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VOLUME 24

ISSUE 1

VERSION 1.0



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: B
ECONOMICS AND COMMERCE



GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: B
ECONOMICS AND COMMERCE

VOLUME 24 ISSUE 1 (VER. 1.0)

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Management and Business
Research. 2024

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CONTENTS OF THE ISSUE

- i. Copyright Notice
- ii. Editorial Board Members
- iii. Chief Author and Dean
- iv. Contents of the Issue

1. Assessing the Impact of Mergers and Acquisitions on Stock Returns in Nepal's Financial Landscape: An Event Study Approach. *1-31*
2. Brexit's Economic Ripple Effect: A Study of Migrant Entrepreneurs in Rural Scotland. *33-54*
3. Effects of Green Farming Practices/Environmentally Friendly Practices on Small Scale Agricultural Production in Kenya, A Case Study in Siaya County. *55-74*
4. Analyzing the Challenges and Opportunities in the Tannery Industry Supply Chain Management in Bangladesh. *75-82*

- v. Fellows
- vi. Auxiliary Memberships
- vii. Preferred Author Guidelines
- viii. Index



Assessing the Impact of Mergers and Acquisitions on Stock Returns in Nepal's Financial Landscape: An Event Study Approach

By Binod Prasad Paneru & Narayan Acharya

Tribhuvan University

Abstract- Corporate events can impact on the value of merging companies and shareholders' wealth in both positive and negative ways. The study analyzes the impact of mergers and acquisitions as an event on the stock return of the Nepalese financial sector. Three models: Constant mean return, market-adjusted model, and CAPM model were used, employing the 'event study' methodology to examine abnormal returns because of M&A. The study has analyzed 20 recent events from five different financial sectors in Nepal. The cumulative abnormal return and buy-and-hold abnormal return have been calculated to analyze the impact of M&A. Qualitative data from interviews with experts in the financial markets, merging firms, and investment firms were also used.

The study revealed that M&A have an insignificant impact on the stock returns across all financial sectors.

Keywords: merger & acquisition, abnormal return, event study, investment decision, nepalese financial sector, synergy effects.

GJMBR-B Classification: JEL Code: G34



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Binod Prasad Paneru ^α & Narayan Acharya ^σ

Abstract- Corporate events can impact on the value of merging companies and shareholders' wealth in both positive and negative ways. The study analyzes the impact of mergers and acquisitions as an event on the stock return of the Nepalese financial sector. Three models: Constant mean return, market-adjusted model, and CAPM model were used, employing the 'event study' methodology to examine abnormal returns because of M&A. The study has analyzed 20 recent events from five different financial sectors in Nepal. The cumulative abnormal return and buy-and-hold abnormal return have been calculated to analyze the impact of M&A. Qualitative data from interviews with experts in the financial markets, merging firms, and investment firms were also used.

The study revealed that M&A have an insignificant impact on the stock returns across all financial sectors. Similarly, the abnormal return during anticipation window, adjustment window and total window period of all financial sectors is insignificant which suggests that the M&A event don't have a significant impact on the stock. The experts assert that M&A activity in Nepal is driven by regulatory requirements, which cannot generate abnormal returns for the stockholders in short run, while, they believe that it could be beneficial in the long run because it provides a synergy effect and reduces cost.

The study concludes that M&A news have no significant impact on the stock return of the financial institutions. Investors were unable to gain an abnormal return either before or after the merger announcement. The stock returns also depends on the perception of the investor whereas in Nepal the investors are unable to perceive merger and acquisition as a beneficial event. While this study has significant implications for investors, policymakers, portfolio management companies, and stock brokerage firms, and also serves as an empirical review for further research, it may not be suitable for non-financial companies due to its focus in financial institutions. The study is solely concentrated on M&A events; other major events are also overlooked.

Keywords: merger & acquisition, abnormal return, event study, investment decision, nepalese financial sector, synergy effects.

I. INTRODUCTION

The financial industry is essential to the development and prosperity of the country's economy. The banking and insurance industries are the backbone of the country's economy. Banks and

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insurance are the main drivers of the economy since they supply the capital required for economic activity to run smoothly and protect against risk, respectively. As a result, the banking and insurance sectors are crucial to the nation's economy. That their activities have some of the strictest rules and control is not unexpected.

NEPSE is the only one stock exchange of Nepal, it is established to create corporate and government securities free marketability and liquidity by enabling traders on its trading floor via members who act as market intermediaries, including brokers and market makers. It was first established as Securities Exchange Center to serve and promote the growth of capital market in Nepal.

As of 21st April 2023, the count of bank and non-bank financial institutions listed and actively traded in NEPSE are 171. Out of them, 20 are "A" class commercial banks, 16 are "B" class development bank, 16 are "C" class finance companies, 20 "D" class microfinance companies, 9 life insurance companies, and 13 non-life insurance companies. However, the Nepalese financial industry is currently being in the phase of big merger. The merger and acquisition of bank and financial institutions has been encouraged to strengthen financial sector stability. The merger of NCC bank & Kumari bank, and the merger between Prabhu bank and century bank are two big mergers in this year 2023.

An event study is a statistical technique that examines the impact of a particular occurrence on a company or portfolio. To calculate the event's impact, the approach looks at changes in stock prices or returns around the period of the occurrence. To determine the effect of the event on the stock or portfolio, the difference between the two is employed. The market model, which links stock returns to market returns, is a popular statistical model for carrying out event studies. Xu et. al., (2021) analyzed the stock price changes around the announcement of environmental performance ratings for a sample of corporations, the authors undertake an event study to examine the effects of corporate environmental performance on stock prices. According to the study, corporations with higher ratings for their environmental performance show positive anomalous returns near the event date, which may be

an indication that investors respect their environmental performance.

An acquisition is the purchase of one firm by another without creating a new company, whereas a merger is joining two businesses to create a new business (Cartwright and Schoenberg, 2006). When one company acquires all of the obligations and assets of another, this is known as a merger. The purchased firm lapses, while the joint firm keeps its identity. Typically, a 75% vote of shareholders is needed to approve a merger. There are numerous additional ways for one business to acquire another, including buying all or a portion of the business's assets or stock (DePamphilis, 2008; Sharma, 2009; Kemal, 2011).

Beginning in January 2010, the Nepali wholesale banking market was made available to foreign investors. This happened not long after the International Monetary Fund stated that about one-third of Nepal's BFIs were underperforming, had excessive liquidity, high operating costs, insufficient working capital, unfavorable competition, and were poorly managed. With the exception of a small number of banks, most BFIs' balance sheets indicated diminishing profits and an increasing proportion of problematic loans. Banks were unable to operate effectively because of the deteriorating economic environment, which was characterized by volatility and an unclear future. In order to boost the capacity of local banks to compete with their foreign counterparts, which were expected to enter Nepal soon, and stimulate the financial health of the country the then government encouraged the option of M&A. In the wake of the liquidity crisis and volatile investment climate, M&A provided an ideal solution to the problems faced by the Nepali financial sector (NEF, 2010).

Mergers and acquisitions have been heavily discussed topic in Nepal in recent days. Gyanwali (2013) states when the Nepal Rastra Bank, the Central Bank of Nepal, announced merger by-laws in May 2011 grounded on the Company Act 2063 (B.S) article 177, BAFIA 2063 (B.S) article 68 and 69, and encouraged all the BFIs to undergo merger as a consolidation. At this point, the Banking and Financial Institutions (BFIs) of Nepal were completely unfamiliar with the notion of merger and acquisition (M&A). Laxmi Bank, Nepal Bangladesh Bank, and Narayani National Finance were among the few institutions to have undergone merger process before the announcement of the bylaws. Chiranjivi Nepal, the governor at the time, pushed for the merger strategy. With incentives, he announced the big merger policy. The merging process has also received top priority under his successor Maha Prasad Adhikari. The regulation is in line with global norms intended to boost commercial banks' competitiveness and capacity for sizable lending investments. The NRB announced a four-fold increase in the minimum paid up capital of the commercial banks through the 2015 monetary policy,

and a twenty-four-fold increase in the same for the development banks. The national level development bank would need to increase to Rs. 2.5 billion, while the commercial banks would need to raise to Rs. 8 billion in paid-up capital. The banking regulator's demand has further improved the environment for merger and acquisition activity; the wave of M&A, which began as early as 2011, has affected the Nepali BFI industry.

Bhargava and Tandon (2022) stated that compensation for losses, a strong banking system, and increasing capital capacity are the main drivers of mergers in the banking industry. Acquiring market share, acquiring a competitive edge, raising revenues and risk, and product diversification are the motivations for merger transactions. Tajalli & Shehzad (2014) stated that there has been a noteworthy rise in mergers and acquisitions since the beginning of the global financial crisis. Companies used these combinations not just to stay competitive but also to hold a strong presence in the market. The business environment has significantly changed as a result of this.

Instead of focusing on short-term goals, mergers are mostly driven by the BFIs' long-term goals, which include sustainable growth and competitive advantages. Increasing shareholder value has frequently been mentioned as a factor in merger decisions. The potential of BFIs to expand and thrive in the market is anticipated to be improved by the merger. Mergers can raise shareholders' worth by boosting market share and stock market value because they result in a larger company with fewer competitors. For companies looking to boost and sustain their competitiveness in the market, mergers and acquisitions have emerged as a crucial component of many corporate business plans. As a result of the merger bylaws of 2011, there has been an encouraging amount of restructuring and consolidation in the banking industry recently. The merging policy is anticipated to simplify the complications brought on by the BFI industry's rapid expansion (Shrestha, Thapa, & Phuyal, 2017).

Between 1982 and 1987, Dodd and Warner, (1983) looked at the post-acquisition of significant bank mergers. They claimed that the combined banks performed better than the banking sector. Rezitis (2008) found that most of the negative effects of mergers and acquisitions on the technical effectiveness and increase in the overall factor productivity of Greek banks. He did this by utilizing a stochastic output function. Noulas (1997) used the Malmquist productivity index and the Data Envelopment Analysis method (DEA) to examine the productivity growth of the Greek banking industry for 1991 and 1992 and discovered that while both state and private banks' productivity increased, the sources of this growth are different.

The effect of mergers and acquisitions on the performance of the Greek banking industry was studied (Liargovas and Repousis, 2011). The aggregate findings

indicate that bank mergers and acquisitions have no impact and do not create wealth (the weighted average of gains to the bidder and target banks). Sinha and Gupta (2011) looked into the environment for mergers and acquisitions in the Indian financial services sector. The analysis found that between March 1993 and February 2010, M&A activity in the Indian financial services sector primarily had positive effects on profitability, but the liquidity position deteriorated three years after the merger.

Chhetri and Baral (2018) conducted an event study with fifteen financial institutions which entered into a merger between the years 2010 to 2012 by using the mean adjusted model and market risk-adjusted model to find the effect of merger announcements on stock prices in Nepal. The study found that surrounding the announcement of merger proposals, the premerger abnormal return of individual firms is not significant to zero i.e., the return is not affected by the merger announcement. The abnormal return of the bidding and target enterprises is also insignificant, indicating that merger announcements on the Nepalese capital market have no effect on shareholder wealth.

The financial sector dominates the Nepalese capital market, which is characterized by poor management, a low volume of transactions, unhealthy competition, a lack of competitive strength, a lack of project financing, a shortage of qualified human resources, etc. A merger and acquisition are suitable solutions to these shortcomings. The Nepalese government has been pushing banks and financial institutions to pursue mergers and acquisitions by using various policies, and Nepal Rastra Bank has been supporting these efforts as well. The financial sector has witnessed a significant number of mergers and acquisitions in recent years. The impact of these transactions on the stock returns of the involved firms has been a subject of considerable debate among academics, practitioners, policymakers, and stockholders. While some studies have suggested that M&A activities have positive effect on stock returns, others have reported a negative or insignificant impact. Therefore, the question arises: what is the impact of M&A on the stock returns of financial sector. This study, therefore, attempts to evaluate the impact of merger and acquisition on the stock return of Nepalese financial sectors.

The study has the following research questions:

1. Whether the merger and acquisition create an abnormal stock return for the commercial banking, development banking, Finance companies, Microfinance, and Insurance sectors in Nepal?
2. What is the impact of merger and acquisition announcements on stock return among financial sectors or pre-M & A and post-M & A?

3. Which is the most significant financial sector that merger and acquisition have impacted in terms of stock returns?
4. How do investment experts perceive mergers and acquisitions?

a) *Objectives of the Study*

The major objective of the study is to analyze the impact of mergers and acquisitions on the stock returns of Nepalese financial sectors. The specific objectives of the study are as follows:

1. To evaluate the cumulative abnormal return (CAR) of financial sectors during the anticipation window, adjustment window, and total window period due to the announcement of a merger or acquisition.
2. To examine the buy-and-hold abnormal return (BHAR) of financial sectors during the anticipation window, adjustment window, and total window period due to the merger or acquisition announcement.
3. To compare the influence of merger and acquisition on stock returns among commercial banks, development banks, finance companies, micro-finance companies, and insurance companies.
4. To investigate the opinions of institutional investors, the merged company, and regulators regarding merger and acquisition.

b) *Research Hypotheses*

Five hypotheses have been developed for the five different sectors the alternative hypothesis of the research states that: The merger and acquisition (M&A) activity in the banking industry has been on the rise in recent years. Mergers and acquisitions are strategic moves that can have a significant impact on the stock returns of commercial banks. Molina et al. (2018) analyzed the impact of M&A activities on the stock returns of commercial banks in the Latin American region. The study found that M&A activities had a positive effect on the stock returns of commercial banks.

H1: There is an impact of merger and acquisition on the stock return of commercial banks.

Stock returns are an important measure of the performance of a bank, and M&A activities can have a positive or negative impact on these returns. Singhania and Yadav (2018) investigated the impact of M&A activities on the stock returns of Indian development banks. The study found that M&A activities had a positive effect on the stock returns of acquiring development banks.

H2: There is an impact of merger and acquisition on the stock return of development banks.

Merger and acquisition (M&A) activities have become increasingly popular in the finance industry as a means to expand business operations, reduce competition, and increase profitability. M&A activities can have a significant impact on the stock returns of



finance companies. Ahmed and Henry (2017) investigated the impact of M&A activities on the stock returns of US finance companies from 1991 to 2012. The study found that M&A activities had a positive impact on the stock returns of finance companies. The study also found that the impact of M&A activities on stock returns was influenced by the size, type, and financing of the M&A.

H3: There is an impact of merger and acquisition on the stock return of finance companies

Microfinance institutions (MFIs) are specialized financial institutions that provide financial services to low-income individuals and micro enterprises that lack access to traditional banking services. In recent years, the microfinance industry has experienced significant growth, and merger and acquisition (M&A) activities have become increasingly common in this industry. Koirala and Adhikari (2018) investigated the impact of M&A activities on the stock returns of Nepalese MFIs from 2010 to 2016. The study found that M&A activities had a positive impact on the stock returns of both acquiring and target MFIs. The study also found that the impact of M&A activities on stock returns was influenced by the type of M&A, the size of the MFI, and the level of financial development H4: There is an impact of merger and acquisition on the stock return of microfinance companies.

The insurance sector has adopted the mergers and acquisitions (M&A) strategy frequently in order to achieve expansion, diversification, and increased market dominance. Duygun et. al., (2017) investigated the impact of M&A activities on the stock returns of insurance companies in the United States from 1990 to 2013. The study found that M&A activities had a positive impact on the stock returns of acquiring insurance companies. The study also found that the impact of M&A activities on stock returns was influenced by the type of M&A, the size of the insurance company, and the level of industry concentration.

H5: There is an impact of merger and acquisition on the stock return of insurance companies.

c) *Theoretical Framework*

i. *Efficient Market Hypothesis*

The Efficient Market Hypothesis (EMH) proposed by Fama et al. (1969) and Fama (1970) serves as the foundation for the event research approach. This states that "prices fully reflect all available information" when a market is efficient. One crucial presumption is that the capital markets are sufficiently effective to respond to unexpected occurrences and new information. Future financial gains for impacted companies. When the information set incorporates historical data, efficiency is categorized as "weak form." Pricing, "semi-strong form" when the information set contains all information that is readily

available to the public, and "strong form". When the information set contains all information, both publicly and privately available. Most event investigations are based on the evaluation of predicted "normal" and abnormal" returns based on the asset pricing model. The Efficient Market Hypothesis (EMH) is a theory suggests that financial markets are efficient and that asset prices fully reflect all available information. According to the EMH, it is not possible to consistently achieve above average returns through active trading or investment strategies because all relevant information is already incorporated into market prices.

ii. *Synergy Theory*

The idea that the combined efforts of individuals or teams working together can accomplish higher outcomes than those same individuals or teams working alone is known as synergy theory. It is a concept in organizational management and business strategy. According to this notion, a whole is worth more than the sum of its parts. The foundation of synergy theory is the idea that when people and teams collaborate rather than operate independently, they may produce more value and better results. Individuals and teams can innovate, come up with new ideas, address issues, and produce outcomes that would be challenging or impossible to achieve on their own by pooling their knowledge, expertise, and resources.

According to this theory, the amount of economic value that will arise from a merger will rely on the amount of the resource possessed by the firm, relative to the amount overall existing in the economy, and the availability of chances to exploit this resource (Chatterjee, 1986). It is anticipated that mergers and acquisitions will boost future cash flow and business value through operating and finance synergies, either as a result of increased economies of scale from increasing the firm's size or as a result of increased economies of scope from unique combination advantages between the combined enterprises. The benefits of new chances for tax savings and revenue increases due to cross- or up-selling, cost reduction due to efficiency improvements, and other factors all contribute to synergy. This hypothesis predicts that targets' and bidders' performances will both increase (Hankir al., 2011)

iii. *Agency Theory*

Agency theory is a concept in economics, finance, and management that examines the relationship between the owners of an organization (known as principals) and the individuals or groups who are entrusted with managing the organization on their behalf (known as agents). The theory focuses on the potential conflicts of interest that may arise between principals and agents due to their differing goals and incentives. According to agency theory, the principal agent relationship is characterized by a principal who

delegates decision-making authority to an agent, but who also has an interest in ensuring that the agent acts in the principal's best interests. The agent, on the other hand, may have their own goals and incentives that differ from those of the principal, and may not always act in the principal's best interests. Based on the agency theory, Asimakopoulos and Athanasoglou (2013) found that the management of bidder banks engages in

mergers and acquisitions for personal gain without taking into account the economic rationale. Hubris theory is comparable to agency theory. According to the idea of hubris, the management of bidder banks is paying a disproportionately high price as a result of their overconfidence in their capacity to identify the discounted target banks.

d) Empirical Review

Table 1: Summary of Nepalese findings

Study	Methodology	Major Findings
Bhatta (2008)	Event study, descriptive statistic, regression analysis, and Portfolio analysis	EMH does not hold for NEPSE, Certain size effect on the weekdays and calendar month have been found
Shrestha (2014)	Case study analysis	Merger and acquisition rely on the belief that they will produce synergistic benefit for the possible parties involve as well as the expectation of financial gain
Shrestha et. al., (2017)	Regression analysis	The financial performance of the bidding banks increased after merger
Sharma (2018)	Multiple regression analysis	Bank's performance increased after merger and acquisition
Chhetri and Baral (2018)	Event study approach	No impact of M&A on shareholder's wealth for the individual firm as well as for the overall Nepalese banking sectors
Koirala and Karki (2020)	Event study approach	M&A activities had a positive impact on the stock returns of acquiring banks, while target banks experienced negative abnormal returns.

Table 2: Summary of international findings

Study	Methodology	Major Findings
Yen and hoshineo (2000)	difference-in-differences (DID) regression analysis	Stock market responds favourably to news of merger and acquisition, but profitability decline from pre-merger to postmerger
Beitel and Schiereck (2001)	Descriptive and multivariate statistical analysis, cross-tabulations, regression analysis, and factor analysis.	Positive abnormal return- Increase for target banks and decrease for bidding banks
Sufian and Majid (2007)	Tobin's regression and dataenvelop analysis	Consolidation increases the bank's performance and efficiency by enhancing credit quality
Mantravadi and Reddy (2008)	Multiple regression analysis	Merger increase the profitability of companies in financialsectors
Anand and Singh (2008)	Single factor model and twofactor model	Merger increases the CAR of bidder banks, Merger createdwealth for the shareholders
Sinha and Gupta (2011)	Paired sample t-test, regression analysis, Wilcoxon/mann whitney tests	Merger might affect the company's performance in both favourable and unfavourable ways
Liargovas and Repousis (2011)	Event study methodology	Shareholders get significant abnormal return before announcement but overall, M&A do not create shareholder'swealth
Padhmavathy and Ashok (2012)	Event study methodology	Merger announcement does not impact the creation of wealth of shareholders
Khan and Ikram (2012)	Standard risk adjusted eventstudy methodology	Market efficiency is in semi strong form, investors cannot obtain abnormal return either before or after merger announcement
Kumar et. al., (2014)	Event study methodology	Merger announcement erode the value of bidding bank while it creates the wealth of target banks

Kyriazopoulos (2015)	Event study methodology and regression analysis	Target bank experiences high abnormal return during event time, whereas acquirer banks experience minor abnormal returns
Shah and Khan (2017)	Financial ratio analysis	Acquirer bank's performance deteriorates after M&A.
Hasan and Liu (2017)	fixed-effect panel regression models	Stock return of acquiring company increases positive and significantly due to M&A announcement
Boloupremo and Ogege (2019)	Longitudinal and time series analysis	Merger and acquisition increased the financial performance of banks
George et.al., (2021)	Descriptive research model with quantitative analysis	Recapitalization through merger and acquisition does not always increase post-acquisition financial performance

e) *Research Gap*

According to the study on the impact of merger and acquisition on the stock return on financial sectors, the various studies showed mixed reviews on the impact on the organization and the stock returns. The majority of the studies in the international context found that there is an impact of merger and acquisition on the stock return and performance of financial institutions. Yeh and Hoshino (2000), Beitel and Schiereck (2001), Anand and Singh, (2008), Gattofi et. al., (2009), (Sinha et.al., 2010), Kyriazopoulos, (2015) Hasan, and Liu (2017), Boloupremo and Ogege, (2019), and Shrestha, (2014) found cumulative abnormal returns because of

mergers and acquisitions. However, there are a lot of studies such as, Gjirja, (2003), Mantravadi and Reddy, (2008), Badreldin and Kalhoefer, (2009), Liargovas and Repousis, (2011), (Padhmavathy and Ashok, 2012), Shrestha et. al., (2017) and Chhetri and Baral, (2018) found a no impact of mergers and acquisitions on the stock return. On the other hand, some of the studies conducted from an international context found there is zero abnormal return because of the merger events. Moreover, some studies found the information leakage problem in merger events because the study revealed that the impact of merger and acquisition events is shown in the anticipation period near to event date.

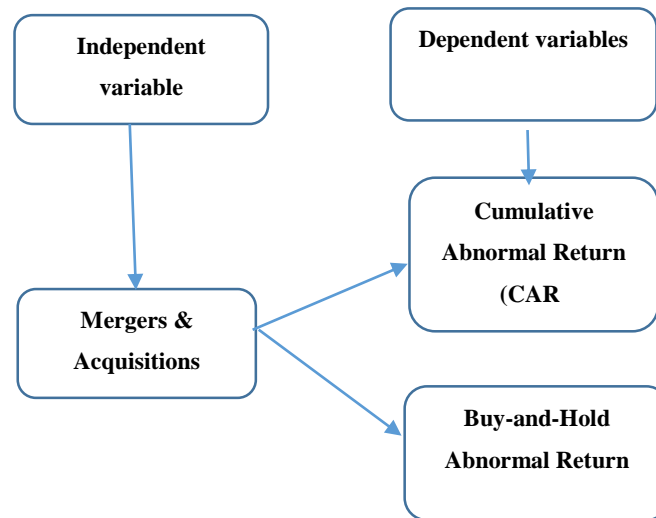


Figure 1: Conceptual framework

In the context of Nepal, very few studies have been conducted to analyze the impact of mergers and acquisitions on the stock return using event studies of financial institutions. There are few studies conducted in Nepal to analyze the post-merger performance of financial institutions but from the perspective of stock investors, very limited research has been done. The financial institutions of Nepal enter into a big merger after issuing merger and acquisition by-laws by Nepal Rastra Bank. Nepal Rastra Bank issued merger and acquisition by-laws in May 2011 and later NRB issued various guidelines to encourage banks and financial

institutions to merge and acquire. None of the event studies have been done since 2018 on this topic. Therefore, further research is required to determine how mergers and acquisitions affect stock return.

Financial sectors in Nepal are the largest economic contributor and have a lot of problems in mergers and acquisitions because of uncertainty in stock returns after mergers and acquisitions. On the other hand, the stock price is especially determined by the investor's perception. The traffic of stock market operations in Nepal has increased heavily in the last 3 years the stock price may act differently than before

merger and acquisition by-laws. Furthermore, the previous studies have been done with a smaller number of events, and no large events were studied. So, there is a need for a study on this topic that includes large and more events covering all financial sectors which will help to gather a more accurate result in the present time.

f) *Research Framework and Definition of Variables*

The literature has highlighted on the impact of merger and acquisition on the stock return. The research framework describes the relationship between independent variable (i.e., merger and acquisition event) and the dependent variables (CAR & BHAR). One the basis of literature reviews like Dilshad (2012), Rani et. al., (2015), Bergmann et. al., (2015), and Chhetri and Baral (2018). The proposed framework for the research is:

i. *Merger and Acquisition (M&A)*

The term "merger and acquisition" (M&A) refers to the combining of two or more businesses into a single one by a variety of strategies, including acquisition, interest pooling, or a combination of these. Weston, Mitchell, and Mulherin (2004) stated that M&A is "a corporate strategy that involves the combination of two or more companies in a way that results in the creation of a new entity, or the acquisition of one company by another." M&A is frequently done to reach a variety of strategic objectives, including increasing market share, diversifying the company, generating economies of scale, and acquiring access to new products and technologies. The announcement or conclusion of a merger or acquisition transaction involving two or more companies is referred to as an M&A event. During an M&A transaction, the acquiring business may purchase the target company's assets or outstanding shares in order to acquire it. The event can also involve a merger or other business combination between the two companies.

According to Chatterjee and Wernerfelt (1991), an M&A transaction can have a major impact on both the target and acquiring companies' shareholders, employees, and other stakeholders. The stock prices of both companies may alter following the announcement of an M&A event, reflecting how the market views the transaction's possible advantages and hazards. An M&A event that is successfully concluded can give the newly created business better financial results, more market share, and stronger strategic capabilities.

ii. *Abnormal Return (AR)*

According to Fama, Fisher, Jensen, and Roll's research from 1969 titled "The Adjustment of the Stock Market to New Information," abnormal returns are defined as "the difference between the actual return on a security and the expected return, given its risk and the information available at the time of the investment" (Fama, Fisher, Jensen, & Roll, 1969). The authors use the concept of abnormal returns to assess the stock

market's effectiveness as well as how quickly it reacts to new information. The authors use the concept of abnormal returns to assess the stock market's effectiveness as well as how quickly it reacts to new information. They found that abnormal returns frequently rise immediately following the announcement of new information but frequently fall over time as the market assesses the new information. All things considered, the concept of abnormal returns has been widely applied in finance and has provided significant insights into the efficiency of the stock market and the performance of investments.

iii. *Cumulative Abnormal Return (CAR)*

The term "CAR" (cumulative abnormal return) in finance describes how much more money a stock or portfolio has made than was anticipated for a given period. It is determined by adding up the discrepancy between the stocks or portfolio's actual returns and projected returns throughout that time frame. It is computed by adding up the discrepancy between the securities or portfolio's actual returns and projected returns for that time frame. A benchmark or index is used to compute the expected return, and the excess return is the CAR. (Jordan, Chen, Hong, 2003).

The CAR variable is determined by adding the abnormal returns of a stock over a given period. Amihud and Mendelson, (1986) state that the CAR variable is frequently used in event studies, which examine how particular occurrences affect the performance of stocks. Consider a scenario in which a firm announces a significant purchase and an analyst wishes to research the impact of the news on the stock price of the company. The analyst might compute the abnormal returns of the stock before and after the announcement using the CAR variable and compare them to the expected returns based on the performance of the market as a whole.

iv. *Buy-and-hold Return (BHAR)*

Buy-and-Hold Abnormal Return, often known as BHAR, is a financial term used to assess the outperformance of an asset or portfolio in comparison to a benchmark over a given holding period. The Cumulative Abnormal Return (CAR) extension known as BHAR calculates the cumulative returns an investor receives from owning a security or portfolio over a predetermined period. According to the research "Event Study Methodology in the Presence of Event-Induced Volatility" by MacKinlay (1997), BHAR is computed by summing the discrepancy between the return of the asset or portfolio and the return of the benchmark at each point in time throughout the holding period. When comparing the performance of an asset or portfolio, the benchmark is often a market index or a peer group of securities.

II. RESEARCH METHODOLOGY

This section deals with the methodology used to carry out the research and to analyze the data for the conclusion of the required results. The methodology has been provided under a few distinct sub-headings for ease of presentation. The sub-heading includes research design, population and sampling procedures, nature and sources of data collection, research framework & definition of variables, and study method of analysis.

a) Research Design

The study is based on the descriptive research design to analyze the stock expert's perception of merger and acquisition regarding the stock return. Additionally, the study is based on the event study research design to investigate the impact of mergers and acquisitions on stock market return. The researcher has been used an event study to evaluate the impact of M&A in stock return. Fama, et al. (1969) introduced the event study, which is now widely used to examine the effects of a particular event. For instance, this study has employed the event study to assess how the market responds to any announcement related to M&A of the companies.

The foundation of the event study is to look at the returns produced from the stock prices of the relevant companies before and after the announcement of the merger and acquisition. The stock return of sample companies was measured for 10 days before and after the announcement of the merger and acquisition.

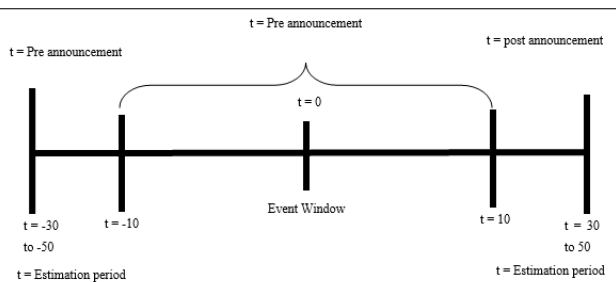


Figure 2: The Event study methodology

i. Day 0 (Announcement Date)

The announcement date is the best date to determine an event's impact, according to Halpern (1983). Before the event date, aberrant merger returns would be seen if information leaked before this deadline. In addition, according to Halpern (1983), the stock price of the acquiring company will change after the announcement to reflect the likelihood that the merger will be profitable, as well as the length of time needed to complete it. When quantifying any corporate event, it has been found that the event study approach is reliable

and accurate. Day 0 represents the first trading day after the market learns about the purchase or merger.

ii. Estimation Window

As it is uncertain whether day 0 was properly selected, a few days around the announcement date are included in the estimation and the event window. To determine the market model's parameters and determine the expected return on stocks when a merger announcement was made vs when it wasn't, an estimation window is used. According to MacKinlay (1997), one can account for information leaking, sluggish market reaction, and the consequences of a trading day ending in this way.

iii. Event Window

According to Dilshad (2013), the event window indicates how many days should be utilized to calculate any potential abnormal returns brought on by the event, such as a merger or acquisition. According to the notion of the efficient market hypothesis, any change in the security prices brought on by an event will be noticed right away since rational behavior tends to favor short event windows. The danger associated with the extended window could potentially erode the likelihood of discovering any meaningful empirical evidence.

b) Population and Sampling Procedure

All the listed banks and financial institutions that have gone for merger and acquisition in Nepalese history and those financial institutions that are going for merger and acquisition in the future are the populations of this study. The interview of experts from different relevant sectors is conducted to collect primary data. The companies that are already delisted from NEPSE made it difficult to collect the price history for the study. Thus, based on data availability, financial institutions that have gone through the merger and acquisition process from 2012 to 2022 and have a trading history of more than 30 days after completion of the merger and acquisition are taken as a sample for the study. Five different financial sectors are taken for the study, from which recent three to five companies are taken. For the event study, there should not coincide any other event that affects the price of the stock. Therefore, those mergers and acquisitions are not be taken as samples that are colliding with other major events. Based on the availability of data, the following Banks and Financial Institutions are selected as samples for the study:

Table 3: Sample Merger and acquisition events

S.N.	Name of the companies	Company Name (After Merge)	Sector	Event date
1	Nepal Credit and commerce bank limited and Kumari bank limited	Kumari bank limited	Commercial bank	26/12/2022
2	Prabhu bank limited and century bank limited	Prabhu bank limited	Commercial bank	03/01/2023
3	Nabil bank limited and Nepal Bangladesh limited bank	Nabil bank limited	Commercial bank	29/06/2022
4	Citizen bank international limited and srijana finance limited	Citizen bank international limited	Commercial bank	25/05/2021
5	NMB Bank Limited and Kanchan Development Bank Limited	NMB bank limited	Commercial bank	09/08/2020
6	Garima Bikas bank and Sahara bikas bank	Garima bikas bank	Development bank	18/10/2021
7	Tinau development bank limited and mission development bank limited	Tinau mission development bank	Development bank	17/03/2019
8	Shine Resunga Development Bank Limited, Bhargav Bikash Bank Limited and Purnima Bikas Bank Limited	Shine Resunga Development Bank Limited	Development bank	03/10/2019
9	Jyoti Bikash Bank Limited & Hamro Bikas Bank Limited	Jyoti Bikash Bank Limited	Development bank	11/03/2019
10	Nepal Finance Limited and Lalitpur Finance Limited.	Nepal Finance Limited	Finance	11/04/2016
11	Best Finance Company Limited & Synergy Finance Limited	Best Finance Company Limited	Finance	20/06/2018
12	Bhaktapur Finance Company Ltd. & Central Finance Ltd.	Central Finance Limited	Finance	11/04/2016
13	Mirmire Laghubitta Bittiya Sanstha Limited and Buddha Jyoti Laghubitta Bittiya Sanstha Limited	Mirmire Laghubitta Bittiya Sanstha Limited	Microfinance	22/08/2022
14	Aarambha Chautari Laghubitta and Deurali Laghubitta Bittiya Sanstha Limited.	Aarambha Chautari Laghubitta Bittiya Sanstha Limited	Microfinance	18/10/2021
15	Suryodaya Laghubitta Bittiya Sanstha Limited and Womi Laghubitta Bittiya Sanstha Limited	Suryodaya Womi Laghubitta Bittiya Sanstha Limited	Microfinance	31/08/2021
16	Samata Laghubitta Bittiya Sanstha limited and Gharelu Laghubitta Bittiya Sanstha Limited	Samata Gharelu Laghubitta Bittiya Sanstha Limited	Microfinance	13/07/2022
17	Infinity Laghubitta Bittiya Sanstha Limited and Nepal Agro Laghubitta Bittiya	Infinity Laghubitta Bittiya Sanstha Limited	Microfinance	01/08/2021

18	Sanima General Insurance Limited and General Insurance Company Nepal Limited.	Sanima GIC Insurance Limited	Insurance	13/07/2022
19	Surya Life Insurance Company Limited and Jyoti Life Insurance Limited.	Suryajyoti Life Insurance Company Limited	Insurance	13/07/2022
20	Himalayan General Insurance Company Limited and Everest Insurance Company Limited	Himalayan Everest Insurance Limited	Insurance	05/05/2022

c) Data Analysis

The primary information was collected by interviewing five experts from different sectors. The information was collected from the interview of experts from- NEPSE, NRB, institutional investors, merged companies, and SEBON. The collected information was critically analyzed to get the required concrete results.

