CLUSTER TO CLUSTER
PARTNERSHIPS IN FUTURE INTERNET
Yearbook of Success Stories
3rd EDITION
Copyright © 2014-2018 EU-India FI-MEDIA Project

Funded by the Delegation of the European Union to India, New Delhi.

Call reference: EuropeAid/135-474/DD/ACT/IN

Project reference number: ICI+/2014/342-895

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording or other electronic or mechanical methods, without the prior written permission of the publisher, except in the non-commercial uses permitted by copyright law. For permission requests, please write to the publisher: James Clarke et. al. <jclarke@tssg.org>
Authors and Project Investigators

James Clarke, Waterford Institute of Technology, TSSG, Waterford, Ireland

Abhishek Sharma, Beyond Evolution Tech. Solutions, Gurgaon, India

MP Gupta, Indian Institute of Technology Delhi, India

Arpan Kumar Kar, Indian Institute of Technology Delhi, India

Shuchi Sinha, Indian Institute of Technology Delhi, India

Brian Foley, Waterford Institute of Technology, TSSG, Waterford, Ireland
FOREWARD

We are delighted to launch the third edition of our annual Yearbook of Success Stories of the EU-India FI-MEDIA project, which is an International cooperation mobility project funded by the Delegation of the European Union to India\(^1\), under a programme entitled ICI+, which is instrumental in the formation of mutually beneficial EU-India cluster to cluster (C2C) partnerships in a variety of Lots, including Information and Communications Technologies (ICT).

In the third year of the project, the team focussed on expansion of the clustering activities to other cities in both EU and India, in road-show formats, with six roadshow events held in New Delhi, Gwalior, Mumbai, Geneva, Malaga, Jabalpur, Trivandrum and Bangalore.

The fruits of successes from our established Cluster to Cluster (C2C) partnerships, including Smart Cities/Villages ecosystems, and Bringing EU's FIWARE programme (http://www.fiware.org) to India, particularly in the context of “Smart environments”, have come to fruition during this year, with follow up activities and MoUs signed between EU and India organisations involved in the clusters. A new C2C has been formed on IoT for smart environments and the project has also teamed up with other EU Delegation funded projects involved in EU – India ICT standards cooperation and planned joint activities in the next years of the projects.

Similar to our previous reports, we dedicate this Yearbook of Success Stories especially to those members from Research, Innovation and Industry communities that have taken time from their busy schedules and have shown tremendous interest and dedication in our third year of bringing together pro-active clusters from EU and India.

Finally, we would like to especially thank the Delegation of the European Union to India for their support and interest in our project.

Yours Sincerely,

James Clarke, Waterford Institute of Technology, Ireland, EU-India FI-MEDIA Coordinator
Abhishek Sharma, Managing Director, Beyond Evolution Tech. Solutions, Gurgaon, India, EU-India FI-MEDIA partner
M.P. Gupta, Professor, Department of Management Studies, Indian Institute of Technology Delhi, EU-India FI-MEDIA partner

\(^1\) EuropeAid/135-474/DD/ACT/IN programme under Grant number ICl+/2014/342-895 (http://eeas.europa.eu/delegations/india)
## List of Acronyms used in the report

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Advisory Board</td>
</tr>
<tr>
<td>BEAM Program</td>
<td>Business with Impact program</td>
</tr>
<tr>
<td>BETS or beTS</td>
<td>Beyond Evolution Tech. Solutions Ltd.</td>
</tr>
<tr>
<td>BIC</td>
<td>Building International Cooperation for Trustworthy ICT</td>
</tr>
<tr>
<td>BOG-ITD</td>
<td>Board of Governance – IIT Delhi</td>
</tr>
<tr>
<td>C2C</td>
<td>Cluster to Cluster partnership</td>
</tr>
<tr>
<td>CII</td>
<td>Confederation of Indian Industries</td>
</tr>
<tr>
<td>DEF</td>
<td>Digital Empowerment Foundation</td>
</tr>
<tr>
<td>DMS</td>
<td>Department of Management Studies (at IIT Delhi)</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus Group Discussion</td>
</tr>
<tr>
<td>FICCI</td>
<td>Federation of Indian Chambers of Commerce &amp; Industry</td>
</tr>
<tr>
<td>FIWARE</td>
<td>Future Internet PPP program platform</td>
</tr>
<tr>
<td>FI-PPP</td>
<td>Future Internet Public Private Partnership</td>
</tr>
<tr>
<td>GE</td>
<td>Generic Enablers (FIWARE)</td>
</tr>
<tr>
<td>ICSC</td>
<td>International Conference on Smart Cities</td>
</tr>
<tr>
<td>INCO</td>
<td>International Cooperation</td>
</tr>
<tr>
<td>IIPA</td>
<td>Indian Institute of Public Administration</td>
</tr>
<tr>
<td>IITD</td>
<td>Indian Institute of Technology Delhi</td>
</tr>
<tr>
<td>M2M / IoT</td>
<td>Machine to Machine / Internet of Things</td>
</tr>
<tr>
<td>MNCs</td>
<td>Multi-National Corporations</td>
</tr>
<tr>
<td>NEM</td>
<td>New European Media Technology Platform</td>
</tr>
<tr>
<td>NREN</td>
<td>National Research and Educational Network of Poland</td>
</tr>
<tr>
<td>IIITDMJ</td>
<td>Indian Institute of Information Technology, Design and Manufacturing, Jabalpur</td>
</tr>
<tr>
<td>PSNC</td>
<td>Poznan Supercomputing and Networking Center, Poland</td>
</tr>
<tr>
<td>R&amp;I</td>
<td>Research and Innovation</td>
</tr>
<tr>
<td>SE</td>
<td>Specific Enablers (FIWARE)</td>
</tr>
<tr>
<td>SPEG</td>
<td>Society for Promotion of e-Governance</td>
</tr>
<tr>
<td>TCOE</td>
<td>Centre of Telecom Excellence</td>
</tr>
<tr>
<td>TSDSI</td>
<td>Telecommunications Standards Development Society, India</td>
</tr>
<tr>
<td>TSSG</td>
<td>Telecommunications Software &amp; Systems Group of WIT</td>
</tr>
<tr>
<td>UAS</td>
<td>University of Agricultural Sciences</td>
</tr>
<tr>
<td>UBA</td>
<td>Unnat Bharat Abhiyan</td>
</tr>
<tr>
<td>UTA</td>
<td>University of Tampere</td>
</tr>
<tr>
<td>WIT</td>
<td>Waterford Institute of Technology</td>
</tr>
</tbody>
</table>
Executive Summary

In the third year of the FI-MEDIA project, the team took a decision to continue to place efforts and resources towards maintaining of the original two Cluster to Cluster (C2C) partnerships, namely Smart Villages Ecosystems and Bringing FIWARE to the India Context. It has also taken significant actions in the setting up a third C2C related to Internet of Things (IoT) for Smart environments (e.g. Smart agriculture, Smart villages, etc.).

The activities carried out in year 3 of the project for each of these C2Cs are summarised below.

**C2C 1: Smart Villages Ecosystems**

In year 3, after the initial collaboration started during the EU-India STI Cooperation Days 2016 conference, 21-22nd Sept. 2016, Goa, India\(^2\), a follow up C2C workshop was hosted at IIT Delhi between Department Of Management Studies | IIT Delhi - DMS, Tekes funded Rural Voice and Business with Impact (Beam ) program, including University of Tampere (UTA, Finland) in joint collaboration with IBM Research Lab, India and University of Agricultural Sciences (UAS), Dharwad, and International Management Institute, Delhi. In the latter part of the year, the FI-MEDIA partners worked closely with the organisers of the annual M2M + IoT forum event (Jan 30-31\(^{st}\), 2018)\(^3\), and organised a dedicated event during the second day of the conference entitled India Smart Villages Forum 2018\(^4\), which brought together the stakeholders from the EU - India Cluster to Cluster (C2C) Smart Villages ecosystem addressing the basics of needs of any village encompassing the vision for a well-connected Smart Village highlighting key sectors that will contribute towards building scalable and sustainable Smart Villages in India. This was a very successful event, which included many C2C members from the EU including FIWARE Foundation (DE), Smart Cities Labs (DE), HOP Ubiquitous (ES), University of Tampere (FI), and others, and a report is currently being generated for this event, which took place outside of the period of this report.

**C2C 2: Bringing the EU’s FIWARE program in an India setting related to Smart environments (e.g. smart campus, smart villages, smart cities)**

In year 3, which runs from 1\(^{st}\) December, 2016 until 30th November, 2017, the C2C activities were plentiful and quite fruitful; culminating in the setup of a FIWARE node in Jabalpur and the FIWARE platform under consideration for numerous Smart cities and villages’ activities around India, including a proof of concept study for a pilot project of the World Bank.

The year started off with a successful C2C Technical workshop on FIWARE for Smart Cities, held in conjunction with the National Conference on Smart Cities\(^5\) (NCSC 2016) held on 25-26\(^{th}\) Nov., 2016, in Jabalpur\(^6\), jointly organized by EU-India FI-MEDIA, PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ) and Indian Institute of Technology Delhi (IITD), in association with Think India Forum\(^7\), and Jabalpur Smart City Limited\(^8\). The conference was hosted in the premises of PDPM IIITDM Jabalpur\(^9\).

\(^2\) [http://www.bic-fimedia.eu/?view=news&amp;news_id=40](http://www.bic-fimedia.eu/?view=news&amp;news_id=40)

\(^3\) [News item at http://www.bic-fimedia.eu/?view=news&amp;news_id=54](http://www.bic-fimedia.eu/?view=news&amp;news_id=54)

\(^4\) [Information available at http://www.m2m2iotforum.com/forum/discover-the-forum](http://www.m2m2iotforum.com/forum/discover-the-forum)

\(^5\) [Web site available at http://sc2016.iiitdmj.ac.in/](http://sc2016.iiitdmj.ac.in/)


\(^7\) [http://www.thinkindiaonline.in/](http://www.thinkindiaonline.in/)
The selection of Jabalpur as a location of FIWARE node and as venue for the workshop is important since Jabalpur was announced by the Government of India in seventh place in the list of first 20 smart cities under ‘Smart Cities Mission’, where the aim is to identify challenges and explore opportunities in order to support creativity and interdisciplinary collaboration required for development of smart cities. As part of this event, on 26th November, 2016, FI-MEDIA Cluster to Cluster (C2C) Partnerships and Smart Cities Lab India organised a full day hands-on developers workshop on FIWARE technologies specifically for Smart Cities, including IoT. There were over 100 participants for the entire day at the FI-MEDIA C2C workshop. The workshop was conducted by C2C members comprised of expert FIWARE trainers from Smart Cities Lab India who travelled from the EU and the lessons included real application for Smart cities, including those related to Internet of Things (IoT).

During the week of 13-21st February, 2017, a dedicated FIWARE C2C team from Europe and India held a week-long mission of events with dual purposes: a. Follow up activities from past C2C events; and b. Initiating new C2C partnerships (e.g. IoT for smart environments) through new events. This encompassed a week-long mission in a number of Indian cities, including New Delhi, Jabalpur, Gwalior and Mumbai. A full report of the mission can be found here.

On 7-9th March 2017, FI-MEDIA partners and C2C member Orange Labs India (Gurgaon) took part in a dedicated session on “How to benefit from the EU’s FIWARE open platform to accelerate development of innovative smart city services” during the 10th edition of the International Conference on Theory and Practice of Electronic Governance (ICEGOV) hosted by the Government of India. The responsible Government department was NeGD, the National e-Governance Division, Ministry of Electronics and Information Technology, with excellent support from the United Nations’ University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV), in collaboration with UNESCO.

In June, 2017, The FI-MEDIA partners attended the IoT week in Geneva, Switzerland (more details on this visit included below under the C2C3 on IoT for Smart Environments). Since the FIWARE community was involved in the event, the FI-MEDIA team took this opportunity to convene a C2C FIWARE meeting with a number of EU and India members, including the CEO of the FIWARE Foundation, Mr. Ulrich Ahle. The C2C meeting focussed on a forward looking strategy and planning for the next steps for the C2C including sustainability models, involving more dedicated assistance from the FIWARE Mundus element of FIWARE and the need for a dedicated project manager, with a non-competitive role.

In July, 2017, EU-India FI-MEDIA sponsored a roadshow mission around a number of India cities (Delhi, Jabalpur and Mumbai) to follow up on the FIWARE C2C activities to date and to foster new collaborations within the FIWARE C2C partnership. In order to build upon the excellent momentum already started with the support of EU-India FI-MEDIA project, a C2C building mission was carried out during July, 2017, in which Mr. Rahul Tomar of Smart Cities Lab India (DE), a core member of

---

8 http://www.smartcityjabalpur.org/
9 http://www.iiitdmj.ac.in/
10 http://www.fiware.in/
FIWARE Foundation and EU-India FI-MEDIA C2C member, travelled from the EU to India to follow-up on previous established activities and to foster new opportunities to build upon for the FIWARE C2C to become a sustainable entity. During the roadshow, meetings were held with interested parties in the C2C including Dell India, World Bank and IIIT D&M Jabalpur, Smart City Jabalpur, and Gaia Smart Cities. A full report of the mission is available [here](http://bic-fimedia.eu/content/news/SCL-FI-MEDIA-July2017-report-final_7889960224.pdf).

Finally, the FI-MEDIA project, through the organisational role of the M2M + IoT Forum 2018 event, were instrumental in inviting the FIWARE C2C members to play a key role in the successful event held during 30-31\textsuperscript{st} January, 2018. This included a keynote from the CEO of the FIWARE Foundation, Mr. Ulriche Ahle, during both day 1 (Smart Cities Forum) and day 2 (Smart Villages Forum) and a dedicated booth during the entire event. During the keynote, Mr. Ahle announced the good news that due to the work of FI-MEDIA in bringing FIWARE to India, a first India company, Mobilepedia Innovations\(^{14}\), has signed up as a paid Gold member of the FIWARE Foundation\(^{15}\). In addition, EU FIWARE Foundation Gold members HOP Ubiquitous from Spain and Smart Cities Lab from Germany participated as speakers with the support of FI-MEDIA and held bi-lateral meetings with other potential FIWARE enthusiasts before, during and after the event. A report is currently being generated for this event, which took place during the start of Year 4 of the FI-MEDIA project.

**C2C 3: Internet of Things for Smart Environments (e.g. Smart Agriculture).**

In year 3, in order to kick off a new C2C on IoT for Smart environments, the FI-MEDIA project team decided it would be an excellent opportunity to meet with EU experts and find out about the activities going on in the EU on Internet of Things (IoT) research and innovation during the IoT week 2017\(^{16}\), which was held from 6-9\textsuperscript{th} June, 2017, in Geneva, Switzerland. Through strong contacts between WIT and the organisers, all of the partners of the FI-MEDIA project were able to secure presentation slots in a number of appropriate panel sessions, which gave excellent scope to carry out raising visibility of the project objectives and recruitment activities from the EU communities engaged in IoT research and innovations.

As part of this annual prestigious event, FI-MEDIA coordinator, Mr. James Clarke, took part in a panel session on IoT for Smart Agriculture. A summary of Mr. Clarke’s responses during the panel session can be found [here]\(^{17}\) and on page 35 in the IoT Week 2017 report available [here]\(^{18}\). FI-MEDIA Partner, Mr. Abhishek Sharma gave a presentation on IoT Market Perspectives during a track called “IoT Business, Finance, and Industry 4.0” perspectives, new financial and business models, as well as the impact of IoT on the industry and factories of the future (see page 13 and 37-38 of the IoT Week 2017 report available [here]\(^{19}\). FI-MEDIA partner, Prof. MP Gupta gave a presentation during a session on Emerging IoT solutions in developing countries. The focus of the session was to present IoT champion solutions from developing countries/regions to let the audience to identify possible joint collaboration between EU and these target regions to work together on common problems and

\(^{13}\) Report available [here](http://bic-fimedia.eu/content/news/SCL-FI-MEDIA-July2017-report-final_7889960224.pdf)

\(^{14}\) FIWARE Foundation Gold Members [https://www.fiware.org/foundation/members/](https://www.fiware.org/foundation/members/)

\(^{15}\) FIWARE Foundation Gold Members [https://www.fiware.org/foundation/members/](https://www.fiware.org/foundation/members/)

\(^{16}\) [https://iotweek.org/](https://iotweek.org/)


develop IoT technologies that are sustainable and that promote sustainability. Prof. M.P. Gupta presented on innovative IoT solutions for Smart Cities and Services in India. Session report on pages 31 - 33 of the IoT Week 2017 report available here\textsuperscript{20}.

Since the event, the FI-MEDIA project has been working with the main sponsor, The Internet of Things International Forum (IoT Forum\textsuperscript{21}), on the setting up of a mirror IoT Forum in India. It has put them in touch with a number of potential partners in India for this mirror group, and the work is ongoing and it is expected that a first IoT Forum India event could be held in the latter part of 2018 or early in 2019. It is also expected there will be India participation in the upcoming IoT Week 2018, which will take place in Bilbao, Spain in June, 2018\textsuperscript{22}.

One of the interested parties involved with the IoT Forum is Forthcode Technologies (from Netherlands and Bangalore, India), whose travel was co-sponsored by EU-India FI-MEDIA project to attend the IoT Week in Geneva, and during October, 2017, to follow up these activities, the EU-India FI-MEDIA project team joined together with Forthcode Technologies for a successful multi-city roadshow style mission with the purpose of building a new EU-India C2C on IoT in smart environments activities in Trivandrum, Kerala, New Delhi and Bangalore. Information on this mission can be found here\textsuperscript{23} and detailed in chapter 12.

During this mission, in order to build up support for a C2C in relation to IoT for Smart environments, in New Delhi, the EU-India FI-MEDIA partners had meetings with the M2M + IoT Forum in relation to the planning of their annual M2M + IoT Forum event dedicated to Smart cities being held on 30-31\textsuperscript{st} January, 2018. In addition, the EU-India FI-MEDIA team members presented the project’s C2C activities (current and future) including the upcoming events in November, 2017 and January, 2018 to the Gov’t of India, Senior Director of The Ministry of Electronics & Information Technology. The idea of a C2C on IoT for Smart environments was discussed with the Minister and was deemed as highly appropriate and he was very supportive.

EU-India FI-MEDIA was invited as a keynote speaker in the Smart republic 2018 conference\textsuperscript{24} in February, 2018, and this event provided excellent contacts for this C2C on IoT for Smart environments as the overall conference topic was on Smart Cities and Smart Villages.

This 3\textsuperscript{rd} edition of the project’s Yearbook of Success Stories contains a summary report of all of the C2C activities held during the third year of the project.

\textsuperscript{21} http://iotforum.org/
\textsuperscript{22} https://iotweek.org/
\textsuperscript{23} http://www.bic-fimedia.eu/?view=news&news_id=53
\textsuperscript{24} http://www.smartrepublic.in/index.html
## Table of Contents

**FOREWARD** .......................................................................................................................... 3  
List of Acronyms used in the report ............................................................................................ 4  
Executive Summary ....................................................................................................................... 5  
1. Introduction to FI-MEDIA Cluster topics .............................................................................. 11  
2. Cluster membership criterion ................................................................................................. 13  
3. Cluster - India .......................................................................................................................... 15  
4. Cluster - European Union ......................................................................................................... 24  
7. FIWARE Summit, 13-15<sup>th</sup> December, 2016, Málaga, Spain ............................................. 44  
8. C2C Roadshow of the FI-MEDIA / C2C FIWARE teams, 13-21<sup>st</sup> February, 2017, New Delhi, Jabalpur, Gwalior and Mumbai ................................................................. 47  
8.1 Bi-lateral meetings ............................................................................................................... 47  
8.2 C2C workshop meetings ..................................................................................................... 47  
9. Parallel C2C FIWARE-and FI-MEDIA session at ICEGOV2017, 7-9th March 2017, ASHOK Hotel New Delhi, India ............................................................................................................. 63  
10. Roadshow event of the EU-India FI-MEDIA team at IoT week 2017, 6-9<sup>th</sup> June, 2017, Geneva, Switzerland .................................................................................................................. 66  
11. Roadshow mission of EU-India FI-MEDIA to foster new collaborations within the FIWARE C2C partnership, 24-28th July, 2017, New Delhi, Jabalpur and Mumbai .......................................................... 69  
12. Roadshow mission of EU-India FI-MEDIA, 23 – 27th October, 2017, Trivandrum, Kerala, New Delhi and Bangalore ................................................................. 74  
13. Focus Group Discussion (FGD) planning round-table on a new C2C with the key theme on “Internet of Things (IoT) and the Future of Internet”, 23rd November, 2017, IIT Delhi .............. 78  
14. M2M+IoT 2018 conference on Smart Cities & Smart Villages, 30-31 January 2018, in conjunction with EU-India FI-MEDIA project ........................................................................... 83  
15. EU-India FI MEDIA in Smart Republic 2018, 15-16<sup>th</sup> February, 2018 ................................. 86  
16. Conclusions and Next Steps for Year 4 (and potentially Year 5) .......................................... 95  

Appendix 1. Accompanying letters in relation to M2M+IoT 2018 conference on Smart Cities & Smart Villages 2018 .................................................................................................................. 97
Chapter-1
1. Introduction to FI-MEDIA Cluster topics

During the third year of the project, the project has continued to focus on topics related to Future Internet and Digital MEDIA (FI-MEDIA) around potential ICT applications where the EU could assist the developments in India and also attempt for reciprocal support from the India side. In addition to working with the C2C partnerships on brainstorming ideas for future topics, the FI-MEDIA partners are working closely with the government, policy and decision makers in both the EU and India to make sure the clustering topics being addressed are core to the current programmes in each country. The project has participated at some EU-India ICT policy dialogue events during the second year, which has enabled them to re-focus on additional potential topics for consideration in the future C2C partnerships, as shown in figure 1 (not exhaustive).

