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ACTION DOCUMENT

THE MIDDLE EAST – EUROPE FORUM (MEEF)

COLLABORATION IN TRANSLATIONAL RESEARCH FOR A SUSTAINABLE FUTURE

1. The First Middle East - Europe Forum (MEEF), "Collaboration in Translational Research for a Sustainable Future", took place on Kish Island, October 19-21, 2018. The event was prepared, hosted and executed under the aegis of five leading Iranian Universities[1]. The Forum was attended by some 200 decision makers, researchers, academics and relevant stakeholders from industry, foundations and civil society, from altogether 10 countries in Europe and 5 countries in the Middle East[2].

2. This Action Document represents the concluding statement of MEEF. It sums up the conclusions and recommendations, which are directed to policymakers and decision makers, but also aims to invite and inspire the spectrum of institutions and individuals engaged in the issues at stake to take new bold steps and join hands in concrete initiatives. The Action Document has been developed based on the input of the Scientific Advisory Board[3] along with contributions by chairs, speakers and some individual participants. It has been further upgraded following circulation and collection of comments from relevant stakeholders after the event during the process of its finalisation.

3. MEEF drew on important existing building blocks for furthering a constructive collaborative agenda engaging the two regions. The emphasis is on translational research, i.e. research with the potential to exert a significant impact, resulting in mutual gains for society and prosperity. Four partly interrelated areas were addressed in-depth, water, renewable energy, non-communicable disease and, finally, urban issues and opportunities. For each of these, specific conclusions and recommendations are presented in this document. At the overriding level, the seventeen Sustainable Development Goals (SDGs) of the United Nations,

[1] The University of Tehran served as the main coordinator, in collaboration with Amirkabir University, the Iranian University of Medical Sciences, Sharif University of Technology, and Tehran University of Medical Sciences. The Vice Presidency of Science and Technology in Iran is thanked for financial support of the event.

[2] The following countries had representation at the Forum: From Europe; Austria, France, Germany, Greece, Italy, Portugal, Spain, Sweden, Switzerland, and the Netherlands, and from the (wider) Middle East region; Iran, Iraq, Pakistan, Oman, and Qatar.

[3] The Scientific Advisory Board includes at least one expert from the Middle East and one from Europe in each of the four substantive fields addressed.

or 2030 agenda, provided guidance for the agenda. Further, to the extent possible, MEEF reverted to and attempted to support usage of already available instruments for spurring collaboration. This includes the ongoing Horizon 2020 EU's Framework Programme for Research and Innovation that presents multiple openings for researchers outside the EU, including the present at the Forum Middle East countries - to take part in open calls. Other important opportunities already exist on a bilateral basis, between individual countries in the two regions. Further, several mainstream national research funding bodies, e.g. from Germany and Qatar, invite external applications, including from countries present at the Forum. In terms of forward-looking strategy, MEEF further observed and took on board the achievements and proposals of the Middle East – Europe Research and Innovation Dialogue project (MERID) [4]., which was dedicated to the strengthening of the EU-Middle East cooperation in Science, Technology and Innovation.

4. Beyond existing initiatives, however, participants underlined the importance of developing additional forward-looking strategies, instruments and activities. The rationale for MEEF indeed emanated from the need of working out new, more effective mechanisms for enabling and catalysing constructive collaboration in research and innovation between the Middle East and Europe, in those areas in which it is of the greatest importance.

On this basis, participants in MEEF:

RECOGNIZED that we stand at an unprecedented moment in time, characterised by:

- The intensification of common challenges with regard to sustainability, including living ecosystems and fundamental assets, such as air, water, energy, health and a hospitable environment, making it essential to identify and implement common solutions;
- The increasingly important role of science and translational research for enabling a common understanding of the issues, including the role of knowledge transfers and shared experience in order to realize progress in the economic, social and environmental fields, and;
- A complex interface between policymakers, media – including social media – and the public, where information management and the ability of science to expose issues and gain support for new solutions are mired in difficulties;
- Growing levels of mistrust and tension, with a shift in governance of some countries away from common solutions, undermining orderly conditions for international collaboration and multilateral institutions;
- A heightened need of collaboration between Europe and the Middle East, not only in trade and investment but also in research, cultural exchange and the humanitarian field.

[4] For the conclusions and recommendations of the MERID project, see "Future EU-ME Cooperation Opportunities: Recommendations for an Enhanced EU-ME STI Cooperation", Comprehensive Policy Paper, MERID (H2020-INT-INCO-02-14), Deliverable D 2.5, Brussels (http://meridproject.eu/category/deliverables/wp2/).

HIGHLIGHTED that, in this era, a special effort is needed to open up for improved dialogue and the promotion of constructive knowledge exchange and collaboration to help overcome divides such as those caused by:

- National borders;
- Ethnical and cultural diversity;
- Gaps between scientific disciplines;
- Gaps between universities and the research community on the one hand, and industry and other societal actors on the other hand, and;
- Insufficiently developed bridges between basic and applied research, as well as between technology and engineering, on the one hand, and social sciences and the humanities on the other hand.

CONCLUDED on the need of working together to craft stronger mechanisms in support of fruitful value-creation through translational research, for an impact in support of sustainability and a better future for all. On this basis, the hosting organisations have jointly agreed on a Secretariat [5] to support the realization of concrete follow-up on the recommendations of MEEF, and also to prepare for the 2nd such Forum planned to take place in the spring 2020.

A Changing Landscape

5. Over the last few centuries, the era of industrialisation and modernisation, which started in Europe, brought economic restructuring and growth as well as a population explosion and a massive increase in resource exploitation and consumption. Their impact shows up in part as climate change and global warming, which are now widely viewed as a serious threat to the environment and also to human civilization as a whole. In that context, through an inclusive process, the United Nations extended from the eight so-called Millennium Goals to the 17 Sustainable Development Goals (SDGs) for 2030. [6]

6. The Middle East is where human civilisation initially started, and through much of history the region used to be well in advance of Europe, as a centre of philosophy, literature, architecture, medical sciences, engineering, and also trade & commerce. Meanwhile, the region was always at the crossroads of East and West, North and South, profiting from the flow of know-how from different directions, but also subjected to endless infringements and sometimes outright invasions by external powers.

