Adoption of IoT in insurance sector of Bangladesh

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ABSTRACT

Background: The idea of insurance was discovered several millennia before Christ (BC). In the second and third millennia BC, traders from China and Babylonia practiced shifting or dispersing risks. Today, insurance is the foundation of the economy, but expanding its penetration is difficult in emerging nations. The fourth insurance industry revolution in the developed world was sparked by the recent advent of IoT, Big Data, and InsurTech.

Objective: To boost insurance coverage in Bangladesh, this study examines the problems with and potential solutions to IoT.

Research Methodology: To identify the themes and factors pertaining to problems and solutions in implementing IoT in Bangladesh's insurance business, this study used a systematic literature review. To find pertinent material from Google Scholar, several keywords were employed. The filtered studies were examined based on inclusion and exclusion standards.

Findings: This report outlined many obstacles to IoT adoption in the Bangladesh's insurance sector as well as potential remedies. The proposals could help policymakers improve the insurance industry service delivery.

Keywords: InsurTech, Insurance Industry**,** Digital Technologies, Bangladesh

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1. Introduction

IoT can transform the health insurance sector by providing patient data gathered through wearable technologies or body sensors to caregivers and insurance sector for improving the well-being of population. Rainfall-based index insurance has proved beneficial for the agriculture sector and insurance sector who use this IoT based technology to identify and measure the risk and accordingly transfer the claim amount that reduces the bogus claim rate and adverse selection issue. IoT devices can intimate the risk before its occurrence like fire smog or water clogging which is beneficial for insurance sector to reduce the claim reimbursement amount as policyholder is informed about risk to stop its occurrence. Data collected by IoT devices is also beneficial to take better decisions regarding altering the business model and bringing customization in offering products or services. Limited study found in IoT adoption in Bangladesh's insurance sector. As per study, smart devices help in underwriting the policy based on past behavior. These several texts of law touch on the status of insurance agents and the regulations of this profession.

The Bangladesh's insurance sector is experiencing a shift toward digital transformation, with key players adopting digital platforms and bancassurance models to enhance accessibility and customer experience (Paul, 2025). Despite of low penetration, Bangladesh's insurance sector is increasingly leveraging digital innovation (Daily Capital Views, 2025). Insurance Development and Regulatory Authority is enabling InsurTech innovation reflect growing institutional support for technology adoption in the sector (Mahmudul Hasan & Halder, 2023).

This study fill gap by exploring the challenges along with solutions in adoption of IoT technology in Bangladesh's insurance sector by using SLR methodology.

2. Literature review

Direct insurance-IoT studies are limited in Bangladesh, therefore, a strategy of synthesize broader Bangladesh IoT adoption evidence and map it to insurance is adopted. Reviewers take out the following data from the involved papers: author name, year of publication, country of publication, publication type and findings. Consequently, a narrative synthesis of the derived information was attained. Table 1 denotes to included literature like articles, conference or book along with methodology and year. Table 2 denotes challenges and solutions derived after reviewing the selected studies.

Table 1 Characteristics of reviewed IoT adoption studies in Bangladesh insurance sector

No.	Journal/	Paper topic/	Method	Year	Author

	Conference/Report Name	**Conference paper Name**			
1	International Journal for Research in Applied Science and Engineering Technology	Smart Campus Using IoT with Bangladesh Perspective: A Possibility and Limitation	Exploratory	2017	(Nadim et al., 2017)
2	IEEE 2018 International Conference on Innovations in Science, Engineering and Technology (ICISET) -	An Internet of Things (IoT) based Smart Traffic Management System: A Context of Bangladesh		2018	(Kadar et al., 2018)
3	Proceedings	IoT Based Smart Healthcare Services for Rural Unprivileged People in Bangladesh: Current Situation and Challenges		2020	(Monirujjaman, 2020)
4	Institute of Appropriate Technology (IAT)	Strategic approach to facilitate integration of internet of things (IoT) in health care sector of Bangladesh.		2020	(Iftekhar, 2020)
5	Internet of Things and Cloud Computing	Impact of Internet of Thing in Developing Country: Systematic Review	SLR	2019	(Gizealew & Sisay, 2019)
6	bondstein.com	IoT & its prospect in Bangladesh	Exploratory	2021	(Bondstein, 2021)
7	www.cirt.gov.bd	IoT possibility and challenges in bangladesh context		2021	(Badsha, M. 2021)