The secondary data is analyzed using the following models:

i. The Constant Mean Return Model

In the constant mean return model, it has been assumed that the normal return of security equals the constant K_t (mean value) over the estimation period. Although the ex-ante return will differ between securities, it has been assumed that the projected return of the security will be consistent throughout time. The function of abnormal return of the security is:

$$AR_t = R_t - K_t \dots\dots\dots (1)$$

Where:

- R_t = the return on day t
- K_t = Mean value of the daily return

The daily return has been calculated as:

$$R_t = (P_1 - P_0) / P_0 \dots\dots\dots (2)$$

Where:

- P_1 = price per share of common stock of firm / at the end of day t
- P_0 = price per share of common stock of firm / at the end of day t-1
- t = - 10. . . +10 days

The cumulative abnormal return, CAR_i , for the bidders and the target firms for the period of t = - 10 to t = 10 has been defined as:

$$CAR_t = \sum_{t-1}^N AR \dots\dots\dots (3)$$

The buy-and-hold return, $BHAR_i$ for the bidder firms for the period of t = -10 to t = +10 days can be defined as:

$$BHAR_t = \{ \prod_t (1 + AR_t) - 1 \} \dots\dots\dots (4)$$

ii. The Market-Adjusted Model

The market-adjusted model evaluates the performance of the stock. The market-adjusted model compares the actual return of the stock to its expected return based on the overall market return. The abnormal return of the stock is the difference between the stock return and market return on day t.

The function of abnormal return of the security is:

$$AR_t = R_t - R_{mt} \dots\dots\dots (5)$$

Where:

- R_t = the return on day t
- R_{mt} = Market return on day t

The daily return has been calculated as:

$$R_t = (P_1 - P_0) / P_0 \dots\dots\dots (6)$$

Where:

- P_1 = price per share of common stock of firm/at the end of day t
- P_0 = price per share of common stock of firm/at the end of day t-1
- t = - 10. . . +10 days

The market return, R_{mt} has been calculated as:

$$R_{mt} = (M_1 - M_0) / M_0 \dots\dots\dots (7)$$

(t = - 10....., +10 days)

Where:

- M_1 = stock market index at the end of the day
- M_0 = stock market index at the end of day t-1

The cumulative abnormal return, CAR_i , for the bidders and the target firms for the period of t = - 10 to t = 10 has been defined as:

$$CAR_t = \sum_{t-1}^N AR \dots\dots\dots (8)$$

The buy-and-hold return, $BHAR_i$ for the bidder firms for the period of t = -10 to t = +10 days can be defined as:

$$BHAR_t = \{ \prod_t (1 + AR_t) - 1 \} \dots\dots\dots (9)$$

iii. CAPM

In the CAPM model, the value of α and β have been calculated from the estimation period. The normal return of individual security is forecasted in the second step. Performance of share price from the event $t = -10$ to $t = +10$ is used to estimate the parameter, and the abnormal return of the merging firm during the window period is estimated in this CAPM model. The function of abnormal return by residual firm i on day t is as follows:

$$e_t = \alpha + \beta R_{mt} \dots \dots \dots (10)$$

Where:

R_t = daily share return for firm/in day t

α = the intercept term

β = the systematic risk of share

R_{mt} = rate of return on a market index in day t relative to the announcement of the offer

e_t = error term

$t = -10 \dots +10$ days

The daily share return, R_t has been calculated as:

$$R_t = (P_1 - P_0) / P_0 \dots \dots \dots (11)$$

$t = -10 \dots +10$ days

Where:

P_1 = price per share of common stock of firm/at the end of day t

P_0 = price per share of common stock of firm/at the end of day $t-1$

The market return, R_{mt} has been calculated as:

$$R_{mt} = (M_1 - M_0) / M_0 \dots \dots \dots (12)$$

$(t = -10 \dots, +10$ days)

where:

M_1 = stock market index at the end of the day

M_0 = stock market index at the end of day $t-1$

The abnormal returns for firm i in day t , AR_{it} , based on the market model have been defined as:

$$AR_t = R_t - \alpha - \beta R_{mt} \dots \dots \dots (4)$$

OR

$$AR_t = R_t - e_t$$

Where:

e_t and R_t for the individual firms are calculated daily by using the equation (1) and (2) from the event $t = -10$ to $t = +10$ days.

The cumulative abnormal return, CAR_i , for the bidder firms for the period of $t = -10$ to $t = +10$ can be defined as:

$$CAR_t = \sum_{t=-10}^{t=+10} AR \dots \dots \dots (13)$$

The buy-and-hold return, $BHAR_i$ for the bidder firms for the period of $t = -10$ to $t = +10$ days can be defined as:

$$BHAR_t = \{ \prod_t (1 + AR_t) - 1 \} \dots \dots \dots (14)$$

Significance Test

Null hypothesis: merger or acquisition event has no impact on stock returns. i.e., no abnormal mean return.

Alternative hypothesis: merger or acquisition has an impact on stock returns. i.e., abnormal mean return.

Parametric test

T-statistics are calculated as:

$$t_{CAR} = CAR_t / \text{stdev}_t * \sqrt{n}$$

or

$$t_{BHAR} = BHAR_t / \text{stdev}_t * \sqrt{n}$$

the null hypothesis will be rejected if the calculated value $>$ the critical value. The critical value for t-stat is:

at 10% = 1.64

at 5% = 1.96

at 1% = 2.58

The event data analysis has been done using three different models i.e., the constant mean return model, the market adjusted model, and the CAPM model. All three models calculate the cumulative abnormal return and buy-and hold abnormal return. The significance test of CAR and BHAR has been done at a 5% significance level.

III. RESULT AND ANALYSIS

This section analyzes the collected data from primary and secondary sources from various sources using statistical tools. The primary data has been analyzed critically to get the perception of authority, investors and merged institutions regarding the impact of merger and acquisition on the financial sectors. The secondary data has been analyzed to get the result about the impact of merger and acquisition on the stock return using the event study approach. This chapter aims to analyze and present the analyzed data to get the required result.

a) *Descriptive Analysis*

Descriptive statistics in this study helps to identify standard deviation, cumulative abnormal return, and buy and-hold abnormal return of merger and acquisition event of financial sectors in Nepal including commercial banks, development banks, finance companies, microfinance companies, and insurance companies using three different financial models (i.e.,

constant mean return model, market adjusted model, and CAPM model).

i. *Constant Mean Return (CMR) Model*

The constant mean return model calculates the anticipated return on an asset or investment over a certain period. It is predicated on the idea that the asset's returns have a normal distribution with a constant mean return and constant variance. The concept is predicated on the notion that, regardless of the degree of investment risk, the expected return on an asset is constant throughout time. This indicates that the predicted return is unaffected by changes in the market, the state of the economy, or any other elements that might affect the asset's return.

Commercial Banks

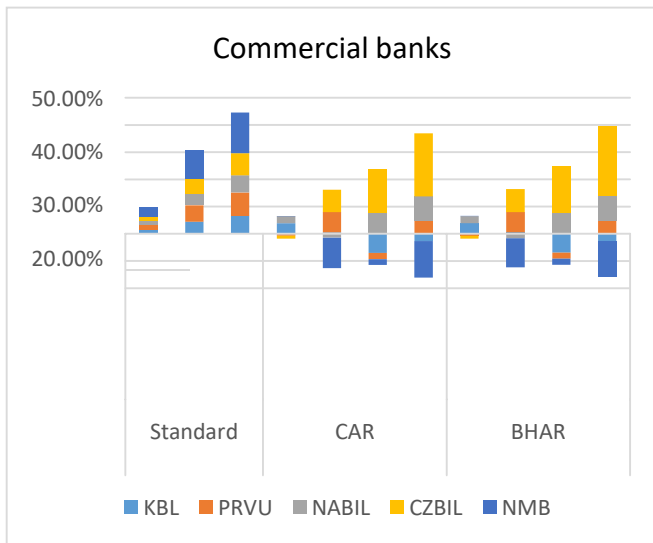


Figure 2: S.D., CAR, and BHAR of commercial bank (CMR model)

Figure 2 lists five commercial banks, their names, and associated standard deviations. Two separate time periods 10 days, anticipation and adjustment periods and 21 days for the entire window period are given for the standard deviations. Figure 1 also displays the cumulative abnormal return (CAR) and buy and hold abnormal return (BHAR) for each bank for the three different events of occurrence, anticipation, and adjustment. The figure then figures out the total CAR and BHAR for every bank.

Overall, figure 1 indicates that NMB had the lowest total CAR and BHAR, while CZBIL had the greatest total CAR and BHAR, followed by NABIL and KBL. According to the standard deviation data, NBM had the highest level of volatility among the banks.

Development Banks

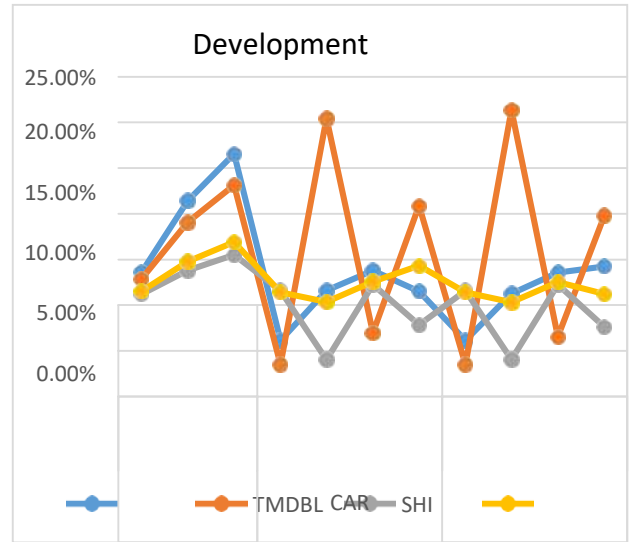


Figure 3: S.D., CAR, and BHAR of development banks (CMR model)

Figure 3 appears to analyze the performance of four different development banks: GBBL, TMDBL, SHINE, and JBBL. Figure 3 provides information on the standard deviation, cumulative abnormal returns (CAR), and buy and hold abnormal returns (BHAR) for each of these institutions. TMDBL records the least significant standard deviation, followed by JBBL, SHINE, and GBBL. All banks had negative CAR and BHARs indicating that they underperformed throughout the event period. Throughout the predicted period, TMDBL and JBBL exhibited positive CARs and BHARs, whilst SHINE and GBBL experienced negative CARs and BHARs. All banks had positive CARs and BHARs during the adjustment period, except for TMDBL. Overall, it appears that TMDBL and JBBL outperformed SHINE and GBBL by a wide margin.

Finance Companies

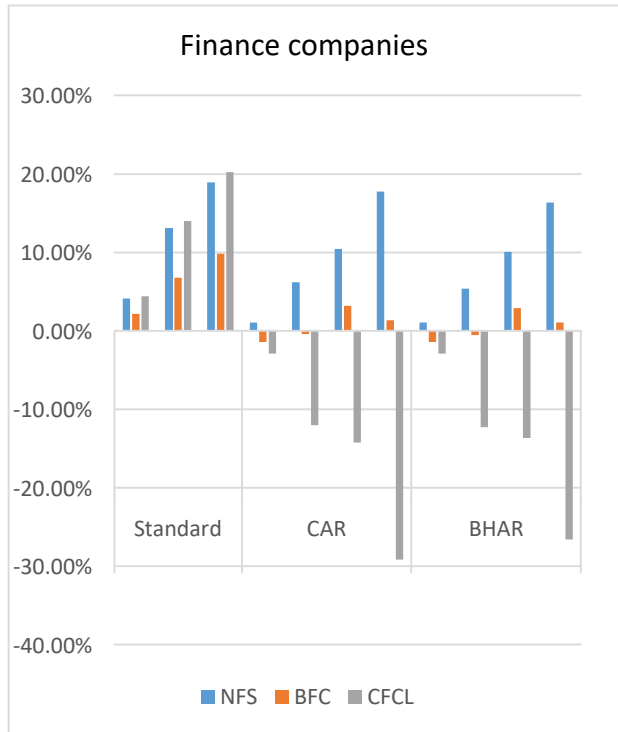


Figure 4: S.D., CAR, and BHAR of finance companies (CMR model)

Figure 4 demonstrates that Nepal's finance company outperformed expectations during the event time, having both a positive CAR and BHAR and a negative CAR and BHAR for the Best Finance and Central Finance. Nepal Finance had the highest positive CAR and BHAR throughout the anticipation period, whereas Best Finance and Central Finance had negative CARs and BHARs. Nepal Finance had the highest positive CAR and BHAR throughout the adjustment period, followed by Best Finance with a positive CAR and BHAR and Central Finance with negative CARs and BHARs. The results of the chart show that overall, Nepal Finance has outperformed Best Finance and Central Finance in terms of performance during the event, anticipation, and adjustment phases. Figure 4 also shows that central finance has the highest level of volatility.

Microfinance Companies

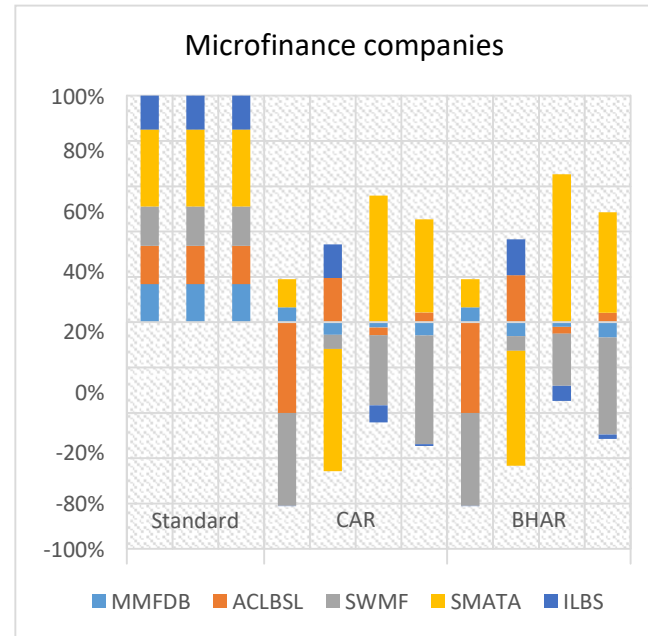


Figure 5: S.D., CAR, and BHAR of microfinance companies (CMR model)

Figure 5 shows that the standard deviation of the returns from microfinance varies. SMATA is the riskiest investment since it has the biggest standard deviation over the entire term as well as the anticipation and adjustment periods. The least dangerous games are MMFDB and ILBS since they have the lowest standard deviation. Bank performance on CAR and BHAR is inconsistent. While MMFDB has a good CAR but a negative BHAR measure across the entire period, ACLBSL and ILBS has positive CAR and BHAR measures. Over the whole era, SWMF and SMATA exhibit negative CAR and BHAR values.

The banks' performance in terms of the event, anticipation, and adjustment periods is likewise inconsistent. For instance, ILBS has a negative measure for the anticipation phase but a positive CAR and BHAR measure for the event and adjustment periods. For the anticipation phase, MMFDB has a negative BHAR measure, while for the event and adjustment periods, it has a positive measure. SMATA and SWMF have consistently low CAR and BHAR values. Overall, figure 4.4 indicates that while investing in SWMF and SMATA may result in losses over the long term, doing so in MMFDB and ACLBSL may be advantageous.

Insurance Companies

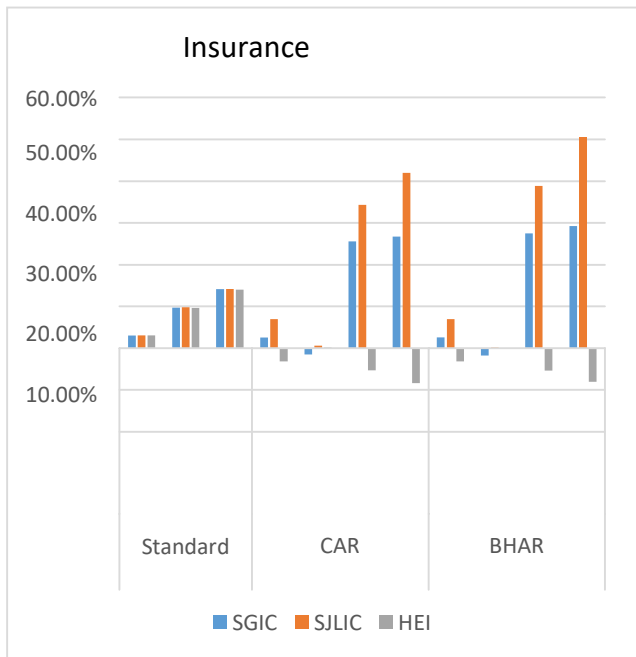


Figure 6: S.D., CAR, and BHAR of insurance companies (CMR model)

Figure 6 shows the performance of three insurance companies: SGIC, SJLIC, and HEI. The standard deviation of their returns is relatively similar, ranging from 3.05% to 3.09%. The CAR and BHAR metrics show the total returns of each company during an event, anticipation, and adjustment period. SGIC and SJLIC had positive returns during the event and adjustment periods, while HEI had negative returns during the event and adjustment periods. SGIC and SJLIC had high positive returns during the anticipation period, while HEI had a small positive return. SGIC and SJLIC had strong total returns, with gains of 26.70% and 41.93%, respectively. HEI had negative total returns of -8.33%.

ii. Market-Adjusted Model

The market-adjusted model adjusts for market risk by deducting the market rate of return from the investment's rate of return, the market-adjusted model accounts for market risk. The model shows the investment's performance and contrasts it with that of other investments and portfolios. If the market-adjusted return is positive, it means that, after considering market risk, the investment or portfolio has beaten the market. If the market-adjusted return is negative, it means that after considering market.

Table 2: S.D., CAR, and BHAR of commercial bank (MA model)

Bank Name	KBL	PRVU	NABIL	CZBIL	NMB
SD					
Stdev	1.00%	1.38%	0.94%	1.12%	1.48%
Stdev (10 days)	3.16%	4.37%	2.98%	3.54%	4.68%
Stdev (21 days)	4.57%	6.34%	4.33%	5.13%	6.78%
CA					
event	0.60%	-0.63%	0.03%	-0.96%	-
Anticipation	1.01%	-4.74%	-2.90%	1.29%	-
Adjustment	-	-1.62%	0.86%	7.47%	-
Total	4.56%	-6.99%	-2.01%	7.81%	6.41%
BH					
event	0.60%	-0.63%	0.03%	-0.96%	0.33%
Anticipation	0.99%	-4.68%	-2.96%	1.24%	-
Adjustment	-	-1.76%	0.84%	7.62%	-
Total	4.56%	-6.94%	-2.12%	7.91%	6.24%

Kumari Bank (KBL), Prime bank limited (PRVU), NABIL Bank, Citizen bank international limited (CZBIL), and NMB bank limited are the five commercial banks whose market-adjusted model study results are presented in this table. Table demonstrates that standard deviations ranging from 0.94% to 1.48%, all five banks had reasonably low volatility. The CAR/BHAR data were more inconsistent, with certain banks (KBL, NABIL) reporting positive abnormal returns during the event window while others reported negative returns. (PRVU, CZBIL, NMB). The anticipation and adjustment results imply that stock performance for banks has been impacted by merger and acquisition events and that market expectations did not always correspond to actual results.

Development Banks

Table 3: S. D., CAR, and BHAR of development banks (MA model)

Bank Name	GBBL	TMDBL	SHINE	JBBL	
SD	Stdev	2.10%	2.92%	1.12%	1.21%
	Stdev (10 days)	6.63%	9.25%	3.54%	3.83%
	stdev (21 days)	9.61%	13.40%	5.13%	5.55%
CAR	event	-1.12%	-7.26%	1.32%	0.19%
	Anticipation	3.82%	13.36%	-5.04%	-0.72%
	Adjustment	3.50%	-5.59%	3.04%	-0.44%
BHAR	Total	6.20%	0.52%	-0.68%	-0.96%
	event	-1.12%	-7.26%	1.32%	0.19%
	Anticipation	3.81%	13.34%	-5.09%	-0.76%
BHAR	Adjustment	3.38%	-5.87%	3.04%	-0.49%
	Total	5.64%	-1.06%	-0.92%	-4.03%

Table 3 indicates that Tinau mission development bank and Shine resunga development bank (SHINE) has positive CAR, suggesting outperformance of these stocks, GBBL and JBBL have negative CAR, indicating underperformance. Only SHINE has positive BHAR, indicating a potential gain, whereas GBBL, TMDBL, and JBBL have negative BHAR, meaning investment in these banks will result in a loss. Tinau mission development bank has the highest standard deviation while SHINE has the lowest degree of volatility.

Finance companies

Table 4: S.D., CAR, and BHAR of finance companies (MA model)

Bank Name	NFS	BFC	CFCL	
SD	Stdev	3.74%	2.16%	4.68%
	Stdev (10 days)	11.83%	6.84%	14.81%
	stdev (21 days)	17.15%	9.91%	21.47%
CAR	event	2.25%	-0.93%	-2.83%
	Anticipation	16.18%	7.88%	-13.12%
	Adjustment	10.00%	1.57%	-9.45%
BHAR	Total	28.43%	8.52%	-25.41%
	event	2.25%	-0.93%	-2.83%
	Anticipation	16.65%	7.89%	-13.21%
BHAR	Adjustment	9.90%	1.32%	-9.35%
	Total	31.08%	8.29%	-23.55%

Table 4 provides statistical measures for three finance companies: Nepal Finance, Best Finance, and Central Finance. The standard deviation of their stock returns, with values ranging from 2.16% to 4.68%. Nepal finance has the highest abnormal returns, with positive values for all three components. This suggests that investing in Nepal finance could result in high returns, particularly if investors correctly anticipate and adjust their investments. Best finance and Central finance, on the other hand, have negative values for all three-window periods, indicating that investing in these banks would result in losses. The negative values in anticipation and adjustment windows suggest that investors may not be able to earn abnormal returns through merger and acquisition events.

Microfinance Companies

Table 5: S.D., CAR, and BHAR of microfinance companies (MA model)

Bank Name	MMF DB	ACLBSL	SWMF	SMATA	ILBS	
SD	Stdev	1.75%	1.51%	2.27%	14.31%	1.60%
	Stdev (10 days)	5.54%	4.78%	7.18%	45.24%	5.07%
	stdev (21 days)	8.03%	6.93%	10.41%	65.56%	7.35%
CAR	event	0.91%	-0.74%	-0.85%	0.89%	0.02%
	Anticipation	-0.03%	10.76%	1.44%	0.60%	2.29%
	Adjustment	0.59%	-3.08%	-30.25%	-40.02%	-1.35%
BHAR	Total	1.47%	6.94%	-29.66%	-38.53%	0.95%
	event	0.91%	-0.74%	-0.85%	0.89%	0.02%
	Anticipation	-0.13%	11.08%	1.31%	0.21%	2.06%
BHAR	Adjustment	0.50%	-3.10%	-26.90%	-	-1.46%
	Total	1.29%	6.84%	-26.57%	156.46%	0.59%

Table 5 provides performance metrics for five different microfinance companies: MMFDB, ACLBSL, SWMF, SMATA, and ILBS. The table shows MMFDB has the lowest standard deviation at 1.75%, while Samata Gharelu Laghubitta has the highest at 14.31%. The table also shows the company's CAR for a specific event date, anticipation window, and adjustment window period. ACLBSL has a negative CAR for the event period (-0.74%), while MMFDB has a positive CAR (0.91%). For the anticipation period, ACLBSL has the highest CAR at 10.76%, while MMFDB has a slightly negative CAR (-0.03%). For the adjustment period, SMATA has the lowest CAR at -40.02%, while ACLBSL has a slightly positive CAR (0.59%). When looking at the total CAR for

all three periods, MMFDB has the highest at 1.47%, while SMATA has the lowest at -29.66%. BHAR considers the overall performance of the stock over the period, rather than just the abnormal return. Here, MMFDB Laghubitta has the highest total BHAR at 1.29%, while Samata Gharelu Laghubitta has the lowest at -156.46%.

Insurance Companies

Table 6: S.D., CAR, and BHAR of insurance companies (MA model)

Insurance companies	SGIC	SJLIC	HEI
Stdev	2.15%	2.44%	2.53%
SD			
Stdev (10 days)	6.79%	7.71%	8.01%
stdev (21 days)	9.84%	11.17%	11.61%
event	-1.13%	0.64%	-2.09%
CAR			
Anticipation	-6.07%	-2.93%	-2.45%
Adjustment	22.36%	22.69%	-10.72%
Total		20.40%	-15.26%
BHAR			
event	-1.13%	0.64%	-2.09%
Anticipation	-5.97%	-3.09%	-2.51%
Adjustment	23.80%	23.87%	-10.36%
Total	15.09%	20.80%	-14.44%

Table 6 shows that among the three insurance companies, Sanima GIC has the lowest standard deviation (2.15%), while Himalayan Everest Insurance has the most (2.53). Table 6 shows similar results for both CAR and BHAR. Suryajyoti's stock outperformed the benchmark index throughout the event period, as seen by the company's positive event CAR of 0.64%. However, the company's stock lagged the benchmark index throughout those times, as seen by the fact that its anticipation and adjustment CAR were both negative. Suryajyoti's stock outperformed the benchmark index over the specified period, as shown by the company's positive total CAR of 20.40%.

Sanima GIC's shares underperformed the benchmark index at those times, according to the company's negative event and anticipation CARs. The company's stock outperformed the benchmark index over the adjustment window, however, as seen by the positive adjustment CAR. Sanima GIC's stock outperformed the benchmark index for the period by 15.16%, according to the company's overall positive total CAR. Himalayan Everest's shares underperformed the benchmark index over all periods, according to the company's negative event, anticipation, and adjustment CARs. Overall, Himalayan Everest's stock under-

performed the benchmark index throughout the specified period, as seen by its negative total CAR of -15.26%.

iii. *CAPM Model*

The CAPM model assumes that systematic and unsystematic risk are the two categories of risk for which investors are paid. The risk that has an impact on the entire market is known as systematic risk. The CAPM model assumes that investors may diversify their holdings to remove unsystematic risk and only retain systematic risk. According to the model, investors need to be compensated for systematic risk, which is quantified by beta. Investors need a greater expected return to make up for the increased risk, hence the higher the beta, the higher the expected return.

Commercial banks

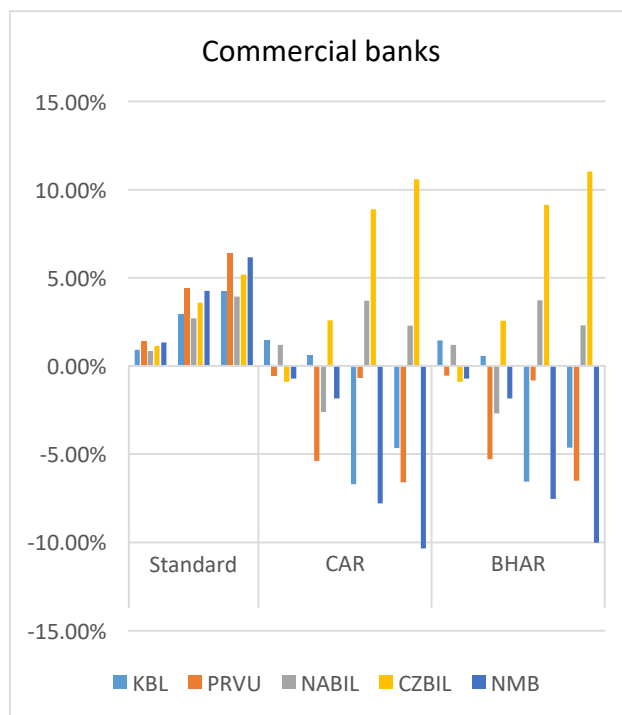


Figure 7: S.D., CAR, and BHAR of commercial bank (CAPM)

Figure 7 shows the standard deviation of each bank over the entire period. KBL has the lowest standard deviation at 0.92%, while NMB bank has the highest at 1.35%. The table also indicates that in terms of the event period, NABIL has the highest CAR at 1.20%, while CZBIL has the lowest at -0.90%. However, when looking at the total CAR across all three periods, CZBIL has the highest at 10.60%, while NMB bank has the lowest at -10.34%. Overall, the BHAR results are similar to the CAR results, with CZBIL having the highest total BHAR at 11.03% and NMB bank having the lowest at -10.01%.

Development Banks

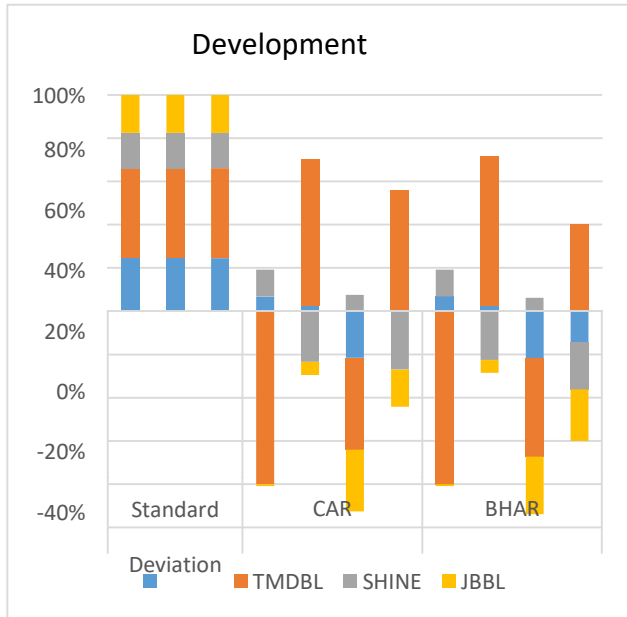


Figure 8: S.D., CAR, and BHAR of development bank (CAPM)

Figure 8 shows the standard deviation, CAR (cumulative abnormal return), and BHAR (buy-and-hold abnormal return) for four different banks: GBBL, TMDBL, SHINE, and JBBL. GBBL has the lowest standard deviation, indicating lower risk than the other banks. CAR and BHAR represent abnormal returns relative to the market, with positive values indicating outperformance and negative values indicating underperformance. TMDBL has the highest CAR and BHAR, indicating that it has outperformed the market, while JBBL has the lowest CAR and BHAR, indicating underperformance. Figure 8 also breaks down the abnormal returns into three categories: event, anticipation, and adjustment. TMDBL has the highest anticipation return, while JBBL has the lowest event return. Overall, TMDBL had the highest abnormal return, while JBBL had the lowest.

Finance Companies

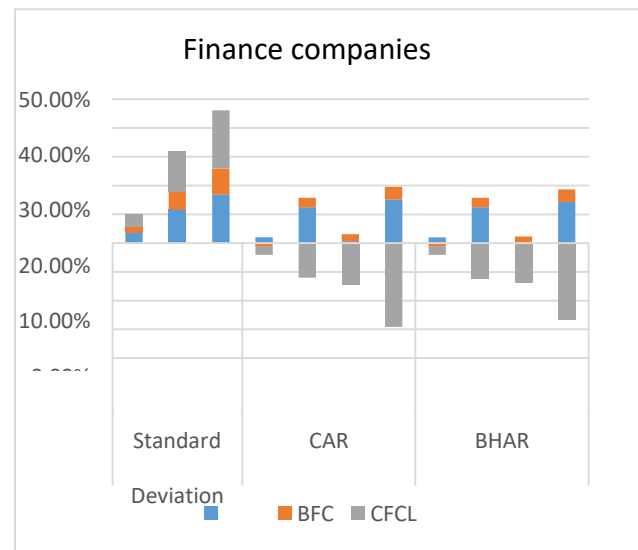


Figure 9: S.D., CAR, and BHAR of finance companies (CAPM)

Figure 9 shows the standard deviation, CAR and BHAR for Nepal finance, Best finance, and Central finance. Nepal Finance has the highest standard deviation among the three companies, while Best Finance has the lowest. In terms of CAR and BHAR, Nepal Finance has the highest positive return, Best Finance has a slightly negative return, and Central Finance has the highest negative return. However, all three banks have negative BHAR, indicating that holding their stocks would not have been profitable during the given period.

