Internship Report
On
Impact of Internet of Things (IoT) on Technical Product Management:
A Case Study of Bondstein's Solutions and Services.

Submitted to:
Islamic University of Technology
in partial fulfillment of the requirement of the degree of
BBA in Technology Management (BTM)

Submitted by:
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Student ID: 190061132
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I understand that my final report will become part of the permanent collection of the Islamic University of Technology BBA in Technology Management Program. My signature belowauthorizes the release of my final report to any reader upon request.

Approved by:
S.M Rakibul Anwar
Assistant Professor
Department of Business and Technology Management
Islamic University of Technology

Date of Approval: 17th May 2024

Internship report on

Impact of Internet of Things (IoT) on Technical Product Management: A Case Study of Bondstein's Solutions and Services.

This internship report is submitted to the Department of Business and Technology Management (BTM) at the Islamic University of Technology (IUT) for the course BTM 4800.

Letter of Transmittal

SM Rakibul Anwar

Assistant professor

Department of Business and Technology Management (BTM)

Islamic University of Technology

Board Bazaar, Gazipur

Subject: Submission of Internship report at Bondstein Technologies Limited.

Respected Sir,

I am pleased to present my report entitled "The Influence of the Internet of Things on Technical Product Management in Bangladesh," as part of my internship program. Working under your guidance has been a significant achievement for me.

This report provides a comprehensive analysis of the IoT industry in Bangladesh, including the current market size, key stakeholders, and recent developments in adoption and innovation. It also discusses the future prospects of IoT in Bangladesh and its potential impact on businesses. Additionally, the report offers recommendations for both businesses and policymakers on leveraging IoT technology for corporate growth and national progress.

I hope you find the report informative and insightful. If you have any questions or need further information, please do not hesitate to contact me. Thank you for your time and attention.

Your Faithfully,

_____

Nasif Omer Bin Haque

Id: 190061132

Department of Business and Technology Management (BTM)

Islamic University of Technology.

Declaration

I, Nasif Omer Bin Haque, a student of Business and Technology Management (BTM) department at the Islamic University of Technology, herby declare that I am the author of the scholarly article entitled "The Influence of the Internet of Things on Technical Product Management in Bangladesh." I affirm that the present document has been produced without external aid and that all referenced sources have been duly cited. This article composed by myself under the supervision of S.M. Rakibul Anwar, Assistant Professor of Business and Technology Management (BTM) department at Islamic University of Technology.

The undersigned affirms that the present document has not been previously submitted, nor has any substantially similar document been submitted, for any other academic evaluation or purpose. I acknowledge the potential consequences of participating in any manner of academic misconduct, such as plagiarism or collusion, which may lead to disciplinary measures.

Student's Full Name & Signature:

_____

Nasif Omer Bin Haque
ID: 190061132
Department of Business and Technology Management (BTM)
Islamic University of Technology

Supervisor Certificate of Acceptance

Nasif Omer Bin Haque, ID: **190061132** has accomplished an internship from **28 January 2024** to **28 April 2024** according to the regulations for internship for the degree programmed BBA in Technology Management under the Department of Business and Technology Management of Islamic University of Technology.

Supervisor's Full Name & Signature:

_____

SM Rakibul Anwar

Assistant professor

Department of Business and Technology Management (BTM)

Islamic University of Technology

Board Bazaar, Gazipur

Internship Completion Certificate

Bondstein Technologies Limited
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Direct: +88-09639595959
Email: info@bondstein.com
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Ref   : BTL/IRF/08052024/01
Date   : 18th January, 2023

Internship completion certificate

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Internship Starting Date   : 28 Jan, 2024
Last Working Date   : 28th Apr, 2024

Mr. Omer,

We would like to thank you for your positive contribution and attributions during your time as trainee at Bondstein Technologies Ltd. We had found you hard-working and responsible towards your tasks in projects you have worked in. We really appreciate your contribution in our Technical Product Management Department.

Bondstein Technologies Ltd appreciate your efforts and hopefully this experience will help you to grow up.

Good Luck.

_____
Mahmud Hassan
Senior Executive, People & Culture
Bondstein Technologies Ltd.

Acknowledgement

The digital revolution is buzzing with the advent of the Internet of Things (IoT). Global IoT spending is projected to reach $1.1 trillion by 2023, impacting manufacturing, healthcare, transport, and logistics. Bondstein Technologies, a leading tech company from Bangladesh, has developed innovative IoT solutions across various sectors, establishing itself as a key player in the technological landscape.

This report analyzes the effect of IoT on businesses in Bangladesh through Bondstein's IoT solutions. It discusses IoT adoption, specific solutions offered by Bondstein, and the potential benefits and challenges for businesses. Additionally, it explores the background of IoT, its future prospects, and provides recommendations for leveraging IoT for growth and development.

Bondstein offers a wide range of IoT solutions across various sectors, including smart urban infrastructures, healthcare, energy, utilities, and logistics. Notable projects include a smart irrigation system for agriculture, IoT-based asset tracking for Robi Axiata Limited, and a real-time energy monitoring system for Radisson Blu Dhaka Water Garden. These solutions have enabled businesses to optimize operations, reduce costs, and improve decision-making capabilities.

Challenges remain in the growth of IoT in Bangladesh, such as inadequate infrastructure, high costs, and data security concerns. The short duration of my internship and the pandemic posed limitations on gaining a comprehensive understanding of the organization. The future of IoT in Bangladesh is promising, driven by government initiatives like "Digital Bangladesh" and increasing demand for automation. To fully realize the benefits of IoT, there needs to be a focus on infrastructure development, cost reduction, and secure data management. Partnerships and collaborations can significantly bolster IoT development and growth.

Bondstein Technologies Limited has played a crucial role in advancing the IoT industry in Bangladesh, providing innovative solutions and driving operations across various sectors. My internship highlighted the critical role of IoT in enhancing operational efficiency, reducing costs, and fostering business growth. As IoT continues to evolve, it offers a golden opportunity for businesses in Bangladesh to improve their competitiveness and achieve sustainable growth.

Executive Summary

The digital revolution is abuzz with the advent of the Internet of Things (IoT). According to IDC, global IoT spending is projected to reach $1.1 trillion by 2023, impacting manufacturing, healthcare, transport, and logistics. Bondstein Technologies, a leading tech company from Bangladesh, has developed and deployed innovative IoT solutions across various sectors, establishing itself as a key player in the technological landscape.

This report analyzes the effect of IoT on businesses in Bangladesh through Bondstein's IoT solutions and services. It discusses the current state of IoT adoption, the specific solutions Bondstein offers, and the potential benefits and challenges for businesses. Additionally, it explores the background of IoT, its future prospects, and provides recommendations for businesses and policymakers to leverage IoT for growth and development.

Founded in 2013 with Runner Group as its parent corporation, Bondstein focuses on IoT, AI, and ML technologies. The company operates in three major domains: Vehicle Tracking System (VTS), non-VTS, and digital solutions, offering a comprehensive suite of services. During my internship at Bondstein, I gained practical experience in technical product management, enhancing my understanding of corporate functions, supply chain management, logistics, and customer experience. Bondstein's innovative contributions were recognized when it won the "Best IoT Startup" at the Bangladesh Startup Awards in 2017.

Bondstein offers a wide range of IoT solutions across various sectors, including smart urban infrastructures, healthcare, energy, utilities, and logistics. Notable projects include a smart irrigation system for agriculture, IoT-based asset tracking for Robi Axiata Limited, and a real-time energy monitoring system for Radisson Blu Dhaka Water Garden. These solutions have enabled businesses to optimize operations, reduce costs, and improve decision-making capabilities.

However, challenges remain in the growth of IoT in Bangladesh, such as inadequate infrastructure, high costs, and concerns about data security. The short duration of my internship and the pandemic posed limitations on gaining a comprehensive understanding of the organization. The future of IoT in Bangladesh is promising, driven by government initiatives like "Digital Bangladesh" and increasing demand for automation. To fully realize the benefits of IoT, there needs to be a focus on infrastructure development, cost reduction, and secure data management. Partnerships and collaborations can significantly bolster IoT development and growth.

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Table of Contents

Table of Figures

Table of Tables

Chapter 1: Introduction

The Internet of Things (IoT) has been identified as a disruptive technology that has the capacity to revolutionize the operational processes of businesses. According to the International Data Corporation's (IDC) report published in 2020, it is projected that the worldwide expenditure on the Internet of Things (IoT) will attain $1.1 trillion by the year 2023. The observed expansion serves as evidence of the considerable influence that the Internet of Things (IoT) can exert on diverse sectors, such as manufacturing, healthcare, transportation, and logistics. Bondstein, a prominent technology enterprise situated in Bangladesh, has been spearheading the development and implementation of Internet of Things (IoT) solutions for commercial entities.

The objective of this report is to conduct an analysis of the effects of the Internet of Things (IoT) on commercial activities, with a particular emphasis on the solutions and services provided by Bondstein. This report aims to present an overview of the current state of Internet of Things (IoT) adoption in Bangladesh. It will also delve into the IoT solutions and services offered by Bondstein, while highlighting the potential benefits and challenges that businesses may encounter in their adoption of IoT. Furthermore, the report will analyse the influence of the Internet of Things (IoT) on critical domains, including operations, supply chain management, logistics, and customer experience.

This report will delve into the historical context of the Internet of Things (IoT) and its potential implications for business operations. Additionally, it will provide an analysis of the future prospects of IoT adoption and innovation in Bangladesh, concluding with recommendations for businesses and policymakers on how to effectively utilize IoT for the purposes of business growth and national development.

The primary objective of this report is to offer an analysis of the potential impact of IoT on business operations in Bangladesh, using Bondstein's solutions and services as a case study.

1.1 Background of the Report

Bondstein Technology Ltd was founded in 2013 and is currently a subsidiary of Runner Group, a prominent national company that has been at the forefront of the IoT, ML, and AI industries. Bondstein encompasses three primary domains, namely Vessel Traffic Services (VTS), Non-VTS, and digital solutions. The solution offers a comprehensive package for both service providers and

customers. This report aims to elucidate my internship experience at Bondstein Technologies Limited. During a three-month internship at Bondstein's VTS Operations department, I gained experience working alongside the operation team. The purpose of this communication is to provide a summary of the knowledge and skills acquired during the internship experience and to elucidate how they will be advantageous for future endeavours.

1.2 Origin of the Internship Report

The completion of an internship program is a mandatory requirement for undergraduate students pursuing Business and Technology Management at the Islamic University of Technology. The principal objective of this program is to facilitate the integration of the second cohort of graduates from the BTM department into the labor market and business sector. The primary objective of the Department of Business Technology Management (BTM) is to provide its students with practical exposure to the industry. The internship program was designed to provide students with an opportunity to apply theoretical concepts of the business world to real-world scenarios and gain professional experience, leveraging their existing familiarity with the theoretical concepts. The primary difficulty in this instance lies in the application of scholarly expertise to practical, tangible concepts and encounters.

1.3 Main Purpose of the Internship Programme

This section will provide an overview of the primary objective of the internship program. The aforementioned objectives are the primary aims.

- Acquire practical knowledge in a genuine corporate setting.
- It is recommended that students be provided with an introduction to the employment market.
- Establishing a connection between theoretical concepts and practical applications.
- It is important to gather and arrange accurate and specific details on the job duties and responsibilities.
- The completeness of the prerequisites for a Bachelor of Business Administration program.

The document presented is a culmination of a three-month internship program at Bondstein Technologies Ltd. and has been prepared under the guidelines set forth by the Business and

Technology Department of the University. The document comprises details on the organization and its products, alongside insights into the relevant industry.