8	Information and Communication Technology Division Government of the People's Republic of Bangladesh	National Internet of Things Strategy Bangladesh		2020	(BCC, 2020)
9	thefinancialexpress.com	Challenges before IoT in Bangladesh		2018	(Kamal & Anuron, 2018)
10	www.takestips.com/iot-in-bangladesh	IOT in Bangladesh		2021	(Takes Tips, 2021)

Table 2 IoT adoption in Bangladesh Insurance Industry: Issues & Solutions

No. of Studies	**Issues**	**Solutions**
Study 1	• Physical impediment, Lack of equipment • Software and technological barrier, Network and storage barrier • Legal and security • Iot concept, application framework, and inter-object communication protocol are still under development and will take time to mature.	• Nil
Study 2	• Bangladesh has minimal smart traffic research. • Currently, closed-circuit cameras and automobile identification technologies are utilised to control traffic congestion. However, under wet and foggy conditions, this system fails.	• Nil
Study 3	• Resource constraints, People's unwillingness to accept modern technologies • Inadequate marketing of the system, Patient trust difficulties • Public awareness, particularly rural, Insufficient starting capital • Incompetent startup management team, Staff desire to avoid rural employment	• We must educate these individuals about health. So the government must help private businesses.

		Healthcare is a large and vital sector for humans.
Study 4	• Absence of internet connection (even 3G) • Lack of competent iot workers, User mentality • Lack of power, Availability of iot devices and services such as lighting, locks, thermostats, and sensors • Lack of financial support, Smart home iot services need Google Home or Alexa, which aren't nationwide.	• Nil
Study 5	• Absence of internet connection (even 3G) • Lack of competent iot workers, User mentality, • Lack of power, Availability of iot devices and services such as lighting, locks, thermostats, and sensors • Lack of funding, • It needs smart home helpers like Google Home or Alexa, which aren't completely working yet in the nation.	• Nil
Study 6	• The country must provide internet access for IoT technologies. • The weak industry-academic cooperation causes a shortage of technologically trained staff and research and development (R&D) resources. • The majority of market leaders are unwilling to use IoT technology due to the possibility of creating bottlenecks in their everyday procedures. • Instability in electrical supply throughout the nation, affecting both families and industry, preventing broad adoption.	• Nil
Study 7	• Nil	• Blockchain-based IoT security is a promising new approach.

Study 8	• Incompatibility of IoT devices with IoT systems. • Data protection, privacy, and security are key challenges. • Technical standards and compatibility vary everywhere. Although most are open standards, value-paying businesses want to set their own.	• Nil
Study 9	• The country's electrical supply is a key challenge for IoT devices. • Building and running devices is expensive. Government restrictions hinder IoT commercialization.	• Nil
Study 10	• Bangladesh's IOT condition is not excellent. • Hardware is the equipment that receives data from the source. • Most hardware in Bangladesh is imported from other nations. • Applications that store, analyse, or handle personal data need highly qualified developers, which Bangladesh lacks. • While the ignorant are oblivious of the internet of thought, many educated are as well. • Because there is no market for IOT devices or services in Bangladesh, they should be made as widely accessible as feasible. • Although IOT devices in Bangladesh are more safe, their security or privacy may be compromised. This happens often due to hacking or piracy, both of which are crimes. Being programmable, IoT devices may cause havoc in the workplace. If any mistake is identified, it causes a lot of issues. • Again, damage to any portion might complicate the whole apparatus. Interconnections between components may sometimes be hampered. This arises due to the failure to maintain relationships between components.	• Raising public awareness. • Again, extensive technical, mechanical, and electrical training is required.

