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IoT to help Albania and Kosovo achieve SDGs.

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Abstract. Internet of Things (IoT) seems to be one of the strongest transforming technological trends. Developed countries are investing a lot of resources in research and infrastructure to provide all it is needed for a better future through IoT. The aim of the paper is to highlight the potential use of IoT in developing countries, such as Albania and Kosovo, as a means to achieve their sustainability goals based on Sustainable Development Goals (SDGs). Both countries are making considerable efforts toward these objectives. This paper analyzes opportunities and challenges of IoT implementation in order to help Albania and Kosovo achieve a sustainable future.

Keywords: Internet of Things, SDGs, Developing countries, Albania, Kosovo.

1 Introduction

IoT acts as a disruptive tech force nowadays. The term describes the connection of different devices to communicate with each other with the same language despite technical differences and without human intervention. These devices are expected to be smart, to learn and to be able to take decisions on their own. Gartner forecasts that 25 billion connected things will be used by 2021 [1]. Industries and businesses are said to swap to IoT if they want to be competitive on the market. In developed countries, governments and universities are investing in IoT research. While the world is changing and new things are expected to come, some simple questions can be raised; what is going on in developing countries? Are they aware of this new wave of developments and transitions? Can IoT help these countries fulfill their development plans?

Albania and Kosovo have adopted the 2030 Agenda for Sustainable Development which proposed 17 SDGs [2][3]. IoT projects and applications can help monitoring and accelerating progress to evaluate and achieve these goals [4] [5]. The paper chooses a descriptive approach to describe the potential use of IoT in problematic sectors in Albania and Kosovo in order to help them towards sustainable development and the fulfillment of SDGs.

On the other side the paper aims to bring a special attention to academia and researches about the potential of the IoT research. A sustainable future requires strong partnership between all the actors [2]. For this reason universities need to work closely

with governments, businesses and everyone involved in the IoT implementation process.

2 IoT solutions in Albania and Kosovo

IoT for agriculture and water management

The economy of Albania and Kosovo is highly depended on Agriculture [6][7][8]. Economic growth is usually vulnerable to weather conditions since they might boost or not hydroelectricity and agriculture production. By the end of 2030, Goal 2 requires practices in agriculture that can increase productivity and the capacity to adopt to climate changes, extreme weather, flooding, drought etc. [7] [8].

IoT seems as a potential enabler for a good transformation of the Agriculture sector [5][9][10]. IoT sensors can be implemented on the ground, in the water, in vehicles in order to collect data for the inputs such as soil moisture and crop health. All the data can be saved on cloud and can easily be accessed by farmers and by institutions [11][12][13]. IoT applications can be found in monitoring the weather, greenhouse management, nutrient management and pest control [10][11]. Main problems of agriculture in Albania and Kosovo include poor marketing of products, low technological levels, underdeveloped irrigation and drainage systems and more over low level of collaboration between farmers and a low level of development of the processing industry and supply food chain controlling [12][13]. IoT can provide information to help farmers and governments design business models with a combination of smart agriculture and smart food supply chains [12][14].

IoT can help in management of the water supply and irrigation and prevent drought or flood, a problem for Albania and Kosovo [12]. Through the use of the right technology, agriculture might use 30%-50% less energy and water. The water resources lack good management and there are citizens that do not have full access to fresh water. The biggest consumer of water resources is agriculture [8]. According to Climate Change Post a study done predicts a decrease in water resources due to climate changes in the near future. New systems and new innovative ways in water resources management are required [7] [8] [15] [16].

IoT for local data and context

Human resource, knowhow, financial resources, lack of transparency, lack of data/statistical system that will provide quality information, validation and strengthen explanatory power of data remain a challenge in both countries [17] [7][8]. One the challenges in achieving SDGs and building proper policies, is the lack of data and trusted information. IoT can feed institutions with information from all the fields, health, environment, agriculture, etc. [18]. A proper and a low cost infrastructure might be built to maintain and analyze all the data coming from IoT devices. Public entities can easily accessed these data in order to improve decision making. An example comes from Honduras where a project aimed to put sonar sensors to bridges and to monitor the water levels. When the levels arise, the government will give alarm for evacuation [18].

IoT in healthcare

Albania and Kosovo fail to fulfil quality health system, social care and protection (Goal 3) for the citizens. There are lots of groups in Albania and Kosovo especially in rural areas that do not receive proper services in healthcare and insurance. IoT technologies can provide new ways in fulfilling these needs with low costs [5][4]. An example of Body Sensing Networks can be proposed to be installed in patients home and to monitor their wellbeing [19]. Middle income countries are known for problems especially in chronic diseases such as cancer, chronic respiratory like asthma and diabetes. These diseases require uninterrupted care which is unavailable in some part of Albania and Kosovo, especially in rural areas. Remote diagnoses with m-health and wearable devices might offer low cost solutions and a proper healthcare system [5].