1.4 Objective of the Internship Report

Generic Objectives: The primary objective of the three-month internship was to gain comprehension of the operations department's functions and their methods for attaining their objectives. The program can be perceived as a corporate apprentice for undergraduate students. The present document provides a comprehensive account of the tasks and responsibilities I undertook during the course of my internship. The objective of this report is to demonstrate my comprehension of the completed task and the knowledge acquired throughout the internship program. This is an analysis that compares various activities and their impact on my learning outcomes, to evaluate my overall learning yield within the organization.

1.5 Methodology used and Data Source

During the preparation of this report on my internship, I collected data and its interpretations from many authentic sources. I have given primary data that only much importance which has been gathered through direct research. All the major parts as well as insights had been derived from the personal discussion with the company personnel and workers.

1. Recorded papers of employees who were engaged with the organization.
2. My written experience about the period, which includes diary and notes.

I also sought the help of many secondary sources in preparing my report. Those sources included books, articles, and other documents that were, in their term, analyzing or interpreting primary sources. Although a good amount of data of this report has been taken from secondary sources, still the main data of this report includes primary research. I have taken the help of many secondary sources to make this report effective.

1. The official website of the organization.
2. Google, the most used internet search engine.

3. Research papers on the e-commerce industry.

1.6 Significance

This is a short but very informative peek into the product management department at Bondstein, the organization, and the industry which this organization is a part of. More or less it deals with the thoughts of the employees and contains specific aspects of the local performance of the company. This study will give an insight into the operations and analytics process of the Internet of Things and Artificial Intelligence sectors in the country of Bangladesh. This report is a very important part of the learning process of students in the BTM department, a document that shows the potentials of learning and taking industrial experience into consideration.

1.7 Limitation

I did try to get the maximum out of this point although some points were restricted. Three months were relatively a short period to achieve the entire set of knowledge and understanding of the organization. Physical communication was an issue due to the pandemic. Due to contractual obligations, some data and statistical information related to the company can not be shared for the purpose of the report on the internship.

Chapter 2: Company Overview

Bondstein is a prominent technology enterprise in Bangladesh that has been significantly contributing to the advancement and implementation of Internet of Things (IoT) solutions for various industries. Bondstein was founded in the year 2013 and has since emerged as a trailblazer in the field of Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning (ML) technologies. Bondstein has been acknowledged as a Microsoft Gold Partner and AWS Advanced Consulting Partner due to its emphasis on customer satisfaction and innovation.

Bondstein offers a variety of Internet of Things (IoT) solutions and services to enterprises, encompassing intelligent urban infrastructure, healthcare, energy and utilities, and supply chain and logistics. The corporation has effectively executed numerous ventures in Bangladesh and other nations, such as India, Singapore, and the United States. The IoT solutions provided by Bondstein have facilitated the optimization of business operations, cost reduction, and improvement of customer experiences.

The organization's proficiency in Internet of Things (IoT) technology and its dedication to originality have established its noteworthy presence in the IoT sector. Bondstein has been acknowledged for its industry contributions, having received the "Best IoT Startup" accolade at the Bangladesh Startup Awards in 2017.

Bondstein's contribution to the IoT industry has played a significant role in promoting the acceptance of IoT technology in Bangladesh and other regions. The innovative solutions and services offered by the company have enabled businesses to effectively utilize the advantages of the Internet of Things (IoT) and revolutionize their operations.

2.1 Overview of Bondstein's IoT solutions and services

Bondstein is a prominent provider of Internet of Things (IoT) solutions in Bangladesh, offering a diverse array of services and solutions to enterprises operating in multiple industries. The Internet of Things (IoT) solutions offered by the company are intended to aid organizations in streamlining their operations, curtailing expenses, and augmenting efficacy by leveraging sophisticated technologies such as sensors, cloud computing, and data analytics. The present discourse delves into several of Bondstein's principal solutions and services pertaining to the Internet of Things (IoT).

The IoT solutions developed by Bondstein have been successfully deployed across diverse sectors such as agriculture, manufacturing, and healthcare. The organization boasts a robust history of efficacious undertakings, accompanied by illustrative instances accessible on their online platform.

An instance of a prosperous undertaking is the execution of a smart irrigation system by Bondstein for a sizable agricultural estate located in Bangladesh. The system employs

Internet of Things (IoT) sensors to observe the levels of moisture in the soil, patterns of weather, and the health of crops. This allows farmers to enhance their irrigation schedules and minimize their water consumption. The implementation of the system has led to noteworthy reductions in expenses for the farm and enhancements in crop productivity.

The IoT solutions offered by Bondstein offer various advantages to enterprises, such as heightened efficacy, reduced expenses, and augmented decision-making proficiencies. Through the utilization of IoT technologies, enterprises can acquire significant insights into their operations and implement data-driven decisions that foster expansion and novelty.

2.2 Mission and Vision of Bondstein

Mission: Bondstein Technologies Limited is committed to providing creative, reliable, and economical solutions to its clientele. Bondstein is dedicated to delivering excellent customer service, exceptional product quality, and unparalleled value.

Vision: The vision of Bondstein Technologies Limited is to establish itself as a leading provider of technology solutions and services that facilitate the success of its clients in their business operations. Bondstein aims to provide optimal customer experience and establish a reputation as a reliable collaborator among its customers, partners, and employees. Bondstein endeavours to cultivate a culture of cooperation, originality, and superiority with the aim of delivering the most pioneering and consequential resolutions for their clientele.

Goal: The objective of Bondstein is to establish itself as a leader in the technology industry by providing its clients with high-quality solutions, services, and support. Bondstein endeavours to cultivate a culture of trust and cooperation among its clientele, associates, and personnel.

Bondstein aims to develop cutting-edge and effective solutions that meet the requirements of their customers, while consistently improving their offerings.

2.2.1 Values of Bondstein

Bondstein Technologies Limited aims to establish itself as a prominent supplier of superior-grade commodities and services in the global market, leveraging its robust market standing, technical expertise, and financial prowess. The company's strategic objective is to foster innovation and expansion in the sectors it caters to, through the implementation of advanced technology and the diversification of its product line. The company aims to prioritize the cultivation of robust relationships with its clients and partners, alongside its pursuit of operational excellence. Bondstein aims to allocate its financial resources towards expanding into new markets while simultaneously retaining its current market share.

2.3 Management

2.3.1 Organizational structure of Bondstein

Bondstein Technologies Limited is a technology enterprise that specializes in the development and implementation of distinctive corporate solutions. The organization has developed a range of products and services aimed at enhancing the operational effectiveness and financial viability of businesses. Bondstein Technologies Limited is managed by a team of seasoned professionals who possess a comprehensive understanding of the technology sector and the challenges that businesses face.

The overall direction of the company is under the purview of Mir Shahrukh Islam, who serves as the Chief Executive Officer and Managing Director. Zafir Shafiee Chowdhury, as the Chief Information Officer, assumes responsibility for all decisions regarding the adoption of novel technologies and advancements. The senior management team is responsible for overseeing the daily operations and management of the company and assisting the employees. The aforementioned tasks encompass the development and execution of strategic plans, resource management, and fostering interdepartmental collaboration. Sadequl Arefin holds a position on the board of directors and exercises considerable authority in the decision-making processes of the

corporation. Bondstein Technologies Limited was established by Md Iftekharul Islam and T M Moniruzzaman Sunny.

2.3.2 Organizational Divisions of Bondstein

The significance of each department within a company is contingent upon the magnitude and nature of the tasks at hand. The various divisions are striving to achieve a competitive edge from their respective viewpoints. The staffing of departments involves the employment of a diverse group of competent personnel to facilitate the attainment of organizational objectives. Bondstein operates as a subsidiary of Runner Group, whereby each department's undertakings are structured and executed in alignment with the established framework of Runner Group. The main departments of Bondstein are as follows:

Finance and Account Department	Marketing Team	Human Resources Department
VTS Operations	Non VTS Business Development Department	Sales Department
Information Technology Department	Business to Government Team	Research and Development Department
Supply Chain Department	Non VTS Operations Department	Customer Services Department

Table 1: Departments of Bondstein

2.3.3 Organizational Leadership Style

Bondstein's leadership style is characterized by a well-defined hierarchy, rigorous benchmarks, and adherence to organizational protocols. Bondstein's leadership approach is characterized by a bureaucratic style, which involves a hierarchical power structure that sets standards for both administration and decision-making. The bureaucratic leadership style employed by Bondstein Technology has been consistently instrumental in facilitating the organization's progress towards achieving new milestones. The subsequent are a few of the benefits:

The process centralizes the responsibilities and functions of the team. Bureaucratic leaders tend to prefer teams that have clearly defined responsibilities. The leadership style aims to cultivate specialized professionals, despite occasional requirements for employees possessing the requisite skills to serve in multiple roles. Each member of the team is assigned a specific task to perform. Consequently, all individuals, including the leader, can concentrate their endeavours on their respective areas of expertise, thereby guaranteeing that all inquiries are handled by the suitable individuals.

The concept of authority hierarchy refers to the organizational structure that establishes the levels of power and decision-making within a group or institution. The organizational structure of the company is hierarchical in nature, where individuals occupying lower-level positions are accountable to and under the supervision of their superiors in higher positions. At Bondstein, employees are accountable to their respective department heads and are supervised by their team leaders.

2.3.4 HR Management Practices

The Human Resources (HR) department plays a crucial role in any organization as it is responsible for safeguarding the welfare of its workforce. The matter in question has also been brought to the attention of the human resources department at Bondstein Technologies Ltd. The department is responsible for overseeing the management of the organization's human resources requirements, including payroll, regulations, policies, and other related matters.

Bondstein adheres to a strict schedule for the working hours of its staff. The availability of the concerned individuals is from 8:00 a.m. to 5:00 p.m. The Human Resources department is responsible for developing employee benefits, Key Performance Indicators (KPIs), and incentives. To achieve effectiveness, the design of the system must be such that it fosters employee motivation and is relevant to their work. In addition, it is imperative to note that the Human Resources department strictly adheres to a policy of non-acceptance towards any form of harassment or discrimination. Individuals who are found to violate the aforementioned rule will be subject to legal repercussions.

The process of recruitment is overseen by the Human Resources department, which is responsible for the hiring of fresh personnel. In instances where additional personnel are needed, the heads of respective departments initiate a formal request for personnel, commonly referred to as a requisition. Subsequently, he collaborates with the departmental heads to conduct a comprehensive job analysis and formulate the job advertisement. Subsequently, he disseminates it across multiple employment websites and online networking services. Furthermore, he endeavours to disseminate information regarding the job vacancies internally in order to explore the possibility of securing a suitable candidate. The individual in question arranges for interviews subsequent to consulting with the relevant departmental leader regarding their schedule, and subsequently informs the candidates of the date and time of the interview.

2.3.5 Organizational Development and Employer Branding

Organizational Development (OD) and Employer Branding are essential factors that significantly contribute to the success of an organization. The significance of these two factors in shaping the culture, values, and reputation of Bondstein cannot be overstated. Bondstein Technologies Limited utilizes diverse approaches to achieve organizational development and employer branding. In the following discourse, I explicate a select few that were procured during the duration of my internship.

Organizational Development refers to the systematic approach of enhancing organizational efficiency and enabling transformative processes. The process entails the identification of areas that require enhancement, the implementation of appropriate strategies to tackle them, and the subsequent evaluation of the results. Bondstein leverages Organizational Development to optimize business processes, optimize resource utilization, and elevate overall performance. By cultivating a culture of continuous development, Bondstein can sustain its competitiveness in the market and adapt to the diverse needs of its customers. The strategy employed by the employer to establish the business as an attractive employer to prospective employees. This entails the formulation and dissemination of the organization's values, ethos, and benefits, as well as projecting a unique and positive image of the enterprise as a prospective employer.

