

Advanced, Cross-Disciplinary & Integrated **M**edical **I**maging
for all **EU**ropeans through a
Network of **R**egional Clusters and **D**evelopment **S**trategies

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List of Abbreviations

Abbreviation	Full expression
SRA	Strategic Research Agenda
AMI	Advanced Medical Imaging
ICT	Information and communication technologies
SWOT	Strength, Weakness, Opportunities, Threats
SMEs	Small and Medium Enterprises
MI	Medical Imaging
RTD	Research, Technology and Development
RS	Republic of Srpska
WP	Work Package
RS/BiH	Republic of Srpska/ Bosnia and Herzegovina
R&D	Research and Development
MoCA	Ministry of Civil Affairs of Bosnia and Herzegovina
MSZS	Ministry of Health and Social Welfare of the Republic of Srpska
MSTRS	Ministry of Science and Technology of the Republic of Srpska
NGOs	Non-governmental organizations
EU	European Union

1. EXECUTIVE SUMMARY

“Strategic Research Agenda (SRA) of AMI Research Cluster in the Republic of Srpska/ Bosnia and Herzegovina (BiH)” is a document which aims to provide a roadmap for a first research driven cluster in the field of Medical Imaging and Advanced Medical Imaging, to explain roles and future strategic actions for the cluster’s members as well as relations to main stakeholders and potential partners and networks in the field of public health.

The field of Medical Imaging has the potential to contribute to the creation of new jobs, economic growth, foreign investments and opportunities for regional SMEs. Therefore, this SRA shows how Medical Imaging and the MI research cluster can help the regional as well as national economy in sense of generating bigger domestic incomes, producing more jobs and increasing competitiveness of national economy.

Research from previous project documents (D7.1 “Initial Analysis Report” and D4.6 “AMI RTD SWOT Analysis Report”) and corresponding exercises have shown very clearly that the Medical Imaging sector is one of the fastest growing ones in sense of investments, considering the whole sector of public health and its financial investments records (public and private as well). SRA intends to point on the economic impact of Medical Imaging in this region is one key issue that should be considered by all relevant stakeholders and for benefit of whole society and region.

SRA document presents the general institutional framework in the Republic of Srpska, mapping key stakeholders that have very important role for further development of sector of Medical Imaging. In this way, AMI research cluster members succeed to identify more than 60 different national and local authorities, financial public and private actors (investment banks, business angels, regional development banks, etc.), associations, public-private-partnerships (PPPs), health delivery system managers, health centres, hospitals, institutes, spa’s, universities, private specialised institutions and SMEs.

The research activities developed by the AMI regional cluster should be governed by certain principles in order to meet expectations of key stakeholders within the health sector and to provide maximum efficiency of AMI regional cluster in communication with society and academic community. Those governing principles is considered as 5 major principles: provide scientific and benefit for patients or to be patient-centred; participate in EU level research activities and projects, such as a Framework Programme and others; follow up most modern achievements in the field of AMI and to encourage innovativeness and talented researchers; meet all the ethical and other issues and to prevent any possible misuse of knowledge and providing strategic leadership and facilitating collaboration when needed.

The SRA defined the vision of AMI Cluster in the Republic of Srpska to be a leading medical RTD cluster in Bosnia and Herzegovina and Western Balkan for Advanced Medical Imaging and related medical and healthcare research activities, with ultimate goal to increase overall level of knowledge for provision of quality and modern healthcare services to citizens, respecting ethical and moral issues. SRA also provides strategic agenda for achievement of this vision and foresee several strategic objectives to be achieved such as: achieving excellence in research, promoting AMI and related research activities,

developing market relations with SMEs dealing with AMI and implementation of most updated and modern AMI equipment and ICT infrastructure.

In order to achieve the mission of AMI research cluster, SRA is offering implementing agenda, exploring different research niches and specific research areas for further MI development (especially focused on new technologies like ICT in imaging, biotechnologies imaging, biomedicine, nanomedicine and use of nanoparticles in Advanced medical imaging, etc)and additionally describing innovation framework and education environment.

Communication and relations towards key stakeholders and society is crucial for AMI cluster visibility and its sustainable functioning. One of the main issues of SRA document is pointed on this communication channel between AMI regional cluster and public bodies, academic and research community, independent researchers, public health sector and especially SMEs connected directly or indirectly with MI, systematically using formal and informal dialogue occasions.

AMI research cluster has to be main contact point for relevant stakeholders and capable to face with different challenges: analysing needs of different actors in public health and MI sector; offering and delivering optimal solutions for end-users; initiating new research projects and technology development; to become hot-spot for research excellence and innovation; main partner for policy advising and strategy implementation in field of MI.

Except abovementioned, it has to be emphasised that AMI research cluster has to be open toward other related clusters and initiatives and to be ready on synergy and opportunities for benchmarking and exchange of best practices.

In the following document, brief findings and facts concerning industrial and research landscape in the Republic of Srpska/BiH, structure of healthcare system and benefits to society and region are provided in Chapters 2 and 3. In these Chapters are given most important information on document background and overall impact on society and region.

Moreover, specific role and tasks for the AMI research cluster in research and academic community in the Republic of Srpska are explained together with main governing principles (Chapter 4). The aim of these governing principles is to point on main directions for future work of the cluster. The principles as such are more generic and require more specific development plans that cluster should produce.

In Chapter 5 SRA points at all benefits which this organisation brings to research and higher education institutions as well as companies oriented to field of Medical Imaging, nanomedicine and ICT for health. Beside this, The SRA intent to explain the importance and benefits not just in national context but also key advantages and opportunities in sense of regional cooperation and possibilities of raising funds and investments from regional, international and European programmes and initiatives which consequently improving national and regional public health infrastructure and quality of human resources in health sector. Moreover, the resulting key advantages and opportunities deriving from regional cooperation and their integration into a national context will be outlined.

2. INTRODUCTION

The present document is deliverable D7.5 “SRA for the Republic of Srpska Cluster on AMI” within the project’s Work Package 7. This document aims at originating and strengthening research activities and capacity building related to Advance Medical Imaging (AMI). The agenda supports expertise development and cooperation in the regional research-driven cluster. It assists the research-driven cluster to choose the focus of research activities, and supports the authorities in directing the use of human and financial resource. This SRA was produced by project partners that are core of the Republic of Srpska’s research-driven cluster in health, and these are:

1. Agency for economic development PREDA Prijedor
2. University of Banja Luka Faculty of Medicine
3. Europrojekt centar Banja Luka
4. General hospital Prijedor

The content of the SRA was defined in a previous phase of the project realization. It intends to be a comprehensive guide for researchers and research organizations that have interest in the research of AMI and its related fields. This SRA is composed of 6 main chapters that discuss important SRA issues addressed by more experienced clusters participating in the AMI-4EUROPE project.

