



To cite this article: Ms. Sonia Merin Jose and Dr. R. ilavenil (2026). EVALUATION OF THE IMPACT OF BUSINESS ANALYTICS AMONG THE IOT SENSOR DEVICES START-UPS IN KERALA- A STUDY, International Journal of Research in Commerce and Management Studies (IJRCMS) 8 (2): 18-29 Article No. 665 Sub Id 1057

EVALUATION OF THE IMPACT OF BUSINESS ANALYTICS AMONG THE IOT SENSOR DEVICES START-UPS IN KERALA- A STUDY

Ms. Sonia Merin Jose¹ and Dr. R. ilavenil²

¹PhD scholar, Alagappa Institute of Management, Alagappa University, Karaikudi

²Assistant professor, Department of Business administration, Government Art's & Science College for women, Paramakudi, Ramanathapuram

DOI: <https://doi.org/10.38193/IJRCMS.2026.8203>

ABSTRACT

Although there is a perception that business analytics is important, little is known about how these investments actually add value to the company. Business analytics can be used to examine the strengths and weakness of the competitors. Planning, managing, organizing, and directing—the four core duties of management—are made simple by the use of analytics. For economic, social, technological, legal, political, and sustainable development objectives, organizations generally collect data on a variety of factors and store it in the form of sizable databases. Organisations can analyse these data and extract meaning with the use of business analytics. Such evidence-based, data-driven outcomes are advantageous for organisations. However, according to experts, using business analytics presents a number of challenges, including those related to human resources, such as the adaptability of personnel, marketing management, such as the validity and dependability of market the process of segmentation financial management, such as the substantial upfront cost for an extended return on investment, operational management, such as quantifying all activities, and information systems, such as comprehending the technical know-how. This study is deals with the to comprehend the elements influencing the use of analytics in enterprises and to investigate the effects of analytics use on business decisions.

KEYWORDS: Business analytics, management functions, sustainable development, competitors and so on.

INTRODUCTION

Industries provide the most significant and crucial part in an economy. The core components of the industries are a synthesis of People, Processes, and Technology that work in unison to produce a certain result. Since industrialization began, technology has advanced to the point where paradigm upheavals known as "Industrial Revolutions" have occurred. The first industrial sector was established in 1784 and consisted of machines powered by steam and water. Industry 2.0, which emerged around



1870, was mainly reliant on the mass production of commodities using electrical energy. The Industrial Revolution advanced the industry to the point of automation in 1969, when information technology (IT) was being used to duplicate and reproduce manufacturing at a much faster rate. The degree to which analytics are used in enterprises is also influenced by the constantly changing macro-level external influences. Therefore, it is crucial to understand how various micro- along with macro-level factors affect analytics and are affected by them. A new paradigm has been created as a result of the improved digitization, Internet technologies, and future-oriented technologies associated with the field of smart things. Finally, the Cyber Physical Systems period, also known as Industry 4.0, marked the progress of the Industrial Revolution. Future systems are modular but effective, allowing for the manufacturing of single products in batches of one while still keeping the favourable economics of mass production.

The internet has a commanding presence in our life due to its pervasiveness and influence on all economic and technological elements. Since its inception as a small-scale network in the previous five decades, the internet has expanded significantly to serve billions of users on a global scale. In the last few years, there has been a phenomenal evolution that has connected billions of items worldwide. The Internet of Things (IoT) is one of the most recent effects, among others. According to the definition given in, the Internet of Things is "a network of specialised physical objects (things) which have embedded technology that can detect or communicate with both their internal state as well as the business environment."

According to definitions in, the Internet of Things (IoT) "is the process of tying together smart physical entities (sensors, gadgets, machinery, assets, and products), internet services, and applications." IoT has made it possible to connect all internet-connected systems to the physical environment. Things and gadgets that were designed to fulfil specific utilitarian functions are now able to actively interact with other things and devices in an ecosystem. Despite doing so, things and devices have the potential to provide even greater benefits to the people for whom they are meant by virtue of their engagement as active IoT constituents. The "Internet of Things" enables connections between people and objects at anytime, anywhere, with anything, and anyone, preferably using any path, network, and service. IoT is a progression of earlier ideas of the Internet of Things, pervasive computing, and ambient intelligence, according to this argument. The Internet of Things (IoT) is described as "a system of interconnected computing devices, mechanical and digital machines, objects, animals, or people that provides them with identities and a means to transmit data across a network lacking necessitating human-to-human or human-to-computer interaction" in the definition. IoT is, at its core, a critical assessment of the internet as machine-to-machine learning is possible. The Internet of Things and its future steps were propelled by forces operating on both the push and pull sides of the technological world. The push force viewed the Internet of Things as a brand-new platform where the application of current as well as future information was made possible. In contrast to technology pull factors, the



widespread adoption of IoT does not examine the current aspects of our economy, society, or way of life for the benefits.