![Figure 1 - Main topic areas scoped between India and EU in years 1 - 3 and beyond)](image)

As detailed above, there were a large number of C2C events throughout the third year dedicated to the promotion of the use of FIWARE as part of the Digital India’s Smart Cities (including Villages) programme. We felt that interlinking the two subjects was essential as the EU borne FIWARE platform is an excellent “open source development platform” with numerous generic and specific enablers with the ability to improve the efficiency and overall productivity of the software development and their implementation processes within smart environments. The approach the C2C has taken is to target and leverage both the Academic sector as well as Industry sectors in the promotion of this useful platform in individual cities that have been chosen in the first tranche of 35 India smart cities in the Digital India program. Events have been held in New Delhi, Jabalpur and an initial C2C event was held in Gwalior during February, 2017. The C2C has expanded to include FIWARE Mundus representatives and respective start-ups in smart cities and smart villages, and larger organisations, Orange Labs India, who has a specialty FIWARE lab based in Gurgaon, and Smart Cities Lab India, an EU-India cluster group dedicated to training and commercialising FIWARE activities in India.
Chapter-2
2. Cluster membership criterion

The FI-MEDIA project has followed some fundamental criterion (ground rules) when seeking and establishing clusters in India and EU, as shown in figure 2.

![Figure 2 - Cluster building criterion](image)

In more detail, the cluster formation is based upon the following criterion:

- **Relevance** – The area of work or business offerings of the cluster members should have a focus on relevant and timely topics of mutual benefit to both countries, especially if linked to current government programmes of high priority;

- **Expertise** – A focus on topics where each country has specific expertise to contribute and thus providing a high probability of success;

- **Existing independent, ICT driven cluster of physical entities (e.g. Academic/ Research Institute/ or a Business Entity):** – a focus will be made on already established, highly relevant clusters/WGs/initiatives/platforms before delving on the setting up new ones from scratch; The clusters should discretely focus and work with the aim to collaborate towards sustainable C2C partnership as per the project objectives.

- **Balance** - Equal representation of Academic, Research and Industry, especially SMEs;

- **Authenticity** - An authentic need and desire to form a cluster to cluster partnership with the other country must be evident;

- **Sustainability** - Having sustainability of cluster to cluster partnerships formed as a foundational value before setting up. This can be achieved through sustainable business interests in the area and/or future research and innovation projects engagements.

The next sections summarise the current clusters in both India and EU, with new additions added in Year 3.
Chapter-3
3. Cluster - India

The core members of the India Cluster are indeed coordinated by the FI-MEDIA partners, Indian Institute of Technology, Delhi (IITD) and Beyond Evolution Tech. Solutions (BETS). FI-MEDIA’s EU partner, Waterford Institute of Technology (WIT), with long experience in setting up international clusters and Working groups, has also pro-actively participated in the cluster building activities in India to ensure consistency and mutuality of benefits with the activities taking place on the EU side. In order to scope and further recruit additional cluster members in India, the FI-MEDIA partners have embedded themselves into a number of current and highly relevant “smart initiatives”, as described below. The current India FI-MEDIA cluster members are the following:

- **Indian Institute of Technology, Delhi (IITD).** is one of the top premieire Technology & Research Institutes of India, and is involved in the coordination of large scale centres of excellence and projects related to the clustering topics under discussion in FI-MEDIA, thus making them an ideal partner on the India cluster.

- **Beyond Evolution Tech Solutions (BETS)**: Pvt Ltd, an SME of prominence with a major focus on M2M/ IoT technology based innovation and developing high end “utility” products and solutions for enterprise and individuals (B2B & B2C). With a strong background in mobile technologies, BETS have many in-house developed products and solutions in their portfolio. BETS has also been involved in the building of international cooperation activities with EU and India government and research and innovation partners for a number of years, an invaluable expertise needed for the building of the C2C partnerships between India and EU.

- **World Bank India.** The team at the World Bank India, based in New Delhi, have been actively involved from the outset of the projects at the C2C partnership meetings organised by the EU- India FI-MEDIA project. Presently, the World Bank India team is studying a number of platforms, including the EU’s FIWARE platform, for suitability as a shared services platform for various projects including the Indian Smart Cities mission. They have been engaged with India and EU organisations involved in the FIWARE communities in both the C2C meetings in India and have also travelled to the EU and took part in the ICEGOV conference in Galway, Ireland the FIWARE summit held in Porto, Portugal. They have also recently taken part in the Indo-Dutch Smart Cities Leaders meeting to share their knowledge on smart cities and e-governance initiatives.

- **Mobilepedia Innovations**. In year 3, the team at Mobilepedia Innovations has become actively involved with the FI-MEDIA team and FIWARE Foundation in conjunction with the C2C on Bringing FIWARE to the India context. They are actively involved in a number of India government projects and with the World Bank team in India with a focus on the use of open source technologies for government based services. With a team of around 80 persons, Mobilepedia Innovations has been a part of implementation of GSTN network among large eGovernance projects, and have good experience in Open stack environments. Mobilepedia Innovations is the first India-based Gold member of FIWARE Foundation. Mobilepedia Innovations, along with partners Tech Mahindra and Hughes Systique, have signed a Memorandum of Understanding with NEC Technologies India Private Limited (NECTI), in order to explore collaboration on joint development of FIWARE-based solutions. On 27th April, 2018, NEC Corporation (NEC; TSE: 6701)

---

25 [http://www.beyondevolution.in/](http://www.beyondevolution.in/)
28 [http://www.mobilepedia.in/](http://www.mobilepedia.in/)
and NECTI announced the launch of their FIWARE Lab node in India to encourage application developers, solution providers, government bodies and academia to experiment and innovate with FIWARE based solutions for smart cities.

- **Gaia Smart Cities**, based in Mumbai, India, is an Internet of Things (IoT) and automation company, providing end to end solutions to enable smart transformation of enterprises and cities. Gaia works on platforms related to smart energy, smart metering and smart grid activities, and they have taken part in the C2C on *Bringing FIWARE to the India context*, especially in smart cities/villages.

- **Kerala Start-Up Mission (KSUM)**, based in Trivandrum. In year 3, Forthcode Technologies organised a successful C2C meeting with KSUM and Forthcode Technologies team from EU and India and the EU-India FI-MEDIA clustering team from India and EU, with a view to establishing C2C partnership activities in the Trivandrum region. Established by the Government of Kerala, KSUM, whose overall vision is to strengthen the Start-up Eco System to support Industrial growth of Kerala, plays a pivotal role in development, and orchestrating every piece of a vibrant Start-up ecosystem. As outlined in the Kerala technology start-up policy 2014, the focus of KSUM is more on future technologies and finding solutions for problems in ways not experimented before, which has been implemented and that in turn leads to more proactive measures in the new State IT policy 2017. KSUM is quite interested in teaming up with IoT related clusters in the EU, including the IoT Forum for an annual IoT week event to be held in Trivandrum in the future.

- **Orange Labs India**, based in Gurgaon, India, is one of the Orange's international centres with a mission to innovate and produce best-in-class software to fulfil the business requirements. This skilled group of 100+ engineering professionals includes software developers, Quality Assurance and testing experts, business analysts, architects, and project managers. In addition to keeping the focus on advanced technologies, the lab is working to leverage Indian ecosystem, and drive the local topics of interests. FIWARE for smart cities development is one of the topics being developed by Orange Labs India, and these were presented and demonstrated by the Orange Labs team at the 43rd Asia-Pacific Advanced Network (APAN43), held at the India Habitat Centre (IHC), New Delhi in February, 2017. The title of the APAN43 session was *Open Innovation through Effective EU-India Clustering partnerships in vertical sectors using the European FIWARE Open platform*. More details of this event in Chapter 8.

- **PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ)** was established to foster the research and development activities in the areas of: IT enabled design and manufacturing, and Design of IT systems to meet the growing demands of the Indian industries and to provide them as well as help them preserve knowledge in the field of design and manufacturing of product and visual designs. In November, 2016, PDPM IIITDMJ along with IIT Delhi have co-organised a co-located conference and C2C workshop with the FI-MEDIA project under the banner of National Conference on Smart Cities (NCSC 2016) and FI-MEDIA C2C Workshop on FIWARE for Smart cities. During the event, a FIWARE Lab was first inaugurated at

---

30 http://gaia.in/
31 https://startupmission.kerala.gov.in/
32 http://forthcode.com/
33 http://www.iiitdmj.ac.in/
PDPM IIITDMJ\textsuperscript{34}. During Year 3, a MoU was signed between Smart Cities Lab India (EU) and PDPM IIITDMJ in February, 2017. See Chapter 8 for more details.

- **Forthcode Technologies\textsuperscript{35}**, is a start-up company based in Bangalore, India and the company has carried out interesting development work involving FIWARE. They have been an active member of the C2C2 with the project. Forthcode Technologies has developed a smart city demonstrator for the city of Eindhoven, NL based on FIWARE. The experience of replacing a proprietary system with FIWARE was recounted and it was carried out in a period of 2 months, and the user interface was also developed by Forthcode Technologies. This demonstrator was very much appreciated by the city council and discussions are ongoing to take it to the next level. Forthcode Technologies is also involved with a leading management institute based in Bangalore, a leading lighting company and few cities in Europe and India for IoT-based IT modernisation. Forthcode Technologies is also working on a FIWARE based system in Kerala in South India to improve quality of services in terms of water supply and street lighting in villages. If this project goes ahead, 1,900+ villages will be connected to the FIWARE platform. During the year 3 in 2017, Forthcode Technologies took part in important clustering events in the EU, including the FIWARE summit in Malaga, Spain and the IoT week in Geneva, Switzerland, and, in India, organised for the FI-MEDIA project an excellent roadshow style set of meetings in Trivandrum and Bangalore with industry and government officials from both India and the EU. See chapter 12 for more details.

- **Atal Bihari Vajpayee-Indian Institute of Information Technology and Management, Gwalior (ABV-IIITM Gwalior)\textsuperscript{36}**, is a premier Institute of higher studies in Computer Science and Engineering, and Business Administration. ABV-IIITM Gwalior is an effort of MHRD (Ministry of Human Resource Development), Government of India for creating professionals who are equally adept in handling concerning issues in IT and business administration. A C2C team consisting of FI-MEDIA partners and Orange Labs travelled to ABV-IIITM Gwalior on 16-17\textsuperscript{th} February, 2017, and held a C2C Workshop on ‘Future Internet’ and FIWARE Technology for Smart Cities. The objectives for the workshop were twofold: Current C2C activities and how ABV-IIITM Gwalior could participate and also viewing hot technologies being developed by start-ups in the Technology Innovation and Incubation Centre located on the campus of ABV-IIITM Gwalior.

- **Unnat Bharat Abhiyan initiative\textsuperscript{37}**, which is a pilot for a cluster of villages where Future internet technologies and ICT can be integrated. This large scale project is coordinated by FI-MEDIA partner, and India cluster member, IIT Delhi. As part of the Apex Committee Meeting of Unnat Bharat Abhiyan in Ministry of Human Resources Development (MHRD) chaired by the Hon’ble Minister, held on 19th June, 2015, IIT Delhi has been assigned the task to develop a concept paper on ‘Smart Village’. One of the key thrust areas within the Unnat Bharat Abhiyan project is rural electronics and IT: e-governance/ICT enabling grass-root initiatives including development of village information network. This relates to the provisioning of computerized support system and database for use by local communities in effective planning and access to technology in the areas of health, sanitation, sustainable agriculture, education, watershed management, etc.

- **India Smart Village Forum\textsuperscript{38}** - As part of this activity, the FI-MEDIA project has become involved in the India Smart Village Forum, which held their annual event in April, 2015. The organisers invited

\textsuperscript{34}http://www.bic-fimedia.eu/?view=news&news_id=45\textsuperscript{35}http://forthcode.com/\textsuperscript{36}https://www.iiitm.ac.in/\textsuperscript{37}http://unnat.iitd.ac.in/index.php/en/\textsuperscript{38}http://www.smartvillageforum.com/
Prof. M.P. Gupta of IIT Delhi to be on a panel related to ICT for smart villages, including the use of M2M and IoT for increased innovation and productivity potential. The Fi-MEDIA partners have been involved in follow up meetings with the Forum members with a view to setting up a specific cluster in this area. The next meeting of the ‘India Smart Village Forum’ was held on Friday, 30 October 2015 with both BETS and IITD are participating. There has since been follow up activities with BETS , IITD and WIT providing inputs from the C2C event on smart villages in December, 2015 towards their white paper. The follow up Smart Village Forum was held on 31st January, 2018 at the India Habitat Centre in New Delhi, organzised by the M2M + IoT Forum and Fi-MEDIA.

- **M2M+ IoT Forum Working Group (Smart villages & Agriculture)**, involved with looking at topics related to M2M/IoT & sensor based monitoring of smart village and agriculture assets, established under the remit of the Telecommunications Standards Development Society, India (TSDSI)[39]. In brief, TSDSI are working towards understanding the India Specific requirements for M2M/IoT as well as considering applicable global Standards to ensure Indian requirements are addressed and created Indian standards. TSDSI M2M work group will also identify the areas R&D which have not been considered by global SDOs and would work towards creating specifications and thereby contribute to Global Standardization activities. In order to further elaborate on the India cluster definition, on 6th May, 2015, the FI-MEDIA cluster team have participated to the M2M/IoT WG meeting and on 7th May, 2015, the team hosted a meeting at IIT Delhi with a view to further explore the possibilities of forming clusters in this area. An outcome of the meeting was the building of a set of requirements for a smart village and how Future Internet and Media could be used to form a cooperative environment, which would provide a number of tangible benefits, including increased profits, more trade potential, easier way of life, employability, better quality of life (e.g. keeping young people from moving to the big cities). During 2017, FI-MEDIA worked very closely with M2M + IoT Forum and co-organised the highly successful Smart Cities Forum and Smart Villages Forum, held on 30-31st January, 2018, respectively.

- **Smart Campus @IIT Delhi Initiative** - The Government of India is promoting the development of 100 smart cities aimed at deployment of internet based applications, content management platforms and broadband infrastructures in every sphere of public systems (such as healthcare, media, energy and the environment, safety, and public services). With this in mind, the cluster member, Indian Institute of Technology, Delhi (IITD), is coordinating an initiative addressing the development of a large scale “smart campus”, as an embodiment of a smart city environment. Academic campuses, essentially for people who are expected to be engaged in intellectual progress, knowledge creation and guiding societies for better living, could also embody principles of a smart environs on their campus. The concept is built around a typical smart campus with three pillars: infrastructure, operations and, of course, people. Each of these pillars would be infused with intelligence, and, more importantly, they would work in an interconnected and integrated fashion to utilise resources efficiently. Such a campus could incorporate the ‘Future of Internet’ involving Internet of Things, sensor technologies, and content creativity as the main facilitators of a smart infrastructure in a campus setting. Some of the key features of such a smart campus are:
  - Smart technology enabled automation;
  - Integrated services via dashboards;

• Energy and water efficiency (Smart distribution systems, smart meters, etc.);
• Foster creativity & innovation via collaboration;
• Results in best practices.

At the NEM General Assembly and NEM summit held in Frankfurt in October, 2015, a number of potential areas have been identified for immediate collaboration between EU based initiatives and the Smart Campus @IIT Delhi, as depicted in Figure 3.

• Irdeto\(^40\) is a world leader in Media Protection, Multiscreen and Revenue Assurance solutions for pay TV operators, OTT service providers and content owners. Irdeto enables pay media companies to provide a personal media experience for their consumers, uncover new revenue opportunities and offer new forms of entertainment on broadcast, broadband and mobile networks. Irdeto participated to a brainstorming session with the FI-MEDIA project team to scope and plan how the India cluster could be built around M2M/IoT applications enabling the improvement of the technical-socio-economics aspects of life in smart villages.

![List of services in a smart campus](image.png)

![Select those which are sustainable or enhance sustainability](image.png)

![Involve students to foster entrepreneurship](image.png)

![Research opportunities](image.png)

**Figure 3 - India – EU clustering in the Smart Campus @IIT Delhi initiative**

• Federation of India Chambers of Commerce and Industries (FICCI\(^41\)) is an association of business organizations in India. Established since 1927, FICCI is a non-government, not-for-profit organisation drawing its membership from the corporate sector, both private and public, including SMEs and MNCs. The chamber has an indirect membership of over 2,500,000 companies from various regional chambers of commerce. It is involved in sector specific business policy consensus building, and business promotion and networking. It is headquartered in the national capital New Delhi and has presence in 12 states in India and 8 countries across the world. FICCI has been supportive of FI-MEDIA since the start and their participation to the India cluster is very welcomed due to their outreach and dissemination activities, especially towards the industry segment of India.

• Confederation of Indian Industries (CII) is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India’s development process.

\(^{40}\)http://irdeto.com/index.html
\(^{41}\)http://www.ficci.com/
Founded in 1895, India’s premier business association has over 7,900 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 240 national and regional sectoral industry bodies. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues. With 66 offices, including 9 Centres of Excellence, in India, and 7 overseas offices in Australia, China, Egypt, France, Singapore, UK, and USA, as well as institutional partnerships with 312 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community. FI-MEDIA partner Beyond Evolution Tech Solutions is a member of CII and thereby enjoys enormous benefits offered by CII to its members, which includes participation and access to various events of national & international importance, enabling not only networking to various segments of industry, society. And also Government access to strong platform for policy changes etc. For FI-MEDIA project cluster building, this membership of CII, with its vast domestic as well as international presence, would come out immensely beneficial for establishing desired C2C partnership. The FI-MEDIA team met with upper management of CII during Year 3 and plan to co-organise events together in the next periods.

- **Digital Empowerment Foundation (DEF)**, based in New Delhi, is one of the world’s leading practitioners in the field of Information & Communication Technology for Development (ICTD). DEF takes part in several national and international government and non-government bodies, expert panels and task forces engaged in the task of promoting a digitally-empowered and information-rich society. Through all its diverse activities, DEF seeks to help people living in information darkness overcome the information barrier, learn how to use digital tools and the Internet to achieve greater socio-economic equality by uplifting themselves almost on their own using the power of digital devices to access information and knowledge. DEF has participated to a number of the FI-MEDIA C2C events.

- **Voxomos Systems Pvt. Ltd.**, is an Indian industry member specialising in applications of Speech and Image Processing. The company has significant experience in Signal Processing algorithms and tools, software & hardware design and verification. Voxomos took part in the FI-MEDIA C2C event in January, 2016, in relation to bringing FIWARE experiences to India and made an excellent presentation entitled “Innovations in MultiMedia Experience”, in which the use of FIWARE is proposed to enhance the human computer interface with integration of touch, voice, image, gestures with text.

- **ONIONDEV** is a social marketing and technology company formed through a strategic partnership between Gram Vaani(meaning “Voice of the Village”) and the Life Impacting Services unit from OnMobile Global Ltd. ONIONDEV gave a very interesting keynote speech during the C2C event on Smart Villages Ecosystems in December, 2015. Their Mobile Vaani platform was described in the Smart Village context and is used to connect through

---

47 [http://mobilevaani.in/vaani/](http://mobilevaani.in/vaani/)
measurable ways different Corporates, Government Agencies, Non-Governmental Organizations, and Social Enterprises to consumers not touched by other media channels.

- **KPMG, a large industry member**, took part as an Inaugural speaker in the C2C event on FIWARE in a smart environment, stressing the need for taking a holistic view towards developments in Smart Cities, empowering a wide range of citizens, including the under privileged, stressing the importance of taking into account human rights, accessibility, making lives better and diversity.

- **Society for Promotion of e-Governance (SPEG)**, is a major think tank and mission mode organization working to accelerate e-Governance initiatives in the South Asia region. SPEG has participated to both the C2V events with a focus on the availability of running pilot villages, which is very interesting from the perspective of externalising activities of large scale pilots in the EU, which is a current major topic in the H2020 Work Programme 2016-2017 call.

- **SHOBHIT University, Centre for Agricultural Informatics and e-Governance Research Studies**, NCR Delhi has been a strong advocate for a need for cluster to cluster partnership in relation to the development of a Climate Smart Village Farm ecosystem. In a keynote presentation during the C2C event in December, 2015, they emphasised that it would be highly worthwhile for India and EU clustering together on a Climate Smart village farm ecosystem, including the following six Smart pillars: Weather, Water, Carbon, Nitrogen, Energy, & Knowledge. On 17<sup>th</sup> February 2017, Shobhit University hosted the 6th International Communication and Information Technology Conference (CICON) - 2017, entitled “Emerging Trends in Science, Technology, Engineering and Management: Research and Development” with the theme: “Doubling Farmers’ income by 2022 - Smart Farming and Smart Village”. The FI-MEDIA project is in contact with the organisers of this event to ensure that the outcomes from this conference will be utilised and followed up at a future C2C event on Smart Villages’ ecosystems in 2017. SHOBHIT University took part in the recently held Smart Villages C2C Forum on 30-31<sup>st</sup> January, 2018.

- **IIT Madras**, has taken part in the FI-MEDIA – UBA C2C event in December, 2015 on smart villages ecosystems, where they presented their The good work on how the Future Internet can be used for the management of natural resources. The presentations focussed on using ‘Future Internet’ ICT technologies, including Open Source GIS tools, in support of energy conservation, energy creation, management of natural resources (water, soil and waste management), mobile surgery units, and traditional craft industries (e.g. hand weaving).

