it, investments in innovation, incomes obtained by renewing products and services, financing sources for investments in RD&I in SMEs, the optimum period for unfolding an RD&I projects, the optimum duration for recovering the investments realized in RD&I projects, main sources of information for the innovative processes in the SMEs, barriers in unfolding RDS activities, use of information technology in SMEs – the structure of IT components used in SMEs, and use of Internet/ Intranet in SMEs and purpose of using it.

3. The innovation concept

The academic research interest in studying innovation does not emerge “as a stage in the logic of cognitive reflection, but as a reflex of the emergencies born in the dynamics of collectives” (Zamfir, 2009, p. 8). Innovation is closely related to the term of discovery and of invention, which in turn includes elements of novelty but incorporated at different levels: “discovery and invention, at the level of final products, innovation at process level” (Stănescu, 2009, p. 19). In sociology, the concept of innovation has a rather broad meaning and signifies a “change resulting from the initiative of one or several individuals that affects, as the case may be, economy, politics, science, or even culture” (Bejin, 1996, pp. 136-137). Innovation might be defined either as “an idea, method, or technical products with novelty characteristics as a result of the creative individual or collective activity”, or as “change generated within a system (technical, economic, social, and cultural, etc.) as result of implementing some new discoveries” (Vlăsceanu, 1993, p. 301). The stages of innovation pursue the following succession: “developing a corpus of hypotheses, recourse to experimenting, transiting to production, and finally the consumption of the new products” (Ferreol, 1995, p. 93).

The specific approaches of (social) innovation lead to social development defined as “orientation of a community/institution towards achieving a desirable state established as objective to be accomplished by a process planned over time, the result of a set of conjugated actions” (Zamfir, 2007, p. 173). In this respect, with reference to innovation in the field of social work, Arpinte underpinned the fact that “it has an essential role by promoting those changes required for development and adjusting services to the needs of the beneficiary” (Arpinte, 2009, p. 91). At the same time, not the volume of innovation determines “the development and efficiency of the system of social assistance. Important is the way in which the innovation is used, and how it is absorbed at the level of the programs and permanent services of social assistance” (Arpinte, 2009, p. 99). Whether we refer to the economic, technological, or social field, “innovation is a condition for evolution and means a readjustment, or better adjustment of the individuality” (Hideg, Neamțu, 2019, p. 1). Regarding the link between innovation and entrepreneurship, Drucker emphasizes that an innovative business presupposes “that innovation itself be organized as a systematic activity. It requires that the business itself be

organized to be a successful innovator. It requires both a discipline of innovation and a discipline of entrepreneurship that is a discipline of how to make innovation effective in the market place" (Drucker, 2007, p. XV). Various innovation sources are mentioned: the unexpected success and failure, incongruities, process need, industry and market structures, demographics, changes in perception, and new knowledge (Drucker, 2007, p. 33-117). Alongside, Drucker refers to three key conditions: 1. "innovation is work (...), 2. To succeed, innovators must build on their strengths (...), 3. Innovation is an effect on the economy and society" (Drucker, 2007, p. 125-126).

Joseph Alois Schumpeter, the father of innovation, as considered by economists, defines innovation as "a new combination of production factors" (Schumpeter, 1982, p. 244). This implies combining production factors to produce new goods and services, applying new production methods, discovering new ones, markets for resources and raw materials, new technologies, increasing managerial and marketing skills, etc.

The Organization for Economic Cooperation and Development (OECD) defines innovation as "the result of implementing new or significantly improved products or new processes, new marketing methods, or new methods of managing the organization. Business practices, workplace or external relations" (OECD, 2005). Seven priority areas were identified in 2014 at the EU level, among which specific investments in research and innovation can have a positive impact on the well-being and health of the population (EU, 2020).

