

An Application of Block-Chain Technology in International Trade: Perspective of Nepal

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Abstract

This thesis investigates in-depth into the potential applications of block chain technology in Nepal's international trade sector, conducting an extensive survey involving 272 respondents from various stakeholder groups in Kathmandu Valley. The study aims to identify obstacles and opportunities associated with Nepal's adoption of block chain in international trade. Demographic analysis reveals a predominantly male workforce with a significant presence from non-technical backgrounds, mirroring Nepal's current employment landscape. Survey findings highlight significant challenges in current trade procedures, including trust and security issues, high transaction costs, regulatory obstacles, and complex supply chains. Block chain is recognized as a transformative solution offering transparency, security, efficiency, cost reduction, and regulatory compliance benefits. However, successful implementation hinges on factors such as regulatory support, technological infrastructure, stakeholder awareness, and trader readiness. Recommendations include tailored regulatory policies, infrastructure investments, stakeholder education campaigns, pilot initiatives, and ongoing evaluation. Overcoming these challenges could unlock unprecedented opportunities for Nepal's international trade expansion, innovation, and collaboration.

Keywords: *Block-Chain Technology, International Trade, Challenges, Opportunities, Feasibility, Regulatory Frameworks, Technological Infrastructure, Stakeholder Awareness, Supply Chain Optimization, Risk Mitigation, Compliance, Pilot Initiatives, Smart Contract, Hyperledger Fabric*

1. Introduction

International trade is essential to a country's economic development because it makes cross-border trade in goods, services, and capital possible. Global commerce is crucial for countries like Nepal because it promotes economic growth, job creation, and poverty reduction (Upadhyaya, Y. M., Kharel, D. R., & Poudel, O., 2021).

Unfortunately, there are several obstacles and inefficiencies with Nepal's current trade procedures that hinder trade's smooth advancement and limit the country's possibility for growth.



Figure 1 Block-Chain Technology (Source: Shutterstock)

Block chain's unique features offer opportunities to address inefficiencies in global commerce by providing transparency, traceability, security, and decentralization (Chang, S. E., & Chen, Y., 2019). Initiatives like we. trade demonstrate how block chain can streamline international trade processes, reducing risks and automating transactions (ibm.com, 2022). The research aims to explore how block chain could enhance Nepali foreign trade by identifying benefits and addressing challenges, with the goal of assisting trade associations, enterprises, and policymakers in improving the efficiency of international trade. Further investigation is required to fully understand block chain's role in the trading ecosystem.

2. Background

International trading greatly contributes to economic growth and progress of various nations worldwide. Nepal, a country situated in South Asia, heavily depends on global trade to sustain its economic operations (Chataut, R., 2023). Due to its geographical constraints and reliance on neighboring countries as a transit route, Nepal, a landlocked nation, confronts difficulties while conducting business (Adhikari, M., & Ma, Z., 2022).

- i. **Critical Role of International Trade**
- ii. **Challenges Faced by Nepal**

2.1 Overview of International Trade in Nepal

Nepal's economy relies heavily on foreign trade for its prosperity, facing challenges due to its landlocked location and dependence on neighbouring countries for transit routes (forestrynepal.com, 2022). Its principal trading partners include the United States, the European Union, China, and India, with key industries such as software, electronics, textiles, agriculture, and tourism-related services (International Trade Administration U.S. Department of Commerce, 2021). Efficient international trade procedures are crucial for Nepal's economic growth, as they contribute to GDP and promote expansion. However, the country's reliance on traditional methods and outdated technologies hampers its global competitiveness.

2.3 Importance of Efficient Trade Processes

For nations like Nepal, effective trade procedures are crucial since they affect the competitiveness of enterprises, the cost of goods and services, and the general expansion of the economy. Ineffective procedures can cause delays, a lot of paperwork, expensive transactions, and a higher chance of fraud and corruption (Chataut, Jagdish & Ghimire, Manish & Jonchhe, S & Tamrakar, Dipesh., 2020). Enhancing trade procedures can benefit Nepalese companies internationally by increasing market access, trade balance, and competitiveness.

2.4 Introduction to Block-chain Technology

Block chain technology, initially developed for cryptocurrencies like Bitcoin, has evolved into a versatile tool applicable across various industries (Belu, M. G., 2019). Operating as a distributed ledger, block chain securely records transactions across multiple machines, boasting traits such as transparency, immutability, decentralization, and traceability (Tamboli, Asst., 2024). Its integration into global trade holds promise for revolutionizing conventional procedures by significantly reducing complexity and inefficiencies. Advantages include accelerated transactions, reduced paperwork, enhanced traceability, improved transparency, and heightened security (Al Amin, S. M., & Yasmin, S., 2022). Therefore, applying block chain technology to global trade has the potential to streamline processes and alleviate inefficiencies.

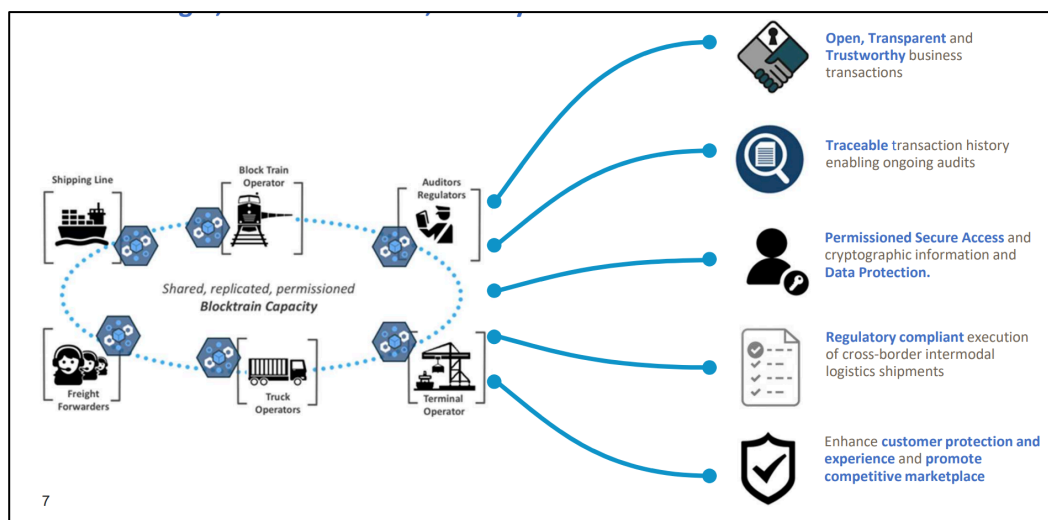


Figure 2 Block chain's workflow (Godbole,s.,Ph.D., 2024)

3. Problem Statement

Block chain technology has garnered attention for its potential to transform international trade, offering both opportunities and challenges for countries like Nepal. Existing inefficiencies and lack of transparency in Nepal's trade procedures hinder its international commerce, leading to increased costs and fraud risks (Upadhyaya, Y. M., Kharel, D. R., & Poudel, O., 2021). The country faces obstacles across paperwork, customs clearance, logistics, and cross-border payments, necessitating improvements for economic expansion (Sainju, R., 2021).

Block chain presents a solution by establishing transparent ledger systems to address trust and accountability issues. Nepal's government aims to streamline trade operations by reducing paperwork, enhancing customs procedures, and improving cross-border transactions (Risal, Nischal,

2018). Trust and transparency are crucial, especially in developing economies like Nepal, where block chain can foster stakeholder trust and verify product legitimacy.

Furthermore, block chain 's decentralized nature can streamline supply chain procedures, reduce reliance on intermediaries, and enhance overall trade efficiency. Despite existing studies, research specific to Nepal's context is lacking. Further investigation is needed to assess feasibility, considering existing obstacles, legal frameworks, governmental support, technological readiness, and stakeholder acceptance.

4. Research Questions

- i. What are the key challenges and inefficiencies in the current international trade processes in Nepal?
- ii. How can Block-chain technology address these challenges and improve trade processes?
- iii. What is the feasibility of implementing Block-chain technology in international trade of Nepal?
- iv. How does the regulatory framework and policy-level support in Nepal facilitate or hinder the adoption of block chain technology
- v. Is there relationship between technological infrastructure and Block chain technology
- vi. Is there relationship between stakeholder awareness and acceptance, and Block chain technology?

5. Research Objectives

The following are the goals of this study paper:

- i. To recognize the shortcomings and obstacles in the Nepal's current international trade procedures and policies.
- ii. To find out the potential advantages of Block-chain technology in filling up these gaps.
- iii. To assess the possibility and acceptance of Block-chain adoption in Nepal's international trade.
- iv. To evaluate if adopting block chain technology in Nepal's foreign commerce is feasible and acceptable.
- v. To examine stakeholder perceptions, attitudes, and readiness towards block chain adoption.

6. Research Hypothesis

i. Hypothesis 1

H₀₁: There is no relationship between Regulatory Framework and policy support and application of Block chain Technology in International Trade in Nepal.

H₁₁: There is a positive relationship between Regulatory Framework and policy support and application of Block chain Technology in International Trade in Nepal.

ii. Hypothesis 2

H₀₂: There is no relationship between Technological Infrastructure and Resources and application of Block chain Technology in International Trade in Nepal.

H₁₂: There is a positive relationship between Technological Infrastructure and Resources and application of Block chain Technology in International Trade in Nepal.

iii. Hypothesis 3

H₁₃: There is no relationship between Stakeholder Awareness and Acceptance and application of Block chain Technology in International Trade in Nepal.

H1₃: There is a positive relationship between Stakeholder Awareness and Acceptance and application of Block chain Technology in International Trade in Nepal.

7. Significance of the Study

The study examines the potential of block chain technology in international trade, focusing on its integration into Nepalese trade procedures. It aims to uncover the benefits, challenges, and feasibility associated with block chain adoption in Nepal. The findings have implications for improving trade protocols and driving economic expansion. The study identifies areas where block chain can enhance operations, such as reducing fraud risks, improving supply chain management efficiency, increasing transparency, and streamlining documentation procedures. It provides insights for stakeholders including traders, policymakers, banks, customs offices, and enterprises, enabling effective utilization of block chain. The understanding gained can inform policymakers in crafting regulations to promote block chain adoption, and businesses can develop adoption strategies based on the findings. Overall, the study contributes to understanding block chain's role in global trade and empowers Nepali stakeholders to leverage this technology for improved trade procedures, increased productivity, and sustainable economic growth.

8. Scope of the Study

The study's primary goal is to examine the use of block chain in international trade, particularly in Nepal. It will assess stakeholders, regulations, technology, and potential challenges. The research aims to understand how block chain can improve trade processes in Nepal, analysing benefits, barriers, and feasibility in areas like cross-border payments, digital trade documentation, customs clearance, and supply chain visibility. While focusing on Nepal's foreign commerce, it also explores how block chain might address broader trade challenges. By evaluating key trade procedures, the study aims to pinpoint where block chain can transform practices, ultimately boosting the efficiency and effectiveness of Nepal's international trade.