The implementation of employer branding strategies has been observed to facilitate the process of attracting and retaining skilled personnel for organizations operating in Bangladesh.

Mental health sessions frequently address the topic of office ergonomics. During these sessions, employees are instructed on the utilization of prompts and reminders to facilitate their movement away from their workstations and encouraged to take a walk outside, if feasible. Employees are advised to incorporate physical activity into their daily routine by opting for the stairs instead of the elevator, engaging in face-to-face communication with colleagues when feasible, and varying their work tasks periodically to promote postural

changes. Additionally, there exists a slogan with an anti-smoking message that has motivated individuals to cease smoking.

Additionally, there exists a designated period during which each employee is afforded the opportunity to articulate any workplace concerns they may have, as well as to request aid, instruction, or updated equipment.

Bondstein is pursuing objectives that are in line with worldwide operations in order to enhance employee empowerment within the organization. Regular meetings are conducted among the employees to deliberate on the challenges encountered within the organization and devise effective solutions to tackle them. Additionally, these meetings serve as a platform to prepare for upcoming tasks and address any apprehensions.

In addition to its other activities, Bondstein arranges interdepartmental athletic contests. This practice enables employees to enhance their interpersonal relationships, augment their leadership and teamwork proficiencies, establish connections with diverse departments owing to the large-scale assembly and involvement, and primarily, to alleviate their mundane cogitations.

2.4 Marketing Practice of Bondstein

Marketing strategies are formulated to ensure the enduring expansion of the organization in the future, while simultaneously fostering enduring and genuine connections with the clientele.

2.4.1 Marketing Strategies of Bondstein

Bondstein Technologies Limited is a company that specializes in the Internet of Things (IoT) and offers service-oriented solutions to its clientele. There is a growing emphasis on utilizing internet marketing strategies to enhance revenue generation. Despite the gradual dominance of online marketing in recent years, traditional marketing has not been entirely replaced. Bondstein Bangladesh engages in both online and offline advertising. Several of them are delineated below:

Bondstein Technologies engages in online marketing via various social media platforms, including Facebook, Instagram, LinkedIn, YouTube, and Twitter, by generating original content such as motion graphics and short films. Bondstein Technologies frequently exhibits advertisements on various websites. In the event that a user selects said advertisements, they shall be redirected to the website of Bondstein Technologies. Furthermore, the topic of interest is search engine optimization.

Bondstein Technologies Limited has identified certain market gaps and has developed products and solutions to address these issues. The organization endeavours to identify prospective enterprises that could leverage their offerings to augment their operations and conducts in-person outreach to advertise their products and services.

The sales representatives at Bondstein engage with multiple individuals, providing them with product information and facilitating sales transactions. Moreover, their sales representative participates in numerous sales gatherings with corporate customers and verifies sales transactions therein.

Bondstein Technologies employs affiliate marketing strategies in conjunction with other reputable brands in Bangladesh. Engaging in a diverse range of activities. The process of identifying the placement of Bondstein Technologies' promotional banners across multiple markets during their advertising initiatives. Bondstein Technologies has adopted a significant marketing approach by

serving as the present title sponsor of IUT Impulse FC. Additionally, they provided backing for various academic celebrations and endeavours at the university.

2.4.2 Targeting Strategies of Bondstein

Bondstein Technologies employs unique targeting strategies. The marketing strategy is characterized by its multifaceted nature. Bondstein Technologies caters to distinct customer segments. Targeting the corporate clientele was their primary goal. The customer base of the

the aforementioned industry has exhibited a consistent upward trend. The company focused on demographic segmentation by targeting the younger and middle-aged demographic, as well as the middle-to-upper income brackets in Bangladesh, where car ownership is considered a societal norm. Bondstein Technologies Limited caters to a diverse range of target audiences, including small and medium-sized enterprises, multinational corporations, garment manufacturers, vehicle vendors, bus companies, truck proprietors, delivery firms, educational institutions, governmental organizations, and individuals. The target market of the company comprises customers who seek affordable technological solutions to aid them in achieving their goals.

Bondstein offers its customers a value proposition of providing equivalent products or services at a lower cost. Bondstein's Internet of Things (IoT) solution offers a higher quality solution at a comparatively lower cost than that of its competitors. The significance of conducting price comparisons across various IoT companies lies in the potential to enhance customer satisfaction. The pricing differential is observed in comparison to other dealers of VTS. The company's distinct collaborations with various brands and corporations allow it to provide digital solutions and goods at a discounted rate of up to 25%. Bondstein holds a competitive advantage in the realm of affordable technology pricing due to its in-house manufacturing capabilities. Bondstein Technologies Limited may employ targeted advertising strategies to encourage potential customers who have previously visited their website to revisit and make a purchase.

2.4.3 Market Segmentation of Bondstein

Market segmentation is a widely adopted practice that involves dividing a large consumer or company market into smaller sub-groups based on a common characteristic or trait shared among the consumers. The topic of Bondstein's market segmentation is further elaborated below.

Geographic

Bondstein Technologies initially focused on the entire nation as a unified market segment. In 2013, Bondstein Technologies was established with the objective of acquiring a significant portion of the burgeoning IoT market in the nation. The primary focus of their business operations was directed towards catering to significant corporate customers, including Robi and Healthcare distribution. Bondstein Technologies has achieved a dominant position in the national market by virtue of its operations and post-sales services in the VTS domain.

Demographic

The company targets a youthful demographic through the utilization of marketing technology equipment. Demographic segmentation is employed in their marketing strategy. The firm caters to a diverse clientele encompassing various sectors such as retail,

manufacturing, banking and finance, healthcare, education, and government. Nevertheless, the VTS segment was aimed at individuals who possess automobiles and have higher levels of income. In addition, they focused on a range of multinational corporations, fast-moving consumer goods companies, domestic enterprises, and governmental entities.

Psychographic

Bondstein Technologies Limited caters to clients who are in search of innovative solutions to enhance their business operations and processes. Individuals seeking effective solutions for securing their automobiles and residences may also utilize these websites. Individuals who utilize online platforms, including but not limited to Facebook, Twitter, and Instagram, have been recognized as a significant demographic of consumers.

Behavioral

Behavioral segments refer to the various aspects of consumer behavior that influence their purchasing decisions. These aspects include the perceived capabilities and benefits of the product, as well as the frequency and extent to which customers utilize it. Bondstein Technologies Limited prioritizes customer service and strives to provide prompt and efficient solutions to its clients.

2.5.4 Marketing Mix of Bondstein

The marketing mix is a tool utilized for the purpose of executing a company's marketing strategy. The marketing mix is a strategic framework utilized to assess the efficacy of promotional endeavours within a marketing plan. This paper briefly outlines the marketing mix of Bondstein Technologies, which encompasses all possible marketing strategies employed to attain the company's marketing objectives.

Product

Bondstein operates as a marketplace for both business-to-consumer (B2C) and business-to-business (B2B) transactions. Consumers have the option to choose from a selection of two distinct classifications of products. The aforementioned classifications are delineated as follows:

The categories being referred to:

1. VTS: The Vehicle Tracking System is Bondstein's flagship product. This tracker allows users to monitor their vehicles. With this product, customers can track the location, expenses, distance traveled, and driving behavior.

Fig 1: Vehicle Tracking System (VTS)

2. Smart Home Solutions: The Smart Home Solutions of Bondstein offer one of the most advanced automation and control systems in premises, further increasing convenience, security, and energy efficiency. It facilitates customers to control lighting, heating, security systems, and other connected devices from one place from anywhere, thus making their home a seamless, intelligent experience.

3. Smart Box: The SmartBox from Bondstein is one of the IoT devices that have brought innovation into the sphere of seamless connected living and automation. SmartBox integrates multiple functionalities, including real-time monitored data analytics with intelligent remote control. It is primarily used in Bangladesh for preventing question leaks during the admission test, thus assuring the integrity and security of the process.

4. Digital Solutions: The Bondstein Digital Solutions suite comprises software development, digital marketing, and data analytics. All these help businesses streamline their processes, optimize their performance, and make data-driven decisions.

5. Software Solutions: Bondstein's Software Solutions provide custom-developed applications tailored to meet the specific needs of businesses. These solutions encompass a wide range of services, customer relationship management (CRM), and mobile app development, aimed at improving operational efficiency and driving digital transformation.

Place

Bondstein supplements physical distribution with a strong online platform to maximize customer reach and convenience. Their online platform enables customers to shop hassle-free, with detailed product information, feature comparison, and easy purchasing. The user-friendly website, bondstein.com, ensures an enjoyable browsing and buying experience. The company also accepts orders through various channels, including YBX (The Yellow Box), KAM, and face-to-face meetings with sales representatives. This multichannel strategy provides flexible ordering options. Upon placing an order, Bondstein dispatches expertly trained technicians to deliver and install products at the customer's location, ensuring quick delivery and professional setup for enhanced customer satisfaction.

Price

Bondstein employs an aggressively competitive pricing strategy that offers fair value to customers. Their IoT and digital solutions are affordably priced to attract small and medium-sized enterprises, promoting widespread adoption. However, their flagship Vehicle Tracking System (VTS) is priced higher than other service providers, justified by its advanced features, reliability, comprehensive support, and quality service. Customers are willing to pay a premium for VTS due to its significant value. Bondstein's transparent pricing strategy ensures customers understand what they are paying for, fostering trust and loyalty.

Promotion

Bondstein uses a well-diversified promotional strategy that leverages both digital and traditional media. Their online promotions target users through Facebook, Instagram, LinkedIn, and Bondstein's website, regularly sharing updates, success stories, and detailed product and service information. The company also runs paid advertisements on these platforms. Additionally, Bondstein has been featured in prestigious publications like Forbes and Prothom Alo, enhancing its credibility and market visibility. A commission-based sales strategy rewards sales experts for generating leads and closing sales, incentivizing top performance and boosting customer engagement and sales.

People

Bondstein's success is driven by a dedicated and skilled workforce of over 55 employees. The company emphasizes continuous learning and professional growth, ensuring employees stay updated with technological advancements. The highly trained team is versatile and adapts to evolving market needs. Bondstein also has eight technicians stationed outside Dhaka to provide prompt and efficient technical support nationwide, ensuring high-quality service for all customers. The company's commitment to employee growth and customer satisfaction is evident in its proactive training and customer service approach.

Physical Evidence

Bondstein's service delivery excellence is demonstrated through both physical and digital touchpoints. Their virtual store offers a seamless shopping experience, while direct engagements with sales representatives ensure personalized service. VTS support is streamlined through partnerships with major providers like Robi and Runner Group, enhancing credibility and reach. Bondstein also offers TMV, a proprietary service that simplifies acquiring VTS, showcasing their commitment to accessibility and customer convenience. These touchpoints collectively create a reliable and user-friendly customer experience.

Process

Bondstein's operational processes prioritize efficiency and customer satisfaction. The purchasing process is straightforward, allowing customers to place orders via the website or by contacting sales representatives. Options like Robi, RAL, and RML are available for those who prefer direct service provider engagement. Once an order is placed, Bondstein takes immediate action from order confirmation to production and delivery. For non-VTS purchases, production begins upon order placement, ensuring timely delivery of customized products. This structured approach guarantees precision and care in handling every order, maintaining high quality and customer satisfaction. Bondstein's streamlined processes and customer-centric operations reinforce their position as a leader in the IoT industry in Bangladesh.

Robi

Robi is a longstanding patron of our establishment. They procure products from us across three categories.