4. Innovation elements in small- and medium-sized enterprises from Romania

This part is based on processing 2004-2018 editions of the White Book of the SMEs in Romania (CNIPMMR 2004-2018). Depending on the capacity to continue this impressive national research, the specific research tools applied to the various items regarding some aspects are pursued for longer or shorter time intervals. We recommend a slight change of questions within the questionnaire as for academic purposes; it would be very useful to comparatively continue to analyze the available data. The following aspects are taken into account: Innovation activities within SMEs; ways of achieving innovation; investments in innovation; incomes realized by renewing products and services; financing sources for investments in RD&I in SMEs; the optimum period for unfolding research-development projects; optimum duration for recovering the investments realized in RD&I projects; main information sources for innovative processes within SMEs; barriers in unfolding RD&I activities; use of information technology in small- and medium-sized enterprises – a structure of used IT components within SMEs; and use of Internet/Intranet in SMEs – the purpose of using Internet/Intranet in SMEs. We present the situation below comprehensively for each of the above indicators, as in line with the above-mentioned White Charters consulted. For more information, also the appendixes by the end of the article might be consulted.

4.1. Innovation activities in SMEs

The inquired elements as regards the innovative actions undertaken by SMEs have included prospecting following elements: "new products", "new technologies", "modernization of the information system" (except 2010-2012 "informatics system"), "new management and marketing approaches", and "training human resources" (since 2007).

Regarding the ranking of the first three innovative activities for the period 2004-2017, we find the constant presence of four options: "new products", "new technologies", "new management and marketing" approach, and "modernization of the information system". The constant, but the modest concern of respondent SMEs for the IT system coincides with the intensified commercial presence in the virtual environment, but also to the potential risk represented by cyber-attacks, and the rigors of complying with the (inter)national regulations such as the newly launched General Data Protection Regulation (GDPR) at the level of the EU member states. The magnitude taken by the concerns regarding the information aspects specific to the development of SME activities' is noticeable. We find that even by 2006, only 1% of the SMEs showed interest in the modernization of the information system.

Save for the year 2007, in the period 2004-2017, “new products” were ranked in the first place as an innovative activity. “New technologies” were placed in 2007 in the first position. The maximum value was achieved in the year 2006 (“new products”, 41%), while the minimum value was in 2014 (“new products”, 28%). The detailed analysis shows that the results from 2006 reflect higher interest for realizing some innovative activities among SMEs active for a period of 10 to 15 years from the region of development south, and represented by small enterprises organized legally as Limited Liability Companies from the field of industry (CNIPMMR, 2006, pp. 316-319). At the same time, the SMEs from the year 2014, which undertook the smallest innovative efforts, had ages between 5 and 10 years and were localized in the development region North-West, and most are micro-enterprises organized legally as joint-stock companies and were active in the field of tourism (CNIPMMR, 2014, pp. 272-277). In the second position were placed most frequently “new technologies” (eight times), followed by “new management and marketing approaches” (four times). We notice that in 2004, these two items had equal values by 18%. In 2007, in the second position was placed “new products”. The maximum value was recorded in 2007 (“new products”, 33%), while the minimum value was registered in 2014 (“new technologies”, 14%). In the third position, as regards the frequency of innovative actions were placed with equal frequencies (three times) both “new technologies”, and “new management and marketing approaches”. Another item recorded twice was “modernization of the information system”. The maximum value was recorded in 2007 (“new management and marketing approaches, 25%), while the minimum value was in 2004 (“modernization of the information system, 10%).

From the viewpoint of the distribution of innovative actions in the ranking regarding the first three positions, leaving aside the effective values obtained, we notice similar profiles for the years:

- 2006, 2008-2011, 2013, 2014, 2016: “new products”, “new technologies” and “modernisation of the information system”,
- 2005, 2012 and 2015: “new products”, “new management and marketing approaches” and “new technologies”,
- 2004 and 2017: “new products”, “new technologies”, and “modernization of the information system”.

For this bulk of items were also recorded “it’s not the case” answers (2004 – 2006, and 2010 – 2017) and “do not innovate” (2007 – 2009). The minimum value for “it’s not the case” was by 16% in 2014, and was exceeded constantly in the subsequent years, and reached 45% in the year 2014. As future research direction, we consider as useful identifying the profile for these SMEs and analyzing in-depth their reasons in a qualitative study. It would be interesting to pursue their development in time: do they constantly remain against innovative actions? Are there new SMEs that thicken their ranks? If yes, for what reason?