9. Limitations of the Study

Certain limitations must be recognized when investigating the use of block chain technology in global trade, particularly from a Nepali standpoint. Among these restrictions are:

- i. There is a shortage of empirical information about the use of block chain technology in Nepal's foreign trade.
- ii. The gathered data's very small sample size of 272 respondents, which could affect the generalizability of the findings.
- iii. Difficulties pertaining to the application of block chain technology in terms of legal, technological, and regulatory factors.
- iv. Difficulties translating the results to different nations or situations.
- v. The research was conducted within a specific timeframe, imposing a time limitation, according to the study's instructional goal.

10. Literature Review

This chapter outlines the conceptual framework of the study and provides a comprehensive analysis of research on utilizing block chain technology in international trade within Nepal. It consists of three sections. The first section reviews relevant literature, addressing research questions, and providing an overview, application, and usage of block chain technology while identifying research gaps. The

second part highlights the study's conceptual framework, including the current state of regulatory frameworks, policy support, technological infrastructure, resources, and stakeholder awareness and acceptance.

10.1 Literature Review of Base Papers

In a study titled “Factors Influencing to Adopt Block chain in International Trade “by (Debnath. D, 2023), the researchers highlight the advantages of incorporating block chain technology in global trade. It identifies factors that could drive the adoption of block chain in the trade sector, offering insights into its value propositions. The study categorizes the adoption of block chain as the dependent variable, with independent variables including cost savings, enhanced traceability and transparency, increased profitability, risk mitigation, creation of new business opportunities, and customer-centric approaches. Despite limitations such as time constraints, participant availability issues, and a narrow focus on the Bangladeshi Food & Beverage sector, the study emphasizes benefits like product traceability, streamlined commercial operations, automation via smart contracts, facilitation of trade finance, and detection of discriminatory practices. Employing a qualitative methodology, the study provides qualitative insights into the factors influencing block chain adoption in international trade.

Another research article titled " Block chain for Transforming International Trade: Bangladesh Perspective” by (Mehedi, H., 2021), the study underscores block chain 's potential to lower costs, streamline processes, and bolster security in trade operations. The research identifies traditional trade procedures, such as customs engagement and trade document management, as ripe for block chain disruption. Highlighting key industries like letters of credit and trade financing, the study treats block chain as the dependent variable, with customs, payments, and trade methods among its independent variables. Despite limitations such as reliance on secondary data and specificity to Bangladesh's trading industry, the research accentuates advantages like heightened visibility, fraud reduction, and operational simplification. Employing a qualitative approach, the study offers insights into block chain’s prospective impact on international trade from a Bangladesh-centric viewpoint.

10.1.1 Base Paper 1: Factors Influencing to Adopt Block chain in International Trade

Author Name/Year	Debashish Debnath/2023
Highlights	<ul style="list-style-type: none"> i. The paper has highlighted to the factors or benefits of Implementing block chain technology in International Trade. ii. Elements that can persuade the global trade sector to use block chain. iii. Value propositions for implementing block chain technology in global trade.
Variables	<ul style="list-style-type: none"> i. Dependent Variable: Adopt of Block chain in International trade ii. Independent Variables: Saving money, improving traceability, improving transparency, raising profits, lowering risk, opening up new company prospects, and being customer centric.
Limitations	<ul style="list-style-type: none"> i. Time and availability of the desired participants ii. Study primarily focused on the view of Bangladeshi Food & Beverage sector. iii. Only ten interviews were conducted so difficult to ensure the authenticity. iv. Technology is new comparatively with others technology and there is not sufficient research on its impact in the international business.

Advantages	<ul style="list-style-type: none"> i. Product traceability and provenance ii. Commercial operations streamlining iii. Automation and smart contracts iv. Finance for Trade v. Aiding in the identification of discriminatory practices
Methodology	Qualitative

Table 1 Literature Review of "Factors Influencing to Adopt Block chain in International Trade".

10.1.2 Base Paper 2: Block chain for Transforming International Trade: Bangladesh Perspective

Author Name/Year	Mehedi, H./2021
Highlights	<ul style="list-style-type: none"> i. The purpose of this research is to determine whether Bangladesh's environment for international trade can support a block chain -based ecosystem. ii. Block chain -based trade applications will save money, speed up processes, and enhance security throughout the trade ecosystem. iii. Trade methods, customs involvement, regulatory oversight, and trade document management are just a few of the traditional trade processes, procedures, and practices that block chain can revolutionize. A few key industries that block chain has a lot of potential to disrupt are letters of credit (LC), trade financing, trade payments, certifications, inspections, and transport documentation.
Variables	<ul style="list-style-type: none"> i. Dependent Variable: Block chain ii. Independent Variables: Customs, payment, trade methods, certifications, transport documents, trade document management, trade documents, and stopping fraud.
Limitations	<ul style="list-style-type: none"> i. The secondary available data served as the basis for this investigation. ii. Only few numbers of qualitative interviews iii. This survey is specific to trading industry of Bangladesh
Advantages	<ul style="list-style-type: none"> i. Visible and transparent ii. Less Fraud & Forgery iii. Secure iv. Simplification v. Speed vi. Reduction cost
Methodology	Qualitative

Table 2 Literature Review of "Block chain for Transforming International Trade: Bangladesh Perspective".

11. Research Theory

Below are some major research theories and insights surrounding block chain technology and its potential implications for Nepal's foreign trade and support my research work.

Innovation and Disruption

Block chain technology, introduced by Satoshi Nakamoto in 2009, has garnered attention across various industries due to its decentralized nature and potential to revolutionize traditional processes.

Vitalik Buterin's Ethereum platform further expanded the possibilities of block chain beyond cryptocurrencies like Bitcoin, highlighting its versatility and applicability across industries.

Efficiency and Security

Studies by Al Amin & Yasmin, Belu, Chang, McDaniel & Norberg, and others underscore the potential of block chain to enhance efficiency, reduce costs, and improve security in international trade processes such as logistics, payments, trade finance, and document management. Block chain's decentralized and immutable nature offers advantages in terms of transparency, traceability, and trustworthiness.

Potential and Challenges

While block chain presents significant opportunities for streamlining international trade, there are also challenges highlighted by Debashish Debnath and Nischal Risal, including environmental concerns, regulatory hurdles, and lack of awareness among stakeholders. The potential tokenization of global GDP by 2027, as projected by the World Economic Forum, underscores the transformative potential of block chain technology in global economies.

Local Context and Application

Despite the global discourse on block chain, there is a dearth of research on its application within Nepal's trade ecosystem. However, studies by Pandey & Pachhai and others suggest promising applications in areas such as foreign employment management, aid distribution, and identity verification. These local insights underscore the need for tailored research and exploration of block chain's potential in Nepal's context.

12. Research Gap

The existing literature and articles on the application of block chain technology in international trade reveal a significant research gap concerning Nepal's context. While various studies cover topics like supply chain management, cross-border payments, challenges faced by Nepalese labourers abroad, and block chain applications, there's a notable absence of comprehensive research specifically focusing on Nepal's perspective. This gap encompasses areas such as regulatory frameworks, technological infrastructure, stakeholder awareness, and acceptance. Existing studies predominantly rely on secondary data, limited qualitative interviews, and broad overviews, lacking empirical evidence and in-depth analysis tailored to Nepal's circumstances. Moreover, the literature lacks exploration of all potential benefits, impacts, and factors affecting block chain adoption in international trade, along with a thorough examination of its applications beyond logistics. Hence, further research is imperative to address these gaps and provide insights into the specific challenges, opportunities, and effects of implementing block chain technology in Nepal's international trade context.

13. Research Design and Methodology

13.1 Introduction

The research design and methodology, forms the foundation of a study's structure and schedule, essential for analysing and interpreting data accurately to draw valid conclusions (Kothari, C.R., 2004). This thesis will detail various research methods, including design, sampling, and data collection tools, alongside addressing ethical considerations, and establishing a timeline for the study.

13.2 Research Philosophy

Research philosophy refers to the set of beliefs, assumptions, and principles that guide the way researchers conceptualize, conduct, and interpret their research. It forms the foundation upon which research methodologies are built and shapes the overall approach to inquiry within a specific field of study (Kothari, C.R., 2004).

Pragmatic

In this study has been guided by a pragmatic approach of the research philosophy. Pragmatism emphasizes practicality, focusing on the usefulness and applicability of research findings in addressing real-world problems (Kothari, C.R., 2004). This approach aligns with the need to address specific challenges and opportunities in Nepal's trade landscape while considering practical implications for stakeholders.

13.3 Research Model and definition of the variables

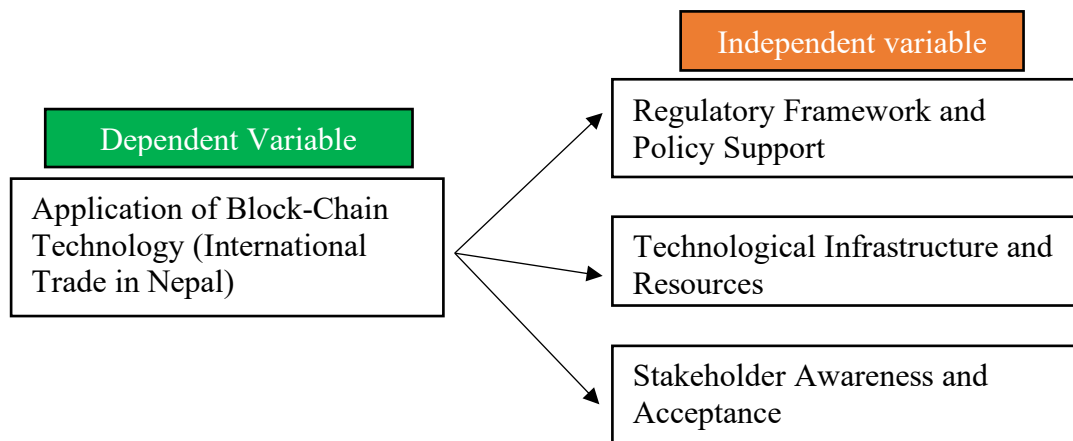


Figure 3 Research Framework of the Research

13.4 Research Approach

The term "research approach" refers to a set of procedures and a conceptual framework used in the process of conducting research. Both the direct and indirect method was followed as follows:

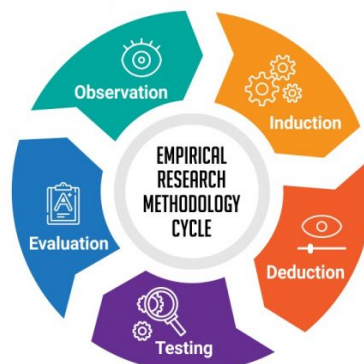


Figure 4 Five phases of the empirical cycle (questionpro.com, 2024)

As illustrated in the figure above, the study has adhered to the systematic approach known as the empirical cycle, comprising of five stages conducting thesis.

