Critical Factors of Failure and Success of Using IoT in Project Management

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ABSTRACT

The Internet is a relatively new endeavor that has had a significant in development for a considerable time but has yet to be finished. It has developed to the point that it piques the attention of people, organizations, and governments all around the globe. It has resulted in development of a novel idea known as the Internet of Things (IoT), which incorporates several types of technological advancement into almost every facet of contemporary life. New services of the Internet of Things (IoT) are developed yearly. This project will need more resources since it is such a strong demand. The Internet of Things in PM is being implemented, but several primary and vital concerns hamper it. Depending on these critical elements, the Internet of Things (IoT) in project management may succeed. Using the Internet of Things in project management raises several important questions and concerns, as well as vital considerations and elements contributing to its success or failure.

Keywords-Factors; IoT; Critical; Success; Failure; Internet of Things.

1. Introduction

According to Hassan et al. (2018), the term Internet of Things (IoT) is becoming daily more popular. The British technology pioneer Kevin Ashton, who was responsible for developing the Auto-ID Centre at the Massachusetts Institute of Technology, was the one who utilized it for the first time in 1999. The Internet of Things, sometimes known as IoT, has emerged as a subject of significant interest in recent months, both in mainstream and technical engineering press. Due to developments in processing capacity, reductions in the size of electronic components, and enhancements in network connections, this technology has made it feasible to create a broad range of networked goods, systems, and sensors. The Effect of the "Internet of Things revolution" has been the focus of several recent conferences, papers, and news pieces (Rose et al., 2015). These events have included discussions and debates on various issues, including opportunities, business, and security, privacy, and technology. The term "Internet of Things" has not yet been defined clearly and comprehensively. The Internet of Things may be characterized as "Things that have identities and virtual personalities working in smart spaces using intelligent interfaces to interact and communicate within the confines of society, the environment, and individual users," which is a realistic definition considering the significance of functionality and identity in the IoT. An alternate notion emphasizing seamless integration is "interconnected items having an active role in what might be dubbed Future Internet" (Tan et al., 2010).

The purpose of this research is to investigate the elements that have a role in the extent of IoT acceptance and deployment within Bahrain's information technology industry. The factors that caused the failure or success of an Internet of Things installation are investigated in this study. In addition, this study contributes to a better understanding of the characteristics, functions, and essential factors that companies need to consider before deploying IoT in their different departments.

2. Literature Review

Consider the Internet of Things as a component of the operation of a business; this literature study investigates what elements influence the success or failure of IoT initiatives and what factors lead IoT projects to succeed. It is vital to examine the previously stated elements that affect the adoption of IoT by organizations and consumers globally to think of the Internet of Things as a business component. Failing to do so will prevent you from thinking of the Internet of Things as a business component. Because the Internet of Things is an established technology, it is continuously subject to new developments and advancements shaped by various commercial,

environmental, and organizational considerations. These considerations affect the likelihood that many companies will embrace this area. Several academics offered a variety of studies that explained the reasons behind the postponements of IoT's acceptance. At the top of the list of these reasons was a need for more awareness about IoT and its capabilities and a minimum grasp of its value in several industries. (Ahmad and colleagues 2008).

The desire to adopt ten independent elements is the criterion that influences the Internet of Things (IoT). These ten factors are as follows: technical readiness, management support, size of business, security and cost savings (Olushola and co-workers, 2019). Radio frequency identification (RFID), wireless sensor networks (WSN), middleware, cloud computing, and IoT application software are the top five technologies that are needed for the successful implementation of Internet of Things-based goods and services (Prasher et al., 2020). RFID stands for radio frequency identification, while WSN stands for wireless sensor networks.

Table 1. Summary of Literature Reviews.

Authors	Title	Description
(Prasher, 2020)	The Revolution Caused by the Internet of Things (IoT) and How to Overcome Management Obstacles	give in-depth information about the various IoT management philosophies, tools, and problems, as well as the benefits and drawbacks of each, as well as how to scale them in order to increase the percentage of successful projects.
(Olushola, 2019)	Factors affecting IoT adoption	explores some of the factors affecting IoT adoption, analyzing the determinants, other challenges, gaps, and future IoT developments provides overview of
(Prasher, 2018)	Internet of Things (IoT) and Changing Face of Project Management	IoT concepts and through a systematic review of scholarly research papers, blogs, review articles and other online literature, it addresses the current managerial challenges for such projects.
(Nnaji, 2021)	Critical Success Factors Influencing Wearable Sensing Device Implementation in the AEC Industry	investigates the success factors (SFs) for implementing wearable sensing devices (WSDs) for safety and health monitoring within the construction industry
(Mohanty, 2022)	An analysis of the most important variables for success in mitigating the hazards to users' privacy posed by IoT devices	determine the most effective ways to protect users' privacy while using IoT devices. An strategy that is centered on the user is used in order to provide users more power and freedom. After conducting an in-depth review of the relevant literature, a synthesis and compilation of the important success elements necessary to reduce hazards in IoT devices were carried out.
(Hakim, 2021)	The following are some of the most important factors that will casued the success of using the Internet of Things (IoT) in automotive companies: Literature Review	discussed literature review related to the introduction of Industry 4.0 in the industrial sector requires a Critical Success Factor (CSF).
(Hughes, 2021)	An organizational information security framework for human factors that is applicable to the internet of things	should be developed to address the human factor, which is a serious vulnerability in the information security of an organization's internet of things that has to be addressed. This framework should include countermeasures that can help prevent or reduce data breach incidents that are caused by human factors.