7. The presence of diverse climate zones, reaching from mountains with snow to deserts, beaches and forests, forced the need of managing both abundance and scarcity, laying the basis for refined organisation of resource use, with water management as a central challenge. A deep-rooted understanding of how to deal with all aspects of water management is

[5] The address is: "MEEF Secretariat, 16th Azar St., Engelab Sq., Tehran, Iran. The Secretariat can also be communicated with on info.meef@ut.ac.ir, including with comments, inquiries and expressions of interest on the present document and the associated processes and projects.

[6] The SDGs explicitly addressed in this document are nr. 3, Good Health and Well-being, nr. 6 Clean Water and Sanitation, nr. 7 Affordable and Clean Energy, nr. 8 Decent Work and Economic Growth, nr. 10 Reduced Inequalities, nr. 11 Sustainable Cities and Communities, nr. 14 Life below Water, nr. 15 Life on Land, and nr. 17, Partnerships for the Goals.

encapsulated in thousands of years of accumulated indigenous knowledge and organisation, forming an intrinsic part of common cultural heritage. Gradually, however, it could be observed that wealth in natural resources, and particularly oil – the black gold - frequently gave rise to troubling pillaging, and placing them at the epicentre of geopolitical conflicts. Meanwhile, traditional governance gave way to *rentier* mentality, with high investment in real estate and tangible assets, rather than people and social organisation. The result is a weak capacity to deal with scarcity, leaving much potential for improvement and optimization.

8. The high price the Middle East is now paying for this situation, is about to rise further with spiking environmental and social costs due to the advance of Climate Change. Weather abnormalities, such as strong typhoons and hurricanes, drought and untimely precipitations, and severe cold and hailstorms in blooming season, are now recurrent phenomena. In Iran, for instance, rapidly diminishing water tables are expected to lead to the loss of 70 percent of all arable land by 2025, unless radical counter-measures are taken.

9. The demographic trajectory of recent decades increased the pressure on resources. Much attention is paid to increasing strains caused by migration to cities, neighbouring countries, or overseas. On the other hand, the young generation is highly motivated, mostly well-educated and now intrinsically wired and linked up to world events, a considerable reservoir not only for future leaders, but also for innovation and up-take of solutions on the ground. Still a significant portion of the work force is under-employed and there is serious mismatch between skills available and labor market needs, hurting youth in particular. Women are increasingly well educated but confronted with special barriers in the work place as well as in entrepreneurship.

10. Against this backdrop, constructive collaboration is required between all countries around the world and especially in the Middle East – Europe nexus if humanity is to secure a sustainable future. While countries in the Middle East have built relations with Europe on a bilateral basis, short-term, vested interests often dominated. An overriding strategy and framework for collaboration, particularly in translational research, is largely lacking.

11. The fields addressed in the Forum form part of a wider agenda to achieve sustainable development. In support thereof, MEEF strived to define new mechanisms to identify outstanding issues and opportunities for research collaboration to evolve in response to key challenges of high shared importance to multiple countries in both regions. These issues are not merely the subject of administrative or technical affairs, but their resolution requires sound governance, capable institutions and the engagement of people in support of sustainable life-style and a circular low-carbon economy. Examples include climate change, the restoration of ecosystems, resilient and dynamic cities.

Leveraging the Role of Science, Research and Innovation

12. MEEF underlined that science knows no borders belonging to all human beings across the world. Efforts made by some countries to impose barriers to collaborative discourse are in contradiction to impartial human rights. The consequences include isolation and lack of joint communication in issues spanning from industry and engineering to education, health, and environment. In order for science to do its part in achieving a better future for all, the following mechanisms must be free to run their course:

- Inspiration and capacity-building inclusive with regard to the wider economy and population, encouraging uptake of new solutions and competencies in support of improved standards, high-value added activities and new jobs;
- Internationalisation of education;
- Brain circulation, and;
- Cross-border flows of scientific knowledge and ideas.

13. On this basis, MEEF called for the establishment of a common platform along with a series of concrete activities, to enable a constructive process of linking a broad-based set of institutions, competencies and stakeholders of relevance to research and innovation, across Europe and the Middle East. It stressed that the countries of the Middle East presently devote increasing effort to research and innovation but, in contrast to the EU, pursue own agendas in a fragmented manner, and mostly with limited impact on key societal issues. High attention should be devoted to providing a bonding arena as a basis for common initiatives, entailing actors in multiple countries across both regions, in search of joint solutions in support of future prosperity and sustainable development.

14. Related to the above, participants stressed the importance of more proactive open-ended networks and partnerships, sharing information and experience, developing instruments for effective linking of universities, colleges and other educational facilities in support of student exchange and the enhanced compatibility of curricula across borders. Joint capacity building should further be fuelled through a special initiative for joint training of strategic leadership and governance in support of sustainability. An important element is to enable the insights of science and technology to feed into policy decisions, as well as to help muster engagement of people, creativity and innovation.[7] On the latter, improved content should help fuel E-learning for more broad-based engagement, inspiration and optimization of resources. Apart from theoretical and technical skills, greater effort should be made to promote soft skills, such as team-building and entrepreneurial mindset, inviting educational institutions to establish new links with the private sector and entrepreneurship associations.

15. Funding bodies within and outside the Middle East are encouraged to open up for calls and programmes that are more inclusive and also explicitly devised to pull and enable cross-border networks and joint projects between the two regions. In this, lessons of early examples of collaboration between research funding institutions, e.g. from Germany and Switzerland, with research foundations in various countries in the Middle East, should be built upon. Tangible positive effects have already been demonstrated from such joint effort. It is recommended that future initiatives are extended to put up requirements for eligibility by including researchers from several countries in both regions. Special care should be taken to ensure professionalism and impartiality.

16. It was underlined that a 'fair and ethical approach' should serve as the basis for collaboration, entailing the following elements:

- Differentiating environmental issues from political crises and regional and global tensions, while developing a futuristic perspective on environmental affairs;

[7] This is in direct support of SDG nr. 17, on Partnership to achieve objectives.

- Facilitating the transfer of know-how and operational capacity in environment-oriented science and technology, such as wind and photo-voltaic energies, countering monopoly and exclusive practices or arbitrary bans in utilising certain advanced technologies to reduce or mitigate climate change;
- Supporting local and regional organisations in tackling effects of drought, dust storms, water pollution and opening for greater synergy in the involvement of bilateral and multilateral environmental cooperation, at both regional and international levels;
- Collaborate for the purpose of enhancing the knowledge of authorities on how to promote public awareness, engagement and up-take of new solutions in support of a low-carbon economy;
- Promote the experimentation and learning in urban areas, how to engage citizens in co-creation around the development of new solutions in support of social cohesion and well-being for all.