The “Executive summary” gives in brief main findings, conclusions and recommendations given in this SRA. This chapter gives a review of the whole SRA, underlying main and important issues.

In the “Introduction” the SRA presents a picture of AMI research benefits for the society, the overall region, the industry and the main stakeholders. In the "General Framework" the impact of AMI to overall society in order to present possible benefits and importance of AMI for society is explained.

In chapter “Governing principles of the SRA”, main methodological and practical principles for the implementation of the SRA and its main reasons for strengthening AMI and research in AMI are given. These governing principles are a “path” for successful improvement of AMI related research levels, as well as to foresee possible barriers in the operationalization of actions on further development of AMI in RS.

The chapter “Implementing SRA” gives a vision and strategic objectives of the SRA and the research-driven cluster. Furthermore, thematic research areas, an analysis of the value chain, as well as priorities in research are demonstrated. The SRA also gives possible paths for implementation and inclusion in the innovation framework, with parallel influence on strengthening of education and training activities. The SRA is explicit in its intention to support process of lifelong learning as one of the most important issues in further development of AMI.

In chapter “Intercommunication outside” are given diverse views on how the communication between AMI related research capacities and research-driven cluster should be organized and implemented.

The last chapter gives concluding remarks produced in this SRA.

2.1. Contributions to Society

RTD health cluster in the Republic of Srpska is the **first cluster of that kind in the whole of Bosnia and Herzegovina**. As a centre of a network of stakeholders, the Cluster has an exceptional opportunity to influence the communities that surround them – on local, national, and international levels. Through comprehensive and extensive connections within the network, stakeholders can contribute to society through pioneering research and development of advanced medical care. This may take the form of evidence for policymaking, social improvements or the translation of research into cost-effective, practical, policy- and technology-based interventions that improve people's health and quality of life. Activities of the Cluster could also be pointed to the promotion of the talents who are able to contribute to the research and development. With this activity, RTD health cluster answers the expectation of the industrial world and the regional society as a creative and intelligent basis of original research.

2.1.1 Industrial landscape

Ministry of industry, energy and mining of the Republic of Srpska is the highest level of entity authority responsible for the SME sector. This authority defines measures for economic- and development-policies to support different economic activities, monitors effectiveness of measures on the industrial production on targeted sectors and companies (SMEs), adopts technical regulations and adjust it with EU legislative, etc. This ministry has a major role and responsibility in the implementation of the strategy of the development of SME in the Republic of Srpska.

According to the document "**Strategy of development of science in the Republic of Srpska from 2011 to 2016**" published by the Ministry of Science and Technology of the Republic of Srpska, systematic planning in new technologies is missing in our country. Also, the role of R&D in economic reconstruction of modern technologies is insufficient, and together with the brain drain, it will cause permanent damage to the Republic of Srpska's development. The Ministry has recognized that a radical change of social status and the repositioning of science and technology are needed if we want to keep in line with developed countries. There is a chance for our Cluster to become a link between research institutions and SME's, because they don't have the possibility to build their own research facilities. Therefore, the Cluster should participate in the building of technology parks, centres for transfer of technologies and incubation centres and become a central part of such network. This strategy is supported by the strategy of The Council, where it is stated that we should "stimulate the building of clusters and connect them with SME's, private companies and successful public business systems".

2.1.2 Research landscape

In the research area there are several possibilities which a Cluster might be able to improve. First of all, **continuous and specialized training in medical education** can be stimulated through the Cluster, which could serve as an initiator and supporter of these activities. The Cluster should initialize specialist seminars, company visits and member presentations. Also, specialized training courses could be directed toward the idea of AMI and integrate several disciplines around one idea.

The Cluster could represent a great opportunity for the **opening of new laboratories**, especially in the part of finding sources of financing. Currently, insufficient facilities and equipment are huge problems in RS's research area. Without proper equipment (and staff training) research is not possible and we see a Cluster as an opportunity to overcome these problems.

Another opportunity, which is also related to 2.1.1. "Industrial Landscape," is to **connect companies and SMEs**. Together with the Cluster they could apply for grants available worldwide and have stronger opportunity to get the funds. Also, such cooperation is an opportunity for education and exchange of the staff. This way, the financial support would be available and staff members could go out of RS, work in international projects and, when they come back here, use and transfer their new knowledge.

According to the "**Strategy of development of science in the Republic of Srpska from 2011 to 2016**" published by Ministry of Science and Technology of the Republic of Srpska and created by the Republic Council for Science, one of priorities in research is "Medicine and Healthcare (including research in medicine, biomedicine, genetics, medical biotechnology, healthcare and its management)"¹. In the mentioned document, the research should be focused on numerous important issues that in its basis are having Medical Imaging and AMI. Therefore, the Cluster is fully on track with the corresponding Strategy in the region.

2.1.3 Healthcare system

In the healthcare system of the Republic of Srpska there are no specialized associations directly involved in the field of AMI. There is an opportunity for the Cluster to improve such a picture. As mentioned in the WP3 analysis report for Republic of Srpska, the **Development program of the Republic of Srpska** emphasized the health system as one of priority sectors. In this area, projects for purchasing of high quality diagnostic devices and modernization of clinical centers are especially emphasized. Through the AMI-4EUROPE project, the Cluster members made contacts with several equipment manufacturers and suppliers and we could offer to the Ministry of health and social welfare to use the network of our contacts to obtain necessary equipment.

Worldwide clusters in the field of healthcare serve as an important factor of the regional economy and create a large local job market for researchers, doctors and nurses. In the spirit of good practice our Cluster could use the same approach. Through support to healthcare institutions our network might be a good chance for them to find financial support for their projects, not only in the field of purchasing of equipment, but also for the control of costs and for measuring the level of achieved plans, staff development and quality control.

All relevant stakeholders - health institutions of secondary and tertiary level - in healthcare system in the Republic of Srpska are part of the RTD health cluster in the Republic of Srpska. The other stakeholders, such as Faculty of Medicine Foca at University of East Sarajevo and other research institutes will be invited to join the Cluster upon its formal establishment. This will provide comprehensive participation

¹ "Strategy of development of science in the Republic of Srpska 2011-2016", Ministry of Science and Technology RS, <http://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/PAO/Strategije/Pages/default.aspx>

of all important stakeholders related to MI and AMI and their linkage in order to promote research and scientific works and results in the region.

