



*The Information Institutions under the adoption of Internet Of Things:  
Towards Smart Information Institutions.*

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**Abstract**

*This study attempted to discuss the possible various uses of IOT in developing and promoting information institutions and in transforming them into smart information institutions that respond to the various and complex information users' needs. We portrayed the extent and the achievement of this transformation firstly by highlighting the current ingredients of these institutions and, secondly, by determining the latter that could benefit from the advantages of IOT, and thirdly, by identifying the development that would occur in these ingredients when applying IOT on them.*

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## 1. *Introduction*

Nowadays, the world moves towards more communication with the uses of communicational devices, in addition to the popular elements and systems that make our life theoretically less stressful. There is a growing recognition that this connected environment has entered the next step of the unlimited probabilities through what is known at present as “Internet Of Things” (Massis, 2015: 289) which permits to connect things and transmit data with or without the human intervention, so it is likely to attend a revolution in our way-out; that is displayed via the fast expansion of IOT which will lead in the forthcoming years to a new vision and a new dimension related to the services of the different institutions. That would not only be the type of individual life, but the institutions’ productivity also. Thus, the scope will be open towards the World Union for Connected Communications’ view known as “Connected Life” (GSMA, 2014:1).

Since the beginning of the era of Information and Communication Technology, the information institutions endeavored to cope with progress and to benefit positively from any technological development. They still go hand in hand with the emergence of IOT because they predict adequately the huge advantages they may get in terms of improving the efficiency and quality of their information services. Through this process, they also intend to

move from electronic information services to smart information services having the ability not only to detect the document that the user wants, but also to suggest to the latter other information resources related to the document wanted. The information institution goes over the passive and classical scale of the electronic service in order to create interactive information services with the user and feel his/her needs in terms of information. As a consequence, the present information institution will know a mutation that will allow it to be modern, operational, innovative and efficient; in other words, it will be a “smart information institution”.

### *1.1 Statement of the problem*

Due to what it possesses as advantages and applications that permit to connect things and transmit data using sensor devices that facilitate things to connect to each other, information institutions have opted for thinking seriously about mechanisms and ways for benefitting from IOT applications and developing and improving their method of work as a pattern for interactive information institutions to reach the level of smart information institutions.

On the basis of what preceded, our scientific paper attempted to discuss the possible uses of IOT in developing and promoting information institutions that would be transformed into smart information institutions. We wanted to have an answer to the following stated problem: How can information institutions benefit from IOT applications in developing and

ameliorating the efficiency and quality of information services, so that they could be transformed into smart information institutions. What are the aspects of this benefit? What are the important challenges that constitute an obstacle for achieving their goal?

### **1.2 The objectives of the study**

Besides looking for answers to the stated question, the study aims at:

- To identify the advantages and benefits the IOT technique relies on in information institutions.
- To highlight the aspects related to the application of this technique in developing and improving the present information institutions.
- To attempt identifying the most important challenges and matters that limit the orientation of the actual information institutions towards the adoption of this new and important technique, in addition to suggesting some solutions to face them.

### **1.3 The importance of the study**

The importance of this study derives its value from the interest of the subject that it treats which is “Information institutions in the shadow of the adoption of the IOT technique”. It is one of the most recent topics that have not known enough study in the Arab countries. This important topic deals also with the information institutions and their leader role in enhancing the developing process in societies today. The information services also have their importance in providing people and the

different sectors of society with the up-to-date, precise, rapid and suitable information for the construction of the pillars of development.

### **1.4 The study approach**

The nature of the study and its objectives have pushed the researchers to adopt the descriptive approach, in addition to the documentary approach through the exploitation, induction and consultation of several references and scientific studies related to the topic of information institutions in the shadow of adopting the IOT technique published between 2011 – 2021 in the electronic and printed formats – the great majority in English – We analyzed the content attempting to deduce what is related to the present topic of our study.