This research contributed toward assisting MIS managers in knowing the success and failure elements of utilizing IoT in their firms so that they could take care of it while using it on their tasks. This research aimed to determine the elements that contribute to any project's success or failure. This study's all-encompassing analysis adds to the body of previously conducted research by identifying the value of uncovering the most frequent variables of success and failure of leveraging the Internet of Things on project management from every conceivable angle. A holistic analysis of the relative importance of these qualities still needs to be completed. The findings of the research will be disseminated to organizations in the public and private sectors, with a particular emphasis on departments that are involved with the use of the Internet of Things in practice, in order to call attention to the elements that are most often associated with the success or failure of implementing IoT.

3. Background of the problem

Businesses typically look for cutting-edge technology that increases efficiency and work efficiency to increase their chances of long-term success and expansion. The Internet of Things is a cutting-edge piece of software that can improve an organization's overall level of productivity. The Internet of Things facilitates and enhances the overall performance of a company's internal and external operations. Business executives hesitated to embrace IoT because they felt they required a deeper understanding of the technology's underlying architecture and how IoT might be implemented successfully inside an organization. utilizing

After going through the available research, we determined the most significant factors and qualities driving the adoption of IoT. This research investigates the significant factors that play a role in businesses adopting the Internet of Things.

4. IoT in a project management role

During a project, the demands placed on the management of the project will gradually decrease. Giving equal weight to the advantages and disadvantages that may result from implementing a potentially transformative technology is essential. The Internet of Things will have far-reaching implications on all business areas, including project management, during the next several years. The participants in the discussion group reached a consensus on two points: first, that the function of the project manager has been fundamentally changed for the better due to technological improvements, and second, that technology aims to aid people, not to replace them. They could make headway in the following areas:

- Critical processes were streamlined.
- Communication and engagement with stakeholders and, more importantly, with team members were improved.
- The results and conclusions reached by the team were received with a higher level of approval.

Making choices and following processes is often a time-consuming agony plagued by bureaucratic delays, information gaps that prevent thorough analysis and formulation, and a general inability to bring about practical collaboration and communication amongst interested parties. As a result, this may be a challenging endeavor. However, with the help of today's technology, not only will all of the unknowns be eliminated, but the project manager will also be able to function at full capacity while preserving high levels of productivity, which will lead to the timely and successful completion of all projects. It is essential to remember that possessing a large amount of information might be hazardous if it is not managed suitably. They agreed to give the team members greater decision-making power over the projects and more access to information than the management. The enormous quantity of information made accessible to project managers by the Internet of Things must be considered a risk and handled following this perception.

In conclusion, it is essential to point out that respondents emphasized the need for the appropriate skill set. This skill set should include innovative and creative supporting technologies associated with Internet of Things applications and the IT ecosystem, in addition to more traditional techniques. You must learn new knowledge to implement apps that use the "full power" of the Internet of Things. According to Hurtoi et al.'s research from 2020, you need to keep your hard and soft skills up to date while also ensuring that you can benefit from the new information technology grid and surroundings.

The Internet of Things (IoT) will affect some aspects of project management, such as cost savings, reduced downtime, decreased waste, increased productivity, and the ability to estimate human requirements better.

Because these projects will need greater attention over time on maintenance, security, and monitoring, the project managers need to plan for more prolonged and more thorough in-person interactions. This will make it possible for them to cater to the requirements of the project better. A successful Internet of Things (IoT) project will prioritize both the business and the technology, will pay close attention to security and privacy threats, will always have an exit strategy or a plan B, will plan better risk management (including vendor risk), will make it easy to replace or update the IoT components, and will have buy-in from across the organization. These are the characteristics of a successful project. According to Prasher et al. (2018), a project manager navigating an Internet of Things project may benefit from considering the abovementioned criteria.

5. Research Questions:

Q1: What are the factors causing success in using IoT

Q2: What are the factors causing failure in using IoT

Q3: What do the organization and department need to inform about the most critical factors of success and failure of IoT implementation?

Q4: What do departments and organizations benefit from knowing the success and failure factors of IoT implementation?

6. Research Hypotheses:

H1: Factors of success in using IoT have a positive significant impact.

H2: Factors Failure to use IoT has a significant negative impact.

H3: Prior knowledge of the factors causing the success or failure of using the Internet of Things helps project managers exercise caution while managing projects.

H4: Prior knowledge of the factors that cause success or failure in using the Internet of Things helps the MIS (Management Information Systems) department avoid the factors causing failure to use IoT.

7. Objectives:

- To investigate factors that cause success or failure using IoT in Bahrain.
- To determine the priority of the selected factors that cause the success or failure of IoT implementation in Bahrain.
- To suggest the improvements to factors currently used in determining which affect the success or failure of IoT implementation in Bahrain.