3. Research Methodology

Systematic literature review identifies, selects, and critically appraises research to answer a clearly formulated question (Dewey & Drahota, 2016).

In this study, a **Systematic Literature Review (SLR)** methodology is adopted to identify, evaluate, and synthesize prior research on IoT adoption challenges and solutions in the Bangladesh insurance sector as mentioned in table 3 and table 4. Google Scholar was selected as the primary database due to its broad coverage of peer-reviewed journal articles between **2017 and 2021**. A structured keyword strategy combining *"IoT," "insurance sector," "Bangladesh," "challenges,"* and *"solutions"* was applied alongwith Quality screening criteria like only English-language studies discussed IoT adoption issues within the Bangladesh context published in peer-reviewed or authoritative sources. After removing duplicates and irrelevant records, the final set of studies was subjected to thematic and content analysis.

Table 3 Keywords Selections

IoT	Literature and conference proceedings on IoT in the Bangladesh financial industry, particularly insurance and health insurance. Past works available since 2017. Primary and secondary research	Studies not in English Magazine, newspaper, thesis, report data Studies in non-financial fields including education, manufacturing Large-scale data analytics and other technologies	Papers publishing platforms such as Google scholar and emerald were opted as the exploring means for this review. Following blend of search, terms are applied: IoT* AND (insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration was carried out between 2017 to 2020.

Table 4 Selection Criteria

IoT	**Identification**	10
	Screening	9 after removing 1 duplicate
	Eligibility	8 after removing 1 archive

	Included	5 after removing 3 full articles

4. Findings of the Included Studies

Based on thematic and content analysis of the selected studies, the challenges related to IoT adoption in the Bangladesh insurance sector were grouped into six major themes. These themes reflect recurring barriers identified across the reviewed literature and highlight areas requiring policy and managerial intervention.

There are many issues and solutions derived from literature reviewed by using systematic literature technique. Issues and solutions are further categorized under sub-heading by using content analysis. Table 5 provides the challenges faced by the insurance industry, while some prominent solutions are pointed out in Table 6 which are derived after reviewing the repeating nature of challenges and solutions.

Theme 1: Digital and Energy Infrastructure Constraints

The first issue is infrastructure. The Internet of Things necessitates seamless and rapid connection among all things. Wired backbone in nation is quite expensive. Wireless technologies like 3G, WiMAX, and 4G-LTE may give internet access. This causes issues with internet speed, power consumption, and cost per unit use. Authorities may use a hybrid internet backbone with a national fiber-optic data highway, local and national data centers, and regional WiMAX and 4G service points. Internet uses up to 5% of total energy produced today, and IoT needs are rising. Energy efficient and reliable data center powered on gathered energy can benefit developing nations. Electricity planning is lacking in poor nations. IoT for developing nations (IoT4D) can help in providing power solutions by allowing clean energy technology, smarter energy markets, and optimizing current goods (Gizealew & Sisay, 2019). Instability in electrical supply throughout the nation, both in families and industry, preventing its adoption (Bondstein, 2021).

Theme 2: Data Privacy, Cybersecurity, and Trust Issues

The second issue is privacy and security. IoT security is evolving (Gizealew & Sisay, 2019). Although IOT devices in Bangladesh are safer, their security or privacy may be compromised. This happens often due to hacking or piracy, both of which are crimes. Being programmable, IoT devices may cause havoc in the workplace. If a mistake is identified, it causes a lot of issues (Takes Tips, 2021). Blockchain-based IoT security is a promising new approach for preventing privay leakage (Badsha, 2021).