### **1.5 The previous studies**

The topic of IOT has benefitted from a large treatment in the foreign intellectual production, above all in the English language. Authors have made efforts to communicate about the aspects related to the possible application of the IOT in the information institutions, especially the services of the latter and their management. Handling this topic began since 2011, while its treatment in the Arabic intellectual production goes back to 2016 with a scientific paper by the author Ahmed Faraj Ahmed and Ahmed amine Abou Saad who participated with their study in the AFLI (Arab Federation for libraries and Information) Congress organized in Egypt in Nov. 14 – 16, 2016. From this date on,

research about this topic began to be done. In March 2019, the first Arab Congress on IOT was organized under the title: “Internet Of Things: the Future of Interconnected Internet Societies”. It was held in Abu Dhabi by the Association of Specialized Libraries – Gulf Branch. 37 papers were presented in this Congress. 4 papers were presented in English. The majority of the papers dealt with the most important issues related to the benefits of the Arab information institutions from the advantages of the IOT technique. Another study was conducted shared by an Arab Mehdi Mohamdi and a foreigner Yegane. They participated with their paper in an International Congress in Nov. 2018. They insisted on the advantages in using IOT in academic libraries with the most important models that applied this technique in information institutions. We may mention that the majority of studies led around the topic of IOT in Arab and foreign countries dealt with works presented in conferences, while just some of them were published as scientific articles.

After consulting the content of the previous studies already mentioned and the induction, we deduced a set of points :

- ✓ A precise identification and a clarification about the concept of IOT and the ways it is applied in information institutions.
- ✓ Highlighting the way of investment is practically made about IOT applications in information institutions, precisely concerning information services.

- ✓ An insistence on the techniques and constituents of IOT which should be available in information institutions for the sake of benefitting well from its applications.
- ✓ Foreign and Arab studies share their view showing that the adoption of the IOT technique and their applications by information institutions has become necessary and will transform information services to smart information services. It can also transform these institutions to smart information institutions.
- ✓ Though the adoption of this technique by the information institutions and the debate concerning the challenges and the matters related to privacy and information security, these Arab and foreign studies together confirm that information institutions facing these challenges and matters should not ignore the perspectives and the numerous advantages that IOT and its applications can offer. Both aspects should be carefully analyzed to achieve the best investment and the best benefits from this distinguished technique.

## **2. Defining IOT**

### **2.1 The concept of IOT**

The term IOT goes back approximately to twenty years before. Nevertheless, till now, there is no clear consensus from organizations and enterprises about this concept (Aruba, 2016:6). The main definition is that: IOT or the valuable Internet is inevitable. The result of the development of Internet has reached an unimaginable way after having been slow in its progression at the beginning of its creation (1:2017, (لطيف).

Recently, Internet has become more convenient for the practical world, so far because of the development of mobile devices and compact connection everywhere (Patel, Scholar, 2016: 6122). The concept of IOT was defined at first by Kevin Ashton who is a member of the Organization for Developing and Determining Wireless Frequencies. In 1999, commissioned from ARUBA, Kevin defined IOT as connected sensor mechanisms that behave in a way that resembles Internet via conducting specialized open connections with a freely participation of data permitting unexpected applications, so that the computer devices can understand the world all around and will become “the nervous system of humanity” (Aruba, 2016: 6). In 2005, in Tunis, during the organization of the ‘World Summit for Information Society’, the International Transmission Union suggested officially the term “Internet Of Things” (Liu, Sheng, 2011:392).

Another common definition of IOT was given as: a network of material objects, Internet is not just a network of computer devices, but it developed into a network of mechanisms from all types, dimensions, vehicles, smart phones, household machines, children toys, cameras, medical tools, industrial systems and animal, people, buildings, all of them connected, all information on communication and participation on the basis of stipulated protocols for creating an intelligent reorganization process and real-time monitoring, and also personal monitoring in real-time, and promotion via Internet,

monitoring in operations and management. IOT is specified in three categories: the first category ‘people to people’, the second one ‘people to machine’ and the third category ‘machine/ machine to things/ things, all that with an interaction via Internet (Patel, Scholar, 2016: 6122).

IOT is also defined as a big communication network that connects all things for the sake of allowing them to be connected at any time, in any place, with anything and any person using a pattern / network and service (Patel, Scholar, 2016: 6122).

## **2.2 IOT working principle**

IOT works through smart phones, other hand tools, and generations from data transfer services via the telephone, in addition to the use of programs that rely on a satellite system or through remote sensors. Researchers have been able in the domain of IOT to develop things and software and a language via Internet.. Things that work via Internet are all material felt things (smart things) that connect with each other via the network, and that can be defined on Internet via a clear stick and a fixed Internet title (IP) on a car, a television, Google glasses, diverse house ware such as refrigerators, washing machine, alert devices and house entrances and everything we wish monitoring with it or controlling it or dealing with it through their understanding via software, and sensors that can be connected to the network, so these things can collect and exchange data, and people in this situation are interconnected via Internet. It is also possible to monitor and control it via Internet by the application of



smart mobile phones. All these things in patterns and ways and in any place have become under control, and it is possible to manage them and control them through IOT via the mobile phone or any other means that can be connected to Internet (168: 2017, الأكلبي).