8. Limitation of Scope

The information technology businesses in Bahrain will take part in this research. Utilizing a survey, meetings, and a questionnaire containing critical questions about the determinants of failure and success to use IOT in project management to get insight into the perspective of MIS managers on the factors of success and failure to utilize IOT in their respective firms. After that, the data collected from the questionnaire will be evaluated using the SPSS (Statistical Package for the Social Sciences) program so that the findings of this research may be presented.

9. Significance of Study

This research helped MIS managers learn the causes of success and failure when it comes to adopting IoT in their firms so that they may take care while using it on their tasks. This research aimed to ascertain, from the perspective of project management, the elements responsible for any project's success or failure. This study's all-encompassing analysis adds to the body of previously conducted research by identifying the value of uncovering the most frequent variables of success and failure of leveraging the Internet of Things on project management from every conceivable angle. A holistic analysis of the relative importance of these qualities still needs to be completed. The findings of the research will be disseminated to organizations in the public and private sectors, with a particular emphasis on departments that are involved with putting into action the Internet of Things, in

order to call attention to the elements that are most often associated with the success or failure of implementing IoT.

10. Critical Factors of Using IoT

Before even contemplating the Internet of Things as a component of a company, it is essential to understand the factors previously identified as impacting the adoption of IoT by companies and consumers throughout the globe. The Internet of Things (IoT) is a new technology susceptible to continuous change and development due to external corporate, environmental, and institutional factors. Because of these issues, it is improbable that many companies would enter this market. According to many studies published by various academics (Ahmad H, 2021): "One of the primary reasons for the delays in IoT's acceptance is the lack of expertise in IoT and its features, as well as little comprehension of its value in many industries."

Several challenges must be surmounted before the Internet of Things becomes a reality. These challenges include those connected to processing of data, architecture, communication, discovery, addressing, administration of data, privacy, and safety. Challenges associated with the Internet of Things include scalability, device heterogeneity, energy-optimized solutions, ubiquitous data exchange via wireless technologies, localization, and tracking capabilities, embedded security and privacy-preserving mechanisms, self-organizing capabilities, semantic interoperability, and data management. According to Olushola (2019), the amount of consumer-related data, points of access, and tradeoffs in advantages connected with the Internet of Things (IoT), as well as human-related challenges with user experience, are all factors that contribute to an increase in the difficulty that management has with maintaining privacy.

In an agile (Internet of Things software) ecosystem, both the technical elements (such as requirement volatility, requirement quality, technical dependence, and non-functional requirement) and the non-technical aspects (such as communication, documentation, domain, hardware, and customer engagement) are continually affecting the environment.

10. Factors of success or failure of IoT

IoT World Forum 2017 was the occasion on which the company also released data from a survey that looked at the success and failure rate of Internet of Things projects and initiatives, as well as the conditions for IoT success in a time when IoT is increasingly present in the digital transformation strategy journeys of ample organizations. The company conducted this survey. According to data recently made public by Cisco, the Internet of Things (IoT) projects of 74% of the assessed firms still have room for improvement. This is primarily because the installation of the Internet of Things involves several human variables in addition to the functional parts of sensors and networks. To succeed, it is necessary to establish a culture of technology inside the firm and cultivate practical cooperation and integration among all the components of the Internet of Things (Prasher, 2020). The variables that contribute to the failure or success of the Internet of Things are outlined in Table 2.

Table 2. Factors that cause the failure or success of IoT.

No.	Factors that cause success	Factors that cause failure
1	Allocating hardware specs	Regulatory support
2	Estimate and figure out all costs	Managing the data flow
3	Implementation of security and governance	Billing
4	Improve IoT projects continuously	Power consumption
5	Intuitive users experience	Scalability
6	Focus on the Business Challenge	Security concerns
7	Enable scalable data management and analytics	Missing the right people and mindset
8	Design-in security	Compatibility
9	Plan for flexible device management	Organizational culture
10	Strategic Planning Before Deploying	Lack of readiness
11	Collaboration:	Lack of precise planning and strategy

12	clearly defined goals	Cybersecurity
13	competent project manager	Ignorance of the latest technologies
14	sufficient resource allocation	Lack of skilled professionals
15	adequate communication channels	Limited guidance for maintaining IoT devices
16	control mechanisms	Non-authentication and authorization of IoT devices
17	feedback capabilities	Lack of knowledge and staff resources
18	Responsiveness to clients	The "high" investment cost
19	Leadership	No clear definition of IoT
20	Firm size	Lack of a substantial project roadmap

11. Methodology

The flowchart for the research, which depicts the sequential stages that were used in the course of carrying out this investigation, may be seen in Figure 1.