Fundamentally, IoT has attracted interest from both users and suppliers due to its capacity to connect commodities, people, and gadgets over a worldwide network. The goal to understand the IoT ecosystem is to collect real-time data from every entity using the network. Each entity has been given a unique identifier. Using advanced analytics models and live data, organisations can derive fascinating and helpful trends. Big Data analytics refers to the act of churning and communicating enormous amounts of data while using cutting-edge analytical tools to uncover hidden patterns and potential correlations. Three important characteristics of big data are volume, velocity, and variety. Physical, biological, and biomedical sciences are all currently experiencing fast growth in this area, as well as engineering. Up until recently, the majority of big data was made up of manually created transactional data that was once kept in relational databases. The balance will fundamentally shift towards massive amounts of sensor data generated by these individually coded connected objects as there are more IoT networks installed around the world. In the area of managing Big Data, IoT causes a change.

The environment people live in appears to be becoming more intelligent by the second. Staying connected to things, people, and innovation is becoming more and more possible thanks to the Internet of Things. Similar communications capabilities have recently been added to the environments where we live and work. By intelligently connecting devices, people, processes, and objects via sensors, it ushers in a significant transformation in the conventional solutions. A scenario that combines intelligent behaviour from electrical and mechanical components with hardware, software, control sensors, data storage, and connectivity across the internet has been made public. As IoT enables the sharing of huge data flows among contemporary businesses, opportunities for organisations to increase productivity and reduce marginal costs while the same time become a reality.

OBJECTIVES OF THE STUDY

Internet-of-Things Applications in our Daily Life

Every industry and aspect of our daily life currently use IoT technologies. These apps are usually cloud-based, allowing for national and even global deployment and operation. Let's examine some real-world instances of Internet of Things applications. The kitchen area appliances, lighting and heating systems, security mechanism, hot- and cold-water faucets, and more can all be monitored and managed using a mobile device. You can even use Alexa or Siri to operate your appliances when they are Apple Home or as Amazon Home Connect compatible.

Smart Home Security

Your home may be protected against burglaries, fires, and floods with the help of door and window contacts, the glass breaks along with motion detectors, heat, smoke, along with water detectors, alarms



with sensor pads, photographic equipment, and smart doorbells. These sensors send readings and warnings to an internal controller, which subsequently sends them to the cloud over the Internet or using battery-operated cellular communicators. Anyone will receive notifications about any suspicious behaviour in the house from the cloud via an app on your smartphone or computer. To find out what is occurring and where, use the app to look at sensor logs and cameras. To allow or prevent entrance to your house, you can remotely arm or disable the security system. Some of you can create unique access codes for designated authorised people and receive notifications when these individuals enter and leave the residence for more security. It will let you know. Keys or codes may soon be unnecessary thanks to technologies like iris scanning, voice recognition, along with facial recognition, which you might already use to access your front door.

Smart Home: Heating & Cooling

For a long time, programmable thermostats have been able to recognise and modify temperatures and humidity based on user preferences, including daytime, nights, weekends, vacations, and so on. With the advent of smart sensors and thermostats, a completely new range of capabilities is now possible. First, a mobile app can be used to access and control the system remotely while the system is linked to the cloud via Wi-Fi. Users can check and change temperatures for comfort from a vacation location, their car, or even on the couch sitting in front of their TV. Additionally, the system may automatically and individually regulate the temperature and humidity when you or a family member takes a shower or works out thanks to clever sensors in your bathroom or gym space.

You can still purchase a smart room air conditioner if your house is an older one lacking central heating and cooling. On a steamy evening, are you en route home? Just turn on the device in advance using an app on your phone. Alternatively, instruct Google Assistant or as Amazon Alexa to turn it on as you enter the room. If something is discovered outside of the permissible ranges, the cooling and heating systems can be configured to send you an alarm. You definitely want to check the status of your heating on a chilly day to avoid having the pipes that supply water freeze and break! With your Smart Home app, you have the option to cut off the water or just disable your security system so a buddy can do it the old-fashioned way. The heating system might additionally include CO₂, CO₂, smoke, or gas sensors that monitor the air in your home to see if conditions are outside of predetermined ranges and notify you (as well as your alarm service) of potential fires, leaks, or gas leaks.