13.5 Research Strategy

The research methodology delineates the procedures and techniques utilized to conduct the study, encompassing methodologies such as surveys, case studies, experiments, interviews, or literature reviews. This study employs a survey-based approach, utilizing a structured questionnaire for data collection.

13.6 Research Methodology

This research integrates a systematic literature review and questionnaire survey, employing a mixed-methods approach to comprehend the implications of block chain in Nepal's international trade. It combines qualitative insights from interviews and focus groups with quantitative data, drawing on interdisciplinary perspectives and theoretical frameworks for holistic analysis.

Descriptive research

Through these studies, the valuable insights into the current landscape, challenges, opportunities, and readiness for block chain adoption in international trade from the perspective of Nepal can be gained.

Comparative research

Several potential comparative studies will be conducted like Regulatory Frameworks, stakeholders' perspectives, awareness of stakeholders and futures prospective and challenges.

Exploratory research

The research aims to provide an in-depth understanding of the opportunities, challenges, and implications of implementing block chain technology in Nepal's international trade sector.

13.7 Data Collection and Methods and Tools

This study utilized both primary and secondary data collection methods to assess the applicability of block chain technology in Nepal's international trade. Primary data was collected through online surveys and face-to-face meetings, while secondary data was gathered through a thorough review of scholarly literature, including journal articles and books.

Primary Data

Primary data collection methods, including online surveys and face-to-face meetings, were utilized to understand the current status, potential, challenges, and relevance of block chain in Nepal's international trade. Employing a combination of Likert scale and open-ended questions, stakeholders provided diverse viewpoints. Recognizing the novelty of block chain technology in the Nepalese context, primary data was deemed essential alongside literature review to comprehensively assess its applicability.

Secondary Data

In the literature review, secondary data were collected from recent books, reports, journal articles, and newspaper articles containing real data and statistics, with a focus on publications within the last five years. Emphasis was placed on identifying gaps, issues, and repercussions in Nepal's international trade, alongside exploring block chain technology as a potential solution. Secondary data revealed insights into leveraging block chain to enhance transparency, accountability, efficiency, and cost-effectiveness in Nepal's international trade.

13.8 Data Collection Methods

Primary data was collected via questionnaires featuring multiple-choice, Likert scale, open-ended, and yes/no questions, with analysis using mean calculation, frequency distribution, and response coding aided by statistical software like SPSS and MS Excel for meaningful insights.

13.9 Research Design

This study employs descriptive, comparative, and explanatory research designs to analyse stakeholders' opinions and perceptions regarding block chain technology in Nepal's international trade. It aims to inform policymakers and industry stakeholders about block chain's potential benefits and applications, guiding strategic planning and policy development initiatives.

13.10 Population and sample, and sampling design

The study focuses on stakeholders like commercial banks, freight forwarders, regulatory bodies, and importers & exporters in Kathmandu Valley, Nepal's economic centre, totalling 767 individuals. Convenience sampling was employed to select 272 respondents, including representatives from 20 commercial banks, 132 freight forwarding companies, 40 developers from 11 block chain companies, 500 IT hardware and software trading companies, and one regulatory body, Nepal Rasta Bank. Data were collected from official websites and online news portals.

<i>S. N</i>	<i>Industry</i>	<i>No.</i>	<i>Distribution</i>	<i>Department</i>	<i>Total Distribution</i>	<i>No. Respondent</i>
1	Commercial Banks	20	4	IT/Trading/Branch Managers	80	69
2	Importer / Exporter (ICT)	50	1	Owner or Logistic/ Finance Head	500	66
3	Expert/Developers	10	4	Developers/Consultants	40	24
4	Freight Forwarding company	116	1	Companies	116	87
5	Regulatory Bodies	1	31	Employees form the department	31	26
Total					767	272

Table 3 List of samples collected along with the total number of observations.¹

13.10.1 Sample Size Calculation

As total number of populations for the survey was know I have used Yamane method to find out the sample size for the survey and found to be 250.

13.11 Method of Analysis

This study employs a systematic approach to analyse primary data concerning block chain technology in Nepal's international trade. Beginning with a pilot test, reliability and validity tests ensure data credibility. Descriptive, correlation, and regression analyses provide insights into respondent profiles, variable relationships, and key indicators, aiding in valuable conclusions and recommendations despite challenges like incomplete datasets and varied respondent understanding.

13.12 Research Timeframe

Below are the study timetable and its Gantt chart.

S. No	Task name	Start date	End date	01.09.2023	14.09.2023	28.09.2023	14.10.2023	28.10.2023	14.11.2023	28.11.2023	14.12.2023	28.12.2023	14.01.2024	28.01.2024	14.02.2024	28.02.2024	14.03.2024	31.03.2024
1	Research Area Identification	1/9/023	3/9/023															
2	Literature Review	3/9/023	1/10/023															
3	Planning Research Methodology	2/10/023	10/10/023															
4	Preparing the Questionnaires	11/10/023	21/10/023															
5	Distribution of the Questionnaires and Data Collection	22/10/023	19/11/023															
6	Data Analysis with SPSS	20/11/023	3/12/023															
7	Report Writing	3/12/023	24/12/023															

¹ Appendix 2 - Data Source of Population for the survey

8	Present First Draft of the Report	25/12/023	3/1/024															
9	Present Second Draft of the Report	4/1/024	13/1/024															
10	Finalising the Report	14/1/024	24/1/024															
11	Discussion and Findings	25/1/024	11/2/024															
12	Conclusion and Recommendations	12/2/024	1/3/024															
13	Dissertation Final Submission	2/3/024	31/3/024															

Table 4 Gantt Chart of Research Timeframe

13.13 Ethics and Confidentiality

Adherence to university regulations and ethical principles ensures morally and legally acceptable research practices, including professional outreach, voluntary participation, and safeguarding participant privacy and confidentiality.

14. Data Analysis and Interpretation

This chapter presents an organized analysis of primary data using various regression and statistical models, including correlation analysis and mean analysis. Divided into three sections, it displays results from the questionnaire survey, explores correlation analysis, and concludes with key findings drawn from the examination of original data.

14.1 Case Processing Summary

This study qualitatively assesses block chain technology’s application in Nepal's international trade, incorporating primary data analysis including questionnaire results from stakeholders. Stakeholder awareness, technological resources, regulatory framework, and acceptance were surveyed using various question types like yes/no, multiple-choice, and Likert scale, followed by detailed descriptions of profiles, traits, and survey outcomes analysed using weighted average mean, frequencies, and percentages for accuracy.

14.2 Respondents Feedback

An online survey method was employed, utilizing concise closed-ended queries via Google Docs, face-to-face, and telephonic interviews, conducted from the third week of October 2023 to the third week of November 2023, resulting in 272 valid responses for analysis out of approximately 620 individuals reached.

Questionnaire	No. of Questionnaire (Online/Offline)
Distributed	620
Collected	274
Utilized	272

Table 5 Summary of the responses collected.

14.3 Reliability and Validity Testing (Cronbach's Alpha)

The Cronbach's alpha coefficients for each set of primary data are shown in the following table.

The table below shows the Reliability and validity of the study.

Reliability Statistics		
<i>Variables</i>	<i>No. of Items</i>	<i>Cronbach's Alpha</i>
Regulatory Framework and Policy Support	3	.877
Technological Infrastructure and Resources	3	.830
Stakeholder's Awareness and Acceptance	3	.703

Table 6 Reliability test and statistics based on response on survey Likert questionnaire, 2024 (Source: SPSS)

The Likert scale questions underwent validity and reliability testing using Cronbach's alpha, yielding values of 0.877, 0.830, and 0.703 for the variables of technological infrastructure, regulatory framework, and stakeholder awareness, respectively—all surpassing the threshold of 0.70. This suggests internal consistency and reliability, affirming the trustworthiness of the data for further analysis.

14.4 Descriptive Analysis

14.4.1 Respondent's Profile

Demographic Data Analysis

The research scrutinized the personal traits of 272 respondents from various sectors such as Commercial Banks, Freight forwarders, Regulatory bodies, and Importer & Exporter, particularly focusing on the Hardware and software business in Kathmandu Valley, recognizing the importance of these traits in shaping their opinions on issues.

<i>Respondents Character</i>	<i>No. of Responses</i>	<i>Percentage</i>
Gender		
Male	170	62.5
Female	100	36.8
Others	2	.7
Total	272	100
Occupational Background		
Technical	98	36
Non-Technical	174	64
Total	272	100
Affiliation with		
Regulatory Body	26	9.6
Block-Chain Expert/Developer	24	8.8
Exporter/Importer (IT Hardware & Software)	66	24.3
Financial Institution	69	25.4
Freight Forwarder	87	32.0
Total	272	100

Table 7 Demographic characteristics of respondent's (Source: SPSS)

The above table shows respondent classification by gender, occupational background, and affiliation in the questionnaire survey, with 272 respondents: 170 male, 100 female, and 2 others. Occupational backgrounds included 26 from Regulatory Body, 24 Block chain Developers/Experts, 66 Exporter/Importers, 69 from Commercial Banks, and 87 from Freight Forwarders, indicating higher responses from non-technical backgrounds and a predominance of males.

14.4.2 Frequency Distribution Analysis

Gender

Gender was examined as a significant variable in responding to the study's concerns. The data reveals that the majority of respondents were male (62.5%), followed by females (36.8%), with a smaller percentage identifying as other (0.7%).