Having such composition of institutions in the Cluster, it will be possible to work on research on two main levels:

- **Fundamental medical research** (use of MI/AMI in basic research activities “in vitro” and “in vivo”), and
- **Clinical medical research** (use of MI/AMI in clinical research activities for improvement of early diagnostics and for improvement of targeted therapy treatment).

2.2 Benefits to the region

RTD cluster in the Republic of Srpska can bring several benefits to the region, such as bringing technology transfer, transfer of knowledge, building a network and strategic partnerships, raising foreign funds, creating employment and improving the quality of institutions. Clusters bring benefits to the region as well as investors². If the Cluster is built and developed carefully, it will begin to attract foreign direct investment long into the future³. Moreover, foreign buyer inquiries could be expected as the resources and efficiencies that are created and developed within firms operating within clusters, so the cluster development can be seen as a tool to attract firms from other region and countries to access the resources available in the region⁴. The Cluster could become a center of a regional network of research institutions, SME's and foreign investors interested in the field of healthcare. In order to build such a network, the Cluster policies should enable investor locating in local regions to build special relationships and gain intangible assets of knowledge brand and reputation, which enable them to compete in the world market. Cluster policies benefits to company and the country in several aspects including attracting foreign direct investment. Transaction costs, better infrastructure, smoothly accessing information can be seen as benefit of cluster policies. Clusters can help the companies to get more out of their efforts.

The Cluster shall promote importance of AMI in preventive medicine and in early diagnostics in order to decrease number of patients needing more complex and expensive treatments. Additionally, the Cluster shall promote participation of medical research institutions in available EU and other programmes. Increasing of participation in these programmes and projects will raise overall benefits to the region with new investments and with increased flow of knowledge and transfer of experience. Only this way the researchers can keep pace with other researchers within the EU and worldwide. Directly, the whole society can benefit from improvement of healthcare services, especially in the field of MI/AMI. The

² Sarinthorn S. The Relationship among Foreign Direct Investment Flows, Government Policy and Investment Strategy: The Case of Thailand. Available at:
http://dspace.wul.waseda.ac.jp/dspace/bitstream/2065/28631/4/Honbun-4575_01.pdf

³ Ketels, C. (2004). Cluster-based economic development: what we have learned, Institute for Strategy and Competitiveness, Harvard Business

⁴ Birkinshaw , J. and N. Hood (2000) 'Characteristics of Foreign Subsidiaries in Industry Clusters'. Journal of International Business Studies, 31(1), pp 141-154.

implementation of AMI knowledge and techniques should decrease costs due to intensive use of modern ICT⁵ in regular work of general practitioners related to AMI.

⁵ Information and Communication Technologies

3. GENERAL FRAMEWORK

3.1. Industry, society and AMI structure

Most scientific stakeholders in the MI sector in the Republic of Srpska / Bosnia and Herzegovina (RS/BIH) act within the frame of health institutions of secondary and tertiary level, on institutional and on individual levels. Other scientific stakeholders in MI do not have significant capacities or profiles for this field. Moreover, there are several research and education institutions (Faculties of Medicine in Banjaluka and Foča, and several research institutes that are autonomous or are part of public universities) that are presenting relevant partners in the scientific sector.

It is a very worrying fact that the SME sector is not involved enough in activities of the scientific and non-scientific sector, planning and implementation of the program, development of new sectorial policy and strategy as well as improvement of environmental factors for business and investments. In RS/BIH at the moment approximately 15 companies are linked to MI, and most of them are just regional representatives of large companies such as Siemens, AGFA, GE, Carl Zeiss, etc. SMEs do not have their own funding schemes for R&D or financially supporting research projects. Due to the difficult economic situation, most of them do not have any development departments or laboratories, but act just like trade mediators between large companies and local domestic market.

Bearing in mind all of these facts, it is obvious that there is a huge gap between SME sector and the R&D sector, especially in the field of health oriented research and clinical medicine.

With a short analysis of market in RS/BIH as with an institutional analysis of the most influent stakeholders, it is clear that there are no specialized institutions that are autonomous in the field of nanomedicine, ICT for health and new medical techniques or biomedical research. There are no scientific stakeholders having dominant or prestigious institutional portfolio in these fields. In such conditions, the links between scientific and non-scientific stakeholders are mainly based on the use of available programmes and measures for support by scientific stakeholders, while there are not enough of synergic approach and joint actions which is one of basic weakness in mutual communication and cooperation. The Cluster might help improving this condition through building up the network of scientific and non-scientific stakeholders, what could (at least) improve communication among interested parties.

Considering the current situation, key stakeholders and policy makers are faced with significant challenges in the coming years related to removing legal and administrative barriers between SME and R&D sectors. There is an urgent need to create and to develop stimulating measures (fiscal, human resources, infrastructural) for both SMEs and R&D sectors in order to strengthen the synergy and to improve RS economic development. The public health sector and MI are an expanding market and presents a huge potential for domestic and international companies to invest in further development and infrastructure. This opportunity is also supported by positive legislation, especially upon adopting a Law on public-private partnerships that entered in force in 2009. The Cluster could serve as a start point in searching for financial support and mediate these activities.

3.2. Stakeholders role

Bosnia and Herzegovina has a specific constitutional decentralized system, with high independence of governing Entities. This complex regional and constitutional model leads to a multilevel system of BH authorities and different stakeholders in the health sector and medical imaging as an integral part.

A framework for defining health and health-research policy does not exist at the state level due to the fact that on that level, there is no national Ministry of Health or any other national agency with the aim to create and carry on the activities connected with defining scientific-research policies in health. The Ministry of Civil Affairs of BiH (MoCA) only has a coordinative role in the process of scientific research in the field of health in the part referring to international cooperation. Therefore, the framework for strategies and policies in health research belongs exclusively to entities in RS and FBiH and Cantons in FBiH, which are based upon constitutional defined jurisdiction of entities/cantons and their Ministries.

The health care system in RS is centralised with overall power concentrated within the Ministry of health and social welfare (MSZS), the Public Health Institute and the Health Insurance Fund. Financing of scientific researches is conducted and coordinated by the Ministry of Science and Technology of the Republic of Srpska (MSTRS), together with mutual coordination with the MSZS.