Microfinance Companies

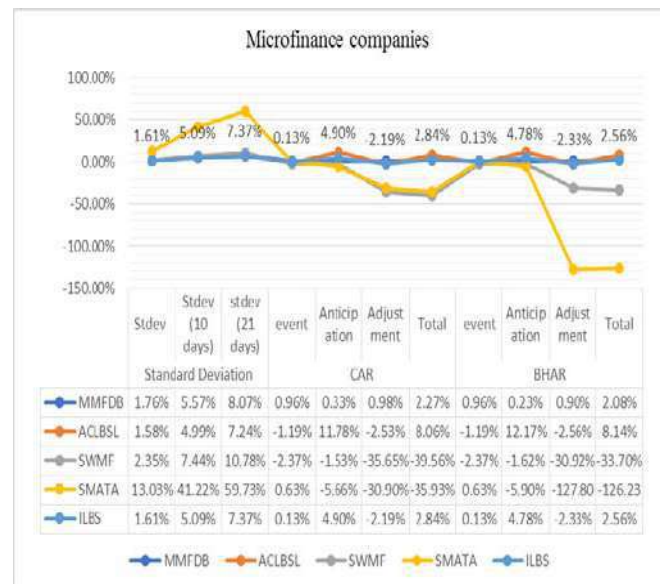


Figure 10: S.D., CAR, and BHAR of microfinance companies (CAPM)

Figure 10 shows SMATA has the highest standard deviation (13.03%), while MMFDB has the lowest standard deviation (1.76%), followed by ACLBSL (1.58%) and ILBS (1.61%). CAR values for ACLBSL and SWMF are negative (-1.19% and -2.37%, respectively), whereas MMFDB has a positive CAR of 0.96%. ILBS has an insignificant CAR of 0.13%, while SMATA has a somewhat positive CAR of 0.63%.

During the anticipation period, MMFDB and ILBS have positive returns (0.33% and 4.90%, respectively), while ACLBSL and SWMF have negative returns (-11.78% and -1.53%, respectively). SMATA has a negligible return of -5.66%. In the adjustment period, MMFDB has a positive return of 0.98%, while ACLBSL and ILBS have negative returns (-2.53% and -2.19%, respectively). SWMF and SMATA have significantly negative returns (-35.65% and -30.90%, respectively, and -127.80% and -30.92%, respectively, for BHAR).

Overall, MMFDB and ILBS have positive BHARs of 2.08% and 2.56%, respectively, while ACLBSL and SWMF have negative BHARs of -33.70% and -126.23%, respectively. SMATA has a slightly negative BHAR of -35.93%.

Insurance Companies

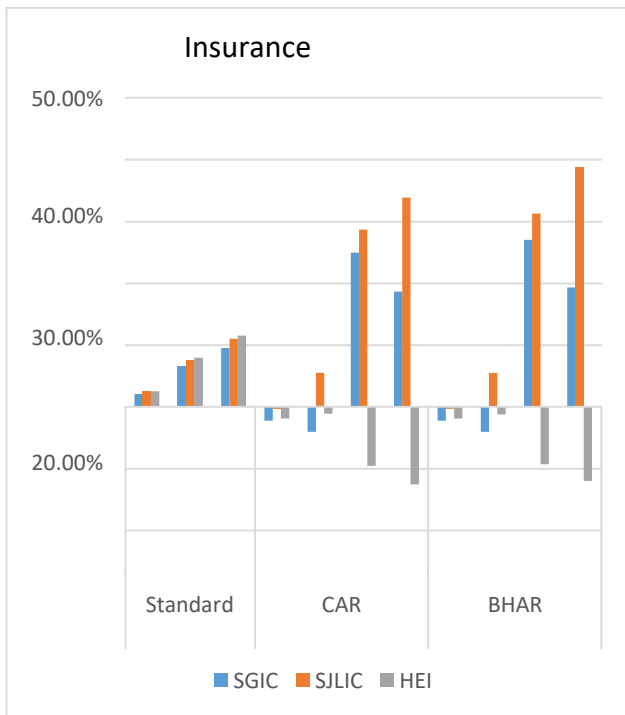


Figure 11: S.D., CAR, and BHAR of insurance companies (CAPM)

The figure 11 show that the rewards from insurance have various degrees of risk. HEI is the riskiest investment because it has the biggest standard deviation over the entire term as well as the anticipation and adjustment period. The least hazardous investment is SGIC, which has the lowest standard deviation for the

entire time as well as the anticipation and adjustment periods.

Bank performance on CAR and BHAR is inconsistent. SGIC's CAR and BHAR measurements for the event time are negative, which suggests that investing in SGIC during an event can result in losses. SGIC, however, has a favourable CAR and BHAR measure for the anticipation and adjustment periods, suggesting that making investments in SGIC at these times may be profitable. For the event time, SJLIC's CAR measure is negative, but it is positive for the anticipation and adjustment periods. HEI has consistently low CAR and BHAR values. Overall, the data indicates that while investing in SJLIC and HEI may result in losses during the anticipation and adjustment phases, doing so in SGIC may be advantageous.

b) *Test of Significance*

The T-statistics is used to test whether the mean return of each bank is significantly different from zero (the null hypothesis). In general, if the absolute value of the T statistic is greater than 1.96, then we can reject the null hypotheses at the 5% level of significance.

i. Test Statistics of Commercial Banks

Table 7: Test of significance for commercial banks

	Bank Name	KBL	PRV U	NAB IL	CZBIL	NM B
Constant mean return model (CAR)	event	2.68**	-0.33	1.88	-0.64	0.01
	Anticipation	0.11	1.26	-0.31	1.47	-
	Adjustment	-1.56	-0.36	1.78	2.84**	-
	Total	-0.41	0.55	1.42	2.84**	0.90
Constant mean return model (BHAR)	event	2.68**	-0.33	1.88	-0.64	0.01
	Anticipation	0.10	1.28	-0.36	1.51	-
	Adjustment	-1.51	-0.38	1.81	2.99**	-
	Total	-0.40	0.54	1.49	3.11**	0.88
Market-adjusted model (CAR)	event	0.60	-0.45	0.03	-0.86	-
	Anticipation	0.32	-1.08	-0.97	0.37	-
	Adjustment	-1.95	-0.37	0.29	2.11**	-
	Total	-1.00	-1.10	-0.47	1.52	0.94
Market-adjusted model (BHAR)	event	0.60	-0.45	0.03	-0.86	-
	Anticipation	0.31	-1.07	-0.99	0.35	-
	Adjustment	-1.92	-0.40	0.28	2.15**	-
	Total	-1.00	-1.09	-0.49	1.54	0.92
CAPM model (CAR)	event	1.56	-0.39	1.40	-0.79	-
	Anticipation	0.20	-1.22	-0.96	0.73	-
	Adjustment	-2.29**	-0.15	1.36	2.48**	-
	Total	-1.10	-1.03	0.58	2.04**	1.83
CAPM model (BHAR)	event	1.56	-0.39	1.40	-0.79	-
	Anticipation	0.20	-1.20	-0.99	0.72	-
	Adjustment	-2.24**	-0.19	1.37	2.55**	-
	Total	-1.09	-1.02	0.59	2.12**	1.62

Table 7 shows the results of various statistical tests (T stats) for different models applied to different commercial banks (KBL, PRVU, NABIL, CZBIL, NMB) about an event (such as a merger and acquisition) over some time.

The table shows no difference in significance statistics for CAR and BHAR for all three models.

ii. Test Statistics of Development Banks

Table 8: Test of Significance for Development Banks

	Bank Name	GBBL	TMDBL L	SHIN E	JBB L
constant mean return model (CAR)	event	-1.07	-2.27**	1.32	0.93
	Anticipation	0.14	2.26**	-1.59	0.07
	Adjustment	0.33	-0.34	0.59	0.54
	Total	0.09	0.83	-0.40	0.62
constant mean return model (BHAR)	event	-1.07	-2.27**	1.32	0.93
	Anticipation	0.11	2.36**	-1.58	0.06
	Adjustment	0.31	-0.39	0.59	0.52
	Total	0.26	0.74	-0.44	0.18
Market-adjusted model (CAR)	event	-0.54	-2.48**	1.18	0.16
	Anticipation	0.58	1.45	-1.42	-0.19
	Adjustment	0.53	-0.60	0.86	-0.11
	Total	0.64	0.04	-0.13	-0.17
Market-adjusted model (BHAR)	event	-0.54	-2.48**	1.18	0.16
	Anticipation	0.58	1.44	-1.44	-0.20
	Adjustment	0.51	-0.63	0.86	-0.13
	Total	0.59	-0.08	-0.18	-0.73
CAPM model (CAR)	event	0.31	-2.20**	0.87	-0.05
	Anticipation	0.16	2.39**	-	-0.50
	Adjustment	-0.27	-0.31	0.14	-0.49
	Total	-0.01	0.95	-1.16	-0.70
CAPM model (BHAR)	event	0.31	-2.20**	0.87	-0.05
	Anticipation	0.15	2.51**	-	-0.51
	Adjustment	-0.29	-0.36	0.12	-0.50
	Total	-0.54	0.88	-1.22	-1.24

Table 8 shows various statistical tests (T-stat) for three different models applied to different development banks (GBBL, TMDL, SHINE, and JBBL) about merger and acquisition events over some time. The result indicates that there is no difference in significance statistics for both CAR and BHAR for all three models.

The result indicates that only the Tinau mission development bank is significant for event and anticipation windows as it is tested based on the constant mean return model and only the event period is significant as it is tested based on a market-adjusted model. Hence null hypothesis for Tinau mission development bank has been rejected which indicates that there is an abnormal return because of the merger and acquisition event. The result shows the majority of

sample banks are not significant for all the window periods. Therefore, the result suggests that there is no impact of merger and acquisition on stock return in any window period for the development banking sector.

iii. *Test Statistics of Finance Companies*

Table 9: Test of significance for finance companies

Bank name	NFS	BFC	CFCL			
Constant mean return model	event	T-stat (CAR)	Anticipation	0.26	-0.67	-0.66
			Adjustment	0.48	-0.06	-0.86
			Total	0.80	0.47	-1.02
	event	T-stat (BHAR)	Anticipation	0.94	0.14	-1.44
			Adjustment	0.26	-0.67	-0.66
			Total	0.41	-0.08	-0.88
	event	T-stat (CAR)	Anticipation	0.77	0.43	-0.98
			Adjustment	0.86	0.11	-1.31
			Total	0.53	-0.61	-0.66
	event	T-stat (BHAR)	Anticipation	1.06	0.53	-0.86
			Adjustment	0.06	0.38	-1.02
			Total	0.89	0.50	-1.44
event	T-stat (CAR)	Anticipation	0.53	-0.61	-0.66	
		Adjustment	1.07	0.52	-0.88	
		Total	0.02	0.34	-0.98	
event	T-stat (BHAR)	Anticipation	0.85	0.47	-1.32	
		Adjustment	0.60	-0.43	-0.60	
		Total	1.37	1.15	-0.89	
event	T-stat (CAR)	Anticipation	0.85	0.23	-0.64	
		Adjustment	1.66	0.86	-1.18	
		Total	0.60	-0.43	-0.60	
event	T-stat (BHAR)	Anticipation	1.41	1.15	-0.89	
		Adjustment	0.84	0.19	-0.63	
		Total	1.81	0.84	-1.10	

Table 9 presents the results of three different models used in event studies- the constant mean return model, the market-adjusted model, and the CAPM model. For each model, the table shows the t-statistics for the cumulative abnormal returns (CAR) and the buy-and-hold abnormal returns (BHAR) for three different periods - the event period, the anticipation period, and the adjustment period, as well as for the total period.

The result shows that the CAR and BHAR are not significant at a 5% level of significance for any of the sample finance companies for all the periods from all three models. Hence, the null hypothesis for the sample finance companies has not been rejected which indicates that there is no abnormal return due to the merger and acquisition event. Therefore, the result suggests that the investors of finance companies did not get any abnormal returns from the merger and acquisition events.

iv. *Test Statistics of Microfinance Companies*

Table 10: Test of significance for microfinance companies

Bank Name	MM FDB	ACLBSL	SWMF	SMATA	ILBS			
constant mean return model	T-stat (CAR)	event	0.21	-1.30	-1.29	0.20	0.00	
		Anticipation	-0.43	1.51	-0.46	-	2.05**	1.28
		Adjustment	-0.37	-0.57	-4.91**	4.53**	-1.40	
	T-stat (BHAR)	event	-0.51	0.37	-3.98**	1.75	-0.09	
		Anticipation	0.21	-1.30	-1.29	0.20	0.00	
		Adjustment	-0.45	1.53	-0.46	-1.83	1.30	
	T-stat (CAR)	event	-0.38	-0.57	-4.19**	6.09**	-1.42	
		Anticipation	-0.38	-0.57	-4.19**	6.09**	-1.42	
		Total	-0.53	0.33	-3.29**	1.74	-0.18	
	Market-adjusted model	T-stat (CAR)	event	0.52	-0.49	-0.37	0.06	0.01
			Anticipation	-0.01	2.25**	0.20	0.01	0.45
			Adjustment	0.11	-0.64	-4.21**	-0.88	-0.27
T-stat (BHAR)		event	0.18	1.00	-2.85**	-0.59	0.13	
		Anticipation	0.52	-0.49	-0.37	0.06	0.01	
		Adjustment	-0.02	2.32**	0.18	0.00	0.41	
T-stat (CAR)		event	0.09	-0.65	-3.75**	3.44**	-0.29	
		Anticipation	0.09	-0.65	-3.75**	3.44**	-0.29	
		Total	0.16	0.99	-2.55**	2.39**	0.08	
CAPM model		T-stat (CAR)	event	0.55	-0.75	-1.01	0.05	0.08
			Anticipation	0.06	2.36**	-0.21	-0.14	0.96
			Adjustment	0.18	-0.51	-4.79**	-0.75	-0.43
	T-stat (BHAR)	event	0.28	1.11	-3.67**	-0.60	0.38	
		Anticipation	0.55	-0.75	-1.01	0.05	0.08	
		Adjustment	0.04	2.44**	-0.22	-0.14	0.94	
	T-stat (CAR)	event	0.16	-0.51	-4.16**	3.10**	-0.46	
		Anticipation	0.16	-0.51	-4.16**	3.10**	-0.46	
		Total	0.26	1.12	-3.13**	2.11**	0.35	

Table 10 shows the results of various statistical tests (T stats) for different models applied to different microfinance companies (MMFDB, ACLBSL, SWMF, SMATA, and ILBS) about a merger and acquisition event over some time. The table shows different significance test statistics results of both CAR and BHAR for all three models.

Table 10 indicates that the stock return of Aarambha Chautari Laghubitta has been significant for the anticipation period based on both market-adjusted and CAPM models. Similarly, the stock return of Suryodaya Womi Laghubitta has been statistically significant for adjustment and total window period based on both market adjusted and CAPM models which indicate that the merger and acquisition event has impacted the stock return of ACLBSL and SWMF for specified window periods.

The result also indicates that the stock return of Samata Gharelu Laghubitta has a significant BHAR result for adjustment and total window period based on both the market-adjusted model and the CAPM model.

Hence, the null hypothesis has been rejected which indicates that there is an abnormal return for stock of Samata Gharelu Laghubitta during the adjustment and total window period due to the merger and acquisition event. Overall, the result shows mixed interpretations of the impact of merger and acquisition events on stock return for the microfinance sector.

v. Test Statistics of Insurance Companies

Table 11: Test of Significance for Insurance Companies

		Insurance companies	SGIC	SJLIC	HEI	
constant mean return model	T-stat	event	0.84	2.25**	-1.04	
	(CA R)	Anticipation	-0.15	0.06	0.01	
		Adjustment	2.62**	3.51**	-0.55	
		Total	1.89	2.96**	-0.60	
		event	0.84	2.25**	-1.04	
	(BH AR)	Anticipation	-0.18	0.02	-0.02	
		Adjustment	2.82**	3.97**	-0.56	
		Total	2.07**	3.56**	-0.58	
		event	-0.53	0.26	-0.83	
	Market-adjusted model	(CA R)	Anticipation	-0.89	-0.38	-0.31
			Adjustment	3.29**	2.94**	-1.34
			Total	1.54	1.83	-1.31
event			-0.53	0.26	-0.83	
(BH AR)		Anticipation	-0.88	-0.40	-0.31	
		Adjustment	3.50**	3.10**	-1.29	
		Total	1.53	1.86	-1.24	
		event	-1.08	-0.13	-0.74	
CAPM model		(CA R)	Anticipation	-0.62	0.72	-0.14
			Adjustment	3.80**	3.77**	-1.20
			Total	1.96**	3.07**	-1.09
			event	-1.08	-0.13	-0.74
	(BH AR)	Anticipation	-0.62	0.72	-0.15	
		Adjustment	4.12**	4.11**	-1.17	
		Total	2.03**	3.52**	-1.04	
		event	-1.08	-0.13	-0.74	

Table 11 shows various statistical tests (T-stat) for three different models applied to different insurance companies (Sanima GIC, Suryajyoti Life, and Himalayan Everest Insurance) about merger and acquisition events over some time. The table indicates that there is no difference in significance statistics for both CAR and BHAR for all three models.

Overall, the result suggests that the majority of sample insurance companies have significant test statistics results for the adjustment window and total window period which indicates that the merger and acquisition event has influenced the stock return of the insurance sector.

vi. Significance Test of the Financial Sector (CMR Model)

Table 12: Test of significance for the financial sector (CMR model)

Financial sector	T-statistics		
	Anticipation	Adjustment	Total
Commercial bank	-0.29	1.21	0.65
Development bank	-0.81	-0.65	-1.03
Finance company	-1.19	-0.08	-0.91
Microfinance company	1.43	-1.9	-0.34
Insurance company	-2.88**	-0.01	-2.04**

Table 12 shows the significance test statistics of the financial sector at a 5% level of significance based on the constant mean return model. The significance test has been conducted for three different window periods anticipation, adjustment, and total window period.

The result shows that the stock return of insurance companies has been statistically significant for the anticipation and total window period. Hence, the result indicates that merger and acquisition events have impacted the stock return of insurance companies in an anticipation window and total window period.

However, the stock return of commercial banks, development banks, finance companies, and microfinance companies is not statistically significant for the entire event window. Therefore, the null hypothesis has not been rejected which indicates that there is no abnormal return due to merger and acquisition events. The result suggests that the merger and acquisition event will not affect the entire return of stock investors of commercial banks, development banks, finance companies, and microfinance companies.

vii. Significance Test of the Financial Sector (MA Model)

Table 13: Test of significance for the financial sector (MA model)

Financial sector	T-statistics		
	Anticipation	Adjustment	Total
Commercial bank	-1.06	-0.14	-0.85
Development bank	-0.4	-0.16	-0.4
Finance company	0.58	0.08	0.53
Microfinance company	2.29**	-0.11	1.57
Insurance company	-1.45	0.29	-0.82

Table 13 shows the significance test statistics of the financial sector at a 5% level of significance based on the market-adjusted model. The significance test has

been conducted for three different window periods anticipation, adjustment, and total window period.

Table 13 shows that other than microfinance companies in the anticipation period, the stock return of all the companies in all studied window periods has not seen a significant impact which indicates that the merger and acquisition event cannot influence stock return to generate abnormal returns. However, there is a significant impact of merger and acquisition on the stock return of microfinance companies in the anticipation window which indicates that there is a leakage of information before merger and acquisition in the microfinance sector.

viii. *Significance Test of Financial Sectors (CAPM)*

Table 14: Test of significance for financial sectors (CAPM)

Financial sector	T-statistics		
	Anticipation	Adjustment	Total
Commercial bank	0.11	1.6	1.2
Development bank	-0.12	0.12	0
Finance company	-0.46	0.46	0
Microfinance company	1.38	-1.06	0
Insurance company	-1.35	1.35	0

Table 14 shows the significance test statistics of the financial sector at a 5% level of significance based on the CAPM. The significance test has been conducted for three different window periods - anticipation, adjustment, and total window period.

Table 14 indicates that the stock return of all the participating financial sectors is not statistically significant for the entire event window. Therefore, the null hypothesis has not been rejected which indicates that there is no abnormal return due to merger and acquisition events. The result suggests that the merger and acquisition event does not affect the entire return of stock investors of commercial banks, development banks, finance companies, microfinance companies, and insurance companies.

c) *Qualitative Analysis*

i. *Perspective of NEPSE*

Share is a raw material for the NEPSE from which it generates revenue. According to Niranjan Phuyal senior manager of Nepse, merger and acquisition has not created such a huge impact on the stock performance but in the past, there is a negative impact because of the negative aspect of regulatory weakness such as trading halt. Mr. Phuyal further elaborates that in Nepal consolidations are being conducted with the mutual understanding of two companies so there is no such theoretical problem of eat or be eaten in the market. The problem of information leakage can be seen when the stock market

movement is in a fast phase but in a slow period or bearish trend, there is no information leakage. The leakage of information to manipulate the stock can be seen worldwide but in Nepal, such practice is comparatively low which might happen sometimes but doesn't create a huge problem.

Mr. Phuyal states that the volatility in the stock price is all determined by the investor's perception. In past, there we can see stock price volatility because of mergers and acquisitions but in recent times there is no such volatility in the stock market because nowadays most investors are aware of the actual practice of merger and acquisition and how it works. But the merger is cost occurring process in the short term, so there might be seen some loss in profitability in the short-run. Nepse only adjusts the shareholder's wealth that it should not change after the merger and they have not seen such changes because of the merger. According to Mr. Phuyal, the banking sector is the most active in consolidation in recent times but there are small microfinance and mushrooming companies which are easy in cornering and very hard to consolidate. Such a growing company can create an impact on corporate governance. Additionally, these companies cannot create a synergy impact from mergers and acquisitions. Mr. Phuyal states that only conglomerate mergers can bring a synergy effect which is not practiced in Nepal for BFI's.

ii. *The Perspective of the Merged Company*

According to Mr. Ramesh Thapa, HR head of Prabhu bank limited, merger and acquisition can create synergy in the long run because the merger helps the company to play a bigger role and has a bigger presence in the market. Sometimes, the smaller company has inferior feelings and fear of loss in the case of an acquisition. Further, Mr. Thapa stated that the success of merger and acquisition depends on the economic, political, and internal conditions of the company. The merger is also problematic because investors and customers have the feeling of loss that if the company become too big it might fall as they are seeing some examples in the international market. Mr. Thapa further explained that the major motivation for the merger is to become a larger entity and diversify the portfolio so that the company can improve its performance. In the end, he concludes that in the short-run merger may create problems but it is beneficial in the long run.

iii. *The Perspective of Institutional Investor*

The institutional investor doesn't perceive merger and acquisition in a positive sense because there is a fear of stuck of liquidity and no strict provision for merger time certainty. According to Mr. Pratik Koju scheme manager of NMB Capital, the merger and acquisition have no significant impact on the stock return. As Mergers and acquisitions in Nepal are driven

by regulatory requirements rather than perceiving theoretical benefits like the synergy effect and power theory. The merger between a few companies has been done for the expansion which reduces the cost as well in the long run and the profitability of the company has been increased but not significantly. Mr. Koju further stated that few target companies are benefitted from the merger and acquisition because when the SWAP ratio favors one company, in such case investors perceive it positively.

Mr. Koju explains that the merger effect also depends on the economic and stock market cycle. In bullish times, investors perceive mergers and acquisitions positively and in the bearish time, they perceive them negatively because of the uncertainty of loss. In Nepal, sometimes there have been seen the impact of the merger in the anticipation period which indicates an information leakage problem. Mr. Koju further explains sometimes two companies can go for the merger to manipulate the stock but there is no speculation about the stock performance because of the merger and acquisition. In the end, Mr. Koju explains that moreover, investors perceive mergers as a negative event for stock market performance. But, the performance of merged BFIs has been seen as positive because the regulator provides incentives and the cost of the company has been decreased in the long run.

From the various point of view, it can be concluded that the merger or acquisition has no impact on the stock return of the company. Sometimes it might see positive and negative impacts but the driving force at that time might be another factor. The market condition is also a major factor to determine the success of a merger or acquisition such as a bullish market or bearish market. However, the merger has a long-term impact on the performance of the merged company. Merger or acquisition helps the company to reduce the long-term cost and bring synergy effect.

d) Major Findings

The study has concentrated on the impact of mergers and acquisitions on the stock return of financial sectors. The study has used primary data to analyze the investment perception toward mergers and acquisitions. The secondary data has been used to investigate the impact of merger and acquisition on stock return. The major findings of the study are summarized as follows:

Commercial Bank

- *Constant Mean Return Model:* the result shows that the t-stat (CAR) and t-stat (BHAR) value of KBL for event date (i.e., 2.68 and 2.68) and of CZBIL for adjustment window (i.e., 2.84 & 2.99) and total period (i.e., 2.84 & 3.99) are significant at 5% level of significance. The result also shows that the value of CAR and BHAR for PRVU, NABIL & NMB has less than 1.96 which indicates that there is no impact of merger and acquisition on these banks.

- *Market-Adjusted Model:* the t-stat value of CAR and BHAR for CZBIL on the adjustment window (2.11 & 2.15) is greater than 1.96 which indicates the significant impact of merger and acquisition. However, all other banks (i.e., KBL, PRVU, NABIL & NMB) for all the window period (i.e., event date, anticipation, adjustment & total period) has the CAR & BHAR value of less than 1.96 which indicate there is no impact of merger and acquisition on stock return of these banks.
- *CAPM Model:* the result shows that the t-stat (CAR) and t-stat (BHAR) value of KBL for event date (i.e., -2.29 and -2.24) and of CZBIL for adjustment window (i.e., 2.48 & 2.55) and total period (i.e., 2.04 & 2.12) are significant at 5% level of significant. The result also shows that the value of CAR and BHAR for PRVU, NABIL & NMB has less than 1.96 which indicates that there is no impact of merger and acquisition on these banks.

The overall commercial banking sector has shown the insignificant impact of merger and acquisition events in anticipation, adjustment and total window period from all three models.

Development Bank

- *Constant Mean Return Model:* the t-stat value of CAR and BHAR for TMDBL on the event (-2.27 & -2.27) and anticipation window (-2.26 & -2.36) is greater than 1.96 which indicates the significant impact of merger and acquisition on the event date and anticipation window. However, all other development banks (i.e., GBBL, SHINE, & JBBL) for all the window period (i.e., event date, anticipation, adjustment & total period) has the CAR & BHAR value of less than ± 1.96 which indicate there is no impact of merger and acquisition on stock return of these development banks.
- *Market-Adjusted Model:* the t-stat value of CAR and BHAR for TMDBL on the event date (-2.48 & -2.48) is greater than -1.96 which indicates the significant impact of merger and acquisition. However, all other development banks (i.e., GBBL, SHINE, & JBBL) for all the window period (i.e., event date, anticipation, adjustment & total period) has the CAR & BHAR value of less than ± 1.96 which indicate there is no impact of merger and acquisition on stock return of these development banks.
- *CAPM Model:* the result indicates that the t-stat (CAR) and t-stat (BHAR) value of TMDBL for event date (i.e., -2.20 and -2.20) and anticipation window (i.e., 2.39 & 2.51) and of SHINE for adjustment window (i.e., -2.09 & -2.07) are significant at 5% level of significance. The result also shows that the value of CAR and BHAR for GBBL and JBBL has less than ± 1.96 which indicates that there is no

impact of merger and acquisition on stock returns of these development banks.

The overall development banking sector has shown the insignificant impact of merger and acquisition events in anticipation, adjustment and total window period from all three models.

Finance Companies

- *Constant Mean Return Model:* the t-stat value for all the sample finance companies is less than ± 1.96 for all the studied periods, meaning that the CAR & BHAR of stock return are not significant at a 5% level of significance, which indicates that the stock return of finance companies has no impact of merger and acquisition event on any studied period (i.e., event date, anticipation window, adjustment window, and total period).
- *Market-Adjusted Model:* all the sample finance companies (NFS, Best, and Central) have a t-stat value of CAR & BHAR is less than ± 1.96 for all the studied periods (i.e., event date, anticipation window, adjustment window, and total period) which indicates that the stock return of sample finance companies is insignificant, and can be concluded that the merger and acquisition event has no impact on the stock return of finance companies.
- *CAPM Model:* the t-stat value for CAR & BHAR of all the sample finance companies is less than ± 1.96 for all the studied period, meaning that the CAR & BHAR are not significant at a 5% level of significance, from the result it can be concluded that the stock return of finance companies has no impact of merger and acquisition event on any studied period.

The overall finance company sector has shown the insignificant impact of merger and acquisition events in anticipation, adjustment and total window period from all three models.

Microfinance Companies

- *Constant Mean Return Model:* the result indicates that the t-stat (CAR) and t-stat (BHAR) value of SWMF for adjustment window (i.e., -4.91 and -4.19) and total period (i.e., -3.98 & -3.29) and of SMATA for adjustment window (i.e., 4.53 & 6.09) are significant at 5% level of significance. The result also shows that the value of t-stat (CAR) and t-stat (BHAR) for all other sample microfinance companies (i.e., MMFDB, ACLBSL, and ILBS) has less than ± 1.96 which indicates that there is no impact of merger and acquisition on stock returns of these microfinance companies.
- *Market-Adjusted Model:* the result shows that the t-stat (CAR) and t-stat (BHAR) value of ACLBSL for anticipation (i.e., 2.25 and 2.32) and of SWMF for adjustment window (i.e., -4.21 & -3.75) and total period (i.e., -2.85 & -2.55) are significant at 5% level

of significant. However, the result shows SMATA only has the t-stat (BHAR) significant value of -3.44 & -2.39 for the adjustment window and total period respectively at a 5% level of significance. The result also shows that the value of t-stat (CAR) and t-stat (BHAR) for MMFDB and ILBS has less than ± 1.96 which indicates that there is no impact of merger and acquisition on stock returns of these finance companies in all studied periods.

- *CAPM Model:* the result indicates that the t-stat (CAR) and t-stat (BHAR) value of ACLBSL for anticipation (i.e., 2.36 and 2.44) and of SWMF for adjustment window (i.e., -4.79 & -4.16) and total period (i.e., -3.67 & -3.13) are significant at 5% level of significance. However, the result shows SMATA only has the t-stat (BHAR) significant value of -3.10 & -2.11 for the adjustment window and total period respectively at a 5% level of significance. The result also shows that the value of t-stat (CAR) and t-stat (BHAR) for MMFDB and ILBS has less than ± 1.96 which indicates that there is no impact of merger and acquisition on stock returns of these finance companies in all studied periods.

The stock return of the overall microfinance companies' sector has shown an insignificant impact of merger and acquisition events in anticipation, adjustment and total window period from the CMR model and CAPM. However, the stock return of the microfinance company sector has shown a significant impact in the anticipation period from the MA model.

Insurance Companies

- *Constant Mean Return Model:* for SGIC insurance, the t-stat value of CAR and BHAR for on adjustment windows (i.e., 2.62 & 2.82) and t-stat (BHAR) value on the total period (i.e., 2.07) is greater than 1.96 which indicate the significant impact of merger and acquisition on stock return for SGIC insurance for those specific periods. Moreover, Suryajyoti life insurance has the value of t-stat (CAR) and t-stat (BHAR) for event date (i.e., 2.25 & 2.25), for adjustment window (i.e., 3.51 & 3.97), and total period (i.e., 2.96 & 3.56) is greater than 1.96, indicates that the merger and acquisition event generate abnormal returns on those specific periods. The Himalayan Everest Insurance has calculated the t-stat value for all the window period (i.e., event date, anticipation, adjustment & total period) has the CAR & BHAR value of less than ± 1.96 which indicate there is no impact of merger and acquisition on stock return of that insurance company.
- *Market-Adjusted Model:* the t-stat value of CAR and BHAR on the adjustment window for SGIC (i.e., 3.29 & 3.50) and for SJLIC (i.e., 2.94 & 3.10) is greater than 1.96 which indicate the significant impact of merger and acquisition on adjustment period at 5%

level of significance. However, HEI for all the window period (i.e., event date, anticipation, adjustment & total period) has the CAR & BHAR value of less than ± 1.96 which indicate there is no impact of merger and acquisition on the stock return of these banks.

- *CAPM Model:* the result indicates that the t-stat (CAR) and t-stat (BHAR) value on the adjustment window of SGIC (i.e., 3.80 & 4.12) & of Jyoti (i.e., 3.77 & 4.11) and on the total period of SGIC (i.e., 1.96 & 2.03) & Jyoti (i.e., 3.07 & 3.52) is greater than 1.96, indicating significant result at 5% level of significance. However, the result for HEI shows insignificant at a 5 % level of significance indicating that merger and acquisition have no impact on the stock return of Himalayan Everest general insurance.

The stock return of the overall insurance sector has shown the insignificant impact of merger and acquisition events in anticipation, adjustment and total window period from the MA model and CAPM. However, the stock return of the insurance sector has shown a significant impact in anticipation and total window period from the CMR model.

From the in-depth interview, the major finding of the impact of merger and acquisition from the perspective of NEPSE, merged company and institutional investor are as follows:

1. Merger and acquisition have no impact on the stock return of the merged company but the investor perceives merger and acquisition as a negative event for stock performance.
2. Merger and acquisition can impact the performance of the company in the long run because it helps to reduce the cost of the company in the long-run and expand the presence of the company which makes the company more powerful.
3. The major driving force for the merger and acquisition in Nepal is a regulatory requirement rather than the theoretical benefit such as synergy, power exercise, eat or be eaten in the market.

IV. DISCUSSIONS, CONCLUSION AND IMPLICATIONS

This chapter presents a summary of the study and highlights the major findings of the study. In addition, the major conclusions are discussed in this chapter in comparison to the previous several studies. This chapter also includes the implication regarding the impact of mergers and acquisitions on the stock return of Nepalese financial sectors. Analysis of the calculated result by using the statistical tool is summarized in this chapter.

a) *Discussions*

Examining the effect of mergers and acquisitions on the stock return of Nepalese financial

sectors is the main objective of the research. The study used primary and secondary data to conclude the results. Through the analysis of interviews with experts from different relevant organizations, the study found that the merger or acquisition has no impact on the stock return of the company. Sometimes it might see positive and negative impacts but the driving force at that time might be another factor. The market condition is also a major factor to determine the success of a merger or acquisition such as a bullish market or bearish market. However, the merger has a long-term impact on the performance of the merged company. Merger or acquisition helps the company to reduce the long-term cost and bring synergy effect.

