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Factors of Success by Using IoT in project management

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ABSTRACT

The Internet is a relatively recent project that has not been completed for a very long time; it has grown to capture the interest of individuals, organizations, and governments all over the world; it has given rise to a new concept, the Internet of Things (IoT), which incorporates many forms of technology into nearly every aspect of modern existence. Every year, developers bring new apps and services to the Internet of Things. This project was supposed to be expanded because of the overwhelming interest. There are many fundamental and crucial problems with implementing IoT in PM. Incorporating IoT into project management may succeed or fail depending on these crucial variables. Successful application of the Internet of Things in project management is examined, along with the key issues and vital aspects that contribute to its implementation.

Keywords: Factors; IoT; success ; Internet of Things.

1. Introduction

The expression "Internet of Things" (IoT) is now often used (Hassan, 2018). In 1999, British innovator Kevin Ashton employed it for the first time when he established the MIT Auto-ID Centre. Recent years have seen a surge in coverage of the Internet of Things (IoT) across all media platforms, from mainstream publications to technical journals and professional engineering communities. Many new types of networked devices, systems, and sensors are now feasible because of advancements in processing power, electronics miniaturization, and network connections. Several conferences, papers, and news articles have been devoted to debating the possible implications of the "IoT revolution," which includes anything from new market opportunities and business models to questions about security, privacy, and technical compatibility (Rose, 2015).

However, the term "Internet of Things" has not yet been defined with any precision. Considering the significance of functionality and identity in the loT, the term "Things have identities and virtual personalities functioning in smart environments using intelligent interfaces to engage and communicate within social, environmental, and user contexts" is an accurate description of the loT. Alternatively, there is the idea of "interconnected items having an active role in what might be labeled Future Internet" (Tan, 2010).

A network in which commonplace items like smartphones, refrigerators, washing machines, and even entire buildings are outfitted with sensors and network connectivity in order to automatically collect, transmit, analyze, and act on data is what is meant by the "Internet of things" (IoT) (Hsu, 2018).

The study's goal is to establish what factors influence the degree to which the Internet of Things is adopted and implemented in Bahrain's IT sector. This research investigates the factors that impact the prosperity of an IoT deployment. The findings of this study also help businesses better understand the features, functions, and critical elements they need to consider while introducing IoT throughout their various departments.

2. Background of the problem

Many successful businesses nowadays actively seek out cutting-edge tools to improve their productivity and competitiveness. A company's productivity may be boosted by implementing an Internet of Things program. Boosting a company's internal and external performance is a

top priority, and the Internet of Things is a key enabler of this goal. Perhaps the reluctance of business managers to embrace the Internet of Things is due to their ignorance of its underlying architecture and the ways in which an organization might make the Internet of Things work for it. Across

Our analysis of the available literature allowed us to determine the critical factors that influence the spread of IoT. The focus of my research is on identifying the critical factors that determine the level of success that a business has while using IoT solutions.

3. IoT in project management role

Over the course of a project's lifetime, the responsibilities placed on the project manager gradually decrease. When deciding whether or not to adopt a potentially disruptive technology, it's crucial to weigh all of the potential benefits and drawbacks. Project management isn't immune to the far-reaching implications that the Internet of Things will have on all fields of work. The participants in the focus group reached a consensus on two points: (1) the function of the project manager has been fundamentally altered for the better as a result of technological improvements, and (2) the aim of technology is to aid humans, not replace them. Success was found in the following areas: simplification of critical procedures; improved communication and interaction with stakeholders and, most importantly, with team members; and increased acceptance of the team's findings and conclusions. Making decisions and carrying out procedures is typically a time-consuming struggle hampered by bureaucratic delays, information shortages that prevent complete analysis and formulation, and an overall inability to bring about meaningful cooperation and communication amongst interested parties. With the help of today's technological advancements, however, the project manager may eliminate the risks and maximize his efficiency, leading to the timely and successful completion of all projects. Having access to a wealth of data might be a double-edged sword if you don't know how to use it safely. All parties involved came to an understanding that team members would have more say in project decisions and access to more information than upper management. Project managers should treat the Internet of Things' potentially dangerous abundance of data with caution. Finally, it is important to note that respondents emphasized the need of having the appropriate skill set, which should include both new and creative enabling technologies linked with IoT applications and the IT ecosystem in general, as well as more traditional approaches. You'll need to learn something new if you want to

deploy Internet of Things applications that use the full potential of the network. It is imperative that you keep your strong soft skills up to date while also being able to take advantage of the new IT grid and environment (Hurtoi, 2020).