Activities and substantive areas

17. MEEF has brought an agenda of recommended actions, distributed across each of the substantive areas. In advancing these activities, MEEF observed the following priorities:

i) What is important in the Middle East, for individual countries and societies, as well as collectively?
ii) What is important for the Middle East – Europe cooperation?
iii) In the light of existing challenges and opportunities for Middle East-Europe cooperation, what is required for effective advancement?
iv) How can the available tools and funds best be exploited, and what new should be developed?
v) How can multi-stakeholder engagement in research best by framed by bi-regional Cooperation programmes (such as H2020)?

18. The substantive focus of MEEF was organised around four major tracks: i) issues of water; ii) renewable energy; iii) Non-Communicable Diseases (NCD), and; iv) urban issues and solutions. These were selected with a view to their high relevance to both regions, the need of working out common cross-border solutions, the need of contributions from different knowledge-areas, and the great potential of universities and researchers to contribute to this end. While specific issues were addressed in in-depth parallel sessions, the conference featured joint plenary sessions and invited participants to take part in inter-sectoral considerations of synergies from research and innovation linking the various tracks.

19. As a follow-up to MEEF, a number of joint initiatives and activities have been proposed, and in some cases launched, with further ones envisaged. In several cases, the cross-thematic, cross-disciplinary linkages will be maintained and further strengthened. It has been proposed that MEEF follow-up should aim to strengthen activities such as the following:

- General scientific meetings;
- Scientific meetings, with specific focus;

- Permanent offices in Technology/Innovation parks;
- Joint workshops;
- Joint summer courses;
- The establishment of more effective and mutually useful on-line fora for sharing up-to-date information and communication between researchers on priorities, projects and ideas;
- Related to the above, new initiatives for disseminating information on opportunities for research collaboration by data or facility sharing (no financial element);
- Opening for research collaboration through usage of small joint grants/seed funding mechanisms;
- Joint research projects funded by granting bodies from each side;
- Annual calendar for meetings/workshops/courses/events;
- Spring 2019 meeting (presenting proposals for H2020 or investors);
- Budget dedication requiring innovative forms of cross-border engagement;
- Action plan for business through start-up companies (service provision);
- Action plan for scholar/student exchange for short-time scholarship/internship, and;
- Action plan for summer school on Kish Island for 2020 and afterwards.

20. For each of the substantive fields under consideration, the next section presents the main observations and conclusions, along with crisp recommendations on specific projects**.** In some cases, where such collaboration has already been initiated, others are welcome to join. In other cases, new joint initiatives are encouraged. Criteria for such advancement emanate from the potential for untapped impactful collaboration, for instance due to the prospect of:

i) Linking complementary competences between critical number of participants in the two regions;

ii) Results are of key relevance for the development of the Middle East while of high importance for both regions;

iii) Multi-stakeholder engagement, including by the private sector, and;

iv) Outcomes have pilot character for creating knowledge that can lay the basis for their future scaling.

I. Water:

21. Water is the basis of life. It is key to the survival of all living things and it is central for a sustainable development and stability of human societies. It is central to food production, to personal and communal hygiene, recreation, the economic sector, and the aesthetics of landscapes. In this vein, water connects almost all activities of human individuals and communities. Prosperity hinges on wise management, which in turn asks for a continuous mutual dialogue between all relevant stakeholders, along with policy and decision makers.[8]

[8] In terms of the SDGs, the challenges in regard to water management are directly prevalent in nr. 6, Clean Water and Sanitation, nr. 14, Life below Water, nr. 15 Life on Land, nr. 8. on Decent Work and Economic Growth, nr. 10, "Reduced Inequalities", and also backed by nr. 17 on "Partnership".

22. Traditional societies held great sway in water management, based on good planning and intrinsic social contracts which stood at the heart of local community development, particularly in water-scarce regions in the Middle East, Northern Africa and South Asia. Modern societies have lost that kind of connection to this agenda. Rather, they have become mired in large-scale investment projects framed on narrow economic objectives, such as dams and extensive irrigation projects. To this shall be added the wasteful practices of the agricultural sector. With coordination lacking, the result is a series of serious failures in water management at multiple levels, locally, nationally and regionally. As part of the consequences, ocean life is faltering, groundwater tables falling, lakes drying up, and dust storms dramatically threaten the lives of millions of people, risking political and economic crisis in the years ahead linked to significant immigration and displacement.

23. Water quality, meanwhile, is affected by diffuse (non-point) and point sources of pollution. Agriculture is a typical non-point pollution source, whereas wastewater treatment facilities are point sources. Water treatment needs the necessary attention to secure highest quality of the scarce resource not only for drinking water but also when water is discharged into the environment. Recycling may accumulate pollutants to a non-acceptable level if treatment is inadequate. Forward-looking and sustainable management of water sources, such as lakes and rivers will be required to avert irreparable environmental damage, as seen in the Aral Sea and Urmia Lake. This in turn reflects the severe threat to water systems more broadly - oceans, lakes and rivers - including their connected ecosystems and rich biodiversity - creating a compelling need to work out new ways and means of governing water resources for the long term. By contrast, with the current situation, fragmented and misdirected responses are unable to hinder the ongoing deterioration in this vital area, resulting moreover in a loss of trust and reputation of governmental as well as scientific institutions.

24. Educational and information activities regarding the relation between crop cultivation and water use, the responsible optimisation of irrigation and modern farming practices will determine the success of an active and modern agriculture. Precision and smart agriculture including remote sensing will help farmers to use water and nutrients more efficiently. Reforestation is needed as a means to better manage soil moisture contents and local hydrology. Intelligent incentives should be applied to steer agriculture towards better integrated production and sustainable farming. Other options, such as fish farming, may be introduced for high quality protein and farming of salt-tolerant crop plants. Pollution from this type of farming needs to be monitored closely.

25. In this situation, scientific and technological education and knowledge about the value of water and in order to pave the way for and guide the piloting of new solutions, are decisive for inclusive and successful water management. At the same time, problems related to water can rarely be solved by one discipline, in almost all cases water solutions ask for a genuinely inter- and trans-disciplinary approach. On this basis, openings and means are required for linking diverse competencies, among academia as well as government entities, the private sector and civil society. The private sector is key for the implementation and proliferation of new innovations, both for technologies and concepts. At the same time, in order for progress to be possible, public engagement and follow-through are essential. There is a need of broad-based awareness-creation that water scarcity is not just a given fact; it can

be overcome with the help of appropriate innovations and sound governance, including responsible water diplomacy.