### 2.3 IOT characteristics

The essential characteristics of IOT are as follows (Partel, Scholar, 2016: 6123):

✓ **Interconnectivity:** it is related to IOT and it is possible to connect anything with the world infrastructure of information and communication.

✓ **Things – related services:** IOT can provide services related to things within restriction material things and virtual things connected to them. To provide services related to things within restriction, all technologies in the material and information world will be transformed.

✓ **Heterogeneity:** the devices available in IOT are heterogeneous on the basis of platforms and networks of various machines. They can interact with other devices or service platforms via various networks.

✓ **Dynamic changes:** the machines' state changes in a dynamic way, such as sleeping and waking up, connection and / or no connection, in addition to the pattern of devices including the site and the speed. Furthermore, the number of machines can change.

✓ **Enormous scale:** the number of machines that must be managed and that are interconnected at least in terms of volume will be bigger than the devices connected to

the present Internet. The most important aspect is the administration of the produced data and its explanation for the sake of practice; that is related to the significance of data, as well as competence in manipulating data.

✓ **Safety:** with the acquisition of benefits from IOT, we should not forget safety, as we are the innovators and recipients of IOT. We have to plan for safety; that includes safety of our personal data and safety of our physical health. We should insure the final points, networks, and data that move through all these means producing safe models that could expand their domain.

✓ **Connectivity:** it permits the possibility to reach the network and compatibility with it. Attaining the network is a step that provides common ability for consuming data and producing them (Partel, Scholar, 2016: 6123).

✓ It is possible for IOT to reinforce the coming wave of services that empower life through multiple sectors that reinforce the economy.

✓ Satisfying customers' needs may require world distribution models, in addition to world consistent services.

✓ IOT gives the opportunity for new commercial models that support the global world expansion.

✓ The majority of wills will be generated from the availability of services with added values, such as mobile phone networks' operators who work on building new capabilities for making new areas and benefit from their services.

✓ The behavior and uses of the machines will ask for new various requests on the mobile networks (GSMA, 2014:1).

✓ In addition to these advantages, the IOT is also characterized by:

✓ IOT contributes strongly to providing time, effort and money by enabling individuals and organizations to assure remote control on things by exploiting them efficiently, in addition to the exploitation of understanding between objects through sensors that may be generated via the Internet that has really created various results.

✓ IOT has freed man from time and place restrictions because he / she can administer things and use the latter through Internet protocols without being obliged to be present in the same place, and in most of the time without his / her direct intervention in case he / she gave instructions in advance (68: 2017, الأكلبي).

✓ IOT enables man to control various situations easily and efficiently up close or far by the use of things (169: 2017, الأكلبي).

✓ When the machines begin their 'discussion' with each other, it is possible to collect fruitful data in real-time and in different areas on work and procedures, and get a point of view at a glance. Relying on such situation, it is possible that the point of view leads to automatic response or provides intelligent information for decision, procedures and their application.

✓ IOT helps also in improving customers experience and employees' productivity (Chang, 2016: 2).

### 3. The areas for executing the IOT applications in the information institutions

The major objective for adopting the technique of IOT and getting started for benefitting from the advantages of its applications by the information institutions consist in facilitating the users' mission in their research of resources (Brian, 2014: 19). Nowadays, the information institutions attempt to determine the potential applications that they can adopt from this significant technique. A study led by OCLC in 2015 highlighted that the expected uses of IOT in the information institutions will be in general related to the smart uses of the space and the accompanying infrastructure (Stefanidis, Tsakonas, 2015: 1), that is to say that the information institutions with their actual orientation towards the use of IOT applications will be transformed from their actual passive managerial systems to a system known as 'smart information institutions' characterized by interaction between each of these: collection and users, users and services, users and foundation building, users and employees; that is interaction at a high level.

As follows, we will deal with the most important areas that will possibly carry out IOT applications in the information institutions.