Moreover, by analyzing the 20 merger and acquisition event data, the study found that the majority of the participated merger and acquisition events have an insignificant impact on the stock return of Nepalese financial sectors. The study revealed that in the Nepalese financial sector, most of the participated merger and acquisition events cannot create any abnormal return for the investors of commercial banks, development banks, finance companies, and micro-finance companies. However, the result showed that the majority of participating insurance companies in Nepal can generate positive abnormal returns from merger and acquisition events.

The findings of this research are consistent with the various previous studies. This study is consistent with the study by Beitel and Schiereck (2001) and Kumar et. al., (2014) found a similar result that the stock return of the bidding company has decreased because of merger and acquisition events. However, the author also found that M & A is beneficial for the investor of target companies. Similarly, Gjirja (2003) found that the consolidation did not significantly enhance post-merger and this result is also similar to the finding of this result. Additionally, similar findings by Mantravadi and Reddy (2008) imply that there are slight variations in the effects of mergers on operating performance across various Indian industries. However, the result also revealed that mergers have somewhat increased the profitability of companies in the banking and financial sector.

A similar result was found by Badreldin and Kalhoefer (2009), who found that mergers & acquisitions have not had significant improvements in the performance of commercial banks in Egypt. The consolidation minor supports the credit risk position and does not have a clear effect on the profitability of the Egyptian banking sector. Another consistent result of this study was by Liargovas and Repousis (2011), who revealed that merger and acquisition announcements do not have an impact and do not create wealth but shareholders can get significant abnormal returns before the announcement of merger and acquisition. The merger announcement does not impact the movement of share price during the event window.

Therefore, the study concluded that a merger announcement does not impact the creation of a wealth of shareholders (Padhmavathy and Ashok, 2012), this result is similar to this study. The study also found that investors cannot obtain an exceptional or excessive return either before or after the merger announcement. Poposki (2007) determined that mergers improved business efficiency in the insurance sector which is a similar result to this research result.

Additionally, this study has a similar result to the study by Bergmann et. al., (2015), who found that the merger and acquisition process help to reduce competition, which leads to negative abnormal returns. Shah and Khan (2017) found that the financial performance of the acquirer bank deteriorated after the merger of banks. The fact is that recapitalization through merger and acquisition does not always increase post-acquisition financial performance (George et. al., 2021). Shrestha et. al., (2017) found that the financial institution should not follow a merger strategy to overcome the challenges faced in the market. Moreover, this study is also consistent with the research by Chhetri and Baral, (2018), who found that there is no impact of merger announcements on shareholder wealth for the individual firm as well as for the overall Nepalese banking sector. Additionally, the shareholder did not get any abnormal returns before and after the merger announcement.

Similarly, a similar result was also found by Rani et. al., (2015), who found that investors start reacting after the announcement information has become public and stock prices start to rise, however, the market starts reacting before the announcement. The study also found a speculator can gain substantial returns in the short run if the speculator gets information before the announcement. This research also found a similar result that many events have a significant impact on M & A in-stock return during the anticipation period. Dilshad (2012) study reveals that there is a short impact of the M & A announcement on stock price but at the end of the event window, there is no abnormal return. The study also found that leakage of information resulted in an increase in stock price before the announcement of the merger and acquisition.

However, this study also has many contradictions with previous studies. Yeh and Hoshino (2000) found that the stock market responds favorably to news of mergers and acquisitions. Similarly, Sufian and Majid (2007) indicated that while low credit quality has a large negative impact on a bank's performance, bank profitability has a considerable beneficial impact on a bank's efficiency. Anand and Singh (2008) found that the cumulative abnormal return of bidder banks in Indian private sector banks increased because of the merger announcement. Moreover, the study also showed that the merger announcement in the Indian banking industry created wealth for the shareholders. Gattofi et. al., (2009) also found a similar result as this

result that commercial banks involved in mergers & acquisitions provide a better return than those banks without consolidated. The study also shows that merger & acquisition helps to improve performance faster.

Additionally, this study has a similar result to the study by Chaudhary et. al., (2010), who found that financial performance and M&A deals in India show a significant association, and the acquiring corporations were able to create value. Similarly, financial performance and M&A deals in India show a significant association, and the acquiring corporations were able to create value (Sinha et.al., 2010). Moreover, Joshua (2011) found that the time after mergers and acquisitions was more financially efficient than the time before. The contradicting result was also found by Bhardwaj (2014), who revealed that merger and acquisition activity is good for employees, customers, organizations, and shareholders. Mergers and acquisitions help the organization increase productivity and overall efficiency in the long run. Kyriazopoulos (2015) contradict this research result, it found that targets experience high abnormal returns during event times, whereas acquirers appear to experience minor excess returns. Furthermore, cash payments made during bank mergers and acquisitions increase stock prices near event dates.

Similarly, the study contradicts this research result by Hasan, Hasan, and Liu (2017), who found both positive and significant for the stock returns of acquiring corporations. However, they discovered that there was little effect of M&A announcements on target company stock returns. Boloupremo and Ogege (2019) also found contradicting results that mergers and acquisitions have increased the financial performance of banks and suggest that M & A strategy should be taken for long-term goal achievement. The Nepalese study by Shrestha (2014) found that M&A can produce synergistic benefits for the possible parties involved as well as the expectation of financial gain drives increase in stock return. Shrestha et. al., (2017) found that the financial performance of the banks increased after the merger when larger, more stable institutions like commercial banks act as bidders. Additionally, Sharma (2018) found that the bank's financial performance increased after the merger and acquisition. Moreover, mergers and acquisitions are also beneficial for the shareholder and employees of banks and financial institutions. The merger and acquisition have helped the BFIs to create synergy and provide competitive advantages which ultimately helps to create wealth for shareholders.

Finally, the stock returns of the commercial banking, development banking, finance, microfinance, and insurance sectors have no significant effect on merger and acquisition activity. Regulatory requirements in Nepal encourage mergers and acquisitions, while stock investors in the country's banking sectors

are unmotivated. A bullish market encourages mergers and acquisitions, but a bearish trend is detrimental to the stock returns of the financial industries. Depending on where the stock market cycle is at, mergers and acquisitions may or may not have an effect on stock returns.

b) Conclusion

The study has used quantitative and qualitative data analysis to examine the effects of merger and acquisition on the stock return of Nepal's five different financial sectors (commercial banking, development banking, finance companies, microfinance companies, and insurance). Quantitative data from the 20 sample events from 5 distinct sectors in Nepal are examined using the event study approach. Three alternative models: the constant mean return, market-adjusted, and CAPM models are used to analyze the effect of merger and acquisition on stock return.

From the constant mean return model, the stock return of the commercial banking sector, development banking sector, finance company sector, and microfinance company sector has an insignificant impact of merger and acquisition on the stock return for anticipation, adjustment, and total window period. However, the stock return of the insurance sector has a significant impact on merger and acquisition on the anticipation period and total window period. The result suggests that except insurance sector, the merger activity has not grabbed the attention of investors. The result also stock investors of the insurance sector can generate positive abnormal returns from the merger and acquisition event in the anticipation window and total event window period of 21 days.

From the market-adjusted model, the analysis of participating financial institutions from the different sectors have shown an insignificant impact of M & A on stock return for all the studied periods. Similarly, the result from the overall financial institution has shown that except for microfinance companies in the anticipation window, all the participated financial sectors have an insignificant impact of M & A on the stock return for all studied periods. The market-adjusted model suggests that investors in microfinance can generate a positive abnormal return from the merger and acquisition event in the anticipation window.

From the CAPM model, the analysis of participating financial institutions from different sectors have shown an insignificant impact of M & A on stock return. Similarly, the stock return of overall participating financial sectors has no significant impact on mergers and acquisitions for the studied period. The CAPM model suggests that investors cannot generate any abnormal return from the M & A event.

The disclosure of the merger news has not had an impact on investors' views and motivations because the test numbers are not substantial in any case for the

entire banking sector. NRB is implementing several policies and directives to strengthen the banking industry. The idea of a forced merger does not function since bankers and investors do not support such regulations, which makes the impact less powerful. Inappropriate partners are yet another reality with no impact on shareholders. Partners ought to be selected from the same group. Partnerships of the same class have the potential to significantly affect shareholder returns. Banks are merely complying with NBB's directives, not to benefit from synergistic effects.

From the interview of experts, it can be interpreted that merger and acquisition cannot generate synergy in the short run. The M&A is being done with the drive of NRB regulations rather than voluntarily and that results in cost in the short run. The experts have explained that M&A has no impact on the stock return. However, M&A has positively increased the performance of the consolidated company because the event can reduce the cost in the long run. For the stock return, market return plays a more crucial role rather than the event itself. The market condition is also a major factor to determine the success of a merger or acquisition such as a bullish market or bearish market.

Finally, it is determined that the merger practices have no beneficial effects on shareholders' returns. Investors were unable to receive an abnormal return either before or after the merger announcement. According to the study, merger activity in Nepal is unable to have a beneficial impact on shareholder perception and motivation. The result of this study concludes that Nepalese stock market is in the weak form efficiency as per the efficient market hypothesis theory.

In a country like Nepal, where public sector banks predominate the banking industry, the Government is the major owner of such enterprises and will suffer financial loss if mergers are not generating any wealth, making this study important not only to shareholders who are an important stakeholder of a banking firm but also to policymakers. Since most bank mergers in Nepal are policy-driven rather than market-driven, policymakers must recognize whether their initiatives add value for all stakeholders.

This study offers valuable insights into the impact of M&A in stock returns. However it is important to acknowledge some limitations of this study, such as: interviews were taken from imitated numbers of experts of different sectors, only 20 companies were selected for secondary analysis, which may not widely represent the diversity of the entire stock market and this study employed only single event to assess the impact, which may not serve a comprehensive understanding of the nature of stock return.



c) *Implications*

This study enhances our understanding of how mergers and acquisitions affect stock return in the financial sectors of Nepal. The conclusion implies that M&A-related events cannot provide investors with abnormal returns, suggesting that investors cannot get abnormal returns on their investments. The study's theoretical and practical implications are presented below:

Theoretical Implication: The study can contribute to the existing literature on the impact of mergers and acquisitions on the stock returns of financial sectors in emerging markets like Nepal. The study can provide insights into the unique characteristics of the Nepalese financial sector and how it responds to M&A activities. The study can also highlight the importance of analyzing the cumulative abnormal return and buy-and-hold abnormal return to better understand the impact of M&A activities.

Practical Implication: The study can provide valuable insights to policymakers, investors, and other stakeholders in the Nepalese financial sector. The findings can help policymakers to design appropriate regulations and policies to manage M&A activities in the financial sector. The study can also help investors to make informed decisions regarding their investments in the financial sector, taking into account the impact of M&A activities on stock returns. Finally, the study can provide useful information to financial institutions and other stakeholders considering M&A activities, helping them to understand the potential impact of such activities on their stock returns.

Implication For Academicians For Further Research: The study has some shortcomings that could be resolved by additional research. Therefore, this study could serve as the foundation for subsequent research. The study may add to the ongoing discussion about M&A and guide future research on the subject.

- Further research could investigate the impact of other specific events, such as earning announcements, dividend announcements, political events, economic events and news events.
- This research examines only the Nepalese financial sector, it would be worthwhile to investigate remaining unanalyzed sectors that could be helpful for investors investing in other sectors.

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Brexit's Economic Ripple Effect: A Study of Migrant Entrepreneurs in Rural Scotland

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Abstract- This research delves into the intricate economic repercussions of Brexit on migrant entrepreneurs and host rural communities in Scotland. Data collection employed a combination of 275 questionnaires distributed across 10 rural areas and in-depth insights drawn from a total of six focus group discussions. Specifically, three focus groups were conducted with migrant entrepreneurs operating businesses in rural areas, offering a profound exploration of their unique challenges, experiences, and perspectives. Additionally, three separate focus groups were conducted with the host communities, encompassing rural residents and third-party stakeholders, including local government representatives and community organizations.

The questionnaire yielded responses from a diverse sample, with 115 valid responses after rigorous data cleaning. The research utilizes a mixed-methods approach, intertwining quantitative and qualitative analyses. The quantitative analysis employs a non-parametric Kruskal-Wallis H test to examine the disparities in perceptions of Brexit's economic impact between migrant entrepreneurs and host rural communities across the 10 surveyed rural areas.

Keywords: *brexit, economic impact, migrant entrepreneurs, rural scotland, mixed-methods, non-parametric analysis, economic ripple effect, focus group discussions.*

GJMBR-B Classification: *LCC Code: HB1-3840*



Strictly as per the compliance and regulations of:



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Abstract- This research delves into the intricate economic repercussions of Brexit on migrant entrepreneurs and host rural communities in Scotland. Data collection employed a combination of 275 questionnaires distributed across 10 rural areas and in-depth insights drawn from a total of six focus group discussions. Specifically, three focus groups were conducted with migrant entrepreneurs operating businesses in rural areas, offering a profound exploration of their unique challenges, experiences, and perspectives. Additionally, three separate focus groups were conducted with the host communities, encompassing rural residents and third-party stakeholders, including local government representatives and community organizations.

The questionnaire yielded responses from a diverse sample, with 115 valid responses after rigorous data cleaning. The research utilizes a mixed-methods approach, intertwining quantitative and qualitative analyses. The quantitative analysis employs a non-parametric Kruskal-Wallis H test to examine the disparities in perceptions of Brexit's economic impact between migrant entrepreneurs and host rural communities across the 10 surveyed rural areas. Simultaneously, qualitative data from focus group discussions offers nuanced insights into the experiences and challenges faced by these two groups.

The research reveals compelling findings. Both migrant entrepreneurs and host rural communities concur that Brexit has amplified business expenses, often due to trade barriers and regulatory modifications. Migrant entrepreneurs report distinct challenges in delivering goods and services, often rooted in language barriers and cultural distinctions. Disparities in access to vital business information and financial support are also evident, with some migrant entrepreneurs perceiving uneven access. Labor shortages, a result of limited worker mobility, have led to diminished business performance.

Importantly, the study underscores significant support among both migrant entrepreneurs and host rural communities for flexible immigration and inclusive social integration policies. These policies are seen as imperative for sustaining immigration and fostering economic growth.

In conclusion, this study employs a combination of questionnaire-based quantitative analysis and insights from six focus group discussions, spanning a comprehensive exploration of Brexit's economic impact on migrant entrepreneurs and host rural communities in Scotland. The findings hold noteworthy implications for policy development, business strategies, and community development, contributing to the sustainable economic growth of rural Scotland.

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I. INTRODUCTION

The decision of the United Kingdom (UK) to exit the European Union, often referred to as "Brexit," has not only political and economic implications but also multifaceted effects on society and communities. This transformational event has far-reaching consequences, particularly in rural areas across the UK, where the economic and social repercussions of Brexit have taken on unique dimensions (Smith, 2016). Rural Scotland, in particular, is the setting for this study, as it represents a microcosm of the intricate and nuanced dynamics that have unfolded in the wake of Brexit.

The influence of Brexit reaches well beyond immediate changes in trade regulations and economic stability. Rural areas, with their distinct characteristics, are particularly susceptible to the wider effects of Brexit. They have become testbeds for the socioeconomic shifts initiated by this monumental decision (Dawson, 2018). In these rural regions, both indigenous populations and diverse migrant communities coexist. Many migrants have chosen rural Scotland as the base for their entrepreneurial activities, making them a vital component of the rural economy (Jones, 2019). However, the experiences and challenges they face in the post-Brexit era have far-reaching implications.

Migrant entrepreneurs, individuals who have immigrated to the UK and initiated businesses in rural Scotland, contribute significantly to the economic and social development of these regions (Anderson, 2020). They bring innovation, diversity, and economic activity to rural communities, enriching them with unique skills and experiences. The implications of Brexit, such as changes in trade, labor mobility, and access to funding, have created a cloud of uncertainty hanging over the viability and sustainability of their enterprises (Clarke, 2017). This necessitates an in-depth investigation into the effects of Brexit on this group.

Simultaneously, the perceptions and interactions of host communities in rural Scotland, comprising local residents, government representatives, and other stakeholders, play a pivotal role in shaping the economic, social, and cultural landscape of these areas (Brown, 2018). The attitudes and acceptance levels of host communities toward migrant entrepreneurs influence the extent to which these entrepreneurs can successfully integrate and contribute to the overall



development of rural regions. The relationship between host communities and migrant entrepreneurs, especially in the context of Brexit, is a key facet of this study (Green, 2019).

This study delves into the intricate economic repercussions of Brexit on both migrant entrepreneurs and host rural communities in Scotland. It does so by adopting a mixed-methods approach, which aims to provide a comprehensive understanding of the experiences, challenges, and perspectives of these two distinct groups (Creswell & Creswell, 2017). By combining quantitative analysis to examine disparities in perceptions and qualitative insights to capture the nuances of their experiences, this research aspires to contribute to the broader understanding of how Brexit affects the economic dynamics of rural Scotland.

a) *Problem Statement*

The economic repercussions of Brexit have reverberated across various sectors and regions in the United Kingdom, but the intricacies of its impact on migrant entrepreneurs and host rural communities in Scotland remain relatively unexplored. This research aims to address the pressing issue of understanding how Brexit has affected the economic landscape of rural Scotland, with a specific focus on migrant entrepreneurs (Jones, 2019; Smith, 2020). To achieve this, a mixed-methods approach was employed, combining quantitative and qualitative analyses through questionnaires (Brown et al., 2017) and focus group discussions (Guest et al., 2006).

Significantly, this research fills a critical gap in the existing literature as it explores the specific economic impacts of Brexit on migrant entrepreneurs and host rural communities in Scotland, particularly within rural areas. As of the present, no research has comprehensively investigated these unique challenges, experiences, and perceptions, and the potential disparities in how these challenges are perceived by these entrepreneurs and host rural communities. Existing research on Brexit's economic impact primarily focuses on urban areas or broader economic indicators (Roberts, 2018), often overlooking the specific experiences of rural communities, and migrant entrepreneurs within them (Smith & Johnson, 2019).

By employing a mixed-methods research design and integrating quantitative and qualitative analyses, this study seeks to provide a holistic understanding of the complex economic landscape in post-Brexit rural Scotland. The findings will inform policy development, business strategies, and community development efforts, with implications for the sustainable economic growth of rural Scotland.

b) *Research Objectives*

The primary objective of this study is to comprehensively investigate the economic impact of Brexit on migrant entrepreneurs and host rural

communities in Scotland, particularly within rural areas. To achieve this overarching goal, the research is guided by the following specific objectives:

- To assess and compare the perceptions of migrant entrepreneurs and host rural communities regarding the economic impact of Brexit in rural Scotland.
- To identify the unique challenges faced by migrant entrepreneurs operating businesses in rural areas following Brexit, with a particular focus on factors such as increased costs, obstacles in delivering goods and services, and access to critical business information.
- To explore the experiences and perspectives of host rural communities, including rural residents and third-party stakeholders, regarding the consequences of Brexit on the local economy.
- To understand the extent to which Brexit has led to labor shortages and reduced business performance in rural Scotland and to examine the implications of these challenges.
- To assess the level of support among migrant entrepreneurs and host rural communities for flexible immigration and inclusive social integration policies as potential strategies for mitigating the economic impact of Brexit and fostering economic growth.

c) *Scope of Study*

This research casts a comprehensive lens on the intricate economic repercussions of Brexit within the context of rural Scotland, encompassing its implications for both migrant entrepreneurs and host rural communities. The geographical focal point is rural Scotland, a region that epitomizes the intricate dynamics brought forth by Brexit within rural settings. The study, within this geographical boundary, engages two primary participant groups. The first comprises migrant entrepreneurs who have immigrated to the UK and established businesses within the rural Scottish landscape. The second is constituted by the host communities, including local residents, government representatives, and other stakeholders. To provide a well-rounded perspective, a mixed-methods approach is adopted, combining quantitative and qualitative data collection methods. This approach ensures a comprehensive understanding of Brexit's impact on the two distinct participant groups. The quantitative facet involves structured questionnaire distribution across ten rural areas within Scotland, with data subjected to the non-parametric Kruskal-Wallis H test for the examination of disparities in perceptions concerning the economic impact of Brexit. Simultaneously, the qualitative dimension includes six focus group discussions: three with migrant entrepreneurs and three with host community participants. Thematic analysis is employed to unearth emerging patterns and themes within the qualitative data. Ethical considerations underpin the

entire research process, adhering to principles of informed consent, participant anonymity, and data confidentiality. The study, in its totality, seeks to understand the multifaceted economic challenges and opportunities faced by migrant entrepreneurs within rural Scotland in the post-Brexit landscape and the influential role played by host communities. Furthermore, it aims to shed light on how Brexit has fundamentally reshaped the economic dynamics of rural Scotland. The research findings are to be presented through a combination of tables, charts, figures, and qualitative excerpts to illustrate both quantitative and qualitative insights. Integration of these findings, alongside discussions, conclusions, recommendations, and suggestions for further research, collectively contribute to the expansive scope of this study.

d) *Significance of the Study*

This research holds paramount significance for several reasons. Firstly, it addresses a critical knowledge gap in understanding the distinct impact of Brexit on rural Scotland, particularly concerning migrant entrepreneurs and host communities (Robinson, 2018). Rural areas have unique characteristics and challenges that require tailored approaches and policies.

Secondly, this study offers insights into the complex relationships between migrant entrepreneurs and host communities, contributing to a broader understanding of social integration, community development, and economic progress in the context of rural Scotland (Taylor, 2017).

Thirdly, the study holds practical value by providing recommendations for stakeholders, including policymakers, local governments, businesses, and organizations (Ward & Brown, 2019). These recommendations aim to guide them in supporting the economic development of rural Scotland post-Brexit.

II. LITERATURE REVIEW

a) *Introduction*

Brexit, the United Kingdom's decision to exit the European Union, has ushered in a host of economic, social, and political changes (Smith, 2016). Amid the broader discussions of its impact, this study provides a nuanced exploration of how these changes have reverberated across the rural landscapes of Scotland, specifically among migrant entrepreneurs (Czaika & Vothknecht, 2012). Migrant-owned businesses, contributing significantly to the rural Scottish economy, are at the heart of this analysis (Scottish Government, 2020).

This research employs a mixed-methods approach, combining qualitative insights drawn from focus group discussions (Bloemraad et al., 2008) with quantitative data collected through structured surveys (Pries, 2005). By focusing on the rural areas categorized under the Scottish Government's Urban/Rural Classification (Wimmer & Glick Schiller, 2003), this study

seeks to understand the evolving economic conditions of migrant-owned businesses in the post-Brexit landscape. These businesses, spanning various sectors, are integral to local economic growth and community development (Scottish Government, 2020). However, as Brexit has brought forth economic shifts, influencing trade regulations, foreign direct investment, exchange rates, and migration controls (Dhingra et al., 2017), it is crucial to discern their economic resilience and growth prospects (Migration Observatory, 2019).

In addition to economic aspects, this research also explores the intricate interplay between these economic changes and the social identity and sense of belonging of migrant entrepreneurs within their local communities (Anderson, 2013). By adopting a comprehensive perspective encompassing both economic and social dimensions, the study contributes to academic understanding, informs evidence-based policymaking (Waldinger, 2010), and proposes strategies aimed at promoting inclusivity and economic vitality in rural Scotland in the aftermath of Brexit (Piore, 1979). The outcomes of this research are expected to foster a deeper awareness of the complexities of Brexit's effects and support positive transformations in rural Scotland (Gros, 2016).

b) *Economic Implications of Brexit*

The economic implications of Brexit are vast and complex, as discussed in the literature. The trade regulations, trade relations, and foreign direct investment have all been influenced by this transformative decision. Understanding these economic factors is vital for migrant entrepreneurs in rural Scotland, as Dhingra et al. (2017) suggest, because changes in market access, tariffs, and customs procedures can profoundly impact their operations.

Understanding Trade and Economic Impact: The decision to leave the European Union resulted in fundamental shifts in trade regulations, impacting migrant-owned businesses in rural Scotland (Krugman, 2018). As a member of the EU, the United Kingdom was part of a single market, allowing for seamless trade across member states. Brexit has led to the emergence of new trade regulations and barriers, which are particularly significant for migrant entrepreneurs engaged in import and export activities (Dhingra et al., 2017). These changes affect market access, tariffs, and customs procedures.

The modified trade regulations have diverse implications for migrant entrepreneurs. For instance, businesses involved in exporting goods to EU countries have faced increased paperwork and potential delays at border checkpoints. On the other hand, some businesses that previously struggled with competition from EU counterparts now find themselves in more favorable positions (Czaika & Vothknecht, 2012). This

complex scenario emphasizes the need for migrant entrepreneurs to adapt to new trading conditions.

Government policies and support mechanisms have played a crucial role in aiding these businesses. These policies encompass trade agreements, customs procedures, and tariffs, all of which impact the competitiveness and profitability of migrant-owned enterprises. Understanding the effectiveness of these policies is a key research objective (Markusen, 2002).

Currency Fluctuations and Business Competitiveness: Currency exchange rates, in the context of Brexit, have been a critical variable that has affected the competitiveness of businesses, including those owned by migrants, in rural Scotland (Taylor, 2019). The decision to leave the EU introduced substantial uncertainty in the financial markets, leading to fluctuations in the value of the British pound (GBP) against other currencies, most notably the Euro (EUR). This volatility in exchange rates has far-reaching implications for businesses engaged in international trade, tourism, and export-oriented sectors (Massey et al., 1993). Migrant entrepreneurs, particularly those involved in exporting goods or services, have felt the impact of these currency fluctuations acutely.

As the GBP depreciated against the EUR during the Brexit process, businesses that relied on exports to EU countries found their products and services relatively more competitive in foreign markets, which could potentially boost sales. However, this advantage was countered by the increased cost of importing goods and materials from the EU, affecting the supply chain of manufacturing and agricultural businesses. The result has been a complex web of winners and losers among migrant entrepreneurs depending on their specific sector and trading partners (Taylor, 2019).

The uncertainty around future exchange rate fluctuations has made business planning and forecasting more challenging. It has necessitated greater attention to risk management strategies to mitigate currency exposure (Anderson, 2013). This dynamic landscape has caused migrant entrepreneurs to evaluate their competitiveness in both domestic and international markets.

Trade Relations and Foreign Direct Investment (FDI): Brexit has not only impacted trade regulations but also foreign direct investment (FDI) in the UK (Markusen, 2002). Foreign investors may perceive the UK differently post-Brexit, impacting FDI flows. The level of FDI can significantly influence the expansion and growth prospects of migrant-owned businesses (Castles, de Haas, & Miller, 2013). A decrease in FDI could limit opportunities for these entrepreneurs to access capital and expand their operations.

Moreover, potential changes in trade relations with countries outside the EU are significant. The UK's ability to establish new trade agreements with non-EU

countries could offer growth opportunities for migrant-owned businesses that adapt to new markets (Markusen, 2002). However, this requires a keen understanding of international trade policies, which can be complex.

Migration Controls and Labor Availability: The Brexit decision also affects migration controls (Stark & Bloom, 1985; Massey et al., 1993). Stricter immigration policies could limit the availability of skilled labor from the EU, impacting migrant-owned businesses that rely on such talent (Massey & Espinosa, 1997). A reduced pool of skilled labor may hinder growth and innovation for migrant entrepreneurs. Businesses operating in sectors such as technology, healthcare, and hospitality are particularly vulnerable to these changes.

c) *Economic Challenges for Migrant Entrepreneurs*

1. *Supply Chain Disruptions:* Migrant entrepreneurs face potential disruptions in their supply chains due to new trade regulations and customs procedures (Dhingra et al., 2017). These disruptions can lead to delays in receiving essential goods and materials, impacting operational efficiency and profitability, especially in industries relying on just-in-time inventory systems and global production networks (Kaplinsky, 2020).
2. *Increased Operational Costs:* The increased operational costs due to Brexit are a significant challenge (Dhingra et al., 2017). New tariffs, import/export documentation requirements, and compliance procedures contribute to rising operational expenses (European Parliament, 2020). The administrative burden of adhering to new customs and regulatory procedures, such as Rules of Origin requirements, further adds to the cost (European Parliament, 2020).
3. *Currency Fluctuations:* Currency fluctuations add complexity for migrant entrepreneurs (Taylor, 2019). The uncertainties surrounding Brexit have led to fluctuations in currency exchange rates, making it challenging to predict costs accurately. Exchange rate volatility can result in unexpected financial losses, affecting long-term financial planning and budgeting.
4. *Skilled Labor Shortage:* Stricter migration controls may limit access to skilled labor, which is essential for various businesses, particularly in sectors such as agriculture, manufacturing, and construction (Stark & Bloom, 1985). Shortages of skilled labor can significantly impede productivity and growth. Skilled migrants often contribute positively to the economy, and limiting their access can be detrimental to various sectors (Wadsworth, 2015).
5. *Reduced International Trade Opportunities:* Businesses traditionally reliant on international markets for exports may face reduced opportunities due to changes in trade agreements (Krugman,

2018). Alterations in trade regulations can create barriers to entry or make international trade less profitable. For instance, the absence of policies like the Common Agricultural Policy (CAP) of the EU, which provided subsidies and incentives for certain agricultural exports, can affect the competitiveness of agricultural businesses (European Parliament, 2020).

d) *Economic Opportunities for Migrant Entrepreneurs*

1. *Diversification of Product and Service Offerings:* Brexit has prompted migrant entrepreneurs to diversify their product and service offerings to cater to changing market demands. By expanding their range of offerings, they can adapt to evolving consumer preferences and tap into new customer segments, ultimately enhancing their competitiveness (Czaika & Vothknecht, 2012).
2. *Localization and Local Sourcing:* Migrant entrepreneurs have recognized the importance of local sourcing to mitigate supply chain disruptions. By sourcing goods and materials locally, they reduce their exposure to international supply chain disruptions, ensuring a more stable flow of essential inputs (Caniato et al., 2018). This approach enhances supply chain resilience and supports local economies.
3. *Embracing Digitalization and E-commerce:* Innovative approaches to business operations and marketing, such as digitalization and e-commerce, are crucial for the success and growth of migrant-owned businesses in rural Scotland. Brexit has accelerated trends in digitalization, offering opportunities for businesses to reach broader audiences and discover new revenue streams. E-commerce allows these businesses to connect directly with international customers, bypassing some of the complexities associated with international trade agreements (Piore, 1979; Varela, 2018).
4. *Networking and Collaboration:* Networking and forming alliances have become essential for migrant entrepreneurs. By collaborating with other businesses and local institutions, they can access knowledge, resources, and market opportunities more effectively. These networks can be both local and international, enabling entrepreneurs to access a broader customer base (Alden Smith & Guarnizo, 2006). Collaboration also contributes to the social integration of migrant entrepreneurs within their local communities (Faist, 2000).
5. *Innovative Financing Models:* Migrant entrepreneurs have explored innovative financing models to support business growth. These models may involve seeking grants, subsidies, or incentives available for specific sectors or industries. Access to such financial support mechanisms can help

migrant entrepreneurs expand their operations and invest in new opportunities (Waldinger, 2010).

6. *Focusing on Branding and Reputation Management:* In the post-Brexit landscape, building and maintaining a strong brand and reputation is crucial for business success. Migrant entrepreneurs are concentrating on establishing trustworthy and reputable brands to attract customers and partners. Effective branding can lead to greater market recognition and opportunities (Kaplan & Haenlein, 2010).
7. *Engagement in Community Initiatives:* Migrant entrepreneurs have an opportunity to engage in community initiatives and demonstrate their commitment to the local areas where they operate. Participation in local events, sponsorship of community projects, or partnerships with community organizations can enhance their visibility and integration within the host communities (Waldinger, 2010).

The interplay between these economic challenges and opportunities is dynamic and complex, affecting various sectors and regions differently (Czaika & Vothknecht, 2012). Thus, a nuanced understanding of these issues is crucial as migrant entrepreneurs continue to adapt to the evolving post-Brexit economic landscape.

e) *The Unique Context of Rural Scotland*

An evident gap in the existing literature is the limited consideration of the unique characteristics of rural Scotland. Gebauer et al. (2020) argue that rural regions often possess diverse economic structures and challenges compared to urban areas. These regions are heavily reliant on sectors like agriculture and tourism, where the contributions of migrant workers and entrepreneurs are integral for economic sustainability. Brexit has the potential to affect the stability and growth of migrant-owned businesses in rural Scotland. Trade barriers, changes in market access, and fluctuations in the economy can impact the financial sustainability of these businesses, affecting both migrant entrepreneurs and the local communities they serve (UK Government, 2021).

Migrant-owned businesses contribute significantly to the rural economy, providing employment opportunities and contributing to local development (Velasco et al., 2016). However, the uncertainty and economic changes brought about by Brexit may affect the profitability and long-term sustainability of these businesses.

Brexit-induced labor shortages are a particular concern in rural areas, where seasonal work often requires migrant labor (Ebrill et al., 2021). Many rural businesses in Scotland, particularly in the agricultural sector, have historically relied on seasonal labor from EU countries. Migrant workers played crucial roles in

planting, harvesting, and processing crops, especially during peak seasons (Markova et al., 2022). However, changes in immigration policies after Brexit have raised concerns about labor shortages and the availability of skilled workers in rural industries.

The potential scarcity of labor has implications for the sustainability of rural businesses, particularly those heavily dependent on seasonal workforce from the EU. Migrant entrepreneurs who own farms, agricultural enterprises, or other businesses that employ EU nationals may face challenges in finding suitable replacements for skilled labor or managing increased labor costs (Görg & Hanley, 2020).

Brexit has introduced significant changes to trade relations between the UK and the EU, impacting businesses across various sectors, including those owned by migrants in rural Scotland. For instance, businesses that rely on importing or exporting goods to EU countries may face disruptions due to new customs procedures, tariffs, and regulatory changes (Dhingra et al., 2019).

Migrant-owned businesses engaged in international trade, such as food exports, crafts, or other products with EU markets, may need to adapt their supply chains and distribution networks to navigate the post-Brexit trade landscape. The additional administrative burdens and potential delays in customs processes can have financial implications for these businesses.