Figure 1.   Flow Chart of Methodology
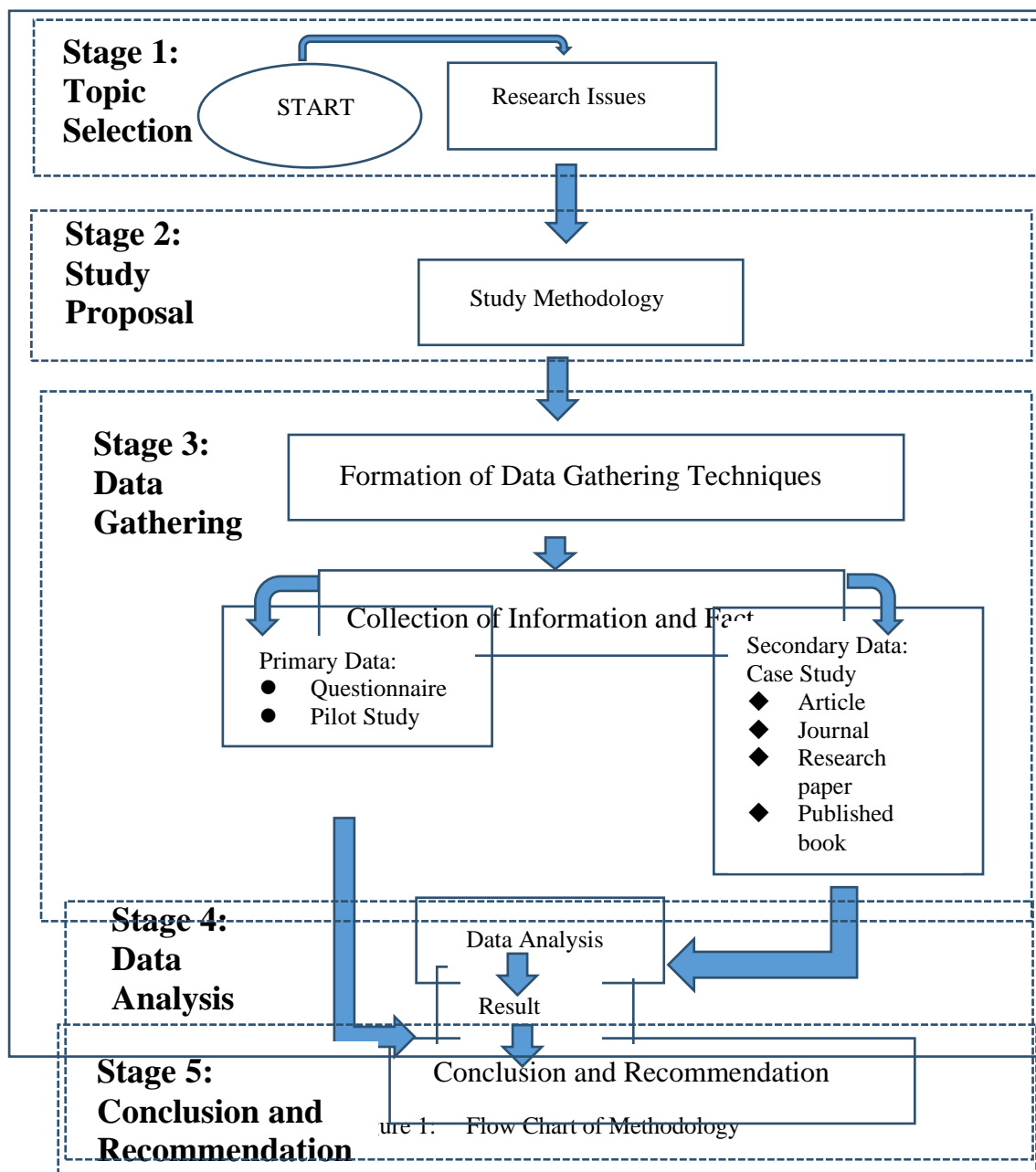
12. Data Analysis

Statistical Package for Social (SPSS) Software, was used to analyze the data. In addition, Microsoft Excel was used to present the results in tables and charts that were visually more appealing.

12.1 Quantitative data analysis

To analyze the data obtained from the questionnaires, an SPSS is used. Quantitative methods are used to analyze the data, such as the T-test, descriptive mean, and frequencies, as well as the Analysis of Variance (ANOVA) test. The findings from the survey and those acquired from examining the relevant literature were compared.

12.2 Discussion

During the debate, the study's results that had been carried out via the analysis of data acquired from different tests were investigated more deeply.

12.3 Result

In this section, we examine the data analysis, and the results that were received from the random distribution of the questionnaire to 439 respondents based on the research carried out in Bahrain. This research analyzed the responses from 439 questionnaires to identify the primary considerations involved in using the Internet of Things for project management and to evaluate the degree to which each consideration should be prioritized.

The gender distribution of the respondents is broken down into frequency and percentage in Table 3. In addition, the information shown in Figure 2. reveals that out of a total of 439 respondents, 185 were female and 254 were male.

Table 3. Respondent Gender Information

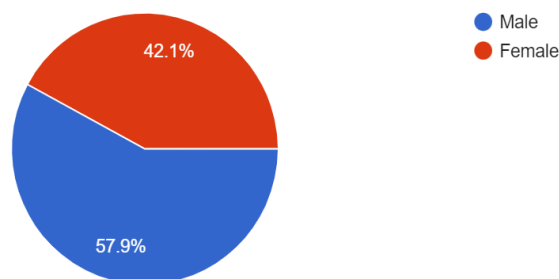| Personal Information	Detail	Frequency	Percentage (%)
Gender	Male	254	57.9
	Female	185	42.1
	Total	**439**	**100**