Cost savings, decreased downtime, less waste, increased productivity, and the ability to better predict human needs are just some of the ways in which the Internet of Things (IoT) will affect project management. These projects will require greater attention to maintenance, security, and monitoring over time, so project managers should plan for longer and more intensive in-person interactions. If you want your Internet of Things (IoT) project to be a success, you should give equal weight to the business and the technology, pay close attention to security and privacy threats, always have an exit strategy or a plan B, plan better risk management (including vendor risk), make it easy to replace or update the IoT components, and get buy-in from across the organization. A project manager's ability to effectively handle an Internet of Things project is dependent on their ability to keep these considerations in mind (Prasher, 2018).

4. Factors of success or failure of IoT

On the occasion of the IoT World Forum 2017, the company also released the results of a survey that looked at the success and failure rates of IoT projects and initiatives, as well as the conditions for IoT success in an era when IoT is increasingly present in the digital transformation strategy journeys of ample organizations. More over three-quarters (74%) of organizations questioned by Cisco had failed Internet of Things projects. This is because there are a lot of human considerations that go into deploying the Internet of Things beyond the technical aspects of sensors and networks. In order to realize the benefits of the Internet of Things, your company must first establish a culture of technology and then guarantee that all of its components function together smoothly (Prasher, 2020). In Table 1, we see the factors that can make or break the Internet of Things.

Table 1. Factors that cause success or failure of IoT.

No.	**Factors that cause success**
1	Allocating hardware specs
2	Estimate and figure out all costs
3	Implementation of security and governance

4	Improve IoT project continuously
5	Intuitive users experience
6	Focus on the Business Challenge
7	Enable scalable data management & analytics
8	Design-in security
9	Plan for flexible device management
10	Strategic Planning before Deploying
11	Collaboration:
12	clearly defined goals
13	competent project manager
14	sufficient resource allocation
15	adequate communication channels
16	control mechanisms
17	feedback capabilities
18	Responsiveness to clients
19	Leadership
20	Firm size

5. Methodology

The flowchart in Figure 1 shows the study flowchart, which demonstrates the sequential phases used to carry out this study.