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	170	62.5	62.5	62.5
	Female	100	36.8	36.8	99.3
	Other	2	.7	.7	100.0
	Total	272	100.0	100.0	

Table 8 Gender statistics (Source: SPSS)

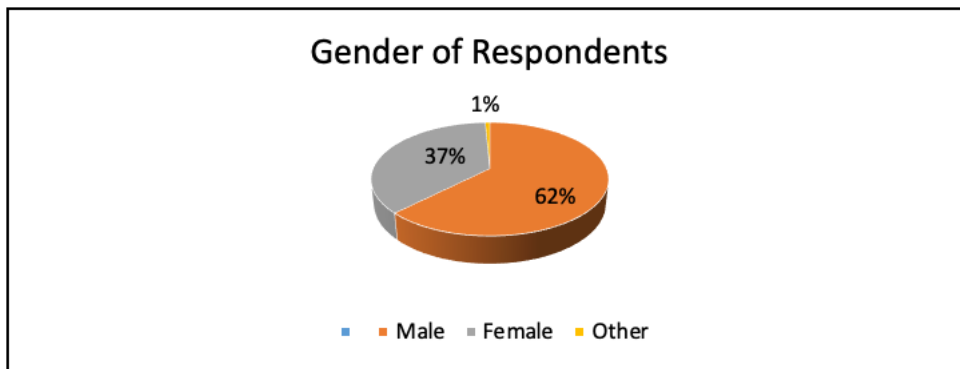


Figure 5 Pie-chart – Classification of respondents by gender (Source: SPSS)

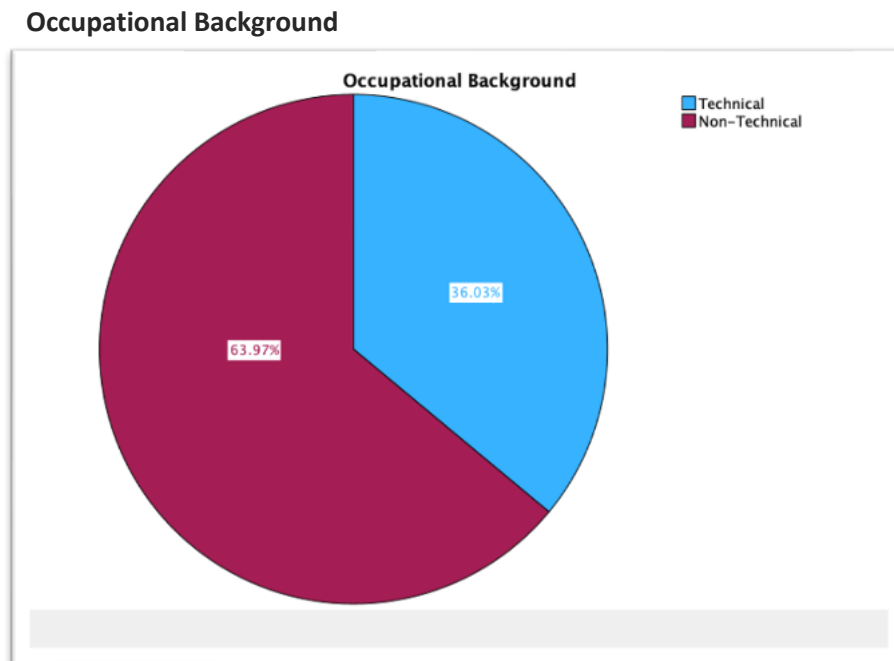


Figure 6 Pie-chart of occupational background of respondent (Source: SPSS)

The frequencies illustrate the distribution of respondents across different occupational backgrounds, with the highest number coming from non-technical backgrounds and the lowest from technical backgrounds. Among the 272 respondents, 98 were from technical backgrounds, while 174 were from non-technical backgrounds, representing the highest proportion of respondents.

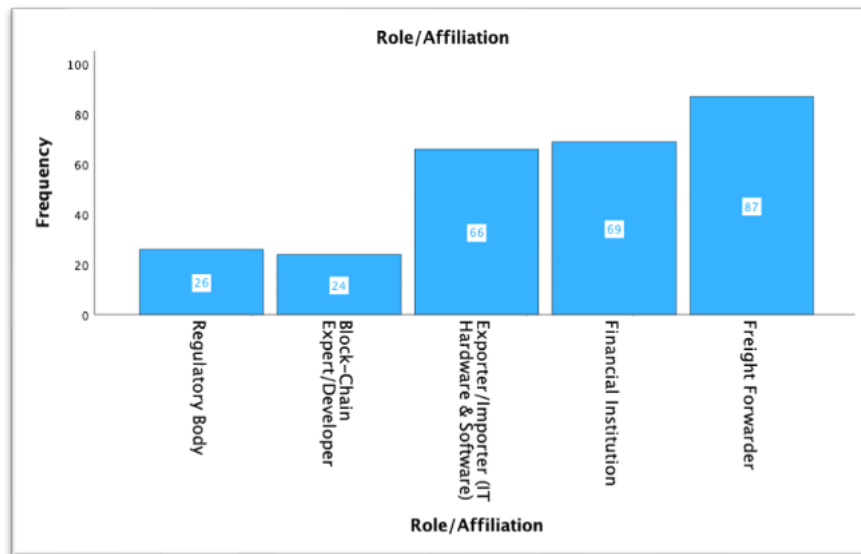


Figure 7 Bar-chart of Role or Affiliation of respondent. (Source: SPSS)

Affiliation or Role

The role or affiliation of respondents with relevant institutions is crucial in understanding their perspectives. Categorized into five groups—regulatory body, block chain experts/developers, IT hardware and software importer/exporter companies, commercial banks, and freight forwarders—the figure illustrates that the majority of respondents are from freight forwarding companies (87), followed by commercial banks (69), importer/exporter companies (66), experts/developers (24), and regulatory bodies (26).

Familiarity with Block chain Technology

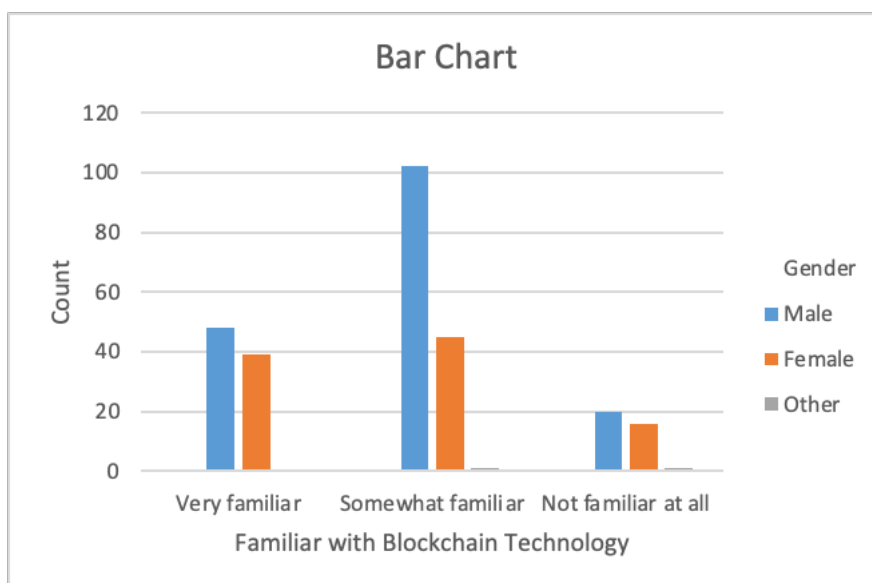


Figure 8 Bar chart - Familiarity with Block chain Technology (Source: SPSS)

The bar chart illustrates respondents' familiarity with block chain technology across genders, revealing that the majority, particularly men (102) and women (45), are somewhat familiar with it, followed by those who claim to be very familiar (48 men, 16 women) or not familiar at all (39 men, 45 women). Individuals identifying as other genders show less representation, with 20 somewhat familiar, 16 not familiar at all, and 4 very familiar with block chain technology. Overall, respondents across all genders demonstrate a level of familiarity with block chain technology.

14.5 Descriptive Statistics of Variables

Descriptive statistics gives a summary of the main characteristics of a dataset. These statistics helps researchers understanding the central tendency, variability, and shape of the distribution of their data (Kothari, C. R., 2004). The Descriptive statistics of variables are as follows:

Descriptive Statistics			
	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
DV_ABT	272	2.93	0.542
IDV_RFPS	272	3.36	0.946
IDV_TIR	272	3.82	0.88
IDV_SAA	272	3.95	0.585
Valid N (listwise)	272		

Table 9 Descriptive Statistics Analysis (Source: SPSS)

Where,

Dependent Variable:

DV_ABT = Application of Block chain Technology

Independent variables:

IDV_RFPS = Regulatory framework and policy support

IDV_TIR = Technological infrastructure and resources

IDV_SAA = Stakeholder acceptance and awareness

The table displays average and spread values for various variables, revealing an average rating of 2.93 for the dependent variable "Application of Block chain Technology," indicating disagreement among participants. Meanwhile, "Regulatory framework and policy support" averages 3.36, lower than "Technological infrastructure and resources" (3.82) and "Stakeholder acceptance and awareness" (3.95), suggesting lower agreement in regulatory aspects. Standard deviations, such as 0.542 for block chain technology adoption, indicate variability around the average, reflecting differing participant perspectives across variables.

14.6 Correlation Analysis

Correlation measures the strength and direction of the connection between two variables, ranging from -1 to +1 (Singh, Y. K., 2006).

The research study has four major variables namely Application of Block chain Technology (DV_ABT), regulatory framework and policy support (IDV_RFPS), technological infrastructure and resources (IDV_TIR), and stakeholder awareness and acceptance (IDV_SAA). Where, DV_ABT is independent variable, and IDV_RFPS, IDV_TIR and IDV_SAA are dependent variables.

Correlations					
		DV_ABT	IDV_RFPS	IDV_TIR	IDV_SAA
Pearson Correlation	DV_ABT	1	0.761	.695	0.782
	IDV_RFPS	0.761	1	.792	0.622
	IDV_TIR	0.695	0.792	1	.596
	IDV_SAA	0.782	.622	0.596	1
Sig. (1-tailed)	DV_ABT	.	0	0	<.001
	IDV_RFPS	0	.	0	0
	IDV_TIR	0	0	.	0
	IDV_SAA	0	0	0	.

Table 10 Correlation between various variables (Source: SPSS)

DV_ABT (Dependent Variable: Application of Block chain Technology) exhibits a moderately strong positive correlation with IDV_RFPS (Independent Variable: Regulatory Framework and Policy Support) at 76.1%, implying that stronger regulatory backing corresponds to higher block chain technology applications. Similarly, DV_ABT correlates positively with IDV_TIR (Independent Variable: Technological Infrastructure and Resources) at 69.5%, indicating that improved technological infrastructure leads to increased block chain technology application. Additionally, DV_ABT demonstrates a positive correlation with IDV_SAA (Independent Variable: Stakeholder Awareness and Acceptance) at 78.2%, suggesting that heightened stakeholder awareness and acceptance result in higher block chain technology application. With p-values below 0.01, rejecting the null hypothesis in favour of the alternative directional hypothesis is appropriate, affirming the established hypotheses from prior literature, knowledge, and theories.

14.7 Normality Test

Normality tests are commonly utilized to evaluate whether a sample is derived from a population with a normal distribution (Singh, Y. K., 2006). The data obtained in this study have been identified as conforming to a normal distribution.