Smart Home: Kitchen

The internet Digital DIOS smart refrigerator introduced by LG Electronics in 2000 was one of the first IoT devices that were commercially accessible. Almost every manufacturer of kitchen appliances has released smart IoT devices since that web-enabled model, despite the fact that it was not considered to be a success. In the kitchen of today, there will be Wi-Fi-enabled fridges, fixtures such as faucets



gas and electric ranges, ovens for microwaves, coffee makers, food such as pizza ovens, liquor coolers, dishwashers, and toasters. Among the initially readily accessible IoT devices was still the World-Wide Digital DIOS intelligent refrigerator implemented by LG Electronics back in 2000. Numerous aspects of smart refrigerators can be managed with a mobile phone app. Some features include a touchscreen where you can access recipes or make shopping lists, as well as cameras within the fridge so you can keep an eye on what's inside. As a result, anyone are able to ask Siri, Alexa, perhaps Google Assistant for help to dispense ice, switch on the microwave, or add anything to the grocery list because smart equipment frequently work with these voice assistants.

Smart Driving

Self-driving automobiles and delivery trucks will become the norm in a few decades. However, there are many instances of IoT technology being used in your daily driving life even without driverless cars. Consider a safety service like OnStar from General Motors. The car's sensors can identify mechanical issues and crashes, and they can upload information to the cloud as well as a 24-hour service advisor (through a cell link). When necessary, the adviser dispatches emergency as well as recovery services and speaks directly to the driver. The advisor also determines the precise location of your car thanks to GPS. The responding mechanic will be prepared if the issue is mechanical because the advisor can conduct remote diagnostics on the vehicle. Navigation apps like Waze, Google Maps, along with Apple Maps are another sort of IoT application that is often utilised. They can be used on your smartphone or in automobile dashboard versions. These apps assist you in getting about using cellular along with GPS networks together! A fantastic IoT example is Waze. The software continuously gathers and uploads vehicle position information to the cloud, where it is combined with position information from all other user vehicles. Waze can calculate each vehicle's relative movement to calculate its speed and locate traffic snarls and slowdowns. It can recalculate the driver's anticipated arrival time, estimate the amount of time spent in traffic, and reroute the driver to a different route that avoids obstacles.

Smart Toll Collection

The electronic toll collection (ETC) example is the next IoT driving example. In urban areas with toll highways, bridges, and tunnels, this application is widespread. Each smart toll booth you pass has sensors that read the transponder on your car's windscreen. You proceed after the transponder ID is submitted to the cloud for validation and the booth flashes a "Toll Paid" sign. You may use an express lane at 50 mph because the transponder-reading technology is so precise. The license plate photos taken by the cameras at the toll booths are used to instantly verify if the vehicle's registration is registered alongside the system.

Wearables

With countless applications in personal fitness, leisure, wellness, and healthcare, the "Dick Tracy"



ideal of wearable communication and computer gadgets is already a reality. The respiration rate, temperature, heart rate and rate variability, blood glucose levels, and blood oxygen levels can all be measured by biometric sensors found in watches, rings, and wristbands. Before being uploaded to a cloud infrastructure via a cellular or Internet connection, these wearable devices capture and store the raw data. Wearable technology frequently includes an accelerometer, which counts steps taken and recognises movements like falls or golf swings. The gadgets can pinpoint your specific location and calculate distances travelled using connections to global positioning satellites (GPS). Golf watches have GPS-based maps of every golf course and may show your position on each hole, the distance to the green, the location of hazards like water and bunkers, and the length of each shot.

Healthcare

Patient trackers and monitoring are the most popular IoT applications in healthcare. These may be used for patient remote monitoring or for diagnostic purposes. Vital indicators like heart rate, the temperature, arterial pressure, along with glucose levels can all be measured by monitoring devices. IoT applications for healthcare are continuously expanding. Even our hearing aids are Wi-Fi capable. Many IoMT devices can be worn, but some must be surgically implanted. For instance, Internet-enabled pacemakers are used to keep patients with slow or erratic heartbeats alive.

Software Distributors in Kerala

One of today's most cutting-edge and promising technologies is the Internet of Things (IoT). The connectivity of gadgets and equipment with the goal of gathering, sending, along with storing data in an encrypted and reliable network is commonly referred to as this.