Robi EB procured a large quantity of products from our company and stored them until the need for new installations arose. They subsequently notified the Key Account Manager (KAM) of Bondstein, who then took the necessary measures to deliver and install the products.

Robi MO and Admin have instructed us to provide the delivery details, installation address, and quantity of the product through YBX. Subsequently, the Key Account Manager (KAM) undertakes requisite measures to facilitate the delivery and installation of the product.

RML & RAL

RML and RAL are additional providers of Bondstein. The KAM is notified via email and YBX when there is a requirement to install a new device. The Key Account Managers (KAM) undertake requisite measures to ensure the delivery and installation of the devices.

2.6 Financial Performance and Accounting Practices of Bondstein

The financial and accounting practices of Bondstein are heavily dependent on the department of finance and accounts. The department carries out its tasks and functions at the headquarters located in Hathirjeel. The department is responsible for overseeing all financial transactions and accounting activities. Bondstein is a privately held corporation, and as such, it does not disclose its financial statements to the public. Additionally, the specific responsibilities of the department in question are not publicly available. Based on the available information, I endeavoured to provide an accurate depiction of the process.

Md. Jahid Ullah has been fulfilling the role of Chief Financial Officer at Bondstein Technologies Ltd. since 2021 and has demonstrated his value to the organization. He assumes responsibility for the organization's financial affairs on a daily basis. Additionally, he assumes responsibility for the creation of annual financial plans, which are subsequently disseminated throughout the organization. The Chief Financial Officer (CFO) is required to collaborate with the global CFO in order to address crucial financial challenges that impact the organization both holistically and across different regions. In addition, the individual devises strategies for ensuring the organization's sustained financial solvency, including methods for augmenting revenue streams while minimizing expenditures. The Chief Financial Officer diligently records and documents all

financial transactions, and authorizes their execution only subsequent to granting approval. This measure guarantees suitable responsibility. In addition to its primary responsibilities, the Finance

department is also tasked with managing the following duties: Conduct an assessment and provide a comprehensive evaluation of the financial statements of the organization to the management.

- It is imperative to uphold robust and intimate connections with essential stakeholders while simultaneously overseeing the treasury.
- It is imperative to uphold robust and enduring connections with essential stakeholders while overseeing the treasury function.
- The task at hand is to create strategies and Standard Operating Procedures (SOPs) that align with the objectives of the organization.
- Coordinate and direct a group of individuals with a shared focus on achieving the goals of the department.

The accounts team of Bondstein Technologies has undergone a merger with the finance team and is presently operating in collaboration. They are responsible for managing all financial transactions and activities. They must maintain comprehensive accounting documentation for all their business ventures.

The responsibility of monitoring and recording the financial activities of the organization has been assigned to the personnel working in the accounting department. They must maintain a continuous liaison with the Commercial, Operations, and Management teams to ensure the proper upkeep of these accounts. Several employees have been assigned the responsibility of generating financial reports and scrutinizing gathered financial information.

The accounting department is responsible for the recording and preparation of daily bank statements. It is imperative for individuals to closely monitor their multiple bank accounts. Furthermore, individuals must maintain accurate and current records of their account information about loan repayments, interest rates, miscellaneous charges, and revenue generated from sales. Stated differently, the department responsible for managing financial records, namely the accounts department, operates under the guidance and supervision of the Chief Financial Officer.

The payment of expenses is handled by the accounting department through two distinct methods. The accounting department is staffed by one full-time employee and one intern who are responsible for managing these tasks. Both employees remunerate through a cheque and maintain individual records thereof, whereas one of them utilizes a cash account for payment and also maintains a record of the same.

The aforementioned activities are documented by each individual and subsequently transmitted to the accounting department for integration into the company's routine financial and accounting operations, as deemed appropriate. According to experts, this is the

daily operational procedure of the entire finance and accounting division.

Bondstein Technologies adheres to a rigorous protocol of non-disclosure with regard to financial information and refrains from furnishing such data. Consequently, due to the confidentiality of the financial statements, a comprehensive analysis of Bondstein Technologies Limited cannot be conducted. The financial performance of the company appears to be satisfactory, facilitating their expansion of operations on both regional and global scales. The investment made by Runner Group in Bondstein Technologies was prompted by the impressive performance of the latter.

2.7 Operation Management and Information System Practices in Bondstein

Information systems encompass the individuals who interact with the systems, as well as the hardware and software utilized and are accountable for managing a corporation's data and formulating decisions based on it. Managers depend on information systems to collect, retain, and integrate essential corporate data for analyzing, monitoring, and making decisions. Bondstein Technologies employs computer-based information systems for the automation of manufacturing operations. Moreover, these systems are employed for ordering, inventory management, billing management, and vendor payment collection. The employment of information systems is prevalent in a vast majority of consumer interactions. Information systems are utilized to capture and monitor transactions, which are subsequently transmitted to designated destinations, when a customer places an order or a seller dispatches a product for delivery via the internet.

Bondstein is a comprehensive Internet of Things (IoT) enterprise that follows established procedures. They utilize distinct software applications for various objectives.

The Sell Update module facilitates business registration. The individual engages in the practice of organizing various items, adjusting their respective prices, and subsequently advertising said products on the Internet as a means of conducting their business operations. In contrast, vendor managers are responsible for monitoring sales, maintaining up-to-date data, and evaluating various

scenarios and operations. The Operations and Inventory team provides support for the sell update function.

The Order process functions from YBX are utilized by both the operational and customer support teams to prepare orders for delivery. The IMS module facilitates the management of inventory, orders, stocks (both single and multiple), and returns (including warranty and product swaps). In the context of customer care operations, the practice of validating customer orders and addressing their concerns is commonly employed through the management of relevant departments.

One can monitor the status of their order in YBX by accessing the feature that tracks the progress of the order from preparation to delivery. This allows for real-time updates on the completion of various stages of the order.

The Logistics Operation Portfolio (LOP) serves as the primary module utilized by the Operations department. The monitoring of orders can be conducted in both forward and backward directions, and the complete lifespan of the product can be tracked through a dedicated status level.

2.8 Company Analysis of Bondstein

Bondstein Technologies Limited is a privately held Internet of Things (IoT) enterprise with its corporate office located in Dhaka, Bangladesh. Established in the year 2013, VTS offers solutions to enterprises of varying magnitudes. Bondstein's Vehicle Tracking System is a platform that consolidates various business processes into a unified system. In addition to its primary offerings, the organization provides a variety of supplementary solutions, including Smart Box, Smart Home solutions, and Fire identifiers. The products manufactured by Bondstein have been intentionally designed to possess a high degree of customization and user-friendliness. This enables clients to promptly implement their solutions. In addition, Bondstein offers a variety of support services aimed at assisting customers in optimizing their utilization of the company's software. Bondstein has undergone significant expansion in recent times, attributable to its inventive merchandise and customer-focused methodology. The organization has experienced a yearly growth rate of more than 20% since its establishment and presently serves a clientele comprising some of the most prominent multinational corporations and fast-moving consumer goods companies in Bangladesh.

2.8.1 Porter's Five Forces Analysis of Bondstein

An analysis of Porter's five forces for Bondstein Technologies Limited:
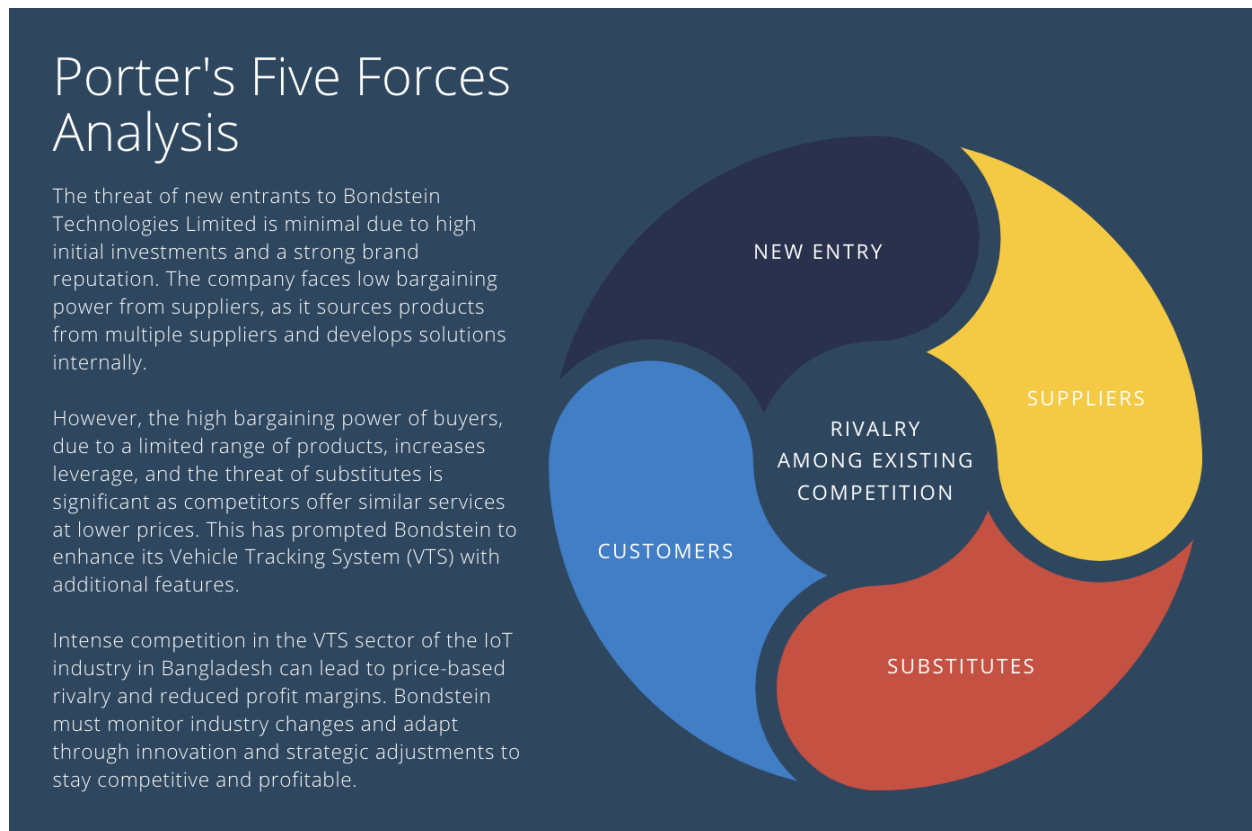
Figure 2: Porter's Five Process

The Threat of New Entrants

Due to the high initial investment required to break into the market, new competitors pose little threat. New competitors will have a formidable obstacle in breaking into the market because of Bondstein Technologies Limited's strong reputation and brand affinity.

Bargaining Power of Suppliers

Based on the evaluation conducted, it can be inferred that the bargaining power of suppliers for Bondstein Technologies Limited is relatively weak. This is due to the fact that the company both imports certain products from foreign sources and also produces its own solutions. Bondstein does not depend on its suppliers for this purpose. Numerous suppliers are available to guarantee the

provision of goods. The organization's internal IT professionals and software developers independently create solutions and products.

Bargaining Power of Buyers

Bondstein Technologies Limited experiences a relatively higher level of bargaining power held by buyers due to the company's limited range of products and services, which restricts the number of options available for buyers to choose from. Moreover, due to the restricted assortment of products and solutions offered by Bondstein, the company is unable to entice a larger customer base, resulting in an increased bargaining power for the buyers.

The Threat of Substitutes

Bondstein Technologies Limited is considered to face a greater degree of risk from substitute products. The organization is endeavoring to introduce novel functionalities within its VTS division, even though its rival offers comparable services at a lower monthly fee. The organization is presently directing its attention toward enhancing competitiveness by augmenting its service offerings with additional features.