- **Indian Institute of Public Administration (IIPA)**, is an Institute set up to equip the public servants with knowledge, skills, and behaviour required for managing the task of governance. In its effort to enhance the leadership, managerial, and administrative capabilities of the executives in government and public sector enterprises, the Institute works in close collaboration with national and international organisations. The major activities of the Institute are: Training, Research, Advisory and Consultancy services, and Information dissemination and exchange. IIPA have participated in speaking roles at both FI-MEDIA C2C events and have advocated an impassioned view for a more holistic development for smart cities that caters for all citizens, especially including those with special needs and enhancement of quality of life for all citizens through the use of emerging technologies. IIPA have also advocated a strong need for clustering between the EU and India in order to compare / collaborate on methodologies.

---

48. [http://www.egovindia.org/about.html](http://www.egovindia.org/about.html)
49. [http://www.shobhituniversity.ac.in/caigers/index.php](http://www.shobhituniversity.ac.in/caigers/index.php)
50. [https://www.iitm.ac.in/](https://www.iitm.ac.in/)
and frameworks for cluster development and growth with strong involvement of the stakeholders (empowerment of communities).

In summary, due to their C2C activities in the first three years, the partners of FI-Media have moved forward successfully in identifying the specific areas of Research & Innovation that would have strong potential of meaningful contribution to not only the Indian society but would have rather equal potential for European society as well, thereby generating enough interest and pull for the formation of a reciprocal European Clusters and further Cluster to Cluster (C2C) partnerships with the Indian clusters, mainly based on the cross-over between the use of the EU’s FIWARE platform and ICT technologies for smart cities and smart villages, including m2m and IoT.
Chapter-4
4. Cluster - European Union

In Year 3, the numbers of C2C members have significantly ramped up and they are described below:

- **Waterford Institute of Technology (WIT)** is an academic/research organisation with the largest research centre in ICT in Ireland entitled Telecommunications Software and Systems Group (TSSG). WIT has been on the NEM platform Steering Board for two terms, and has a large portfolio of research and innovation projects in areas related to future internet, network management and IoT and cloud computing. WIT has also considerable experience in building international working groups and clusters over the last ten years. Therefore, WIT is in a good position to take a leading role in the EU-India FI-MEDIA clusters. WIT has some interesting projects in the Smart agriculture area and organised a networking session at the prestigious ICT 2015 event in Lisbon, Portugal with the topic entitled: Agriculture 4.0: the Internet of Things boosting regional innovation. The session had delegates discussing current, unsolved challenges and identify where ICT and the interlinked, data-sharing elements of the ‘Internet of Things’ have the greatest opportunity to stimulate innovation, capacity and growth within a scope of Agriculture sectors.

- **HOP Ubiquitous**

  HOP Ubiquitous, based in Spain, is an innovation leader in Internet of Things (IoT) solutions. HOP Ubiquitous was established to make a different in the use of the Internet of Things through more human oriented products. For this purpose, HOP Ubiquitous has built on its expertise in ubiquitous / global connectivity to Internet offering innovative low power modules with M2M/IoT/LP-WAN, scalable management to facilitate large scale deployments, maintenance and monitoring, and finally ad-hoc sensors for the different markets. Their expertise is focused on IoT connectivity, IoT management / maintenance, IoT Security and the development of customized products including Hardware, firmware and encapsulation (3D printing for fast prototyping). HOP Ubiquitous are participating in EU-India FI-MEDIA C2C on Bringing FIWARE to the India context and also setting up a new dedicated C2C partnership on IoT.

- **NEM Technology Platform**

  The NEM Initiative (Networked and Electronic Media Initiative) was established as one of the European Technology Platform (ETPs) under the Seventh Framework Programme (FP7) and Horizon 2020 (H2020). NEM aims at fostering the convergence between consumer electronics, broadcasting and telecoms, in order to develop the emerging business sector of networked and electronic media. In order to respond to new need and requirements of the Horizon 2020 programme, the NEM initiative enlarged its focus towards creative industries and changed its name to New European Media. The NEM constituency includes all major European organisations working in the networked and electronic media area, including content providers, creative industries, broadcasters, network equipment manufacturers, network operators and service providers, academia, standardisation bodies and government institutions. The NEM Initiative is supporting Europe’s activities on the Future Internet and is actively contributing to the definition of the related research and innovation areas. In particular, the Future Media Internet has been identified by the NEM community as its major innovation area. Consequently, it is very natural that the NEM initiative has been very supportive to the EU-India FI-MEDIA project from the start and throughout year 1. Through clustering with NEM members in various events organised by the NEM initiative during year 1, there have been numerous opportunities emerged for the development of fruitful cluster collaboration related to FI-MEDIA between India and EU, which are presented herein below.

---


• **University of Tampere (UTA)**, in joint collaboration with IBM Research Lab, India and University of Agricultural Sciences (UAS), Dharwad, and International Management Institute, Delhi have been asked to join with us in the C2C on Smart Villages ecosystems. We made contact with them during the session on Rural Renaissance held at the EU-India STI Cooperation Days 2016 conference\(^{55}\), held on 21-22nd September 2016, in Goa, India, in which the FI-MEDIA were speakers also in the session. The event was held at National Institute of Oceanography (NIO), within its headquarters at Dona Paula, Goa. They also participated to the m2m + IoT Forum 2018 / EU-India FI – MEDIA co-organised event on Smart Villages Forum held on 31\(^{rd}\) January, 2018.

• **Smart Cities Lab India**\(^{56}\), based in Germany, is a collaborative initiative aiming for development, delivery and export of smart ICT and mobile based services and products in the following priorities areas – Smart Cities, e-Health, Energy, Environment, Agrifood and Logistics. Smart Cities Lab India is actively promoting FIWARE technologies and cooperation of Indian companies, universities and clusters with relevant counterparts. Although borne in the EU, the open community FIWARE platform has been promoting international markets in the last years. Smart Cities Lab India addresses the specific challenges of metropolitan societies (cities: consisting of government, citizen, university and corporates) and providing well defined solutions to relieve the challenges of multi-stakeholders. Smart Cities Lab India is committed to open source in general, specifically to FIWARE as technology agnostic platform and API’s. Smart Cities Lab India have participated to a number of the C2C events in Year 3.

• **Open & Agile Smart Cities**\(^{57}\) (OASC) initiative, whose vision is to create an open smart city market based on the needs of cities and communities. There is a requirement for a minimum of 3 cities per country to establish a chapter in the country, which would be very easy for India. Its motto is to have a City as a Platform: Fostering Innovation & supporting Entrepreneurs. The idea for their participation in a C2C partnership is the setting up of a Smart City Lab federation in India, which will foster standardisation and continuous replacement of idiosyncratic and incompatible structures with forms that are shared, accepted and used by all as defacto-standard.

• **Alliance for Internet of Things Innovation (AIOTI)**\(^{58}\) are an inclusive body of members from key IoT industrial players – large companies, successful SMEs and dynamic startups – as well as well-known European research centres, universities, associations and public bodies. Most of the AIOTI activities are carried out through Working Groups\(^{59}\), which focus on well-defined areas of development. These include vertical Working Groups in research and innovation, policy issues and proposed standards, as well as horizontal, cross-disciplinary activities focused on hot topics in the field. The project is in initial discussions with AIOTI about setting up a new C2C on IoT.

• **Orange Labs Research**, France, NEM Steering board member, has been involved in previous EU-India cooperation building projects, including leadership roles in Working group/clustering in the EU-India Spirit project (2010 – 2012) related to Audio Visual Media and Internet and Emerging Information and Communications Technologies (ICTs) and e-infrastructure, respectively. In addition, Mr. Pierre-Yves Danet, NEM Vice Chair of Orange Labs Research, was a steering committee of the EU-India Synchroniser project\(^{60}\), whose broad objective was the strengthening of the international dimension of EU-India ICT research programme. Mr. Danet is also currently

---


56. [http://www.fiware.in/](http://www.fiware.in/)

57. [http://oascities.org/](http://oascities.org/)


60. [http://euroindiaresearch.org/synchroniser/SteeringCommittee.htm](http://euroindiaresearch.org/synchroniser/SteeringCommittee.htm)
leading the NetWorld/NEM joint working group, which is looking at the alignment of the future research and innovation activities of the NetWorld and NEM technology platforms. This knowledge and expertise will be very valuable in bringing additional contacts to the EU cluster when scoping the needed technologies for the EU-India cluster to cluster partnership. Mr. Danet has been involved in the FIWARE programme since the beginning and is a member of the FI-LINKS project and FIWARE Mundus programme, and in this role, he will help to pursue a C2C partnership with India on FIWARE for smart villages, smart campus, etc. In addition, Orange has developers already working with FIWARE in smart agriculture applications.

- **FIWARE**—Through the connections established via NEM and others in the Future Internet domain in the EU, the FI-MEDIA project has formed a C2C partnership with the EU based FIWARE programme (which was described recently in a session at ICT 2015 as the “Airbus” of the Future Internet). The FIWARE Community was established a number of years ago as a Public Private Partnership (FI-PPP) related specifically to Future Internet, engaged as an independent open community with a mission: “to build an open sustainable ecosystem around public, royalty-free and implementation-driven software platform standards that will ease the development of new Smart Applications in multiple sectors”. FIWARE offers Generic Enablers (APIs), which are designed to minimise the complexities for developers, and Open Data as well as an innovation ecosystem called FIWARE Lab, where developers can start easily to work with the tools on offer. In addition to increased acceleration in Europe of FIWARE, especially in smart activities in a large number of smart verticals (agriculture, transport, cities, ...), there has already been significant interest and uptake FIWARE in other regions of the world, including the Americas (primarily in South America), Korea, Africa, and recently starting in North America. FI-MEDIA partners have made contact with members of the global component of FIWARE known as FIWARE Mundus with a view to clustering partnership between the EU’s FIWARE program with the important topics in India, such as smart campus, smart village, M2M, IoT, etc. This cluster partnership has been further discussed with both FIWARE Mundus and the European Commission at both the NEM summit and ICT 2015 event in Lisbon, and the perception is that the setting up of a FIWARE region in India would be greatly welcomed. There is a formal methodology that takes place during the establishment of a FIWARE region and the initial steps are already underway and are being coordinated in India by the FI-MEDIA partners, BETS and IITD. A number of successful C2C partnership events, including roadshow activities, were held during year 3 and they are reported in the subsequent chapters of this report.

- **Images & Réseaux** cluster, NEM Steering board member, involves 256 members across a variety of domains. The areas of excellence or strategic action areas defined by Images & Réseaux cover technologies and markets. A single domain (example: "networks and Internet of things) may cover several technologies ("infrastructures, networks and terminals" and "Software and services") and target several markets, including Networks and Internet of Things; Big Data and Multimedia; Digital security and trust Interactions; Immersions, Mixed realities; Software and engineering; and users and collaborative producers - See more at: [http://www.images-et-reseaux.com/en/la-strategie/themes-6-areas-excellence-rd#sthash.fEK3GCou.dpuf](http://www.images-et-reseaux.com/en/la-strategie/themes-6-areas-excellence-rd#sthash.fEK3GCou.dpuf). The key markets addressed by the Images & Réseaux cluster include: ehealth, smart cities and territories (including villages),

---

61 [https://www.fiware.org/](https://www.fiware.org/)
63 [https://www.fiware.org/mundus/](https://www.fiware.org/mundus/)
connected vehicles, education, e-Tourism combined with augmented reality, and smart grids, electrical network of the future. They have also expressed a significant interest to expand their international cooperation activities to the India markets. The Images & Réseaux cluster is also the unique French cluster porting an European accelerator for the Future Internet (entitled FI-C3) as part of the EU’s FIWARE accelerator programme66.

- **Peacefulfish**67, NEM Steering board member, based in Berlin, Germany has been working for many years with Indian collaborators in areas related to creativity and electronic media content creation and one such example of this collaboration is with Mumbai based Curry Western Productions, who have partnered together since 2010 in creating the European-Indian business network for audio-visual professionals, eurindiamedia68. eurindiamedia is an on-line platform for facilitating business collaboration between audio-visual content producers in Europe and the sub-continent. eurindiamedia also engages in industry research to better cater to the needs of this sector. Curry Western Production is a film production company and provider of business networking events for the audio-visual industries via own initiatives like Swiss-Indian film bridge and eurindiamedia. Typical customers of Curry Western Production include European broadcasters and co-producers, audio-visual professionals in Europe and India. By working with Curry Western Productions, the project is able to build a trusted network of business professionals in India and Europe and to create the foundation for easier collaboration between these players, due to its complementary competencies and geographical networks. Peaceful fish also have been researching into the integration of innovative payment gateways for advanced media technologies, which could be of significant interest in the smart villages setting.

- **Media Deals**69, NEM Steering board member, is a pan-European investor cluster gathering business angels and early-stage venture capital funds focusing on Creative Industries and digital media. Since its creation in 2008, Media Deals has been promoting and encouraging early-stage equity investment in high-growth start-up companies in the following fields/sectors: Audiovisual (film, TV, videogames, music and distribution platforms); Digital Tools/Services for creative sectors; Disruptive models bringing content and technology together; and cutting-edge media technologies. Through their involvement in FI-MEDIA, they are quite interested to expand their network toward the innovative industries in India.

- **Holken Consultants & Partners**70, NEM Steering board member, is the founder of NEM’s Global International WG. In the foundation phase of this WG, a survey was carried out related to international cooperation and its benefit to NEM and, conversely, how NEM could enable the strategic building of international cooperation. Within this survey, India was identified as a core country for cooperation with NEM, especially in a number of the priority vision and strategy topic areas identified by NEM, to drive and accelerate the innovative development towards the Future Internet and Electronic Media. Holken Consultants & Partners will be an added value to the cluster due to their experience in similar endeavours in other regions of the world. For example, they are involved in the EU-MED ICT project, Cooperation with Mediterranean Partners to build Opportunities around ICT and Societal And Industrial Challenges of Horizon2020 (MOSAIC71), whose objective is to setting up mirror Technology platforms in non EU Mediterranean countries.

---

66 [https://www.fiware.org/](https://www.fiware.org/)
70 [http://holkenconsultants.wix.com/home#!home/c1sta](http://holkenconsultants.wix.com/home#!home/c1sta)
71 [http://www.mosaic-med.eu/](http://www.mosaic-med.eu/)
including Maghreb countries (Algeria, Morocco, Tunisia, Libya) and Mashriq countries (Egypt, Jordan, Lebanon, Palestinian administered areas, Syria Arab Republic Syria). Therefore, the lessons learned from MOSAIC brought by Holken Consultants & Partners to the building of the FI-MEDIA C2C partnerships will be an invaluable support.

- **Cap Digital**, NEM Steering board member, is the French business cluster for digital content and services with over 700 members consisting of primarily innovative SMEs but also major universities, higher education establishments, research labs, and corporations focused on a specific technology-driven industry. Cap Digital organise the annual long FUTURE EN SEINE\(^{73}\) event held in Paris, France. Since 2009, the Cap Digital cluster has been implementing the Paris Region’s strategy for digital content and services, supporting innovative SMEs in this field. In addition, Cap Digital is leading the Eurotransmedia Project\(^{74}\), which is gathering some of the most influent media clusters in Europe, representing a critical mass of complementary skills all along the value Digital media chain. In one of their work packages (WP4, Communications, Dissemination and International prospection), and in follow up discussions with the project coordinator, they indicated a strong desire to include India in this WP activity.

- **Swansea University**, United Kingdom, is a world-class research – led university founded in 1920. The University has enjoyed a period of tremendous growth, soaring up the 2014 Research Excellence Framework league table to 26th in the UK from 52nd in 2008. Swansea University are very active in the Smart cities research and innovation areas and work closely with IIT Delhi.

- **Poznan Supercomputing and Networking Center**, Poland, affiliated to the Institute of Bioorganic Chemistry of the Polish Academy of Sciences, is responsible for the management of the countrywide Polish National Research and Educational Network (NREN). PSNC mission has been the integration and implementation of scientific research results via the deployment of services for public administration, healthcare, education, agri-food and social sectors in polish e-infrastructure and has been a very valuable participant in the C2C partnership related to Smart Villages ecosystems, and have played a role on the C2C partnership on FIWARE in India.

- **The FIWARE Regional Center in Minas Gerais, Brazil**, hosted by the Faculty of Computing (FACOM), Federal University of Uberlândia (UFU), have participated to the FI-MEDIA C2C partnership on bringing FIWARE to India with their considerable experience. They made a presentation entitled **Experiences in Setting up a FIWARE Node in Brazil: The FIWARE Future Internet Innovation Laboratories (FIILAB)**. Federal University of Uberlândia (UFU) is Higher Education Institution (HEI) funded by the Federal government of Brazil, located in Minas Gerais, a state at the southeast region of Brazil. UFU currently has 1.600 professors and 32.000 students over Seven Campuses (three at Uberlândia, Patos de Minas and Monte Carmelo). UFU has been considered a regional center of FIWARE since 2014 and was involved in a task inside the FIWARE project, Task 10.8: Creation and support of FI-WARE Regional Centers in Brazil. The main activities in this task included:
  - Setup and operation of two FIWARE Regional Centers in the cites of São Paulo (USP Polytechnic School) and Uberlândia (Federal University of Uberlândia);
  - Deployment of a FIWARE Lab node associated to each Regional Center;
  - Evangelism, training, coaching and support of local entrepreneurs using FIWARE platform;
  - Development of Proof of Concept applications.

---

\(^{72}\)http://www.capdigital.com/en/

\(^{73}\)http://www.futur-en-seine.paris/en/

\(^{74}\)http://www.eurotransmedia.eu
In summary from the EU Clustering membership perspective in year 3, the FI-MEDIA project provided continuity for the existing cluster members established in years 1 and 2, including those from existing initiatives and clusters in the EU, for maximum impact. In addition, new connections have been fostered, primarily within the IoT domains. These have included active participation from the EU members of the following initiatives / clusters / platforms:

- **EU FIWARE program** ([http://www.fiware.org/](http://www.fiware.org/)) is an EU led initiative that was started as part of a Future Internet Public Private Partnership (FI-PPP), which is comprised of an Advanced OpenStack-based Cloud + rich library of Generic Enablers (GE) that make the development process much easier by hiding complexities (e.g. protocols) from the developers. Through the FIWARE Mundus global element of FIWARE, they have taken part in a C2C partnership set up in the FI-MEDIA project. They have played a large role in the follow up activities for this cluster, since they are set up to assist the migration of FIWARE to other non – EU countries. During Year 2, FIWARE Mundus asked the FI-MEDIA project to help organise an international session on FIWARE and bring a speaker from India to their first global FIWARE Summit being held in December, 2016 in Málaga, Spain. This led to a very successful session, which is described at [http://www.bic-fimedia.eu/?view=news&news_id=44](http://www.bic-fimedia.eu/?view=news&news_id=44).

- **Smart Cities Lab India** ([http://www.fiware.in/](http://www.fiware.in/)). Since 2016, the FI-MEDIA project has teamed up with Smart Cities Lab India, with offices based in Germany and Mumbai, with the strong support of the FIWARE Foundation based in the EU. The concept being developed by FI-MEDIA and Smart Cities Lab India is to use the C2C partnership to invite all interested stakeholders from students’ communities, academics and professionals’ world (industry) to join hands and spread the FIWARE platform to the advantage of a new ‘smart’ living in cities, villages, etc. Together, through the FI-MEDIA C2C partnership programme, Smart Cities Lab India and FI-MEDIA are committed to expand the group and promote FIWARE by working closely with corporates, start-ups incubated within Institutions of higher learning (IITs/IIMs), and college students via workshops, internships, lab and competitive schemes. In conjunction with the FIWARE Foundation, this relationship has continued in 2017 and has resulted in the spreading of the FIWARE platform throughout India, including the establishment of a number of FIWARE nodes.

- **Open & Agile Smart Cities (OASC) initiative** ([http://oascities.org/](http://oascities.org/)), whose vision is to create an open smart city market based on the needs of cities and communities. There is a requirement for a minimum of 3 cities per country to establish a chapter in the country, which would be very easy for India. Its motto is to have a City as a Platform: Fostering Innovation & supporting Entrepreneurs. The idea for their participation in a C2C partnership is the setting up of a Smart City Lab federation in India, which will foster standardisation and continuous replacement of idiosyncratic and incompatible structures with forms that are shared, accepted and used by all as de-facto-standard.

In addition, during the third year, due to the FI-MEDIA partners taking part in an annual IoT week event in the EU (Geneva, June, 2017), a strong cooperation has developed especially with initiatives that are based on the Internet of Things topics. These include the following two main IoT initiatives based in the EU:
• The Internet of Things International Forum (aka IoT Forum - https://iotforum.org/), the main organisers of the EU's Annual IoT Week events in the EU with an interest to have a mirror event in India. IoT Forum is a member based organization which aims to promote international dialogue and cooperation on the Internet of Things, organize events and conferences, such as the IoT Week, and develop activities and synergies with and among its members. It supports the development of a worldwide interoperable Internet of Things, addressing technology barriers, business and societal challenges to create the conditions for a truly worldwide Internet of Things ecosystem and market. It does this through promoting international dialogue and cooperation on the Internet of Things between diverse actors from industry, research and government and across sectors.

• Alliance for Internet of Things Innovation (AIOTI - https://aioti.eu/) are an inclusive body of members from key IoT industrial players – large companies, successful SMEs and dynamic start-ups – as well as well-known European research centres, universities, associations and public bodies. Most of the AIOTI activities are carried out through Working Groups, which focus on well-defined areas of development. These include vertical Working Groups in research and innovation, policy issues and proposed standards, as well as horizontal, cross-disciplinary activities focused on hot topics in the IoT field.