#### 3.1 Smart building

This area deals with the information institutions as a building and a place. The buildings of smart information institutions consist of dissimilar systems, such as heating, aeration, air-conditioning, lighting,

safety and security (Chang, 2016: 5). In fact, “it is possible for engines and various devices in the information institution construction to apply a smart control and a global administration to the air-conditioning systems that can control toxic and harmful substances in the air. It can then introduce air-conditioning and cleansing. It is also possible through a control system to assure an automatic control in lighting, heat, temperature, humidity, and smart organization and noise control” (Wei, 2016: 26). It is also possible to provide natural lighting inside the building by equipping the latter with smart lighting devices connected to the network and that consists of light sensors outside, so that they may provide an appropriate environment and diminish the consumption of energy (37: 2019, عبد الزهرة). The intelligence of fire and security system may assure peace for individuals and for the building. The IOT technique in the smart information institution helps in detecting fire (Wei, 2016:26). In fact, when there is a fire in the information institution building and nobody is there to notice it, there is a fire alarm in the library which is connected to the network. An automatic message will be transmitted to the fire department. Professional and specialized agents who receive the message may take suitable decisions and dispositions at an early stage and will avoid damages (Bansel, 2018: 4). In general, this dimension is described as ‘smart environment’ and an environmental monitoring. It is possible for us inside the smart information building to differentiate

between two different aspects: the first is the environment, which is similar to the concept of green library that covers as an example the respect of indexing sustainable building systems, the administration of waste, the attraction of natural conditions, the loss of pollution, and the sustainable management of resources... The second aspect can be described as smart life which is related to buildings and means, such as the control of construction and its mastery, the control of electric devices, the personal safety, the healthy environment for employees and the public (Schopfel, 2018: 8). Such factors modify the information institution construction to a space for recovery thought.

This kind of environment encourages users to frequent constantly these institutions without weariness. We may add also that it is possible to change the actual buildings to smart constructions through merge, that is to say integrating the systems, the services and technology to serve users for a better preservation and administration. (37: 2019, عبد الزهرة )

### 3.2 Smart persons

It is clear that the creation of a building requires necessarily the existence of smart employees with competencies and careers development. The information institution employees are a part inseparable of the smart information institution. They are responsible for managing and offering the various services of the institution, and for responding to their users’ needs with high precision and as quickly as possible. We should mention that the smart institution does not only need



smart employees, but it also needs a smart user who can interact with flexibility with smart information services that are offered to him / her by the information institution. The smart user is considered as an active producer of knowledge, not as a passive information consumer. He/ she is a participative producer among the other users and / or employees. Developing, enrichment and exchanging information and knowledge are other terms that describe the role and work of the smart information institution's user. This institution offers a platform for rumors as a space for producing knowledge by employees and with them (Schopfel, 2018: 7).

### **3.3 Smart management**

It is possible for smart administration in a smart information institution to be characterized by taking initiatives, such as adding transparency in the administration and management system, encouraging the user to participate in the process of taking decisions and automatic procedures, in addition to the analysis of big data in real time concerning the use of the information institution to improve the quality of information institution strategies and decision making ... Thus, the user becomes a stakeholder in an information institution and participates in the management of this institution (Schopfel, 2018: 8).

### **3.4 Smart services**

We can describe this aspect as the application of 'the spirit of innovation' in the smart information institutions for improving their services. Some studies describe the

smart information institutions' services as technological communication and information systems based on information institution for the search of information resources, their retrieval, and the construction of collaborating collections... Among the other aspects related to the smart information institutions' services, we may mention the possibility of interoperability with the other information services (Schopfel, 2018: 6). The information institutions' services on which we may apply the technique of IOT, and that may reach the level of smart information services are:

- **Reaching information institutions and their resources:** Through their use of mobile phone applications, the information institutions may provide an affiliation card to their subscribers; that will allow the latter to reach the information institution and use its resources. When the user reaches the institution catalog to determine the resource location, the wanted resource, the information institution application will be stored on the user's mobile phone; that will provide a map to the information institution to orientate the user to the site with the resource location. Supplementary information may also be provided concerning the resource through connection with the electronic site Amazon, so that several detailed information about the resource may reach the user before borrowing the document (Pajar, Satyanarayana, 2015: 188).
- **Managing the collections:** The information institution collections that bear the mark RFID on each of its items can be

represented virtually; that may be determined by the use of computerized devices and RFID couplers. The RFID cards will be merged with the information institution affiliation cards; that facilitates the circulation of the collection items and their good gathering. IOT can inform the users about the late books and the fine amount they owe it to the information institution; that will push them to return the books via Internet avoiding queuing in offices. The smart digital shelves can assure the promotion of contents on the basis of the users' loan records and the search record on the net. IOT also helps in improving the inventory management (stock check); that facilitates the identification of books that are not in their location (Pajar, Satyanarayana, 2015: 188).