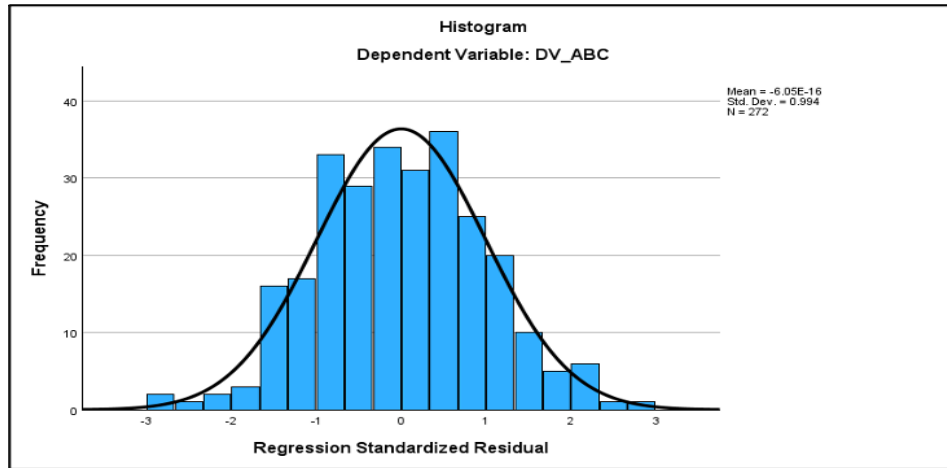


Figure 9 Histogram graph – Regression standardized residual.

The above histogram analysis indicates symmetrical distribution around the mean, resembling a bell curve, suggesting a normal distribution of data. This observation is supported by the below Normal P-P Plot of Regression Standardized Residual, where points closely cluster around a straight line, affirming the normality of the distribution.

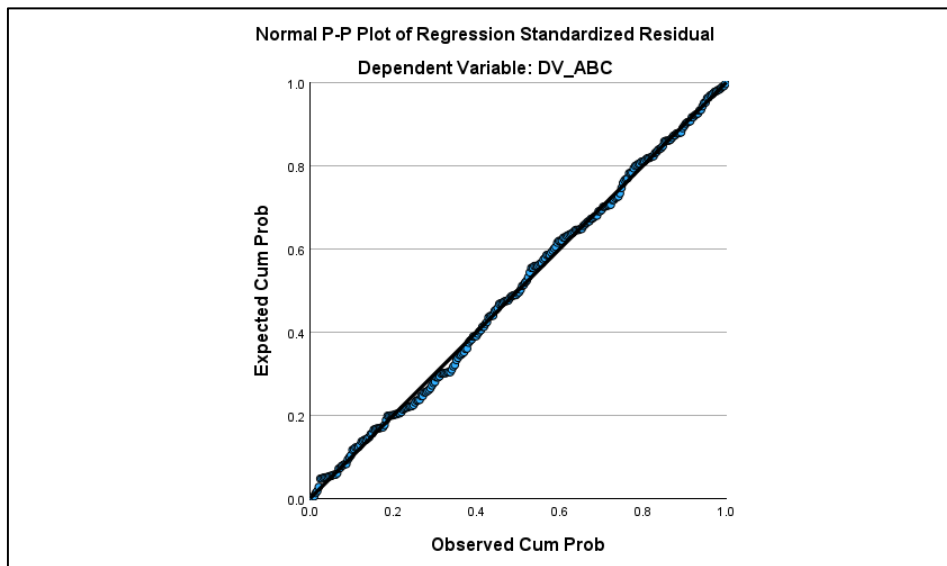


Figure 10 Normal P-P Plot of Regression Standardized Residual

14.8 Multiple Regression Analysis

The research employs multiple regression analysis to understand the relationships between the dependent variable, Application of Block chain Technology (ABT), and independent variables: Regulatory framework and policy support (RFPS), technological infrastructure and resources (TIR), and

stakeholder awareness and acceptance (SAA). Utilizing ANOVA testing, model summary, and coefficient tables, the analysis validates the application of multiple regression analysis in the study.

14.8.1 ANOVA (Analysis of Variance)

ANOVA, which is known as the examination of differences regarding variability, is a statistical method applied to contrast the averages of multiple groups and helps researchers in identifying whether there exist any statistically notable variations among the groups under review (Kothari, C. R., 2004).

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.808	3	1.936	7.02	<.001 ^b
	Residual	73.865	268	0.276		
	Total	79.673	271			
a. Dependent Variable: DV_ABT						
b. Predictors: (Constant), IDV_SAA, IDV_TIR, IDV_RFPS						

Table 11 ANOVA Table (Source: SPSS)

The table data presents an F-value of 7.024 with a p-value of less than 0.001, indicating high statistical significance. This suggests a strong relationship between the independent variables - Regulatory framework and policy support (IDV_RFPS), Technological infrastructure and resources (IDV_TIR), and Stakeholder awareness and acceptance (IDV_SAA) - and the dependent variable, the degree of acceptance of block chain technology in International Trade (DV_ABT). The p-value below 0.001 implies statistical significance, leading to the rejection of the null hypothesis (H0) and acceptance of the alternative hypothesis (H1) with confidence.

14.8.2 Model Summary

This Model summary analysis is used to understand the level of impact that one or more independent variables hold over a dependent variable (Kothari, C. R., 2004).

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.9	0.732	0.729	0.425
a. Predictors: (Constant), IDV_SAA, IDV_TIR, IDV_RFPS				
b. Dependent Variable: DV_ABT				

Table 12 Model Summary Regression between ABT and RFPS (Source: SPSS)

The model summary table indicates an R² of 0.732, suggesting that 73.2% of the variability in the application of block chain technology (DV_ABT) can be explained by the regulatory framework and policy support (IDV_RFPS), technological infrastructure and resources (IDV_TIR), and stakeholder

awareness and acceptance (IDV_SAA). The adjusted R², closely aligned with R² at 0.729, also indicates a favourable fit for the model. Additionally, the Std. Error of the Estimate, at 0.425, suggests a good fit for the data, affirming that the model effectively elucidates a significant portion of the variation in DV_ABT.

14.8.3 Coefficients Analysis

The Coefficients are likely the result of the regression, a statistical method used to investigate the connection between one dependent variable and one or more independent variables (Singh, Y. K., 2006).

The simple linear regression with three independent variable is as below:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

Where,

Y = Dependent Variable (Application of Block-chain technology in International Trade of Nepal)

a = Constant Value

X₁ = Regulatory Framework and Policy Support (RFPS)

X₂ = Technological Infrastructure and Resources (TIR)

X₃ = Stakeholder Awareness and Acceptance (SAA)

b₁, b₂, b₃ = B-Value (Coefficient or Slope)

The above simple linear regression equation for this study is made based on the table and the numerical figures of all variables given below:

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.854	0.125		2.403	<.001
	IDV_RFPS	0.402	0.037	0.244	1.691	0.032
	IDV_TIR	0.464	0.039	0.474	8.166	0
	IDV_SAA	0.486	0.055	0.404	9.097	<.001
a. Dependent Variable: DV_ABT						

Table 13 Coefficients table (Source: SPSS)

Above is a table displaying the coefficients derived from a basic linear regression model with three independent variables—Regulatory Framework and Policy Support, Technological Infrastructure and Resources, and Stakeholder Acceptance and Awareness—predicting the Application of Block chain technology in international trade. The regression equation is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

Application of Blockchain Technology in International Trade of Nepal = 3.854 + 0.402(Regulatory Framework and Policy Support) + 0.464(Technological Infrastructure and Resources) + 0.486(Stakeholder Awareness and Acceptance)*

14.8.4 Analysis of Independent Variables on Block chain Technology Application

The analysis of independent variables on block chain technology application reveals key insights. Regulatory framework and policy support (IDV_RFPS) exhibit a moderately positive impact, with a coefficient of 0.402, suggesting a notable role in driving block chain adoption. Similarly, technological infrastructure and resources (IDV_TIR) demonstrate a strong positive effect, with a coefficient of 0.464, indicating a robust correlation with block chain adoption. Stakeholder acceptance and awareness (IDV_SAA) also contribute significantly, with a coefficient of 0.486, emphasizing their importance in fostering block chain adoption. Overall, improvements in technological infrastructure, stakeholder buy-in, and regulatory frameworks are crucial for facilitating widespread adoption of block chain technology, with technological resources showing the strongest positive impact.

14.9 Hypothesis Testing and Reporting of Findings

The table below shows the result and report of hypothesis testing and of findings.

Hypothesis		Developed Hypothesis	Sig. (P-Value)	Accept/Reject	Type of Effect
Hypothesis 1					
Null	H0 ₁	There is no relationship between Regulatory Framework and policy support and application of Block chain Technology in International Trade in Nepal.	0.032	Reject	-
Alternative	H1 ₁	There is a positive relationship between Regulatory Framework and policy support and application of Block chain Technology in International Trade in Nepal.		Accept	Positive
Hypothesis 2					
Null	H0 ₂	There is no relationship between Technological Infrastructure and Resources and application of Block chain Technology in International Trade in Nepal.	0.000	Reject	-
Alternative	H1 ₂	There is a positive relationship between Technological Infrastructure and Resources and application of Block chain Technology in International Trade in Nepal.		Accept	Positive

Hypothesis 3					
Null	H0 ₃	There is no relationship between Stakeholder Awareness and Acceptance and application of Block chain Technology in International Trade in Nepal.	<.001	Reject	Positive
Alternative	H1 ₃	There is a positive relationship between Stakeholder Awareness and Acceptance and application of Block chain Technology in International Trade in Nepal.		Accept	-

Table 14 Hypothesis Testing and Reporting of Findings

The Hypothesis Testing and reporting of findings table demonstrates a significant association between the "application of Block chain Technology in International Trade in Nepal" (dependent variable) and independent variables such as Regulatory Framework and Policy Support, Technological Infrastructure and Resources, and Stakeholder Awareness and Acceptance. The positive influence of these independent variables on the dependent variable, as indicated in the table, leads to the acceptance of the alternative hypothesis.

15. Findings and Discussions

15.1 Challenges Encountered During the Responses Collection

- The survey is restricted to an online, calls and some in person interviews.
- Responses were not received as expected.
- There is the time limitation to collect the data.

15.2 Summary of Findings

The study analysed demographic data from 272 respondents, primarily from the IT sector in Kathmandu valley, representing stakeholders such as commercial banks, freight forwarders, regulatory bodies, and Block chain Experts/Developers. The analysis revealed a male majority of 62.5%, reflecting the predominant gender demographics in Nepal's IT sector. Moreover, non-technical backgrounds constituted 64% of respondents, indicating a higher participation from this group. The most represented roles or affiliations were freight forwarder companies (32%), followed by commercial banks (25.4%) and importer/exporter companies (24.3%). The mean rating for block chain technology adoption was 2.93, showing a lack of consensus among participants. Positive correlations were found between block chain adoption and regulatory support, technological resources, and stakeholder engagement, with ANOVA analysis confirming strong overall relationships. Coefficients analysis revealed that improvements in regulatory support, technological resources, and stakeholder awareness were associated with increased block chain adoption. Overall, the study underscores the pivotal role of regulatory support, technological resources, and stakeholder engagement in driving block chain adoption, urging policymakers and stakeholders to prioritize initiatives to enhance these factors for trade efficiency and competitiveness.