Gender

439 responses

Figure 2 Percentage of Respondents Categorized by Gender

12.4 Analysis of Critical factors (CF) of using IoT in project management

This study may analyze the laborer's perceptions, knowledge, and thoughts on the essential aspects that influence the usage of IoT in project management. The first question, which was similar to the ones that were asked in the questionnaires, was to determine whether or not employees had the perspective and the understanding that when businesses connect items to the Internet, they should regard the safety of the devices and the communications as the highest priority chain. The next issue was data management, which said one had to be attentive to the data acquisition and use. The purpose of the third inquiry is to get an understanding of the concept of employees in the context of an A system for the Internet of Things (IoT) has to be scalable in order to ensure that it can rapidly absorb more machines and devices and cope with an increasing data load without committing any faults. The fourth inquiry was about using data created by machines to achieve insights that might be put into action and acquire tangible rewards. The sixth inquiry concerned ensuring that an Internet of

Things deployed system can communicate across a diverse set of file transfer protocols. The worker's perception of how important various aspects of the Internet of Things are should be the subject of the sixth question. The last inquiry centered on whether the bandwidth needs and overall connection standards are the most important aspects to consider.
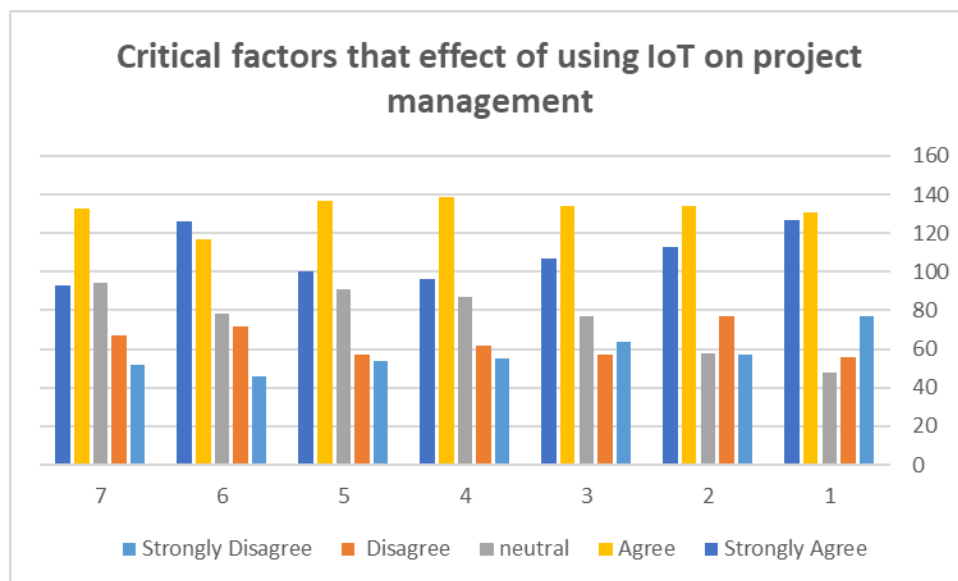

Figure 3 Ranking Distribution of Critical factors that Effect using IoT on Project Management

According to the findings of the investigation, which are shown in Figure 3, respondents identified a critical element in the implementation of IoT in project management. Meanwhile, these findings indicate that the highest rating ever received for simplicity of use in mean (3.47) and standard deviation (1.34) should be a primary characteristic of IoT. With the Internet of Things linking things, businesses should place a high priority on ensuring that both the equipment and the communications are secure., using a mean (3.40) and standard deviation (1.46). The findings suggest that the question on this portion has the second-highest rating.

The third most important item on the list of critical criteria that influence the use of IoT in project management is. The mean value (3.39) and the standard deviation value (1.30) indicate the importance of ensuring that an Internet of Things system can interact via various file transfer protocols in the development process.

According to the most recent ranking of the essential elements that impact adopting IoT in project management, the most essential aspect is the bandwidth and the total connection needs, which have mean values of 3.34 and standard deviations of 1.29.

In this section, we examine the data analysis, and the results that were received from the random distribution of the questionnaire to 439 respondents based on the research carried out in Bahrain. This research analyzed the responses from 439 questionnaires to identify the primary considerations involved in using the Internet of Things for project management and to evaluate the degree to which each consideration should be prioritized.

The gender distribution of the respondents is broken down into frequency and percentage in Table 4. In addition, Figure 4. reveals that out of 439 respondents, 185 were female and 254 were male.

Table 4.   Respondent Gender Information

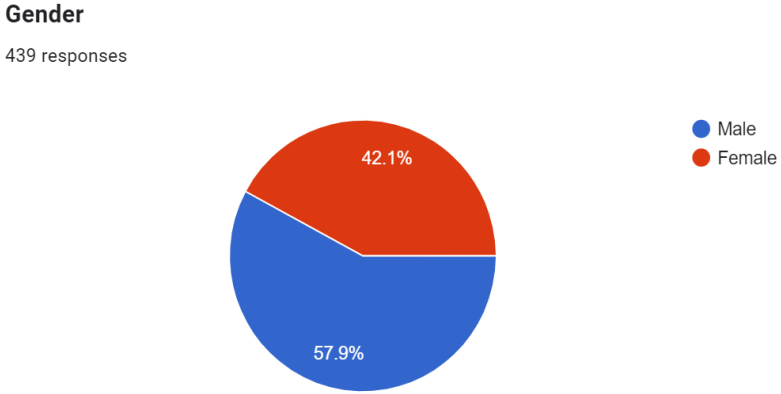| Personal Information	Detail	Frequency	Percentage (%)
Gender	Male	254	57.9
	Female	185	42.1
	Total	**439**	**100**