- **Information literacy:** The expansion of information literacy will be assured. The information institution will look for new users to sensitize them about the institution, its resources and services. IOT can help information institutions in presenting a personal virtual trip around the information institution. The latter possesses beacons, such as wireless devices in the different departments of the institutions. When the users visit a specific department, their mobile phone will show a section of video or a sound that explains and gives more information about the department and how it is possible to benefit from it. This video may show a fruitful experiment about special collections, such as manuscripts through the provision of a digital link on their mobile

phones with instructions on how to reach really these resources (Pajar, Satyanarayana, 2015: 188 – 189).

- **Recommendation service:** IOT allows users to make specific recommendations, to use real-time data in relation with the date of their borrowing. When a researcher makes a search through a data-basis about information resources related to his research topic, it will be possible to suggest other resources around his subject; that may be important for the user whenever he / she visits the information institution in future or finds himself / herself near the information institution. IOT can inform on the one hand the user about new acquisitions in the field of his / her research, and, on the other hand, when the document he was looking for last time was borrowed, and is now available ((Pajar, Satyanarayana, 2015: 189).

- **Location based service:** IOT will help information institutions by offering services related to the site if users have created their preferred list in the information institution catalog using their account from home or from their office. The users can then join the information institution using their mobile device that highlights the technique of IOT. The user can get orientations about the collections because the preferred books have been put on shelves. He / she can be helped in identifying the interesting available titles on his topic, and those that are lent. The information institutions may give information about the situation of the reading rooms, the discussion rooms, the printers, scanners, computers ... ; that may be

projected for hours during rush hours or regular periods on the information institution site. The users can check using the information institution applications on their mobile ((Pajar, Satyanarayana, 2015: 189).

- **Managing the devices:** IOT can help information institutions and their users in managing the available devices in a better way, and consequently reducing the energy costs. Similar things may be observed in some information institutions, but these matters can be enlarged not only to the institution employees, but also to the users. Let us imagine users performing management in the information institution using a compartment or a reading table exploiting their mobile functioning with the technique of IOT. They will be able to control lighting, air-conditioning, Wi-Fi ... (Pajar, Satyanarayana, 2015: 189).

- **Relying on themselves in borrowing / returning books:** By using a subsystem personal service for RFID technique, people are no longer obliged to open a title page and clear button bar for each book, or borrowing / returning other resources, or completing a spontaneous operation, or simplifying dispositions, or improving the work more efficiently because the RFID with a personal service device can work 24 hours without employees. Thus, one can notice that this technique will reinforce tremendously library services and the efficiency of book circulation and other resources (Liu, Scheng, 2011: 394).

- **Finding resources rapidly:** We have the mobile search and the fixed search. The mobile search consists in inserting research information from multiple books in RFID mobile station to find information related to our research. The fixed search is the search for resources via RFID couplers, the computer and wireless LAN connections. This technique is used for determining the RFID wireless site; here, you can find out quickly the resource determined site in the information institution. Consequently, you will avoid the 'wrong site' – it is possible to return the resources, but you cannot find them – (Lin, Scheng, 2011: 394 – 395).
- **To complete inventorying the long, quick, big and precise resource distances:** It is possible for IOT to improve the inventory efficiency, limit the work effort resulting from dealing with resources, data download, and user interface management for graphs and highlight the great advantages of the RFID technique (Liu, Scheng, 2011: 395).
- **To achieve detecting theft sources:** You can discover the security of sources through automatic detection from the fixed programs on the computer. The devices consist of RFID circuits, light, sound alarm, antenna security. These devices may also have the function of identification through long distances (that can reach two meters), the quick identification, light and sound alarm, false error report (Liu, Scheng, 2011: 395).
- **The use of RFID technique allows the activation.** It is similar to the library card for using the information institution services at any time, without worry about whether they

carry readers' cards or not from the part of the administration (Liu, Scheng, 2011: 395).