Major **non-scientific stakeholders** identified in BiH are:

1. NATIONAL GOVERNMENT

- 1.1 Ministry for Civil Affairs of Bosnia and Herzegovina
- 1.2 Agency for pharmaceuticals and medicine assets of Bosnia and Herzegovina

2. REGIONAL AUTHORITIES (REPUBLIKA SRPSKA)

- 2.1 Ministry for health and social welfare of the Republic of Srpska
- 2.2 Ministry for science and technology of the Republic of Srpska
- 2.3. Ministry of industry, energy and mining of the Republic of Srpska

3. FINANCIAL PUBLIC AND PRIVATE ACTORS (INVESTMENT BANKS, BUSINESS ANGELS, REGIONAL DEVELOPMENT BANKS, ETC.)

- 3.1 The Republic of Srpska Investment-Development Bank (IRBRS)

4. PUBLIC-PRIVATE-PARTNERSHIPS (PPPs)

- 4.1 For dialysis centres - Fresenius medical care, Banja Luka and
- 4.2 For radiotherapy - International dialysis center, Banja Luka.

5. ASSOCIATIONS

- 5.1 Chamber of doctors of medicine of the Republic of Srpska
- 5.2 Pharmacy Chamber of the Republic of Srpska
- 5.3 Society of physicians of the Republic of Srpska

5.4 The Chamber of Commerce and Industry of the Republic of Srpska

5.5 Republic Agency for Small and Medium Enterprises the Republic of Srpska (RARS)

6. HEALTH DELIVERY SYSTEM MANAGERS (*PEOPLE IN CHARGE OF MANAGING THE PUBLIC AND/OR PRIVATE HEALTH SYSTEMS IN EACH REGION/COUNTRY*)

Major **scientific stakeholders** identified in the Republic of Srpska are:

1. HEALTH CENTRES (located in Banjaluka, Prijedor, Mrkonjić grad, Kozarska Dubica and Modriča)

2. HOSPITALS

2.1. General hospitals (located in Bijeljina, Prijedor, Doboj, Gradiška, Zvornik and Trebinje)

2.2. Clinics (Clinical centers in Banjaluka and East Sarajevo, and Clinic and hospital in Foča and Kasindo)

3. INSTITUTES

3.1. Institute for physical medicine and rehabilitation "Dr Miroslav Zotović" Banjaluka

3.2 Institute of Transfusion Medicine RS, Banja Luka

3.3 Institute of Forensic Medicine RS, Banja Luka

3.4 Institute of occupational health and sports, RS Banja Luka

3.5 Institute for treatment, rehabilitation and social care of chronic mental patients Jakeš, Modriča

3.6 Institute for health protection RS, Banja Luka

3.7. Institute for physical medicine, rehabilitation and balneoclimatology Mlječanica, Kozarska Dubica "

4. UNIVERSITIES

4.1. University of Banjaluka (Faculty of Medicine and Faculty of Electrotechnical engineering)

4.2. University of East Sarajevo (Faculty of Medicine Foča and Faculty of Electro technical engineering Lukavica)

5. PRIVATE SPECIALISED INSTITUTIONS

5.1. ENT specialist medical clinic "Dr Šukalo"

5.2. Specialist medical clinic for physical medicine and rehabilitation "MG VITA PLUS" Bijeljina

5.3. Center for thyroid gland Banjaluka

5.4. Specialist medical clinic for mammography with ultrasound "Maksimović" Doboj

5.5. Specialist medical clinic for mammography with ultrasound "DR ŠAJINOVIĆ" Banjaluka

5.6. Specialist medical clinic for computer tomography "Dr Brkić" Doboj

5.7. Specialist medical clinic for ultrasound diagnostic "Dr Vojniković" Kozarska Dubica

5.8. Diagnostic centre "DR ARAR" Banja Luka

5.9. Specialist medical clinic for plastic and reconstructive surgery "ESTETIK" Banjaluka

- 5.10. Specialist ophthalmological surgery "SVJETLOST" (Eye Clinic) Banjaluka
- 5.11. Ophthalmic ambulance "MedicoLaser" Banjaluka
- 5.12. Ophthalmic ambulance "ORTOOPTIC" Banjaluka
- 5.13. Ophthalmic ambulance "Dobrijević" Banjaluka
- 5.14. Private Ophthalmic ambulance Trebinje
- 5.15. Medical electronics Banjaluka

6. SMEs (including those with headquarters in Federation of Bosnia and Herzegovina)

- 6.1 MEDICAL doo GE HEALTHCARE Mostar
- 6.2 BAWARIAMED Banja Luka
- 6.3 SIEMENS Bosna i Hercegovina, Sarajevo
- 6.4 PAROCO B Medical Equipment, Banja Luka
- 6.5 MedPoint doo, Sarajevo
- 6.6 SONO Medical doo, Sarajevo
- 6.7 OLYMPUS Bosna i Hercegovina d.o.o.
- 6.8 ALPHA IMAGING S.R. d.o.o.
- 6.9 BOSNAMED d.o.o.

7. SPA's (Spa Vrućica in Teslić, Spa Mlječanica, Spa Slatina, etc.)

4. GOVERNING PRINCIPLES OF THE SRA

The Strategic Research Agenda of the AMI CLUSTER in the Republic of Srpska and its regular activities should be in line with expectations of key stakeholders in health sector as well as all relevant associations, NGOs, companies and individuals who are interested in the field of medical imaging, nanomedicine and ICT for health. Therefore, main governing principles of the SRA have to be comprehensive and fulfil the mission and vision of AMI regional cluster in the Republic of Srpska. At the same time, those principles have to provide maximum efficiency of AMI regional cluster in communication with society and the academic community as well as provide clear guidelines for AMI regional cluster's strategic activities for the next mid-term or long-term period.