In the modern era, organisations of all shapes and sizes are using IoT solutions to safeguard their credential data as it is transmitted from one device to another. The nice thing about this technology is that it works with a variety of gadgets, including desktop computers, laptops, iPhones, and smartphones. Devices may quickly and easily communicate data in real time through the IoT.

Table1: The top companies IOT solution providers in Kerala Districts

SNO	NAME OF THE IOT SOFTWARE PROVIDERS	SUPPLIERS For
1	Gadgeon smart systems pvt limited	Enables healthcare providers
2	Cocoalabs india pvt ltd	e-commerce, hospital management, purchase management, tracking, and automation solutions for hotels and homes
3	Softland india limited	Handheld pda, thermal printers, led display panel, queue management system, spot electricity bill, sales force automation, and many more.
4	Focaloid technologies private limited	Enterprise solutions, mobile and web platform solutions, animation solutions, and application development. Clients are: microsoft, deloitte,ibm
5	Wisilica india pvt ltd	Increased energy consumption, unsustainability, security breaches, and lack of real-time information
6	Novasoft	Marketing services, rfid lock
7	Amyntor tech solutions private limited	Telecommunication, electronic security, data center, networking with wired/wireless products office/home automation, energy conservation and isp services

Secondary data source obtained from website

IoT is a wide concept and apply in the market research when compare with the competitive analytics, HR analytics, Area analytics and so on. A really strong and dynamic system called competitive analytics may greatly aid you in analyzing the competitive landscape of a dynamic combination of a chosen sector, tailored regions, and numerous market clusters.

Businesses can acquire significant insights into the competitive environment of their sector by utilising its advanced features and functionalities, empowering them to make wise decisions about strategy, product development, and marketing in Kerala.

SOCIO-ECONOMIC STATUS OF THE RESPONDENTS

The profiles of 387 respondents who have purchased home usage IOT devices were taken for this study. The details of the respondents have been shown in Table 1.

Table1: Demographic Profile of the Respondents

<i>Personal Background</i>	<i>Particulars</i>	<i>Percentage</i>	
Gender	Male	69	
	Female	31	
	Total	100	
Age	20-30 years old	18	
	31-40 years old	30	
	41-50 years old	24	
	Above 50 years old	28	
	Total	100	
Type of Products in home appliances	LG	32	
	Samsung	29	
	Glen	5	
	Whirlpool	11	
	Philips	17.7	
	Godrej	4	
	Bosch	1.3	
	Total	100	
	Medical Devices Usage purpose	Diabetics	38.5
		Monitor body temperature/ Nebulizer	16.9
Blood oxygen levels		12.6	
Heart rate		20.5	
Safe and effective way		6.4	
Reduce the regular visit to hospital		5.1	
Total		100	
Medical device Brand	Siemens AG	7.3	
	MedtronicPlc	23.2	
	Dr Morepen	13.2	

	Apollo Product	20.4
	Omran	3.6
	Philips	14.5
	Biotronic	7.4
	One touch Verio Flex Blood	0.63
	Control D	4.50
	Newnik	1.27
	No Opinion	4
	Total	100

Source: Primary Data

Table 1 shows that about the majority of the respondents are male (69%) and 31% are the female. The age of the respondents is the majority level (in 30%) is ranged from 31-40. The usage of type of home appliances and its majority level (32% and 29%) that are LG and Samsung. then usage level of the medical devices is Medtronic plc (23.2%).

The purpose of the medical devices for diabetics (38.5%) is the majority level followed by the heart rate (21.5%) majority level.

STATISTICS OF THE DEMOGRAPHIC PROFILE

The standard deviation (SD), a measure of the variability, is extensively used in statistics. It shows how out of the ordinary (mean) things are. A low SD implies that the data points often lie close to the mean, whereas a high SD indicates that the data are distributed across a large range of values. As a result, the table indicated that the mean and standard deviation remain normal.

Table-2 Statistics

	Type of the Home appliance Product	Age of the Customer	Gender	Brand of Medical devices	medical devices usage purposes
N Valid	387	387	387	387	387
Mean	3.4212	1.7814	1.2175	1.3514	2.5436
Std. Error of Mean	.3171	.1359	.1973	.3471	.7436
Std. Deviation	3.5714	1.2652	1.3412	1.2517	2.7391
Range	7.2147	1.00	1.00	1.00	5.00

Source: Primary Data

The above table stated that mean value is more than 1.2 for the independent variables age, gender,



type of the home appliance product and medical devices usage, medical device brand. Hence there is positive feedback from the customer segment in Kerala in Thiruvananthapuram.

