

Economic and Social Prospect of the Internet of Things: an Explanatory Study

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Abstract

Purpose: The changing dynamics of the business and the consumer preferences have made companies to focus on adopting the maximum use of smart devices in order to increase the ease for individuals. For this, the concept of IoT came into practice, which helped in different ways. The purpose of the study is to explore the social and economic prospects of IoT. It intends to conduct the assessment of social and economic prospects that helps to make the technological integration successful in the form of IoT.

Methods: For this, the emphasis is on two independent variables (economic and social aspects) and one dependent variable (IoT). The data gathered for the research is based on quantitative approach for which the closed-ended questionnaire is designed and the respondents of the study are the 50 managers of different tech-based organizations in the UK. Applied methods of analysis are MLR Analysis.

Findings: Study reveals that economic and social prospects results in the development of IoT. It reflects that both the aspects tend to give a margin to companies to focus on technological advancement to achieve growth and productivity.

Managerial Implications: The study suggests that companies should strive to achieve excellence by means of investing more in IoT devices. This can help to increase future connectivity and ease for individuals.

Keywords: Internet of Things, Economic Prospect of IoT, Social Prospect of IoT.

Introduction

The present conditions of the market are been denoted as the revolution in the technological adoption that exclusively emphasized on forming a network connection among people, devices, and technological tools [1]. Unlike the use of internet, technological infrastructure is focused on concrete architecture where Internet of Things (IoT) is discovered as the concept that exists primarily on reality [2], asserted that IoT is defined as the concept that helps to analyse the interconnection between the networks of the day-to-day objects, which are equipped with unique technology and intelligence. It is based on forming integrative systems, which gives tremendous opportunity for technological advancement and enhancing the quality of life. Towards the technological advancement, the adoption of IoT has been increased over the period of 5 years. Various mergers and acquisitions have been witnessed in past few years where the examples such as Google took over the company Nest and this acquisition was of approx \$3.2 billion. Another acquisition has been witnessed between Nest and Dropam[3]. While talking about IoT, the example such as Radio Frequency Identification (RFID) has been considered as a revolution. However, the dynamics of social and economic environment have created huge impact on the technological adoption and its implementation to form integrative structures and tools of

technology [4, 5]. Based on this, the study has been conducted on exploring the social and economic impact of IoT in the recent context.

Aims and Objectives

The aim of the study was to explore the social and economic prospects of IoT. It intends to conduct the assessment of social and economic prospects that helps to make the technological integration successful in the form of IoT. Based on this, the objectives of the study were:

- To explore the concept of Internet of Things and technological revolution towards it
- To investigate the social and economic prospects towards IoT
- To analyse business trends towards IoT and the economic and social support to enable the adoption of IoT
- To conduct explanatory study in order to analyse the social and economic prospects of IoT
- To provide recommendations to various technological companies towards IoT by means of adopting benefits from social and economic environment

Research Questions

- What are the economic prospects towards IoT?
- What are the social prospects towards IoT?
- How IoT can benefit to achieve growth and sustainability within technological environment?

Literature Review

Internet of Things

According to Kumar, and Patel [6], the adoption of IoT helps to monitor, control, trace, and allocate technological resources for the administrative reasons. The research conducted by [7] revealed that IoT determines the integration between electronic appliances and the technological softwares. An earlier projection done by [8] revealed that the increase in the IoT devices would be seen up to 30 billion by the year 2020. These products will have a market value of \$7.1 Trillion.

Economic Prospects of IoT

The internet penetration and the adoption of technology help to bring various potential economic benefits [9,10]. For this, the economic benefits and prospects are modeled based on several factors as asserted by [11,12] , which are presented below:

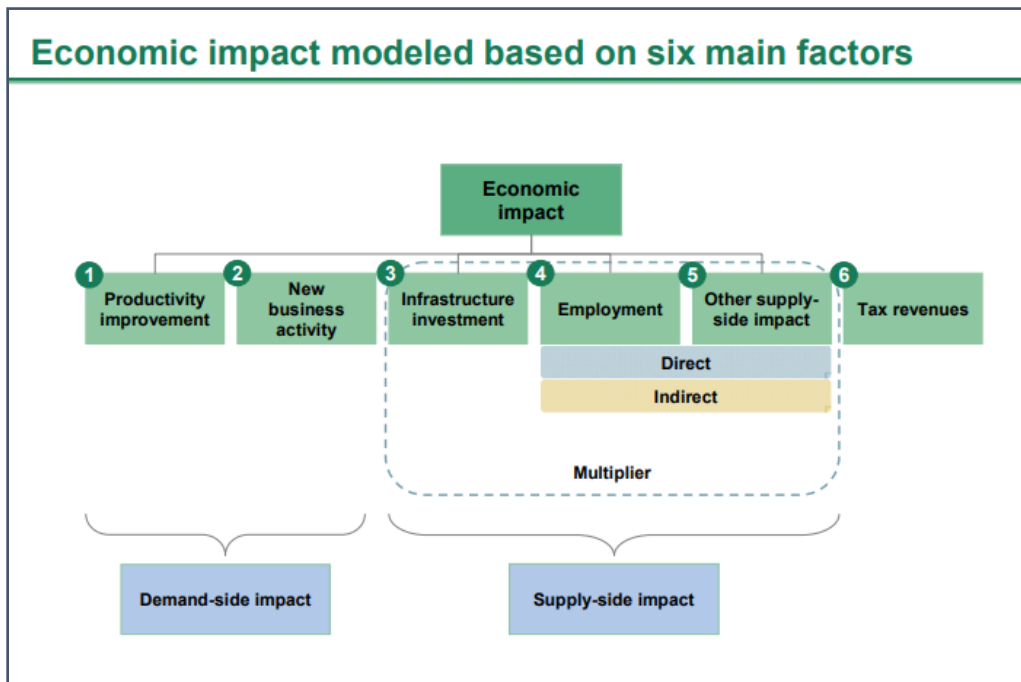


Fig. 1. Economic Prospects of IoT

The productivity-based aspects are located at demand side, whereas the GDP contribution is presented at the supply side as presented in Fig.1. According to Porters and Heppelmann (2010), by 2020, the GDP will be one of the significant factors towards productivity representation. Much of the internet advancement and growth will be witnessed based on the numbers of GDP. For instance, in Bangladesh, approx 11% growth in GDP have been witnessed due to the development in the field of IoT. It include the development in internet banking based on cheap and safe solution, which has become the source of bringing remittances. Hence, from the economic point of view, Coetzee, and Eksteen, (2011); Fleisch, (2010) asserted that IoT helped to bring intensive revolution in the industrial development, which resulted in economic development and productivity.

Social Prospects of IoT

The social prospects of IoT have been towards bringing the positive change in the social environment. It focused on merging and integrating such networks that enables social benefits at broader level [13,14]. For instance, Austria, the train system is been integrated with the Traffic management in order to manage the entire traffic operations. The city focused on connecting the light rail trams as well as business to IoT so that efficiency can be enabled [15].

Another benefit of IoT has been witnessed in terms of dealing with the challenges faced by the rising population of the world. Due to rising droughts, the farming has been decreased. For this, IoT technology has been used as the solution by installing soil and air sensors to track changes in microclimates [15].

In [16] asserted that IoT is the future of global infrastructure that enables in forming the information societies as well as advanced services. This helps in forming the interconnection between the physical and virtual environment, which is sensor network and communication machine, 3G, 4G, GPS system, RFID and WI-Fi systems. Further, Wedyan and Aljumilyalso asserted that the enabling technologies have made IoT possible. For Medical field [17, 18, 19], or in information retrieval system [20, 21] Couturier, Sola, Borioli, and

Raiciu, (2012); Haddud, DeSouza, Khare, and Lee, (2017) asserted that there are fewer characteristics associated to IoT, which are presented below:

Interconnectivity – Couturier et al., (2012) asserted that IoT shows the interconnection with the global information and communication system within a collaborative infrastructure.

Heterogeneity – Devices that are been used for the IoT tends to be highly heterogeneous in nature that is developed based on hardware platforms and complex networks. The interaction is thus formed based on distinctive network structure.

- **Connectivity:** Connectivity is the core of IoT that helps in increasing accessibility as well as compatibility.
- **Enormous Scale:** The devices that are being connected through IoT are in huge numbers and one larger device manages communication magnitude at higher level.
- **Safety:** Safety in the IoT devices tends to help in ensuring the wellbeing of physical as well as personal data.

Research Methodology

Research Methods

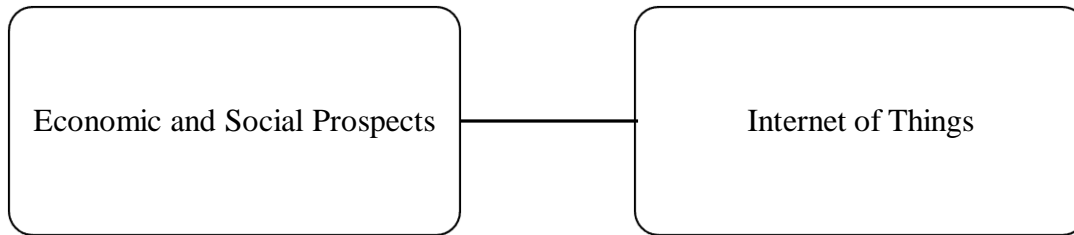
As the study was based on adopting the exploratory aspects; therefore, the approach chosen for the study was explanatory research approach. The approach emphasized on analysing the issue by means of investigating the cause and effect relationship. Hence, this helped in analysing the issue by means of exploring the social as well as economic prospects based on scientific means. According to the chosen research approach, the adopted methods of data collection for the study were quantitative methods. The reason for choosing quantitative method for the study was that it helped to analyse the economic and social prospects towards IoT by means of conducting explanatory investigation. Hence, the adoption of quantitative method helped to obtain the scientific evidences by means of gathering the objectivity towards the issue. Certain parameters have been discussed and analysed by means of applying statistical tools so that the significance and insignificance level can be investigated exclusively. The reason for adopting quantitative method was that it helped in focusing on such aspects that require scientific reasoning and interpretation. Hence, the use of specific techniques of quantitative method supported to achieve empirical evidences exhaustively.