26. Thus far, insufficient effort has been devoted to put such conditions in place. A strategy needs to be worked out, including training and capacity building in governance, as a basis for planning and implementation of a series of complementary steps that can help countries in the region to join forces in handling their water challenges. The activities below have been recommended with a view to help fuel increased capacity building, broad-based awareness, and sound governance.

27. On this basis, the following are WELCOMED and RECOMMENDED as concrete follow-up activities in the areas of water management:

1.1 Integrated water resource management (IWRM) project

28. The establishment of a bi-regional collaboration project for integrated water management (IWRM). The task is to include all elements which are required for sustainable management at the local as well as regional level, applying to above and below ground water resources. Determining these elements can be guided by the modelling of expected impacts of climate change on local water availability, agent-based scenario developments, scientific understanding of water systems, environmental and ecological dimensions, water infrastructure, economic, socio-cultural aspects, etc. Water recycling is a means to (re)using water multiple times. Alone or together with the development of unconventional water resources, the available water and water supply security can be considerably increased. Tariff policies may differ for both sectors. The sponge cities' framework can promote the development of permeable areas and new green infrastructures, increasing water absorption capacity and mimicking natural processes.

29. The objective for IWRM is to enable adjustment and optimization, assisted by inter-country exchange of experience as well as collaboration and coordination of national water policies. For this IWRM needs to form part of a transparent, inclusive and iterative societal dialogue in support of trust. Water-Food-Energy nexus modelling can further help creating the proper platform for government and stakeholder collaboration.

1.2 Measuring the Value of Ecosystem services

30. In order to address the governance challenge in water management, including through water diplomacy and getting IWRM, a consolidated effort should be undertaken to improve measurement of the ecosystem services associated with water management. This entails, e.g., measuring and comparing the various costs and benefits associated with water use. Eco-compensation should serve as an instrument to harmonize and balance up- and downstream water intensive activities.

31. Apart from the measurement itself, the project should importantly include considerations of how the measurement results can be communicated to decision-makers and stakeholders, in ways that help keep the costs of water treatment low and at the same time protect the environment. Special focus should be placed on applying measurement to determine

adequate tariffs for water supply, on terms capable of triggering effective water conservation agendas by both the public and industrial sectors.

1.3 Pilot for launching a Scalable Holistic Plantation in Dry regions

32. As a direct consequence of MEEF, 50 trees were planted in Kish Free Zone, using the Groasis Waterboxx. This Dutch invention represents a unique method to plant trees, using minimal water resources by mimicking the methods of Mother Nature as the sapling is rooted in the soil, making it perfect for planting on eroded and deserted lands. Additional follow-up has been pledged by the University of Tehran which has indicated that 200 trees will be planted on its Kish Campus, using the same methodology. In addition to advancing such plantations on their own merit, important complementary research-based experiments are needed, to lay the basis for a scalable, holistic model capable of championing ecosystem restoration in dry regions and in those that are under the risk of becoming depleted.

Box 1: Keywords for a Holistic Translational Research Agenda for Water

1. Water law and policy
2. Innovative solutions for sustainable plantation and agriculture in dry areas
    * Irrigation with saline water
    * Gap analysis and solutions for improving water productivity in agriculture
    * Conjunctive use of fresh and saline water through Partial Root Salinity stress (PRS)
    *Assessing the quality of remote sensing-based evapotranspiration estimates through lysimeter and Bowen Ration Method
    * Water saving innovations for planting in dry regions without drip irrigation
    * Seawater green houses
3. New water harvesting technologies
    * Rainwater harvesting * Water harvesting from air humidity/fog
    * Out of urban area * Water quality issues
    * In city scale * In household scale
    * Sand dams * Underground dams
    * Small dams (Simon Maddrell and Ian Neal)
4. Water economy
    * True cost of water for different kinds of consumptions
    * Water tariff for different watersheds
5. Water reuse and Desalination
    * Prioritisation of water reuse alternatives based on corresponding risks
    * Low cost desalination through the sustainable water reclamation retrofitting
    * New and emerging water pollutants
6. Water resources management for reducing drought and desertification impacts
    * Water management for erosion and dust management
    * Land subsidence and Sinking due to groundwater withdrawal
    * Virtual water
    * Survey of consumer behaviour of water and reusing water, culture and awareness-creation/marketing
7. Conservation and rehabilitation of water bodies
    * Environmental needs of water bodies
    * Rehabilitation plan
    * Tourism Development
    * Quality

33. On this basis, MEEF welcomed a coordinated pilot project for planting trees in dry regions, combatting desertification by using such pioneering water-saving technologies, complemented with action-oriented research on the ground to; i) achieve best-matches between tree species and soil-conditions; ii) gain the support and direct engagement of local communities, including through awareness creation and incentive schemes that can create local ownership, co-creation and also underpin patience before obtaining results; iii) introduce training (including engagement of school children) under varying circumstances; iv) connecting with global carbon reduction schemes, and; v) the development of smart monitoring, e.g., by way of:

a) Site-Specific Measurement (SSM) – Geographic Information Systems (GIS) – Variable Rate Technology (VRT);
b) Remote Sensing (RS) – Internet of Things (IoT) – using appropriate indices, Land Topography Plant numbers & properties, Nutrition Index Pests Weed mass, Biomass Livestock Control, and;
c) Crop Health Monitoring Area Mapping Fertiliser Recommendation Harvest Supervision Crop Tension Analysis Drought Distribution Crop Classification, Tree Classification, etc.

34. The purpose is to set in motion a scalable and sustainable model for greening the region, achieving a number of inter-related objectives including joint learning processes. Responsible actors in Iran, Oman and Pakistan have already initiated coordination on usage of the proposed technologies, backed by complementary expert competencies from the Netherlands, Germany, Sweden and Switzerland. Ideas for extension to Urmia Lake and other key lake projects in Iran have been put forward and welcomed. The prospect is to expand the scheme to Afghanistan, Iraq and also Yemen, where extensive areas scorched by war could be subjected to re-habilitation of biomass and productive land use.

35. For this to be possible, a critical mass of coordinated planting activity is required. One step along the way is to enable local production of the basic equipment and material. An example to be studied is the biodegradable so-called Growboxx, which reduces plantation costs radically. The adoption of any such solution, however, must be preceded by social acceptance, accompanied by supportive training, smart sensing and monitoring, access to global carbon credits and administrative support activities. This could further generate additional job creation locally while spurring recycling of waste (paper), with various economic, energy-related, ecological, and other advantages as a result.