Figure 4 Percentage of Respondents Categorized by Gender

13. Analysis of Failure factors of using IoT in project management

This section focuses on the elements that contribute to the failure of utilizing IoT in project management. We begin with the first issue, which investigates whether or not Regulatory support, rather than Managing the data flow, is the most crucial reason for the failure of using IoT. The second inquiry inquires whether the quantity of energy consumed to reconfigure or maintain the system is the root reason for rising costs. These two issues led to the unsuccessful use of the Internet of Things. The third question asks if any system needs to be able to manage the data provided by my existing and future projected client base; if it is not, then the usage of IoT is failing, and there is no use in continuing to utilize it. The need for a well-defined, business-oriented, and consistent vision is the subject of the fourth inquiry, which investigates whether or not Internet of Things initiatives are doomed to fail. The fifth question addresses the fact that nobody is flawless, even IoT specialists, and that a lack of a solid project plan often causes the failure of IoT initiatives. The sixth concern is that IoT will only be successful if the organization's processes, cultures, and management structures go through a transition period to integrate their workings completely. The seventh inquiry inquired whether organizations' overestimation of the present technological resources, commitment levels of team members, and availability of financial resources led to a failure to utilize the Internet of Things. The eighth issue is whether using IoT was unsuccessful because the planning phase needed to consider ensuring the safety of data, devices, web servers, and communication networks. The ninth inquiry pondered the possibility that businesses that do not intend to begin with a comprehensive list of use cases, customer criteria, and market demand are doomed to fail. The eleventh inquiry inquires whether or not a company often fails to use the most recent technology to accomplish superior results at a lower expense. The last question was whether or not a deficiency in qualified experts, competent personnel, and limited advice for the life cycle maintenance and administration of IoT devices is an issue that causes IoT to fail.
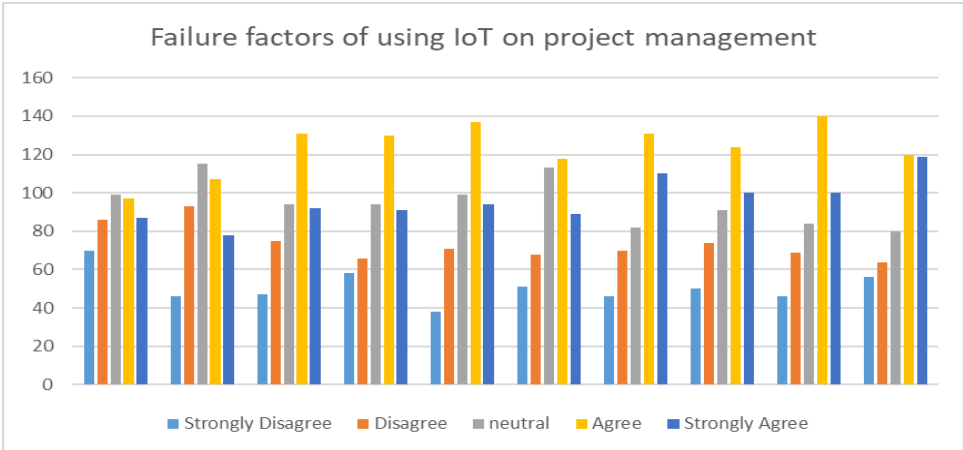

Figure 5 Ranking Distribution of Failure factors of using IoT in project management