Rivalry among existing competitors

The sector of Vehicle Tracking System (VTS) within the Internet of Things (IoT) industry in Bangladesh is characterized by intense competition, as numerous providers offer comparable services. The aforementioned scenario has the potential to result in a heightened level of price-based rivalry and a concomitant decrease in profit margins for all market participants, including Bondstein.

To sustain competitiveness and ensure profitability, it is imperative for Bondstein to consistently monitor and adjust to industry changes.

2.8.2 SWOT Analysis of Bondstein

A comprehensive evaluation of a company's marketing tactics and products is conducted through a SWOT analysis, which aims to identify the company's strengths, weaknesses, opportunities, and threats. This analysis can be performed either holistically or by individual departments. In general,

it facilitates an organization in enhancing its decision-making process and attaining greater accomplishments in its overall pursuits. The following is a presentation of the SWOT analysis for Bondstein Technologies.

Strengths: Bondstein Technologies boasts an experienced and qualified management team, which is crucial for strategic decision-making and leadership. The company has advanced technological advancements and specialized expertise in the field of security, giving it a competitive edge. With a robust clientele and established customer connections, Bondstein enjoys a significant market presence. The brand name has gained substantial recognition and reputation, particularly in the Vehicle Tracking System (VTS) segments. The company's VTS monitor panel offers more features than its competitors, attracting corporate clients from diverse industries.

Weaknesses: Despite its strengths, Bondstein faces some critical weaknesses. The enterprise has a significant dependence on a limited set of pivotal customers through its proprietary TMV platform. Additionally, the monthly subscription cost is relatively steep, which could be a barrier for some potential clients. The company currently offers few readily available products for sale in the market, apart from VTS. Lack of diversification into alternative industries and a dependence on imports also pose challenges.

Opportunities: Bondstein has several opportunities for growth and expansion. Market and geographic expansion into unexplored areas can provide new revenue streams. The growing need for security products and digital solutions presents a substantial market opportunity. Establishing contact with the government and marketing their merchandise to them could open new channels. Forming strategic partnerships and alliances can further strengthen Bondstein's market position. Additionally, the increasing popularity of smart home appliances and the rising demand for digital solutions offer significant growth potential.

Threats: The company faces threats from escalating competition in the security sector, which can erode its market share. Changes in governmental regulations and policies can impact operations. Emerging technologies could potentially disrupt the market, posing a threat to Bondstein's current product offerings. Furthermore, rising expenses for raw materials and technicians are significant concerns that could affect profitability.

Thus, it can be inferred that Bondstein Technologies possesses significant potential for expansion and market dominance in the foreseeable future. The organization has faced multiple challenges and hindrances in its journey towards attaining its present status. The organization's initial size was modest, but it has since expanded significantly. It is imperative for enterprises operating in the Internet of Things (IoT) sector to give precedence to delivering superior quality products and services to drive the industry's growth. Bondstein Technologies, being a decentralized organization with a shared set of core values among its workforce, facilitates adaptability to dynamic work settings beyond initial expectations. Bondstein Technologies is able to uphold its dominant position in the IoT industry of Bangladesh due to the diligent efforts of each department and the utilization of advanced technological infrastructure, resulting in an efficient workforce.

Chapter 3: Industry Analysis

The implementation of Internet of Things (IoT) technology in Bangladesh is a topic of interest in academic circles.

The notion of the Internet of Things (IoT) is increasingly gaining momentum in Bangladesh, as the nation endeavors to establish itself as a prominent player in the realm of technological advancement. Bangladesh has experienced a surge in demand for connected devices and a corresponding need for secure and efficient data transmission due to its expanding population. The Internet of Things (IoT) has been leveraged to create applications in various domains, including but not limited to smart urban centers, medical services, farming, transportation, and others. The Bangladeshi government has undertaken multiple initiatives aimed at enhancing the country's Internet of Things (IoT) infrastructure, while several private enterprises are also making significant investments in this domain.

The Bangladesh Telecommunications Regulatory Commission has undertaken several initiatives aimed at promoting the growth of the nation's Internet of Things (IoT) infrastructure. One of the initiatives involves the creation of an Internet of Things (IoT) platform that facilitates the exchange of information among various parties. Additionally, there exists an endeavor to implement a standardized system for the administration of Internet of Things (IoT) devices within Bangladesh, thereby facilitating user connectivity to the network.

As per a report published by the Bangladesh Association of Software and Information Services (BASIS), the Internet of Things (IoT) market in Bangladesh was appraised at $20 million in the year 2019. It is anticipated that the market will expand at a Compound Annual Growth Rate (CAGR) of 20% and attain a value of $60 million by the year 2024.

The expansion of the Internet of Things (IoT) in Bangladesh can be attributed to several factors, including the government's emphasis on digitalization, the presence of proficient IT experts, and the growing need for automation and efficacy in sectors such as healthcare, agriculture, and manufacturing. Furthermore, the growing accessibility of cost-effective Internet of Things (IoT) devices and sensors is simplifying the process of integrating IoT solutions into business operations.

Notwithstanding the potential benefits of IoT in Bangladesh, there exist several obstacles impeding its widespread implementation, such as inadequate infrastructure, exorbitant expenses associated

with IoT solutions, and apprehensions regarding data security. Additionally, there exists a necessity for heightened cognizance and instruction among commercial enterprises and decision-makers regarding the prospective advantages of Internet of Things (IoT) technology.

The topic of discussion pertains to the implementation of the Vehicle Tracking System (VTS) in Bangladesh.

The Vehicle Tracking System (VTS) is a nascent technology in Bangladesh that is increasingly gaining traction owing to its efficacy and economical nature in monitoring vehicular movements. The utilization of VTS technology enables the monitoring of vehicular movements, performance assessment, and status reporting. The utilization of this technology encompasses a range of applications, including but not limited to freight tracking, fleet management, and personal vehicle tracking.

The Bangladeshi government has implemented measures aimed at promoting the uptake of Vessel Traffic Service (VTS) technology. The Bangladesh Road Transport Authority (BRTA) has initiated a project aimed at the installation of Vehicle Tracking Systems (VTS) in buses and taxis. The anticipated outcome of this project is to mitigate traffic congestion and enhance road safety.

The adoption of Vessel Traffic Services (VTS) technology is being promoted by the Bangladesh Telecommunications Regulatory Commission (BTRC) through the provision of incentives. A special fund has been established by the Bangladesh Telecommunication Regulatory Commission (BTRC) to offer monetary aid to enterprises that are utilizing Vessel Traffic Service (VTS) technology.

In Bangladesh, the industries of IoT and VTS are experiencing a rapid growth and present several prospects for businesses to leverage. Given the backing of both governmental and private entities, these particular industries are strategically poised to make significant contributions towards the advancement and expansion of the nation's economy.

3.1 Industry Size

The Internet of Things (IoT) and Vehicle Tracking System (VTS) sector in Bangladesh is currently in its early developmental phase. As per a recent survey conducted by Statista, the market for Internet of Things (IoT) and Vehicle Tracking System (VTS) in Bangladesh is projected to attain a value of $106 million by the year 2023, exhibiting a Compound Annual Growth Rate (CAGR) of 11.6%. Huawei, Ericsson, and Nokia are the prominent entities in the market. The Internet of Things (IoT) industry is witnessing significant investments from the private sector, while the government is adopting a proactive stance towards its development. Moreover, the telecommunications companies in Bangladesh have undertaken the initiative to offer Internet of Things (IoT) services. This is anticipated to facilitate the expansion of the sector.

In comparison to developed nations, Bangladesh, classified as a developing country, has exhibited a slower pace in the adoption of IoT technology. Nevertheless, there has been a noteworthy surge in the adoption of IoT in the nation in recent times, propelled by the expansion of the technology industry and the administration's prioritization of digitalization. As per a report published by the Bangladesh Association of Software and Information Services (BASIS), the Internet of Things (IoT) industry in Bangladesh was appraised at $20 million in the year 2019 and is anticipated to expand at a Compound Annual Growth Rate (CAGR) of 20% to attain a valuation of $60 million by the year 2024.

The growth of IoT in Bangladesh can be attributed to several factors, including the government's emphasis on digitalization, the presence of proficient IT experts, and the rising need for automation and efficiency in sectors such as healthcare, agriculture, and manufacturing. In addition, the growing accessibility of cost-effective Internet of Things (IoT) devices and sensors is facilitating the adoption of IoT solutions by enterprises.

Notwithstanding the potential benefits of IoT, various obstacles are impeding its uptake in Bangladesh, such as inadequate infrastructure, exorbitant expenses associated with IoT solutions, and apprehensions regarding data security. Furthermore, it is imperative to enhance the level of consciousness and instruction among enterprises and decision-makers regarding the probable advantages of Internet of Things (IoT) technology.

Notwithstanding the aforementioned obstacles, the potential outlook for the Internet of Things (IoT) in Bangladesh appears to be encouraging. The Digital Bangladesh initiative of the government endeavors to furnish digital services to the entirety of its citizens, with the Internet of Things (IoT) anticipated to have a pivotal function in realizing this objective. Furthermore, the increasing need for automation and enhanced productivity in sectors like manufacturing and agriculture is anticipated to propel the expansion of the Internet of Things (IoT) industry in Bangladesh.

Although the implementation of IoT in Bangladesh is currently in its nascent phase, the possibilities for expansion and creativity are noteworthy. The growing recognition of the potential advantages of IoT technology among businesses and policymakers is anticipated to result in an upsurge in the adoption of IoT, thereby enhancing productivity and efficiency in various industries and bolstering the nation's economic expansion.

3.2 Background on IoT and its potential impact on business operations

The Internet of Things (IoT) is a technological innovation that facilitates the interconnection of physical objects, devices, and machines to the internet, thereby enabling them to autonomously exchange data and execute operations without the need for human intervention. The Internet of Things (IoT) possesses the capability to transform business

operations through its ability to gather and analyse data in real-time, automate processes, and enhance efficiency and productivity.

The Internet of Things (IoT) is anticipated to exert a noteworthy influence on various sectors, such as healthcare, transportation, manufacturing, and agriculture. The implementation of IoT technology has the potential to enhance various aspects of business operations, including supply chain management optimization, logistics and inventory management improvement, and customer experience enhancement. Moreover, the implementation of Internet of Things (IoT) can aid enterprises in diminishing expenses, augmenting earnings, and attaining a competitive edge.

As per the findings of a report authored by McKinsey & Company, the Internet of Things (IoT) possesses the capability to generate an economic value of a maximum of $11.1 trillion annually

by the year 2025. According to the report, the Internet of Things (IoT) is expected to play a crucial role in enhancing productivity growth, with the capacity to raise productivity by as much as 1.5% annually.

The implementation of IoT technology presents certain challenges, such as data security and privacy apprehensions, the requirement for novel skills and expertise, and the expenses associated with the establishment and upkeep of IoT systems. Furthermore, the advantages that can be derived from the Internet of Things (IoT) are not uniformly dispersed, and enterprises belonging to diverse magnitudes and domains may encounter distinct obstacles and prospects while harnessing IoT for the expansion of their businesses.

In general, the capacity of IoT to revolutionize commercial activities is noteworthy, and enterprises that effectively utilize IoT technology are expected to attain a competitive edge in the industry.

3.3 Maturity of The Industry

The industries of Internet of Things (IoT) and Vehicle Tracking Systems (VTS) are experiencing significant growth in Bangladesh. The level of maturity exhibited by these two industries is discernible from the rising quantity of products, services, and corporate entities that are channeling resources into this domain. The expansion can be primarily ascribed to the government's dedication to furnishing digital infrastructure and connectivity, along with the mounting need for dependable and safe resolutions.