The results from the numerous C2C events will now be elaborated in Section 5 through Section 14.
5. CII’s 13th Global SME Business Summit 2016 – 22-23rd, November, 2016, New Delhi

Abstract: Confederation of India Industry (CII)’s organised their 13th Global SME Business Summit 2016 – 22-23rd, November, 2016 in New Delhi, India. As part of this event, EU-INDIA FI-MEDIA assisted CII to organise a successful standing room only breakout session dedicated to India - EU cooperation. As part of the session, there was a speaker from the Delegation of the EU to India and FI-MEDIA had a dedicated presentation on eliciting the support of CII for for Enhancing C2C Partnerships.

Background and interactions with the Global SME Business Summit 2016

In June, 2016, Mr. Abhishek Sharma, MD Beyond Evolution Tech Solutions Pvt Ltd, FI-MEDIA partner and a full member of the Confederation of Indian Industry (CII), became aware from management of CII about the dates and scope of their annual Global SME Business Summit 2016. With a sub-theme of Global SME Partnerships for Sustained Growth and Equitable Development, the event was being held on 22-23rd November 2016, in New Delhi. According to Mr. Sharma, “Since CII is a body of Industry Association whose primary objective is to help create suitable environment and conditions that can support the growth of business for its industry members, FI-MEDIA can associate itself with CII with the help of the CII membership of one of the FI-MEDIA partner. The Confederation of Indian Industry (CII), a non-government, not-for-profit, industry-led and industry-managed organization, works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes”. Furthermore, due to his role as a Partner in the EU-India FI-MEDIA project, which is funded by the Delegation of the European Union to India, Mr. Sharma was engaged to help in the organisation and recruitment efforts for a dedicated session on EU-India cooperation. Following this approach, Mr. Sharma offered to assist in the recruitment of speakers/panellists for the Europe session of the event, including attendees from the EU and a large number of other delegates from the industry. The overall attendance at the event was 500+ and more details on the event can be found at [http://www.ciisme.in/](http://www.ciisme.in/).

The panel session entitled Breakout Regional Session II: Scope for SME Partnerships with Europe, had the following panellists:

- a. Mr. Thomas Hundt, Director, Germany Trade & Invest;
- b. Mr. Indranil Chaudhary, Co-Chair, Sub Group on Ease of Doing Business, CII National MSME Council;
- c. Dr. Francesco Pensabene, Trade Commissioner, Embassy of Italy;
- d. Ms. Marika Jakas, Head, Trade & Commerce, Delegation of the European Union to India, New Delhi, India;
- e. Mr. James Clarke, Waterford Institute of Technology, EU-India FI-MEDIA coordinator, Ireland;
- f. Mr. Bernardo Theotonio Pereira, Portugese Business Agency.

---

75 [http://www.cii.in/](http://www.cii.in/)
The presentations and discussions in the panel session revolved around the following:

- **Scope of strengthening SME Partnership between India and Europe - Ms. Marika Jakas:**

  Ms. Jakas shared the status of EU related SME based initiatives and their contribution in European Trade & Commerce, where the fact that about 99% of the total number of Industries in Europe are SMEs was emphasised. Hence there is a wide scope of partnership in every possible field that Indian SMEs would be interested in. A number of initiatives were outlined including the Investment plan for Europe, where SME start-up loans were available (up to 200k euros), to improve the framework of SMEs to operate and encourage SMEs from EU Member States. The Small business act was outlined, which encourages the “Think Small principle”, which is based on two tenets: Measure impact on initiatives and work towards the EU’s Digital Single Market strategy. The Competitiveness programme, which supports internationalisation in Europe, was outlined by Ms. Jakas, which is important as studies indicate that 90% of growth is expected to be outside of the EU. Some of the areas helped by the programme include analysing new potential markets and finding new partners, which is quite difficult for SMEs to carry out on their own. The Enterprise Europe network was outlined, which is present in 60 countries including the EU, with 4,500 experts both in the EU and outside. A Gateway financed by the EU is currently in Asia (S. Korea and China) but not yet in India. This Gateway programme is used to facilitate one week business missions to the visited countries. The EU also hosts an IPR helpdesk and has set up some business desk centres in some countries around the globe to assist companies. As part of the new Free Trade Agreement EU negotiations, it was reported that there will probably be something included about SMEs. The EU-India summit held in Belgium in May, 2016, served to strengthen the EU – India dialogue in key areas with potentially great impact, such as:
Climate change and Environment, Research Infrastructures, ICT, Transport and Space. A number of areas in which there is already cooperation partnerships happening were highlighted, including: Water, Clean Energy and Climate change, Energy efficiency, urbanisation partnerships, and ICT (which includes the EU-INDIA FI-MEDIA project (EU-India clustering related to Future Internet), and the REACH project (EU-India clustering related to TV whitespaces). The Start-Up Europe initiative was outlined by Ms. Jakas, which hosted an event in October, 2016 supported by EU Member States with the involvement of over 300 delegates. Ms. Jakas concluded by announcing a recent launch of and EU-funded project supporting EU-India cooperation on ICT related standardization, policy and legislation (launched 1st November, 2016). The broad objective of this project is to promote close EU-India alignment regarding future ICT standards. This will also focus on standardizing the exchange of statistical data. This cooperation can facilitate trade, increase interoperability and ease of doing business, and strengthen European and Indian ICT standardization efforts at a global level.

- **Doing Business in Europe-An overview of industry Trends and Outlook with Focus on Germany- Mr. Thomas Hundt:** Mr. Hundt’s talk highlighted the technology as key driver for business partnership with a special punch calling it “Industry 4.0” with emphasis on Internet of Things (IoT) as the most potential area for working together between EU and Indian industry groups and SMEs;

- **Potential for SME Trade and Investment Partnerships between India and Italy- DR. Francesco Pensabene:** Dr. Pensabene shared in detail the present technological and economic environment in Italy, focusing on Italian Industrial Clusters, comprised of nearly 200 clusters of local systems with a manufacturing concentration, in which there was a large concentration of SMEs. Relating to the strong history of many India – Italy business partnership, Dr. Pensabene also suggested a healthy prospect of India - Italy business partnerships in area related to Information Communications Technologies (ICT);

- **Emerging SME Partnership Opportunities with Portugal- Mr. Bernardo Theotonio Pereira:** Mr. Pereira talked a lot about the emerging business opportunities for EU and India. Quoting history in Portuguese association with India and admiring India’s huge contribution and strengths in the field of Information Technology, Mr. Pereira shared that a lot of business entities with lots of available funds are quite keen to invest in India;

- **Joining Forces-Leveraging SME Partnerships for Mutual Economic Growth and Development-Mr James Clarke:** Mr. Clarke presented an overview of the EU-INDIA FI-MEDIA project, which is funded by the Delegation of the European Union to India, and shared its objectives of facilitating the Cluster to Cluster (C2C) partnership between Indian and EU clusters. Mr. Clarke elaborated upon the huge potential of such C2C partnerships for SMEs participating in CII working in areas related to Future Internet, Internet of Things (IoT), Smart cities and Electronic Media and shared the supporting role that the project can play. Mr. Clarke invited the attending delegates to sign up for an Expression of Interest (EoI), which would be helpful in motivating the EU industry for appropriate C2C partnerships in the suitable topics of the ICT domain. As a consequence of the talks by the panellists of the session and, in particular, the projection of FI-MEDIA objectives and initiative to facilitate

76 http://www.bic-fimedia.eu/
77 http://www.eu-india.net/
78 http://www.bic-fimedia.eu/
C2C by Mr. Clarke, a large number of delegates came forward to sign up the Expression of Interest (EoIs). A total of 21 companies signed up the EoI during the session. Mr. Clarke explained the FI-MEDIA project’s overall support strategy towards working with platforms like CII, which emanates from the core objective of the FI-MEDIA project, which is to facilitate Cluster to Cluster (C2C) partnerships between EU & Indian Clusters. As explained by Mr. Clarke, a Cluster is defined as “a group of one or more research institutes getting into partnership with one or more industry elements, preferably SMEs, working on a commonly identified topic of innovative technology within ICT domain (particularly in the Future Internet and Electronic Media space) which can be taken to the society/ market commercially”. Since the end objective of the C2C partnership is to promote business activities between EU and India which are evolved through the platform of innovative researches on a range of topics within Future Internet (IoT) and Electronic Media domain, the best way to achieve these objective is that the FI-MEDIA focuses on organizing or participating in such events that are of a hybrid nature, where both the research orientation as well as industry orientation are equally represented. This effort, however, would require a mechanism and platform where the range of topics within the given space of FI-MEDIA are showcased and the research institute and the industry elements are able to view, study and analyze the offered range of topics and appreciate the nature and usability of the same and finally identify partners who would agree to come together and work on the topics to meet above stated objectives of cluster formation and C2C partnership. Therefore, the partners of the project have developed an ongoing outreach strategy to seek regular help and support of large scale platforms like CII with its vast reach to the Indian industry element. Clarke stated, “Through CII organized events such as this one, this will indeed achieve visibility of the FI-MEDIA Project before the large gathering of Industry elements - both SMEs and corporates - and enable it to explain its objectives and carry out recruitment to its activities. Then it will be possible to motivate them to join the cluster to cluster partnerships with a suitable EU cluster through the FI-MEDIA C2C programme”. In going forward, Mr. Clarke explained that “FI-MEDIA will align itself with a CII-like industry body of Europe (almost like a cluster of clusters) and seek its support to participate in a similar event in Europe. At such event or events, FI-MEDIA will be forcefully presented and its objective projected along with clarity on topics within the scope of FI-MEDIA for which C2C is expected. “We believe that this effort, duly supported by the EoIs obtained in India, would certainly motivate the participating companies to come forward for the partnership. Even if a small percentage of companies come forward for C2C partnership, it would be a good success”, concluded Mr. Clarke.
Chapter-6

Abstract: A two-day National Conference on Smart Cities (NCSC 2016) was jointly organized by the EU-India FI-MEDIA project, PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ) and Indian Institute of Technology Delhi (IITD) during November 25-26, 2016, in association with Think India Forum, and Jabalpur Smart City Limited. The conference was hosted in the premises of PDPM IIITDM Jabalpur.

The selection of Jabalpur as the venue is important since Jabalpur was announced by the Government of India in seventh place in the list of first 20 smart cities under ‘Smart Cities Mission’, where the aim is to identify challenges and explore opportunities in order to support creativity and interdisciplinary collaboration required for development of smart cities.

As part of this event, on 26th November, 2016, FI-MEDIA Cluster to Cluster (C2C) Partnerships and Smart Cities Lab India organised a full day hands-on developer’s workshop on FIWARE technologies specifically for Smart Cities, including IoT.

There were over 100 participants for the entire day at the FI-MEDIA C2C workshop. The workshop was conducted by C2C members comprised of expert FIWARE trainers from Smart Cities Lab India and the lessons included real application for Smart cities, including those related to Internet of Things (IoT).

A full report of the co-located events can be found below.
in the development of smart cities and come up with solutions that lead to development of economically vibrant, environment-friendly cities that conserves heritage and provides better amenities to its citizens.

Eminent speakers were invited not only from India but also abroad. The exhaustive list of speakers includes Mr. James Clarke (EU Strategic Liaison Manager, Coordinator of the EU-INDIA FI-MEDIA project, Telecommunications Software & Systems Group, Waterford Institute of Technology, Ireland), Mr. Abhishek B. Sharma (Managing Director, Beyond Evolution Tech Solutions Pvt. Ltd., Gurgaon), Prof. M. P. Gupta (IIT Delhi), Prof. Kapil Gupta (IIT Bombay), Prof. Gopal R. Patil (IIT Bombay), Prof. M. Parida and Prof. Kazmi (IIT Roorkee), Mr. Rahul Tomar (CTO Smart Cities Lab, Germany) and Mr. Peter Muryshkin (Fraunhofer IAIS, Germany).

Entries were invited throughout the country to present ideas/papers on this theme. An exhibition cum contest and a panel discussion was also organized under Smart City Challenges. In the exhibition, the participants were encouraged to present their ideas on smart city through prototype/model/concept poster etc. There was no bar on age, profession or background of an individual/team to participate in the conference. Each entry was judged by a panel of experts based on creativity, innovation, and originality and the two best entries were felicitated in the valedictory function. The conference was marked by an exhilarating participation of 340 students, research scholars, and faculty members from various schools & colleges of Jabalpur and institute of national importance from neighbouring cities like Indore, Bhopal, Raipur, Nagpur, Mumbai etc.

Highlights, Day 1 - November 25, 2016

The inauguration ceremony began with the lamp lighting and Saraswati pooja by the Chief Guest Dr. Swati Godbole, Mayor Municipal Corporation Jabalpur, Guest of Honor Mr. James Clarke, Prof. P. K. Jain Director IIITDM Jabalpur, Prof. M. P. Gupta, Dr. Pritee Khanna and Dr. Vinod K. Jain. An exhibition on “Smart City Challenges” was inaugurated by the Chief Guest Dr. Swati Godbole just after the inaugural session.

Twenty three models and thirty posters where displayed on issues relevant to smart cities development like ‘Traffic control and smart roads development’, ‘Sewage Management’, ‘Energy Conservation’, ‘Green Revolution’, ‘Natural Resources utilization and management’ etc. The exhibition received a fervent response by all the guests and participants.

The first day also witnessed informative talks by 5 speakers, i.e., Mr. Clarke on BENEFITS OF EU-INDIA CLUSTERING, Mr. Abhishek B Sharma on IOT AS TECHNOLOGY AND ITS ROLE IN SMART CITIES, Prof. M. P. Gupta on DIGITAL TO SMART VILLAGES, Prof. Kapil Gupta on TOWARDS DISASTER RESILIENT AND SUSTAINABLE SMART CITIES, and Mr. Rahul Tomar on PREPARE YOUR CITY FOR FUTURE WITH FIWARE, OPEN APIs FOR OPEN MINDS. In addition, a presentation was made by Jabalpur Smart City Limited representative.

Highlights, Day 2 - November 26, 2016

The second day began with the research paper presentations by the participants. The conference included 15 research paper presentations by research scholars from renowned institutions on topics like “IoT based interactive smart home automation system”, “IoT based facial recognition security system for smart cities”, “Piezoelectricity: a smart solution for a smart city”, “Road transportation redefined”, “Waste as a Resource”, “Public transportation: up gradation of bus network for sustainable mobility” etc.
Informative talks were again hosted by Mr. Prem Narayan, Chief Material Manager, Stores Department, Indian Railways Jabalpur on “SMART CITY: A NEW URBAN FORM FOR SUSTAINABLE DEVELOPMENT”, Prof. Gopal R. Patil on SMART TRANSPORTATION FOR SMART CITIES, Prof. Absar Ahmad Kazmi on SEWAGE TREATMENT IN INDIA-TOWARDS ENERGY EFFICIENT SYSTEM, and Prof. M. Parida on URBAN MOBILITY STRATEGIES FOR SMART CITIES.

A special panel discussion session was also organized where a brainstorming discussion was held amongst Mr. Ved Prakash (Commissioner, Municipal Corporation Jabalpur), Mr. Nagesh, (Additional Commissioner, Municipal Corporation Jabalpur and CEO-SPV of Jabalpur Smart City Ltd.) and distinguished speakers including Mr. James Clarke, Mr. Abhishek Sharma, Mr. Rahul Tomar, Prof. M. P. Gupta, Prof. Patil, Prof. M. Parida, Prof. Kazmi and Prof. P. K. Jain. The agenda included issues like Public transport and investment in projects through PPP mode in the context of Jabalpur. Another point of discussion included Development of Jabalpur as “Gateway to Ethnic and Spiritual Tourism, City of Festivals and Events, and Garment City”. The crowd present there also participated in the discussion and come up with valuable suggestions. This panel session was featured in a Jabalpur newspaper as shown to the left.

The second day of the Conference also witnessed a simultaneously organized full day event organized by FI-MEDIA C2C partner, Smart Cities Lab India, entitled “Cluster 2 Cluster (C2C) partnership workshop on FIWARE Technology in the India smart cities context”. The hands-on training event was organized to understand FIWARE Generic Enablers (GEs) and how to use it in development of Smart Cities and Internet of Things (IoT) Applications. An initiative was also taken to launch and develop a dedicated FIWARE Lab facility at PDPM-IIITDM Jabalpur with the EU-India FI-MEDIA C2C participants. The full day event was attended by around 90 participants including the EU C2C participants, including Dr. Bhargav Dave from Aalto University, Finland. The workshop covered four important topics, i.e., Handling Authorization & Access control to APIs Understanding Keyrock Generic Enabler FIWARE which brings a powerful framework to setup Authorization and Access Control policies based on widely adopted Security Standards (OAuth, XACML), Development of Context-Aware Applications using FIWARE Orion Context Broker which allows one to model, manage gather context information at large scale enabling context-aware application, Connection to the Internet of Things, which allows IDAS IoT Agents to easily gather context specific information from sensors or actuate upon physical objects, and Real time processing of Media Streams which allows to process multimedia information in real-time so that one can incorporate extended sensing capabilities based on cameras or microphones (detecting faces, crowds, plates) into applications.

The Morning session was started with inaugurating FIWARE Lab by the Director of IIITD&M Jabalpur, Prof. Pramod Kumar Jain along with James Clarke (Waterford IT & FI-MEDIA coordinator), Peter Muryshkin (Fraunhofer IAIS, Germany), Rahul Tomar (CTO & Co-Founder Smart Cities Lab, Germany), Prof. M.P. Gupta (Dhanjay Chair Professor & Head - DMS at IIT Delhi, India), Abhishek Sharma (Beyond Evolution Tech Solutions, Gurgaon, India), Dr. Ruchir Gupta (Prof. IIITD&M Jabalpur), Dr. Pritee Khanna (Prof. IIITD&M Jabalpur) and 90 participants from the Institute and other organisation from Jabalpur and Aalto University, Finland. This is the first FIWARE Lab set up in India.

![Figure 5 - FIWARE Lab Launch at IIITD&M Jabalpur](image)

Immediately after the launch, Peter Muryshkin explained FIWARE Lab to the attendees and how to open account in FI-Lab and start working with it.
All of the participants proceeded to create their trial accounts to go further with the workshop. After this, Rahul Tomar took over explaining the Generic Enablers (GEs) of FIWARE as per the agenda mentioned above. It was started by explaining the Keyrock Generic Enabler. Identity Manager (IdM) GE API specifications comply with existing standards for authentication and user and provide access information. The presentation on Keyrock can be downloaded from [here](https://www.dropbox.com/s/lgbfiv7l8bxxi8m/Keyrock.pdf?dl=0).

For explaining the concept even better, codes have been presented to the developers. The code can be downloaded from the GitHub repository. [GitHub Tutorial Link](https://github.com/1605200517/fi_delhi2016/tree/master/keyrock.tutorial).

A second GE, Orion Context Broker[^81], was presented in front of the attendees. The Orion Context Broker is an implementation of the Publish/Subscribe Context Broker GE, providing the NGSI9 and NGSI10 interfaces. Using these interfaces, clients can carry out several operations:

- Register context producer applications, e.g. a temperature sensor within a room;
- Update context information, e.g. send updates of temperature;
- Being notified when changes on context information take place (e.g. the temperature has changed) or with a given frequency (e.g. get the temperature each minute);
- Query context information. The Orion Context Broker stores context information updated from applications, so queries are resolved based on that information.

In the afternoon session, a third GE that was presented entitled IDAS. IDAS IoT Agents translate IoT-specific protocols into the NGSI context information protocol, which is the FIWARE standard data exchange model. It was explained how developers do not need this component if their devices or gateways natively support the NGSI API.

Finally, the GE Kurento was presented. The Stream Oriented GE Kurento is a multimedia platform aimed to help developers to add multimedia capabilities to their applications.

In the hands-on sessions, the participants significantly worked with all these Generic Enablers to understand how to use NodeJS for developing applications.
The selection of Jabalpur as the venue for the FIWARE Lab workshop is important since Jabalpur was announced by the Government of India in seventh place in the list of first 20 smart cities under ‘Smart Cities Mission’, where the aim is to identify challenges and explore opportunities in order to support creativity and interdisciplinary collaboration required for development of smart cities. IIITD&M Jabalpur, EU-INDIA FI-MEDIA project\textsuperscript{82}, funded by the Delegation of the EU to India, and Smart Cities Lab organised the full day hands-on developers workshop on FIWARE technologies specifically for Smart Cities, including IoT. There were over 90 attentive participants for the entire day at the workshop and follow up activities are being planned.

The overall conference was concluded through a valedictory ceremony with Prof. M. Parida as Chief Guest. Model/poster competition is won by students of Ryan International School, Jabalpur for their model on “Microbial Fuel Cell”. “Smart Bike” model from Satya Prakash Public School, Jabalpur stood runner up.

In a nutshell, NCSC 2016 succeeded in providing a platform to students, academia, and industry professionals working in this area for exchanging knowledge and improving their skills and also enabled valuable India – EU collaborations in areas related to smart cities, including IoT technologies.

Follow up activities are being planned with IIITD&M Jabalpur in relation to the planning, setting up and going live of a C2C FIWARE node in India.

Authors: Dr. Pritee Khanna, IIITD&M Jabalpur, Dr. Vinod K. Jain, IIITD&M Jabalpur, Mr. James Clarke, Waterford IT & FI-MEDIA, Mr. Rahul Tomar, Smart Cities Lab India, and Mr. Olaf-Gerd Gemein, Smart Cities Lab India.