14. Analysis of Success factors of using IoT in project management

A ranking study of the elements that contribute to the success of adopting IoT in project management was carried out. Because project managers want their projects to be successful, identifying the characteristics that will lead to that success is vital for every project. As is the case with the questionnaire that was prepared, the first question discusses how Data sensitivity has to be carefully examined to make IoT-based linked business deployment effective in viewing the perspectives on the Effect of data on the project. A second question to determine how it impacts the project's success is how adding new capabilities and features for a successful and impactful IoT deployment affects the project's success. Because it enables devices to interact with one another through a single network connection, the third issue on the Network design is essential to effectively implementing an Internet of Things system. This question also addresses how the Network design affects the project's success. The fourth question to assess how the organization's size is vital for the project's success asked how successful use of IoT depends on the organization's size. Once all the different types of hardware and appropriate resources have been allotted and all the different kinds of expenses have been identified, the fifth question asks whether the firm effectively utilizes IoT. The sixth issue concerns whether IoT devices' security inside the firm must be matched with the appropriate channels of pre-existing corporate rules and other security procedures. The seventh one is to make sure that the organization is prepared to make modifications as they become necessary, to prepare the users, and to increase the users' efficiency during the project over time. Is it necessary to inquire whether the training and courses are crucial to the project's success in order to achieve success while utilizing IoT? In the ninth question, it was said that it is necessary to design security as an integral element of an overall strategy, enable scalable data management and analytics, and arrange for flexible device management to use the Internet of Things. The ninth issue is whether or not businesses need to prioritize their investments in their strategic planning before deploying their plans and cooperating with other organizations to magnify the value they provide to customers and produce desirable results for those customers. The tenth one then discusses the importance of focusing on the Business Challenge and clearly defined objectives for the firm, which are essential to achieving success via IoT. In the eleventh question, we inquire as to whether or not providing regular feedback and being responsive to the needs of customers is critical to the success of using IoT and whether or not it is necessary for the improvement of the product itself. The last question is as follows: Leaders are more proactive in pursuing a more substantial quantity, scope, and diversity of Internet of Things applications and use cases than their less successful colleagues to know the rule of the leaders of successful project completion.
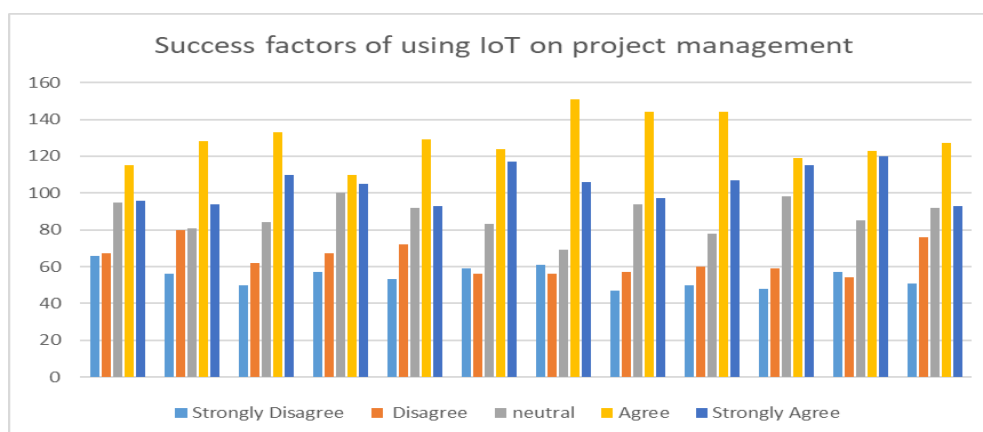

Figure 6 Ranking Distribution of Success factors of using IoT in project management

15. Conclusions:

According to the findings of the investigation, which are shown in Table 6 and Figure, the respondents' perceptions indicate that there are failure factors associated with the use of IoT in project management; these findings reveal that the factor with the highest rating is The use of IoT was unsuccessful because the planning phase, the mean (3.43), and the standard deviation (1.30) did not take into consideration the importance of ensuring the safety of the data, devices, web servers, and communication networks.

Suppose the company's processes, culture, and management structures do not go through a period of adjustment to integrate its workings completely. In that case, the use of IoT in project management has the potential to fail, which places it in the second-highest ranking of failure reasons—using IoT results in a mean (3.41 points) and standard deviation (1.23 points) failure.

When it comes to integrating IoT in project management, one of the most common reasons why it does not work is that businesses do not take advantage of the most recent technology, which would allow them to provide superior results at a lower cost, according to the mean (3.41), and the standard deviation (1.28).

Regulatory support and lack of it last place among the risk considerations associated with using IoT in project management. The inability to successfully manage the flow of data is the primary cause of unsuccessful usage of IoT, as measured by mean (3.10) and standard deviation (1.36).

According to the findings of the analysis based on the findings of the fourth hypothesis, "Prior knowledge of the factors affecting the success or failure of the use of the Internet of Things helps the MIS (Management Information Systems) department to avoid the factors causing failure to use IoT," the factors of failure can be placed in order as shown in Table 5. The success factors can be placed in order, as shown in Table 5.

Table5 Factors of Failure placed on order

No.	Factors of Failure
1	Cybersecurity
2	lack of standards for authentication and authorization of IoT edge devices
3	Organizational culture
4	No clear definition of IoT
5	Ignorance of the latest technologies
6	The "high" investment cost
7	Lack of skilled professionals
8	Limited guidance for life cycle maintenance and management of IoT devices
9	Lack of precise planning and strategy
10	Security concerns
11	Compatibility
12	Missing the right people and mindset
13	Lack of a substantial project roadmap
14	Lack of readiness
15	Lack of knowledge and staff resources
16	Scalability
17	Billing
18	Power consumption
19	Regulatory support
20	Managing the data flow

In this section, we examine the data analysis, and the results that were received from the random distribution of the questionnaire to 439 respondents based on the research carried out in Bahrain. This research analyzed the responses from 439 questionnaires to identify the primary considerations involved in using the Internet of Things for project management and to evaluate the degree to which each consideration should be prioritized.
The gender distribution of the respondents is broken down into frequency and percentage in Table 6. In addition, Figure 7 illustrates that out of the total of 439 respondents, there were 185 female and 254 male respondents.