15.3 Interpretation of Findings

The key findings of the study form the statistical data analysed are briefly discussed in this chapter.

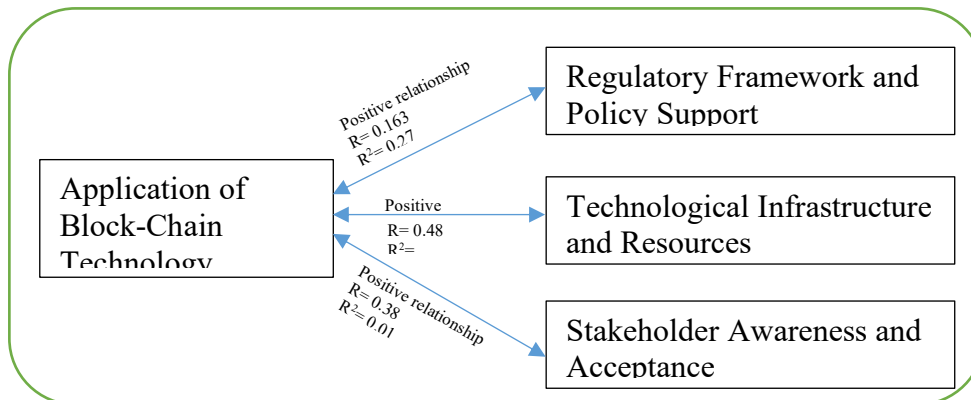


Figure 11 Figure 12 Relationship of variables.

A detailed examination of the data the following outcomes for the questions below were observed after a thorough data analysis was conducted using SPSS:

RQ1. What are the key challenges and inefficiencies in the current international trade processes in Nepal?

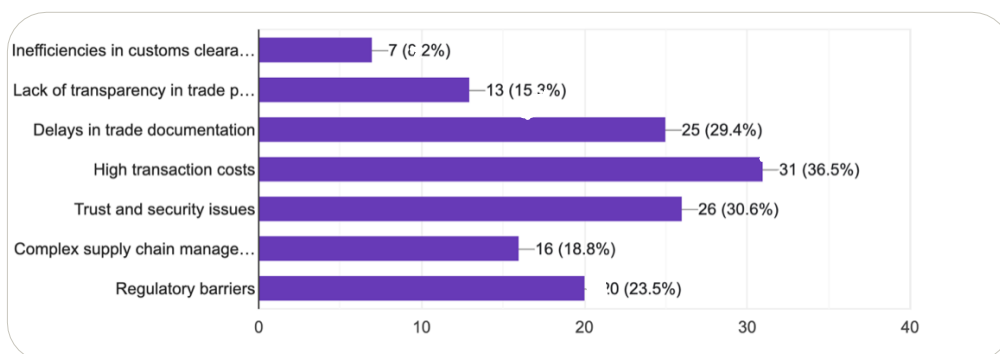


Figure 12 Respondents perception on current international trade of Nepal (Source: Google Form)

The survey conducted among 272 participants aimed to assess the suitability of block chain technology in Nepal's international trade, focusing on challenges and inefficiencies in the current process. Primarily targeting stakeholders from the IT trading sector in Kathmandu valley, including commercial banks, freight forwarders, regulatory bodies, and Block chain Experts/Developers, the study captured insights from key players involved in international trade. Findings reveal high transaction costs (36.5%), trust and security issues (30.6%), delays in trade documentation (29.4%), and regulatory barriers (23.5%) as significant challenges. Additionally, lack of transparency in trade procedures, complex supply chain management, and inefficiencies in customs clearing processes were indicated by respondents. The analysis underscores a gap in the trade sector's readiness for block chain adoption, suggesting moderate potential challenges. This highlights the role of block chain technology in addressing inefficiencies, improving overall efficiencies, and ensuring trust and transparency in trade processes through features like smart contracts.

RQ2. How can Block-chain technology address these challenges and improve trade processes?

The study indicates the potential application of block chain technology in Nepal's international trade despite existing challenges. The supportive regulatory environment, adequate technological infrastructure, and skilled workforce provide a foundation for block chain adoption. Improving stakeholder awareness and readiness through educational initiatives and targeted training programs is recommended. Block chain technology addresses various trade challenges, including enhancing transparency and traceability, improving security, reducing costs and inefficiencies, accelerating settlement processes, mitigating risks, ensuring compliance, and optimizing supply chains. Overall, block chain offers a transformative solution to trade challenges, promising secure, transparent, and efficient transactions, thus revolutionizing international trade and fostering growth, innovation, and collaboration across global supply chains.

RQ3. What is the feasibility of implementing Block-chain technology in international trade of Nepal?

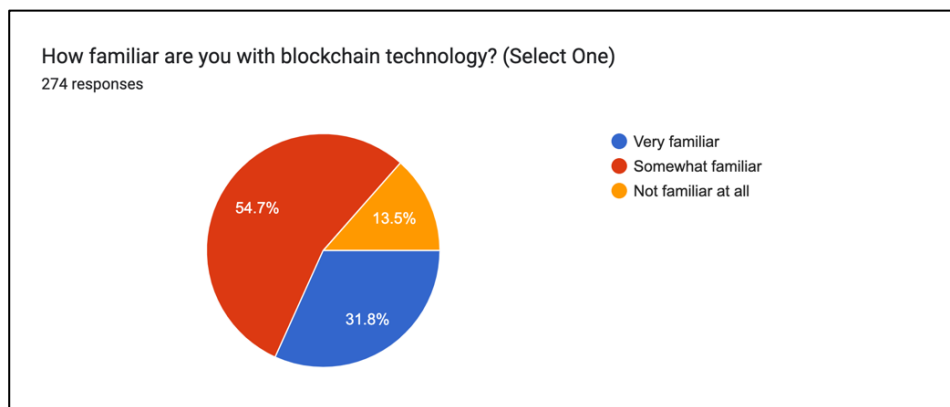


Figure 13 Survey responses on familiarity on block chain technology (Source: Google form)

As per the above chart, majority of respondents, 54.7%, acknowledge a complete lack of familiarity with block chain technology. This unfamiliarity may present a hurdle to the adoption and execution process, necessitating educational and awareness campaigns to ensure stakeholders grasp the possible advantages and functions of block chain technology.

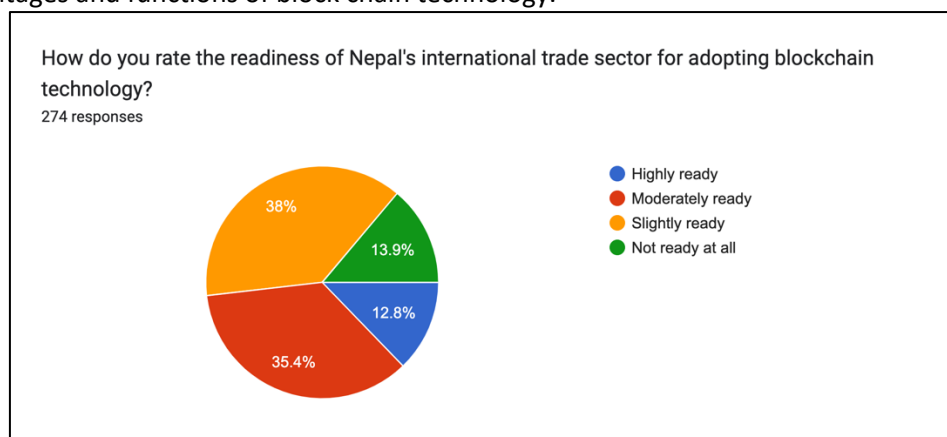


Figure 14 Feasibility of implementing block chain technology in international trade of Nepal.

As per the above chart, approximately 38% and 35.4% of respondents view the sector as highly or moderately prepared to embrace block chain technology, indicating a sense of readiness and receptiveness among stakeholders in the international trade sector.

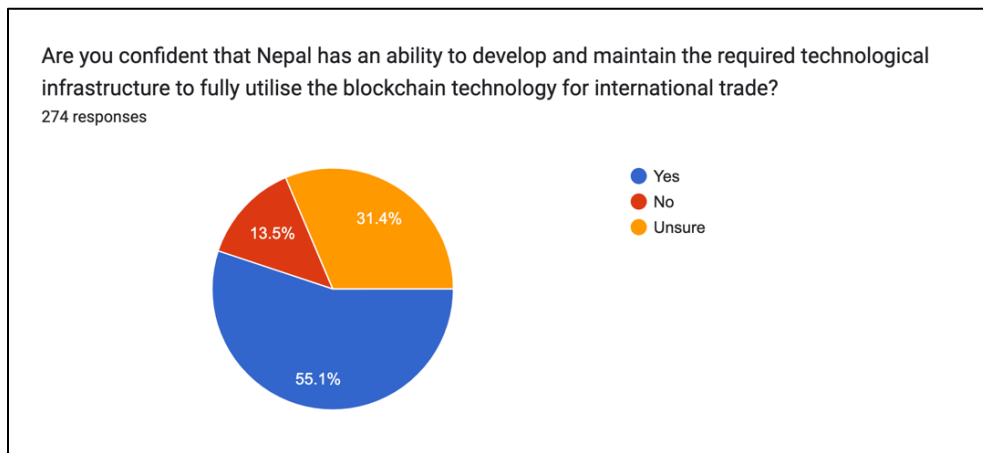


Figure 15 Survey responses on Nepal’s ability to develop and maintain the required technological (Source: Google form)

As per the above chart, more than half of the respondents, around 55.1%, express belief in Nepal's potential to construct and sustain the technological infrastructure necessary for the utilization of block chain technology in international trade. This showcases trust in the country's ability to support the integration of block chain technology.

In summary, while there are positive signs of readiness and potential for block chain integration in Nepal's international trade, addressing education, awareness, and regulatory challenges is crucial for successful adoption. Through collaboration and targeted initiatives, block chain technology can enhance efficiency, transparency, and security in trade transactions, ultimately benefiting Nepal's international trade landscape.

RQ4. How does the regulatory framework and policy-level support in Nepal facilitate or hinder the adoption of block chain technology?