IoT in tourism

Tourism is an important sector in both countries, especially in Albania. It is predicted to contribute directly at 9.3 growth of GDP by 2028 in Albania [20]. Albania and Kosovo might benefit from IoT applications in tourism. IoT implementation in this field can increase quality of services [21], smart energy saving, data, information and personalization that will attract tourists [22].

IoT for renewable energy and energy efficiency

A decrease to summer rains is projected to have a major impact by 2050 in energy consumption. For that reason, one of the priorities of Albanian and Kosovo government is to increase competitiveness and innovation and to promote innovative technologies for renewable energy [7][8].

Both Albania and Kosovo have a significant potential for clean and renewable energy [23][24]. Especially in Albania the market for solar water heating systems has seen a growth these late years [23]. Energy management is another problem in both countries since there is a lot of loss and corruption in the system. The current infrastructure lacks the ability to cover the need for all the population and the price of energy consumption isn't affordable by all the families. Renewable energy and energy efficiency seems to be the solution [25]. The use of IoT in renewable energy management and energy efficiency can be irreplaceable. Sensors collecting real time data, remote management and intelligent behaviors are some of the potential applications in energy management in these countries.

3 Challenges and recommendations of IoT implementation in Kosovo and Albania

Despite that both countries have plans to foster international collaboration through advancements and deployment of ICT infrastructure, innovation and science still the actual physical infrastructure seems to be a barrier for innovation and growth [28]. ICT innovations in these countries are a little bit far from the desired results. More efforts in improving current ICT infrastructure are required [26]. IoT implementation might be

a cost effective solution and it might need to start with essential applications only [27]. ICT and even IoT seem to be an important tool for economic and social growth. IoT needs some investments in the beginning where interested parties, like farmers might not have the financial resources for the installation costs required and also the knowledge on working on this technology [28]. European Projects, funding organizations and collaboration with businesses and ICT forces might be another way to invest and help decrease initial investment costs of IoT devices and infrastructure.

One of the main problems in all these applications and in overcoming challenges is the lack of professionals in the field of IoT and especially in ICT in Agriculture [29]. There are more than 80 study programs in Albania and Kosovo in ICT and ICT related fields and there is not a single study program with a focus in IoT. A search was done in some of the biggest ICT study programs in Albania and Kosovo and less than 3 courses in IoT were found. There were other courses that part of their syllabuses had basic concepts in IoT. On the other side, ICT professionals rarely prefer to go and work in rural areas after graduating. Academia and governments need to work together to fulfill the gap in knowledge and knowhow [12][14]. Broader and long term plans for training professionals in this field are required. Developing proper courses and curricula in universities with a focus on trainings in ICT and IoT is a must with this expected impact of IoT in everything. There is a strong need for collaboration with other international organizations that give advice and monitor the process of SDGs implementations and IoT. A new form of IoT knowledge needs to be implemented in our education system [4]. Bachelor and Master Programs in ICT field should see IoT knowledge as a must and include that on curricula and syllabuses. Other challenges of IoT implementation are security and privacy. These concerns need to be understood well by the governments and be put as a priority if they want things to succeed in long term. Academia can bring solutions through innovative curricula in security area.

To achieve growth and sustainable development, both countries need to explore new models of investments, businesses and to create a strong collaboration environment between industries, public authorities and researchers [19][27][28].

3 Conclusions

Developing countries like Albania and Kosovo are having trouble with their efforts achieving SDGs for a sustainable future. On the other side, latest developments in technology, especially the so called IoT, are expected to transform our society, our economy, our world to another level. IoT applications can be found not only on developed countries and stable economies but they can also be a huge help even for developing, unstable economies, sectors and countries. IoT-enabled solutions can transform Agriculture, Data Management, Tourism, Environment protection, Energy efficiency - some of the main sectors in Albania and Kosovo that if developed properly can have a directly impact in sustainability. On the other side, there are a lot of challenges in implementing these tech trends. Old infrastructure, lack of human resources and knowhow, lack of financial resources etc., delay the work of IoT implementation and achieving SDGs. Academia can play an important role in leading IoT change and transformation in both

countries. Universities can propose visionary plans to government and need to strongly cooperate with administration, tech businesses and all the units and sectors in order to build strong foundation for stable development. New curricula and study programs with a focus on developing professionals in IoT for the purpose of using this knowledge to implement IoT in Albania and Kosovo can be developed.