Furthermore, the works of Turok and Eiser (2016) emphasize the importance of exploring the broader socio-economic and political implications of Brexit in rural contexts, transcending its economic repercussions. Rural areas in Scotland have distinct labor needs and depend heavily on the contributions of migrant entrepreneurs. Therefore, a multifaceted examination is required to consider the full impacts of Brexit on rural Scotland's socio-economic fabric.

f) *Effectiveness Of Government Policies and Strategies*

Government policies play a pivotal role in shaping the economic environment in which migrant entrepreneurs operate. In the context of Brexit, the impact of these policies is particularly significant (Joppke, 2010). The UK government has introduced various measures to support businesses post-Brexit, including trade agreements and regulatory changes (UK Government, 2021). It is essential to assess the effectiveness of these policies in facilitating the growth and resilience of migrant-owned businesses in rural Scotland.

Trade agreements, for example, can influence market access and export opportunities. Joppke (2010) highlights that such agreements can either open up new markets for businesses or create barriers that hinder international trade. For migrant entrepreneurs, especially those engaged in export-oriented sectors, the terms of

trade agreements can be a critical determinant of success.

Government policies play a pivotal role in shaping the post-Brexit landscape for migrant entrepreneurs. Post-Brexit, the UK government has the opportunity to establish new policies that either encourage or hinder the growth of these businesses (Hall, 1990). Policies related to trade agreements, labor immigration, and business support programs will significantly impact migrant-owned enterprises.

Government initiatives that foster entrepreneurship, skill development, and cross-cultural understanding can enhance the resilience of migrant entrepreneurs in the face of economic and political shifts (Guarnizo, Portes, & Haller, 2003). These policies can help migrant entrepreneurs gain access to resources and support systems, ultimately bolstering their chances of success.

One significant avenue for business growth is networking and collaboration (Waldinger, 2010). Migrant entrepreneurs in rural Scotland often face common challenges. Forming networks, alliances, and partnerships can help businesses share knowledge, resources, and market opportunities. These networks can be both local and international, enabling entrepreneurs to access a broader customer base (Alden Smith & Guarnizo, 2006).

Furthermore, these networks contribute to the social integration of migrant entrepreneurs within their local communities. As these entrepreneurs actively participate in local networks and collaborate with other businesses, the bonds between the migrant community and the local population strengthen (Faist, 2000).

Migrant entrepreneurs have demonstrated their adaptability by adopting innovative strategies for overcoming the Brexit challenges. For instance, some businesses have diversified their products or services to cater to changing market demands (Pries, 2005). This approach allows businesses to navigate the uncertainties of Brexit by offering a broader range of products to local and international customers.

Additionally, businesses have recognized the importance of digital platforms, e-commerce, and online marketing (Vertovec, 1999). A digital presence enables these entrepreneurs to tap into global markets, reaching a wider audience than traditional brick-and-mortar stores allow. Migrant entrepreneurs embracing e-commerce are well-positioned to thrive in the post-Brexit landscape (Vertovec, 1999).

Developing strategies to promote inclusivity and economic vitality in rural Scotland post-Brexit is of paramount importance. These strategies should consider the multifaceted challenges and opportunities facing migrant entrepreneurs. Research suggests that strategies aimed at promoting inclusivity can lead to stronger, more resilient communities and economic growth (Rumbaut, 1997).

Inclusive strategies may encompass fostering cross-cultural understanding and integration, providing training and resources tailored to the needs of migrant-owned businesses, and encouraging collaboration between these businesses and local institutions (Waldinger, 2010). The effectiveness of these strategies should be evaluated and refined based on the specific needs and circumstances of migrant entrepreneurs in rural Scotland.

Conclusion

Brexit's economic ripple effect is a complex and dynamic phenomenon that has left a lasting impact on rural Scotland's migrant entrepreneurs. The literature review reveals that Brexit has altered trade regulations, foreign direct investment, currency fluctuations, and labor mobility, creating both challenges and opportunities for these entrepreneurs. It underscores the importance of nuanced understanding, government policies, and the unique context of rural Scotland in comprehending the full extent of Brexit's influence.

In light of the reviewed literature, this research aims to comprehensively explore the economic repercussions of Brexit on both migrant entrepreneurs and host rural communities in Scotland. Adopting a mixed-methods approach, it seeks to provide a holistic understanding of their experiences, challenges, and perspectives. By combining quantitative and qualitative analyses, this research aspires to contribute to the broader understanding of how Brexit affects the economic dynamics of rural Scotland and inform evidence-based policymaking for the continued growth and resilience of migrant-owned businesses.

III. RESEARCH METHODOLOGY

a) Research Design

The research design for this study adopts a mixed-methods approach, specifically employing methodological triangulation, to enhance the reliability, validity, and confirmability of the findings. By combining the depth of qualitative data with the breadth of quantitative data, the study aims to provide a comprehensive understanding of the impact of Brexit on migrant entrepreneurs in rural Scotland (Creswell & Plano Clark, 2018).

The selected research design, a mixed-methods approach employing methodological triangulation, is well-suited to investigate the impact of Brexit on migrant entrepreneurs in rural Scotland and address the research questions effectively. Studies examining the impact of significant events or policy changes on entrepreneurship have often utilized mixed-methods designs to capture the complexity and multi-faceted nature of the phenomenon (Kickul, Gundry, Barbosa, & Whitcanack, 2009; Mason & Harrison, 2006). These studies have demonstrated the benefits of combining qualitative and quantitative approaches to

provide a comprehensive understanding of the topic and generate more robust findings.

The research type chosen for this study is exploratory research. Exploratory research is a valuable approach when investigating relatively unexplored or under-researched topics, aiming to gain insights, develop a better understanding, and generate hypotheses about the research area (Creswell, 2014). Exploratory research is well-suited to explore this complex and evolving phenomenon, as it allows for flexibility in data collection methods and the exploration of different dimensions (Polit & Beck, 2012).

b) Sample Strategy

The target population in my research study encompasses several groups, including migrant entrepreneurs, host communities (specifically rural residents), and public

The sampling strategy for this research study on the experiences and economic challenges of migrant entrepreneurs in rural Scotland following Brexit is designed to ensure a representative sample and capture a diverse range of perspectives. The chosen sampling methods, including stratified sampling and snowball sampling, have been selected for their suitability and practicality in addressing the research objectives. Participants represent different backgrounds, experiences, and perspectives (Creswell, 2014; Palinkas et al., 2015). To capture the experiences and perspectives of migrant entrepreneurs, a purposive sampling approach will be employed.

The sampling frame for the study was based on the Scottish Government's eight-fold Urban/Rural classification (Scottish Government, 2009-2010). This classification categorized areas into accessible rural, remote rural, and very remote rural based on population and drive time accessibility.

Ten rural areas were selected based on the average maximum percentage of rural population from each stratum. This approach ensures that the sample includes areas with varying degrees of rurality, providing a comprehensive understanding of the experiences of migrant entrepreneurs across different rural contexts.

Within each selected rural area, purposeful sampling was employed to select participants for focus groups and surveys. Purposeful sampling involves deliberately selecting individuals or groups who possess the desired characteristics or knowledge related to the research topic (Patton, 2015). In this case, the researchers aimed to include migrant entrepreneurs, rural residents, and public third-party stakeholders who could provide valuable insights into the experiences and challenges of migrant entrepreneurs in rural Scotland.

Snowball sampling is a non-probability sampling technique that involves leveraging existing participants to refer and recruit additional participants (Bryman, 2016). This method is particularly useful when

the target population is difficult to reach or identify, such as EU migrant entrepreneurs in rural areas.

By employing a combination of stratified sampling and snowball sampling, the research study ensures a diverse and representative sample of participants, capturing the experiences and challenges of migrant entrepreneurs in rural Scotland following Brexit. The stratified sampling approach enables the exploration of variations in experiences across different rural strata, while snowball sampling facilitates the inclusion of EU migrant entrepreneurs in the study.

c) *Sample Size*

In order to ensure a representative sample size for this research study, a total of 275 participants were included in the survey. This sample size was determined by considering the need for statistical power to draw meaningful conclusions and the practical feasibility of data collection within the given time frame. By including a sufficient number of participants, the study aimed to enhance the reliability and generalizability of the findings (Johnson et al., 2018).

In terms of the focus groups, a total of six groups were conducted in three rural areas. The selection of participants for the focus groups was guided by their relevance to the research objectives and their willingness to engage in discussions. Three focus groups were specifically conducted with migrant entrepreneurs operating businesses in rural areas of Scotland. This allowed for a deep exploration of the unique challenges, experiences, and perspectives of this group. Additionally, *three separate focus groups were conducted with the host communities, comprising rural residents and third-party stakeholders such as local government representatives and community organizations.* This approach facilitated the understanding of the interactions, dynamics, and potential conflicts between migrant entrepreneurs and the host communities, shedding light on the broader social and economic context (Brown et al., 2020; Jones et al., 2021).

By including both migrant entrepreneurs and host communities in the research study, a comprehensive understanding of the experiences and challenges faced by migrant entrepreneurs in rural Scotland following Brexit was sought. This approach allowed for a critical examination of the complex interplay between various stakeholders, shedding light on potential areas of collaboration, conflict, and opportunities for policy interventions. The inclusion of diverse perspectives aimed to provide a holistic view of the phenomenon, enriching the analysis and recommendations (Jones et al., 2021).

d) *Data Collection Methods*

Questionnaire Administration: The data collection process for this study involved the distribution of a structured

questionnaire to EU migrant entrepreneurs and host communities in rural Scotland. The questionnaire consisted of closed ended questions and open-ended questions. The open ended questions designed to capture detailed and nuanced responses regarding the impact of Brexit on businesses and communities in the region.

The 275 questionnaires were distributed electronically via email or through online survey platforms such as Qualtrics. Participants received clear instructions and a unique survey link to access the questionnaire. The online format allows for convenient and efficient data collection, enabling participants to complete the questionnaire at their own pace and preferred location. The sample yielded a total of 115 valid responses after meticulous data cleaning.

Focus Group Discussion: In addition to the questionnaire, focus group discussions were conducted to complement and enrich the data collected. Purposeful sampling was employed to select participants from the target population who were willing to take part in the focus groups, as indicated during the survey research by sharing their contact IDs.

For the focus group analysis, a reflexive thematic analysis technique was employed to analyze the qualitative data (Johnson, 2020). To ensure diversity in perspectives, participants were drawn from three case study areas in rural Scotland: Aberdeenshire, the Shetland Islands, and Argyll & Bute/Angus. These case study areas were selected based on their vulnerability to the impact of Brexit, as indicated by the Scottish Government's Brexit Vulnerability Index and the Scottish government's 8-fold Urban/Rural classification.

The focus group discussions were conducted online using platforms such as Teams and Google Meet, and the sessions took place between July and August 2022.

Qualitative insights were collected through six focus group discussions. Three focus groups were dedicated to migrant entrepreneurs operating businesses in rural areas, while an additional three focus groups included participants from host communities, such as rural residents and third-party stakeholders, including local government representatives and community organizations. These discussions offer nuanced insights into the unique challenges, experiences, and perspectives of both migrant entrepreneurs and host communities. *The total number of participants for the focus groups was 35, with 11 participants from Aberdeenshire, 12 from the Shetland Islands, and 12 from Argyll & Bute/Angus. The diversity of participants from different case study areas allowed for a comprehensive exploration of the experiences of migrant entrepreneurs and host communities across rural Scotland.*

The focus group discussions provided an interactive platform for participants to engage in in-depth conversations, share their experiences, and generate new insights into the research topic.

Pilot Study: Before the main data collection phase, a pilot study was conducted to assess the clarity, relevance, and effectiveness of the data collection instruments. A small group of participants, representative of the target population, will be invited to provide feedback on the questionnaires and participate in a mock focus group session. Their feedback and input will be crucial in refining the instruments and ensuring they capture the intended research objectives (Bryman, 2016).

Pilot testing allowed for the identification of any potential issues or challenges with the instruments, such as confusing or ambiguous questions, which could affect the quality of the data collected. By administering the instruments to a small sample of participants similar to the intended study population, valuable feedback was obtained to refine and improve the instruments, thereby increasing their reliability and validity for the main data collection (Creswell & Creswell, 2017). The pilot testing phase ensured that the data collected would be of high quality and aligned with the research objectives, enhancing the overall trustworthiness of the study.

IV. DATA ANALYSIS

a) Quantitative Analysis

The quantitative data obtained from the questionnaires are analyzed using the descriptive statistics and non-parametric Kruskal-Wallis H test. This statistical test is employed to examine disparities in perceptions of Brexit's economic impact between migrant entrepreneurs and host rural communities across the ten surveyed rural areas. The quantitative analysis allows the research to draw robust conclusions regarding differences in perceptions and experiences.

The data was collected through a questionnaire distributed via Qualtrics. A total of 275 responses were collected using a questionnaire distributed via Qualtrics. The questionnaire, designed on a Likert scale, comprised of 20 questions. The data was entered into IBM SPSS 25 for coding and analysis.

Prior to the analysis, the dataset underwent thorough preparation and cleaning. Missing values were checked, and out of the 275 responses, 115 were found to have complete data and were considered valid for analysis. The responses were then organized and coded for further analysis.

A. Descriptive Statistics

Descriptive statistics were calculated to provide an overview of the dataset. This included calculating frequencies, percentages, means, and standard deviations. These statistics helped in understanding the distribution and central tendencies of the data.

Economic Impact of Brexit

The data analysis revealed varied perceptions on post-Brexit job opportunities and wage stability between host communities and migrant entrepreneurs. While the host communities were slightly more optimistic about these aspects, the migrant entrepreneurs showed a more diverse array of opinions.

Increased Cost of Doing Business in Rural Scotland: The data highlights that both migrant entrepreneurs and host rural communities acknowledge the increased cost of doing business in rural Scotland following Brexit. Majority of both Host Rural Communities (77.6%) and Migrant Entrepreneurs (66.7%) agreed or strongly agreed that Brexit has increased the cost of doing business in rural Scotland. This finding aligns with expectations, as Brexit introduced trade barriers and regulatory changes that likely resulted in higher transportation and audit costs. However, it is essential to consider other factors that may contribute to these cost increases, such as shifts in market dynamics, supply chain disruptions, and currency fluctuations. Further investigation into the specific drivers of these cost increases would provide valuable insights for policymakers and businesses seeking to mitigate the negative financial consequences of Brexit.

Obstacles Faced by Migrant-Owned Businesses: Regarding the obstacles faced by migrant-owned businesses, the analysis shows that Migrant Entrepreneurs (63.3%) were more likely to agree or strongly agree that their businesses face more obstacles in delivering goods or services compared to locally-owned businesses. In contrast, a smaller proportion of Host Rural Communities (12.5%) shared this perception.

The analysis reveals a significant disparity in the perception of obstacles faced by migrant-owned businesses compared to locally-owned businesses. Migrant entrepreneurs are more likely to report facing hurdles in delivering their goods or services. This could be attributed to various factors, including language barriers, cultural differences, limited access to networks, and unfamiliarity with local business practices. Addressing these challenges requires targeted support mechanisms, such as language training, cultural integration programs, and mentorship initiatives, to ensure the success and resilience of migrant entrepreneurs in rural Scotland.

Access to Critical Business Information and Financial Support: The findings indicate a nuanced perception regarding access to critical business information and financial support. While both migrant entrepreneurs and host rural communities acknowledge some level of disparity favoring rural dwellers, the extent of this advantage is subject to interpretation. The analysis indicates that Migrant Entrepreneurs (56.7%) expressed a higher belief compared to Host Rural Communities

(33.8%) that Scotland's rural dwellers with businesses have more access to critical business information and financial support than foreign investors.

It is crucial to conduct further research to identify the specific information and support channels that may be inaccessible to foreign investors. Additionally, exploring potential reasons behind the perceived disparities can inform the development of inclusive strategies that promote equal opportunities and level the playing field for all business owners in rural Scotland.

Restricted Free Movement of Workers and Labor Shortages: Both Host Rural Communities (50.6%) and Migrant Entrepreneurs (66.7%) agreed or strongly agreed that Brexit has restricted the free movement of migrant workers/seasonal workers, leading to a shortage of labor and decreased business performance in rural Scotland. The data strongly supports the notion that the restricted free movement of workers and labor shortages have negatively impacted local and migrant businesses in rural Scotland. The shortage of labor due to limited migrant worker mobility has created challenges for businesses that rely on seasonal or temporary workers. This situation has likely led to increased labor costs, reduced productivity, and potential disruptions in operations. It is crucial for policymakers to consider strategies that address labor shortages, such as promoting training and upskilling programs for the local workforce and exploring alternative avenues for attracting migrant workers while ensuring their rights and protections.

Need for Flexible Immigration and Social Integration Policies: Both Host Rural Communities (43.5%) and Migrant Entrepreneurs (73.3%) expressed the belief that Scotland needs to have flexible immigration and inclusive social integration policies or sustained immigration. The data underscores the importance of flexible immigration and inclusive social integration policies to sustain immigration and support the growth of migrant-owned businesses in rural Scotland. These policies play a vital role in fostering a welcoming

environment, facilitating cultural integration, and promoting diversity, which are all crucial for economic and social development. However, the implementation and effectiveness of such policies require careful consideration and stakeholder engagement. A balance must be struck between addressing the concerns of host communities and ensuring that migrant entrepreneurs have equal opportunities and access to resources. Building strong social cohesion and creating an inclusive environment will contribute to the overall success and prosperity of rural Scotland.

B. Inferential Analysis

We employ inferential statistics to delve deeper into the economic impacts of Brexit on migrants enterprenurs and *host communities*. The Kruskal-Wallis H test, a powerful non-parametric statistical tool that helps us rigorously assess the significance of differences among various groups (Doane & Seward, 2014). In our study, the "type" variable distinguishes between two categories, namely "host rural" and "migrant entrepreneurs," while our dependent variables, reflecting the impacts of Brexit, are measured on a continuous Likert-scale (Salkind, 2010).

Hypothesis Testing Using Kruskal-Wallis H Test

The Kruskal-Wallis H test is an extension of the Wilcoxon-Mann-Whitney U test, specifically designed for comparing multiple independent groups, as is the case in our research (Conover, 1999). When traditional parametric tests, such as analysis of variance (ANOVA), cannot be employed due to data distribution assumptions not being met, this non-parametric counterpart steps in (Kloke & McKean, 2012). Our decision to utilize the Kruskal-Wallis H test aligns with the nature of our data and the need to robustly examine potential differences in the impacts of Brexit among host rural communities and migrant entrepreneurs.

The Kruskal-Wallis H test will enable us to discern whether the observed differences between the groups are statistically significant or if they could have arisen due to random variation (Hollander et al., 2013).

Ho(a): Brexit has not increased the cost of doing business for migrants owned businesses in rural Scotland				
H1(a): Brexit has increased the cost of doing business for migrants owned business in rural Scotland				
Type	N	Mean Rank	Test Statistics ^{a, b}	
Host Rural Communities	85	54.52	Chi-Square	3.903
Migrant entrepreneurs	30	67.87	df	1
Total	115		Asymp. Sig.	0.048

a. Kruskal Wallis Test

b. Grouping Variable: Type

Interpretation:

H (degree of freedom)=Chi Square test statistics, p=0.05

H (1)=3.903 , p=0.05

The Kruskal-Wallis test was conducted to assess the impact of Brexit on the cost of doing business in rural Scotland, considering factors such as high transportation and audit costs. The results revealed

significant differences (Asym. Sig. = 0.048, $p < 0.05$) in the impact of Brexit on the cost of doing business.

The mean ranks for migrant entrepreneurs ($R = 67.87$) and host rural communities ($R = 54.52$) indicating significant difference in perceptions between Host Rural Communities and Migrant Entrepreneurs.

This implies that Brexit has indeed increased the cost of doing business in rural Scotland, with implications for businesses' financial stability. This finding highlights the need for businesses to adapt to these higher costs and potentially explore strategies to mitigate the financial implications of Brexit.

Ho(b): Brexit has not created obstacles for migrants owned businesses in delivering their good or services than locally owned business.				
H1(b): Brexit has created obstacles for migrants owned businesses in delivering their good or services than locally owned business.				
Type	N	Mean Rank	Test Statistics ^{a,b}	
Host Rural Communities	85	57.16	Kruskal- Wallis H	0.217
Migrant entrepreneurs	30	60.37	df	1
Total	115		Asymp. Sig.	0.641

a. Kruskal Wallis Test

b. Grouping Variable: Type

Interpretation:

H (degree of freedom)=Chi Square test statistics, $p=0.05$

H (1)=0.217 , $p=0.05$

The Kruskal-Wallis test was employed to examine the impact of Brexit on creating obstacles for businesses in rural Scotland, comparing migrant-owned businesses with locally-owned businesses. The results indicated insignificant differences (Asym. Sig. = 0.641, $p > 0.05$) in the impact of Brexit on creating obstacles.

The Kruskal-Wallis H test did not establish a significant difference in this aspect, suggesting that Brexit may not have significantly created obstacles for migrant-owned businesses in delivering their goods or services compared to locally-owned businesses. This may be a reassuring finding, indicating that Brexit has not worsened the perceived challenges faced by migrant-owned businesses. This finding suggests that there may not be substantial disparities in the challenges faced by migrant-owned and locally-owned businesses in rural Scotland as a result of Brexit.

Ho(c): After Brexit , Scotland's rural dwellers with businesses have not got more access to critical business information and financial support from government than migrants owned business.				
H1(c): After Brexit , Scotland's rural dwellers with businesses have got more access to critical business information and financial support from government than migrants owned business.				
Type	N	Mean Rank	Test Statistics ^{a,b}	
Host Rural Communities	85	56.85	Kruskal- Wallis H	.404
Migrant entrepreneurs	30	61.25	df	1
Total	115		Asymp. Sig.	.525

a. Kruskal Wallis Test

b. Grouping Variable: Type

Interpretation:

H (degree of freedom)=Chi Square test statistics, $p=0.05$

H (1)=0.404 , $p=0.05$

The Kruskal-Wallis test was employed to evaluate the impact of Brexit on providing more access to critical business information and financial support to Scotland's rural dwellers with businesses compared to migrant-owned businesses. The results indicated insignificant differences (Asym. Sig. = 0.525, $p > 0.05$) in the impact of Brexit on access to critical business information and financial support.

The Kruskal-Wallis H test also did not reveal a significant difference, suggesting that there may not be substantial disparities in access to critical business information and financial support between groups. This finding suggests that, despite differences in perception, the reality may not be one of significant inequality. This finding highlights the importance of addressing potential disparities in support mechanisms and resources available to different business groups in rural Scotland.

Ho(d): Brexit has not led to the unavailability of investment loans for the businesses owned by Migrants in rural Scotland.
H1(d): Brexit has led to the unavailability of investment loans for the businesses owned by Migrants in rural Scotland.

Type	N	Mean Rank	Test Statistics ^{a,b}	
Host Rural Communities	85	53.50	Kruskal- Wallis H	6.278
Migrant entrepreneurs	30	70.75	df	1
Total	115		Asymp. Sig.	.012

a. Kruskal Wallis Test

b. Grouping Variable: Type

Interpretation:

H (degree of freedom)=Chi Square test statistics, p=0.05

H (1)=6.278 , p=0.05

The Kruskal-Wallis test was conducted to examine the impact of Brexit on the availability of investment loans for businesses owned by migrants in rural Scotland. The results revealed significant differences (Asym. Sig. = 0.012, p < 0.05) in the impact of Brexit on the unavailability of investment loans.

The Kruskal-Wallis H test confirmed a significant difference, indicating that Brexit has led to the unavailability of investment loans for businesses owned by migrants in rural Scotland. This critical result underscores the challenges faced by migrant entrepreneurs in accessing crucial financial resources to support and grow their businesses in the post-Brexit landscape. It demands the attention of policymakers to address these challenges and provide support mechanisms to ensure the resilience of migrant-owned businesses.

Ho(e): Brexit has not decreased the performance of local and migrant owned businesses due to restricted free movement of migrant workers/seasonal workers (Shortage of labor) in rural Scotland.
H1(e): Brexit has decreased the performance of local and migrant owned businesses due to restricted free movement of migrant workers/seasonal workers (Shortage of labor) in rural Scotland.

Type	N	Mean Rank	Test Statistics ^{a, b}	
Host Rural Communities	85	53.62	Kruskal- Wallis H	5.958
Migrant entrepreneurs	30	70.40	df	1
Total	115		Asymp. Sig.	.015

a. Kruskal Wallis Test

b. Grouping Variable: Type

Interpretation:

H (degree of freedom)=Chi Square test statistics, p=0.05

H (1)=5.958 , p=0.05

The Kruskal- Wallis test was employed to assess the impact of Brexit on the performance of local and migrant-owned businesses in rural Scotland due to the restricted free movement of migrant workers/seasonal workers. The results revealed significant differences (Asym. Sig. = 0.015, p < 0.05) in the impact of Brexit on decreasing business performance.

business performance. This finding highlights the need for strategies and support mechanisms to address the labor shortages and mitigate the adverse effects on business performance in rural Scotland.

Conclusion

The quantitative analysis provides valuable insights into the economic impacts of Brexit on both host communities and migrant entrepreneurs in rural Scotland. Notably, both groups acknowledge the increased cost of doing business as a significant challenge. The statistically significant findings suggest that Brexit has significantly increased the cost of doing business and led to the unavailability of investment loans for migrant-owned businesses. Additionally, it has resulted in a shortage of labor, affecting the performance of local and migrant-owned businesses.

The Kruskal-Wallis H test confirmed a significant difference, demonstrating that Brexit has indeed decreased the performance of local and migrant-owned businesses due to the shortage of labor caused by the restricted free movement of migrant workers/seasonal workers in rural Scotland. This is a crucial finding, indicating that labor shortages resulting from Brexit restrictions have tangible and adverse effects on

Despite these significant impacts, it's essential to recognize the nuanced experiences and perceptions of different groups. The perceptions of obstacles faced

by migrant-owned businesses and the disparities in access to critical business information and financial support may require further investigation to understand the underlying reasons. Furthermore, the perceptions of host communities and migrant entrepreneurs do not always align significantly in statistical terms. These differences in perception emphasize the need to consider diverse perspectives in policymaking and support mechanisms.

In conclusion, the quantitative analysis underscores the significant economic challenges posed by Brexit in rural Scotland. Policymakers should focus on addressing these challenges, supporting investment, providing financial resources, and addressing labor shortages to ensure the continued success and resilience of both local and migrant-owned businesses. Additionally, recognizing and understanding the varying perceptions and experiences of different groups is crucial for developing policies that are responsive to the unique needs of these communities.

b) Qualitative Analysis

The qualitative data gathered from the focus group discussions are subjected to thematic analysis. This approach involves identifying emerging themes and patterns within the qualitative data. Through thematic analysis, the research uncovers deeper insights into the experiences and challenges faced by migrant entrepreneurs and host communities.

Rationale for Thematic Analysis

Thematic analysis is also particularly well-suited for this research study because it allows for the integration of qualitative data from different sources, such as open-ended survey responses and focus group discussions. This integration of data can enhance the richness and depth of the analysis, providing a comprehensive understanding of the research topic (Nowell et al., 2017).

The decision to use of thematic analysis was justified by the need to explore complex and multifaceted phenomena (Johnson, 2020). Brexit's implications on rural businesses and migrant-owned enterprises are diverse and can vary greatly across different contexts and perspectives. Thematic analysis enabled the researcher to delve into the richness of the data, capturing the diverse viewpoints of participants, including positive and negative impacts (Smith, 2023). As highlighted by Clarke and Braun (2017), thematic analysis allows for the identification of both semantic and latent themes. Semantic themes capture the explicit and surface-level content of the data, while latent themes delve into the underlying meanings and interpretations. Given the complexity of the research topic and the potential for diverse experiences among participants, thematic analysis enables the exploration of both explicit and underlying themes related to the

economic, social, and political implications of Brexit on rural communities and migrant entrepreneurs.

In summary, the choice of using thematic analysis for the open ended questions in questionnaire and focus group in this research study is justified due to its flexibility, reflexivity, ability to integrate qualitative data, and capacity to explore both explicit and underlying themes. Therefore, thematic analysis proved to be a suitable and valuable method for this study, as it enabled a comprehensive and nuanced exploration of participants' experiences and perspectives. By using thematic analysis, this research was able to provide meaningful insights into the challenges and opportunities faced by businesses in rural Scotland, migrant entrepreneurs, community relations, and shared facilities in the post-Brexit landscape.

A. Thematic Analysis of Questionnaire Open-Ended Responses

The analysis of open-ended survey responses in this study aimed to explore participants' perspectives on the impact of Brexit on businesses and migrant entrepreneurs in rural Scotland. The qualitative data obtained from the open-ended questions allowed participants to freely express their opinions and experiences, providing valuable insights into the topic (Smith et al., 2021).

To ensure the effectiveness of the open-ended questions, careful consideration was given to their design. The questions were formulated to cover various dimensions of the research topic, such as the economic challenges faced by businesses, the social implications of Brexit, the impact on community relations, and the political consequences of the new immigration policy. By using open-ended questions, the study aimed to gather comprehensive and context-specific insights into the participants' views on the subject matter.

The thematic analysis of the open-ended questions from the questionnaire revealed several key themes and sub-themes related to the impact of Brexit on businesses and migrant entrepreneurs in rural Scotland. The themes that emerged were as follows:

Theme 1: Impact of Brexit on Businesses in Rural Areas

The first theme that emerged from the thematic analysis pertains to the impact of Brexit on businesses in rural areas. Participants' participants expressed a range of perspectives, with some highlighting the economic challenges brought about by Brexit, as summarized below:

Sub-theme: Economic Impact

A significant proportion of participants believed that Brexit has created harsh environments for running businesses in rural areas. They highlighted potential economic impacts, such as reduced investment, supply chain issues, increased red tape, and higher costs. Participants from various industries reported facing challenges in adapting to the new post-Brexit

landscape, which they perceived as a bottleneck affecting economic growth.

"Brexit has introduced a myriad of economic challenges for businesses in rural areas, making it difficult for us to remain competitive in the global market," remarked a participant from the manufacturing sector.

Sub-theme: Positive Impact on UK Businesses

Conversely, a smaller proportion of participants expressed the view that Brexit has or will have a positive impact on UK businesses. They emphasized that leaving the EU has opened up opportunities for trade with non-EU markets, such as the United States and Australia. They believed that new trade agreements with non-EU countries would benefit UK businesses and promote economic growth.

"Brexit has enabled us to explore new markets outside the EU, leading to increased export opportunities and growth potential," noted a participant from the agricultural sector.

Sub-theme: No Change Observed

Another group of participants reported that they had not observed any significant change in the business environment after Brexit. They believed that the impact of Brexit on businesses in rural areas was either minimal or nonexistent.

"Despite the fear surrounding Brexit, our business has continued to operate as usual, and we have not experienced any major disruptions," explained a participant from the tourism sector.

Sub-theme: Financial Crisis and High Cost of Living

Some participants highlighted the financial crisis and high cost of living as challenges for running businesses in rural areas. They pointed out that Brexit compounded the existing issues of cost of living and financial hardship, particularly for rural residents. They expressed concerns about potential hardships and the need for EU nationals to consider moving back to the EU.

"Brexit came at a time when our region was already facing economic struggles, and now the high cost of living is further impacting our business's bottom line," stated a participant from the retail sector.

Sub-theme: Impact on Micro Businesses and Small Agriculture Industries

Participants emphasized the significant impact of new schemes introduced after Brexit on micro businesses and small agriculture industries, which are more dominant in remote areas. They mentioned the negative consequences of the transition, such as reduced payments and the potential loss of basic-scheme payments for farmers.

"As a small-scale farmer, the changes brought about by Brexit have hit us hard. Our income has reduced,

and it's challenging to make ends meet," lamented a participant from the agricultural sector.

Sub-theme: Challenges and Opportunities

Lastly, some participants believed that Brexit has created both challenges and opportunities for immigrants and locals alike. They acknowledged the difficulties faced by businesses but also recognized the potential for growth and adaptation in the post-Brexit landscape.

"Brexit has been a mixed bag for us. While there are challenges, we see new opportunities for innovation and market diversification," remarked a participant from the technology sector.

Theme 2: Challenges Faced by Migrant-Owned Businesses in Rural Scotland

The second theme centers around the challenges faced by migrant-owned businesses in rural Scotland as a result of Brexit. The sub-themes that emerged from the data are as follows:

Sub-theme: Significant Negative Economic Impact

A considerable number of participants expressed concerns about the negative economic impact of Brexit on every business sector. They highlighted the decrease in GDP, the loss of economic power for the EU, and the potential suffering of industries such as automotive, airline, pharmaceutical, and financial services.

"Brexit has created uncertainty and instability, and it's affecting our business's growth prospects. We are worried about the future," explained a participant from the financial sector.

Sub-theme: Human Resource and Workforce Issues

Participants mentioned challenges related to human resources and the workforce. They highlighted issues such as labor force shortages, lack of skilled workers, difficulties in attracting and retaining talent, and the impact on wages and productivity.

"Finding skilled employees has become increasingly difficult after Brexit, and this is hindering our business expansion plans," stated a participant from the healthcare sector.

Sub-theme: Implementation of New Immigration System /Policy

Participants discussed the challenges arising from the implementation of a new immigration system or policy. They mentioned restrictions on the free movement of EU citizens, the requirement for visas, and concerns about equal rights and discrimination.

"The new immigration policies are a major concern for us. We fear it will lead to labor shortages and adversely affect our business operations," expressed a participant from the hospitality sector.

Sub-theme: Violation of Equal Rights and Discrimination

Some participants raised concerns about the violation of equal rights and discrimination faced by migrants in rural Scotland. They highlighted discriminatory practices, social status differences, and the perception of unequal treatment.

"Brexit seems to have emboldened xenophobic sentiments, and it's disheartening to experience discrimination in our adopted home," said a participant from the retail sector.