Table 6.   Respondent Gender Information

Personal Information	Detail	Frequency	Percentage (%)
	Male	254	57.9

Gender	Female	185	42.1
	Total	**439**	**100**

Gender
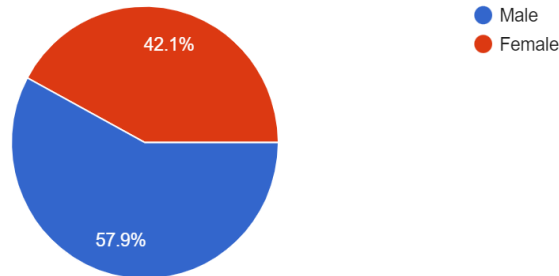
439 responses

● Male
● Female

42.1%

57.9%

Figure 7 Percentage of Respondents Categorized by Gender

Through the results of the study, we can summarize the factors that causing failure or success of use the Internet of Things in project management, as shown in the table 7

Table 7: Summary for the factors which cause success or failure of using the Internet of Things in project management

No	Items
I1	Security of devices and communications is a top priority.
I2	Consider sensitivity when dealing with data and when obtaining and using it.
I3	The Internet of Things system must be capable of continuous updating and development and the ability to accommodate new devices easily without any defect.
I4	Gain actionable insights and gain practical benefits from the use of automatically generated data
I5	Ensure that the used IoT system can communicate across all protocols used to transfer files
I6	A key feature of IoT should be ease of use.
I7	The most critical factor is the bandwidth and the overall connectivity requirements.

According to the findings of the investigation, which are shown in Table 7 and Figure 6, the respondents' perceptions indicate that there are failure factors associated with the use of IoT in project management; these findings reveal that the element that received the highest rating overall is. IoT was unsuccessful because the planning phase, the mean (3.43), and the standard deviation (1.30) should have considered the importance of ensuring the safety of the data, devices, web servers, and communication networks.

Suppose the company's processes, culture, and management structures do not go through a period of adjustment to integrate its workings completely. In that case, the use of IoT in project management has the potential to fail, which places it in the second-highest ranking of failure reasons—using IoT results in a mean (3.41 points) and standard deviation (1.23 points) failure.

When it comes to integrating IoT in project management, one of the most common reasons why it does not work is that businesses do not take advantage of the most recent technology, which would allow them to provide superior results at a lower cost, according to the mean (3.41), and the standard deviation (1.28).

Regulatory support and lack of it last place among the risk considerations associated with using IoT in project management. The inability to successfully manage the flow of data is the primary cause of unsuccessful usage of IoT, as measured by mean (3.10) and standard deviation (1.36).

According to the findings of the analysis based on the outcomes of the fourth hypothesis, "Prior knowledge of the factors affecting the success or failure of the use of the Internet of Things helps the MIS (Management Information Systems) department to avoid the factors causing failure to use IoT," the factors of failure can be placed in order according to the format shown in Table 8.

Table 8 Factors of Failure placed on order

No.	Factors of Failure
1	Cybersecurity
2	lack of standards for authentication and authorization of IoT edge devices
3	Organizational culture
4	No clear definition of IoT
5	Ignorance of the latest technologies
6	The "high" investment cost
7	Lack of skilled professionals
8	Limited guidance for life cycle maintenance and management of IoT devices
9	Lack of precise planning and strategy
10	Security concerns
11	Compatibility
12	Missing the right people and mindset
13	Lack of a substantial project roadmap
14	Lack of readiness
15	Lack of knowledge and staff resources
16	Scalability
17	Billing
18	Power consumption
19	Regulatory support
20	Managing the data flow

According to the findings of the investigation, which are shown in Table 7 and Figure 6, the respondents' perceptions indicate that there are failure factors associated with the use of IoT in project management; these findings reveal that the element that received the highest rating overall is. IoT was unsuccessful because the planning phase, the mean (3.43), and the standard deviation (1.30) should have considered the importance of ensuring the safety of the data, devices, web servers, and communication networks.

Suppose the company's processes, culture, and management structures do not go through a period of adjustment to integrate its workings completely. In that case, the use of IoT in project management has the potential to fail, which places it in the second-highest ranking of failure reasons—using IoT results in a mean (3.41 points) and standard deviation (1.23 points) failure.

When it comes to integrating IoT in project management, one of the most common reasons why it does not work is that businesses do not take advantage of the most recent technology, which would allow them to provide superior results at a lower cost, according to the mean (3.41), and the standard deviation (1.28).

Regulatory support and lack of it last place among the risk considerations associated with using IoT in project management. The inability to successfully manage the flow of data is the primary cause of unsuccessful usage of IoT, as measured by mean (3.10) and standard deviation (1.36).

According to the findings of the analysis based on the outcomes of the fourth hypothesis, "Prior knowledge of the factors affecting the success or failure of the use of the Internet of Things helps the MIS (Management Information Systems) department to avoid the factors causing failure to use IoT," the factors of failure can be placed in order according to the format shown in Table 8.

Table 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 and 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 projects continuously

16. Summary

In deploying an Internet of Things project, we analyze project management's criteria and essential success components. An Internet of Things project's likelihood of success depends on several elements; if the management or end users of the project pay attention to these factors, the project will be successful. We also go through the various ways that may be used to figure out how many respondents and what sort of respondents are required to carry out a data-gathering activity in private. The findings of this research will serve as a cautionary tale for those considering using IoT in project management by bringing attention to the parts of this sector that are most important after this is a synopsis of the whole research study that was conducted.

During the course of the research, no data, models, or code were developed or used in any way.

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