CONCLUSION

There are numerous others, and as technology develops, we'll keep witnessing brand-new applications of this technology. The majority of our examples are created and distributed by vendors; the cloud, sensor, or artificial intelligence technology that's hidden beneath the surface isn't visible. But in your professional life, too might be involved in the development and management of a unique IoT application. The cloud, networking, along with security are three things that every IoT application has in common. Which cloud technology you choose depends on your business, but according to a minimum of one projection, AWS is the biggest provider of cloud platforms in the comparative thoroughly in worldwide, with three times the market share of Google Cloud and half the market share of Microsoft. IoT service providers that can transform your life and improve the security, effectiveness, and safety of their company while moving credential data between various locations and devices. The Kerala IoT service providers have innumerable happy clients headquartered in various nations in the web-based secondary data analysis. Our development company's agile methodology and proper project delivery have won us a strong reputation in the industry. They constantly guarantee that every step of the creation of an IoT application will be completely transparent.

REFERENCES:

Bhimsankaram and Sridhar 2019, Essentials of Business analytics, An Introduction to the methodology and its applications, international series in operation research & Management Science Vol 264.

Bhavook and Jamal (2020), Importance of Web Analytics for the success of a start-up business, international conference on recent Developments in science, engineering and technology, pp:366-380. Twitter data analytical methodology development for prediction of start-up firm's social media marketing level, Technology in society", Vol 63.,2020

Usman et al., (2021), Analytics mistakes that derail software start-ups, international conference on evaluation and assessment in software engineering. pp:60-69.

Retrieved from "<https://doi.org/10.1145/3463274.3463305>"

Hokey min 2021, Business analytics practices and managerial implications based on the evidence from korea, American Journal of Business, vol 36(2).



Efpraxia et al., (2021), Making Sense of Business Analytics in Project Selection and Prioritisation: Insight from the start-up trenches, *Information Technology & People*.

Retrieved from “<https://doi.org/10.1108/ITP-09-2020-0633>”

Leo et al., (2021), Toward a business resilience framework for start-ups, vol 13(6), p:3132.

Eivind et al., (2021), Towards a business analytics capability for the circular economy, *Technological Forecasting and Social Change*, Vol 171.

Retrieved from “<https://doi.org/10.1016/j.techfore.2021.120957>”

Gomathy et al., (2022), Use of Predictive Analytics within Learning Analytics Dashboards: A Review of Case studies, *Technology, Knowledge and Learning*, Vol 28, PP:959-980.

Helene Cherrier and Meltem 2022, Blame work and the scapegoating mechanism in market status-quo, *Journal of Business Research*, Vol 144, pp:1207-1217.

Retrieved from “<https://doi.org/10.1016/j.jbusres.2022.02.061>”

Austin et al., (2022), Discovery sells but who’s buying? An empirical investigation of entrepreneurs’ technology license decisions, *Journal of Business Research*, Vol 144, PP:403-415.

Priyanka (2022), Role and Application of Artificial Intelligence in Business Analytics: A Critical Evaluation, [International Journal for Global Academic & Scientific Research \(Monsoon Issue\)](#), Vol 1(3)

Retrieved from “<https://doi.org/10.55938/ijgasr.v1i3.15>”

Efpraxia et al., (2022),” Using Business Analytics for SME Business Model Transformation under Pandemic Time Pressure, *Information Systems Frontiers*, Vol 24, 1145-116.

Manish et al.,2022, Analytics for business Decision, *Management Decision*, vol 60(2).



Saradhi et al., (2022), How does remote analytics empowerment capability payoff in the emerging industrial revolution? *Journal of Business Research*, Vol 144, PP:1163-1174.

Retrieved from “<https://doi.org/10.1016/j.jbusres.2022.02.064>”

Yassine et al., 2023, Recovering the divide: A review of the big data analytics—strategy relationship, *Long Range Planning*, Vol 56(2), P:102

Varsha and Karan 2023, Descriptive analytics and data visualization in e-commerce, *Handbook of Big Data Research Methods*, PP:86-104.

Jens 2023, Digital Factory Transformation from a Servitization Perspectives: Fields of Action for Developing Internal Smart Services, *Sci. 2023*; 5(2):22. <https://doi.org/10.3390/sci5020022>.

Sachin et al., (2023), “Tech-Business Analytics”- a new proposal to improve features and quality of products and services in various industry sectors- An Explorative study, *IJMTS*, vol 8(2).