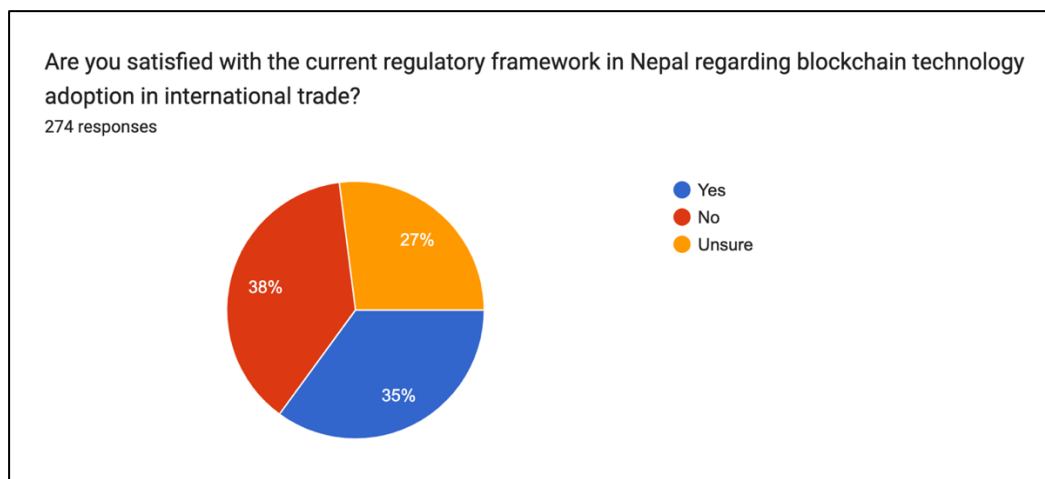


Figure 16 Survey responses on Satisfaction on current regulatory framework (Source: Google form)

The results of above chart show a significant positive correlation between regulatory framework and policy support and block chain technology adoption, indicating that supportive policies can facilitate its implementation. However, analysis of Nepal's regulatory environment reveals potential facilitators and hindrances to block chain adoption. Approximately 38% of respondents are satisfied with the

current regulatory framework, suggesting a generally supportive environment for technological advancements, which could ease block chain adoption. However, a significant portion, comprising 27% unsure and 35% not satisfied, signals obstacles such as inadequate stakeholder awareness and infrastructure, possibly due to limited government focus or awareness. Policymakers need to enhance their understanding of block chain, develop specific regulations, invest in infrastructure, and increase stakeholder awareness to overcome these barriers and facilitate block chain technology adoption in Nepal's trade sector.

RQ5. Is there relationship between technological infrastructure and Block chain technology?

The analysis reveals a significant relationship between technological infrastructure and the adoption of block chain technology in international trade. Descriptive statistics indicate a moderate level of agreement among respondents regarding the quality and availability of technological resources, with a mean of 3.82 and a standard deviation of 0.88. Regression analysis further confirms this relationship, with a coefficient of 0.464 indicating that each unit increase in technological infrastructure corresponds to a 0.464-unit increase in block chain technology adoption. The standardized coefficient (beta) of 0.474 underscores a strong positive impact on block chain adoption. Additionally, the p-value associated with technological infrastructure is lower than 0.001, signifying high statistical significance and a meaningful association between the variables. In conclusion, both descriptive statistics and regression analysis support the notion of a positive and significant relationship between technological infrastructures and block chain adoption in international trade.

RQ6. Is there relationship between stakeholder awareness and acceptance, and Block chain technology?

The analysis indicates a significant relationship between stakeholder awareness and acceptance and the adoption of block chain technology in international trade. Descriptive statistics reveal a strong consensus among participants, with stakeholder awareness and acceptance averaging 3.95 and a deviation of 0.585. Regression analysis further supports this relationship, with a coefficient of 0.486 suggesting that an increase in stakeholder awareness and acceptance corresponds to a 0.486-unit increase in block chain technology adoption. The standardized beta coefficient of 0.404 denotes a moderately favourable impact on block chain adoption, indicating that heightened stakeholder awareness leads to increased integration of block chain technology. Moreover, the p-value below 0.001 in hypothesis testing underscores the statistical significance of this relationship. In conclusion, based on the evidence from descriptive statistics, regression analysis, and hypothesis testing, there is a positive and significant association between stakeholder awareness and acceptance and the utilization of block chain technology in international trade.

16. Conclusion and Recommendations

16.1 Conclusion

In summary, the study underscores the potential of block chain technology to transform Nepal's international trade sector by mitigating major challenges and inefficiencies. Despite existing hurdles like regulatory, infrastructural, and awareness-related issues, the findings suggest a promising groundwork for block chain adoption. By enacting supportive policies, investing in infrastructure, engaging stakeholders, and enhancing trade sector readiness, Nepal can leverage the benefits of block chain technology to facilitate more efficient, transparent, and secure trade processes. Through ongoing evaluation and adaptation, Nepal has the opportunity to emerge as a leading player in block chain innovation and foster sustainable growth in its international trade landscape.

16.2 Recommendations

The study identifies several shortcomings and challenges in Nepal's international trade and suggests implications of block chain technology for addressing them. Recommendations include:

- Policy and Regulatory Support: Develop specific regulations for block chain, incentivize research and adoption, and foster collaboration between government, industry, and academia.
- Infrastructure Development: Invest in technological infrastructure and support projects integrating block chain into trade processes.
- Stakeholder Engagement and Awareness: Conduct educational initiatives and workshops to increase understanding and acceptance of block chain.
- Trade Sector Readiness: Pilot block chain projects, offer training programs, and build capacity for companies to use block chain effectively.
- Continuous Evaluation and Adaptation: Monitor implementation, adapt policies based on feedback, and stay updated with technological trends.

In summary, the study highlights block chain 's potential to transform Nepal's international trade by addressing challenges through supportive policies, infrastructure investments, stakeholder involvement, and readiness-building. Continuous evaluation and adaptation are crucial for successful integration, positioning Nepal as a leader in block chain innovation and driving sustainable growth in its international trade.

16.3 Future Research Recommendations

Future research possibilities in this area involve broadening the study beyond Kathmandu Valley and exploring various sectors such as finance, logistics, elections, and procurement to achieve more generalized findings. Increasing the sample size can enhance reliability, and incorporating qualitative data alongside quantitative findings can provide richer insights. Furthermore, exploring additional independent variables can expand the research scope.

References

- Adhikari, M., & Ma, Z. (2022). The Belt and Road Initiative as a Gateway to the Sea for Land-Locked Countries: With Reference to Nepal. *SAGE Open*, 12(1), 21582440221. <https://doi.org/10.1177/21582440221087271>
- Ahmed, S., Islam, M. E., Hosen, M. T., & Hasan, M. H. (2020). Block chain -based fertilizer distribution system: Bangladesh perspective. In *Proceedings of the International Conference on Computing Advancements*, pp. 1-5.
- Amin, S. M. Al, & Yasmin, S. (2022). Block chain for Transforming International Trade: Bangladesh Perspective. *International Journal of Supply Chain Management*, 11(4). Retrieved from <https://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/5994>
- Belu, G. & M. G. (2019). Application of Block chain in international trade: An overview. *Romanian Economic Journal*, 22(71), pp. 2-15. Retrieved from <http://www.rejournal.eu/sites/rejournal.versatech.ro/files/articole/2019-04-01/3547/10belu.pdf>
- Bhat, Basit & Makkar, Manpreet & Gupta, Dr. (2023). The Darkside of Block chain Technology: A Case of Cryptocurrency Mining and Environmental Sustainability. *Sustainability and Climate Change*. 16. 328-337. 10.1089/scc.2022.0106. Retrieved from https://www.researchgate.net/publication/374964551_The_Darkside_of_Block_chain_Technology_A_Case_of_Cryptocurrency_Mining_and_Environmental_Sustainability
- Block chain for Trade Finance. (2022). Block chain for trade finance. Retrieved from <https://www.business.hsbc.com.bd/en-gb/innovation-digital-transformation/Block-chain-for-trade-finance>

- Buterin, V. (2014). A next-generation smart contract and decentralized application platform. White paper.
- Casino, F., Dasaklis, T. K., & Patsakis, C. (2018). A systematic literature review of block chain -based applications: Current status, classification and open issues. *Telematics and Informatics*, 36(7674). <https://doi.org/10.1016/j.tele.2018.11.006>
- Chang, S. E., & Chen, Y. (2019). Block chain in Health Care Innovation: Literature Review and Case Study From a Business Ecosystem Perspective. *Journal of Medical Internet Research*, Volume(Issue), Retrieved from <https://www.researchgate.net/scientific-contributions/Yi-Chian-Chen-2159315117>
- Chang, S. E., Chen, Y.-C., & Wu, T.-C. (2019). Exploring block chain technology in international trade: Business process re-engineering for letter of credit. *Industrial Management & Data Systems*, ahead-of-print(ahead-of-print). <https://doi.org/10.1108/IMDS-12-2018-0568>
- Chataut, Jagdish & Ghimire, Manish & Jonchhe, S & Tamrakar, Dipesh. (2020). A Community Based Cross Sectional Study to Estimate the Prevalence and Associated Factors of Hypertension in Rural Nepal. *Kathmandu University medical journal (KUMJ)*. 18. 235-242. 10.3126/kumj.v18i3.49216. Retrieved from https://www.researchgate.net/publication/352881330_A_Community_Based_Cross_Sectional_Study_to_Estimate_the_Prevalence_and_Associated_Factors_of_Hypertension_in_Rural_Nepal
- Chataut, R. (2023). Nepal's international trade: Problems exist, but there are some opportunities too. Retrieved from <https://english.onlinekhabar.com/nepal-international-trade.html>.
- Debnath, D. (2022). Factors Influencing to Adopt Block chain in International Trade (Seminar Paper). Bangabandhu Sheikh Mujibur Rahman Maritime University. Retrieved from https://www.researchgate.net/publication/369267124_Factors_Influencing_to_Adopt_Block_chain_in_International_Trade
- forestrynepal.com. (2022). NEPAL'S TRADE DEFICIT: HOW TO SOLVE IT. Retrieved from <https://www.forestrynepal.org/nepals-trade-deficit-how-to-solve-it/>.
- Ghimire, S., & Selvaraj, H. (2018). A Survey on Bitcoin Cryptocurrency and its Mining, pp. 1-6. Retrieved from <https://doi.org/10.1109/ICSENG.2018.8638208>.
- Godbole, S., Ph.D. (2024). How Block chain can transform Global Trade Supply Chains. Lead, IBM Center for Block chain Innovation, IBM Research, IBM Academy of Technology. Retrieved from [https://www.unescap.org/sites/default/files/3_IBM%20Block chain .pdf](https://www.unescap.org/sites/default/files/3_IBM%20Block%20chain.pdf)
- ibm.com. (2022). We.trade Block chain . Retrieved from [https://www.ibm.com/case-studies/we-trade-Block chain .](https://www.ibm.com/case-studies/we-trade-Block%20chain)
- International Trade Administration U.S. Department of Commerce. (2021). Nepal - Country Commercial Guide. Retrieved from <https://www.trade.gov/country-commercial-guides/nepal-market-overview#:~:text=In%202019%2C%20Nepal%20exported%20%24931.5,China%2C%20and%20Indonesia%20in%202019>.
- International Trade Forum. (2019). Why block chain could become the new container of international trade. 2019(1), pp. 16–17. Retrieved from <https://doi.org/10.18356/15645304-2019-1-7>.
- Investment Board Nepal. (2017). *Investment Opportunities in Nepal: A Comprehensive Overview*. [Investment Board Nepal, 2017]. ICC Complex, New Baneshwor, Kathmandu, Nepal: Government of Nepal.
- Juma, H., Shaalan, K., & Kamel, I. (2019). A Survey on Using Block chain in Trade Supply Chain Solutions. *IEEE Access*, 7, pp. 184115–184132.
- Kaushik, K. (2023). Block chain Technology for the Financial Market. In D. R. Choudhury, S. Sharma, & A. S. Thakur (Eds.), *Contemporary Studies of Risks in Emerging Technology, Part A* (pp. 305-320). doi:10.1108/978-1-80455-562-020231020
- Kim, C. H. (2019). A Study on the Application of Block chain Technology in International Trade Settlement. *Korean Academy Of International Commerce*, 34(2), pp. 103–120.