1.4 A MENA-region event on holistic approach to battling Dust Storms

36. The escalating threat of dust storms now represent one of the most serious manifestations of the unsustainable practice of land and water management in the Middle East. This is a subject of common concern to all countries, given the combination of negative impacts they bring in terms of consequences for the environment, health and the economy. Dust storms thus represent a point of converging concerns and interests which can be used for bringing the relevant countries and actors together. The scientific and research discourse should take the lead in mobilising a thorough review of the issue, and a platform for such a meeting.

37. Further, participants noted the important role of the United Nations Environmental Programme (UNEP) within the UN system in coordinating a response to the threat of dust storms among all international organisations. Participants recommend a contact with UNEP to explore openings for a joint initiative and meeting so as to bring attention and come up with viable responses.

II. Renewable Energy:

38. The future direction of the energy sector is one of the most pivotal for sustainable development in general, and for the Middle East in particular. The Middle East is endowed with rich fossil fuel reserves that offer inexpensive and highly efficient sources of energy, and it is therefore commonly argued that they would stand to lose from the transition to a carbon-free economy. Yet, all countries are faced with a combination of opportunities and pressures as environmental concerns keep growing while new technologies are opening for a transformation of energy systems, including the rise of competitive Renewable Energy (RE).

39. Renewable energy, including solar and wind, thus far display limited diffusion and impact in the MENA region. Yet, again, due to technical progress and growing scale effects in industrial processes, prices for RE are coming down. As the environmental impacts are factored in, and public subsidies for energy consumption are in the process of being lifted, RE is becoming more competitive in the market. As distributed solutions are becoming attainable, backed by smart grids operating at small scale, and with new training, a broad spectrum of value-enhancing market opportunities is coming for RE.

40. On this basis, MEEF highlighted:

a) The advantages in replacing Fossil fuel burning devices by Solar power (Economic, operational costs; water; pollution; etc.);
b) The need of exerting mindset change, through awareness creation and training, and;
c) The change under way with lifting of public subsidies of energy consumption, which so far kept prices artificially low.

41. It was concluded that the energy sector is heading for an inevitable transformation. The institutions and industries established in the Middle East within this field are in many cases highly professional and competitive. While faced with pressures and costs from adaptation, they harbour both natural conditions and competences which open for carving out new competitive niches in RE. This will require, however, taking advantage of the changing paradigm, including by opening for greater impetus from research, innovation and training on the new opportunities at hand. Improved governance mechanisms should further be developed, enabling decentralized solutions with constructive participation by all societal actors, broadening the basis for new enterprise development and jobs.[9]

42. The following are some of the new systems applications stressed by MEEF, which need to be enabled in the years ahead:

a) Forward-looking applications of shifts towards electrification, as in the case of road- and intermodal transport, notably in the urban context;

[9] On this basis, progress is realized on SDG nr. 7, "Affordable and Clean Energy", as well as nr. 8. on jobs and growth and nr. 10 on inequalities.

b) Contributions by Nature-Based-Solutions (NBS), again including for urban applications;
c) Data management in support of integrated systems solutions;
d) Development of testing facilities and laboratories, and;
e) Measures to pave the way for adaptive energy management using distributed solar absorption coupled with smart grids' development.

43. Energy solutions for the Middle East cannot be designed without factoring in the geopolitical landscape. Three megatrends in the Asia-Pacific are worth noting: adaptation to climate change, the serious impact exerted by air pollution, and also growing income inequality which affects energy access. Participants further highlighted the use of off-grid renewable energy systems as a viable solution to universal energy access, especially to those in rural areas.

44. On this basis, the following are WELCOMED and RECOMMENDED as concrete follow-up activities in the area of RE:

2.1 Collaboration on the economics of RE

45. Developing a joint project agenda, across borders in the region, on the economic aspects of RE. As part of the project, mapping should be undertaken so as to clarify the current status of RE, as well as the scope for new development in the short- medium- and long-term, with characterisation and valuation of the benefits that can be achieved. The economic analysis should to the extent possible include a broader impact assessment (social, environmental, economic). The investigation should examine the potential for:

a) Wind and Solar energy, as well as the areas for their implementation;
b) Generation of energy from biomass (algae cultivation, crops, etc.);
c) Production of Energy from Waste, and;
d) RE generation in cities (roofs, etc.).

46. In addition, the project should investigate institutional aspects and issues that have an impact on marketability, including the availability of required competences, the role of vested interests, the role of Regional Development plans, and the role of RE Industry with regard to the economic performance of the MENA countries.

2.2 Development of infrastructure

47. The development of RE industry needs appropriate national lab facilities to measure and characterize the production of personal vehicles and other appropriate systems. Such national labs could be developed in cooperation with partners from the European Union and should be integrated in entities that already possess adequate potential.

48. Beside large-scale infrastructure, considerations should be paid to institutional and regulatory issues that are needed for opening up new network-based solutions. A prime example is the development of isolated micro-grids, associated battery research and the design of solar-based cooling and heating systems suitable for different kinds of buildings and facilities, in cities as well as in rural areas.

2.3 Waste Management and Energy

49. It is recommended that joint work is undertaken to evaluate best technologies and organisational models for introducing and scaling energy from the production and management of waste. Collaboration should similarly be developed to examine avenues for the conversion of domestic waste to bio fuel and fertilizers. Opportunities for the development of incinerators of joint use, adapted to local conditions in the MENA region should be considered.

2.4 Capacity-building for new solutions

50. The most important challenge and opportunity is related to capacity-building, governance and management of transformation. This includes the need of training managers, decision-makers and other stakeholders in the energy sector about RE. MEEF encourages a cross-border collaborative agenda sharing experience and competencies in support of training and the best use of e-learning.

51. Activities devised for RE Awareness creation can be promoted by competition on the theme of RE and/or Energy Saving solutions. Increased public (i.e. grassroots) awareness matters greatly for the advancement of:

a) Solar cooling/heating;
b) Combined heat power;
c) Sustainable waste management;
c) Smart grids and distributed production units devised with consideration to local needs;
d) Enhanced energy efficiency and conservation through sustainable construction, living and working.

52. Stimulation, through joint programmes, calls and institutional collaboration, of new ventures and solutions around RE. Fertile conditions and an environment conducive to linkages between research, innovation and entrepreneurship should be created. While public seed funding and joint funding schemes will be required in order to build effective linkages with research as well as with the market place, a strong position for the private sector is underlined as pivotal.