The nation of Bangladesh boasts a notable legacy of inventive achievements, which is evidenced by the latest advancements in the Internet of Things (IoT) and Vehicle Tracking System (VTS) sectors. Several enterprises have been founded in Bangladesh with a primary focus on the advancement and implementation of these technologies. The aforementioned enterprises are utilizing the nation's capacity to emerge as a frontrunner in the Internet of Things (IoT) and Vehicle Tracking System (VTS) domain.

The level of maturity exhibited by the industry is evidenced by the investments made by multinational corporations in said technologies. Microsoft, Amazon, and Google are among the prominent entities operating in this domain. The aforementioned companies have made significant

investments towards the advancement of Internet of Things (IoT) and Vehicle Tracking System (VTS) solutions and services within the country of Bangladesh.

Apart from the investments made by multinational corporations, the Bangladeshi government has also been significantly contributing to the advancement of the Internet of Things (IoT) and Vessel Traffic Services (VTS) sector. Tax incentives, loans, and grants have been made available by the government to encourage companies to invest in said technologies. The facilitation of operations establishment and product/service innovation has been enhanced for companies in Bangladesh.

The enhanced range of products and services being provided by enterprises in Bangladesh is indicative of the industry's maturity. Presently, corporations are providing a diverse array of Internet of Things (IoT) and Vehicle Tracking System (VTS) solutions, encompassing interconnected household appliances to logistical fleet supervision mechanisms. The utilization of these products and services has facilitated the enhancement of operational efficiency and cost reduction for businesses.

In general, the level of maturity exhibited by the Internet of Things (IoT) and Vehicle Tracking System (VTS) industry in Bangladesh is a positive indication of the nation's capacity to emerge as a frontrunner in this domain. Given adequate investments and governmental support, the industry is poised to sustain its swift expansion in the forthcoming years.

3.4 Competitive Environment

There exist several competitors of Bondstein in the Bangladeshi market. Bondstein faces competition from various companies in the IoT industry such as Finder, GP Tracker, Prohori, BDCom, Nextdecade, among others.

Details of competitors of Bondstein for VTS segment includes:

Finder: Over the course of the past decade, the corporation has expanded its portfolio through various affiliated entities, including Monico Technologies Limited. The corporation has been at the forefront of GPS vehicle tracking technology and introduced the FINDER GPS in 2009.

GP Tracker: The Grameenphone Smart Tracker, previously referred to as the 'Vehicle Tracking Service', is a telematics solution that collects data on individual vehicles or entire fleets. This data includes vehicle location, driver behaviour, engine diagnostics, activity reporting, and notifications. The software utilized by the Smart Tracker visualizes this data, allowing users to manage their entire fleet resources through satellite GPS and GSM

communication. This solution offers a range of features including vehicle tracking, navigation, management, incident alarms, reports, driving behavior analytics, and engine status monitoring. It enables users to conveniently interact with their vehicle through an application. The implementation of this solution necessitates the connection of a tracking device to the respective vehicle. This will enable the user to personalize their vehicle settings, such as establishing a designated area for operation and receiving notifications when exceeding speed limits. Additionally, the system provides comprehensive reporting and numerous other functionalities.

Prohori: Onnorokom Group offers Prohori as an additional VTS provider. The company is endeavoring to penetrate the market and striving to attain a position of excellence within this particular sector.

BDCom: BDCOM takes pride in being the pioneer VTS Provider Company in the Bangladesh market since 2005. The BDCOM Smart Tracker Vehicle Tracking System integrates automatic vehicle location technology in individual vehicles with a software platform that gathers fleet data to provide a comprehensive overview of vehicle locations. Contemporary vehicle tracking systems frequently employ GPS technology to determine the vehicle's location and transmit the information via cellular networks such as 2G, 3G, or 4G.

Nextdecade: NEXT Carbon Solutions is collaborating with external clients globally to implement carbon capture and storage technology in order to mitigate carbon dioxide emissions at their industrial sites. It is believed that NEXT Carbon Solutions has the potential to make significant and quantifiable advancements in the pursuit of a net-zero future, thereby effecting transformative change.

Details of competitors of Bondstein for IoT segment includes: The Internet of Things (IoT) sector is experiencing swift expansion within the borders of Bangladesh, with numerous entities offering a range of IoT-based solutions and services. Bondstein faces competition from several prominent players in the IoT sector in Bangladesh.

Figure 3: Competitors of Bondstein

Grameenphone is a prominent telecommunications operator in Bangladesh that offers Internet of Things (IoT) solutions, including but not limited to fleet management, asset tracking, and smart farming. Robi Axiata Limited is a significant telecommunications operator in Bangladesh that provides Internet of Things (IoT) solutions such as asset tracking, smart metering, and remote monitoring. Aamra Technologies Limited is a prominent provider of Internet of Things (IoT) solutions in Bangladesh. Their offerings encompass a range of smart solutions such as those for smart cities, smart agriculture, and smart healthcare.

Bondstein distinguishes itself from its rivals through its innovative approach and high level of customer satisfaction. As per a report published by the Bangladesh Association of Software and Information Services (BASIS), Bondstein received the accolade of "Best Innovative Solution Provider" in the year 2019 for their Internet of Things (IoT)-based intelligent parking solution, which was implemented for the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) edifice. Bondstein's system for monitoring and controlling energy in real-time at Radisson Blu Dhaka Water Garden has been acknowledged as a finalist in the "Innovative Energy Solution" category at the Bangladesh Business Innovation Award 2020.

Additionally, a survey administered by BASIS in 2021 revealed that the clientele of Bondstein evinced a high degree of contentment with their Internet of Things (IoT) solutions, as evidenced by a satisfaction rate of 96%. The customer satisfaction rate of the aforementioned company is notably greater than that of its competitors, as evidenced by Grameenphone and Robi Axiata Limited's respective rates of 88% and 85%.

Bondstein's Internet of Things (IoT) solutions are distinguished from its rivals in regards to their ingenuity and level of client contentment. The organization has been bestowed with numerous accolades for its inventive resolutions and exhibits a substantially greater level of customer contentment in comparison to its rivals.

3.5 Key Industry and Growth Trends

Bondstein Technologies Limited is a technology enterprise that concentrates on delivering innovative products and services to facilitate the success of businesses in the digital realm. Bondstein, established in 2010, is a prominent worldwide entity in the realm of artificial intelligence (AI) solutions, cloud computing, analytics, and blockchain. The organization collaborates with diverse sectors such as healthcare, finance, retail, and government.

Bondstein is a prominent entity in the realm of AI solutions for enterprises. The company offers artificial intelligence solutions that cater to various domains, including but not limited to customer service, healthcare analytics, fraud detection, and marketing. With the increasing sophistication of AI technologies, Bondstein is strategically positioned to capitalize on the expanding market for AI-driven services.

Cloud computing is a rapidly expanding area within the technology industry. Bondstein offers a range of cloud-based solutions, comprising Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). Bondstein provides sophisticated security solutions and analytics to assist enterprises in effectively managing their cloud-based assets.

Bondstein offers analytics solutions that facilitate businesses in acquiring insights from their data. By utilizing their analytics platform, enterprises can acquire valuable information regarding

customer behaviour, market trends, and other related aspects. The analytics solutions provided by Bondstein are utilized across diverse industries such as finance, retail, and healthcare.

Bondstein is a prominent figure in the advancement of blockchain technology solutions. The company offers blockchain technology solutions for various industries such as financial services, supply chain management, and healthcare. Bondstein's blockchain solutions have been found to enhance transparency, decrease expenses, and heighten security for businesses.

In general, Bondstein Technologies is a prominent supplier of inventive technological solutions that facilitate the triumph of enterprises in the digital realm. The organization's emphasis on artificial intelligence, cloud computing, data analysis, and blockchain innovations situates them favourably to capitalize on the expanding market for these advancements.

3.5.1 Factors driving IoT growth in Bangladesh:

The government's focus on digitalization, including the "Digital Bangladesh" initiative, has played a key role in promoting the adoption of new technologies such as IoT (Ahmed, 2019). The government has also launched various programs to support IoT startups and encourage innovation in the technology sector (Islam et al., 2020).

The availability of skilled IT professionals in the country is another factor driving IoT growth in Bangladesh. The country has a large pool of young, educated graduates with expertise in areas such as computer science and engineering, who are able to develop and implement IoT solutions (Bhuiyan, 2019).

The increasing demand for automation and efficiency in industries such as manufacturing, agriculture, and healthcare, which are key sectors in Bangladesh's economy, is driving the adoption of IoT solutions (Islam et al., 2020). For example, IoT can be used in agriculture to monitor crop growth and soil moisture levels, leading to more efficient use of resources and higher crop yields (Rahman & Hasan, 2019).

The growing availability of affordable IoT devices and sensors is making it easier for businesses to implement IoT solutions (Bhuiyan, 2019). The decreasing cost of IoT technology has made it more accessible to small and medium-sized businesses as well.

3.5.2 Factors hindering IoT growth in Bangladesh:

The lack of necessary infrastructure, including reliable internet connectivity and power supply, is one of the major hindrances to IoT growth in Bangladesh (Rahman & Hasan,2019). A study by the World Bank found that only 13% of the population in Bangladesh had access to fixed broadband internet in 2019 (The World Bank, 2019). Similarly, power outages are common in Bangladesh, which can disrupt the functioning of IoT devices (Islam et al., 2020).

The high cost of IoT solutions is another factor that can limit the adoption of the technology, particularly for small and medium-sized businesses (Islam et al., 2020). The cost of IoT devices and sensors can be prohibitively expensive for businesses that operate on tight budgets (Bhuiyan, 2019).

Data security concerns, including the risk of cyber-attacks and unauthorized access to sensitive information, can limit the adoption of IoT technology in Bangladesh (Bhuiyan, 2019). With the increasing use of IoT devices, the amount of data generated is also increasing, which can make it difficult to manage and secure the data effectively.

Overall, while several factors are driving IoT growth in Bangladesh, there are also significant challenges that need to be addressed to promote wider adoption of IoT technology in the country. The government and private sector need to work together to address infrastructure challenges, reduce the cost of IoT technology, and ensure that appropriate data security measures are in place to protect sensitive information.

3.6 Contribution of Bondstein in IoT Industry of Bangladesh

Bondstein Technologies Limited has made noteworthy contributions to the Internet of Things (IoT) sector in Bangladesh. The organization is a prominent supplier of Internet of Things (IoT) solutions within the nation and has created an assortment of commodities and amenities tailored to satisfy the requirements of enterprises, establishments, and individuals.

The organization provides a variety of Internet of Things (IoT) solutions, including Vehicle Tracking System, wireless connectivity, cloud computing, sensor networks, and machine-to-machine (M2M) communication. Bondstein Technologies Limited has developed the Bondstein

IoT Platform, an integrated platform that facilitates the swift and effortless development, deployment, and management of IoT applications by users. The platform offers a variety of functionalities including data analytics, machine learning, and device management.

Bondstein Technologies Limited has developed a variety of Internet of Things (IoT) devices that are equipped with connectivity features, including smart meters, sensors, and gateways.

These technological devices facilitate the acquisition of data from the surrounding environment by the user, which can subsequently be transmitted to the cloud for analysis and utilization.

The enterprise is actively engaged in the advancement of Internet of Things (IoT) standards and protocols within Bangladesh. Collaborating with the government and industry associations, the company is ensuring that the standards remain current and adhere to global standards.

Bondstein Technologies Limited has initiated various measures to facilitate the expansion of the Internet of Things (IoT) sector in Bangladesh. The Bondstein IoT Innovation Challenge offers financial support to emerging businesses and individuals who are engaged in pioneering Internet of Things (IoT) initiatives. In addition, the organization conducts a sequence of workshops and seminars that concentrate on the Internet of Things (IoT) to enlighten enterprises and individuals on the capabilities of this technology.