In order to achieve best results in implementation of SRA, AMI regional cluster should be focused on the following guiding principles:

This SRA will be governed by following principles:

- I. **First consideration – to provide scientific and benefit for patients or to be patient-oriented.**
The patient – oriented approach guarantees targeted and objective oriented research with main focus on patient's needs. The ultimate goal is to act in the best interest of the patient, which is also the interest of whole society and government.
- II. **Second consideration – to participate in EU level research activities and projects, such as Framework Programme and others.**
The healthcare system, not the authorities have sufficient funds for funding of research (especially clinical). Therefore, the SRA intention is to raise participation of domestic research institutions in all available programmes and projects on international or European level in order to draw research funds for activities. On the other hand, established cooperation will facilitate transfer of knowledge and experience to domestic practitioners which will increase overall level of healthcare services. By this, SRA attempts to ensure that the quality of the research ideas and activities is at least equal to what is happening elsewhere in the world.
- III. **Third consideration – to follow up most modern achievements in the field of AMI and to encourage innovativeness and talented researchers.**
The research in the field of medicine and healthcare in the Republic of Srpska is trying to keep pace with other advanced researchers. In order to bridge that gap, the SRA intends to build links with all relevant international and European institutions and individual researchers in order to provide networking support to domestic and talented researchers. The SRA encourages innovativeness, competitiveness and professional advancement as main topics of future Cluster vision. Creation of project networks for research projects and for networks with potential suppliers of AMI equipment and SMEs dealing with AMI will be of significant importance for future development of RTD in AMI sector. The success of research depends on the quality of the scientists and clinicians involved. Therefore research resources should be appropriately directed

towards the research questions being addressed as part of a wide ranging initiative to ensure sustainability of high quality of available research capacities.

Health sciences are very important for modern society. If we considering Medical imaging, Nano-medicine and ICT for health as part of interdisciplinary research niche in Health sciences, it is obviously that we cannot imagine modern medical diagnostic or any other medical treatment without these technologies. Medical imaging and Advanced Medical Imaging are today the synonym for science and research excellence. Therefore, Strategic Research Agenda of AMI regional cluster should promote excellence in basic as well as applied research in order to improve public health infrastructure in the Republic of Srpska/Bosnia and Herzegovina and achieve better health protection of healthcare users.

Beside this, it has to emphasise that Medical Imaging have a significant influence on economic growth of region. Major financial investments in last few years are done just in sector of medical imaging (modern regional radiology centre). It could be expected even more (foreign and domestic) level of investment in this field of public health sector so SRA of regional AMI cluster has closely look on its economic potential considering good opportunity for regional SMEs.

IV. **Fourth consideration – to meet all ethical and other issues and to prevent any possible misuse of knowledge.**

Upholding individuals' rights to confidentiality and privacy is a central tenet of every medical work and research. Since dealing with very sensitive data, the SRA considers ethical and other human rights issues as very important for any research related to AMI. Privacy, data protection, confidentiality are key words that should be in mind all stakeholders related to AMI and its implementation in practice. In order to respect all these issues, it has to establish close cooperation with entities' Ethical Commissions and create legal framework to be in line with Commissions' regulations.

V. **Fifth consideration – Providing strategic leadership and facilitating collaboration when needed.**

The SRA should provide strategic leadership in the field of AMI and medical research. The Cluster itself should act as one of the leading and most prominent network in this research field, intending to gather all prospective and advanced domestic researchers and research organizations, in order to concentrate research efforts and results. The SRA shouldn't make discrimination between different research approaches, but will facilitate their fusion for benefit of research results. From the other side, SRA shall support intersectoral cooperation (academia-industry cooperation) as an important factor for further development in AMI.

5. IMPLEMENTING SRA

5.1 Vision and Strategic Objectives

The Vision of AMI Cluster in the Republic of Srpska is to be a leading medical RTD cluster in Bosnia and Herzegovina and Western Balkan for Advanced Medical Imaging and related medical and healthcare research activities, with the ultimate goal to increase the general level of knowledge for provision of quality and modern healthcare services to citizens, respecting ethical and moral issues.

The SRA aims to provide strategic agenda for achievement of this vision. More details and action plans will be developed in the Cluster's operational documents. However, from the strategic point of view, SRA foresees following strategic objectives to be achieved:

- **Achieving excellence in research** – this objective refers to all types of research related to AMI (fundamental and clinical, in-vivo and in-vitro, etc.) with the ultimate goal to improve research capacities and to be important research network and research facilitator in research community. This excellence in research should be achieved with stronger participation of the Cluster's members in respective research programmes, regardless the funding mechanism and donors. From the other hand, achievement of excellence will impose strengthening of networks between the Cluster and other stakeholders, regardless domestic or international.
- **Promoting AMI and related research activities** – promotion of guiding principles and objectives of AMI as specific branch of medical science that can ensure better healthcare services to citizens through advanced AMI diagnostic systems and tools. Increased number of research activities should contribute to increased investments (public and private) in AMI sector, thus improving AMI infrastructure in domestic institutions.
- **Developing market relations with SMEs dealing with AMI** – for further promotion of AMI in industrial sector. These market relations should also provide positive effects in improvement of overall industrial and economic progress. With this, region of the Republic of Srpska can be wide recognized as initiator of progressive ideas and activities in AMI sector of BiH.
- **Implementation of most updated and modern AMI equipment and ICT infrastructure** – in order to keep the pace with overall development of AMI in EU and in the World, domestic researchers should be informed, trained and familiar with modern equipment and ICT infrastructure related to health oriented research.

5.2 Research Areas and Value Chain

Medical Imaging technology plays an important role in today's health care system, and workers with the knowledge and skills to perform diagnostic imaging procedures are in high demand.

The education process is in tight connection with research in Imaging. There are different modalities to implement research process through nationwide multidisciplinary network promoting high quality research training.

A possible high quality solution is to establish a strategic area of research to create opportunities for developing unique forms of multidisciplinary collaboration between respected research communities in medical technology. The aim is to develop new technological methods, materials and equipment for use in Imaging as well as in diagnostics, treatment and rehabilitation, and increased understanding of societal aspects of medical technology. Medical technology involves multidisciplinary collaboration between health professionals, biologists, technologists, and social scientists. It is also very important to foster international connections between specialists in medical imaging, through institutional cooperation and individual exchange.

Advances in Imaging are assisting with the earlier detection of a range of diseases including cardiovascular disease, stroke, cancers and neurodegenerative diseases. At the cellular level, new imaging technologies can identify changes associated with diseases faster and more reliably than before. Early diagnosis provides the opportunity to deliver medical interventions to either prevent the development of the disease or prevent the progression of the condition and emergence of symptoms. In particular, medical imaging can provide the quantitative tools to help industry develop cheaper and more efficient screening tests.

5.3 The Research Contents and priorities

Medical Imaging research investigates new and improved modalities for clinical diagnosis, using minimally invasive techniques for the whole body, tissues, organs or cells. It encompasses various methods including: X-ray and computer tomography (CT), magnetic resonance imaging (MRI), single-photon-emission tomography (SPECT), positron-emission tomography (PET), and ultrasound. Biomedical imaging research aims to develop new methods and software for characterizing diseases from medical images.