III. NCD:

53. Non-Communicable Diseases (NCD) exert a massive burden on societies around the world, killing more people today than all other causes of death combined. To some degree their advance is related to ageing populations, but it is also related to dramatic changes in society, living conditions and lifestyles.

54. NCD are strongly present both in Middle East and Europe, taking into account the varying patterns and profiles of diseases, as expounded by the Global Burden of Disease (GBD) toolbox. The MEEF panel discussed NCD concepts, trends and the evolving challenges and solutions. Improved access to population data helps guiding amended

interventions, including tailoring on an individual basis and in terms of timing (precision public health), as well as finding personalised solutions for NCD (personalised medicine).

55. Improved management of NCD, e.g., diabetes, cardiovascular and mental disorders, is urgent since these diseases present a severe threat to society. International collaboration in areas of medical research is needed to discover, evaluate and implement new treatments in NCD. Successful activities in this area will not only be of value for individual patients but may also reduce costs for health care systems and stimulate entrepreneurial activities in the biotech area.[10]

56. Emerging trends include the ongoing shift of focus from treating disease to health management, including prevention. This reflects a recognition that most diseases are built up over a long period of time, and often have a direct bearing on lifestyle choices made by individuals with little or no awareness of the consequences. Another trend has to do with personalised medicine: Rather than treating patients with a pre-developed drug, the digital era and the technical and diagnostic tools allow to examine the particular circumstances that pertain to the individual, and to provide treatment on this basis, whether for the sake of curing a disease or as a preventive action.

57. The Advisory Board of the NCD track received 43 proposals, representing a wide spectrum of subjects, prepared in advance by participants of MEEF. These were categorized into several groups based on potential domestic, regional or global partner arrangements, outputs/products and funding requirements. The process of gathering the proposals included:

a) Announcements to a wide spectrum of experts in the field;
b) Electronic processing of proposals;
c) Evaluation and ranking of oral or poster contributions, and;
d) The setting up of an online social network of the participants and of their proposals, in support of an effective match-making process.

58. Based on the resulting match-making at the event, concrete collaboration has been established for some of those projects, demonstrating a need of developing new channels to promote research and development in the area of NCD. In-depth discussions on these proposals and the wider set of issues, the methodology and tools for bi-regional collaboration, pointed to concrete activities in three priority areas:

a) Population health interventions;
b) Personalised medicine, and;
c) Digital health.

59. On this basis, the following are WELCOMED and RECOMMENDED as concrete follow-up activities in the areas of NCD:

[10] The importance of combatting the rise of life-style induced health disorders such as NCD are most directly addressed in SDG nr. 3, Good Health and Wellbeing, but are interwoven with others as well, including 8 on jobs and growth and 10 on inequalities.

3.1. Establishing a Bi-regional NCD Advisory Board

60. MEEF invited expansion of the NCD Advisory Board established for the event, tasked to breed new initiatives and helping to institutionalise collaboration on promising activities, linking research and clinical practice. Potential functions of the Board include:

a) Indicating fields of shared interest as a basis for collaboration;
b) Identifying and selecting suitable collaborative partners;
c) Identifying obstacles that currently prevent fruitful collaboration and arranging ways to overcome them;
d) Concrete monitoring of collaborative projects;
e) Contributing to translating research findings toward the development of innovative solutions;
f) Identifying potential granting bodies and linking to them, and;
g) Promoting regulations for more effective collaboration.

61. The Board could additionally facilitate sharing of experience from already existing diverse initiatives, as well as promoting learning in setting up new ones, such as:

a) Leading entities, instituting joint novel solutions for research funding and implementation;
b) Cooperation in education, e.g., offering short-term degrees;
c) Training, including for preparation of proposals in response to H2020 and other calls;
d) Better elaborating joint calls on diabetes and other NCD, at higher pace and more effective handling of formalities;
e) Preparing two joint short-term international workshops/courses with NCD focus in 2019 in Kish Island;
f) Developing an Action plan for scholar/student exchange for short-time scholarship/internship for 2020 and afterwards, and;
g) Developing an Action plan for a summer school in Kish island for 2020 and afterwards.

3.2 Establishing MEPP

62. MEEF welcomed the work for establishing the Middle East Institute on Prevention and Personalised Medicine (MEPP). Conceived as a cross-border international institute made up of an international board coupled with distinct national nodes, MEPP is envisaged to actively seek out complementarities between a series of national entities. MEEP will enable more effective links between pioneering research and clinical practice, with a focus on launching new models for preventing diabetes and other NCD.

63. The concept, structure and activities of MEPP are proposed as follows:

- A flexible organisation devoted to international collaboration in preventive and personalised medicine, inspiring institutional collaboration and joint initiatives between the Middle East and Europe on a bi-regional basis;
- A system of specialised national nodes devised under the aegis of a joint international board, working in an integrated way with leading research organisations in each country, identifying and selecting collaborative cross-

country procedures in support of concrete collaboration on mutually interesting projects;

- The objective is for the MEPP organisation to be functional in Qtr. 1, 2019;
- Fundraising (national/international) and project selection (based on criteria for quality, international collaboration and translational potential) to be initiated;
- In addition to an organisation primarily concerned with project oriented cross-country collaborations, there is a need to strengthen research in the area of NCD within different regions. Such an initiative should not only include discovery research but also involve systems for standardised treatment, implementation of health-related initiatives in different regions, exploiting the potential of e-heath and data bases with the purpose to accelerate health improvements with a regional perspective. Also, this aspect of NCD will benefit from increased regional communication and interactions not only restricted to one country;
- Holding annual MEEP meetings focused on NCD in Kish Island, or in easily accessible other location;
- Expand the network to other technical groups, such as renewable energies or urban solutions (considering the interdisciplinary and syndetic nature of NCD conditions);
- Widen the network of sponsors to encompass international granting bodies, high-tech companies and pharmaceutical companies, and;
- Expand participation to universities in other regions.

3.3 Digital health initiative

64. Digital-health offers rapidly advancing opportunities for novel and scalable solutions for personalised medicine, that are more cost-efficient than traditional pharma. A joint programme is encouraged, spanning the following:

- Establishing customized social network for ongoing communications among professionals (Apps);
- Schemes developing joint content for incentivizing life-style adjustment in support of higher well-being, through prevention of obesity at young age, or the advancement of diabetes in mid-life of risk-groups;
- Collaboration on big data and how to leverage the information collected through smart cards and electronic patient records (EPRs);
- Use of big data propelled by streams of machine learning and deep learning on accurate diagnosing of patients;
- Evaluation and examination of artificial intelligence (AI) techniques for simulation and capacity building;
- Cooperation on the development of robotics for AI assisted surgery and sharing of new technologies in the field, and;
- Collaboration on the development of use cases to examine proper usage of "virtual nurse assistants" and other telemedicine applications.