4.2. Ways of achieving innovation

The four options included in the SMEs research were: “adjustment and changing novelty elements developed initially by other organisations”, “taking over integrally elements of novelty developed initially by other organisations”, “unfolding individually of research-development activities”, and “cooperation with other organisations as regards the unfolding of research-development activities”.

Due to the changes registered in the process of developing the research tools, we find that this bulk of questions was implemented only by 2012 so that our analysis is based on data gathered for the period 2012-2018. From the perspective of ranking the ways by which innovation is achieved within the SMEs from Romania, we find that in the first place is ranked most frequently, “adjustment and changing novelty elements developed initially by other organisations” (2013-2016, and 2018). It is followed by “unfolding individually research-development activities” (2012), and “taking over integrally the novelty elements developed initially by other organisations” (2017). The maximum value for the first position was registered in the year 2015 (“adjusting and changing novelty elements developed initially by other organisations” 48%), while the minimum value was in 2017 (“taking over integrally elements of novelty

developed initially by other organisations” 38%). On the second position was placed most frequently “unfolding individually research-development activities” (2013-2016), followed by “adjusting and changing novelty elements developed initially by other organisations” (2012 and 2017), and by “taking over integrally novelty elements developed initially by other organisations” (2018). The maximum value was recorded in 2017 (“adjusting and changing novelty elements developed initially by other organisations”, 33%), while the minimum value was in 2015 (“unfolding individually research-development activities”, 25%). On the third position of the ranking was placed for six out of the seven years of analysis, “taking over integrally novelty elements developed initially by other organisations” (2012-2017), followed by “unfolding research-development activities individually” (2018). The maximum value was recorded in 2013 and 2014 (“taking over integrally novelty elements developed initially by other organisations”, 25 %) while the minimum was in 2015 (“taking over integrally the novelty elements developed initially by other organisations”, 20%).

4.3. Investments in innovation

From the viewpoint of values for the first position, it is surprising that in 13 out of the 14 analyzed years, the SMEs had no innovation investments. Only in the year 2017, in the first position was placed the percentage investment by 5.1-101% in innovation, and in 2009 the percentage by 0.1-5%.

For the first top position, the maximum value was recorded in the year 2014 (no percentage for innovation as stated by 49% from the respondents) while the minimum value was registered in 2009 (“0% equal as value with the share by 0.1-5% which was the answer for 20% from the ones surveyed). On the second position are found only two percentages of investments in innovation: 0.1-5%, and 5.1-10%. We notice that for the year 2005, these have recorded some value. At the same time, comparatively, the percentage allotted by 0.1-5% for investments is found in 10 out of the 14 analyzed years (2004-2007, 2010-2014, and 2016), while the percentage by 5.1-10% in five years (2005, 2008, 2009, 2015 and 2017). The maximum value was registered in 2012 (“0.1-5%” answered 26 % of the SMEs), while the minimum value was in 2009 (“5.1-10% for 18 % of the respondents). In the third position, we remark with priority the share by 5.1-10% dedicated to innovation in 8 out of the 14 years of analysis: 2004, 2006, 2010-2014 and 2016. On the third position, as well, follows the share by 10.1-20% dedicated to innovation registered for the respondents in three years, respectively 2005, 2008, and 2015. For only one year, were also recorded the following shares of investment dedicated to innovation: 0% in the year 2007, 0.1-5% in 2015, and 20.1-50% in 2009. The maximum value was registered equally in the years 2006 and 2008 (“5.1-10%” and a share by 10.1-20% ” for 19% of the respondents), while the minimum value was in 2011 (“5.1-10% for 13% of the respondents).