\textsuperscript{82}http://www.bic-fimedia.eu/
Chapter-7
7. FIWARE Summit, 13-15th December, 2016, Málaga, Spain

Abstract: FI-MEDIA project were called upon to help organise a dedicated panel session on global reach of FIWARE at the FIWARE Summit held in Málaga, Spain during 13-15th December, 2016. James Clarke, coordinator of the EU-INDIA FI-MEDIA project, played a key role in the organisation of a panel session on global cooperation for the 1st annual FIWARE Summit, which kick-starts a new stage for the open community of developers, users, companies, cities, accelerators, researchers, public authorities and non-profit organizations in a 3-day event. The EU-INDIA FI-MEDIA project co-sponsored the travel costs of a C2C member from India, who has already benefited from his participation to the FIWARE Community as a result of the project’s efforts.

The theme of the FIWARE Summit was “FIWARE is Moving Forward, Going Global; Together, we build FIWARE!”

Due to his work in coordinating the EU-INDIA FI-MEDIA project, in which one of the created Cluster to Cluster (C2C) partnerships is on bringing FIWARE to the India context, Mr. Clarke has been invited to join the newly established FIWARE Foundation, which has been formally registered on October 28th, 2016, with headquarters in Berlin, aimed at supporting the continued growth of FIWARE, the open source platform called to become the de-facto standard for development of IoT-enabled smart services. In addition, Mr. Clarke was also invited to a newly established FIWARE Mundus Committee, the element of FIWARE looking after the global reach of FIWARE, and he attended the kick-off meeting, which was held on the first day of the FIWARE Summit.

In the organisation phase of the FIWARE Summit over the last months of 2016, Mr. Clarke was asked to identify a speaker from India with experience in FIWARE for a panel session entitled Going Global: The FIWARE Mundus programme. The project identified an excellent speaker from the C2C activities and co-sponsored his travel to participate in the panel session and network with many participants from the FIWARE community.

In the panel session, the FI-MEDIA project was praised for bringing this Cluster to Cluster (C2C) partnership on FIWARE to India and the C2C was represented by Mr. Ajith Balakumar of Forthcode Technologies (shown left), a start-up company based in Bangalore, India. Forthcode
Technologies has developed a smart city demonstrator for the city of Eindhoven, Netherlands, based on FIWARE. The experience of replacing a proprietary system with FIWARE was recounted and it was carried out in a short period of 2 months, due to the modularity of FIWARE and the user interface was also developed by Forthcode Technologies.

According to Mr. Balakumar, “This demonstrator was very much appreciated by the city council and discussions are ongoing to take it to the next level”.

During the session, Mr. Balakumar compared FIWARE to an operating system, “whereas you don’t have to worry about the nuts and bolts of how it works. You can just connect IoT sensors and controllers and define rules in the Rule engine to go live quickly. Without FIWARE, I would have to put 20-30 people working on the various components, IoT device manager, rule engine, big data integration, etc.”, stated Mr. Balakumar.

Forthcode Technologies is also working on a FIWARE based system in Kerala in South India to improve quality of services in terms of water supply and street lighting in villages. “If this project goes ahead, 1,900+ villages will be connected to the FIWARE platform”, according to Mr. Balakumar.

Mr. Balakumar concluded by especially thanking EU-INDIA FI-MEDIA project, which is funded by the Delegation of the European Union to India, and the FIWARE Mundus programme for enabling this important networking activity at the FIWARE summit, which enabled him to “network with the larger FIWARE community to find other FIWARE related applications and services and even source IoT components, including low cost sensors, that could be brought into the India context on mass scale”.

Other distinguished panellists in the session were from the USA, Japan, Mexico, Spain, France and Morocco. The panellists exchanged experiences and willingness to cooperate globally on sharing best practices and lessons learned in their activities.
Chapter-8

Abstract: The C2C on Bringing EU’s FIWARE programme (http://www.fiware.org) to India, came together in February, 2017, in India to carry out a roadshow series of events across four cities. Their activities were indeed in the context of “Smart environments”, especially smart cities and villages, as per the priority being attached to these in the Digital India programme.

For this second C2C partnership, the project has teamed up with Smart City Lab India and the FIWARE Mundus global component, both based in Europe, which is being proactively extended towards other regions around the world, including India. This week-long mission was a set of C2C partnership activities with dual purposes: as follow up activities from past C2C events and initiating new C2C partnerships through new events.

This report summarises all of the activities carried out during the week-long mission in a number of Indian cities, New Delhi, Jabalpur, Gwalior and Mumbai. The travelling C2C team was greatly supported on logistics by the EU-India FI-MEDIA partners, WIT, IIT Delhi and Beyond Evolution Tech. Solutions, and the Directors and Staff at PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ) and ABV-Indian Institute of Information Technology and Management, Gwalior (IITM Gwalior), who provided their warm support, welcomes and hospitality during our events. The EU delegation team was made up of a dedicated team from WIT, FIWARE, Smart City Lab India and Orange Labs.

The following section contains a summary of the events held during the roadshow, comprised of bi-lateral and C2C workshop meetings.

8.1 Bi-lateral meetings

13-02-2017

For growing the cluster from the India side, the representatives from Smart Cities Lab visited Citiforce, an SME in New Delhi. This SME core area includes developing software and hardware for the security of petroleum logistics. The team presented FIWARE to them and how it can leverage and improve their products & business models. Shashi Mudgal, Vice President - Electronic Security was highly impressed with the FIWARE ecosystem and willing to learn more about the APIs and also about FIWARE lab concept. As follow up, Smart Cities Lab will provide further education via Skype and other online media to them so that they can start using FIWARE components.

A second meeting was held with EBTC (European Business Technology Centre) to ensure the cluster widening will take place in different cities of India. With EBTC, the team are planning to organise a Hackathon on FIWARE in two different cities of India, where Municipal Corporations are already to engage with us.

8.2 C2C workshop meetings

14-02-2017

The team visited ICLEI foundation (Local Governments for Sustainability) to determine the best ways of engagement as part of the C2C partnership. This foundation is already engaged with many cities and organisations in India and is now willing to grow our network of clusters by introducing all of them with us within next few weeks over Skype first and then we will arrange further meetings with them in person in India over a next visit.
The FI-MEDIA project has initiated the gathering of Expressions of Interest (EoI) from all of the events attended, in order to capture as many potential cluster members possible, and to begin to identify their topics of interest, as shown in figure 6. The EoI template has been very successful in identifying interest parties to join the C2Cs. During second half of the day, FI-Media and Smart Cities Lab together organised a follow up meeting with the companies that had submitted Expressions of Interest to the FI-MEDIA project at the past events. The meetings were held at the Indian Habitat Centre in New Delhi.

**Expression of Interest**

We, (company’s name), are a Company/ Organization incorporated under the provisions of the [Registration Act or provision of registration], having Registration Number [Optional], and its Principal place of Business at [Optional], hereinafter referred to as “Company” and is represented by [name].

We, [company/organization] are engaged in the business of [Business activity] and are (involved in) shall be undertaking the Research & Innovation and future commercial exploitation in the following areas under domain of Future Internet /IoT/ Electronic Media (please tick as appropriate):

1. Smart Agriculture
2. Smart Health Care
3. Smart Transportation Management
4. Smart Water Supply Management
5. Smart Waste Management
6. Smart Energy Management
7. Smart Safety & Security
8. Smart City/ Village/Campus
9. Smart Content & Media
10. Any other (please specify)

We, as an organization, hereby express our interest in forming a “Cluster to Cluster” (C2C) partnership with a Cluster in Europe, working on the same or similar topic of Research, Innovation and Commercial engagement.

Signed for and on behalf of [Company/ Organisation]

Signature: __________________________ Date: __________________________

Name: __________________________

Designation: __________________________

Email: __________________________

Contact No: __________________________

Please handover/ email to Mr. James Clarke, Mr. Abhishek Sharma or Prof MP Gupta

jclarke@tsu.ac.jp ; abhishek.sharma@beyonddevolution.in ; mp.gupta@dms.titd.ac.in ; mgupta@titd.ac.in

**Figure 6 - Expression of Interest (EoI) template**

A number of interested SMEs and corporates were in attendance and each had ample time with the team to discuss their requirements and desires for C2C partnerships.

The topics of interest discussed included Smart Villages, Smart agriculture, Smart farming, Smart cities, and innovative uses for Internet of Things (IoT) and funding mechanisms for joint projects.

The next step will be to go through their profiles and interests to see whether they would satisfy the criteria and fit within the C2C partnerships.
15-02-2017

In the morning, FI-MEDIA organised a meeting with the champions of the C2C Partnership on *Bringing FIWARE to the India context in Smart environments* kindly hosted by Orange Labs India at their offices in Cyber Hub, Gurgaon. The purpose of the meeting was on the alignment of visions on the bringing of FIWARE to India with the following agenda items: round table on each parties expertise, desired goals and strengths, desired outcomes, and how they see themselves fitting into the FIWARE ecosystem in India, and search for missing gaps in the ecosystem and how to plug those gaps. The outcome was the setting out of an action plan for the Team with a common shared vision. The full action plan can be found in the conclusions section of the report. It was a very valuable strategic planning meeting of the team and one of the arising actions is to complete a table of the entire FIWARE Lab and Commercial ecosystem components within the India context.

In photo: front row (l-r): Dinesh UPRETI, Orange Labs India, James CLARKE, Waterford IT, Ireland, FI-MEDIA project, Rahul TOMAR, Smart Cities Lab India; top row (l-r): Ajith BALAKUMAR Forthcode Technologies (Bangalore), Olaf-Gerd GEMEIN, Smart Cities Lab, Germany, Pierre-Yves DANET, Orange Labs France, Abhishek SHARMA, Beyond Evolution Tech Solutions, Gurgaon, FI-MEDIA project. Missing from photo: Prof. MP GUPTA, IIT Delhi, and Emilia NICOLAE, Orange Labs India.
In the afternoon, the EU C2C team submitted an application for a dedicated session, which was accepted by the organisers of the prestigious 43rd Asia-Pacific Advanced Network (APAN43) against tough competition, to be held at the India Habitat Centre (IHC), New Delhi from February 12-17, 2017. The title of the session was **Open Innovation through Effective EU-India Clustering partnerships in vertical sectors using the European FIWARE Open platform**. The main purpose of the session was to present the FIWARE platform & ecosystem and to evaluate the interest to set up collaboration & nodes in Asia-Pacific region, following the lead of the C2C partnership work being carried out in India via the FI-MEDIA project. With such an Open platform, anyone - cities, corporates, start-ups, governments, academia including students, researchers, and developers - should be able to develop easily a number of applications in any vertical domains, and this was being demonstrated during this session. As shown in figure 8, the session was also very useful in the recruitment of additional members of the Indian C2C partnership, with the team showing areas of interest.

**Figure 8 - Topics of interest for the C2C partnerships**
The audience showed keen interest in the presentations and the project collected Expressions of Interests (EoIs) from all the participants and will follow up with them.

Figure 10 - Mr. Abhishek Sharma presenting at the APAN 43 conference.
Session chair, Mr. Pierre-Yves Danet, Orange Labs France, in background.
The following presentations were given during the session:

1. **FIWARE platform, what is it?**

DANET Pierre-Yves, pierreyves.danet@orange.com, Orange Labs France, UPRETI Dinesh
IMT/OLPS, dinesh.upreti@orange.com, Orange Labs India

**Abstract**

Presentation of the FIWARE platform, success stories and potential use in APAN

**Short speaker Biography**

Head of collaborative research at Orange Labs, New European media vice-chair, European
Telecom Network Operator R&I chair

2. **FIWARE Cluster to Cluster (C2C) Partnerships in India**

CLARKE Jim, jclarke@tssg.org, Waterford Institute of Technology, Ireland

**Abstract**

Presentation of the FI-MEDIA project and how it supports the concept of building EU-India
Cluster to Cluster (C2C) partnerships related to Future Internet research and innovation (R&I)
topics of importance to India and EU.

**Short speaker Biography**

Programme Manager at Waterford Institute of Technology within their R&I Group entitled
Telecommunications Software and Systems Group (http://www.tssg.org/). Specialties include
International cooperation in Future Internet and Cybersecurity. Experience with India includes
Coordinator of two EU-India projects: BIC (http://www.bic-trust.eu) and EU-India FI-MEDIA

3. **FIWARE applications in the India context**

BALAKUMAR, Ajith, ajith@forthcode.com, Forthcode Technologies (Bangalore)

**Abstract**

Two FIWARE use cases from India and a sample project based on Fiware.

**Short speaker Biography**

Ajith Balakumar is the CEO of Forthcode Technologies, a startup focusing on IoT-based IT
Modernisation. Previously, Ajith worked as an IT Advisor in a Big 4 consulting company. He was
also the member of the Technical Advisory Committee of one of the largest Govt Utility
company in India.

He graduated from Indian Institute of Management Bangalore/Stockholm School of Economics
with a degree in Business Administration.

4. **FIWARE for SMEs in India**

SHARMA, Abhishek, abhishek.sharma@beyondevolution.in, Beyond Evolution Tech Solutions

**Abstract**

The thriving SME sector in India is always facing the resource and the time crunch as their
major challenge to undertake and complete the projects. To be cost and time competitive is
another big challenge. The FIWARE platform, with its easily accessible enablers can greatly help
SMEs meet these challenges.
Short speaker Biography

Founder and MD of Beyond Evolution Tech Solutions (P) Ltd, a company into developing IOT, Mobile App and SI solutions. Has 40+ years of global experience on ICT domain - IOT, Telecom, IT, Radar & Satellite Systems. Also contributed in the cyber security domain.

Presently partner to EU funded FI-Media Project, Mr. Sharma has worked in the EU FP7 BIC project (http://www.bic-trust.eu) as the member, International Advisory Group, and was chief architect for of a Multi-lateral International Cooperation model for Trustworthy ICT.

5. Smart Cities Lab initiative

GEMEIN Olaf-Gerd,
olaf-gerd.gemeim@fiware.in,, Smart Cities Lab India

Abstract

„How foster innovation in Smart Cities via Smart Living Labs - a practical roadmap“

Short speaker Biography

Olaf-Gerd Gemein, Business Architect & Co-founder | Smart Cities Lab
Passionate Serial Entrepreneur and Strategic Leader, having demonstrated an acumen for building businesses from the ground up while consistently injecting new ideas and leveraging technology to keep driving success.

• 30+ years of experience within diverse markets in Europe, North & South America and Canada.
• Successfully supported recently 100+ projects from 13 countries in the ICT sector.
• Currently Co-founding the Global Smart City Living Labs in Asia
• FIWARE Foundation Gold Member

Supported FIWARE since 2014 in various roles (Chair of Steering Board, Director of SpeedUP Europe Accelerator, Director of iHUB Hamburg, Business Development FIWARE Lab and Commercial Node)
16-02-2017
On 16th February, the C2C Team split into two missions: One group destined for Jabalpur and one group destined for Gwalior.

Jabalpur mission
As there was follow up activities to the previous successful C2C event held at the esteemed PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ), the Smart Cities Lab group travelled to Jabalpur on 16h Feb. 2017. The visit was graciously hosted by Prof. Pramod Kumar Jain, Director of IIITD&M Jabalpur, and his Team. As background, the report of the previous successful C2C event held in Jabalpur during November, 2016 can be found at [http://www.bic-fimedia.eu/content/news/NCSC-2016-report_11502011845.pdf](http://www.bic-fimedia.eu/content/news/NCSC-2016-report_11502011845.pdf) and [http://bic-fimedia.eu/content/pages/C2C-Fiware-Workshop-Report_231386202569.pdf](http://bic-fimedia.eu/content/pages/C2C-Fiware-Workshop-Report_231386202569.pdf). As a follow up to the November, 2016 event, the Smart Cities Lab team visited PDPM IIITDM Jabalpur for signing of a Memorandum of Understanding (MoU). Additional photos of the signing ceremony can be found at [https://goo.gl/photos/6yWcU9cWupcZL6VP8](https://goo.gl/photos/6yWcU9cWupcZL6VP8). In addition, Jabalpur Media has also covered the whole event and published on 17-02-2017 as can be seen below in Figure 11.

![Image of newspaper article](https://i.imgur.com/3Q5Z5ZG.png)

**Figure 11** - The Hitava newspaper article on MoU signing at IIITDM Jabalpur
Gwalior mission

A team consisting of FI-MEDIA partners and Orange Labs travelled to the esteemed Atal Bihari Vajpayee-Indian Institute of Information Technology and Management, Gwalior (ABV-IIITM Gwalior), and held a C2C Workshop on ‘Future Internet and FIWARE Technology for Smart Cities’. The workshop was kindly organised and hosted by Prof. S. G. Desmukh, Director ABV-IIITM Gwalior, and the objectives for the workshop were twofold broken over morning and afternoon.

In the morning, the C2C team presented the current work being carried out in FI-MEDIA C2Cs, including FIWARE in the India context, and to brainstorm on new topics for C2C in year 3. The format was presentations on FI-MEDIA and FIWARE and then presentations from IIIT Gwalior Professors and Post doc scholars on ongoing and future work in all areas related to 'Future Internet' being carried out, with a view to seeing the "hot topics" for collaboration between EU and India.

We also started to focus in on areas of collaboration and the possibility of having a longer workshop together in a few months’ time. In the afternoon, the team was presented with tangible applications that have been worked on in areas like smart transport, smart energy, IoT, amongst others. The applications are being developed by start-ups working within the Technology Innovation and Incubation Centre located on the campus of ABV-IIITM Gwalior, as shown in Figure 12.

Figure 12 - Technology Innovation and Incubation Centre located on the campus of ABV-IIITM Gwalior

The visiting team was shown opportunities in smart cities by using IoT based technology to enhance the transportation systems in India via the development of a prototype low cost E-Vehicle, as shown in Figure 13.
Figure 13 - E-vehicle under development at the ABV-IIITM Gwalior

Figure 14 - FI-MEDIA coordinator, James Clarke, presenting at the ABV-IIITM Gwalior workshop
Figure 15 - Dr. Harish Kumar, IIT Delhi presenting on approaches for Smart cities/villages scenarios in India

Figure 16 - Mr. Pierre-Yves Danet, Orange Labs France, presenting the benefits of EU’s FIWARE for Smart cities
It was a memorable pleasure for all the EU team on their visit to the ABV-Indian Institute of Information Technology and Management, Gwalior to learn about their many dedicated activities in relation to developing smart environments in India. Moreover, there is significant interest to learn more from the developed countries and smart cities in Europe and the project will look at the possibility of providing more visibility on these aspects in future events.
The Smart Cities Lab Team finished up with meetings with IL&FS Education CTO, Mr. Bharat Verma. IL&FS Education work in the key areas of Education, Skill Development, Healthcare and Cluster Development for long term and sustainable impact.

The FI-MEDIA project was featured during the Education Ireland Fair taking place around a number of cities in India and was presented to a delegation from Ireland, when they arrived to Mumbai, India. The delegation included Mr. John Halligan, TD, Minister of State for Training, Skills and Innovation, Ms. Mary Doyle, Deputy Secretary General of the Department of Education and Skills, Irish Government, Mr. Brian McElduff, Ambassador of Ireland in India (based in New Delhi), Mr. Giles O’Neill of Enterprise Ireland, Mr. Barry O’Driscoll of Enterprise Ireland, and Dr. Albert Byrne, Head of Department, Engineering Technologies, Waterford IT.

The Irish delegation were highly impressed with the presentation of the EU-India FI-Media project, especially in the approach on insisting the clusters have both research and innovation as well as industry actors on board. They were also impressed in the selection of clustering themes around prioritized topics of importance to Ireland like smart cities/villages, Smart Agriculture and Internet of Things and linkages to H2020 and I2020 and they have specifically requested to follow up with us when back in Ireland. The Irish ambassador has also asked for the India partners to come visit him to discuss the project in more depth also. In the Question and Answers session, we further discussed some approaches towards funding across the knowledge triangle (research and innovation, industry and society) and the gaps and barriers that currently exist within Irish and EU programmes, and how it is addressed in Indian programmes.
Conclusions

A dedicated C2C team from Europe spent a week-long mission over 13-21st Feb, 2017 in four India cities and had fruitful meetings and events, as described in the report.

A number of tangible outcomes were made possible from this multi-pronged mission, including the following:

- Follow up activities with organisations that filled in Expression of Interest (EoI) forms to become members of the FI-MEDIA C2C partnership communities. The persons from these organisations traveled great distances in some cases to meet with us and there will be significant follow ups with them, either directly, or pairing with relevant EU organisations that can assist them in their needs;

- Accepted session entitled Open Innovation through Effective EU-India Clustering partnerships in vertical sectors using the European FIWARE Open platform at the 43rd Asia-Pacific Advanced Network (APAN43) held at the India Habitat Centre (IHC), New Delhi from February 12-17, 2017.

- FI-MEDIA C2C strategic planning meeting hosted by Orange Labs India in their offices in Gurgaon, India. At this meeting, the team set out an action plan for the Bringing FIWARE to India C2C, which includes the following elements:
  - Agreement on an overall shared objective, which is to set up a sustainable FIWARE ecosystem in India in order to develop applications in priority domains (Smart cities, Smart agriculture, Smart environment);
  - Agreement on what constitutes a FIWARE Ecosystem qualification: what are the key elements? data sets (IoT, open data, mobile, ...), application developers/Start ups/SMEs, incubator/accelerator, platform hosting / Data center, government, student education;
- What is the role of each stakeholder? any gap? any overlap?
- Identify contact names and set up a team/group able to make it happen;
- What is your foreseen business model for sustainability purposes?
- Develop a communication plan and material in order to convince future “customers” such as cities. This should include a set of existing applications able to fix existing societal issues;
- Define what should be the needs in terms of FIWARE instances in India (one or several FIWARE labs federated or not? one or several FIWARE commercial?);
- Define the role of the FIWARE foundation and the relationship with the India C2C FIWARE team/group, what should be the support?