The primary research goals in medical imaging include the development of: innovative targeted contrast reagents for various imaging modalities including MRI, X-Ray and ultrasound; novel X-ray imaging methods and instruments, especially involving phase contrast imaging and synchrotron systems as well as novel image processing systems.

The research aims to enable: the assessment of the molecular basis of cell function leading to diagnosis of disease states at very early stages; improved monitoring of disease progression and response to treatment; the application of targeted therapy to locally identified disease states as well as increased resolution and sensitivity of modalities that measure anatomical features (e.g. CT or MRI).

The special field in research represents nanomedicine, the medical application of nanotechnology including the medical applications of nanomaterials. The use of nanotechnology in medicine has different possibilities, among them some techniques are still imagined, while others are at various stages of testing, or actually being used today. One application of nanotechnology in medicine currently being developed involves employing nanoparticles to deliver drugs, heat, light or other substances to specific types of cells (such as cancer cells). Nanoparticles can attach to proteins or other molecules, allowing detection of disease indicators in a lab sample at a very early stage. There are several efforts to develop nanoparticle disease detection systems.

Nanomedicine has become an important tool in the imaging and therapy of numerous diseases including cardiovascular diseases. Of the cardiovascular syndromes, atherosclerosis has received the most attention from nanomedicine researchers. This is likely due to the number of deleterious consequences resulting from the rupture of inflamed, vulnerable plaques. Since the sequelae of cardiovascular disease are amongst the leading causes of death and disability in the developed world, much research has been undertaken in order to prevent and treat the resulting cardiovascular syndromes. One greatly enabling technology that has arisen over the past decade is nanomedicine. Although very few nanomaterial-based preparations have made it into clinical use thus far, there are an abundance of data demonstrating the multitude of advantages that this class of agents possesses, including longer circulation times and greater permeability into inflamed tissues⁶.

It is observed that nanoparticles are promising tools for the advancement of drug delivery, medical imaging, and as diagnostic sensors. However, the biodistribution of these nanoparticles is still imperfect due to the complex host's reactions to nanomaterials⁷. Parallel to the development of nanomedicine, the dangers of nanotoxicity of nanomaterials is an important issue in further understanding of their medical uses, and represents the further challenge for research⁸.

5.4 Implementation: Bringing the Vision to Reality

Due to the interdisciplinary nature of Advanced Medical Imaging the central goal is to develop coordination of the stakeholders to obtain the collaborative network of centers. Therefore arriving at a definition of achievable research contents and priorities in nanomedicine and medical imaging in general is necessary and achievable in the short run. There is the room for rendering more explicit the preferred balance of biological research versus tool development, as well as the timeframe from these activities to clinical application.

The roots of the efforts to bring some of the visions to reality could be some of the proposed models:

- Organizing a series of meetings to identify major issues in biomedical research in institutes and centres defined as stakeholders. The goal of the meetings is to develop a set of actionable priorities. During these meetings, the development of nanotechnologies for biomedical application should be identified as an area of research to be addressed by the Republic of Srpska Cluster on AMI in the future. The overarching result of the meetings would be the Republic of Srpska Cluster on AMI "roadmap" for medical research.
- The implementation plan could be to solicit "letters of intent" whereby applicants outline in five pages or less their vision for a development of Advanced Medical Imaging. After vetting of the letters, applicants whose ideas demonstrated promise were to be selected to receive planning awards to develop further their plans.
- Series of workshops are to be held that include the Republic of Srpska Cluster on AMI, planning award recipients, and members of the stakeholders (listed in Chapter 3). The primary activity of the workshops would be interactive discussion amongst the participants to clarify what constituted

⁶ [McCarthy JR](#). **Nanomedicine and Cardiovascular Disease**. *Curr Cardiovasc Imaging Rep*. 2010 Feb;3(1):42-49.

⁷ Allen TM, Cullis PR. (2004). "[Drug Delivery Systems: Entering the Mainstream](#)". *Science*. **303** (5665): 1818–1822.

⁸ Minchin, Rod (2008). "Sizing up targets with nanoparticles". *Nature nanotechnology* **3** (1): 12–13.

practical implementation of proposed plans for development of “nanomedicine” and medical imaging in general.

- The Republic of Srpska Cluster on AMI is meant to be a center comprised of scientists from multiple fields and disciplines, including but not limited to physicians, biologists, engineers, computer scientists, and mathematicians. Interaction across the scientists and stakeholders ensures resource efficiency and scientific complementarity.
- The activities mentioned above are required, but they are not completely sufficient to ensure the pursuit of the progressive, high-risk research in advanced medical imaging. Accordingly, there is the need for highly interactive selection and competition between stakeholders in order to generate novel center proposals emphasizing progressive thinking.

5.5 The Innovation Framework

Driving innovation should be an everlasting process, which should advance in a controlled manner. By the means of a strategic innovation-approach, a network can help to make disruptive changes in ways of thinking and working in a focused way to be able to build up structures that are intertwined with one other and finally drive new revenue potential.

Organisation and natural persons should initiate innovation. Medical Imaging should be put into context of implementing new knowledge for helping people to reach better quality of life. With that end in mind, new opportunities should be seen with the wish to completely change existing ways of doing Imaging and find new ways of diagnostic and treatment options. In any way, the innovation process does not have to disturb the existing core modalities of Medical Imaging, which should continue to be built-up. At the same time organisation (future Cluster) should look for new completely disruptive fields in the area. Inspiration could be found not only from the medical field and hospitals but also from other non-conventional sources like graphic design, data basis software developers and image processing which is used in video games. It means that the experimenting with new venture companies and other organisation structures is welcome.

In a managed process of research, a certain form of strategic alignment of interested stakeholders is necessary. Having in mind the very end of framework planned, a well-managed innovation process can help to start looking beyond the obvious with regard to the industry foresight. This way innovation can be conducted in the way to be able to understand industry foresight and trends. With existing core competencies and technologies, openness to fast absorptions of new ideas is as critical as successful management of operational, political, cultural and financial demands needed for the network. Network should give new growth strategies, show which are the new products and services needed and through new ventures, business models, partnership, markets pave the road to the sustainable innovation.