4.4. Incomes obtained by renewing products and services

On the first position in the top is placed the share by 0% resulting from incomes obtained by renewing services and products in 11 out of the 14 years included in the study. The share by 5.1-10% follows that was recorded in the years 2008 and 2009, and the share by 10.1-20% in the year 2007. The maximum value was recorded for three consecutive years 2010-2012 (no share for 46% of the respondents), while the minimum value was registered in 2006 (no share for 21% from the respondents). In the second position were placed the shares by “0.1-5%” for half of the analysed years: 2010-2014, 2016 and 2017. After that follows the share by “5.1-10%” for the years 2006, 2007 and 2015, and the share by “10.1-20%” for the years 2004, 2005 and 2009, and by 0% for the year 2008. The maximum value was recorded in 2016 (“0.1-5%” according to 23% from the respondents), while the minimum value was recorded in 2010 (“0.1-5%” for 17% from the respondents). On the third position of the ranking were placed, as follows: the share by “5.1-10%” from the incomes generated by renewing products and services in eight of the studied years: 2004, 2005, and 2009-2014. Then follows the share by “10.1-20%” for the incomes in the years 2006, 2008, and 2016. In one single year were recorded the following shares: 0% in 2007, “0.1-5%” in the year 2015, and “20.1-50% ” in the year 2017. The maximum value by 19% for respondents was recorded in five different years: 0% in 2007, “0.1-5%” in the year 2015, “5.1-10%” in the year 2009 and “10.1-20%” in the years 2006 and 2008.

4.5. Financing sources for investments in research-development and innovation in SMEs

The items taken into account were: “own resources”, “loans, bank credits”, “EU funds”, “funds from local public authorities”, “funds from central public authorities”, and others. According to the available data for the period 2012-2018, the main financing source of investments in the RD&I process for Romanian SMEs was represented by their own sources. Maximum values by 89% of the respondents were recorded constantly in the period 2012-2014. The lowest value (67%) was found for the year 2017. We remark on the discrepancy between the years 2014 (89%) and 2015 (71%), a period that coincided with the elections for the current President of Romania in November 2014. In the second position, but the significant difference is placed the answer "loans, bank credits" with a maximum threshold of 21% recorded in 2015. At the opposite pole, the lowest value was in the year 2018 by only 8%. Three types of funds were prospected as representing financing sources for R&DI in SMEs: the European Union (EU), the local and central public authorities. The highest values were recorded in the case of those made available at the community level, respectively 6% in 2012 and 2% (2013-2015). Second, as share are the ones accessed from central and local public authorities. In the third position are placed the “funds from the EU” (2012-2017), and “others” (2018). The maximum value was registered in the year 2012 (“funds from the EU” la UE” according to 6% from the respondents), while the minimum value was registered in the years 2013-2015 (“funds from the EU” as stated by 2% from the respondents).

4.6. The optimum period for unfolding a research-development project

This relevant element for the innovation activity within SMEs from Romania was implemented in the research instruments only in the year 2013. The items suggested for the evaluation of the period considered as optimum for unfolding a research-development project were of “up to 6 months”, “6 to 12 months”, and “1 to 2 years”. In the first position were ranked: the period "1 to 2 years" (2013-2015), “up to 6 months” (2017 and 2018), and "6 to 12 months" (2016). The maximum value was recorded in the year 2018 ("up to 6" months for 51% from the respondents) while the minimum value was recorded in 2014 and 2017 (“1 to 2 years” and “up to 6 months” for 36% of the interviewed persons). In the second position, we found two items present: "6 to 12 months" (2014, 2015, 2017, and 2018) and "up to 6 months" (2013 and 2016). The maximum value was registered in the year 2016 (“up to 6 months”, replied 36% of the respondents) while the minimum value was in the years 2015, 2017, and 2018 (“6 to 12 months” for 22% from the respondents). On the third position were placed the following: "1 to 2 years" (2013, 2014 and 2015), "up to six months" (2017 and 2018), and "6 to 12 months" (2016). The maximum value was recorded in the year 2016 (“1 to 2 years” answered 33% from the SMEs), while the minimum value was in 2018 (“1 to 2 years” for 19% of the respondents).