- Signing of MoU between Smart Cities Lab and PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (PDPM IIITDMJ), following up from the successful establishment of a FIWARE node in Jabalpur in November, 2016\(^3\). Jabalpur is one of the first tranche selected 35 smart cities in the Digital India programme;
- C2C workshop graciously hosted by ABV-Indian Institute of Information Technology and Management, Gwalior (ABV-IIITM Gwalior) and site tours of the on-campus Technology Innovation and Incubation Centre with many start-ups and entrepreneurs working on technologies for smart environments, including smart cities and smart villages. This will certainly lead to follow up C2C events and activities in this region, which is one of the first tranche selected 35 smart cities in the Digital India programme;
- EU-India FI-MEDIA featured during an Education Ireland Fair with high level delegates visiting from Ireland to India. This will lead to follow-ups both in Ireland and in India, where the Ambassador of Ireland has already invited the India partners to meet with him in New Delhi. There was also significant interest to involve Ireland in the Smart Agriculture, IoT, Smart cities and Smart villages initiatives of the EU-India FI-MEDIA project;
- The Team has taken significant time together to brainstorm and discuss future topics for C2C partnerships and is focussing on the following:
  - Internet of Things, including security of Internet of Things devices, which is a hot topic now after the denial of service attacks of October, 2016 via IoT devices;
  - Smart Agriculture, which is a topic that has arisen amongst a large number of the Expressions of Interest gathered to date and also arisen as part of the C2C1 in Smart Villages Ecosystems;
  - 5G and Next Generation Internet (NGI) studies, which are key topics identified in the EU-India ICT Dialogue meetings; and
  - Content and Media creation, which is a hot topic in both India and in the EU, especially via the NEM Technology platform\(^4\), which has been highly supportive of the project.


\(^4\) [https://nem-initiative.org/](https://nem-initiative.org/)
Chapter-9
9. **Parallel C2C FIWARE-and FI-MEDIA session at ICEGOV2017, 7-9th March 2017, ASHOK Hotel New Delhi, India**

*Abstract:* The 10th edition of the International Conference on Theory and Practice of Electronic Governance (ICEGOV) was hosted by Government of India (through NeGD, the National e-Governance Division, Ministry of Electronics and Information Technology), and the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV), in collaboration with UNESCO, from 7-9 March 2017 at Hotel Ashok, New Delhi. Shri Ravi Shankar Prasad, Hon’ble Union Minister, Ministry of Electronics & Information Technology, Government of India, chaired the conference along with Ms. Maria Manuel Leitao Marques, Hon’ble Minister of Presidency & Administrative Modernization, Portugal, as co-chair. The conference theme was entitled “Building Knowledge Societies: from Digital Government to Digital Empowerment”. On 8th March 2017, a special event session on FI-MEDIA’s C2C FIWARE along with a Smart Cities session was organised with the objective to discuss “How to benefit from FIWARE open platform to accelerate development of innovative smart city services?”

![Smart City C2C FIWARE session at ICEGOV 2017](image)

In the above Smart City C2C FIWARE session, the EU-India [FI-Media Project](http://www.bic-fimedia.eu/)85, a project funded by the Delegation of the EU to India86, was represented and presented by one of the India partners, Mr. Abhishek Sharma, Managing Director of Beyond Evolution Tech Solutions Pvt Ltd (BETS). The other speakers of the panel of the session were:

1. Mr. HeeraLal, Managing Director, UPDESCO, Deptt of IT, Govt of Uttar Pradesh;
2. Mr. M Nagarajan - CEO, Smart City Surat, Govt. of Gujrat;
3. Ms. Emilia Nicolae – Orange Labs, Gurgaon , India;
4. R. Mohit Dhingra – Orange Labs, Gurgaon , India.

---

The other attendees of the session were Municipality representatives, web developers, students, SMEs, startups.

The session commenced with the presentation by Ms. Emilia Nicolae of Orange Labs, which shared the background of the FIWARE Foundation\(^\text{87}\) and its work in highlighting the role of the FIWARE platform for the smart city ecosystem – useful for city managers, solution providers and developers to help them in developing innovation applications for the smart city domain such as:

- Parking management systems;
- Surveillance system/Security;
- Mobility including multi-modality;
- Intelligent traffic management;
- Intelligent solid waste management;
- Electrical smart metering;
- Street Lighting management;
- Smart tourism services;
- Dynamic messaging boards and web/mobile applications with route information;
- City level application and smart dashboard, Data Analytics and MIS.

Mr. Heeralal then made a presentation in which he highlighted the various plans, ongoing activities and the roadmap of the Govt. of U.P. towards making its cities “Smart”. He mentioned that the U.P. Govt’s approach for Smart Cities is holistic and duly appreciating the role of FIWARE, as was showcased by Ms Emilia, he welcomed the prospects of utilising the FIWARE platform for developing applications in the areas as mentioned above.

Thereafter, Mr. M Nagarajan shared his vision and requirements for his city of Surat. His main priority area was transport management besides smart health care and smart energy management.

Mr. Abhishek Sharma, while presenting, elaborated the manner in which the developers and system managers could develop their applications and solutions much faster and more efficiently with the help of FIWARE platform. He also explained the role of the EU-India FI-MEDIA project and how the project can facilitate the C2C (Cluster to Cluster) partnerships, which can be formed to make the best use of the advanced technologies and the developments taking place in Europe by their counterparts in India. The explanation on the support of FI-MEDIA for C2C partnership delighted most of the participants of the session including the panelists who then offered the invitations to their respective places for taking it forward.

Mr. Mohit Dhingra of Orange Labs then gave a demonstration of the FIWARE platform and explained various aspects related to the utilization for developing various smart applications and solutions.

The discussions that followed were on various questions raised by the attendees, from technological details of the FIWARE platform, how to immediately join the C2C partnerships, as well as the procedures to become providers of the smart solutions and the difficulties faced by the companies due to Government process of tendering etc. The panelists responded to those queries.

The session concluded on a positive note of appreciation for the FIWARE platform and the Cluster to Cluster (C2C) partnership approach being undertaken within the EU-India FI-MEDIA project.

---

87 [https://www.fiware.org/foundation/](https://www.fiware.org/foundation/)
Chapter-10
10. Roadshow event of the EU-India FI-MEDIA team at IoT week 2017, 6-9th June, 2017, Geneva, Switzerland

Abstract: In order to kick off a new C2C on IoT for Smart environments, the FI-MEDIA project team decided it would be an excellent opportunity to meet with EU experts and find out about the activities going on in the EU in relation to Internet of Things (IoT) research and innovation during the IoT week 2017\(^{88}\), which was held from 6-9 June, 2017, in Geneva, Switzerland. Through contacts between WIT and the organisers, all of the partners of the FI-MEDIA project were able to secure presentation slots in a number of appropriate panel sessions, which gave excellent scope to carry out raising visibility of the project objectives and recruitment activities from the EU communities engaged in IoT research and innovation.

As part of this annual prestigious event for the global IoT community, EU-India FI-MEDIA coordinator, James Clarke of Waterford Institute of Technology, as shown above on the far right in Figure 22, took part in a panel session on IoT for Smart Agriculture, Towards an IoT Ecosystem: The IOF2020 Project. A summary of Mr. Clarke's entire intervention during the panel session can be found here\(^{89}\) and on page 35 in the IoT Week 2017 report available here\(^{90}\).

---

\(^{88}\) https://iotweek.org/

\(^{89}\) http://bic-fimedia.eu/content/news/IoTweek-panel-smart-agriculture_7762069291.pdf

FI-MEDIA Partner, Mr. Abhishek Sharma gave a presentation on IoT Market Perspectives during a track called “IoT Business, Finance, and Industry 4.0” perspectives, new financial and business models, as well as the impact of IoT on the industry and factories of the future (see page 13 and 37-38 of the IoT Week 2017 report available here. FI-MEDIA partner, Prof. MP Gupta gave a presentation during a session on Emerging IoT solutions in developing countries. The focus of the session was to present IoT champion solutions from developing countries/regions to let the audience to identify possible joint collaboration between EU and these target regions to work together on common problems and develop IoT technologies that are sustainable and that promote sustainability. Prof. M.P. Gupta presented on innovative IoT solutions for Smart Cities and Services in India. Session report on pages 31 - 33 of the IoT Week 2017 report available here.

Since the IoT week 2017 event, the FI-MEDIA project has been working with the main sponsor, The Internet of Things International Forum (IoT Forum), on the setting up of a mirror IoT Forum in India. It has put them in touch with a number of potential partners in India for this mirror group, and the work is ongoing and it is expected a first IoT Forum India event could be held in the latter part of 2018 or early in 2019.

This potential C2C was presented at a meeting in September, 2017, in New Delhi, with two prestigious India organisations, CII and m2m + iot Forum, in order to crystallise efforts to undergo mutually beneficial joint activities in relation to building Cluster to Cluster C2C partnerships in areas related to Internet of Things in the coming months. The successful meeting was hosted on 5th September, 2017 by EU - India FI-MEDIA partner, Professor MP Gupta, Dhananjaya Chair Professor & Head of Department of Management Studies, IIT Delhi. Present at the meeting were: Col Suhail Zaidi (Retd), Head - ICT, Confederation of Indian Industry (CII); Mr. Abhishek Sharma, Beyond Evolution Tech Solutions, FI-MEDIA partner; Prof. MP Gupta, DMS, IIT Delhi, FI-MEDIA partner; Mr. James Clarke, Waterford IT - TSSG, FI-MEDIA Coordinator; and Ms. Shilpi Batra, India m2m + iot Forum.

---

93 http://iotforum.org/
94 News item at http://www.bic-fimedia.eu/?view=news&news_id=52
Chapter-11
11. Roadshow mission of EU-India FI-MEDIA to foster new collaborations within the FIWARE C2C partnership, 24-28th July, 2017, New Delhi, Jabalpur and Mumbai

Abstract: The EU-India FI-MEDIA project sponsored a C2C roadshow mission in July 2017 to build upon existing C2C partners and foster new collaborations within the FIWARE C2C partnership. In order to build upon the excellent momentum already started with the support of EU-India FI-MEDIA project, a C2C building mission was carried out during July, 2017, in which Mr. Rahul Tomar, Smart Cities Lab India, a core member of FIWARE Foundation and EU-India FI-MEDIA C2C member, travelled from the EU to India to follow up on previous established activities and to foster new opportunities to build upon for the FIWARE C2C to become a sustainable entity.

In the first two years of the EU-India FI-MEDIA project\(^95\), a project funded by the Delegation of the European Union to India, there was a particular emphasis on the official launching and maintenance of two dedicated EU–India Cluster to Cluster (C2C) partnerships.

One of these was on the **bringing EU’s FIWARE platform\(^96\) to India**, (C2C launch event held on 22\(^{nd}\) Jan. 2016 and numerous follow up events held throughout 2016 and early in 2017)\(^97\). In the FIWARE C2C, the project has teamed up with Smart Cities Lab India\(^98\) and the EU’s FIWARE program [http://www.fiware.org/], through their FIWARE Mundus\(^99\) global component, which is being proactively extended towards other regions around the world, including India.

In order to build upon the excellent momentum already started with the support of EU-India FI-MEDIA project, a C2C building trip was carried out during July, 2017, in which Mr. Rahul Tomar, Smart Cities Lab India, a core member of FIWARE Foundation and EU-India FI-MEDIA C2C member, travelled from the EU to India to follow up on previous established activities and to foster new opportunities to build upon for the FIWARE C2C to become a sustainable entity.

The roadshow mission was built upon existing collaborations already established and some new contacts achieved in 2017 in relation to the development of FIWARE platforms’ potential use in Indian Smart Cities and Smart Villages activities (in conjunction with EU-India FI-MEDIA’s C2C1 on Smart villages, initiated in the first year of the project in 2015), and could be extended later to other EU-India FI-MEDIA’s C2Cs under development for year 3 including Internet of Things (IoT) and/or Smart Agriculture.

This section details a roadshow mission of a European based C2C member, Mr. Rahul Tomar that took place in July, 2017, to investigate and achieve the above mentioned objectives of creating sustainability of this successful C2C partnership.

The nearly week-long trip began with a high level meeting to discuss with the World Bank about the use of the EU’s FIWARE platform in the India context specifically for Smart Cities (and Villages).

---

\(^95\) [http://www.bic-fimedia.eu/]: EU-India FI-MEDIA project is funded by the Delegation of the European Union to India.

\(^96\) [http://www.fiware.org/]

\(^97\) A listing of all events can be found at [http://www.bic-fimedia.eu/?view=events].

\(^98\) [http://www.fiware.in/]

\(^99\) [https://www.fiware.org/mundus/]

Page | 69
the next concrete steps in the field of Smart Cities and Villages in India together with FIWARE platforms’ implementation and uptake, a very fruitful meeting was set-up and held with the World Bank in India during the mission in July, 2017. The meeting took place at the head office of World Bank in India located in the heart of New Delhi in Connaught Place. The full day meeting consisted of a full day workshop and presentation to all of the officials in the office. The planned agenda of the meeting was to propose a single digital platform for all Smart Cities and Villages in India, and the World Bank have agreed to approach with this concept to the Central Govt. of India in the next planned meeting in October, 2017.

The main host of the meeting was Dr. Shashank Ojha, Sr. e-Govt. Specialist and Mr. Vikas Kanungo, Sr. Consultant in Transportation and ICT Global Practice.

Mr. Rahul Tomar of Smart Cities Lab India presented the full features of the EU’s FIWARE platform in centralising a single digital platform for Smart cities and villages in India and proposed having a pilot project in 3 different cities in India, to which they have agreed upon during the meeting. They have assured that the result in writing will come by the end of 2017.

On 25th July, 2017, a meeting was held with Dell India in their office at Imperial Hotel Janpath, in New Delhi. The focus of the meeting was to bring Dell India on board as a large industry participant into the FIWARE C2C, especially for the supply of hardware and submitting tenders together with them for the many opportune solutions to Smart Cities and villages, which could incorporate the EU’s FIWARE platform. It was organised with the help of Mr. Ravinder Pal Singh, Director, in Solutions Business Development at Dell.

As the FIWARE platform will provide the open source software for cloud infrastructure, the Indian smart cities will require dedicated hardware and this creates an excellent core market for Dell India, and they showed tremendous interest together with Smart Cities Lab to carry out this important function. In addition, Smart Cities Lab presented to them many solutions on offer for Smart Cities requirements, which could come together quickly with collaboration with Dell India if they are willing to jointly fill the tenders of interest.

Also on 25th July, 2017, a second meeting was held with Tata Consultancy Services at their office in New Delhi together with Mr. Harjit Singh, Sr. Consultant. Tata Consultancy Services is one of the largest companies in India having their own private cloud infrastructure running on OpenStack technology, which makes them an ideal candidate to participate to the FIWARE C2C activities in India, and the purpose of the meeting was to ask them to host a dedicated FIWARE Lab node at their premises. The presentation of setting up a FIWARE Lab node was well received and they indicated a possibility of establishing a FIWARE Lab by November 2017, which would be in addition to the already established FIWARE Lab node in India launched in IIIT D&M Jabalpur during November, 2016100.

On 26-27th July, 2017, the location of the roadshow mission shifted to Jabalpur, India, where there have already been excellent successes achieved in the FIWARE C2C activities (see chapter 13 of the EU-India FI-MEDIA project Yearbook of Success for year 2).

The first meetings took place with the CEO of the Smart City of Jabalpur and Prof. P. K. Jain, Director PDPM IIITDM Jabalpur. The FIWARE Lab and benefits of having a single digital platform and also the

features of an Open Source ecosystem was presented to the CEO of Smart City of Jabalpur by Mr. Rahul Tomar. The concept was well received and they agreed to jointly fill the Tender for Smart Wastage, Smart Lighting, Smart Bike rental and Smart Water management together with Dell India and a few other Indian partners of Smart Cities Lab. The tender process will be open in few months on a one-by-one basis and it was agreed to go through them together as a cluster activity.

The Director and Professors at IIIT D&M Jabalpur, who were responsible for the establishment of the first FIWARE Lab node in India\textsuperscript{101}, enabled an excellent opportunity to allow Mr. Tomar to give a dedicated lecture on entrepreneurship and open source ecosystems to the students at IIIT D&M Jabalpur. The lecture covered how students can benefit the time of their studentships whilst becoming an entrepreneur and utilising the time to invent new innovations and techniques in the area of computers, electronics and mechanical engineering, which is a core mode of operation now in the EU programmes of research and innovation (R&I). During the lecture, it was stressed that today, there are many open source platforms to which they can benefit from in developing their own real world solutions. The lecture also afforded an excellent opportunity to provide the students with a number of practical hands-on projects that can be started immediately, which they could benefit from collaboration with EU partners in a quick fashion. In fact, a number of the students, under the guidance of Mr. Tomar, who due to his experiences, has an excellent understanding of both the EU and India ICT ecosystems, submitted a wonderful project for the NASA-GODAN challenge, to which we all were working for the last 6 months. A link of that project can be found at https://farmsntech.github.io. In addition, a number of other excellent project ideas discussed are now starting to take shape working toward other problems in relation to smart cities and smart villages that were fostered during the lecture and will be carried out as part of their official semester projects.

The roadshow mission continued onward to Mumbai where a number of excellent meetings were held in the next leg of the trip.

The first meeting was with one of the partners of the FI-MEDIA C2C brought on board by Smart Cities Lab, entitled Gaia Smart Cities\textsuperscript{102}, and the purpose of the meeting was to align our next steps for getting projects started in the areas related to smart water management. This meeting was held in their office of Mumbai together with Mr. Bipin, CEO of the Gaia Smart Cities organisation.

A meeting was held with Momenta Partners venture capitalist (VC) in Mumbai in order to discuss the possibilities for obtaining the funds on board for the project implementation in the 3 cities after getting the contracts with World Bank as mentioned above in the initial part of the visit. They indicated a sincere willingness and interest to provide funds once the contract awarded was shown in writing.

Finally, a meeting was held with the Municipal Commissioner of Navi Mumbai, which was a follow up to a previous meeting held last year in conjunction with European Business and Technology Center (EBTC\textsuperscript{103}). The discussions focussed on potential business models to implement the project and will be followed up in due course.

\textsuperscript{101} \url{https://goo.gl/photos/6yWcU9cWupcZL6VP8/}
\textsuperscript{102} \url{http://gaia.in/}
\textsuperscript{103} \url{http://www.ebtc.eu/}
In conclusion, during 2016 and early 2017, a number of key Cluster to Cluster (C2C) partnership events were organised by the EU-India FI-MEDIA project partners, Waterford Institute of Technology, Beyond Evolution Tech Solutions and IIT Delhi, in conjunction with Smart Cities Lab India, in relation to the bringing of the EU’s FIWARE platform to the India context. A follow up roadshow trip was organised in July, 2017, to follow up on two key aspects of the sustainability of the FIWARE C2C set up by EU-India FI-MEDIA, including:

1. Continuation of the momentum of C2C members already on board; and
2. Recruit potential new members of the C2C, especially in relation to making the FIWARE C2C a sustainable entity with future projects and investigating potential business models.

The trip details have been presented in this report and successes obtained, including:

1. Continued active interest of the first FIWARE Lab node established at IIIT D&M Jabalpur with the support of EU-India FI-MEDIA and Smart Cities Lab;
2. Potential collaborators with an interest in tendering for Smart Cities and Villages activities with EU partners incorporating an efficient view towards utilising a single digital platform such as the EU’s FIWARE platform;
3. Venture capitalists interested in participating to the sustainability activities made possible with the establishment of the FIWARE C2C in going forward.

Since the mission has concluded, follow ups are already taking place with further meetings with the World Bank in India scheduled in the latter part of September, 2017, to showcase a proof of concept for a potential pilot project involving the EU FIWARE platform in one of the designated cities in Goa, India.

In addition, a week long lecture series on FIWARE platform and the use of its Generic Enablers (GEs) for Smart cities is being planned to be held at IIIT D&M Jabalpur with the support of the FIWARE Foundation\(^\text{104}\) and Smart Cities Lab India. The lecture series will be designed to instruct the students in developing useful applications in the first FIWARE Lab node established in Jabalpur, which was officially launched in November, 2016 with the support of IIIT D&M Jabalpur, IIT Delhi, EU-India FI-MEDIA project partners and Smart Cities Lab India as part of their established FIWARE C2C partnership\(^\text{105}\).

\(^{104}\) [https://www.fiware.org/foundation/](https://www.fiware.org/foundation/)

Chapter-12
12. **Roadshow mission of EU-India FI-MEDIA, 23 – 27th October, 2017, Trivandrum, Kerala, New Delhi and Bangalore**

Abstract: The EU-India FI-MEDIA project team consisting of James Clarke of Waterford Institute of Technology and Abhishek Sharma, Beyond Evolution Tech Solutions, Gurgaon, and Prof. Angela Mathews (representing IIT Delhi) and Cluster to Cluster (C2C) members Ajith Balakumar and Jan Schakenraad Forthcode Technologies (from and Bangalore, India and Netherlands, respectively) carried out a highly successful multi-city mission with the purpose of building new EU-India C2C activities in Trivandrum, Kerala, New Delhi and Bangalore. The mission started with a very positive workshop at the Kerala Start Up Mission (KSUM) organised by Forthcode Technologies, at which key areas were identified for potential C2C collaborations including smart agriculture (e.g. smart dairy farming and resources), smart water management, and electric mobility. In addition, ideas for a new C2C bringing together the necessary societal and technology challenges in relation to building a citizen-centric Next Generation Internet were discussed. This topic was taken up further at a focus group discussion (FGD) organised by FI-MEDIA partner, IIT Delhi, on 23rd November, 2017 (see chapter 13 for more details). The idea was to involve specialists in the fields of civil society matters, and involve technology industry and start-ups (e.g. IoT) in the discussions as they would have a good knowledge and close relationship to their customers and they could feed into determining the best ways to address societal challenges such as privacy and data protection issues as deemed important by the citizens. In addition to the meeting with KSUM, C2C member Forthcode Technologies were instrumental in organising a number of successful meetings with eminent Gov’t of Kerala staff members including Chief Scientific Advisor, IT Secretary, IT Mission, Advisor and Private Sect’y to Minister of Transport, and Water resources Minister over the three day mission in Trivandrum, Kerala.