The network should have a clearly defined scope and focus in which consumer or customer’s needs should be clearly understood. The key stakeholders should participate through interviews, web surveys or regular communication during different staging sessions. The short-term action milestone is to establish the structures, which will be able to communicate and exchange ideas on a regular basis. End users opinion from hospitals, research centres and patients should not be considered only as feedback, but also as valuable part in keychain of making new innovative strategies. Innovation network as a heterogenic organisation in its nature should be able to kick off new products and new fields for growth

as well as give opportunity to spread the idea of networking and participation in creating new imaging modalities.

5.6 Strengthening Education and Training

Education has always been at the top of priorities in different European and national agendas. So called “Triangle of Knowledge” was one of the basic elements in Lisbon strategy and this integration of key three elements (education-research-innovation) are supposed to be a key driver and creator of knowledge based European economy. The new Europe 2020 agenda has also set five ambitious objectives - and education and innovation is one of most important ones, defined in this key EU strategy document.

Considering national education framework in the Republic of Srpska/ Bosnia and Herzegovina, it can be described that one of the main characteristics is continuing reform process since 2003. Last eight years higher education system in the Republic of Srpska is moving towards adoption and implementation of basic principles of Bologna process as well as enhancing research landscape.

Despite numerous difficulties, medical education in the Republic of Srpska has a strong tradition. It is necessary to continue with the positive practice of continuous medical education, which provides a constant upgrade of knowledge and further development of workforce skills. Only highly skilled and qualified staff will be able to utilize available MI and AMI equipment and provide quality healthcare to citizens.

Beside this, it is crucial to develop regional doctoral schools and PhD studies together with all regional medical faculties and partner universities. This kind of partnerships in third cycle studies can provide necessary medical experts in different fields such as AMI and help regional education and research institutions to develop adequate networks.

The constant update of knowledge and skills should be also achieved through the intensification of participation in EU funded research programs, such as FP7, COST and EUREKA. This can be achieved with more intensive collaboration with other clusters and networks of interest. This collaboration can result in numerous positive effects- from the financial, but also from the scientific and educational point of view. The cluster should participate in dissemination of good practice and encourage its implementation.

In order to improve the overall status of the MI sector and especially AMI in the Republic of Srpska, it is necessary to increase funds invested in this sector. Namely, general investments in the medical sector are insufficient, but considering the importance of MI and AMI in the prevention of diseases and illnesses and further development of modern healthcare services, it is reasonable to expect further investments from public and private sector. The cluster should catalyze partnership among public and private stakeholders, in particular between universities, research centers and businesses.

One of the things that are missing in our education system is to Education Management Information System. A major concern lies on the reliability of available data. Most of the information given from schools and institutions of higher education is presented in raw form without being analyzed. Some officials fill information using estimates rather than the actual figures. Thus there is need to initiate change that will lead to the promotion of culture of information management system at all levels of the

organization. Therefore, procurement of ICT facilities and training in the use of ICT facilities are necessary. Also, building up a network, both in education and research are required for successful education and training. Such network might be used in establishing of alumni service (which is currently missing) and help us to establish and expand the connection with other institutions and individuals which might be interested in AMI.

The term "Medical Imaging" covers several specialties that use a wide array of methods and technologies to aid physicians in making diagnoses. While medical imaging professionals may take different career paths, they are all extremely important to the process of providing quality patient care and treatment plans. Here are a few common education paths in the medical imaging field:

- **Radiography** - is the profession in which diagnostic medical images are made using x-rays and other radiations. The radiographer may work independently or with a physician to create images in the areas of computed tomography (CT), magnetic resonance (MR), mammography, cardiovascular interventional technology (CIT) and others.
- **Nuclear Medicine** - utilizes radiopharmaceuticals, scintillation cameras and computers to image and quantify various physiologic processes throughout the body. The nuclear medicine technologist administers radiopharmaceuticals to patients, positions them for images and operates the cameras and computers to produce the images and analyze the data.
- **Ultrasound/Sonography** - generates high frequency sound waves to produce images of the human body. Using medical imaging procedures, the sonographer gathers data for interpretation and evaluation by the physician. This profession includes abdominal sonography, neurosonography, echocardiography, obstetrical and pelvic sonography, and vascular technology.
- **Computed Tomography (CT)** - sometimes called CAT scan, uses special x-ray equipment to obtain many images from different angles and then join them together to show a cross-section of body tissues and organs. CT scanning provides more detailed information on head injuries, stroke, brain tumors and other brain diseases than do regular x-ray films. It also can show bone, soft tissues and blood vessels in the same images.
- **Magnetic Resonance Imaging (MRI)** - uses radio frequency waves and a strong magnetic field rather than x-rays to provide remarkably clear and detailed pictures of internal organs and tissues. The technique has proven very valuable for the diagnosis of a broad range of pathologic conditions in all parts of the body including cancer, heart and vascular disease, stroke, and joint and musculoskeletal disorders.

6. INTERCOMMUNICATION OUTSIDE

6.1 Communicating with Society and Public Bodies

It is very important when and how communication can be used as a means to promote Medical Imaging with enhanced accountability, transparency and citizen participation without discrimination. There is clear need for better and increased use of communication to meet desired outcomes for the implementation of the new knowledge and its democratization made through the recent scientific advances. Communication should be considered both as a concept and as a method. It should identify possible entry points and opportunities for using communication within program-based approaches with a main focus on public bodies using menu of key issues for planning, review, assessment and follow-up at different levels and in different areas.

The process of effective communication has both technical and political aspects to it. On one level it is about ensuring availability and access to information, improving and maintaining health of the population. On another level it is about ensuring the citizens' right to participate and to have a voice in the development of society. A public body in a democracy has the responsibility to secure both levels, and both are needed for reaching sustainable results.

Engaging with partners systematically using formal and informal dialogue occasions as well as sensitizing activities to promote and encourage citizens' influence and understanding of the development agenda should help that technology has its full potential. Of course, the use of existing processes and mechanisms for dialogue and consensus building, integrating assessments of communication methods, analyzing the communication flows, focusing communication activities on results and addressing reasons for lack of motivation for increased sustainability and planning for sensitizing activities in order to showcase positive evidence of how and why to make a change should not be neglected.

At the international level analytical tools and methods should be considered in communication approaches and processes for integration into international tools for assessments, analyzing development results and planning development support.

At the national level when supporting formulation and implementation of key legislation, national reforms, and support of media and NGO in promoting medical imaging the quality of the laws already in place.

One should consider the institutional capacities and systems for public access to information, staff capacity and the quality of activities enabling access to information, as well as the capacity of the public administration, including public financial management, comprehensiveness and timeliness.