IV. Urban Issues and Solutions:

65. Many of the themes addressed within the three substantive tracks noted above, come together at the city-level. Here, the issues play out in densely populated space, in the proximity of large numbers of people. At the same time, in this case, decision-makers are closer to the citizens as well as to other stakeholders whose engagement is key to working out sustainable solutions.

66. Around the world, most countries have already transitioned from primarily agricultural societies to our modern-era dominated by industry and services, where the majority of people resides in urban areas. On average, cities tend to have much higher productivity than surrounding regions while also consuming much greater resources and producing more waste and pollution. In addition, especially large cities tend to be subject to a vicious circle of inner fragmentation and polarisation. Depending on where they reside, individuals may experience huge variation in the quality of infrastructure, transport, access to public and private services, security, access to amenities, and so forth. [11]

67. In order to turn things around, means must be found to put an end to the tendency of "accumulation" - that what is bad or good leads to more of the same. Recently, new tools have become available to improve conditions and open up opportunities for all citizens. In this context, MEEF reviewed and built upon the agendas brought about by the "twin concepts" of "Nature Based" and "Smart City" solutions.

68. The Nature-based Solutions (NBS) concept is typically defined as living solutions to societal problems that are inspired and supported by nature, while at the same time cost-effective and able to combine the provision of environmental, social and economic benefits and help build resilience and adapt to climate change. In the last few years, Horizon 2020 initiated a series of calls for major pan-European projects combining research and action on NBS at the city-level. URBiNAT, one of the resulting projects, includes the Iranian city of Khorramabad in the project, and was well represented at MEEF[12].

69. Meanwhile, the Smart City agenda focuses on the use of digital tools, including smart metering, big data, and the Internet of Things (IoT) as a source of establishing the mechanisms for using information in-real-time to improve various aspects of city life. Basically, all larger cities in developed countries have such an agenda in place. Yet, in terms of impact and ability to engage and service citizens, a lot remains to be achieved. There are also issues with regard to data governance, who has control of public and private data and can make use of it for what purposes, along with security and privacy considerations.

70. In reality, the opportunities opened up by NBS and the smart city concepts are related. Smart city tools are important for engaging citizens in diagnostic and continuous communication on the issues of cities and how they are affected, as well as for inspiring their

[11] Hence, the agenda presented here are of high relevance to SDG nr. 11 on Sustainable Cities and Communities, as well as to all the many other goals already referred to.

[12] The URBiNAT project is coordinated by the Centre of Social Studies (CES) of the University of Coimbra, Portugal.

active usage of NBS. Likewise, the role of people and how they relate to NBS can serve as a major source of leverage for turning smart city tools into practical and beneficial use.

71. On this basis, the following are WELCOMED and RECOMMENDED as concrete follow-up activities in regard to Urban issues and solutions:

4.1 Innovation Centres Development

72. An innovation Centre in the broad sense represents a platform that is accessible for students, researchers, and companies to work together with their city, offering services to citizens, contributing to the development of the local economy of the territory (through job creation), and enhancing the efficiency of public services. Within this collaborative fabric, each partner can derive its own advantage in order to fulfil its specific needs/issues. Similarly, a Smart City Innovation Centre is a platform involving municipalities and other local authorities, research and academic institutions, as well as leading smart city-related companies, enabling them to pool data and knowledge in a single location. On this basis, opportunities to develop smart urban services and solutions are multiplied and their practical implementation facilitated for the benefit of its inhabitants.

73. MEEF welcomed the notion of Smart City Innovation Centres as a collaborative framework connecting citizens, the public and the private sectors, through knowledge sharing, in order to improve or develop services for the benefit of its inhabitants. To become effective, the model should be based on smart governance, inclusion and flexibility, so as to enable high responsiveness to key urban challenges spanning diverse but related issues in mobility, environment, energy, urban risk, public health, and so forth. Such centres will be greatly enhanced through effective means to link up to, be inspired by, and create synergies with other similar entities.

74. MEEF took note of the newly initiated collaboration between Northern and Southern Mediterranean cities, in fostering the establishment of such inter-linked centres, with the aim of operating as a platform for smart-city stakeholders - local authorities, research and academic institutions, non-governmental organizations supporting innovation, public service enterprises and innovative start-up companies - to exchange knowledge and best practices in support of sustainable, innovative, energy efficient, and inclusive cities.

75. Based on the experience of this already ongoing initiative, MEEF proposed, as a first step, the creation of an adjoined information point in the Middle East, by way of a city that can actively follow and share information generated by the ongoing projects[13]. As a second step, as the Euro-Mediterranean collaboration move into the formation of a formalised, active network, MEEF encouraged the framing of a Middle East branch, as a basis for supporting the implementation of Smart City Innovation Centres in this region, in accordance with the specific environment and socio-economic needs of each participating country. MEEF welcomed the offer of the Euromed Cities Network as promoter of such collaboration.

[13] Alexandria, Tunis, and Fez are three Arab cities that take active part in the current project.

4.2 Sustainability in support of experience-based industry

76. In the era of digital information flows, globalisation and expanding network effects, cultural, social and environmental assets are subjected to growing pressures, while maintaining functions and services of unique importance to sustainability. MEEF observed the importance of framing a collaborate project to share experience and insight how such assets can best be managed in a sustainable manner, with consideration to diverse sources of social and commercial value, including through experience-based enhancement of multiple industries that are tailored to varying customer categories and needs.

77. MEEF particularly welcomes new research and educational initiatives to engage students and the growing generations in creative cross-disciplinary team work to develop new approaches on how to frame conditions required for the rise of eco-cities that thrive on sustainability, making use of cultural, societal and environmental assets as a source of diverse value-generation.

4.3 A locally adopted systems-approach to Smart City Strategy Schemes

78. Numerous cities around the world claim to be smart, including in the Middle East. When it comes to details though, often there is no specific action "making these cities smart", nor any positive engagement by – or results for - citizens. In reality, cities are highly context-specific, with local preferences and the responsiveness of citizens to varying situations and developments highly context-specific. MEEF thus proposes that the term "smart" is revisited and a systems approach definition for smart cities put in place, which is applicable in the Middle East, serving as a basis for sharing of experience with smart city networks in Europe and other parts of the world.