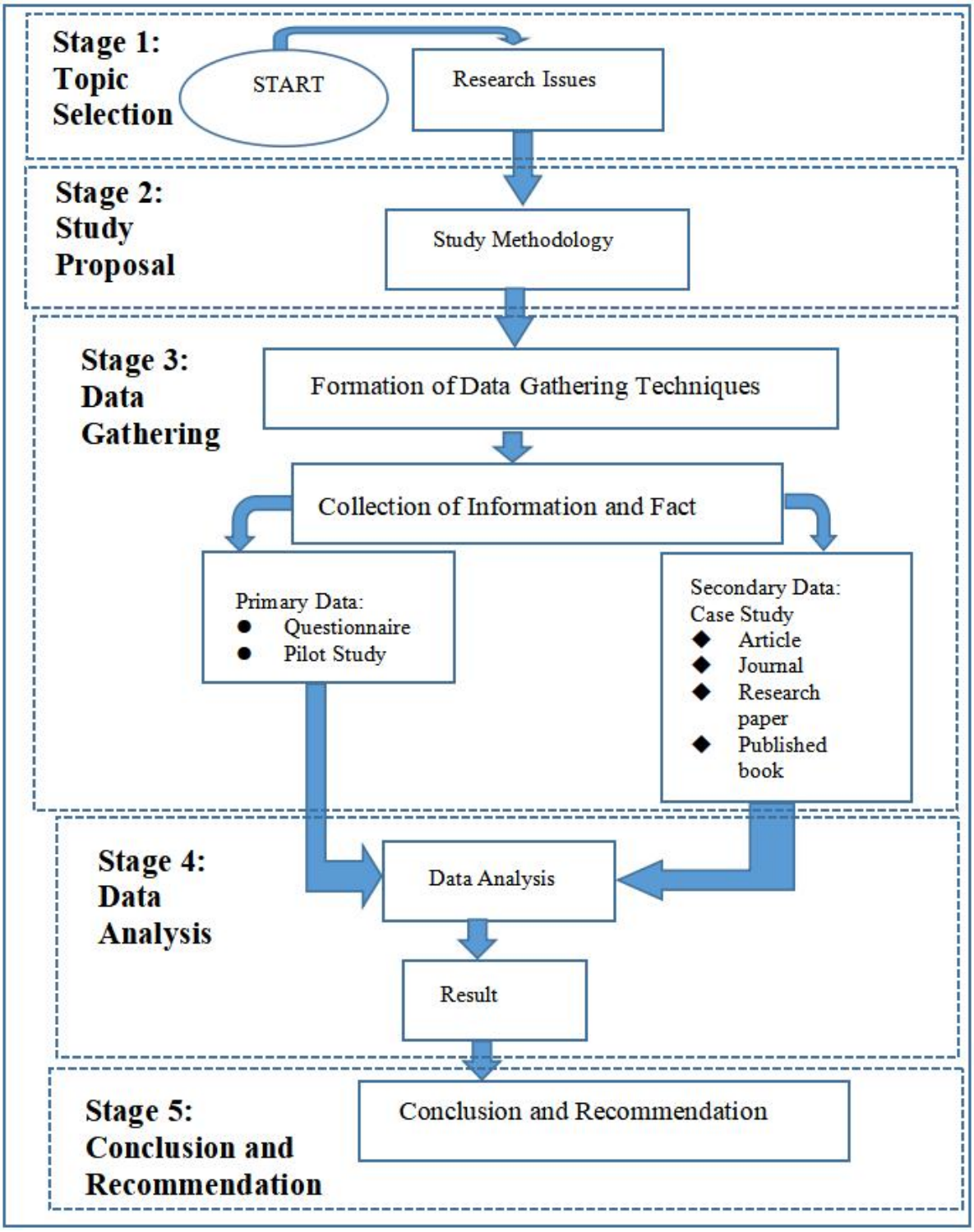

Figure 1: Flow Chart of Methodology

6. Data Analysis

SPSS was used for the data analysis (Statistical Package for Social Software). Microsoft Excel was also utilized to create aesthetically pleasing tables and charts to present the results.

6.1 Quantitative data analysis

Questionnaire data is analyzed using SPSS. Quantitative methods like the T-test, descriptive mean, frequencies, and the ANOVA (Analysis of Variance) test were employed to examine the data. The survey findings were compared to what was already known in the field.

6.2 Discussion

The discussion examined in more detail the findings of research carried out by the analysis of data obtained from various types of tests.

6.3 Result

We discuss here the analysis of the data and the result obtained from the random distribution of the questionnaire to 439 respondents based on the study conducted in Bahrain. This study received answers from 439 sets of questionnaires to identify the main factors using the Internet of Things in project management and to determine the level of importance of each factor.

Table 2. shows the frequency and percentage on gender of the respondents.and figure 2. shows that totally 439 respondents, 185 of respondents were female and 254 were male.

Table 2. Respondent Gender Information

Personal Information	**Detail**	**Frequency**	**Percentage (%)**
Gender	Male	254	57.9
	Female	185	42.1
	Total	**439**	**100**

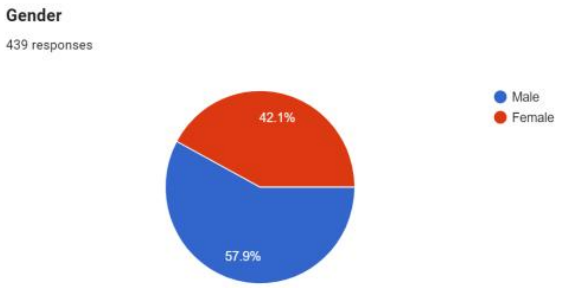

Figure 2 Percentage of Respondent Categorized by Gender

7. Analysis on Success factors of using IoT on project management

Ranking analysis was conducted on Success factors of using IoT on project management. As we know, success factors are important for any project cause manager need their project to success. As in the questionnaire constructed, the first question talk about Data sensitivity needs to be considered carefully to make IoT-based connected enterprise implementation successful to see the opinions how effect of data of success the project. Adding new capabilities and functionalities for a successful and powerful IoT implementation is a second question to know how it effect on success of the project. The third question asking about the Network design is critical to a successful deployment of an IoT system as it allows devices that communicate with each other over one network connection and how it effects on success of the project. From size is a key of success for using IoT was the fourth question to determine how is the size of organization is important for success of the project. Then the fifth question asking about if once all forms of hardware's and sufficient resource are allocated and determined all kinds of costs then the organization is success to use IoT is make the project success? the sixth question IoT security in your organization must be aligned with proper channels of existing corporate policies and other security practices. Then the seventh one is Ensure that the organization is ready to make improvements as they arise, and prepare the users and improve their efficiency over time during the project are the way to success of using IoT to asking if the training and courses is important to success the project. In eighth question Enable scalable data management & analytic, Design-in security as part of a holistic strategy and Plan for flexible device management are important to success for Using IoT. The ninth question Companies need to focus their investments on their Strategic Planning before Deploying and collaborate with other organizations to amplify the value and create successful customer outcomes. Then the tenth one talking about Focus on the Business Challenge and clearly defined goals of the organization are the most important keys for success to using IoT. The eleventh question asking about if Regular feedback and Responsiveness to clients are essential to help improve the product and it is a key for success to using IoT. And the last question is Leaders are more aggressive about pursuing a greater number, scope, and variety of IoT applications and use cases than their less successful peers to know the rule of the leaders of project success. Table 4.12 presents the results of the first question: what are the factors available causing success for using IoT on project management".