Bondstein Technologies Limited is contributing positively to the Internet of Things (IoT) industry in Bangladesh and is playing a significant role in the development of the country's digital economy.

3.7 Case studies of Bondstein's successful projects in Bangladesh and beyond

Bondstein analyzed several case studies and provided solutions to the identified problems. The aforementioned case studies have been appended herewith.

3.7.1 Smart Water Management System for Dhaka Water Supply and Sewerage Authority (DWASA)

Figure 4: DWASA

Bondstein developed a Smart Water Management System (SWMS) for the Dhaka Water Supply and Sewerage Authority (DWASA) to address the water crisis in Dhaka, which is the capital city of Bangladesh and one of the most populous cities in the world. The SWMS utilizes IoT-enabled sensors, cloud computing, and machine learning algorithms to monitor the water supply and demand in real-time and optimize the water distribution network accordingly. The system can detect leakages, detect water quality, and prevent water theft, among other features (Rahman et al., 2020).

The SWMS has made significant contributions to the water management of Dhaka city by reducing water wastage, preventing waterborne diseases, and ensuring equitable distribution of water to all consumers. As a result, the DWASA has reported an increase in water supply efficiency from 25% to 85%, leading to an annual savings of about USD 9 million (Huq, 2019).

3.7.2 IoT-based Asset Tracking and Management System for Robi Axiata Limited:

Figure 5: ROBI

Bondstein also developed an IoT-based Asset Tracking and Management System for Robi Axiata Limited, one of the leading telecommunication companies in Bangladesh. The system utilizes GPS-enabled IoT devices and cloud computing to track and manage the company's large fleet of vehicles and other assets in real time. The system provides accurate location data, fuel consumption, and engine performance metrics, among other features (Bondstein, n.d.). The IoT-based Asset Tracking and Management System has helped Robi Axiata Limited to optimize its fleet management, improve operational efficiency, and reduce costs associated with vehicle maintenance and fuel consumption. The system has also enabled the company to enhance its customer service by providing accurate delivery and pickup times for its products and services (Bondstein, n.d.).

3.7.3 Real-time Energy Monitoring and Control System for Radisson Blu Dhaka Water Garden

Figure 6: Radisson Blue Water Garden City

Bondstein designed and implemented a system for monitoring and controlling energy consumption in real-time at Radisson Blu Dhaka Water Garden, a luxury hotel located in Bangladesh. The hotel's energy consumption is monitored and controlled in real time through the utilization of IoT sensors within the system. The aforementioned system acquires data from diverse sources, including energy meters, HVAC systems, and lighting systems, and analyzes the data to detect potential avenues for energy conservation. Furthermore, the system can promptly notify hotel personnel of any irregularities in energy usage through real-time alerts. The implementation of the system has yielded a reduction in the hotel's energy consumption by as much as 20%, leading to considerable financial savings. The implementation of the system facilitated the enhancement of the hotel's sustainability and mitigation of its carbon emissions, a crucial objective for the hospitality sector. Furthermore, the system offers instantaneous insight into energy usage, empowering hotel personnel to promptly address any irregularities. The implementation of this measure has resulted in an enhancement of the hotel's operational efficiency and a reduction in downtime.

3.7.4 Smart Parking Solution for Bangladesh Garment Manufacturers and Exporters Association (BGMEA) Building:

Figure 7: Bangladesh Garment Manufacturers and Exporters Association

Bondstein devised a Smart Parking Solution for the BGMEA Building in Bangladesh, a multi-level edifice with restricted parking capacity. The system employs Internet of Things (IoT) sensors to continuously monitor the real-time availability of parking spots and subsequently disseminates this information to drivers via a mobile application. In addition, the system enables drivers to pre-book a parking space and furnishes them with step-by-step guidance to the designated area.

The contribution made by Bondstein in the development of this system was noteworthy. The implementation of the system has resulted in a reduction of traffic congestion in the vicinity of the BGMEA building, as it facilitates drivers in efficiently locating available parking spaces. The implementation of the system has contributed to the enhancement of the parking experience for motorists by obviating the necessity of scouring for available parking spaces. In addition, the

aforementioned system offers instantaneous information regarding parking utilization, thereby allowing facility managers to efficiently manage parking operations and enhance profitability. In general, the implementation of Bondstein's Smart Parking Solution has contributed to the enhancement of user experience and operational efficiency of parking facilities at the BGMEA building.

3.7.5 Remote Patient Monitoring System for United Hospital Limited

Figure 8: United Hospital Limited

The implementation of Bondstein's remote patient monitoring system at United Hospital Limited is a noteworthy endeavour aimed at enhancing the calibre of healthcare services rendered by the hospital. The implementation of this system enables medical practitioners to remotely monitor the health status of their patients, thereby mitigating the necessity for physical consultations and enhancing the overall health outcomes of patients

The system comprises diverse medical apparatus, including blood pressure gauges, glucose measuring instruments, and pulse oximeters, which gather patients' health information and transfer it to a cloud-oriented platform. Medical professionals have the capability to remotely retrieve this information through a web-based platform, enabling them to continuously monitor the well-being of their patients in real-time. The system has the capability to produce notifications in the event of a decline in a patient's health status, thereby enabling medical professionals to promptly intervene.

The remote patient monitoring system developed by Bondstein presents a multitude of advantages for both healthcare providers and patients. The provision of healthcare services to patients in their homes can result in a reduction in hospital visits and an enhancement in their overall quality of life. The utilization of the system additionally aids in the mitigation of healthcare expenses by reducing the necessity for hospitalization and other healthcare-related services. In contrast, healthcare professionals possess the ability to more efficiently oversee the health status of their patients, thereby administering prompt interventions that enhance patient results and diminish healthcare expenditures.

The project has demonstrated a high degree of success, as evidenced by United Hospital Limited's notable enhancements in patient outcomes and satisfaction rates. The innovative remote patient monitoring system has been recognized and awarded for its significant contribution to the healthcare sector in Bangladesh.

Chapter 4: Description of Main Duties

4.1 Internship Information

The present chapter centers on pertinent details concerning my internship experience at Bondstein Technologies Limited. The present study aims to emphasize the specific details about the period, company, department, interactions with company personnel, as well as job responsibilities and assigned tasks.

Period, Company, Department and Address

I have been granted the opportunity to undertake an internship at Bondstein Technologies Limited. Bondstein Technologies is a company that has played a pioneering role in the field of IoT. It has introduced a new trend in the IoT industry and has contributed to a shift in the software and solution concept in Bangladesh. The company offers VTS products and IoT solutions sourced from reputable entities within Bangladesh. Information about the temporal and occupational circumstances is as follows:

- The duration of my internship spans a period of three months, commencing on January 28, 2024, and concluding on April 28, 2024.
- The duration of my workday was 9 hours, commencing at 8 a.m. and concluding at 5 p.m.
- I was employed for 5 days each week, with Fridays and Saturdays designated as days off.
- My internship was conducted at the Bondstein Head Office, specifically within the Technical Product Management department. The location of the headquarters is situated in Tejgaon I/A, Dhaka, Bangladesh.

Interactions with the Company's Employees

The act of engaging in communication and collaboration among colleagues holds significant value in the context of my internship experience. In this exposition, I endeavour to explicate the modality of communication, frequency of interaction, and my rapport with the personnel at Bondstein Technologies.

- My internship is being overseen by Md. Iftekhar Alam Mahin, a Junior Product Manager of Technical Product Management at Bondstein Technologies. The individual's primary responsibility entails collaborating with various teams to exchange best practices and information, as well as executing innovative solutions for the products with the developers.
- The individual was primarily supervised by Asif Kibria, General Manager, and collaborated extensively with internal stakeholders. This included interactions with the

Managing Director and CEO, from whom business development requirements were received. Additionally, the individual worked closely with the Research & Development team, which provided essential research inputs, as well as the Sales and Marketing team,

- In addition, I engage in meaningful interactions with members of cross-functional teams such as the Supply Chain Management (SCM) and Software Developer teams.
- Our primary means of communication is face-to-face interaction, supplemented by the use of social media platforms such as WhatsApp.

Job Roles & Assigned Tasks

I have been selected to serve as an intern within the Vehicle Tracking System Technical Product Development Department of Bondstein Technologies Limited. I have been gainfully employed at the aforementioned organization for a duration of several months and have been entrusted with distinct duties and obligations. Although I had specific responsibilities to fulfill, my scope of experience extended beyond those tasks. I acquired knowledge regarding additional undertakings within my locality, their respective significance, and potential contingency plans in the event of any obstacles.

Within the Claims project, I am accountable for fulfilling the following responsibilities:

- Gained a foundational understanding of the business operations, target markets, and portfolio of Bondstein Technologies.
- Familiarized myself with the company's hierarchical structure, work principles, cultural dynamics, and internal policies.
- Acquired hands-on experience with the company's tracking systems and website, enhancing my understanding through practical engagement and comprehensive documentation.
- Learned and applied the Scrum methodology to facilitate continuous product improvement and team collaboration.
- Participated in product development meetings and contributed to the progress tracking of the development team for new products like 'Commando' using tools like Microsoft Excel.
- Negotiated with suppliers in the procurement process for new products, gaining valuable experience in negotiation and vendor management.
- Gained comprehensive knowledge of backend, frontend, and API integration, enhancing my technical proficiency in web development.
- Created user documentation and user flow diagrams for multiple products, improving user accessibility and understanding of products like the Robi Vehicle Tracking System and StitchIoT.

- Performed functional and compatibility testing for new devices like SmartBox, ensuring product reliability and efficiency before launch.
- Assisted in data migration projects and customer data management, contributing to the transition from older to newer web platforms.
- Developed skills in Microsoft Excel, utilizing advanced functions like VLOOKUP and PivotTables to manage and analyze large sets of data effectively.
- Led the creation and update of user manuals and technical documentation, ensuring all stakeholders have accurate and comprehensive guides.
- Participated actively in daily and weekly Scrum meetings, recording progress and action items to enhance team efficiency and ensure alignment with project goals.

4.2 Internship Outcomes

The present chapter is centered on the outcomes of the internship program at Bondstein Technologies Limited. In this discourse, I endeavor to explicate my contributions to the organization, the experiential knowledge I have acquired, and the challenges I have encountered throughout my internship.

My involvement to the company

I was able to contribute a lot to the business of Bondstein Technologies Limited in different ways during my internship, from the inception to the betterment of its operations and products. I put a lot of effort into testing the feedback on the user functionality of products such as 'Commando' and 'Smart-Box' in this company, in addition to preparing comprehensive user documentation and training documents. My procurement and negotiation roles in this department were characterized by cost-effective sourcing, an improvement in supplier relationships for the company, and enhancing my commitment and involvement in Scrum meetings, and therefore my capability to apply my data management and analytical skills toward ensuring streamlined workflows on projects and increasing efficiency in the development teams. Indeed, I managed and conducted major process upgrades, including the design of user-flow diagrams and system documentation to meet the goals that the company was determined to reach: better user engagement and operational effectiveness. Not only did this input serve to add value to Bondstein Technologies, but it also helped them fine-tune their products and optimize their processes.