4.7. The optimum duration for recovering the investments realized in research-development and innovation projects.

The answers to this question were: “up to 6 months”, “6 to 12 months”, “1 to 2 years”, “3 to 5 years”, “6 to 10 years” and “over 10 years”. We find that the period was changed correspondingly to the research tools, so that in the period 2013-2015 was recorded a single category, respectively, "over 5 years". As of the year 2016, it was differentiated into two categories: “6 to 10 years” and “over 10 years”. On the first position were placed: “1 to 2 years” (2013-2016), “3 to 5 years" (2017), and “up to 6 months” (2018). The maximum value was recorded in the year 2014 (“1 to 2 years” answered 47% from the representatives of the surveyed SMEs), while the minimum value was in 2017 (“3 to 5 years” answered 29% from the respondents). On the second position were placed: “3 to 5 years” (2013-2015), “up to 6 months” (2016-2017) and “1 to 2 years” (2018). The maximum value was recorded in the years 2016 and 2018 (“up to 6 months”, respectively “1 to 2 years” replied 28% of the respondents). At the same time, the minimum value was in 2014 (“3 to 5 years” replied 19% from the surveyed ones). On the third position were placed: the period “6 to 12 months” (2014, 2016 and 2018), “up to 6 months” (2013 and 2015), and the period “1 to 2 years” (2017). The maximum value was recorded in the years 2013 and 2017 (“up to six months”, respectively “1 to 2 years” replied 19% of the respondents). The minimum value was in 2015 (“up to 6 months” for 15% from the surveyed individuals).

4.8. Main sources of information for the innovative processes in the SMEs

The research instruments for the White Charter of SMEs were applied as of the year 2004. In time, these were improved as to allow for implementing some new aspects regarded as relevant for investigating the situation of SMEs from Romania. From this perspective, as of the year 2013, were collected data about the main sources of information for the innovative processes within the SMEs. The respondents were asked to answer this question with the following options, respectively “own organisation”, “customers and consumers”, “suppliers of equipment, materials”, “journals and specialised magazines”, “direct competitors and/or indirect ones”, “exhibitions, fairs, conferences, etc.”, “employers' organisations and other professional associations”, “consulting, private research organisations”, “universities”, “government and/or public research institutions”, and “others”. Save for the year 2018, on the first position was ranked the option “customers and consumers” (2013-2017). In 2018, on the first position was placed the option “own organisation”. The maximum value was recorded in the year 2014 (“customers and consumers”, for 73% from the respondents). The minimum value was in 2018 (“own organisation”, for 42%). On the second position was placed preponderantly “own organisation” (2013-2017), followed by “customers and consumers” (2018). The maximum value was in 2014 (“own organisation”, for 52% from the surveyed individuals), while the minimum value was registered in 2013 (“own organisation”, considered 33% of the respondents). On the third position in the ranking was placed the option preponderantly “journals and specialized magazines” (2013-2017), followed by “suppliers of equipment, materials” (2018). The maximum value was recorded in 2015 (“journals and specialized magazines” stated 37% from the respondents), while the minimum value was in 2018 (“suppliers of equipment, materials” answered 21% from the respondents).

4.9. Barriers in unfolding research-development and innovation activities

The options to this question included the following answers: “the high costs of research activities”, “own insufficient funds”, “uncertainty regarding demand for innovative products”, “lack of medium-, and long-term forecasts about the evolution of the sectors of activity”, “difficulty in finding partners in view of cooperating as regards research-development activities”, and “the lack of adequate human resources”. The main barrier was considered “high costs of research activities” for the entire period 2013-2018. The maximum value was recorded in the year 2015 (58%), while the minimum value was in 2016 (33%). The second and third position was disputed between the options “own insufficient funds”, and “uncertainty regarding the demand for innovative products”. “Insufficient own funds” was placed on the second position in all the years, save for 2017 when it was replaced by “uncertainty regarding the demand for innovative products”. The maximum value was recorded in the year 2013 (41%), while the minimum value was in 2018 (28%). “Uncertainty regarding the demand for innovative products” was on the third position of the ranking in all years, save for 2017 when it was replaced by “own insufficient funds”. The maximum value was recorded in the year 2013 (39%), while the minimum value was in 2018 (18%).