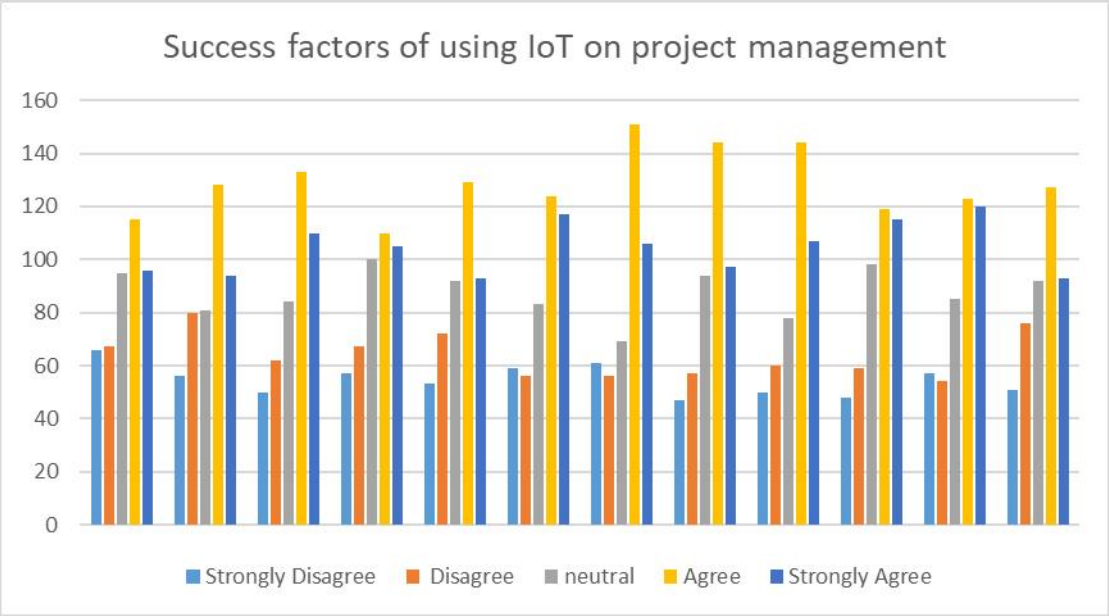

Figure 3 Ranking Distribution of Success factors of using IoT on project management

8. Conclusions:

Through the results of the study, we can summarize the factors affecting the use of the Internet of Things in project management, as shown in the table3

Based on results of the analysis as shown in Table 4.13 and Figure 4.11, respondents perceived that there is Success factors of using IoT on project management, these results suggest that the first highest rating is Companies need to focus their investments on their Strategic Planning before Deploying and collaborate with other organizations to amplify the value and create successful customer outcomes in mean (3.45) and in standard deviation (1.30).

Second highest ranking is about the Focus on the Business Challenge and clearly defined goals of the organization are the most important keys for success to using IoT, in mean (3.44) and in standard deviation (1.30).

The third highest ranking of Success factors of using IoT on project management is Network design is critical to a successful deployment of an IoT system as it allows devices that communicate with each other over one network connection, in mean (3.44) and in standard deviation (1.30).

The last ranking of Success factors of using IoT on project management is data sensitivity needs to be considered carefully to make IoT-based connected enterprise implementation successful, in mean (3.25) and in standard deviation (1.35).

As the analysis shows from the results of the fourth hypothesis: " Prior knowledge of the factors affecting the success or failure of the use of the Internet of things helps to MIS (Management Information Systems) department to avoid the factors causing failure to use IoT" The success factors can be ranked as shown in table 2.

Table 2 Factors of success placed on order

No.	Factors of Success
1	Strategic Planning before Deploying
2	Collaboration
3	Focus on the Business Challenge
4	clearly defined goals
5	adequate communication channels
6	control mechanisms
7	Responsiveness to clients
8	Enable scalable data management & analytics
9	Design-in security
10	Allocating hardware specs
11	Intuitive users experience
12	Implementation of security and governance
13	Firm size
14	Estimate and figure out all costs
15	sufficient resource allocation
16	competent project manager
17	Leadership
18	Plan for flexible device management
19	feedback capabilities
20	Improve IoT project continuously

9. Summary

We analyze the criteria and critical success aspects that project management plays in the rollout of an Internet of Things project. Several factors contribute to the success of an Internet of Things project; if the management or end users of the project don't pay attention to these factors, the project will fail. We also discuss methods for determining how many and what kind of respondents are necessary to carry out a confidential data collection exercise. Results from this study will serve as warnings to would-be adopters of IoT in project management by drawing attention to the most crucial aspects of this field. This is followed by a brief summary of the entire study.

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