- **The mobile reference service:** That is the type of applications that contribute in developing the reference services in information institutions. They permit to the user to present reference questions and to get answers from the inside of the information institution or the outside of it. A discussion with the employee of the information institution is possible; that is one of the mobile reference services. In addition to the discussion, the transmission of questions and the reception of responses, the user is authorized by virtue of his membership to get the paper or the item he / she needs in an electronic format through the mobile reference services which accept the operation after recognition of the user and making sure about his identity. The digital content will be transmitted to his / her device for consultation and reading only, and not for conservation or printing or copying for the protection of intellectual property rights. The employee availability in the lobbies of the information institution during monitoring or presenting any help are parts of the mobile of services because the user can realize all the activities related to borrowing, returning, reserving and searching in the users' information institution catalog. Thanks to the mobile palm devices connected to IOT, they can have access to the loan service headquarters (173-174: 2017, الأكلبي).

We may mention that information institutions can carry out these applications only if they are equipped with the suitable

technical infrastructure, such as the sensors, the users, services and programs (Stefanidis, Tsakonas, 2015: 1).

We may highlight the major examples and leading models in the information institutions in executing the IOT applications. The most popular is the experience of Orlando Public Library which succeeded in Nov. 2014 in applying the Bluubeam technique consisting in transmitting information about the site to the users. The latter who use the library applications receive an alert about the presentations and the activities of the library. As an example, if the user looks for a cookbook, he will also get a program 'the kitchen corner' in the library that contains presentations on local kebab. More than 30 libraries in the USA accepted to apply the Bluubeam technique. One of the libraries uses this technique to the new films presented the same day. Another library informed the users about free computer workshops and bookselling. Another enterprise in technology possessing Capira succeeded to attract 100 customers from libraries. Two of these libraries remind the users concerning the late books and the items that are available for reception whenever they are returned to the library (Pajar, Satyanarayana, 2015: 189). Sarmah (2015) also described that Orlando Public Library used Bluubeam, and the iBeacon technique from Apple to transmit information. It also informed them about the services that correspond to their interests, sent alerts about library presentations and activities. Users enter the library to which they are

subscribers (Chang, 2016: 7-8). It is possible for IOT sponsors to expect from information institutions the provision of a reference layer and connect things with resources that can be taught, explained or to be used in its context (Chang, 2016: 9).

#### 4. The future of information institutions

Some people may be careful or afraid from the prospective development of IOT where information institutions are asked to do more work. Modern services attempt to enlarge the request domain. The interruption of the technique does not always end with the expected result in terms of service efficiency. However, the technological promise may reach its aim (Hahn, 2017: 7). Information institutions need to take care about several issues before jumping into the IOT vehicle:

- \* **Firstly:** privacy and safety of users' data because the latter can participate with a third party; that will lead to hacking.
- \* **Secondly:** the costs in investing in IOT in terms of money, work-force and time.
- \* **Thirdly:** training employees which is related to the movement back of the use of the material information institution. The latter cares about human resources. The provision of training, awareness about privacy and data safety, in addition to technical infrastructure will be able to valorize IOT and enrich information institution services (Pajar, Satyanarayana, 2015: 190).

IOT applications in information institutions can be summarized in producing 'smart information institutions', that is to say institutions based on smart buildings. In the near future, people will notice absolutely the

deep changes generated by IOT at any time and any place in the domain of information institution management (Liu, Sheng, 2011: 395), above all when users begin imagining the means and facilities that IOT can provide to them, and improve its application to smart information services (Chang, 2016: 14).

#### 5. Conclusion

The study reached the following results:

- ✓ Information services represent the most important domains for carrying out IOT practical applications in information institutions.
- ✓ Information institutions orientations of their investment in IOT applications will take place step by step due to the big financial costs needed by the actual information institutions buildings to be transformed to smart information institutions buildings that are ready and able to execute the applications of IOT with quality and a required level.
- ✓ This transition and this orientation towards investment in IOT applications push information institutions to care about a set of challenges and matters.
- ✓ Investing in IOT applications needs from information institutions to prepare training sessions for their professionals around this new technique. Efficiency and intelligence in using these applications will help professionals to provide smart information services for their users.

Though IOT faces challenges and complex matters not yet solved, this new technique bodes for a good future. Information institutions should make tremendous efforts to succeed in their transition. Human,



material and financial resources are certainly required in order to enhance these institutions and their professionals for more work and more investment in all areas. They know that thanks to this new technique, they will acquire a fruitful added-value in their management of these information institutions. Smart information services should be their new perspective and their first priority.

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