The Kerala mission started with a very positive workshop at the Kerala Start Up Mission (KSUM) organised by Forthcode Technologies, at which key areas were identified for potential Cluster to Cluster (C2C) collaborations including smart agriculture (e.g. smart dairy farming and resources), smart water management (e.g. water rising conditions in real-time), and electric mobility (e.g. smart electric vehicles).

One of the challenges perceived by KSUM was shortening the walk of the last mile in getting innovative companies in their start-up ecosystem into the marketplace. This was identified as an area that EU-India FI-MEDIA partners could provide assistance, both from EU and India participations. In addition, ideas for a new C2C bringing together the necessary societal and technology challenges in relation to building a “human-centric” Next Generation Internet (from 10 year + from now) that is preserving EU values such as privacy and data protection were discussed, as this would involve the know-how of innovative start-ups such as those involved in KSUM.

This topic, which is very important now in the EU with an NGI Flagship initiative planned for the next EU framework programme following Horizon 2020, known as Framework Programme 9 (FP9), is being planned for the year 2020 timeframe. This topic is to be taken up further at a focus group discussion (FGD) being organised by EU-India FI-MEDIA partner, IIT Delhi, at their premises on 23rd November, 2017 (see chapter 13). Following this initial discussion, the idea would be to set up a C2C on this topic to involve specialists in the fields of civil society matters, and involve technology

---

106 [https://www.ngi.eu/](https://www.ngi.eu/)
industry and start-ups (e.g. IoT, smart cities and villages) from both EU and India in the discussions as they would have a good knowledge and close relationship to their end user customers and they could feed into determining the best ways to address societal challenges such as privacy and data protection issues as deemed important by the citizens.

Concrete outcomes

A number of concrete outcomes were reached in the highly successful meeting with KSUM, including the following:

1. Based on the discussions, KUSM CEO is interested in collaborating with Forthcode and TNO building a mirror lab in Kerala. Forthcode requested KUSM CEO to sign a MoU to formalize the understanding during his next visit to Europe.

2. KUSM CEO expressed interest in hosting the first IoT Forum summit in India in collaboration with IIIT Trivandrum. Given enough advance notice, EU-INDIA FI-MEDIA project could support travel for additional EU delegates to attend, as this is one of their key objectives and the project has been instrumental in bringing together the IoT Forum in EU with India participants funded to attend at the last IoT week 2017 event held in Geneva, Switzerland, during June, 2017. For more information, see chapter 10 in this yearbook and the news item at http://www.bic-fimedia.eu/?view=news&news_id=51.

3. Forthcode invited the KUSM CEO and IT Mission director to visit work done by TNO in Amsterdam Arena, one of the best IoT implementations in the world.

4. EU-INDIA FI-Media partners would like to engage with KUSM to bring the knowledge and background on ICT topics to the notice of like-minded European start-ups and larger industry players and also help them inviting their counterparts in Europe for clustering partnerships. The selection process can be discussed and decided with KUSM.

5. Forthcode expressed interest in conducting an IoT workshop for start-ups and Gov’t officers, using highly relevant and Kerala specific new IoT use cases.

6. To address the challenge of making the last mile shorter for start-ups to get into the market place, the EU-INDIA FI-MEDIA project can help here as their C2C constituency includes successful start-ups both in India and EU that have walked this last mile with considerable successes. The project is very willing to help KSUM to address this considerable challenge.

In addition to the meeting with KSUM, C2C member Forthcode Technologies were instrumental in organising a number of very successful meetings with eminent Gov’t of Kerala staff members including Chief Scientific Advisor, IT Secretary, IT Mission, Advisor and Private Sect’y to Minister of Transport, and Water resources Minister over the three day visit in Trivandrum, Kerala.

During the meeting with the IT Secretary, the whole gamut of IoT based IT modernization was discussed and two immediate and concrete action items were recommended by the IT Secretary:

1. Smart Panchayat (Subsequently we had meeting with IT Mission Director (additional details given below on the follow up meeting set up by IT Secretary with the IT Mission staff members));

2. Setting up a mirror lab with projects already undertaken by EU-based TNO and Forthcode. Two core areas of projects were identified for mirroring from the EU Netherlands perspectives, including:

   A. An open platform with a common context platform for aggregating information from various smart city and smart village data sources, including intelligent transport systems, street lighting, and potentially others;

   B. Water management system monitoring water levels in Kerala, based upon projects underway in the Netherlands.

A valuable meeting was also organised by Forthcode with the IT Mission Director, with representatives of Forthcode and EU-INDIA FI-MEDIA present to discuss potential joint areas of activities of mutual interest and benefit between EU and India. Projects highlighted included:

1. Kerala Fibre Optic Network (KFON) Director would like to see an IoT Network pilot project in Kochi with open source backend; The project idea is to make KFON the backbone for such a network state-wide;

2. The Director wanted Forthcode to review the E-Health project; Forthcode has given quick feedback based on the requirements shared;

3. The Director wanted to share the Smart Panchayat initiatives and Forthcode has given their inputs and suggested he should visit few smart city implementation in EU and go through the process of providing solutions in IoT for cost-effective implementations;

4. Forthcode suggested a project related to Gov’t wallet currency with a Blockchain back end;

5. Forthcode has expressed interest to collaborate with the Kerala Gov’t in IT modernization, including a human-centric view of how users will access and use the systems. This is an area where collaboration with the EU can help to mutual benefit as they are funding initiatives specifically looking at this aspect (for example, the NGI Initiative within DG Connect).

Following the successful Kerala leg of the mission, back in New Delhi, the EU-India FI-MEDIA partners held workshop meetings with the representatives of the M2M + IoT Forum organisers in relation to the planning of their annual M2M + IoT Forum event dedicated to Smart cities being held on 29th January, 2018. This event is being held in conjunction with a joint M2M + IoT Forum and FI-MEDIA C2C workshop on Smart Villages being held on 30th January, 2018. In addition, the EU-India FI-MEDIA team members presented the project’s C2C activities (current and future) including the upcoming events in November, 2017 and January, 2018 to the Gov’t of India, Senior Director, Dr B K Murthy, Ministry of Electronics & Information Technology (MeITy) on the current and future activities of EU-India FI-MEDIA, and he has pledged his support to the project.

To end the mission, in Bangalore, the Netherlands Investment Agency, in conjunction with Forthcode Technologies, FI-MEDIA coordinator and other participants from Netherlands (e.g. TNO) and India, have organised a series of EU-India events to determine key areas of mutual benefit for C2C cooperation.

---

108 http://www.bic-fimedia.eu/
109 http://www.ngx.eu/
Chapter-13
13. Focus Group Discussion (FGD) planning round-table on a new C2C with the key theme on “Internet of Things (IoT) and the Future of Internet”, 23rd November, 2017, IIT Delhi.

Abstract: The Internet of Things (IoT) as a field consists of multiple co-existing and competing products, platforms and domains. IoT business ecosystems represent communities of firms interacting with each other as well as with the socio-economic environment. To survive, the firms must cooperate as well as compete by using a common set of resources like hardware, software, platforms, standards that pertain to the connectivity of connected devices, applications developed, provisioning services, assurance of quality and billing etc.

A Round Table Focus Group Discussion (FGD) was organised by the EU-India FI-MEDIA project, which is funded by the Delegation of the European Union to India, based in New Delhi, was organised on 23rd November, 2017 at the Department of Management Studies, IIT Delhi to discuss issues ranging from understanding the IoT Ecosystem to discussing the manpower and skills required for making IoT a success. Experts from Government of India, Industry and Academia participated in the round table discussion. The purpose of the meeting was to build up a momentum towards clustering of like-minded researchers and innovators on this topic, to progress towards a full-scale Cluster to Cluster (C2C) Partnership with EU based counterparts. While many of the participants were from the India Research and Innovation (R&I) community, there were in attendance a number of EU participants from a co-located larger scale conference organised by IIT Delhi in the days before the FGD.

Experts shared their enthusiasm about the opportunities offered by IoT, but also highlighted concerns pertaining to the dearth of standardization of solutions, network maintenance requirements, need for global standards, need to build a culture of innovation and entrepreneurship, and the need to strengthen public-private sector partnerships. The discussion closed with highlighting some of the adoption challenges and ways to overcome these.

On 23rd November, 2017, a Focus Group Discussion (FGD) round-table was held with the key theme on “Internet of Things (IoT) and the Future of Internet” at the Indian Institute of Technology (IIT) Delhi. It was co-organised by Dept of Management Studies (DMS) of IIT, Delhi and the EU-India Project on Future Internet & Electronic Media (EU-India FI-MEDIA), funded by Delegation of the European Union to India. The main purpose of the EU-India FI-MEDIA project is facilitating Cluster to Cluster (C2C) partnership cooperation between European and Indian “clusters” in important fields of mutual interest, such as the field of Internet of Things (IoT) in Smart environments.

Theme – based Clusters

A good example of a theme for clustering between EU and India is IoT, which is a technology domain of “connected devices”, consisting of multiple co-existing and competing products, platforms and domains. It is an excellent seamless integration of multiple technologies – electronics, embedded software, software platform, cloud based services and mobile applications. For its survival and growth, the firms involved must cooperate as well as compete by using a common set of resources like hardware, software, platforms, standards that cater to the connectivity of devices, applications developed, provisioning services, assurance of quality and billing etc. The “FGD Round Table” session was aimed at addressing the key aspects of IoT as a domain important for the society, through
discussions with the intention of improving the awareness of cross domain issues related to the development, growth and sustainability of IoT domain and also facilitating the formation of a dedicated EU – India Cluster to Cluster (C2C) partnership in this important topic.

Session results

The session was well participated by a large number of experts from Industry, Researchers and Government of India. The discussions commenced with the opening address by EU-India FI-MEDIA partner, Professor MP Gupta, Head-DMS, IIT Delhi, who highlighted the socio-economic relevance of this newly emerging technology and emphasised upon the importance of such organised discussions in view of IoT being an emerging technology. The session concluded with the aggregation of the expert views during the session and concluding remarks by EU-India FI-MEDIA partner, Mr. Abhishek Sharma, Managing Director, Beyond Evolution Tech Solutions (P) Ltd, a company which has developed and commercially launched their IoT product and Platform “Betty” successfully in the market.

The “Round Table” was anchored by Dr. Shuchi Sinha (right), Assistant Professor, DMS, IIT Delhi and supported by research scholars: Sudatta Kar and Bratin Chakravorty.

The key aspects discussed and the suggestions that emerged are as follows:

1. The IoT Ecosystem - Service Models, Competition and Survival: This part attempted to touch upon the following aspects:
   a. Relevance of IoT for its stakeholders- the individuals, industry and the society as a whole;
   b. Identifying the key actors in the IoT ecosystem, their place in the IoT value chain, their aspirations and key challenges;
   c. The ways in which the diverse actors may be involved and integrated, and the challenges faced by IoT solution providers in integrating these systems and actors;
   d. The delivery model that would involve both the need for limited specializations and on the other hand, a mass consumption / mass production oriented delivery network;
   e. The business and commercial model for its sustainability and growth – what would be the target market segment, what are the cost implications for commercial viability of the products, solutions and consequently the industry.

2. Manpower, Skills and Adoption: This theme addressed the following aspects:
   a. Top manpower issues facing IoT e.g. issues related to talent sourcing and the top challenges in engaging and retaining people;
   b. Identifying the role requirements and core competencies necessary in the people who could be engaged in creating, delivering and carrying it to the society through an effective and sustainable business model;
   c. Analyzing the availability of such people;
   d. The challenges faced by the IoT players for the adoption of the IoT products and solutions by the society.
3. **Discussions**: The discussions brought out a variety of ideas and experiences as shared by the participants. Some of the major views and suggestions were as follows:

a. **Ecosystem**: IoT Ecosystem was the starting point of discussion where the system elements were talked about and the scope of IoT devices from their utility perspective was highlighted;

b. **IoT Actors**: Discussions highlighted the need to identify the key actors in the IoT ecosystem and the importance of coordination amongst them. Examples were shared of the designers of the electronics & embedded software, the suppliers of the components, the electronic manufacturing services (EMS) production units, other peripheral providers, the commercial entities, the financers etc., all of whom need to work synergistically for the development, commercialisation, successful utilisation and the demand growth of IoT products and solutions;

c. **Standards**: IoT standards were another important aspect that were pitched by many participants and discussed at length for different views. The need for seamless connectivity amongst the IoT products and solutions was a major concern and the driver for the focus on standardisation. One of the observations raised was if the standardisation would solve the problems or, conversely, add to them. It was also noted that there are two “sister projects” of EU-India FI-MEDIA working on EU – India ICT standards developments in Delegation of the European Union to India funded EU - India, the SESEI project and ICT standardisation projects in Europe, which can contribute strongly to this aspect in a cluster setting;

d. **Interoperability**: Interoperability and compatibility with global standards was also discussed and considered essential for the growth of IoT market for the Indian players;

e. **Addressing and Connectivity**: In the light of expected growth, many devices would be connected. Therefore, unique addressing of the connected devices is a key element of the IoT products and solutions. This brings out the need for much higher addressing capacity of the internet protocol. Implementation of “IPv6” internet protocol across all geographies would be essential very soon as the adoption of IoT Devices grows and the growth of IoT solutions gather pace. Equally critical is the need for efficient and reliable connectivity between the devices;

f. **Momentum building**: A concern was also raised that due to the sudden popularity and appeal of this new technology, a “me too” race is emerging, particularly in the ICT related domain based companies;

g. **Start-up Role and Financing**: Start-ups were considered to be the main drivers for the innovation and growth of IoT systems. However the biggest challenge that the start-ups face are the financial constraints. Some structured mechanism and system for the financial support to the start-ups are essential;

h. **Government Role** for facilitating the growth of IoT systems was also discussed.
The FGD session was concluded with closing remarks presented by EU-India FI-MEDIA partner, Mr. Abhishek Sharma. Besides consolidating the points discussed, he highlighted the confidentiality concerns in the IoT ecosystem. Also highlighted was the weakness of the regulatory and legal systems for awarding IPRs and ensuring the protections to the IPRs as one of the main issues posing challenges to the cooperation and healthy partnerships essential for the IoT’s growth. Similarly, substantial government support to the Start-ups involved in the IoT business shall be yet another critical contributor for the speedy and healthy growth of IoT solutions. There were key conclusions about who should be contacted to form an EU - India C2C partnership in the hot topic of Internet of Things, broken down along a number of important areas that each side could contribute for mutual benefit.
Chapter-14
14. **M2M+IoT 2018 conference on Smart Cities & Smart Villages, 30-31 January 2018, in conjunction with EU-India FI-MEDIA project.**

**Abstract:** Although this event took place in the very start of Year 4 of the EU-India FI-MEDIA project, a significant amount of preparation work for this prestigious event took place during the entirety of year 3. The event enabled the work of the EU-India FI-MEDIA C2C’s to be presented to the wider communities, and new members of the C2C partnerships were attracted to participate. The following section summarises the activities that led to this successful two day event.

The EU-India FI-MEDIA team decided to collaborate with the m2m+IoT Forum of India as early as January, 2017, to co-organise this event, with EU participation as a core component of its success, as the objectives of this dedicated annual forum and the various conferences organized by them have been found to be of the same objective that could help promote the C2C partnership building within the FI-MEDIA project.

The Smart Cities Forum (Day 1) and Smart Villages Forum (Day 2), with an objective to promote India’s brand image and provide a pre-eminent platform to the m2m+IoT community, from large, medium to small enterprises and innovators/researchers to showcase their business ideas, innovations and capabilities in this emerging market, has been at the forefront of this cause since 2014 and has now become the signature Forum to project Brand India to the entire ICT stakeholders across the world.

The Fi-MEDIA team based in India, represented by Prof MP Gupta of IIT, Delhi and Mr. Abhishek Sharma of Beyond Evolution Tech Solutions Pvt Ltd, was invited to attend the IoT forum session of 6-7 March’17 on the “Connected World” and on “Policies, regulations and standards”. In the session, the team could interact with various professionals of the field and the high level Government Officials dealing with m2m and IoT policies and standards and the team had an ideal opportunity to share the C2C partnership objectives of the FI-MEDIA to the delegates. The details were well received and the support was assured as highly applicable.

Subsequently, the teams of Fi-MEDIA and the M2M + IoT Forum decided to work together and met regularly to work out details for Co-Organising the annual event being held during 30-31st January, 2018. On 5th September, FI-Media also organized meeting with Confederation of Indian Industries (CII) for identifying the avenues and approach to support the C2C objective of the FI-MEDIA project. The meeting was held at the DMS, IIT Delhi and was attended by Col Suhail Zaidi, Director & Head ICT for CII, Mr. Subhankar Mitra & Shilpi Batra of M2M + IoT Forum and the FI-MEDIA Team.

At the same time, FI-MEDIA team continued working towards maintenance of the already successful C2C of **Bringing the FIWARE platform to India** and formation of the India node of the FIWARE platform by way of initiating and supporting the direct and close involvement of the FIWARE Foundation, including with Mr. Ulrich Ahle, the CEO of the FIWARE Foundation. These efforts resulted in the participation of Mr Ahle as a keynote on both days to present successes of establishing an India node of FIWARE.

---


Minister Hardeep S. Puri and Mr. Ulriche Ahle, FIWARE Foundation
In the highly successful M2M + IoT conference of 30-31st January, 2018, FI-MEDIA took part as co-organizers along with IIT Delhi and the M2M + IoT Forum organizers. The conference was inaugurated on 30th January, 2018 by H.E. Tomasz Kozlowski, Ambassador of the EU for India & Bhutan and attended by the senior government officials and those from the Telecom / ICT industry and research and innovation domains. On this opening day, the sessions were dedicated to various aspects of the Smart Cities, including infrastructures, applications and services. There were presentations on various business and research aspects of the Smart Cities and the role of M2M and IoT in this field. Mr. Saurabh Sharma, CEO, Beyond Evolution, the member company of FI-MEDIA also presented on Smart Energy, supplementing the C2C partnership objectives of the project.

The sessions on 31st January, 2018, the second day of the conference, were dedicated to “Smart Villages”, which was the first C2C partnership formed by the EU-India FI-MEDIA project. The inaugural session, entitled “Empowering Villages through Technology and Creating Rural Innovation Clusters”, was moderated by Mr. Abhishek Sharma, Member FI-MEDIA and Managing Director, Beyond Evolution Tech Solution, the industry FI-MEDIA Partner Company. The panel comprised of Ms. Seema Gaur, Chief Economic Adviser, Ministry of Rural Development, Government of India, who shared with the audience various government schemes for the villages involving support and usage of IoT, as well. The details were eye-opening and extremely exciting for the future exploitation of the m2m + IoT technology. The other panellists were Prof MP Gupta, Head – Department of Management Studies, IIT Delhi and Academic member partner of FI-MEDIA; Mr. Vikram Tewatia, Director General, COAI, Mr. Haliodor Macko, CEO, SPEAK s.r.o. and Mr Ulrich Ahle, CEO, FIWARE Foundation, based in Berlin, Germany.

On behalf of FI-MEDIA project, a presentation on “Smart Energy for Villages” was made by Mr. Abhishek Sharma (left), highlighting the areas of cooperation between EU and Indian entities in industry and research in the area of Smart Energy for villages. FI-MEDIA, through its mobility programme, also facilitated the participation of Dr. Antonio J Jara of H.O.P. Ubiquitous SA of Spain and Professor Mikk J Ruohonen of University of Tampere, Finland, who were delighted to be given this opportunity of partnering with India IoT-based clusters of technologists and policy makers.

In his concluding remarks, Mr. James Clarke (right), FI-MEDIA project coordinator declared “by co-organizing and actively participating in this M2M+IoT conference, the FI-MEDIA project team successfully achieved the opening of the doors for further C2C partnerships and provided a healthy momentum for the activities for the next years of the project. The final report of the event is currently being circulated. Appendix 1 contains accompanying letters from the Minister of State, Housing and Urban Affairs, Government of India, and the H.E. Ambassador of the European Union to India and Bhutan.
Chapter-15

Abstract: EU-India FI MEDIA was represented by Prof. M.P. Gupta (IIT Delhi) in the Smart Republic 2018 edition organised by World Bank (http://www.smartrepublic.in/index.html) on 15-16th February, 2018. The Smart Republic initiative is aimed to create a multi-stakeholder partnership and serve as a platform for structured and continuous dialogue among governments, civil society, private sector, and others to jointly develop effective solutions for smart cities and smart villages.

Figure 24 - Prof. MP Gupta, (https://www.youtube.com/watch?time_continue=143&v=swbxixQ39AM)

Theme and Rationale

India is witnessing huge transformations in public service delivery through innovative uses of digital technologies under the remit of the Digital India Agenda. The 100 Smart cities mission, along with AMRUT and HRIDAY Missions, were announced by the Government of India in 2015 with a first list of successful cities to pursue Smart City Challenges announced in 2016. Since then, 90 cities from across the county have been selected for getting support through centre and state governments under the initiative. Additionally, the RURBAN mission was announced for the development of smart village clusters.