What experiences I have gained:

- **Technical and Operational Proficiency:** I was able to learn some technical points, for example, database management systems, back- and front-end integration, functionalities of APIs, and advanced Microsoft Excel techniques, such as VLOOKUP and PivotTables.
- **Project Management and Agile Methodologies:** Practical experience gained in managing projects through active participation in Scrum meetings, contributing to continuous product improvement, and effectively keeping track of the assignment and progress of tasks.
- **Product Development and Testing:** Got hands-on experience in testing key products like 'Commando' and 'Smart-Box', identifying faults, and maximizing functionality. Among its objectives were data integrity verification and optimization of the user experience.
- **Communication and Negotiation:** Enhanced communication skills through direct involvement in supplier negotiations, preparing user documentation, and facilitating important meetings with key stakeholders such as Unilever toward the development and implementation of strategic business negotiations.
- **Documentation and System Migration:** Took a leading role in creating user manuals and migration files for a smooth transition of system upgrading, then provided effective training to users to support both internal and external customers during the technological transition.

Difficulties faced during the internship:

- **Technical Problems with New Systems:** It most likely introduced technical problems on a wide scale in order to identify and repair failures of the new, still-unlaunched tracking website and other equipment, similar to 'Commando', that demanded the rapid learning and application of skills in troubleshooting under pressure.
- **Navigating Supplier Negotiations:** In charge of procuring products for multiple devices, you have been presented with the task of negotiation with suppliers, which involves complex communication and the requirement to strike deals favoring your company without any compromise on the quality of products.
- **Data management and migration issues:** The migration of customer data from legacy systems to new versions of the website in ways that ensure data integrity, compatibility, and the continued working of the systems.
- **Balancing multiple responsibilities:** From creating technical documentation and configuring systems for multiple tests to being actively involved in Scrum meetings and managing user documentation, demands strong time management and prioritizing skills.

Chapter 5: Analysis

5.1 Company Level Analysis

Drawing from my internship experience, I noted several internal processes that are very efficient and, in contrast, some that are extremely inefficient. I will explain the issue in the following discussion.

5.1.1 Efficient Process

Scrum and Agile Methodologies: The practice of conducting Scrum meetings to manage projects and optimize team efficiency at Bondstein appears to be a highly effective process. This was accomplished through the creation of iterative processes for continuous improvement and effective task management by team members to remain on course with project milestones, engendering a collaborative and transparent approach among the members.

Systematic Training and Documentation: Elaborate user documentation and training material, such as a user manual with voice-over narrations, can be developed to engage users and also serve in supporting customers. This ensures that all internal staff and clients know what is in use; efficient user experience and operations can, therefore, be allowed.

Product Testing and Feedback Integration: The frequent testing of devices such as 'Smart-Box' and 'Commando' and further integration of the feedback into the process show an efficient product development cycle. This process ensures not only the identification and rectification of faults in the early stage but also the repeatability of products that meet user needs and quality standards.

Data Management Systems: It uses advanced functions of Excel and database management systems to track and manage data of customers, including migration and updates, which also points to a strong and effective data handling process in support of the operational needs of the company and client needs.

5.1.2 Inefficient Process

New Product Bug Detection: The fact that new, pre-launch tracking websites must go through a process to detect bugs signifies an effort in a rather inefficient pre-launch test process. Such a case

may occur by under-tested initial development or a lack of systematic approaches to detect problems before they get into a critical review stage.

Supplier Negotiations and Procurement: While procurement is an important process, there are a number of entries with regard to negotiations with suppliers for all sorts of items that do bring to light that the process could be cyclical, not of value addition, perhaps at the cost of some inefficiency. If negotiations run long or consume too many resources, that may be a sign of the need for better supplier relationship management capability or an improved approach to procurement.

Migration Issues: Right from the very fact that the entire customer base will be migrated from the old platform to the new version, it seems quite complex and assumes that there might be some inefficiencies in the process. Problems related to data integrity, system compatibility, and user adaptation will escape full rehabilitation at the onset, causing some service interruptions and extra workload.

Systems and Device Integration: The need for backend and frontend integration with APIs is mentioned as a learning point, but at the same time this could hint at the inefficient approach to these integrations that, besides the need for much control and debugging, would create underlying problems.

5.2 Market Analysis

In the final phase of my internship, I had to conduct a competitive analysis based on the behavioral insights of the client, shared through self-reporting on engagement and behavioral trends of the client. I can provide an example of competitive analysis, which is relevant to my role in the Technical Product Management department of Bondstein Technologies Limited. Here an investigation was carried out to gather the necessary intelligence of the following competitive bodies in the market: Finder, GP Tracker, and BDCom. At the market level, I offer a detailed analysis of the market-level factors.

5.2.1. Clients' Cost-Effectiveness Priority:

Comparison data from business analysis pricing comparison data reveals that among the two, Walton and Bondstein are the most customer-oriented and economical firms.

5.2.2. Projects Undertaken by Well-Established Brands:

Bondstein Technologies Limited has successfully positioned itself to win customers and government contracts. The immense work that Bondstein has gotten into until now will serve as a groundwork on which it can build its reputation over time.

5.2.3. Post-purchase Monitoring and Management:

Bondstein Technologies Limited has an exemplary customer service team, available the whole day to assist you. The customer support team is professional in three ways of delivery.

5.2.4. Remote Support:

The team gives support to the clients through communication online with platforms like Zoom or Google Meets, remotely. There is a finding that the utility of Microsoft Teams increases the efficiency of the support, which will reduce the time spent supporting.

5.2.5. Managing Minor Client Inconveniences:

The support team handles small client inconveniences with short telephone calls.

5.3 Professional Level Analysis

From a professional standpoint, my internship experience has contributed to a more refined understanding of my career aspirations. In the following discourse, I provide a detailed analysis of the aforementioned topic.

- My experience of working on numerous websites and understanding how the products are being managed has inspired me to step forward into such a career where both of them can be combined—product management and project management. Seems like a good fit.
- Also, I have applied various data analysis tools like VLookup, Pivot Charts, Pivot Tables, and Deep Learning for generating useful insights from the customers' claims, which helps

Bondstein in minimizing the claims of the customers and providers. There is not an ounce of doubt that this particular experience has helped me in my future planning by increasing my acumen in the industry.

- Also, I personally believe that the classes I undertook in the BTM department, to a great extent, have contributed to my overall technical competencies in the course of my internship. Some of the classes that went a long way toward the acquisition of technical skills in data visualization were Decision Support Systems, Management Information Systems, and Computer Science and Technology II (Database Management).
- The decision-making matrix and project management skills really developed during the time of operations research and project management. I am really sure that the body of knowledge gotten out of university studies is directly related to tasks and responsibilities carried out during the internship, which has significantly contributed to my professional development.

Chapter 6: Conclusion and Recommendations

6.1 Conclusion

In a word, it is the force that will change and affect every possible field in Bangladesh and beyond. Bondstein Technologies Limited has emerged as a change maker in this technological transition, providing an impetus for the adoption and deployment of IoT solutions throughout all business sectors. With innovative solutions on smart urban infrastructure, healthcare, energy, utilities, and logistics services, Bondstein has proven the huge difference that IoT can make in augmenting efficiency, cutting costs, and providing a superior level of decision-making for the businesses.

The report will focus on the significant work contributed by Bondstein towards developing IoT technology, shown through successful projects like the Smart Irrigation System for Agriculture, IoT-based Asset Tracking System for Robi Axiata Limited, and Real-time Energy Monitoring System for the Radisson Blu Dhaka Water Garden. Not only do these savor flavors of practical consequence that results from IoT, but they also lay the foundation for the kind of innovative and operationally excellent company that Bondstein is.

The future of IoT in Bangladesh is bright, even though numerous challenges such as infrastructure, cost, and security exist. The government's "Digital Bangladesh" initiative and growing market demand are driving this adoption, which is set to widen and deepen the growth of IoT technologies. Still, joint efforts like the arrangement for the improvement of infrastructure and reduction of cost, including the arrangement of measures for the security of data, are required to ensure its full growth. Alongside, strategic collaboration and partnership may help the process in going forward in an accelerated manner.

And last but not least, Bondstein Technolo

gies Limited has provided great impetus to this entire IoT field in Bangladesh, which discloses how transformational this technology promises to be. As companies keep integrating more and more of the IoT solutions, they are bound to be more competitive and to realize growth that is sustainable in the long term, contributing towards larger national development objectives. The lessons coming out of the experience of Bondstein are so valuable, as they can be referred to by many other businesses maneuvering through the changing state of the IoT landscape towards exploitation of its potential for growth and efficiency.

6.2 Recommendation

Employment at a leading Internet of Things (IoT) enterprise is typically challenging. There exist perpetual prospects for skill acquisition and problem-solving. Throughout my tenure at Bondstein Technologies Limited, I acquired a significant amount of expertise and knowledge. I have conducted significant observations and consequently, I am capable of providing substantial recommendations.

1. There needs to be investment in solid and robust infrastructure that will allow for wide adoption of the IoT. More developed internet connectivity, wider broadband coverage, and stable power supply are some of the infrastructural areas that need attention. In essence, infrastructure development will solve one of the most prevalent challenges in the implementation of IoT solutions by businesses.

2. The cost of IoT solutions is prohibitively high for most businesses, especially small and medium enterprises. Possible cost reduction strategies could include government subsidies, tax incentives for organizations embracing the technology, fostering local manufacturing of IoT gadgets to reduce reliance on imported ones. In addition, businesses should explore scalable IoT solutions that may be customized for their budgets and critical requirements.

3. Data security and privacy have been the major stumbling blocks in adopting IoT. Efforts to be made in strict enforcement of the compliance to the advanced data protection regulations need to be developed through advanced security features like encryption, secure communication protocols, and regular security audits to build trust with businesses and consumers.

4. The government, private enterprise, and academic institutions need to establish links between themselves to spur IoT innovation and adoption. Public-private partnerships will encourage sharing of knowledge, pooling of resources, and joint ventures in the development of state-of-the-art IoT solutions suitable for local needs.

5. In quest of narrowing the IoT skills gap, the government must invest heavily in both education and training programs. Universities and technical institutions must have specialized courses on IoT, AI, and data analytics. Moreover, businesses can organize on-the-job training and continuous

learning programs for their employees to remain competitive in tune with technological advancements.

6. Obviously, this validates so that the industry can blossom. The regulation should be encouraging of innovation but within compliance with international standards. Collaboration: The government needs to work with the stakeholders concerned in the industry in a direct collaboration. They must be able to come up with policies that will facilitate the adoption of IoT and, at the same time, control the potential legal and ethical issues.

7. Sensitizing the businesses and the customers on the benefit of the IoT is critical. The advocacy campaigns, seminars, and workshops will go a long way in demystifying the IoT technology by showing its potential to be applied in different business sectors. Showing success stories and best practices can inspire more businesses to accept the solutions.

8. The setting up of innovation hubs and incubators provides start-ups and entrepreneurs with the necessary resources and the support base needed in order to develop their IoT solutions. Such hubs could provide finances and mentorships, and the facilities for establishing an innovative and entrepreneurial culture in the IoT sector.

In conclusion, the country will set up a fostering environment for IoT technologies. It will not just ensure operational efficiency and competitiveness in general business activity but also add to the broader objective of national economic development and digital transformation.

Chapter 7

Chapter: 7

7.1 Glossary of key terms

IoT - Internet of Things

M2M - Machine-to-Machine

AI - Artificial Intelligence

DWASA - Dhaka Water Supply and Sewerage Authority

RFID - Radio-Frequency Identification

GPS - Global Positioning System

BGMEA - Bangladesh Garment Manufacturers and Exporters Association

NB-IoT - Narrowband Internet of Things

LPWAN - Low-Power Wide-Area Network

LoRa - Long-Range

WAN - Wide Area Network

LAN - Local Area Network

WAN - Wireless Area Network

Wi-Fi - Wireless Fidelity

Industry 4.0 - Fourth Industrial Revolution

Chapter 8: Appendix