- Kothari, C. R. (2004). Research Methodology. New Age International (P) Ltd., Publishers. ISBN: 978-81-224-2488-1. Retrieved from <https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf>
- Maltseva, V., & Maltsev, A. (2019). Block chain and the Future of Global Trade (Review of the WTO report “Can Block chain revolutionize international trade?”). International Organisations Research Journal, 14(4), pp. 191–198. Retrieved from <https://doi.org/10.17323/1996-7845-2019-04-1>.
- McDaniel, C. A., & Norberg, H. C. (2019). Can Block chain Technology Facilitate International Trade? SSRN Electronic Journal. Retrieved from <https://doi.org/10.2139/ssrn.3377708>.
- Mehedi, H. (2021). Block chain Technology and its Impact on International Trade-what does the Future Hold. Retrieved from https://www.researchgate.net/publication/354708376_Block_chain_Technology_and_its_Impact_on_International_Trade-what_does_the_Future_Hold.
- Mishra, S. B., & Alok, S. (2017). Handbook of Research Methodology. Educreation. ISBN: 978-1-5457-0340-3. Retrieved from https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODOLOGY
- Misra, N., Rao, T. J., Gupta, S., & Grima, L. (2023). Block chain technology for the financial markets. In S. Gupta & T. K. Shome (Eds.), Intelligent Multimedia Technologies for Financial Risk Management: Trends, Tools and Applications (pp. 225-260). doi:10.1049/PBPC060E_ch11
- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. Retrieved from <https://bitcoinwhitepaper.co/bitcoin.pdf>
- Nepal - Market Overview. (2024). Nepal- Market Overview. Retrieved from <https://www.trade.gov/country-commercial-guides/nepal-market-overview>
- Nepal Rastra Bank. (2022). Foreign Trade Pattern of Nepal: Gravity Model Approach. Retrieved from https://www.nrb.org.np/contents/uploads/2022/12/vol26-1_art2.pdf.
- Pandey, Sijan, & Pachhai, Sirish. 2018. Block chain technology: A solution to plight of Nepalese migrant workers in foreign employment, pp. 112-120.
- Rejeb, A., Rejeb, K., Simske, S., & Treiblmaier, H. (2021). Block chain Technologies in Logistics and Supply Chain Management: A Bibliometric Review. Logistics, 5(4), p. 72. Retrieved from <https://doi.org/10.3390/logistics5040072>.
- Risal, Nischal. (2018). An Empirical Evidences on Cryptocurrencies: Emerging Digital Money in the World, p. 100.
- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2018). Block chain technology and its relationships to sustainable supply chain management. International Journal of Production Research, 57(7), pp. 2117–2135. Retrieved from <https://doi.org/10.1080/00207543.2018.1533261>.
- Sainju, R. (2021). Assessment of Trade and Competitiveness Barriers to Nepal’s Export Sector. Kathmandu: Rabi Shanker Sainju and The Asia Foundation. Retrieved from <https://asiafoundation.org/wp-content/uploads/2021/11/Assessment-of-Trade-and-Competitiveness-Barriers-to-Nepals-Export-Sector.pdf>.
- Singh, Y. K. (2006). Fundamental of Research Methodology and Statistics. New Age International (P) Ltd., Publishers. ISBN: 978-81-224-2418-8. Retrieved from <https://mfs.mkcl.org/images/ebook/Fundamental%20of%20Research%20Methodology%20and%20Statistics%20by%20Yogesh%20Kumar%20Singh.pdf>
- Srivastava, N. (2020), November 19. Drivers and Barriers for Adoption of Block chain . Block chain Council. Retrieved from https://www.block_chain_council.org/block_chain_drivers-and-barriers-for-adoption-of-block_chain/.
- Upadhyaya, Y. M., Kharel, D. R., & Poudel, O. (2021). Foreign Trade of Nepal: An Outline of India and Overseas Economies. The Saptagandaki Journal, Vol.XII/Issue 12/November 2021/ISSN 2594-3243. Retrieved from <https://nepjol.info/>
- Upadhyaya, Yadav & Kharel, Khom & Poudel, Omkar. (2021). Foreign Trade of Nepal: An Outline of India and Overseas Economies. Saptagandaki Journal. 7-20. 10.3126/sj.v12i12.46167.

- wavebl.com. (2022). Frictionless Digital Document Exchange. Retrieved from <https://wavebl.com/solution/>.
- Yli-Huumo, J., Ko, D., Choi, S., Park, S., & Smolander, K. (2016). Where is current research on Block chain technology —a systematic review. *PloS one*, 11(10), e0163477.
- Zhong, Jiaqi. (2024). The Influence of Block-Chain Technology in Chinese Smart Logistics. *Highlights in Business, Economics and Management*. 24. 59-64. 10.54097/k7w5k031.
- Thapa, S., Piras, G., Thapa, S., Rimal, P., Thapa, A., & Adhikari, K. (2021). Block chain -based secured traceability system for the agriculture supply chain of ginger in Nepal: A case study . *Archives of Agriculture and Environmental Science*, 6(3), 391-396. <https://doi.org/10.26832/24566632.2021.0603020>

APPENDICES

Appendix A: Survey Questionnaire

Questionnaire for Research survey on "An application of Block-chain Technology in International Trade: Perspective of Nepal "

1. Gender

- Male
- Female
- Others

2. Your Occupation Background

- Technical
- Non-Technical

3. What is your role or affiliation in the field of international trade in Nepal?

<input type="checkbox"/>	Regulatory Body
<input type="checkbox"/>	Block-Chain Expert/Developer
<input type="checkbox"/>	Exporter/Importer (IT Hardware & Software)
<input type="checkbox"/>	Financial Institution
<input type="checkbox"/>	Freight Forwarder

4. Please select the top challenges you believe are currently affecting international trade in Nepal (Select up to 3).

<input type="checkbox"/>	Inefficiencies in customs clearance
<input type="checkbox"/>	Lack of transparency in trade processes
<input type="checkbox"/>	Delays in trade documentation
<input type="checkbox"/>	High transaction costs
<input type="checkbox"/>	Trust and security issues
<input type="checkbox"/>	Complex supply chain management
<input type="checkbox"/>	Regulatory barriers

5. How familiar are you with block chain technology (Select One)

<input type="checkbox"/>	Very familiar
<input type="checkbox"/>	Somewhat familiar
<input type="checkbox"/>	Not familiar at all

6. How do you rate the readiness of Nepal's international trade sector for adopting block chain technology (Select One)

6.1	Highly ready
6.2	Moderately ready
6.3	Slightly ready
6.4	Not ready at all

7. Rate your level of Agreement on the following statements.

Indicate (✓) your level of agreement with the following statements 1 (Strongly Disagree) to 5 (Strongly Agree).

(1=Strongly Disagree, 2=Disagree, 3=Neither Agree or Disagree, 4=Agree, 5=Strongly Agree)

1	Block chain technology is a viable solution for enhancing trust and accountability in international trade.	1	2	3	4	5
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2	Block chain solutions have a substantial positive impact on the overall efficiency of international trade processes.	1	2	3	4	5
3	The implementation of block chain technology can help in reducing cost.	1	2	3	4	5

8. Rate your level of Agreement on the following statements.

Indicate (✓) your level of agreement with the following statements 1 (Strongly Disagree) to 5 (Strongly Agree).

(1=Strongly Disagree, 2=Disagree, 3=Neither Agree or Disagree, 4=Agree, 5=Strongly Agree)

1	The regulatory environment in Nepal facilitates innovation and adoption of emerging technologies like block chain in international trade.	1	2	3	4	5
2	The government of Nepal demonstrates commitment to supporting technological advancements in the international trade sector through policy initiatives.	1	2	3	4	5
3	Regulatory authorities in Nepal are open to revising trade policies to accommodate the adoption of block chain technology in international trade processes.	1	2	3	4	5

9. Rate your level of Agreement on the following statements.

Indicate (✓) your level of agreement with the following statements 1 (Strongly Disagree) to 5 (Strongly Agree).

(1=Strongly Disagree, 2=Disagree, 3=Neither Agree or Disagree, 4=Agree, 5=Strongly Agree)

1	The Nepal's technological infrastructure, including internet connectivity and digital networks, adequately supports the implementation of block chain technology in international trade.	1	2	3	4	5
2	The government of Nepal invests in developing and maintaining technological infrastructure necessary for supporting block chain adoption in international trade.	1	2	3	4	5
3	Nepal has a skilled workforce with expertise in block chain technology and its applications in international trade.	1	2	3	4	5

10. Rate your level of Agreement on the following statements.

Indicate (✓) your level of agreement with the following statements 1 (Strongly Disagree) to 5 (Strongly Agree).

(1=Strongly Disagree, 2=Disagree, 3=Neither Agree or Disagree, 4=Agree, 5=Strongly Agree)

1	The stakeholders awareness and acceptance are for the successful adoption of block chain technology in Nepal for International trade is very much crucial.	1	2	3	4	5
2	The stakeholders in Nepal are aware of the potential benefits of block chain technology.	1	2	3	4	5
3	Stakeholders in Nepal open to adopting block chain technology for international trade.	1	2	3	4	5
4	Educating stakeholders about block chain technology's potential benefits and applications in international trade is very important.]					

Appendix 2: Data Source of Population for the survey

- 1) No. of Commercials Bank (Class A)
Source: <https://www.nrb.org.np/bank-list/>
- 2) No Freight Forward Companies
Source: <http://www.tepc.gov.np/pages/freight-forward>
- 3) No. of Custom Offices
Source: <https://archive.customs.gov.np/en/contactcustomsofficesdetails.html>
- 4) No. of Custom Agents
Source: <https://nepalnews.com/s/nation/added-660-customs-agents#:~:text=The%20department%20had%20demanded%20a,only%20170%20agents%20at%20present.>
- 5) IT Hardware & Software Trading Companies
Source: <https://myrepublica.nagariknetwork.com/news/nepal-s-booming-it-sector/>