Material and Procedure

The adopted tool for the study was questionnaire. A closed-ended questionnaire has been designed for investigating the key variables of the study. The questionnaire was based on 9 statements specific to the dependent variable IoT and independent variables that are economic and social prospects. The statements were specifically on the five-point likert scaling, which helped to analyse the statements in order to obtain comprehensive results. The procedure adopted for the investigation was based on self-administered questionnaire where the data collection and entire mechanism have been influenced based on self-monitoring. The sampling technique specifically adopted was convenience sampling as non-probabilistic method. This helped to obtain the response of participants based on convenience. For this, the sample size of the study was 50. Data have been obtained from the managers of tech-based organizations in the UK in order to analyse the social as well as economic prospects of IoT.

The data analysis method adopted for the study was based on quantitative technique. For this, SPSS have been adopted as the tool of analysis. Multiple regression analysis has been applied in order to analyse the impact of economic and social prospects of IoT.

Model of the Study



H₀: Economic and social prospects does not results in the development of IoT

H₁: Economic and social prospects results in the development of IoT

Data Analysis and Findings

For the study, MLR model has been applied which is Multiple Regression Analysis. The independent variables of the study were economic and social prospects and the dependent variable was IoT. Based on this, the reliability statistics obtained is presented below:

Table1: Reliability Statistics of the Data

Reliability Statistics	
Cronbach's Alpha	N of Items
0.878	9

Obtained reliability for the study is 0.878, which means that α shows internal consistency of data. Hence, this proves that the data obtained for the study is reliable and has stronger internal consistency as obtained α is closer to 1.00.

Below presented are the tables of MLR.

Table 2: Model Summary obtained from MLR

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.576 ^a	.331	.303	.89832

a. Predictors: (Constant), Social_Prospects, Economic_Prospects

b. Dependent Variable: IoT

Obtained model summary from MLR revealed the value of adjusted R-square. Value obtained is 0.303, which is 30.3%, which means that the impact among dependent and independent variables shows somewhat good relationship.

Table 3: ANOVA obtained from MLR

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	18.792	2	9.396	11.643	.000 ^b
Residual	37.928	47	.807		
Total	56.720	49			

a. Dependent Variable: IoT

b. Predictors: (Constant), Social_Propects, Economic_Propects

The table presented above is of ANOVA test, which helps to analyse the significance and insignificance of the model. Obtained value from the ANOVA test is 0.000, which is less than 0.05. Hence, based on the rule of thumb, obtained value shows that it is < and equals to 0.05, which proves that the alternative hypothesis is accepted proving that social and economic prospects results in the development of IoT.

Table 4: Coefficients from MLR

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized_Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.256	.482		2.603	.012
Economic Prospects	.174	.132	.201	1.322	.193
Social_Propects	.454	.162	.428	2.810	.007

a. Dependent Variable: IoT

Model Developed: $\text{IoT} = 1.256 + 0.174(\text{EP}) + 0.454(\text{SP}) + \varepsilon$

The coefficients table obtained from MLR analysis helped in knowing the positivity of the variables through value of unstandardised β . Obtained value of β for economic prospects is 0.176, and value of social prospects is 0.454, which reveals that there is weak relationship as it is closer to 0. Further, obtained t-value for economic prospects is 1.322, which is less than 1.96, whereas t-value of social prospects is 2.810, which is greater than 1.96. This shows that the relationships can be investigated further.

Conclusions and Managerial Implications

In present context, the revolutionized era is where the IT, internet and computerized techniques resulted towards bringing the change in terms of business digitalization. It not only helped businesses to become technologically centralized, but also helped to improve productivity by means of reducing cost as well increasing efficiency in the performances. The contribution of technology as well as digitalization at one side helped to achieve economic and social growth, but on the other hand resulted in increasing challenges in terms of technological use by individuals [6]. From the analysis, it is identified that the model designed for the study proved to be significant. It proved that social and economic prospects results in development of IoT.

Based on the obtained findings, it can be suggested that for businesses, it is essential to focus on adopting modern technological tools in order to make the right use of smart devices. IoT is the future of technology and this can help in many ways to benefit people as well as society. The research in the field of technology and IoT particularly can help a lot to bring change in to the economic situation of any country. Economic development and growth can be witness when the proper technological development based initiatives are taken. Besides, from societal point of view, IoT can help to enhance social network and interconnectivity.

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