4.10. Use of information technology in small- and medium-sized enterprises – the structure of IT components used in SMEs

The options to this question were “computers”, “Internet”, “email”, “own site”, “Intranet”, “online sales/purchases”, “none of the above”, “others”, and “IT not used”. In the ranking of the first three options as frequency were counted: “computers”, “Internet”, and “email”. Save for the year 2014 (“Internet”), on the first position was placed the option “computers”. The minimum value was in the years 2007 and 2009 (“computers” replied 83% from the representatives of SMEs). On the second position was placed preponderantly “Internet” save for the years 2014 (“computers”) and 2017 (“email”). The maximum value was registered in the year 2013 (“Internet” for 83% from the respondents), while the minimum value was in the years 2005 and 2017 (“Internet”, respectively “email” by a 64% share). The third position was taken by “email” for the period 2005-2016, next to “Internet” (2017). The maximum and minimum values were recorded for “email” in 2010 (75% from the respondents), respectively, the year 2005 (57% from the respondents).

4.11. Use of Internet/Intranet in SMEs – the purpose of using Internet/Intranet in SMEs

The options in answering this question included the following: “communication with suppliers or customers”, “obtaining information about the business environment”, “facilitating communication inside the company”, “transactions, contracts, payments”, “for promoting products/services”, and “not connected to the Internet”. On the first position of the ranking as regards the first three options were counted with priority “communicating with suppliers or customers” (in 12 out of the 13 years analyzed: 2006-2017). Also, on the first position was placed “obtaining information about the business environment” in 2005 and with a value equal to the first option in 2008. The maximum value was recorded in the year 2009 (“75 %”), while the minimum value was in 2005 and 2006 (“59 %”). On the second position were placed “obtaining information about the business environment” (2006-2007, 2009-2014), “for promoting products/services” (2015-2017), “facilitating communication within the company” (2008), and “communication with suppliers or customers” (2005). The maximum value was recorded in 2013 (“obtaining information about the business environment”, 67%) and the minimum value in 2008 (“facilitating communication within the company”, 29%). On the third position were placed “facilitating communication within the company” (2005-2007, 2009 and 2010), “transactions, contracts, and payments” (2006-2007, 2009 and 2010), “obtaining information about the business environment” (2015-2017), and “for promoting products/services” (2014). The maximum value was in 2013 (“transactions, contracts, payments”, 51%), while the minimum value was in 2008 (“transactions, contracts, payments, 25%).

5. Conclusions

The article emphasized the main RD&I elements in Romanian SMEs as in line with the yearly 2004-2018 White Book of Romanian SMEs. The main 2004-2017 innovation activities in SMEs were: "new products", "new technologies", "new management and marketing approaches", and "modernization of the information system". The main way of achieving innovation, according to the available data for the period 2012-2018, is "adjustment and changing novelty elements developed initially by other "organizations. In the period 2004-2018, only in 2007 in the first position was recorded the investment in innovation. In all other years, in the first position was registered the investment zero in innovation. The situation is somewhat better in the case of incomes achieved by renewing products and services. In 11 out of the 14 years analyzed, the value of zero incomes is in the first position, while the other positions are shares by 5.1-10% (2008 and 2009) and 10.1-20% (2007). The main financing sources of investments in RD&I within SMEs for the period 2012-2018 were their own sources, loans, and bank credits, and funds at the community level. Both the optimum period for unfolding a research-development project and one of recovering the investments for RD&I projects is – according to the opinion of SMEs representatives from Romanian – of 1 to 2 years. The main information sources for innovative SMEs' innovative processes are "customers and consumers, the own organization, and journals and specialized magazines". According to the data available for the period 2013-2018, the main barriers in unfolding insufficiencies were the high costs of research activities, "insufficient own funds", and "uncertainty about the demand for innovative products". Regarding the use of information technology in small- and medium-sized enterprises, the structure of SMEs' IT components places in the first three positions: computers, the Internet, and email. In the first position as regards the use of Internet/Intranet in SMEs – the purpose of using the Internet/Intranet in SMEs is "communication with suppliers or customers", next to "obtaining information about the business environment".