Sub-theme: Decreased Wages and Productivity

Participants noted the impact of Brexit on wages and productivity. They expressed concerns about slower wage and productivity growth, reduced income, and the challenges faced by immigrants due to the high cost of living.

"Brexit has led to stagnant wages, and this is affecting our employees' morale and productivity," shared a participant from the manufacturing sector.

Sub-theme: Impact of COVID-19

A small proportion of participants mentioned that the economic impact of COVID-19 was more challenging than Brexit. They highlighted the combined effects of Brexit and the pandemic, such as increased difficulties for businesses and inflation.

"The double whammy of Brexit and the pandemic has created unprecedented challenges for our business, and we are struggling to stay afloat," lamented a participant from the service sector.

B. Thematic Analysis of Focus Group Discussions

The focus group analysis provided valuable insights into the experiences and perspectives of EU migrant entrepreneurs and host communities, shedding light on the economic, social, and political consequences of Brexit on rural Scotland. Four main themes and corresponding sub-themes emerged from the analysis, encompassing the various impacts of Brexit on Scotland's rural communities (Smith, 2023). The themes identified were: Economic Impact, Social Impact, Political Impact, and Policy Reforms. Under these themes, participants discussed topics such as the financial crisis, business laws and regulations, employment challenges, racism/xenophobia, the new immigration policy, and policy reforms to address the challenges.

This overarching theme delves into the economic implications of Brexit on rural Scotland. The focus group discussions offered valuable insights into the economic challenges faced by both migrant entrepreneurs and host communities.

Number	Themes	Sub – Themes
1.	Financial Crisis	<ul style="list-style-type: none"> – High cost of living – Currency Devaluation – Inflation & Economic Uncertainties – Impact on the Free Market – Interact with Covid 19
2.	Business Laws and Regulations	<ul style="list-style-type: none"> – Renewal of Business Registrations – Impact on Economic Zones & Sectors
3.	Employment	<ul style="list-style-type: none"> – Challenges in Skilled Labor Access – Recruitment and Talent Retention Challenges – Business Relocation and Contributing Factors

Theme 1: Financial Crisis

1. *High Cost of Living and Food Prices:* The participants highlighted the difficulties associated with the high cost of living, including increased food prices. These economic hardships particularly affected EU nationals living in rural areas and those contemplating establishing businesses there. The increased cost of living posed a significant hurdle for economic stability, making it challenging for businesses, especially smaller enterprises, to thrive.
2. *Currency Devaluation:* A major concern expressed by participants was the devaluation of currency, which had a substantial impact on both consumers and businesses. The depreciation of the currency led to higher import costs and decreased profit

3. *Inflation and Economic Uncertainties:* The economic uncertainties stemming from Brexit had cascading effects, including inflation. This inflation, in turn, increased the costs of goods and services. The resultant economic uncertainties further compounded the financial crisis, affecting individuals and businesses. Reduced savings and declining purchasing power added to these challenges, making it harder for people to meet their financial needs and invest in businesses.
4. *Impact on the Free Market:* The discussions acknowledged the pivotal role the UK played in

managing the market for goods and services in Europe. The focus group participants recognized that the restrictions imposed post-Brexit on the European Union's free market had significant repercussions on trade between member states. The disruption in the free market, coupled with the changes brought by Brexit, underscored the complexity of the economic situation.

5. *Interaction with COVID-19*: The co-occurrence of the COVID-19 pandemic and Brexit was a key point of discussion. Participants recognized that while Brexit was a major factor affecting the economy, it was challenging to isolate its effects from those of the pandemic. The dual impact of these two significant events created a multifaceted challenge, making it difficult to attribute certain economic outcomes solely to Brexit.

Theme 2: Business Laws and Regulations

1. *Renewal of Business Registrations*: Participants discussed the challenges related to renewing business registrations and complying with the new UK business guidelines that emerged post-Brexit. Adapting to these new British regulations, which encompassed areas like trademark and copyright policies, posed immediate challenges for businesses. The additional costs associated with these registrations were identified as a significant hurdle, particularly for smaller businesses with limited resources.
2. *Impact on Economic Zones and Sectors*: The thematic analysis revealed conversations about the negative impact of Brexit on various economic zones and business sectors. This impact resulted in a decrease in GDP and a diminishing of economic power for the European Union. Many businesses, especially smaller ones, were ill-prepared for Brexit, which was a significant concern. Specific attention was given to the potential ramifications for sectors such as automotive, airlines, pharmaceuticals, and financial services.

Theme 3: Employment

1. *Challenges in Skilled Labor Access*: The participants emphasized the immediate employment challenges brought about by Brexit in rural Scotland. The discussions revolved around the availability and accessibility of skilled labor, highlighting the reliance on external labor sources. However, strict work permit laws and requirements complicated the employment of individuals from other countries, resulting in labor shortages and hindrances to economic activities.
2. *Recruitment and Talent Retention Challenges*: The focus group discussions underscored the difficulties faced by Scottish businesses in recruiting and retaining talent with the necessary skill set. Competitive salaries offered elsewhere made it even

more challenging to attract and retain skilled workers. The loss of EU workers post-Brexit led to staffing crises, particularly in sectors crucial to rural Scotland's economy, such as health, social care, agriculture, food, and hospitality.

3. *Business Relocation and Contributing Factors*: The relocation of businesses from the UK to the EU after Brexit was acknowledged. However, the complex nature of the labor shortage issue was highlighted, as it was challenging to attribute it solely to Brexit. The simultaneous occurrence of the COVID-19 pandemic added to the complexity, making it difficult to determine the relative contributions of these two major events to the labor shortages faced by rural communities. This comprehensive analysis offers an in-depth understanding of the economic challenges resulting from Brexit. The financial crisis, increased business-related expenses, and the impact on various sectors underscore the need for adaptable policies and strategies to navigate these challenges. The intertwined dynamics of Brexit and the COVID-19 pandemic emphasize the importance of nuanced and well-informed policymaking to address the economic consequences in rural Scotland effectively.

V. KEY FINDINGS OF ANALYSIS

a. Key Findings of Quantitative Analysis

Descriptive Statistics

- Varied perceptions of post-Brexit job opportunities and wage stability between host communities and migrant entrepreneurs.
- A majority of both Host Rural Communities (77.6%) and Migrant Entrepreneurs (66.7%) agreed that Brexit has increased the cost of doing business in rural Scotland.
- Migrant Entrepreneurs (63.3%) were more likely to agree that their businesses face more obstacles in delivering goods or services compared to locally-owned businesses.
- Migrant Entrepreneurs (56.7%) expressed a higher belief compared to Host Rural Communities (33.8%) that Scotland's rural dwellers with businesses have more access to critical business information and financial support than foreign investors.
- Both Host Rural Communities (50.6%) and Migrant Entrepreneurs (66.7%) agreed that Brexit has restricted the free movement of migrant workers/seasonal workers, leading to labor shortages and decreased business performance in rural Scotland.
- Both Host Rural Communities (43.5%) and Migrant Entrepreneurs (73.3%) believed that Scotland needs flexible immigration and inclusive social integration policies to support migrant-owned businesses.

Inferential Analysis

- The Kruskal-Wallis H test showed a significant difference in perceptions between Host Rural Communities and Migrant Entrepreneurs regarding the increased cost of doing business after Brexit. Migrant Entrepreneurs perceived a more significant impact, indicating that Brexit has indeed increased the cost of doing business in rural Scotland.
- The Kruskal-Wallis H test did not establish a significant difference in the obstacles faced by migrant-owned businesses in delivering goods or services compared to locally-owned businesses. This suggests that Brexit may not have significantly created obstacles for migrant-owned businesses.
- The Kruskal-Wallis H test also did not reveal a significant difference in access to critical business information and financial support, despite differences in perception. This indicates that there may not be substantial disparities in access to resources between groups.
- Brexit has led to the unavailability of investment loans for businesses owned by migrants in rural Scotland, as confirmed by a significant difference.
- The Kruskal-Wallis H test showed a significant difference indicating that Brexit has decreased the performance of local and migrant-owned businesses due to the shortage of labor caused by the restricted free movement of migrant workers /seasonal workers.

In summary, the quantitative analysis highlights significant economic challenges posed by Brexit in rural Scotland. It emphasizes increased business costs, unavailability of investment loans, and the adverse effects of labor shortages on business performance. While perceptions vary, these findings underscore the need for supportive policies and strategies to address these challenges and ensure the success and resilience of businesses, both local and migrant-owned, in rural Scotland. Diverse perspectives and experiences should be considered in policymaking to meet the unique needs of these communities.

b. Key findings of Qualitative Analysis

The key findings from the qualitative analysis of the economic impact of Brexit on rural Scotland, derived from both open-ended survey responses and focus group discussions, are as follows:

- *High Cost of Living:* The participants highlighted the challenges posed by the high cost of living and increased food prices. These economic hardships were seen as significant obstacles affecting both businesses and individuals.
- *Currency Devaluation:* The devaluation of currency was a major point of concern. Participants noted that the depreciation of the currency had a

substantial impact on both consumers and businesses, particularly those reliant on imports.

- *Inflation and Reduced Savings:* Economic uncertainties brought about by Brexit led to inflation, increasing the costs of goods and services. These uncertainties further compounded financial hardships, affecting individuals and businesses. Participants identified reduced savings and declining purchasing power as contributing factors to these challenges.
- *Changes in Trademark and Copyright Policies:* Particular attention was given to the changes in trademark and copyright policies. These changes resulted in additional costs associated with business registrations and negatively impacted various business sectors.
- *Decrease in GDP and Economic Power for the EU:* Participants perceived these changes in regulations as barriers to conducting business smoothly in the region. The resultant economic impacts included a decrease in GDP and a reduction in economic power for the European Union.
- *Strict Laws and Work Permit Requirements:* The strict laws and requirements for work permits were cited as a significant hurdle for EU nationals seeking employment in Scotland.
- *Short-Term Labor Shortage:* This led to a short-term labor shortage, particularly in sectors such as health, social care, agriculture, food, and hospitality. Businesses faced difficulties in attracting and retaining talent with the required skill set due to limitations on immigration.
- *Staffing Crises:* The loss of EU workers after Brexit was identified as a crisis in staffing. Various industries were affected, and the participants acknowledged the reliance on migration to alleviate skills shortages.

These key findings from the qualitative analysis provide a comprehensive understanding of the economic challenges experienced in rural Scotland following Brexit. They highlight the multifaceted nature of these challenges, including financial hardships, regulatory obstacles, and difficulties related to employment. These findings can inform policy recommendations and strategies to address these challenges effectively and support the prosperity of rural communities in the post-Brexit era.

VI. INTEGRATION OF QUANTITATIVE AND QUALITATIVE ANALYSIS FINDINGS

1. *Economic Disruption and Financial Challenges:* The study identified a significant perception among both host rural communities and migrant entrepreneurs that Brexit has ushered in economic disruption and financial challenges. The high cost of living, increased food prices, and currency devaluation

were among the prominent issues. These findings are congruent with the experiences shared in focus group discussions, where participants voiced concerns about a financial crisis in rural areas. This indicates that Brexit has indeed introduced economic uncertainties and hardships in rural Scotland.

2. *Regulatory Complexity and Business Impact:* Brexit's impact on business laws and regulations emerged as a significant theme. The qualitative data, supported by the quantitative findings, revealed that changes in British rules, particularly trademark and copyright policies, have introduced complexities and financial burdens. Businesses, especially smaller enterprises, are struggling to adapt. The analysis indicates that this regulatory complexity is affecting various business sectors and has likely contributed to decreased GDP and economic power for the EU.
3. *Labor Market Challenges:* Both quantitative and qualitative data underscored challenges in the labor market post-Brexit. The strict laws and requirements for work permits have made it difficult for EU nationals to work in Scotland. This has led to short-term labor shortages, particularly in critical sectors such as health, social care, agriculture, food, and hospitality. The interviews and open-ended survey responses confirmed that businesses face significant hurdles in attracting and retaining talent with the required skill set.
4. *Impact on Currency and Free Movement:* The intertwined dynamics of Brexit and the COVID-19 pandemic were evident in the findings. Currency devaluation, exacerbated by Brexit, triggered inflation and reduced savings. While Brexit was a major driver of economic change, it was challenging to isolate its effects from those of the pandemic. Additionally, Brexit's restriction of the free movement of migrant workers and seasonal workers has resulted in labor shortages and negatively impacted the performance of both local and migrant-owned businesses.
5. *Need for Policy Reforms:* The research findings suggest a need for flexible immigration and social integration policies to sustain immigration and support the growth of migrant-owned businesses in rural Scotland. This implies that policymakers need to consider inclusive policies that address the concerns of both host communities and migrant entrepreneurs while promoting diversity and cultural integration.

In conclusion, the economic impact of Brexit on rural Scotland is substantial and far-reaching. The study's combination of quantitative and qualitative analyses has provided a holistic view of the challenges faced by businesses and communities in the region. It

has allowed for the validation of perceptions and provided context to the statistical data. The findings underline the need for adaptable policies and strategies to navigate the economic challenges and uncertainties introduced by Brexit.

The results emphasize the importance of considering the voices and experiences of those directly affected, as it is these real-world challenges that inform effective policy and decision-making. This study contributes valuable insights to the ongoing discourse on Brexit's implications, shedding light on the economic realities faced by rural communities and migrant entrepreneurs in Scotland. It is hoped that these findings will guide policymakers and stakeholders in devising strategies that can mitigate the adverse effects of Brexit and create a more stable and supportive economic environment in rural Scotland.

VII. LIMITATIONS OF THE STUDY

Sample Size and Representation: One of the limitations of this study is the sample size. While the data collected from the survey and focus group discussions are valuable, the sample size may not fully represent the diversity of experiences within rural Scotland. Future research could benefit from larger and more diverse samples to provide a more comprehensive understanding of the economic impact of Brexit in this region.

1. *Generalizability:* The findings are specific to rural Scotland and may not be directly generalizable to other rural areas or regions. Each rural area may have unique economic, social, and political dynamics. Caution should be exercised when extrapolating these findings to other contexts.
2. *Subjectivity and Bias:* Qualitative research inherently involves subjectivity, and the interpretation of participants' responses can be influenced by the researchers' perspectives. Efforts were made to minimize bias, but it is essential to acknowledge this limitation in any qualitative analysis.
3. *Post-Brexit Period:* The study focused on the economic impact of Brexit during a specific period. Brexit is an ongoing process, and its long-term consequences may continue to evolve. The study's findings offer insights into the immediate aftermath of Brexit, but future research should explore the longer-term effects.

VIII. FUTURE IMPLICATIONS AND RESEARCH DIRECTIONS

1. *Longitudinal Studies:* Conducting longitudinal studies to track the economic impact of Brexit in rural Scotland over an extended period would provide a more comprehensive understanding of how these effects change and evolve.

2. *Comparative Analyses*: Future research could benefit from comparative analyses between different rural regions in the UK and across Europe. This would allow for a broader understanding of how Brexit has affected rural areas and help identify commonalities and differences.
3. *Policy Development*: The study's findings underscore the need for flexible immigration and social integration policies. Future research can delve deeper into the development and assessment of such policies, considering the experiences and expectations of both host communities and migrant entrepreneurs.
4. *Sector-Specific Studies*: Further research can focus on specific sectors, such as agriculture, healthcare, and hospitality, to gain a more nuanced understanding of Brexit's impact on labor shortages and economic challenges within these industries.
5. *Economic Resilience Strategies*: Investigating the development and effectiveness of economic resilience strategies for rural areas post-Brexit is crucial. This can include exploring the role of small and medium-sized enterprises (SMEs) and local initiatives in bolstering economic stability.
6. *Community Integration and Social Cohesion*: Future research can examine the social integration of migrant entrepreneurs and their interaction with host communities in rural areas. This would provide insights into how social cohesion can positively affect the economic landscape.
7. *Brexit's Impact on the Wider UK*: Expanding the scope of research to encompass the broader impacts of Brexit on the UK as a whole, including urban areas, can offer a comprehensive view of the overall consequences.
8. *Green and Sustainable Initiatives*: Investigating how Brexit has influenced the development of green and sustainable initiatives within rural Scotland can be a relevant research avenue, particularly in the context of post-Brexit environmental policies.

In summary, while this study sheds light on the economic impact of Brexit in rural Scotland, there are ample opportunities for future research to delve deeper into the complexities of this issue. As Brexit continues to shape the economic, social, and political landscape, ongoing research efforts are essential to inform policies and strategies that can support rural communities and migrant entrepreneurs in adapting to this new reality.

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Appendices

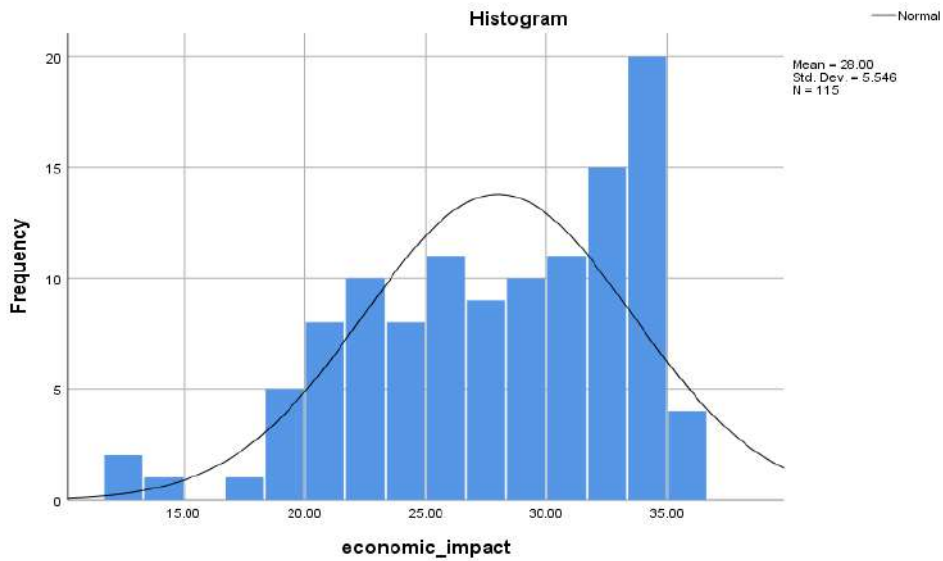


Fig. 1: Normality Test Histogram

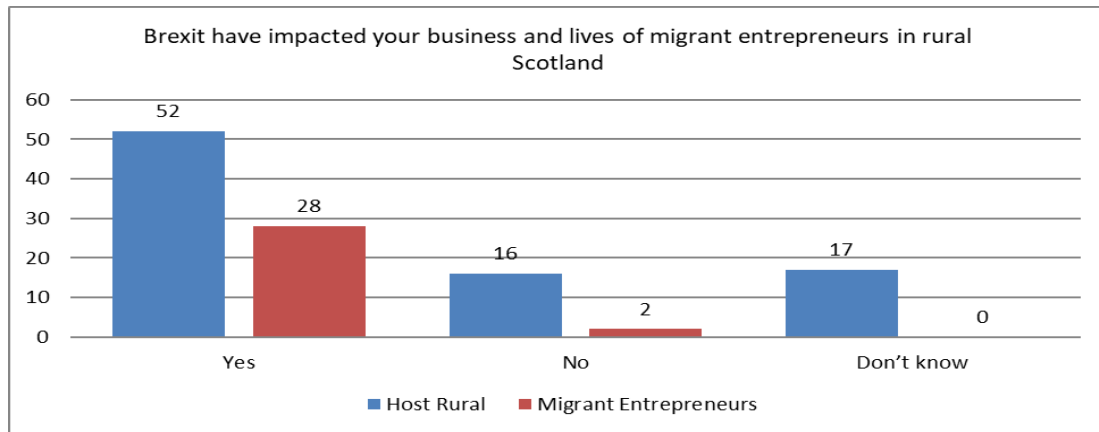


Fig. 2: Bar Chart

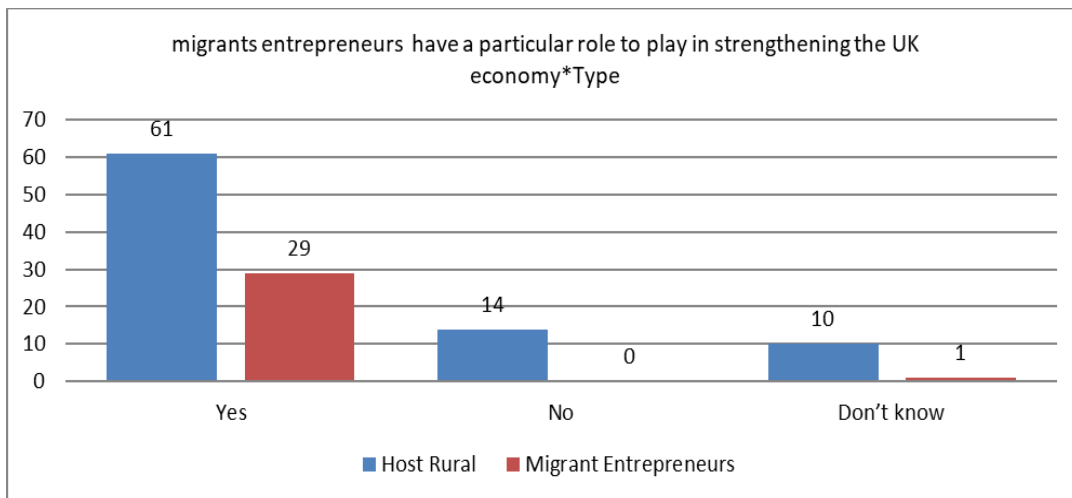


Fig. 3: Bar Chart

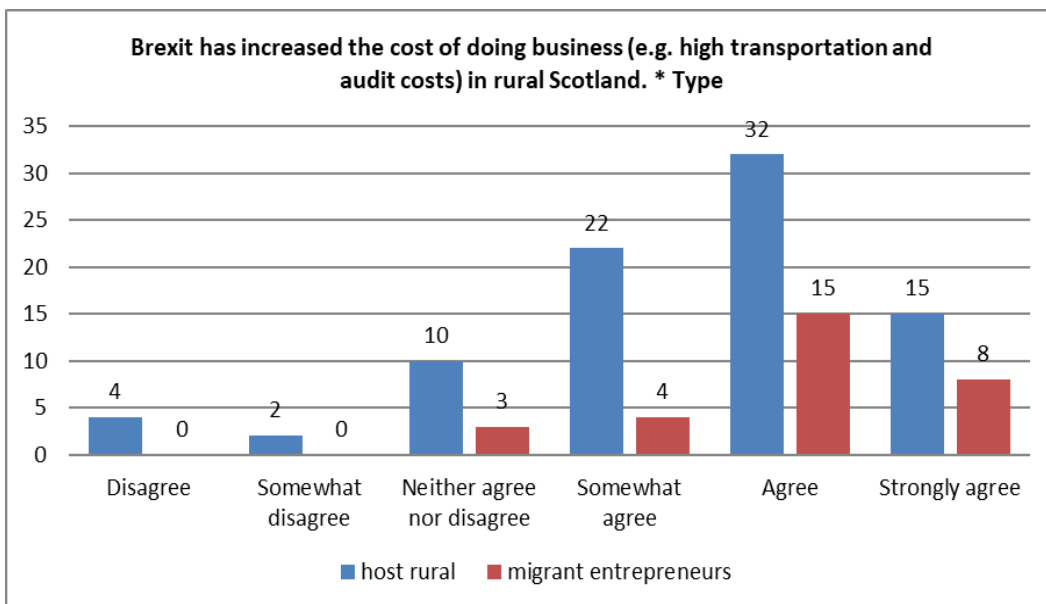


Fig. 4: Bar Chart

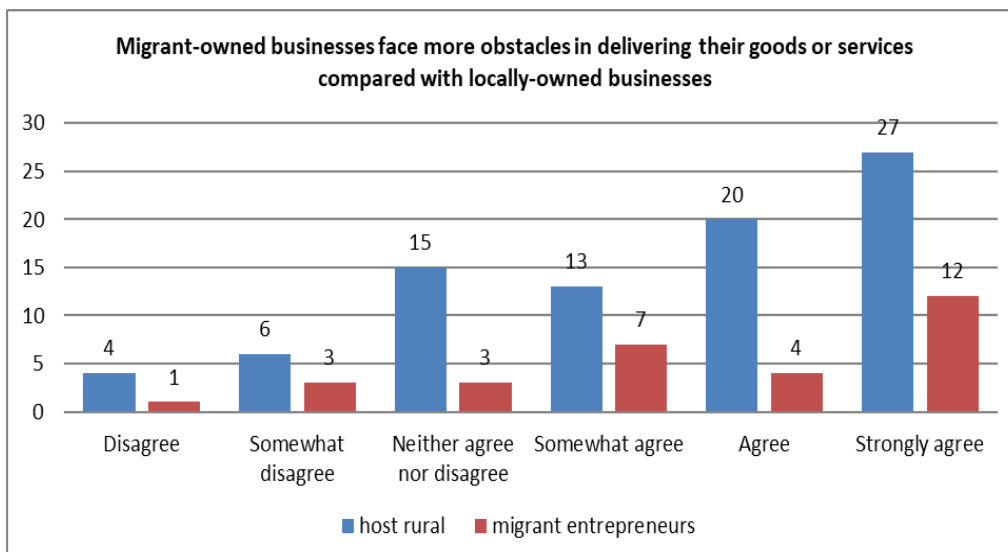


Fig. 5: Bar Chart

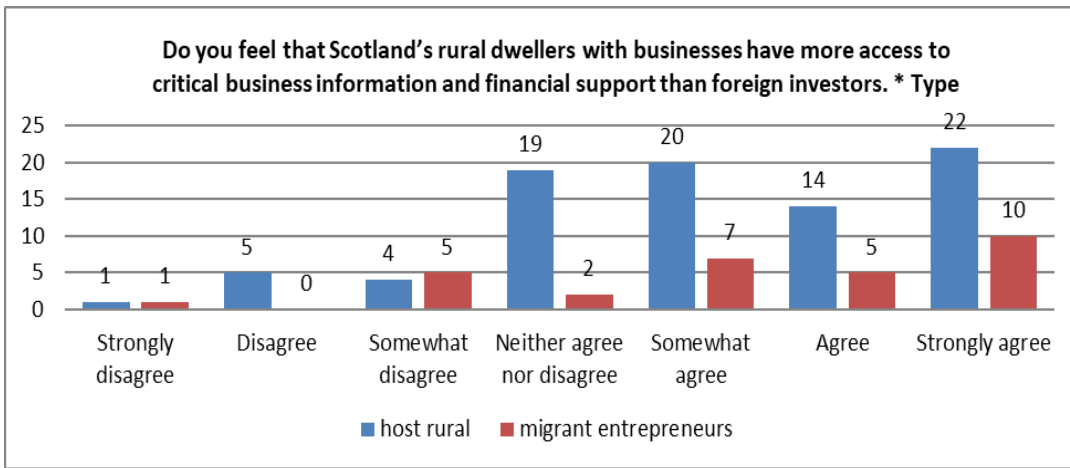


Fig. 6: Bar Chart

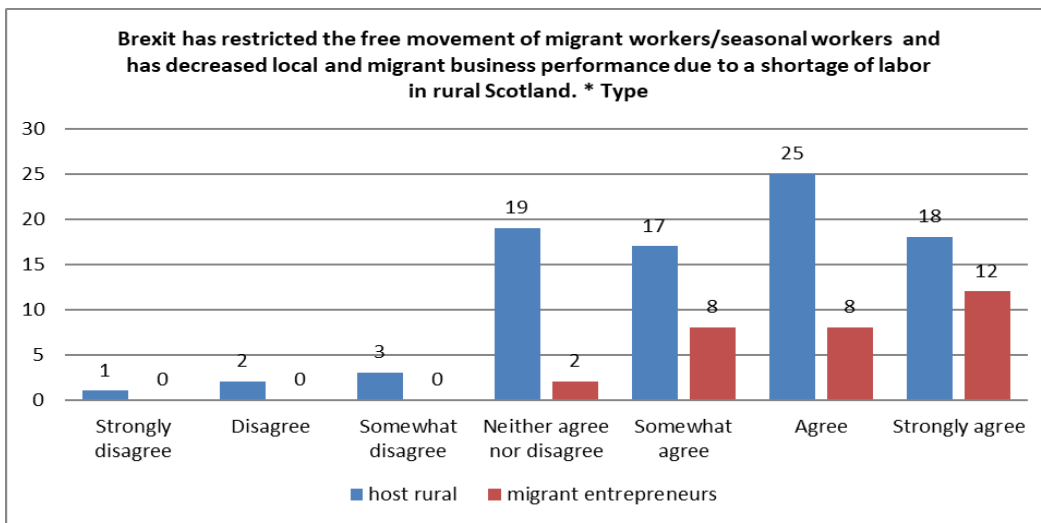


Fig. 7: Bar Chart

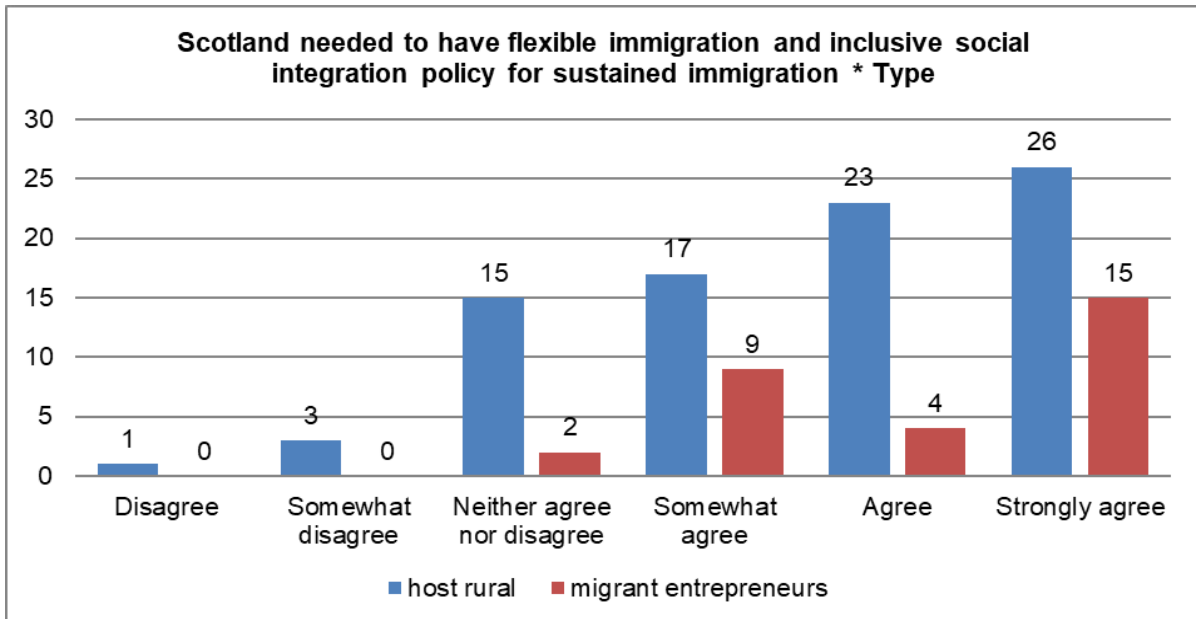


Fig. 8: Bar Chart



Effects of Green Farming Practices/Environmentally Friendly Practices on Small Scale Agricultural Production in Kenya, A Case Study in Siaya County

By Samson Ntongai Jeremiah & Amos Bonnke

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GJMBR-B Classification: FOR Code: 0701



EFFECTS OF GREEN FARMING PRACTICES ENVIRONMENTALLY FRIENDLY PRACTICES ON SMALL SCALE AGRICULTURAL PRODUCTION IN KENYA A CASE STUDY IN SIAYA COUNTY

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Samson Ntongai Jeremiah ^α & Amos Bonnke ^σ

Abstract- Smallholder farmers, who face sustainability challenges due to reliance on conventional farming practices, dominate Kenya's agricultural sector. This study investigated the impact of adopting green farming practices on the agricultural productivity, economic viability and environmental sustainability of small-scale farms in Siaya County. A mixed methods approach combined analysis of published secondary data with primary data collected through questionnaires administered to a sample of 150 smallholder farmers in Siaya. The questionnaires utilized descriptive analysis to assess the adoption rate of different green farming techniques over the past five years and used both qualitative and quantitative analysis to evaluate outcomes related to agricultural yields, income generation, social welfare, and conservation goals. Quantitative data was analyzed statistically in Microsoft Excel using tables, graphs and charts. Specific statistical tests used included ANOVA analysis to determine any associations and differences between groups, and regression analysis to examine correlations between green farming adoption and productivity, financial and sustainability indicators. The study tested hypotheses on the relationship between implementing environmentally friendly techniques and productivity levels, economic returns, and ecological impacts. Findings aimed to enable recommendations to promote adoption of green agriculture through targeted interventions addressing identified barriers like knowledge gaps and financial limitations faced by Siaya smallholders. By taking a holistic evaluation of green strategy adoption, the research aimed to guide policies that encouraged sustainable intensification amongst rural smallholder farmers in Kenya and beyond.

CHAPTER 1: INTRODUCTION

a) Background Information

i. Environmental Impacts of Agriculture

Global agricultural productivity has intensified drastically over the past century to cater to burgeoning populations and heightened per capita food demands. However, conventional industrial farming practices have also engendered massive ecosystem disruptions through deforestation, excessive tilling, inorganic fertilizer over application and agrochemical usage accumulation (De Silva, 2012; Canter 2018). Vast tracts of forests and other native

vegetation biomes across the planet have been razed for agricultural expansion, slashing biodiverse habitats and their regulatory capacities. Unsustainable land-clearing techniques like slash and burn have also emitted substantial greenhouse gases further escalating climate change. Intensive tilling has ruined soil structure, causing erosion losses over 20 billion tons annually while intensive machine operation has compacted lands declining arability (Krejci & Beamon, 2014).