6.2 Synergies and Opportunities with other Clusters / Initiatives

Within the RTD health cluster in the Republic of Srpska, key stakeholders are working together in pursuit of regional economic development and the strengthening of the European Research Area. Following the logic of identifying similarities and complementarities among the participating projects' activities, the ultimate aim is to explore possible synergies among the projects in terms of concrete actions as well as in terms of funding opportunities with other European and local funding instruments.

Opportunities for benchmarking and exchange of best practices regarding strategies, structures and resources associated with technology transfer could be seized in order to increase the efficiency of the proposed measures by the RTD health cluster in the Republic of Srpska initiative to further enhance its visibility and impact.

6.3 Societal challenges drive European competitiveness

Science, technology and innovation can help provide a solution to the growing societal challenges faced by Europe⁹. Today, Europe faces a number of other societal challenges arising from inverted demographic curves, constantly increased demands for non-renewable natural resources, constant expectations for improved quality of life, and especially climate change.

Two particular areas that are the first objectives of the European Innovation Partnerships¹⁰ are:

- (1) Climate-change mitigation and preserving the environment (including renewable energy technologies), and
- (2) Healthy ageing. These two areas are of particular interest for Europe because no single country can provide the solutions to these challenges.

Closer investigation of the societal challenges has highlighted the importance of interoperability, system autonomy, networking - including use of the Internet - and consideration of mixed criticality for more dependable systems. The Republic of Srpska Cluster on AMI is not striving to address all possible so-called Grand Challenges but rather specific societal challenges in order to derive the research challenges.

The global challenges in healthcare that are having a dramatic impact on the healthcare market are driven by the following global trends in society and healthcare:

- Global economic growth: increased spending on health related services, access to healthcare for a larger number of people and increased awareness of available healthcare options.
- Dramatic changes in demographics with an ageing population - by 2045 more people will be over 60 than under 15, rising from 600 million to 2 billion. In the Republic of Srpska in 2010 the number of deceased was over the number of newborns¹¹.

⁹ European commission. Innovation union competitiveness report, 2011 edition

¹⁰ Innovation Union Communication for a detailed description and areas of action of the European Innovation Partnerships (http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf#view=fit&pagemode=none).

¹¹ Statistical Yearbook of Republika Srpska 2010

- Increase in number of patients with age-specific, chronic and degenerative diseases (cardiac, cancer, diabetes, Alzheimer's, Parkinson's). The number of US patients with a chronic illness will have risen from 118 million in 1995 to 157 million in 2020. In the Republic of Srpska in 2010 three leading causes of death were circulation diseases, tumors and Symptoms, signs and pathological clinical and laboratory results.

Concerning the financing of healthcare, Donor mapping report 2009-2011, published by the BiH Ministry of Finance and Treasury/Sector for Coordination of International Aid (MoFT/SCIA), finds that Donor Coordination Forum (DCF¹²) members allocated €727.75 million to initiatives in 2009 and €726.93 million to date in 2010. Of the €1454.67 million allocated in both 2009 and 2010, €415.30 million was in grants and €1039.37 million was in loans. Most support to the Health sector in 2009-2010 was given to primary healthcare reform, mental health protection and prevention/control of HIV/AIDS, TB and other transmittable diseases. There are no resources directly available for the field of research in AMI in BiH.

Projects which are realized in the framework of available programmes/initiatives are:

- Health Sector Enhancement Project;
- Coordinated National Response to HIV/AIDS & Tuberculosis in a War-torn and Highly Stigmatized Settings;
- Further strengthening of DOTS strategy in Bosnia and Herzegovina;
- Balkans Youth and Health Project;
- Support to Reform of Mental Health Care at Community Level in BiH;
- Family Medicine Implementation Project in Bosnia and Herzegovina;
- Strengthening of Public Health Institutes in BiH; etc.

In terms of AMI, much more significance should be given to new programmes, which are expected to be open very soon, through different donor and financial institutions. The Republic of Srpska Cluster on AMI could mediate through finding financial support and use of cluster's network to reach:

- Investments to the health infrastructure through programmes such as "Capacity building of the public health sector in BiH" and "Modernizations of hospitals in BiH"
- Procurement of the equipment for MI departments.
- Reconstructing and equipping microbiology and general laboratories.
- Education of laboratory staff.

SRA should go further: the societal challenges can be used to structure the inherent technological issues into a concrete research and innovation strategy spanning multiple application contexts, with results that will benefit both society and the economy. Scenarios for break down the complexity of these challenges to manageable and comprehensible pieces and map them to application contexts and

¹² The Donor Coordination Forum in Bosnia and Herzegovina was established in December 2005 by 17 major donor agencies and financial institutions as a semiformal platform for information exchange. Presently DCF has 20 members and meets quarterly, Donor mapping report 2009-2011

7. CONCLUDING REMARKS

1. Public health infrastructure in the Republic of Srpska is not satisfactory and does not fulfil requirements of healthcare users.
2. Investments in health sector is not fully sufficient in order to implement modern international standard in public health, especially in field of medical imaging, using modern ICT technologies for health, nanotechnologies and biomedicine.
3. Lack of human resources and qualified personnel in high-tech medical devices.
4. Lack of financial (public, especially private) investments in research related to public health and medical imaging products (software and hardware). On the other hand, there are great demands and needs for investments in medical imaging and advanced medical imaging sector
5. Extremely low number of SMEs focused its interest on medical imaging market.
6. RTD oriented AMI cluster in the Republic of Srpska can respond to needs of different stakeholders such as: public bodies, academic and research community, SMEs, different associations and networks, individual researchers and innovators.
7. AMI regional cluster can generate new commercial research, new products and new jobs for cluster members and closely connected associations;
8. AMI regional cluster can contribute in raising funds and investments from different national, regional and EU funds, programmes and initiatives.
9. AMI regional cluster can contribute in creating strategic partnerships, networks and project consortiums related to medical imaging, ICT for health, nanomedicine but health-oriented research.
10. Cluster organisation is supporting on gathering different SMEs, organisations and networks on joint actions and creating added value, raising competitiveness of regional and national economy.
11. AMI Cluster organisation has benefits for its members in communications with different stakeholders, targeted groups, companies, policy makers, etc., in sense of stronger influence on social and economy sectors.
12. AMI cluster organisation has a strategic dimension, making long-term solution and institutional framework for all interested institutions and individuals.
13. Cluster organisation is removing gap between research and market exploitation and therefore help research organisation and “research oriented SMEs” to commercialise its products and ideas.

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