Further research could assess to what extent these above-mentioned elements support the achievement of international and UE established goals (i. g. Millennium Development Goals or European Green Deal) within the context of managing large natural resources and concern for preserving the biodiversity (Barna, 2008; Botan, 2015). Besides, innovative SMEs such as social enterprises could represent an asset in emphasizing the key role played by Research Development and Innovation related strategies in accomplishing economic as well as social purposes (Stănescu *et al.*, 2013; Neagu, 2014; Barna, Vameşu 2015; Rebeleanu, 2016; Lambru, Petrescu, 2019; Mihalache, 2020).

In the context of the contemporary driven knowledge-based economy, the shared concern for implementing innovation-based elements within Romanian SMEs is an integral part of their development strategy on the medium-and long-term towards both increasing their competencies to successfully activity on the labor market and rationale use of generally available resources (Vasile, Zaman 2005; Nicolae, 2007; Zaman, Gherasim 2007). The current Romanian Ministry of Economy, Energy, and Business Environment, through its designed national policies, could play a valuable role alongside other private and public (inter)national stakeholders.

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Manuscript received: 27.08.2020

Manuscript received in revised form: 04.09.2020

Manuscript accepted: 16.09.2020

7. Appendixes

7.1. Appendix 1: Ranking of innovative activities in the period 2004-2017

| No. | | 2004 | 2005 | 2006 | 2007 | 2008- 2011 | 2012 | 2013-2014 | 2015 | 2016 | 2017 |
|-----|-----------------|--|---|---|------------------|------------------|---|---|---|---|---|
| 1. | First position | New products | | | New technologies | New products | | | | | |
| 2. | Second position | New technologies/new management and marketing approaches | New management and marketing approaches | New technologies | New products | New technologies | New management and marketing approaches | New technologies | New management and marketing approaches | New technologies | |
| 3. | Third position | Modernisation of the information system | New technologies | New management and marketing approaches | | | New technologies | New management and marketing approaches | New technologies | New management and marketing approaches | Modernisation of the information system |

Source: CNIPMMR 2004-2017 White Charter of SMEs in Romania

7.2. Appendix 2 Ranking regarding ways of achieving innovation

| | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----|-----------------|--|--|------|------|--|------|--|
| 1. | First position | Unfolding individually research-development activities | Adjusting and changing novelty elements developed initially by other organisations | | | Taking over integrally novelty elements developed initially by other organisations | | Adjusting and changing novelty elements developed initially by other organisations |
| 2. | Second position | Adjusting and changing novelty elements developed initially by other organisations | Unfolding individually research-development activities | | | Adjusting and changing novelty elements developed initially by other organisations | | Taking over integrally novelty elements developed initially by other organisations |
| 3. | Third position | Taking over integrally novelty elements developed initially by other organisations | | | | | | Unfolding individually research-development activities |

Source: CNIPMMR 2012-2018 White Charter of SMEs in Romania

7.3. Investments in innovation

| No. | | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----|-----------------|---------|-----------------|------|---------|------|----------|----------|------|---------|------|---------|--------|---------|----------|
| 1. | First position | 0% | | | 5,1-10% | | 0% | | | | | | | | |
| 2. | Second position | 0,1-5% | 0,1-5%/ 5,1-10% | | 0,1-5% | | 5,1-10% | | | 0,1-5% | | 5,1-10% | 0,1-5% | 5,1-10% | |
| 3. | Third position | 5,1-10% | 10,1-20% | | 5,1-10% | 0% | 10,1-20% | 20,1-50% | | 5,1-10% | | | 0,1-5% | 5,1-10% | 10,1-20% |

Source: CNIPMMR 2004-2017 White Charter of SMEs in Romania

7.4. Incomes achieved by renewing products and services

| No. | | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----|-----------------|----------|------|----------|----------|----------|----------|---------|--------|------|--------|----------|----------|--------|------|
| 1. | First position | 0 % | | | 10,1-20% | 5,1-10% | | | 0 % | | | | | | |
| 2. | Second position | 10,1-20% | | 5,1-10% | | 0% | 10,1-20% | | 0,1-5% | | | 5,1-10% | | 0,1-5% | |
| 3. | Third position | 5,1-10% | | 10,1-20% | 0% | 10,1-20% | | 5,1-10% | | | 0,1-5% | 10,1-20% | 20,1-50% | | |