All of these missions have received unprecedented interest from multi-lateral agencies such as the World Bank, Asian Development Bank, UN habitat; in addition, multiple countries and industry players have expressed significant interest to be part of this big transformation opportunity. However, each of these players is working in isolation with their independent initiatives addressing
the same problems. This is resulting in a multiplicity of efforts and development of disparate systems by different cities. These systems are not interoperable and, in the long run, may result in wastage of investment and resources.

In order to address this scenario, Smart Republic 2018 is envisaged as a Multi-Partner global forum to deliberate on the collaboration framework between government and multiple agencies such as the World Bank, UN Habitat, UN Global Compact, Asian Development Bank, Industry and academia for achieving a shared goal of making India a Smart Republic by 2022. The Smart Republic Forum will focus on innovative ICT and New Media platforms and deployment of best practices to catalyse effective, coordinated and results-based implementation of 100 Smart Cities Program, AMRUT, HRIDAY and RURBAN missions to achieve the Sustainable Development Goals (SDGs). The Smart Republic forum aims to strengthen and deepen the collaboration among multiple implementing agencies working in the domains of smart cities and smart villages; fostering knowledge sharing among practitioners of Smart Cities and Smart villages programs to ensure adherence to global standards and good practices for accelerated achievement of Sustainable Development Goals; helping government agencies leverage private sector investment, knowledge and resources through innovative public private partnership models; support deliberations among multiple players to formulate structured mechanisms for improving cross-sectoral integration to accelerate deployment of sustainable smart city and smart village programs; and facilitate sharing of good practices among the Smart City and smart village practitioners for development and deployment of Digital Platforms for transformative interventions across multiple thematic areas.

In his keynote address, Prof. Gupta outlined the following points:
- According to 2014 revision of the World Urbanization Prospects by UN DESA’s, 54% people (3.3 billion), lived in urban areas. This number will rise to 66% by 2050;
- More than 80% of population in US, UK, Australia & Japan are urban;
- In Japan, 70% of population live in and around Tokyo;
- According to UN report on ‘World Cities in 2016’, there were 512 cities with at least 1 million inhabitants globally. By 2030, a projected 662 cities will have at least 1 million residents. Cities with more than 10 million inhabitants are often termed “megacities”. In 2016, there were 31 megacities globally and their number is projected to rise to 41 by 2030. In 2016, 45 cities had populations between 5 and 10 million inhabitants. By 2030, 10 of these are projected to become megacities and the population of one (Saint Petersburg, Russian Federation) is expected to fall below 5 million.
- In China, 50% of population is urban;
- China is developing 20 mega cities, one of those will be 20 times bigger than Mumbai;
- In India, 31% of population live in cities and trend is increasing;
- Their Contribution to GDP was 45% in 1990; by 2015, it grew more than 60%. It is expected to go up to 75% by the year 2020;
- Top 53 cities of the world with 13.3% population, occupy just 0.2% of the land, and contribute nearly 33% country’s GDP.
- As a result, most resources (60-80% energy) are consumed in cities;
- The consequence is that the economic importance comes at a cost which is poor environmental performance.
Irrepressible trends of urbanization led the ITU to coin the term “smart sustainable cities” to highlight concerns about resources, and to incorporate characteristics of both eco-cities and smart cities in 2014. “A smart sustainable city is an innovative city that uses ICT and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects”. We need to think about an integrated approach, running cities as an integrated network rather than a set of individual sectors; It meets the needs of today without sacrificing the ability to meet the needs of future generations. Smart sustainable cities can be assessed using four broad themes: society; economy; environment; and governance (Society means that the city exists for its inhabitants).

![Smart physical infrastructure](image)

**Figure 25 – Smart physical infrastructure**

Functioning smart sustainable cities contain 8 physical infrastructure and service elements:

- Real estate, for example, integrates multiple technologies, such as lighting, safety and renewable energy, and uses intelligent building analytics;
- Industry aims for zero emissions and develops innovative manufacturing techniques;
- Energy companies and utilities run a smart grid and wireless communications;
- Air, water and waste management companies use sensor networks or water information systems;
- Security is provided through video surveillance;
- Medical practices give remote health care and use electronic record management;
- Educational facilities supply world-class digital content and flexible, interactive learning;
- Convenient mobility.
Issues that need attention are to have:

a) **Common Vision**: Centre and the state governments should have a common vision. Conflicting and multiplicity of ideas make the things more complicated and there is a need to need to bury differences and share the limited resources available with them.

b) **Weave integration among various national programs** (Digital India, Make in India, Smart Cities, Clean India, Start India, Skilling India etc.). Earlier programmes such as the National E-governance Plan (NEGP) lacked on several counts viz. ‘Common sense approach’ vs ‘Life event approach’, Idea of CIO was not envisioned, BPR was not mandated, Enterprise Architecture was not insisted, Security Provisions and required audit were ad-hoc, legal framework dedicated to E-governance was not exclusive, Vertical (Federal/State/District/Local) and horizontal Integration among various mission mode Projects were not envisaged, Outsourcing was indiscreet, local ownership was not strong, capacity building was inadequate, Project Management Approach was missing, Intelligent Support Systems in the business of government were not thought about, and a comprehensive Portal strategy was not laid down etc.

c) **Investments**: Need to attract higher investments, for accelerating economic growth; Investors look for quality infrastructure before putting in their money; hence Government of India announced mega programs ‘Make in India’, ‘Digital India’; these will prove a big boost to economic investment & growth.

d) **Quality of infrastructure**: The Quality of Infrastructure is questionable in absence of sustainable real estate, communications system, Energy, water, transport, security and waste management systems. So, is the Smart City project is far cry?

e) **Satellite Towns & Rural sides**: Development should be in tandem- city, towns & Villages. Improving city landscape will enhance migration, adding further challenge. Hence it is necessary to add on smart layer among small town and make village life equal partner in smart city agenda. Hence India may have to think developing not 100 but smart 500 cities living attractive. From economic perspective, smart technology can be explored how it augments commercial activities positively.

f) **Digital Village vs Smart Village**: Idea of smart system laying over the digital landscape. A Digital Village is conceived to have computing layer while smart village is conceived to be laid out over that. Three (3) Key Areas were found part of digital Village, including 3 Cs

   - C1 Connectivity (refers to Digital Connectivity);
   - C2 Content (refers to Digital Services);
   - C3 Capacities (refers to Digital Literacy)

   + 2 Cs

   - C4 Collaborating;
   - C5 Co-creating.

g) **Tech infrastructure**: The backbone of infrastructure, high-speed broadband connectivity, cloud intelligent energy, water, transport, security and waste management systems, video surveillance networks, emergency healthcare.

h) **People’s Participation**: Intelligence of the people and not the smartness of the technology can determine the smartness of the city. Therefore, people should be at the forefront of the development of the city. Urban poor should be included in the process; not just use for
building the city and then forced to leave. People need to be made smart to demand and utilise the services.

i) Liveability: Provide safety, security, sustainability and energy efficiency at affordable cost; provide conducive environment so that people develop emotional attachment. Proper facility for working women is essential as working women face many challenges.

j) Waste Management: This should be decentralised in smaller recycling plants. For sewage as well as solid waste there should be recycling units within every one km radius. It will help save energy, reduce pressure on road traffic and improve sanitation and cleanliness.

k) Energy Supply: Renewable power sources should be tapped to ensure 24x7 power supply. Rooftop solar panels should be installed to bridge the gap of energy supply from conventional sources. Moreover, it will ensure uninterrupted energy supply required for some essential services.

l) Land: Land acquisition is a big challenge. If the existing cities or satellite towns are to be transformed into smart cities, what will be the land acquisition strategy for development and expansion of infrastructure? In the case of green-field projects, the challenge is even larger. Land acquisition is currently in the concurrent list. I.e. central government has one law, while state governments can have their own laws. This creates confusion and leads to unnecessary delays. Land acquisition should be brought fully under the purview of the states. Efforts should be made to reduce indirect cost and increasing direct cost of land acquisition. Direct costs are the money paid to the farmers or the land owners, while the indirect costs are the expenses incurred in the process due to delays and bureaucratic hurdles etc. If land owners are compensated adequately, their opposition to land acquisition for infrastructure and city development will go. The Land acquisition norms should be simplified and more powers should be given to the District heads/collectors. Under the present law everything goes to chief secretary, which is not necessary.

m) Urbanisation Strategy: Urbanisation in India is often seen as a by-product of failed regional planning. People migrate to towns and cities because they don’t find basic facilities, proper infrastructure and jobs in rural areas. There is hardly any policy framework, either at the Centre or at the state level, for planned urbanisation. For higher economic expansion and development of the country, urbanisation is inevitable. There is need for a proper planning and clear strategy both at the centre and the state level to promote and facilitate urbanisation in a way, which is best suited for the economy.

n) Single data portal: As per Planetary Defense Conference recommendation:

- Internet is a powerful medium of communicating & sharing;
- Have dedicated portal to show how threats evolve and to illustrate possible action scenarios;
- In the long run it can become a central platform for the forming of the planetary defense system in the future;
- This system will be responsible for the worldwide warnings and protection actions to encourage international cooperation;
- Educate governmental officials and public on the nature of threats;
- Mechanism for direct communication between scientific community and policy makers;
- It will be helpful for international scientific organizations in exchange of research data and forthcoming events;
- There are many websites but the problem is they are not integrated and it takes too much effort to access them;
- Reliable and objective information from scientific organizations or space agencies is often not clear to the public;
- A non-specialist cannot apprehend huge amounts of information and evaluate its credibility;
- Therefore there is a strong need for a unified, easily accessible, and competent source containing specific, relevant, and consistent information and a universal database;
- The single data portal will unite the existing Internet resources and carry out the function of a search system, a monitoring centre, and a social platform;
- That will significantly facilitate the process of searching for information and working with it;
- It will stimulate public interest in the planet safety issue and increase public awareness, which in turn will increase the level of public support;
- Features for news day-to-day updates from media in English and other languages, including news, press releases, etc.;
- Publish digital versions of articles from scientific magazines;
- Have a place for video interviews with experts;
- Make available abstract and links of reports from international organizations;
- Access to research reports by scientific institutes and social organizations;
- Access to multimedia materials [impact events, including presentations, videos and photos];
- Display of future events;
- Single portal may be pursued under UN cooperation.

**o) Sharing of Best Practices:** This is about following Project Management Book of Knowledge (PMBOK), identify Best practices and make it a law.
p) Use of the EU developed FIWARE open source platform\(^\text{111}\): Professor MP Gupta presented the work undertaken as part of an EU - India Cluster to Cluster (C2C) partnership on *Bringing the FIWARE platform to the India context*, which has been quite successful in the last two years, as a result of the support of the EU-India FI-MEDIA project\(^\text{112}\), which is funded by the Delegation of the European Union to India and Bhutan\(^\text{113}\). The C2C partnership has highlighted a number of important elements on the use of the FIWARE open source platform for smart cities and smart villages in India, including:

- **Public services data of the citizens or infrastructure has to be hosted on Indian servers.**
  - The way to enable this requirement would be to set up a FIWARE Lab node in India for pilots and trials and a commercial FIWARE node for productive usage. Already, an academic node has been established in PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur IIIT (see chapter 6 of this Yearbook of success) and a number of FIWARE Platinum members, such as Orange and Atos have large operations in India and are already addressing the India Smart City market. But it is also open for Indian companies like Tata, HCL, and others. At the M2M + IoT Forum in January, 2018, it was announced by the CEO of the FIWARE Foundation, Mr. Ulrich Ahle, that Mobilepedia Innovations\(^\text{114}\) is the first India-based Gold member of the FIWARE Foundation. See chapter 14 of this Yearbook of Success.
  - Ownership of all the smart cities projects should have support available to ensure 24/7 operation. This may not be manageable if experts are sitting outside the country. It would be expensive also. Mission critical applications can only be run on a system with guaranteed SLAs on performance, maintenance support and availability. In other countries there are already commercial FIWARE instances with professional SLA’s. Same can be set up in India (see above). As FIWARE was born in Europe, we need to transfer the know-how to the local market in India. Simply looking at the difference in labour cost it will not be possible to serve Indian clients and cities from Europe.

- **FIWARE viability has to be established by pilot projects to start with and this cost has to be borne by the solution providers (FIWARE vendors in this case):**
  - Depending on the availability of open data in the cities, it is possible to create nice applications based on the large functionality of FIWARE. This is one of the major advantages of FIWARE: portable and interoperable solutions.

- **Clarity on a financial model for using FIWARE: If the pilot succeeds, the cities will also need to have a clear understanding beforehand on the cost implications of scaling this up to an entire city.**
  - This important aspect needs to be discussed as it depends on the business model. If there is no business case, it will be difficult to justify;
  - FIWARE is open source and available for everyone;
  - It is very efficient to create and operate applications based on the Generic Enablers (GEs) or to re-use existing solutions.
  - Some or the solutions need a payment and also the integrations services and providing the SLA’s will need payments, which require a concrete business case.

---

\(^{111}\) [http://www.fiware.org/](http://www.fiware.org/)

\(^{112}\) [http://www.bic-fimedia.eu/](http://www.bic-fimedia.eu/)


\(^{114}\) [http://www.mobilepedia.in/](http://www.mobilepedia.in/)
q) Disaster Management: Disaster is phenomenon where cooperation is vital for its efficiency and effectiveness. Last years’ experience of Gurgaon Flood is a lesson to learn from. The main challenge is coordination among various agencies locally and globally [Government-Military & others, NGOs, Community groups (social & religious both) and International Volunteer organization]. ICT can play a big role in disaster management; for example:

- (Sensor networks developed by CDAC for Flood Monitoring system in Brahmputra river)
  - Special system requirements.
    - Emergency Operation Center;
    - Communications;
    - Warning Systems;
    - Survey & Assessments;
    - Information Management;
    - Emergency Logistics.
- Policy may be an issue (Limit on number of sms’s);
- Adopt best practices from global sources (EU, US, Japan, Russia, etc....);
- Single portal may be pursued under UN cooperation

r) Research: There is a need to encourage research investment into some unique areas, such as:

- Rare Event Simulation:
  - Howra/Pumban/Brooklyn bridge will fall;
  - Probability of collision of two aircrafts;
  - Probability of a nuclear breach;
  - Probability of attack on parliament;
  - Probability of Grid failure in Dadri;
  - Probability of Qutub Minar falling.
- Risk & hazard assessment and invest into such and related research;
- Define large joint research projects to foster global collaboration (EU, India, US, Japan).
Chapter-16
16. Conclusions and Next Steps for Year 4 (and potentially Year 5)

In the third year of the EU-India FI-MEDIA project December, 2016 – November, 2017, there was particular emphasis on the maintenance of two dedicated Cluster to Cluster (C2C) partnerships started during years one and two, namely C2C on Bringing the EU’s FIWARE platform (http://www.fiware.org) to the India Context and C2C on Smart Villages.

In addition, a new C2C on Internet of Things for Smart Cities and Villages was started with a successful participation to the large scale EU based IoT week in 2017 in Geneva, Switzerland, and a follow up C2C Focus Group Discussion (FGD) workshop held at IIT Delhi in November, 2017.

These C2C partnership activities has resulted in a number of key successful missions, both in New Delhi and road-show style events in Jabalpur, Gwalior, Mumbai, Bangalore, Kerala, and others. All of these C2C events in year 3 of the project are detailed throughout this annual Yearbook of Success Stories.

In Year 3, a new fruitful collaboration has been formed between FI-MEDIA and the Delegation of the European Union to India funded EU - India ICT Standards projects and SESEI project and ICT standardisation projects in Europe, which are ending in 2019. These discussions have started already and were strengthened at the start of Year 4 with joint participation to the M2M + IoT Forum 2018, in which EU-India FI-MEDIA co-organised a C2C partnership workshop dedicated to Smart Villages on day 2 of the overall event.

We feel our projects can work together to assist in bringing EU experts to relevant meetings and events in 2018 and 2019. In order to accomplish this, a no-cost extension of one year period (to end of November, 2019) is being requested by the EU-India FI-MEDIA project.

Activities planned for Year 4 (and potentially Year 5), include the following:

- Developing a deeper inter-projects relationship, alignment and shared events with the Delegation funded EU - India ICT Standards projects and SESEI project and ICT standardisation projects in Europe, including bringing EU experts to relevant meetings and events in 2018 and 2019, if granted an extension.

- Continue with the promotion and dissemination activities of the EU’s FIWARE platform in India, which is starting to show tremendous traction following our C2C activities, to date.

- Further building upon the successful IoT and Smart Villages cluster to cluster (C2C) partnership created in EU-India FI-MEDIA and followed up in an event at IIT Delhi in November, 2017 and the successful event on 31st January, 2018, held on day 2 of the M2M + IoT Forum event. In 2019, we intend to further develop this successful EU – India cooperation, along with the event organisers and participants, and invite others for a follow up C2C events in both 2018 and their planned annual event to be held again in 2019. A report of this event has been circulated to the communities and our project’s C2C event is included in this report.

- If an extension is granted for Year 5, we plan to start a new C2C partnership on Digital Content and Media creation, which is a hot topic in both India and in the EU, especially via the New European Media (NEM) Technology platform\(^{115}\) of the EU, which has been highly supportive of the FI-MEDIA project from its outset. The project was presented by the coordinator at the recent NEM Steering Board meeting and General Assembly, and there is already significant interest from NEM members to set up a C2C partnership in India.

\(^{115}\) https://nem-initiative.org/
Appendix 1
Appendix 1. Accompanying letters in relation to M2M+IoT 2018 conference on Smart Cities & Smart Villages 2018

MESSAGE

I am delighted that the 4th edition of the India Smart Cities Forum is jointly being organised by the Department of the Management Studies, IIT Delhi, EU India FI Media, and M2M+IoT Forum. It is heartening to note the forum aims to enrich the urban environment with the use of latest technologies.

India is undergoing rapid urbanisation with the number of city-dwellers expected to reach 600 million by 2030 (from about 400 million now). All organisations and programmes contributing towards development of our cities, particularly those seeking community based growth, are becoming increasingly crucial for the success of our cities. The India Smart Cities Forum, therefore, with its close association with academia, industry and government has a significant role to play.

The Ministry of Housing and Urban Affairs (MoHUA) has been supporting efforts by various stakeholders involved in urban transformation towards a sustainable environment - one that would allow people to live in smarter and more liveable cities. I hope that the Forum can contribute to the meeting of this objective by using its networks for capacity building of various stakeholders responsible for improving standards of living and quality of life for all.

Government of India and MoHUA, through their various programmes and missions, particularly the Smart City Mission, are working to develop investor friendly smart cities. Good quality infrastructure - simple and transparent online businesses and public services/processes that make it easy to set up an enterprise and run it efficiently without any hassles - are high on our agenda. I would like to see the Forum proactively utilise its resources for moving towards this goal.

I extend a warm welcome to all stakeholders from across the globe at the India Smart Cities Forum on 30 January 2018 at the Indian Habitat Centre New Delhi. I extend my very best wishes to the Forum for achieving their goals.

New Delhi
24 January 2018

(Hardeep S Puri)
India-EU cooperation on smart cities

It was with great pleasure that I have accepted the invitation to participate in the "Indiam2m Iot Forum 2018", and I am glad that the European Union is able to provide support to this important gathering.

This year's event focuses on smart cities and villages, a topic which is close to our heart, and on which we cooperate with India in a number of ways.

In the last India-EU Summit in New Delhi in October 2017, our Leaders adopted an India-EU Joint Statement on a Partnership for Smart and Sustainable Urbanisation. The aim is to step up cooperation on priority topics such as developing Smart Cities in India, modernising urban infrastructure, or promoting the New Urban Agenda of the United Nations.

The partnership will allow us to look at the provision of water, waste, clean energy, mobility, emergency and other services needed for smart urban transformation in a holistic manner.

India and the EU share similar challenges and need similar solutions to ensure smart and sustainable urbanisation.

The EU is impressed by India's ambitious urban and digital agenda and committed to implement the Urbanisation Partnership. The EU can bring together its 28 Member States, all of which have their own key strengths, competencies and technologies. Our Partnership will bring on board the relevant stakeholders to facilitate policy dialogue and provide best practices, business solutions and joint research & innovation, and to look at financing models.

The European Investment Bank (EIB), the world’s leading multilateral lender, has established an office in India and already committed credits at favourable conditions of some €2 billion for clean and smart projects. Smart cities, as part of the EIB’s regional focus on climate action, is one field where such financing is likely to be relevant.

In the field of ICT standardisation, an EU funded project supports the cooperation between the Indian and European telecom standards bodies (TSDSI and ETSI) on emerging global standards in priority areas of mutual interest, including machine to machine (M2M) communications and Intelligent Transport Systems. ETSI and TSDSI are active members of the leading international standardisation initiatives working out essential interoperable standards for smart cities and the “Internet of Things”: oneM2M and 3GPP.

Under our cooperation project we are - as just one example - preparing a series of tutorials for app developers and a hackathon to be held from 12 to 19 February in New Delhi, Hyderabad, Bangalore and Chandigarh. These events, organised in cooperation with prestigious Indian and European organisations, will be based on an open source implementation of oneM2M, and focus on applications relevant for smart cities.

I wish the "Indiam2m + Iot Forum 2018" success and reaffirm the EU’s commitment to strengthening cooperation with our strategic partner India, including in the important field of smart urbanisation.

H E Mr Tomasz Kozlowski
Ambassador of the European Union to India and Bhutan
The FI-MEDIA website www.bic-fimedia.eu is used to keep the C2C partners and the wider Future Internet communities informed about the FI-MEDIA activities, enabling further recruitment possibilities from EU and India.

In addition to working with the cluster participants, the FI-MEDIA partners are working closely with the government, policy and decision makers in both EU and India to make sure the clustering topics being addressed are core to the current programmes in each domain. The potential topics under consideration are shown below (not exhaustive).