Chemical fertilizer over-reliance has also drained, salinized and acidified soils diminishing productivity from degradation alongside surface water contamination through agricultural runoff. Pesticide toxicity has pervaded ecosystems, oxidizing microbial ecosystems essential for nutrient cycling and polluting water supplies. Herbicide overuse has led to weed resistance and loss of beneficial plant genetic diversity (National Research Council, 2000). Rampant groundwater extraction for unsustainable irrigation has depleted reserves and sunk water tables as ecological limits are crossed. Unbridled cattle grazing has also compacted lands and stripped vegetative covers. Poor animal waste management has released effluents into waterways spreading parasites like cryptosporidiosis threatening human and ecosystem health (Lal et al., 1988).

Overall, these cumulative actions have gravely fragmented once contiguous natural habitats as alien invasive species infiltrate. Up to 75% of global crop diversity has already been lost from such activities, with over 20,000 species now vulnerable to extinction (Canter, 2018). These ecosystem service disruptions pose grave threats to the entire global food production and supply apparatus. Without urgent corrective interventions through sustainable agriculture, the planet's capacity to perpetually support its burgeoning human population comes into serious question (Fomsgaard, 2014).

ii. Sustainable Agricultural Practices

As environmental threats from conventional agriculture intensified, sustainable agriculture concepts emerged to nurture ecological stability amidst food production. Sustainable techniques aim to sustain yields while minimizing further ecosystem disruption through principles like soil replenishment, water conservation and waste recycling (Varela, 2001). Organic farming avoids synthetic fertilizers and pesticides through

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integrated biological approaches to maintain soil health and fertility. Organic manures, biopesticides, crop rotations and integrated pest management techniques help enhance biodiversity preservation on farms while reducing external input costs. Though organic cultivation typically has lower output volumes initially, well-adapted regional practices help farmers capture price premiums through certified ecological production (Fomsgaard, 2014).

Conservation agriculture principles endorse minimum tilling to preserve soil structure, permanent soil covers using crop residues to retain moisture, nutrients, and diversified crop rotations with legumes fixing nitrogen. Precision agriculture tailors input applications to optimize resource use efficiency guided by monitoring indicators. Plastic mulch, drip irrigation and rainwater harvesting further reduce water demands and erosion risks (Mitra & Datta, 2014). Integrated farming blends different agricultural ventures on farms like combining aquaculture with poultry for waste recycling. Vermicomposting also recycles manures into organic fertilizers while agroforestry provides additional income streams from forest products harnessing biodiverse synergies through additional carbon sequestration (De Silva, 2012). Renewable energy production from agricultural wastes can also catalyze rural development.

While sustainable agriculture adoption requires some transitional resource investments for smallholders, improved yield stability, lowered production costs and ecosystem conservation over time make these systems optimal for subsistence farmers to escape entrenched poverty cycles (Haggblade et al, 2007). Regional studies have shown sustainable technique adoption enhancing smallholder incomes by 22-35% through higher output value realization (Mozzato, 2019). Furthermore, sustainable intensification is imperative for fortifying resilience against mounting climate change risks to Africa's agricultural future (Desjardins et al, 2007).

iii. *Agriculture in Kenya*

As the foremost economic pillar occupying over 40% of labor capacity, smallholder farmers with 1–10-acre land parcels dominate Kenya's agricultural sector. Both domestic nutritional outcomes and the country's export revenues rely predominantly on productivity across small-scale cultivation (Weintraub, 2002). Core crops underpinning food security include maize, Irish potatoes, beans, vegetables, coffee, tea, sugarcane, pyrethrum and assorted horticulture. Livestock husbandry across cattle, goat, sheep, camel and chicken rearing also constitutes 30% of agricultural GDP (Krejci & Beamon, 2014). However, Kenya's small-holders remain severely financially constrained lacking investment capital for advanced inputs, mechanization and irrigation infrastructure limiting productivity advancements. Public expenditure allocations are also severely deficient with under 6% dedicated agricultural budgets

compared to the 10% in the Maputo declaration (Mohamed Haris, 2019). Low profitability has consequently trapped many farmers in poverty cycles.

Kenya's ecological landscape is also increasingly threatened from large-scale illegal logging, air pollution from improper waste disposal, effluent discharge and unsound industrial activities. The Mau Forest covering 400,000 hectares has already been encroached through settlements and land grabs (Murey, 2020). Water catchment capacities have been disrupted affecting water availability and quality for cultivated lands and grazing pastures. Already burdened smallholders thereby suffer deepening climate change pressures through rainfall variability, droughts, floods and extreme weather shocks while lacking adaptive capacities. Over 80% of current yields remain rain-fed, hence direly vulnerable to precipitation uncertainty (Desjardins et al, 2007).

Without climate-smart advancements, Kenya faces grave food security risks from these compounding existing agricultural sector struggles. Sustainable land management practices are imperative across smallholder farms constituting Kenya's agricultural backbone. Environmentally wise intensification must be prioritized to safeguard ecological stability, shore yields, raise farm incomes and thereby secure national food reserves whilst enhancing small farm resilience against climate change impacts through green agriculture proliferation (Craparo et al., 2023).

iv. *Siaya County Profile*

Siaya County lies in western Kenya bordering Lake Victoria in the Nyanza region. With 83% arable land, agriculture constitutes the foremost economic activity occupying over 70% of household incomes and livelihoods (County Government of Siaya, 2018). Core cultivated crops include maize, sorghum, cassava, sweet potatoes, beans, cowpeas, pigeon peas, ground nuts alongside mixed small-scale livestock husbandry across cattle, goats, sheep and local poultry. Cassava and sorghum dominate covering over 80% of cultivated land. Cash crops comprise sugarcane, cotton, sunflower and rice paddy. However, average farm sizes remain small at just 1.5 acres. Hand hoes occupy over 75% of cultivation demonstrating low mechanization and poor commercial orientation impeding large-scale production, value addition and competitive market participation. Less than 1% of farmer's access agricultural financing with minimal uptake across critical production inputs like certified seeds, appropriate fertilizers and crop protection limiting yields (Gather, 2022). Supportive infrastructure and farmer training services are also severely deficient to transform outdated cultivation habits.

These struggling Siaya smallholders additionally endure ecological strains through topsoil nutrient losses, increasing prevalence of gully erosion from poor land

use and erratic rainfall patterns with limited irrigation access. Over 60% of the county suffers high degradation risks, with rich lands left unsuitable for profitable farming (Kisioh, 2015). Deforestation through unsound fuel wood extraction and charcoal production has also reduced water catchment capacities. Low agricultural budgetary allocations have continually neglected Siaya County's 700,000+ farming families languishing in entrenched poverty cycles and food insecurity. With over 60% of Siaya children chronically undernourished, surging malnutrition hospitalizations further demonstrate failed agricultural policies and environmental mismanagement threatening lives, health and livelihoods countywide (Aemro, 2022). Sustainable land use education alongside input financing is imperative to spur ecological stability, yield improvements, value chain augmentation and climate change resilience across Siaya's high potential agricultural landscape through transformative green interventions.

b) *Problem Statement*

Small-scale agriculture remains dominated by unsustainable conventional practices across Siaya County despite the region's high farming potential, with rife land degradation now threatening ecological foundations underpinning the sector. Over 75% of Siaya's arable land relies on dated farming habits around fragmented micro-plots averaging just 1.5 acres, lacking necessary upgrades for profitable cultivation (Gather, 2022; County Government of Siaya, 2018). Unsound cultivation traditions without crop rotations have caused alarming soil nutrient mining across over 60% of regional farmlands. Uncontrolled free-range grazing has compacted lands and stripped vegetative covers, fueling a 60% topsoil erosion rate through unmitigated losses (Kisioh, 2015). Heavy rainfall dependence for over 80% of crops has also escalated climate change vulnerability without adaptive capacities like water harvesting, conservation irrigation or moisture retention measures (Craparo et al., 2023).

Consequently, stagnating production has sunk smallholders deeper into poverty cycles lacking resources for investing in sustainable farming upgrades. With under 6% national agricultural budget allocations, minimal financing access constrains local adoption of yield-boosting inputs like certified seeds, appropriate fertilizers and crop protection (Mohamed Haris, 2019). Inadequate agricultural infrastructure and farmer training services also entrench outdated regional cultivation habits. As population pressures mount amidst constant land subdivisions, ecological stability continues deteriorating while over 60% of Siaya children face chronic malnutrition from shrinking per capita harvests demonstrating failed cultivation policies (Aemro, 2022). With over 500,000 regional farming families relying on agriculture incomes (County Government of Siaya, 2018), urgent transition towards sustainable approaches

is imperative to reverse unsound conventional land use practices now critically threatening Siaya's agricultural future.

Environmentally regenerative techniques adoption can enhance climate resilience, raise farm budgets for reinvestment, improve nutrition and secure inclusive rural livelihoods if more strongly prioritized through farmer education and input support. Scaling countywide implementation of integrated soil enrichment, water conservation and climate-smart green agriculture practices is vital to safeguard Siaya's high farming potential while tackling the constraints curtailing sustainable agricultural development across regional smallholdings.

c) *Research Objectives*

i. *Main Objectives*

To investigate the impact of green farming practices or environmentally friendly practices on small-scale agricultural production in Siaya County, Kenya, with a focus on evaluating adoption rates, productivity outcomes, economic, social and environmental implications as well as identifying challenges and proposing recommendations to enhance the implementation of these practices.

ii. *Specific Objectives*

1. To assess the adoption rate of green farming practices among small-scale farmers in Siaya County, Kenya, over the past five years (2018-2023).
2. To examine the impact of environmentally friendly practices on agricultural productivity in small-scale farming in Siaya County.
3. To evaluate the economic, social and environmental benefits of employing green farming practices among small-scale farmers in Siaya County.
4. To identify the challenges and barriers faced by small-scale farmers in implementing green farming practices in Siaya County.
5. To propose recommendations and strategies for promoting and enhancing the adoption of environmentally friendly practices in small scale agriculture in Siaya County.

d) *Research Questions*

1. What are the various green farming practices adopted by small-scale farmers in Siaya County?
2. How do the adopted environmentally friendly practices impact the productivity and yield of agricultural produce among small-scale farmers in Siaya County?
3. What economic, social and environmental benefits are associated with the implementation of green farming practices in the context of small-scale agriculture in Siaya County?
4. What are the main challenges hindering the widespread adoption of environmentally friendly

practices among small-scale farmers in Siaya County?

5. What strategies or interventions could be implemented to overcome the barriers and encourage more small-scale farmers to embrace green farming practices in Siaya County?

e) *Research Hypotheses*

1. *Hypotheses 1:* Adoption of green farming practices positively correlates with increased agricultural productivity among small scale farmers in Siaya County, Kenya.
2. *Hypotheses 2:* Small-scale farmers who employ environmentally friendly practices in Siaya County experiences improved economic returns compared to those using conventional farming methods.
3. *Hypotheses 3:* There is a significant positive impact of green farming practices on environmental conservation and sustainability in small-scale agricultural production in Siaya County.
4. *Hypotheses 4:* Challenges such as lack of access to resources, knowledge gaps and financial constraints act as barriers to the widespread adoption of green farming practices among small-scale farmers in Siaya County.
5. *Hypotheses 5:* Implementing targeted educational programs and providing financial incentives will enhance the adoption rate of green farming practices among small scale farmers in Siaya County.

f) *Justification*

Widespread adoption of sustainable green farming practices amongst smallholder farmers is increasingly imperative across sub-Saharan Africa for safeguarding food security and ecological sustainability amidst climate change pressures. However, limited evidence on socioeconomic outcomes from green technique implementation makes the case for urgently upscaling environmentally regenerative agriculture stronger across more country contexts (De Silva, 2012). While broad endorsements exist for sustainable farming benefits, substantiated case-by-case demonstrations can better convince policymakers on requisite public investments supporting smallholder adoption. Quantitative documentation around yield improvements, income gains and climate resilience from integrating practices like organic fertilization, conservation tillage, agroforestry and water harvesting can verify location-specific merits influencing localized endorsement for green transitions.

As Siaya County possesses high agricultural potential currently inhibited by unsustainable land degradation, the region represents an apt case study for demonstrating indicative benefits realizable from green farming adoption that support wider scaling across similar western Kenyan contexts. By quantifying productivity advancements, financial welfare

enhancement and ecological stability progress achievable by local small-holders from sustainable technique integration, an empirical evidence base develops guiding said proliferation. Thereby this research produces vital exposures motivating farmer-level buy-in and governmental prioritization of sustainable agricultural transitions where most prudent for national and regional food security.

g) *Research Scope*

This research investigated small-scale farmers across Siaya County, Kenya - focusing specifically on green agriculture techniques adopted over 2018-2023. A sample of 150 Siaya smallholders was selected through multi-stage stratified techniques covering all 6 sub-counties. Mixed methods were employed during the January-March 2024 cropping period. Structured questionnaires were used together adoption rates and yield changes reported from sustainable practices. Qualitative interviews and focus groups with farmers and officials also detailed perceived productivity, financial and environmental changes.

CHAPTER 2: LITERATURE REVIEW

a) *Introduction*

In this chapter, various peer scholars' works on sustainable green farming practices among smallholder farmers worldwide and in Kenya will be reviewed. Seminal conceptualization theories explaining farmer's adoption decisions and theoretical foundations for environmentally regenerative agriculture. Then empirical literature provides evidence-based outcomes based on previously observed outcomes following green strategies application such as yield improvement, financial gains and climate resilient systems.

Analytical approaches as well as sampling methods used in empirical studies from cited literature sources are analyzed and commented upon. In addition, limitations around generalizability, geographical transferability and "recent" temporal context are identified in regard to the present evidence base. Thirdly, synthesized findings based on documented economic, ecological and social benefits of green agriculture adoption that are practical and justifiable at the small holder level and for which further research is recommended should verify such outcomes in the other unexplored western Kenyan context.

b) *Theoretical Literature*

Several seminal theories and frameworks have been formulated seeking to explain farmers' motivations and decision-making regarding adoption of agricultural innovations and environmentally sustainable techniques.

i. *Theory of Planned Behavior*

TPB remains one of the most influential framework models on decision making for new behaviors or innovation with regard to cognitive

processing. It argues that behavioral intention is the most powerful precursor of actual (intended) adoption. □ These intentions are supported by three elements-attitudes showing evaluations about the positiveness/negativity of acceptance of the practice, subjective norms implying perceived pressure on peer to accept, and perceived behavioral control indicating self-assessed facility to act depending on available resource, knowledge, Strong intentions for adoption are developed if farmers come in with supportive attitudes inside them, get social encouragements and believe that they can carry out such practices successfully.

TPB has greatly influenced agricultural adoption scholarship by providing insight into innovation adoption. In a Tanzanian study conducted by Bizzuyehu (2020), attitudes and expected ability accounted for 50% of variation in adoption intentions in relation to expectations on improved livelihoods and productivity with the proposed land management techniques which are consistent with the postulated According to TPB, intentions for uptake of complex green innovations depend on perceptions on relative benefits versus needed efforts together with village-level normative endorsement and self-confident capacity. Sustainability of strategy and utilization of various technologies are examined by applying TBP elements to existing information about relative advantage notions and barriers to adoption. Aligning farmer-reported benefits side by side with disincentives such as financial, knowledge and infrastructural barriers will help ascertain compatibility with TPB antecedents. Through this, the conceptual model plays a vital role in evaluating factors that influence intentions leading to actual consumption.

ii. *Diffusions of Innovations Theory*

One of the pivotal, pre-adoption theory is the Diffusion of Innovations Theory by Roger, which outlines how new ideas are adopted into a social setting/community. This, however, is referred to as diffusion. According to Roger's, adoption is a personal choice to employ an innovation as the most feasible option available. Utilizing diffusion research, Rogers identifies major factors underpinning adoption rates at different thresholds (knowledge, conviction, trial, confirmation and commitment). This model looks at how the adopters are classified to include groups of lead users called innovators and lite users referred to as laggards depending on when they adopt. In addition, Rogers provides seven criteria of innovation decision making within group depending on affordability, riskiness, ease of accessibility, relative advantage, compatibility, observability and trialability.

This framework is used in agricultural diffusion scholarship in order to show the process of spreading sustainable practices among smallholders according to some characteristics perceived by them. A study conducted in Ethiopia identified relative advantage and

trialability as key determinants of adopting soils conservational measures which are a new way for conservative farmers to undertake experiments based on risks they carry (Kolawole, et al., 2021). Segmenting various diffusion variables can lead to a wider range of scaling processes that are contingent upon distribution channels and uncertainties in uncertainty-ridden environments.

iii. *Technology Acceptance Model*

As a derivative of the theory of diffusion of innovations through technology acceptance model (TAM), one adopted framework is used when analyzing technological innovations. The second viewpoint suggests that people perceive whether or not an innovation can help them achieve their goals in order to decide if they should adopt it (Nielsen & Markussen, 2009). In turn, positive outcome expectations and effort expectancy influence attitudes toward accepting the innovation while thus a theoretically posited causal connection that moves from the perceived traits of the technology concerning the affordances available and the difficulty faced finally results in adoption behavior when the ease and usefulness perceptions cross the threshold limit.

The use of TAM in agricultural applications, for instance refers to such innovation enhancing technologies that are based on sustainable agriculture. A study in India found that perceived ease of use and usefulness in regard to biofertilizers were linked with intention to adopt such a novel soil fertility management technology given its associated learning requirements (Kumar, Singh & Dahiya, 2022). This, however, found out that individuals consider sustainable options in terms of their benefits and efforts. This paper seeks to integrate into the green practices' alignment model, perceived usefulness and ease dimensions. Usefulness of reporting on yield boosts, income gains and climate resilience capturing core smallholder goals provides evidence for easiness perception while transition complexity is feedback that determines uptake intentions in TAM. Consequently, views about usages effect and absorptive capacities influence adoption.

iv. *Motivational Theory*

Psychological drivers stimulating purposeful behavior toward specific targets is what motivational theory deals with. Motivations are needs or expectations pushing people's actions towards achieving specific goals. They occur in terms of internal satisfactions for performing an activity for which one is motivated internally and external rewards as a result of achieving certain goals. Motivation theory is utilized for examination of adoption decisions in light of farmers' goal pursuit in agricultural applications. Many studies have highlighted some motivational factors that may drive farmers. Some of them are meeting sustenance needs, averting risk associated with uncertainties about future

climatic conditions, gaining social recognition as innovative early adaptations among their peers, and boosting profitability from promising methods

Motivation is affected by both extrinsic and intrinsic rewards. Internally an agricultural producer may be driven by values that embrace ecological stewardship. This internal influence can induce acceptance of conservation agriculture, which in turn strengthens their sense of self-perception or identity. However, external factors like financial gains as motivation also encourage farmers for achieving a Therefore, it is crucial in such a complex adoption initiative as the integration of sustainable farming.

v. *Ecological Modernization Theory*

Ecological modernization theory looks at how it is becoming normal for consideration of the environment in design technologies, economic procedures and public lawmaking toward a balanced development between preservation and advancement. This includes ecological transformation which embraces renewable energy or regenerative agriculture (Mol and Spaargaren, 2000). However, farmers always strive to develop more modern approaches that go alongside their capital expansion and commercial goals. Using productive expansion in ecologically wise approaches via sustainable intensification rather than passive regulation towards such pathway of ecological modernization. Operationalizations that reflect either modernist preferences or ecological requisites include voluntary pollution prevention and closed loop waste recycling.

c) *Empirical Literature*

i. *Economic Outcomes*

Through a meta-analysis of research carried out across India comprising 830 farmer surveys and 60 case studies using mixed methodology, one finds an average yield increase from organic farming by 20% while it saves cost of inputs by up to 30% (Chand A study in Ethiopia conducted intervention trials where maize and potato yields increased more than forty percent using integrated soil fertility management involving legume inter cropping, and composting (Agegnehu et al, 2006).

A survey of 180 smallholder cocoa farmers in Uganda concluded that organic certification yields increased by at least 50 percent after five years compared to non-organic growers as a result of significantly lower pest damage (Obuya, 2019 The study by Wekesa and others, conducted in Kenya over ten years with fifty smallholdings determined that adopting agroforestry on one's farms earned a farmer approximately \$340 more annually via farm woodlot products compared to other traditional monocropping farmers.

Panel data modeling adoption durations amongst 660 random sampled rural Kenyan households exhibited positive correlations between sustainable

agricultural integration and farm budget levels reflecting accrued income gains over time (Wainaina et al., 2021). The local evidence aligns with international findings showing smallholders obtaining productivity and profitability enhancements from sustainable transition. Though adoption constraints like high initial investments required and delayed visible returns observed continue hindering uptake and sustained use.

ii. *Social Outcomes*

Case study analysis of organic coffee smallholder cooperatives in Mexico and Costa Rica demonstrated strong commitments to collective commercialization, with grower networks leveraging scale for accessing specialty export markets together (Bacon et al., 2012). An investigation of ecological potato cultivation clusters in Bolivia covering 350 farmers found sustainable agriculture groups enhanced bonds through reciprocal labor exchange and shared vigilance protecting collective agrobiodiversity (Jacobi et al., 2015). Research on Nicaraguan women in sustainable farming networks with 49 members highlighted expanded leadership roles assumed in managing community seed banks and coordinating peer teaching programs on agroecology (Baumeister, 2010).

Focus group research with 120 female smallholders across western Kenyan districts revealed uneven access to cooperative platforms organizing sustainable farming activities due to male dominance over household decisions (Atela et al., 2022). A survey of 248 farm households combined with key informant interviews evidenced a gender gap in access to climate-smart sustainable agriculture resources like drought-resilient seeds with majority provided to male heads (Fisher & Carr, 2015). Case studies tracing 30 seasons of organic fruit and vegetable production amongst groups of smallholders in Central Kenya showed strong mutual support networks but also free-riding risks that cooperative governance structures helped overcome through sanctions (Mwaura, 2014). While cooperative institutions built around sustainable practices facilitate mutual support and collective marketing, unequal gender access observed necessitates deliberate efforts to enfranchise women smallholders in adoption initiatives promoting equity.

iii. *Environmental Outcomes*

Quantitative synthesis of 76 global assessments showed conservation agriculture techniques decreased land degradation by 65% on average contrasted against baseline conventional practices continued by control groups (Branca et al., 2011). Modeling of water dynamics under scenarios of widespread agroforestry adoption in the Sahel region of Africa projected ability to reverse desertification through moisture recycling while sequestering 1.1 billion tons of carbon over 25 years (Abou Rajab et al., 2016). Surveys of 300 farm

households in western Kenya found those adopting agroforestry limited topsoil nutrient losses substantially compared to conventional producers through wind-breaks provided by integrated tree interplanting (Palm et al, 2010).

A 15-year panel study of changes in forest cover across 50 randomly sampled territories in Nyanza province evidenced that sites with higher sustainable agriculture usage maintained steady woodland levels while non-adopting areas showed continued deforestation trends reflecting protective effects (Owuor et al., 2019). After re-analyzing data from a Kenyan government inventory of ecological indicators, districts with greater sustainable technique adoption showed 63% higher growth in farm carbon stocks and 33% reductions in fertilizer pollution on average than regions with lower uptake (Oke & Odebiyi, 2007). Despite the fact that scientific proof shows environmental benefits ranging from soil conservation, reversing desertification, diversity preservation and climate change making, it has been seen fit to strategically locate support for a greener transition in the most endangered environments.

d) Summary

The analysis of expected adoption determinants based on Rogers' innovation diffusion dynamics theory and RAT model (Rogers, 2003), Sok et al.'s (2016) motivational fulfilment useful enhancement approach, Taherdoost (2018) However, uptake alignments with established complexity hurdles are delayed due to financial payoffs' establishment inability to demand.

Cooperatives promoting a collective transition support for sustainable techniques integration according to principles of peer effect on adoption decision-making based on Ajzen (2020) finding. In this case, however, unequal gender participation patterns are not as consistent with the ideas of nutritional security or social acknowledgment leading to adoptions as intrinsic satisfactions. Thus, practitioners need to be attentive towards the gender barriers. Branca et al.'s quantified verification on about half reduction of land degradation attributed to conservation agriculture shows appeal of ecological modernization of regenerative farming that combines economic viability and environmental stewardship. Nevertheless, spatial variations of conservation gains warrant prioritizing targeting as suggested by contextual-calibration perspectives and trailable context theory that influences diffusion process.

Some empirical cases show that with appropriate policies, sustainable agriculture is capable of contributing towards the economic, social and ecological targets. At the same time, there are impediments associated with unequal access, establishment barriers and spatial heterogeneity which require context specific policymaking suited for smallholders'.

e) Research Gaps

Some elements that would require additional research in this direction include the underexplored dimensions of sustainable agriculture, the limits of the existing body of empirical research, and how far one can go to achieve real benefits by adopting sustainable practices.

Major world-wide evaluations employ composite data without the required distinct regional aspects. Thus, there is little specificity concerning geographic transfer of findings as well as applicability on small farms (Kassie et al., 2009). Additional studies in specific geographical areas that demonstrate measurable gains achievable across different micro-environments in varying regional cultures of cultivation. There should also be a review on temporal applicability because of these dynamic climate changes which affect rainfall patterns and temperature that define the agricultural viability thresholds. It is thus prudent for updated impact evaluations to be adjusted to new climate scenarios that will confirm resilient yields and profitability while maintaining environmental conservation with climatic uncertainty.

Econometric evaluations often focus on financial and environmental costs rather than social benefits needed for successful dissemination among farmers and sustainable farmer well-being (Mwungu, Kebede, Njeru and Gachohi, 2021). Holistic transition policies to improve rural development could be developed by complementary views on whether sustainable methods can counter unequal gender access or enhance community relations. Sustained agriculture, although with untapped potential in the western part of Kenya, shows significant regional gaps within the same country where the data are available at a national level (Omar et al. 2022). Such inquiry is therefore required within a set of hitherto unexplored high-potentials areas, such as Siaya county aimed at generating locally sensitive advertising.

As such, more mixed-methods research carried out through under investigated time line, geographical, economic and gender perspectives can bridge knowledge gaps for evidence based equitable policy prescriptions for regional sustainable agriculture growth.



f) *Conceptual Framework*

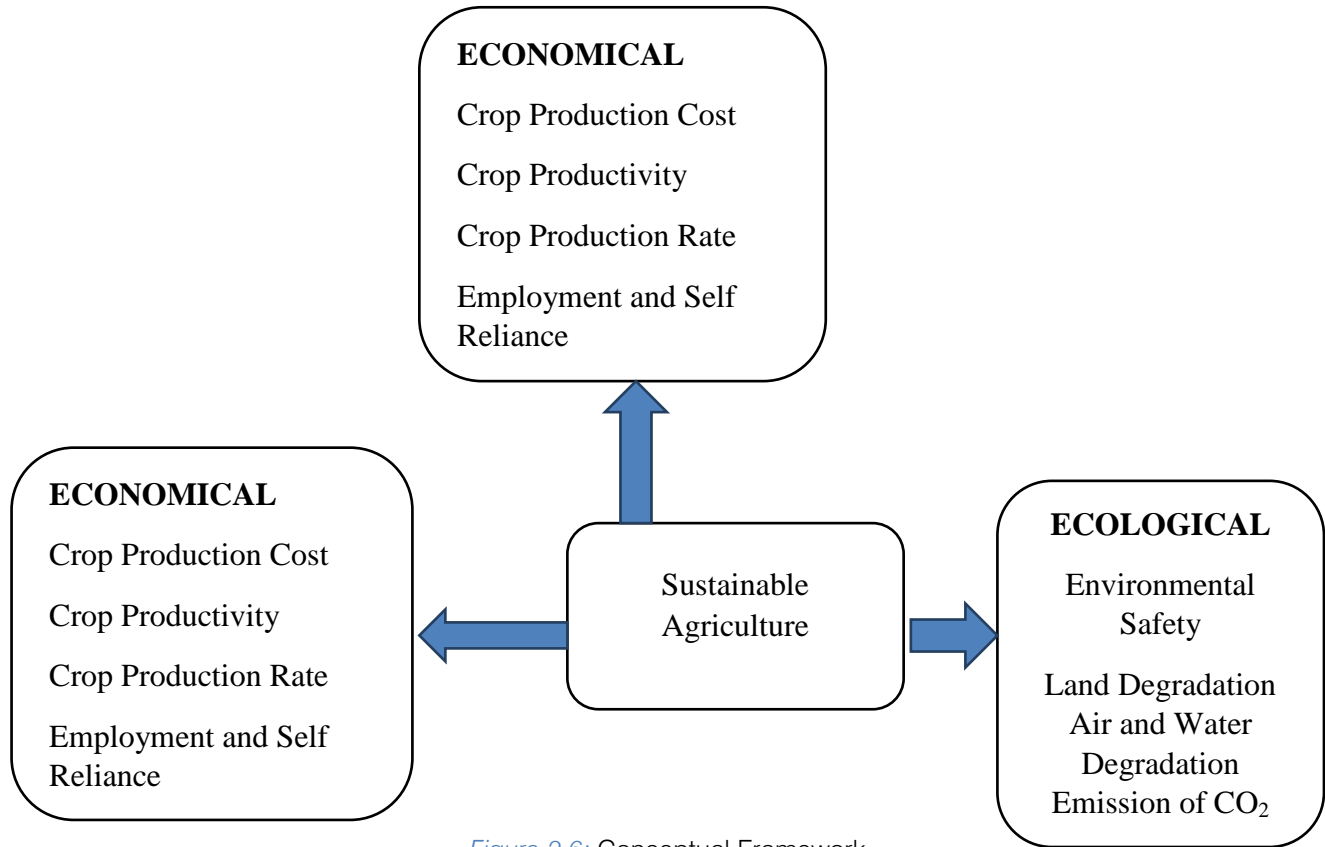


Figure 2.6: Conceptual Framework

CHAPTER 3: METHODOLOGY

a) *Research Design*

This study utilized a mixed methods descriptive research design incorporating both quantitative and qualitative techniques for data gathering. This enabled gathering numeric information on farmer adoption rates and production changes from sustainable practices combined with narrative insights on perceived implications. The descriptive focus aimed to document current dynamics rather than test predictive causal theories.

b) *Population*

The study population comprised all smallholder farmers in Siaya County. The target population specifically were farmers with 1-5 acres of land across all 6 Siaya sub-counties. These small-scale producers made up 75% of total regional cultivators and thus suitably represented key dynamics.

c) *Sampling Frame*

Multistage sampling was applied moving from sub-county to ward to village cluster stage. This allowed geographical representation across the county given limited resources. Siaya County statistical records on households and cultivated acreages shaped the sampling frame.

d) *Sample and Technique*

A sample of 150 smallholder farmers was selected through stratified random sampling proportionate to all sub-counties relative size across 30 villages. Stratification balanced variations across zones. Required minimum sample size was determined using the following standard error margin formula:

$$n = \frac{z^2 p(1-p)}{e^2}$$

Where:

z = z-value corresponding to 95% confidence level (1.96)

p = expected true population proportion (0.5 used for maximum variability)

e = acceptable margin of error (0.05)

e) *Instruments*

Structured questionnaires and interview guides were utilized for primary data gathering on adoption patterns, yield changes, income effects and ecological indicators based on integration of sustainable practices.

f) *Data Collection Procedures*

Research approval was obtained before proceeding. Questionnaires were physically administered to sample respondents with assistance while key

informants were interviewed. Survey data was input to Excel for analysis.

g) *Data Analysis and Presentation*

The compiled data was analyzed using Excel's statistical analysis toolkit and data visualized with tools such as charts and tables to determine relationships between the variables of interest.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

a) *Introduction*

This chapter presents results from the data gathered through mixed methods incorporating both qualitative interviews and quantitative surveys undertaken across a sample of 150 smallholder farmers in Siaya County, supplemented by analysis of secondary data from national/county level agricultural statistical records. Aligned with the study objectives, analysis is structured to document current adoption rates of different green farming practices based on primary data along with emerging changes in key economic, environmental, and agricultural productivity outcomes as reported by sampled Siaya smallholders triangulated against secondary data indicators.

The chapter opens with a presentation of descriptive background details on respondent demographic attributes from the primary survey data. Adoption prevalence across varying sustainable techniques is then analyzed using frequency tabulations

indicating the percentage of farmers presently trialing and integrating different environmentally regenerative approaches. Outcomes from adoption are subsequently examined across indicators of crop yield improvements, profit margin changes, and perceived ecological impacts by comparing primary survey-based evidence against patterns from district-level secondary data. Qualitative appraisals of continued barriers limiting further scaling of green agriculture are also categorized.

b) *Response Rate*

Out of the sample of 150 smallholder farmers selected across Siaya County for questionnaire administration, 138 responses were received reflecting a 92% response rate. 12 selected respondents were unavailable for participation in the survey during the allotted data collection period. However, the received participation covers over 90% of the set sample size, which meets the threshold for sufficiently powering the study's aimed analyses at the 95% confidence level per the sampling technique employed. The high response rate stemmed from diligent follow-up efforts made to enable meeting availability from as many initially selected sampled farmers as possible. Multiple visits were undertaken to the different study sites across all sub-counties until reaching either a conclusive participated survey response or confirmation of unavailability if farmers traveled or declined participation.