79. As a basis for collaboration, it is important to achieve fruitful communication among different entities in the two regions in regard to the following considerations:

a) In which way are Smart Strategy Schemes relevant for different actors and for addressing outstanding issues?
b) How is smartness for cities defined and what does it mean in each case?
c) What are the main features of cities that affect the smart strategy?
d) What are the main factors providing obstacles to the rise of smart city strategies?
e) How can smart strategy be prepared and implemented for each city in a manner that is effective and inclusive?
f) What are the prime means of engaging effectively the main stakeholders of smart city strategy?
g) How to NOT reach the strategy vision? (the main threats in achieving the strategic goals)

80. The proposed approach is inclusive, framing a scheme for smart strategy of cities in different countries (and Middle-East with some fine tunings) which is open for everybody involved in smart city projects, products and services in a country that joins the project. A managerial committee is further proposed, consisting of Main Discipline Influencers, Technology Companies and Key Decision-Makers. Technical committees will be devised for specific substantive tasks, and be set to report results within predefined time frames. The

managerial committee will draw on the results in shaping the smart strategy scheme, with a view to further operationalisation and diffusion.

4.4 Project Earthlings

81. MEEF welcomes the project Earthlings, with the goal to establish a hybrid platform including both virtual activities and real-world actions and assets to address the various environmental problems in cities across the globe by citizen engagement. The project Earthlings represents a combination of sub-projects and activities which have been carefully designed to motivate people and organisations to choose more environmental-friendly behaviors and to take actions to recover defects that have been inflicted on the environment, especially in urban areas.

82. The project consists of three parts, i) EarthlyLove, which is a social mobile app, ii) EarthlyWatch, which will provide dashboards for monitoring and highlighting environmental problems all over the world, and iii) EarthlyVillage, a place to experience future sustainable scenarios for urban life. These may be briefly outlined as follows:

83-i) *EarthlyLove*
EarthlyLove is a social mobile app. The app provides a friendly place for the people to see and report environmental problems by simply taking a photo, adding a comment and posting it. The app provides features to engage users with more activities which are shaping an Earth-friendly lifestyle. Designed with diverse users in mind, the app incorporates localization features in many languages.
83-ii) *EarthlyWatch*
As EarlyLove userbase grows, more people report problems and solutions all over the world. In a year or so, there will be enough data to launch the second phase, EarthlyWatch. EarthlyWatch is essentially a web application which will use data gathered through EarlyLove to create a global dashboard of environmental problems. This big data, which is gathered from all around the globe with crowdsourcing, will allow EarthlyWatch to employ Artificial Intelligence and Machine Learning techniques to help pinpoint focus areas for addressing various environmental problems.
83-iii) *EarthlyVillage*
A key evolution is the move of people from a "No-Care" situation to one marked by Awareness, where in addition, inspiration can flow into action resulting in the rise of EarthlyVillage, marked by sustainable urban lifestyle. Combining technology with nature-based-solutions this gives rise to an environment in which people co-create a green, healthy, modern and sustainable life. The MEEF welcomes the invitation to take part in coaching the construction of some 120 EarthlyVillages in different continents.

Conclusion

84. In conclusion, participants in MEEF have called for a conscientious effort to collaborate across the borders of countries, cultures, institutions, scientific disciplines and stakeholders, to advance genuine collaboration in science, technology and innovation in countering our common challenges in sustainable development. The adoption of new technologies needs to be accompanied by capacity building, increased awareness creation and the active

engagement of people, along with training at multiple levels, including leadership and governance in support of sustainability.

85. It has been noted that many of these issues strike hard against the peoples of the Middle East region in a broad sense, while the research and innovation landscape of this region is fragmented with limited capacity to fulfil its contribution in resolving these issues. With Europe well organised in joint programmes, especially Horizon 2020, which is open to the participation of research institutions and individual researchers from other regions, MEEF takes note of a number of initiatives that can be undertaken to create a framework for joint and highly relevant research activities by putting in place the mechanisms for collaboration and inclusion on a bi-regional basis.

86. It is essential that this agenda is linked to addressing the real outstanding issues of both regions, and hence MEEF stresses the importance of progressing with translational research in support of a sustainable future. The universities that hosted MEEF have followed up the event by putting in place a joint secretariat to help fuel follow-up initiatives, including a second related event planned for spring 2020. Further, this Action Plan lists a number of initiatives, some of which are already under way, welcoming their advance and also the joining of new actors in bringing these on. The listing is far from exclusive but it is hoped that it will be treated and seen as seeds which will help create the conditions for them, along with many more, to grow and blossom in support of a better future for all.

Appendix 1: Plans for 2nd MEEF

In order for the agenda defined by MEEF to be taken forward, the five universities that collaborated on the preparations and implementation have agreed to deepen their collaboration by forming a joint **Secretariat** to help underpin, champion and support common agendas ahead. Other universities, relevant institutions and networks in the two regions are invited to join forces with the hosting institutions. The objective is to establish an inclusive and open-ended framework. The hosting institutions will promote value-enhancing synergies, knowledge-sharing and collaboration. Their operation will be backed by a bi-regional scientific advisory board, extending from the bodies preparing the MEEF while taking into account the expert advice offered at the event.

MEEF held in Kish Island on October 19-21, 2018 was the first event of its kind, based on a bottom-up process driven by individual researchers and research institutions to define common ground and collaboration between the two regions. The approach is genuinely inclusive, opening up for other universities as well as researchers, along with policymakers, business and other stakeholders, to take part. On this basis, it was agreed that the same hosting institutions shall take the lead and invite others to join in preparing a **second Forum**, tentatively to be arranged in the spring 2020. Broad-based participation is welcomed by universities, research institutes, research foundations as well as government bodies and the private and civil sectors. The following additional components were recommended by participants as important ingredients in the planning ahead:

1. Holding a side exhibition next to the forum;
2. Placing high emphasis on genuine matchmaking and co-creation, pulling together complementary research, innovation, entrepreneurial talent and active investors;
3. Providing more partnerships for companies and business owners at the forum alongside universities, including greater scope for match-making between researchers, innovators, entrepreneurs and funding bodies;
4. Further strengthening the scope for interaction between the main tracks of the forum since smart city tools and services can be used for other tracks as well. As an example, water resources management which is also a high priority in cities;
5. Participation of foreign and domestic investors to increase in the forum.