References

1. Gartner, <https://www.gartner.com/en/newsroom/press-releases/2018-11-07-gartner-identifies-top-10-strategic-iot-technologies-and-trends>, last accesses: 25/08/2019
2. UN, <https://sustainabledevelopment.un.org/post2015/transformingourworld>, last accessed: 1/09/2019.
3. INDEP, https://indep.info/wp-content/uploads/2019/07/SDG_ENG.pdf, last accessed: 30/09/2019.
4. CISCO, Harnessing the IoT for Global Development, Cisco 2016.
5. GIZ/AlumniPortal, <https://10innovations.alumniportal.com/internet-of-things/introduction-the-internet-of-things-is-already-here.html>, last accessed:15/09/2019.
6. INSTAT, <http://www.instat.gov.al/media/6049/gdp-q1-2019.pdf>, last accessed: 15/09/2019
7. First report on the implementation and results of the National Development Strategy 2016–2021, Kosovo, October 2018.
8. Government of Albania and United Nations, Programme of Cooperation for Sustainable Development 2017-2021, 2018.
9. Stočes M, Vanek J, Masner J, Pavlik J., Internet of Things in Agriculture, *Agris On-line Papers in Economics and Informatics VIII(1):83-88*, 2016.
10. Lalitha A., Suresh B., Purnika K.S., Internet of Things: Applications to Developing country agriculture sector, *International Journal of Agriculture Sciences* 10(20),pp 7410-7413, 2018.
11. Raneesha A. et al., Adoption of the Internet of Things (IoT) in Agriculture and Smart Farming towards Urban Greening: A Review, *International Journal of Advanced Computer Science and Applications*, 10(4), 2019.
12. WestBase, <https://www.westbase.io/iot-for-farming-in-developing-countries/> last accessed: 12/09/2019.
13. WorldBank, <https://blogs.worldbank.org/digital-development/agriculture-20-how-internet-things-can-revolutionize-farming-sector>, last accessed: 12/09/2019.
14. Dlodlo N., Kalezhi J., The internet of things in agriculture for sustainable rural development, *International Conference on Emerging Trends in Networks and Computer Communications (ETNCC)*, 17-20 May 2015.
15. ClimateChangePost, <https://www.climatechangepost.com/albania/fresh-water-resources/>, last accessed: 20/09/2019.
16. <https://blogs.microsoft.com/latinx/2019/08/05/the-internet-of-things-is-going-mainstream-microsoft-survey-finds/>, last accessed: 18/09/2019.

17. The sustainable development goals and Albania, Antonella Scolamero, 2017.
18. Engineeringforchange, <https://www.engineeringforchange.org/news/how-the-internet-of-things-is-improving-lives-and-livelihoods-in-developing-countries/>, last accessed: 15/09/2019.
19. Ismaili S. A., Li M., Shen J., He Q., Alghazi A., African Societal Challenges transformation through IoT. 21st Pacific Asia Conference on Information System (PACIS 2017) (pp. 1-9). AIS Electronic Library.
20. Ministria e Mjedisit, <http://www.mjedisi.gov.al/strategjite-e-sekt-nderl/>, last accessed: 12/09/2019
21. <https://www.revfine.com/internet-of-things-travel-industry/>, last accessed: 12/09/2019.
22. IoT Week presentation, Dolores Ordonez, IoT&Tourism, June 2019.
23. UNDP, <https://www.al.undp.org/content/albania/en/home/crisis-response/in-depth.html>, last accessed: 24/09/2019.
24. WorldBank, <https://www.worldbank.org/en/country/kosovo/brief/energy-in-kosovo>, last accessed: 24/09/2019.
25. Digiteum, <https://www.digiteum.com/iot-green-energy>, last accessed 23/09/2019.
26. Emerging Europe, <https://emerging-europe.com/intelligence/40120/>, last accessed 14/09/2019.
27. TelecomTv, <https://www.telecomtv.com/content/iot/is-the-iot-the-solution-to-the-un-s-sustainable-development-goals-13208/>, last accessed 17/09/2019.
28. Miazi. ,Erasmus Z., Razzaque A., Zennaro M., Bagula A., Enabling IoT in Developing countries, 5th International Conference on Informatics, Electronics and Vision (ICIEV), pp:564-569, 2015.
29. Food and Agriculture organization of UN, <http://www.fao.org/family-farming/countries/alb/en/>, last accessed 19/09/2019.
30. ASCAL, <https://www.ascal.al/sq/lista-e-ial/programet-e-studimit>, last accessed: 23/09/2019.
31. AKA, <http://e-akreditimi.rks-gov.net/>, last accessed: 23/09/2019.