Source: CNIPMMR 2004-2017 White Charter of SMEs in Romania

7.5. Financing sources of research-development investments within SMEs

| No. | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | |
|-----|-----------------|------------------------|------|------|------|------|--------|------|--|
| 1. | First position | Own sources | | | | | | | |
| 2. | Second position | Loans, banking credits | | | | | | | |
| 3. | Third position | EU Funds | | | | | Others | | |

Source: CNIPMMR 2012-2018 White Charter of SMEs in Romania

7.6. Optimum period for unfolding a research-development project

| No. | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----|-----------------|-------------|----------------|------|----------------|------|----------------|
| 1. | First position | 1-2 years | | | 6-12 months | | Up to 6 months |
| 2. | Second position | 6-12 months | | | Up to 6 months | | 6-12 months |
| 3. | Third position | 6-12 months | Up to 6 months | | 1-2 years | | |

Source: CNIPMMR 2013-2018 White Charter of SMEs in Romania

7.7. Optimum duration for recovering investments realised in research-development and innovation projects

| No. | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | |
|-----|-----------------|----------------|-------------|----------------|----------------|-----------|-------------|----------------|
| 1. | First position | 1-2 years | | | | 3-5 years | | Up to 6 months |
| 2. | Second position | 3-5 years | | | Up to 6 months | | | |
| 3. | Third position | Up to 6 months | 6-12 months | Up to 6 months | 6-12 months | 1-2 years | 6-12 months | |

Source: CNIPMMR 2013-2018 White Charter of SMEs in Romania

7.8. Main sources of information for innovative processes in SMEs

| Nr. | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | |
|-----|-----------------|------------------------------------|------|------|------|---|------|--|
| 1. | First position | Clients and customers | | | | Own organisation | | |
| 2. | Second position | Own organisation | | | | Clients and customers | | |
| 3. | Third position | Journals and specialised magazines | | | | Suppliers of materials, equipment, etc. | | |

Source: CNIPMMR 2013-2018 White Charter of SMEs in Romania

7.9. Barriers in unfolding research-development and innovation activities

| No | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----|-----------------|--|------|------|--|------|--|
| 1. | First position | High costs of research activities | | | | | |
| 2. | Second position | Insufficient own funds | | | Uncertainty about demand for innovative products | | Insufficient own funds |
| 3. | Third position | Uncertainty about demand for innovative products | | | Insufficient own funds | | Uncertainty about demand for innovative products |

Source: CNIPMMR 2013-2018 White Charter of SMEs in Romania

7.10. Use of information technology in small-, and medium-sized companies – structure of IT components used in SMEs

| No. | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----|-----------------|-----------|------|------|------|------|------|------|------|------|-----------|-----------|-------|------|
| 1. | First position | Computers | | | | | | | | | Internet | Computers | | |
| 2. | Second position | Internet | | | | | | | | | Computers | Internet | Email | |
| 3. | Third position | Email | | | | | | | | | | Internet | | |

Source: CNIPMMR 2005-2017 White Charter of SMEs in Romania

7.11. Use of Internet/Intranet in SMEs – purpose of use

| No. | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----|-----------------|--|---|------|--|--|------|-----------------------------------|------|---------------------------------|------|--|------|------|
| 1. | First position | Obtaining information about the business environment | Communication with suppliers or customers | | Communication with suppliers or customers / Obtaining information about the business environment | Communication with suppliers or customers | | | | | | | | |
| 2. | Second position | Communication with suppliers or customers | Obtaining information about the business environment | | Facilitating communication within the company | Obtaining information about the business environment | | | | | | For promoting products/services | | |
| 3. | Third position | Facilitating communication within the company | Facilitating communication within the company / Transactions, contracts, payments | | Transactions, contracts, payments | Facilitating communication within the company | | Transactions, contracts, payments | | For promoting products/services | | Obtaining information about the business environment | | |

Source: CNIPMMR 2005-2017 White Charter of SMEs in Romania