Theme 3: Technological Maturity and System Compatibility

Third, IoT concept, application framework, and inter-object communication protocol is still under development (Nadim et al., 2017). Fourth, research on smart traffic systems is lacking in Bangladesh (Kadar et al., 2018). There are few research centers. The financing for inventions is at a low point (Gizealew & Sisay, 2019). Fifth difficulty is limited technological resources. Smart home IoT services need Google Home or Alexa, which are not completely functioning in the nation (Iftekhar, 2020). For impoverished nations, IoT devices must be sturdy, energy efficient, and battery powered for months. They should utilize solar energy to recharge. Sensors that are exposed to the environment must be of excellent quality and long-lasting. Sensors are the IoT's raw material, yet they are costly owing to purchase and shipping costs from developed nations (Gizealew & Sisay, 2019). Because there is no market for IOT devices or services in Bangladesh, they should be made as widely accessible as feasible. Smart lights and locks are available at a few Chinese electrical stores, although they are pricey.

Theme 4: Human Capital and Technical Skill Deficit

The eleventh issue is the lack of expert staff. IoT demands expertise in IoT architecture, data science, security, and AI/ML (Monirujjaman, 2020). Lots of technical, mechanical and electrical training is required (Takes, 2021).

Theme 5: Low Awareness, Resistance to Change, and Consumer Attitudes

Experts agree that consumer attitude is critical to embracing new technologies like IoT, yet Bangladeshi consumers now lack this perspective (Kamal & Anuron, 2018). The sixth barrier is people's disinterest in embracing new technologies (Monirujjaman, 2020). Because IoT technologies create bottlenecks in normal company procedures, most market leaders are unwilling to use them.

The seventh issue is lack of adequate marketing of this device (Monirujjaman, 2020). The eighth concern is trust (Monirujjaman, 2020). User safety, user-based assessment, and expectations of IoT product competency all play a role in the idea of trust. These elements influence customer adoption. Trust lets people discern between trustworthy items and technology (AlHogail, 2018).

The ninth obstacle is raising rural people's awareness (Tips, 2021). ICT can help Bangladesh to fight poverty. Radio, TV, phones, and internet provide information to farmers and small business owners. They can thus make more informed judgments about which markets to sell leading to avoiding intermediaries or have greater negotiating power if they do sell to middlemen. Websites can readily show different laws and regulations of conducting business and the overall investment environment in

Bangladesh. ICT helps in reducing poverty by boosting information and communication flows throughout the Bangladeshi people (NerdySeal, 2021).

Theme 6: Financial Constraints and Regulatory Barriers

Tenth issue is the shortage of operating funds. Success in IoT initiatives begins with a clear knowledge of the business challenges to be solved, the investment required, and the anticipated ROI (Sam, 2019). Finally, present government rules are one of the impediments to commercializing IoT. As solutions, education is essential for individuals about health based IoT devices. Government must help private businesses working in this field. Healthcare is a large and vital sector for humans (Takes Tips, 2021).

Table 5 IoT Adoption Challenges in Bangladesh Insurance Industry

Infrastructural barrier
Privacy & safety
Iot concept, application framework, and inter-object communication protocol are continually evolving.
Bangladesh has minimal smart traffic research.
Resource constraints
People's unwillingness to accept modern technologies
Inadequate marketing of the system
Patient trust difficulties
Public awareness, particularly rural
Funding shortfall
Incompetent team
Disparities in standardisation and obstacles in integrating iot devices with iot systems.
Government regulations are one of the obstacles to commercialising iot.

Table 6 IoT Adoption Solutions in Bangladesh Insurance Industry

We must educate these individuals about health. So the government must help private businesses. Healthcare is a large and vital sector for humans.
Blockchain-based iot security is a promising new approach.

5. Conclusion

This study explores the challenges and potential solutions related to the adoption of IoT in the Bangladesh insurance sector. The findings reveal that inadequate infrastructure, weak regulatory support, security and privacy concerns, lack of skilled human capital, low public awareness, and high implementation costs are the primary barriers hindering IoT adoption. Despite these challenges, IoT holds strong potential to transform insurance operations. Policymakers can support stakeholder collaboration to accelerate IoT-driven

digital transformation in the insurance industry. This study is limited by its reliance on secondary data obtained through a systematic literature review. The exclusion of non-English publications may also result in the omission of relevant local studies. Future research should employ empirical methods such as surveys, interviews, or case studies involving insurers, regulators, and policyholders to validate the findings.

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