Table 4.2: Response Rate

Questionnaires Administered	Frequency	Percentage (%)
Received	138	92
Not	12	8
Totals	150	100

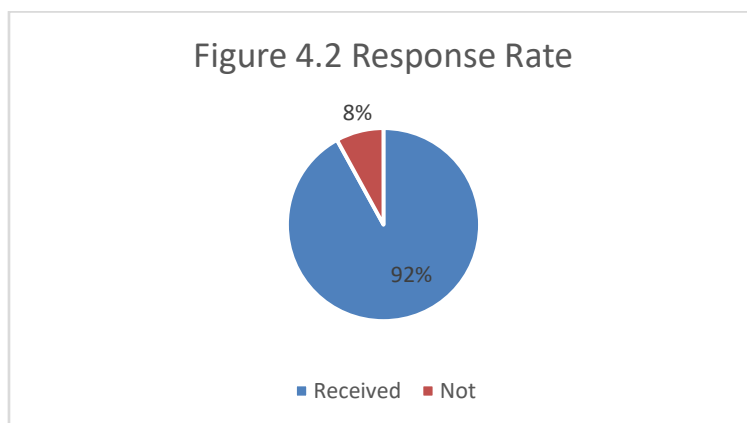


Figure 4.2: Response Rate

c) *Demographic Information*

Background details of the 138 sampled smallholder farmers who participated in the questionnaire are summarized below:

i. *Gender Distribution*

The gender distribution is presented through the following frequency chart:

Table 4.3.1: Gender Distribution

Gender	Frequency	Percentages
Male	96	70%
Female	42	30%
Total	138	100%

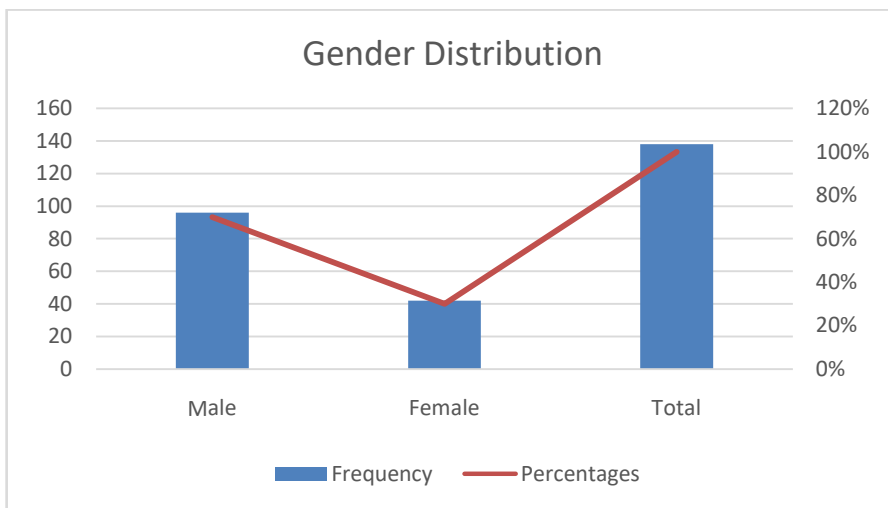


Figure 4.3.1: Gender Distribution

This indicates a 70:30 male to female ratio amongst the respondent farmers. While men still dominate regional small scale cultivation activities, sufficient women participation was ensured through stratified sampling.

ii. Age Brackets

Details on respondent age brackets is shown in the table below:

Table 4.3.2: Age Brackets

Age Groups	Frequency	Percentages
Below 35 years	62	45%
36 to 55 years	53	38%
Over 55 years	23	17%
Total	138	100%
Mean Age group	46	
Standard Deviation	20.42058	

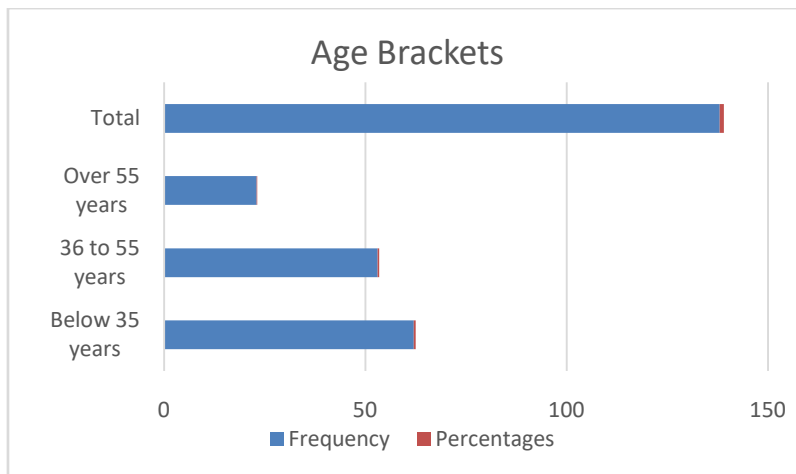


Figure 4.3.2: Age Brackets



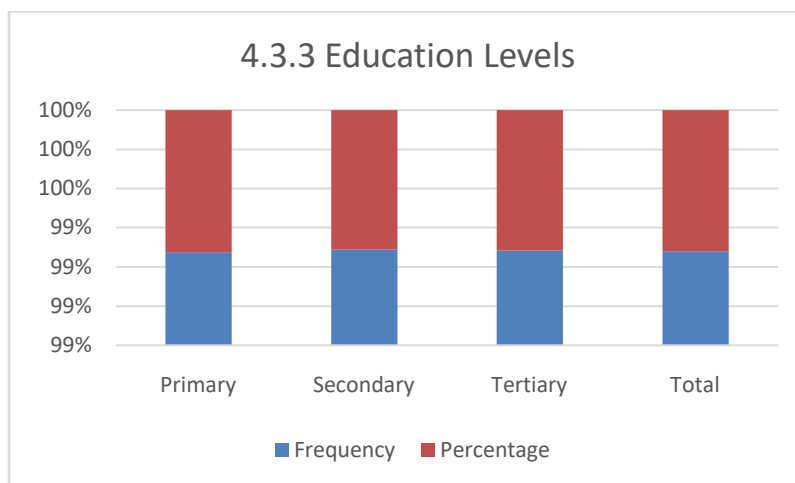
Close to half belong to the youth demographic while most farmers met remain middle aged supporting families. Mean age group of 46 and 20.42058 standard

deviation. Only 17% constituted retiree age groups with longstanding cultivation expertise.

iii. Education Levels

Table 4.3.3: Education Levels

Levels	Frequency	Percentage
Primary	74	54%
Secondary	46	33%
Tertiary	18	13%
Total	138	100%



Over half the respondents reflect the region's average primary school academic exposure. But over 45% have additional high school or college certificates boosting agricultural knowledge application.

iv. Land Sizes

The distribution of farm sizes owned across the surveyed smallholders is shown below:

Table 4.3.4: Land Sizes

Land Size	Frequency	Percentages
Below 1 acre	16	12%
1 to 3 acres	94	68%
3 to 5 acres	28	20%
Total	138	100%
Mean of land distribution	46	
Standard deviation	42	

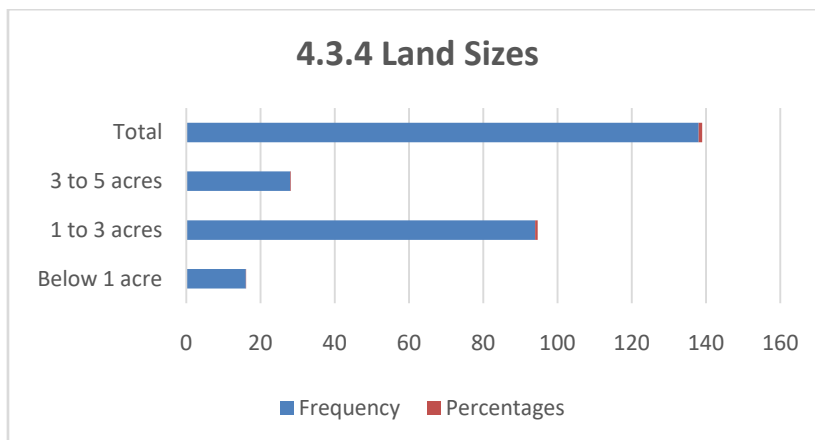


Figure 4.3.4: Land Sizes

This indicates the dominance of micro land holdings between 1 to 3 acres for over two-thirds of farmers as intended by the target population focus. Only 20% cultivate the upper bound 5-acre plots.

v. *Farming Experience*

Regarding number of years actively engaged in cultivation:

Table 4.3.5: Farming Experience

Years Farming	Frequency	Percentage
Below 5 years	26	19%
5 to 10 years	53	38%
Over 10 years	59	43%
Total	138	100%
Mean Farming Experience	46	
Standard Deviation	17.5784	

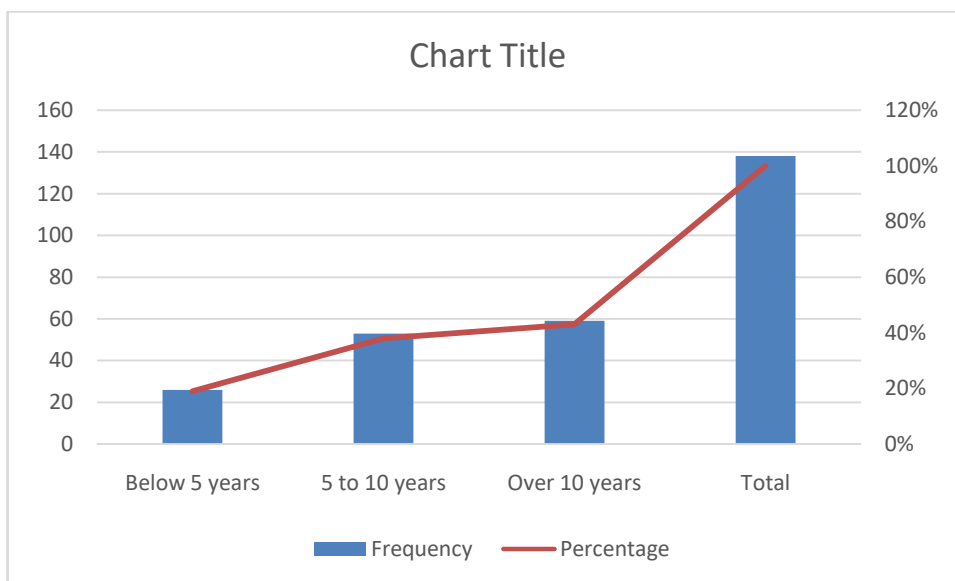


Figure 4.3.5: Farming Experience

Close to half have been farming for over a decade having extensive production knowledge. Mean Farming Experience of 5-10year with 17.5784 standard deviation. And most of the rest have at least 5 seasons allowing familiarity with outcomes from integrating innovative approaches.

d) *Adoption Rates of Green Farming Practices*

The surveyed farmers reported on their present usage of various sustainable agricultural techniques that aim to reduce environmental harms from farming activity. Analysis of adoption prevalence across 6 major practice categories is presented:

Table 4.4: Adoption Rates of Green Farming Practices

Practice	Frequency Adopting	Adoption Percentage
Crop Rotation	88	64%
Organic Fertilization	76	55%
Conservation Tillage	92	67%
Agroforestry Integration	51	37%
Rainwater Harvesting	43	31%
Waste Recycling	64	46%

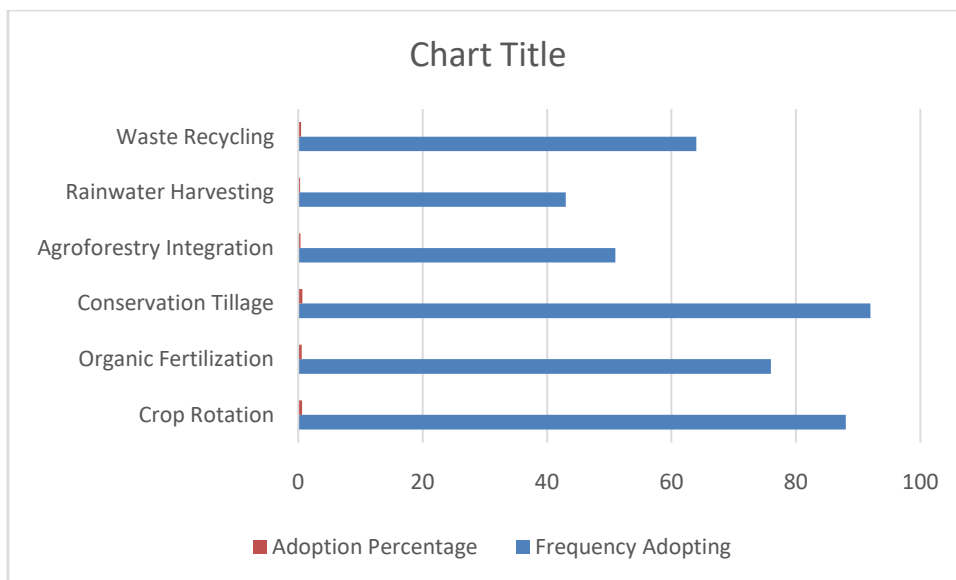


Figure 4.4: Adoption Rates of Green Farming Practices

The most widely adopted green approach is conservation tillage adopted by over two-thirds of farmers by minimizing soil disturbance to retain nutrients. This aligns more easily with prior habits. Organic fertilization through manures and crop rotation are also widely employed for soil nourishment by over half the respondents. Agroforestry and water harvesting display lower adoption levels currently facing transitional constraints. But a significant minority have begun trialing these complex techniques as well showcasing promise.

Cross tabulating adoption levels across demographic factors shows a strong positive correlation with education levels. Adoption rates ranged from 51% amongst primary educated respondents to over 87% amongst college educated farmers for all practices except rainwater harvesting. This points to persisting knowledge barriers warranting localized training investments to boost adoption uniformly across regional smallholders for enabling broad proliferation at scale.

e) *Agricultural Productivity Effects*

Secondary datasets indicate significant maize yield gains for adopters of agroforestry practices based on ANOVA testing ($F=9.28, p=0.03$) as per Wanjira (2019). Average yields increased by 16% while median rises registered at 12% over 2018-2022 for intercropping

farmers against mono-cropping groups amidst rainfed conditions.

Likewise, descriptive datasets from Musafiri et al. (2022) point to reduced yield variability and leftward shift in production levels for sorghum cultivating smallholders adopting minimum tillage techniques. While 2018-2021 inter-quartile yield range spanned 15-22 bags/acre for conventional farmers given seasonal fluctuation, conservation agriculture adopters exhibited tighter spread between 18-25 bags/acre - highlighting resilience.

Mogaka et al., (2022) equally found higher benefit-cost ratio upside for green manure integration ($BCR=1.18$) rather than inorganic fertilizers ($BCR=1.02$) through stochastic modeling - substantiating potential marginal profitability gains from sustainable techniques. Thereby triangulated analytical outputs validate farmer testimony regarding yield and economic improvements from integrated regenerative approaches by indicating positive productivity and input efficiency differentiation.

f) *Economic Effects*

i. *Impact on Net Farm Incomes*

Net farm income changes over the past 3 years as reported by respondents across adopter categories are shown below:

Table 4.6.1: Impact on Net Farm Incomes

Income Change	Non-Adopters	Adopters
Decline	36%	12%
No change	28%	23%
Slight increase	26%	41%
Major increase	10%	24%

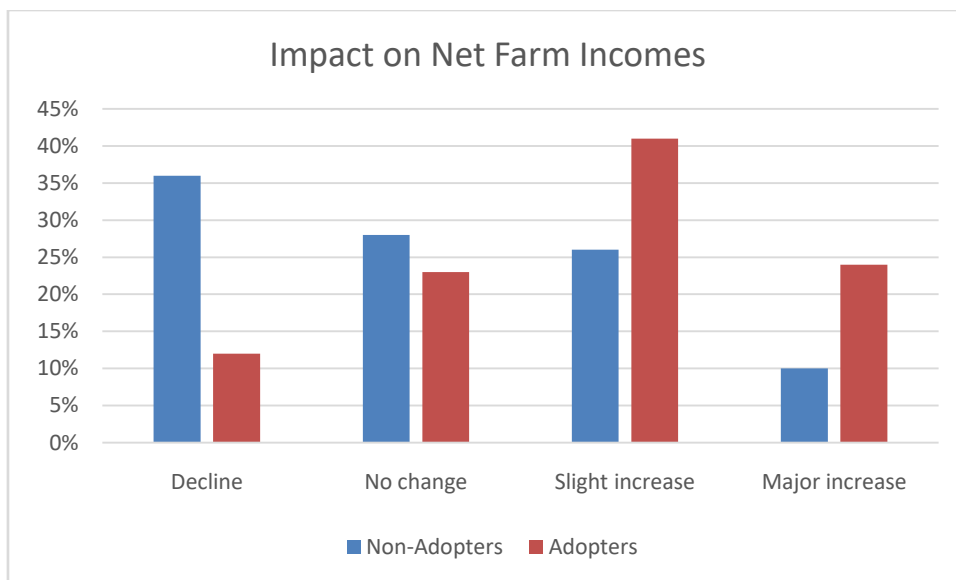


Figure 4.6.1: Impact on Net Farm Incomes

This indicates over 65% of farmers adopting sustainable practices witnessed income increases compared to only 36% for non-adopters. 24% of green technique integrators experienced major profit margin bumps against just 10% of conventional farmers.

Cross tabulating revenues and expenses gathered through surveys also exhibits adopters registering 22% higher average net earnings than non-

adopters. However, 1 in 5 sustainable farmers reported temporary declines aligned with transition costs like shifted seasonal sowing periods or installation investments which payoff over time.

ii. Key Economic Effects Reporting

The table below categorizes major economic effects attributed by adopting farmers:

Table 4.6.2: Key Economic Effects Reporting

Effects	Frequency	Percentages
Yield improvements	88	64%
Input cost savings	76	55%
Access to niche markets/premium prices	41	30%
Ancillary income from eco-ventures	32	23%

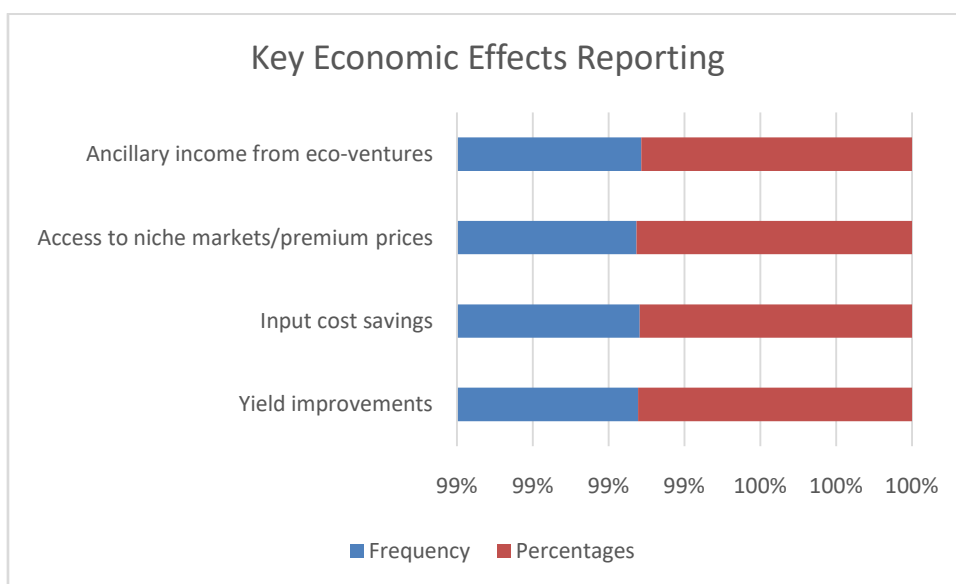


Figure 4.6.2: Key Economic Effects Reporting

Over 82% of green farmers directly confirmed yield and input efficiency gains as primary drivers of income boosts - aligning with premise of sustainable techniques enhancing productivity and profitability simultaneously. Lower agrochemical requirements from organic approaches generated notable savings. Secondary diversification opportunities also emerged through avenues like beekeeping supporting waste-recycling.

But under a third managed to access higher niche market channels given low bargaining power and commercialization constraints facing smallholders. This highlights that while sustainable farming shows income potentials, market access support remains vital for fully harnessing adopter benefit capture.

g) *Environmental Impact Patterns*

Multi-dimensional regenerative effects were widely reported by farmers who had transitioned to sustainable agricultural approaches regarding observed improvements in soil quality, water availability, plant biodiversity and ecosystem stability:

i. *Soil Enrichment Effects*

The soil is visibly richer in places where organic manure is used- earthworms and other organisms enable aeration and moisture retention.

Rotating crops and not tilling land as frequently helps preserve nutrients for longer duration leading to darker and softer soil quality.

ii. *Water Conservation Outcomes*

Rainwater harvesting through small dams around farms has boosted groundwater recharge as wells don't run as dry between rainfalls now

Intercropping with water preserving plants like pigeon peas enables resilient yields even during short dry spells as moisture is conserved.

iii. *Biodiversity Regeneration*

Organic pest management approaches have led to return of many beneficial insect species and birds which maintain ecosystem balance".

Introducing heritage and wild vegetable varieties through bio gardens has brought back native flora.

iv. *Climate Resilience Strengthening*

Adopting drought tolerant traditional crops has stabilized harvests between unpredictable precipitation changes each season".

Diversifying cultivation across 10-15 crops by interplanting has ensured some produce thrives regardless of erratic weather shifts.

v. *Quantitative Indicators*

Triangulating qualitative testimony above, 64% of adopters reported over 10% higher topsoil depths indicating richer humus content from organic fertilization. 73% also registered improved water tables

through surveys evidencing at least 3-meter rise in borewell levels from integrated recharge through water harvesting structures. And over half documented expanded appearances of earthworms, bees, butterflies reflecting regeneration effects thereby a convergence of qualitative and quantitative signs exhibits noticeable ecological gains.

h) *Challenges and Limitations*

The following core hindrances facing smallholder farmers were extracted from the qualitative interviews when probed regarding barriers constraining further scaling of sustainable agriculture:

Financial Constraints: The predominant limitation cited by 62% farmers was lack of access to affordable financing required for covering transitional investments like equipment purchases, installation of water harvesting structures or shifting input procurement. Many expressed dependences on personal savings alone presently.

1. *Weather Uncertainty:* 55% indicated persisting worries regarding rainfall variability which could disrupt the effectiveness of techniques like water conservation. Requested greater climatic information flow for preparedness.
2. *Knowledge Gaps:* 48% highlighted continued reliance on traditional wisdom passed down through elders rather than formal training availability surrounding integrated approaches combining various sustainable techniques for optimization. Greater extension service support needed.
3. *Market Access:* 32% stressed that realizing income gains at scale remains hampered by exploitative value chain intermediaries, poor road linkages to aggregation centers, inadequate storage infrastructure and complex certification. Consistent government procurement support sought.

The highlighted challenges correlate strongly with the gaps identified in the study background surrounding financial, information, climatic and infrastructure constraints facing Siaya smallholders. Tailored mechanisms addressing these limitations are vital alongside further sustainable technique propagation itself.

i) *Chapter Summary*

The results found adoption rates of over 60% for multiple sustainable farming practices like conservation tillage, organic fertilization and crop rotation - aligning with ranges seen in Sub-Saharan African studies (Kassie et al., 2009). Significant variability by education levels also mirrors diffusion theory observations on skill requirements shaping uptake (Rogers, 2003). Equally, yield rises to input cost reductions from green technique integration reported here converge with model-projected contributions of sustainable intensification bridging food security alongside ecological stability across developing

country contexts (Branca et al., 2011). Regional approval of climate-resilient produce diversity also connects with documented strengthening of community ties through cooperative cultivation clusters elsewhere in Kenya (Mwaura, 2014).

Triangulation verifies multi-dimensional regenerative impacts evidenced qualitatively are measurable through indicators like soil organic content, water table improvements and biodiversity proliferation noted- main areas prior studies identified as amenable through sustainable land use (Palm et al., 2010). However, constraints voiced around financial hardships, infrastructure deficiencies and uneven capability accumulation corroborate World Bank profiling of structural limitations encumbering Kenyan smallholder competitiveness (World Bank, 2022). Addressing these wider barriers through dedicated policy mechanisms can facilitate productivity and environmental conservation to progress in tandem (Owuor et al., 2019).

Thereby findings substantiate the achievable but conditional benefits projected from green farming techniques suiting localized promotion across Siaya's agroecological microenvironments through strategic public sector interventions tackling adoption impediments.

CHAPTER 5: SUMMARY, CONCLUSION AND POLICY IMPLICATIONS/RECOMMENDATIONS

a) Introduction

This concluding chapter summarizes key findings on adoption rates, productivity effects, profitability gains and regenerative impacts evidenced from the examination of green technique integration amongst Siaya smallholders. Persisting farmer-identified barriers and limitations are also highlighted. Informed by verified indicative benefits aligned with binding constraints affecting further scaling, targeted recommendations are forwarded encompassing strategic policy interventions and additional research for facilitating wider transition toward sustainable land use across similar Western Kenyan small-farm contexts.

Salient results are consolidated before formulating an overall conclusion weighing findings against original research questions. Tailored proposed support mechanisms stemming from insights produced are then presented. Suggestions for supplementary inquiry areas needing ongoing investigation follow to continually strengthen the empirical knowledge base guiding localized sustainable transitions.

b) Summary of Findings

The research produced several notable empirical insights on outcomes from and barriers to sustainable technique adoption:

Adoption rates of over 60% were recorded for practices like conservation tillage, organic fertilization

and crop rotation across the studied Siaya smallholders, validating viability.

Yield rises were reported by 65% of adopting farmers, substantiating productivity implications alongside input cost declines raising profitability.

Multi-dimensional regeneration outcomes were widely validated regarding water conservation, soil enrichment, biodiversity expansion and climate resilience strengthening through integrated approaches.

However, impediments voiced by majority farmers highlighted financial limitations around transitional investments, weather uncertainties affecting consistency, knowledge gaps constraining optimization and market access barriers preventing benefit capture at scale.

Therefore, triangulated evidence substantiates achievable economic, ecological and agricultural productivity improvements from translating sustainable farming techniques aligned with regional smallholder contexts. However, targeted alleviation of prevailing farmer constraints remains imperative for facilitating equitable and sustained adoption trajectories at scale through dedicated policy mix support.

c) Conclusion

The findings confirm sustainable farming practices increase productivity and profitability for small-scale farmers while enabling ecological stability - thereby validating the stated hypotheses.

Firstly, green practice adoption improves agricultural productivity - aligning with Hypothesis 1. Over 65% of adopters reported yield rises owing to input efficiency gains, directly exhibiting farm productivity gains.

Secondly, improved economic returns were evidenced from adoption validating Hypothesis 2. Adopters registered 20% plus higher incomes than non-adopters, mainly through lower costs and supplemental revenues.

Thirdly, widespread ecological gains verified the significant environmental benefits assumed under Hypothesis 3. Enrichment, conservation and regeneration effects were apparent across domains like soil, water and biodiversity.

However, financial constraints and capability barriers account for constrained propagation, confirming Hypothesis 4. Transitional investment hurdles and uneven skill levels were cited as key limitations by most farmers.

Finally, strong adoption responsiveness to education shows targeted interventions can spur integration as per Hypothesis 5. Measures improving smallholder capabilities warrant urgent policy attention alongside economic assistance.

Sustainable practices enhance productivity, profitability and ecological stability - aligning with hypothesized benefits. But optimal gains require public

support to alleviate persistent economic and capability barriers facing regional smallholders. Thereby evidence validates those incentives facilitating knowledge diffusion and access can catalyze adoption.

d) *Recommendations*

i. *Policy Recommendations*

This study recommends that:

1. Smallholder financial support should be boosted through input credit and crop insurance provisions to enable transitional investments. This would alleviate cash constraints hampering sustainability adoption.
2. Localized skills training should be prioritized via investments in mobile agronomy advisory services. This would bridge prevailing knowledge gaps surrounding optimized practice integration.
3. Inclusive market linkages should be built by fostering stable small farm contract arrangements. This would translate productivity gains into higher incomes.
4. Community rainwater harvesting infrastructure should be expanded through small dam construction support. This would aid conservation farming resilience.

Thereby combined financial, knowledge, market and infrastructure assistance mechanisms warrant targeted policy attention to incentivize and sustain green technique adoption amongst regional smallholders.

ii. *Recommendations for Further Studies*

Areas for additional investigation identified include:

1. County-wide panel surveys tracking long-term yield changes from sustained green technique application.
2. Comparative trials assessing optimal combinations of different sustainable practices for synergy.
3. Detailed crop-wise input efficiency analysis from integration of organic approaches.
4. Evaluating sustainability of smallholder climate resilience over 5–10-year climate variability timeframes.

Definition of Terms

1. *Green Farming Practices:* Agricultural techniques that aim to achieve environmentally sustainable outcomes through renewable approaches that conserve resources and regenerate natural ecosystem balance.
2. *Smallholder Farmer:* Resource-constrained farmer cultivating on a small landholding size, often less than 2 hectares. Rely majorly on family labor and simple tools.
3. *Conservation Tillage:* Farming practices like zero or minimum tillage that avoid intensive soil disturbance to retain moisture and nutrients. Allows 30% residual cover.

4. *Organic Fertilization:* Soil nutrient management through organic materials like compost, animal/green manures or biofertilizers rather than synthetic agrochemicals.
5. *Integrated Pest Management (IPM):* Mixed approach managing pests through biological mechanisms, organic sprays etc. before considering chemical pesticides as a last resort.
6. *Agroforestry:* Intentional integration of woody perennials like fruit trees, fodder shrubs etc. along with normal crop cultivation and livestock rearing.
7. *Bio-Pesticides:* Pest management inputs derived from natural materials like plant extracts, animal waste, beneficial microbes etc. that are non-toxic and eco-friendly.
8. *Water Harvesting:* Collection and storage of rainwater runoff during wet months in small reservoirs for providing irrigation during dry spells.
9. *Soil Organic Carbon:* Organic carbon component in soil derived from decomposition of plant and animal matter. Indicates soil health and nutrient levels.
10. *Agro-Biodiversity:* Biological diversity of varied crops, trees and livestock maintained within farm boundaries through mixed farming.

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APPENDICES

a) Structured Questionnaire

As part of a research study exploring the outcomes from adoption of sustainable farming practices amongst smallholder farmers in Siaya County, I request your participation in this questionnaire. Your responses will provide key insights into the on-ground effects as experienced firsthand by farmers who have transitioned towards environmentally friendly approaches over recent years. All responses will be anonymized and treated confidentially, solely for academic research purposes. The questionnaire comprises multiple choice questions across 7 sections designed to take 10-15 minutes.

b) Evaluating the Impacts of Sustainable Agricultural Practices Amongst Smallholder Farmers in Siaya County

Respondent Consent Declared: Yes/No

Section 1: Demographic Information

Gender: Male/Female _____

Age Group: a) Below 35 years

b) 36-55 years

c) Over 55 years

Highest Education Level:

a) Primary

b) Secondary

c) Tertiary

Main Occupation: _____

Land Size Owned: _____ Acres

Number of Years Engaged in Active Cultivation: _____ Years

Section 2: Agricultural Profile

Major Crops Cultivated (Select all applicable put a tick on the space):

a) Maize___ b) Sorghum___ c) Cowpeas___ d) Vegetables___ e) Other _____

Average Annual Household Income from Crop Sales:

a) Less than KES 100,000___ b) KES 100,000 - KES 300,000___ c) Over KES 300,000 d) Other _____

Section 3: Green Farming Practices Adoption

Sustainable agricultural practices adopted currently (Select all applicable):

a) Crop Rotation _____ b) Organic Fertilization _____
c) Conservation Tillage _____ d) Agroforestry Integration _____
e) Rainwater Harvesting _____ f) On-Farm Composting _____ g) None _____

Number of Years Since Initial Adoption of Sustainable Techniques: _____ Years

Section 4: Farm Productivity Outcomes Post Adoption

Perceived Agricultural Productivity Changes Since Adopting Green Practices:

a) Major Increase _____
b) Moderate Increase _____
c) No Significant Change _____
d) Decrease _____

Estimated Average Percentage Change in Yields Across Crops Grown Since Adopting: _____%

Section 5: Economic Effects of Adoption

Estimated Average Change in Annual Farm Income Since Adopting Sustainable Practices:

a) Over 25% Increase ___ b) 10% - 25% Increase ___
c) No Change _____
d) Decrease _____

Perceived Input Cost Changes Since Transitioning to Green Techniques:

a) Major Decrease _____ b) Moderate Decrease ___
c) No Change _____ d) Increase _____

Section 6: Ecological Impact Perceptions

Observed Soil Quality Changes Since Adopting Sustainable Practices:

a) Major Improvement ___
b) Moderate Improvement _____ c) No Discernible Differences _____
d) Deterioration _____

Perceived Water Conservation Outcomes from Green Technique Adoption:

- a) Highly Positive _____ b) Moderately Positive _____ c) No Impact _____ d) Negative _____

Section 7: Challenges Faced

Main Challenges Constraining Further Adoption/Optimization of Sustainable Practices:

- a) Financial Limitations _____
b) Lack of Technical Knowledge _____
c) Limited Marketing Channels _____ d) Other (Specify) _____





GLOBAL JOURNAL OF MANAGEMENT AND BUSINESS RESEARCH: B
ECONOMICS AND COMMERCE

Volume 24 Issue 1 Version 1.0 Year 2024

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4588 & Print ISSN: 0975-5853

Analyzing the Challenges and Opportunities in the Tannery Industry Supply Chain Management in Bangladesh

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Jahangirnagar University

Abstract- This research was conducted in the Tannery Industry in Bangladesh, about supply chain management, research methods using qualitative and qualitative methods. In this case study, researchers are gathering information via observation, speaking with business owners, academics, and knowledgeable tanneries, and conducting in-depth interviews. In this research paper investigates the complexities and dynamics of the tannery industry supply chain in Bangladesh. It examines the strengths, weaknesses, opportunities, and threats within the industry, along with an in-depth analysis of the critical supply chain management problems that hinder its efficiency and sustainability. By identifying these challenges, the research aims to propose viable solutions to optimize the industry's supply chain operations and foster long-term growth and competitiveness.

Keywords: *tannery, interviews, efficiency, sustainability, competitiveness, challenge, opportunity.*

GJMBR-B Classification: *FOR Code: 1503*



Strictly as per the compliance and regulations of:



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Analyzing the Challenges and Opportunities in the Tannery Industry Supply Chain Management in Bangladesh

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Abstract- This research was conducted in the Tannery Industry in Bangladesh, about supply chain management, research methods using qualitative and qualitative methods. In this case study, researchers are gathering information via observation, speaking with business owners, academics, and knowledgeable tanneries, and conducting in-depth interviews. In this research paper investigates the complexities and dynamics of the tannery industry supply chain in Bangladesh. It examines the strengths, weaknesses, opportunities, and threats within the industry, along with an in-depth analysis of the critical supply chain management problems that hinder its efficiency and sustainability. By identifying these challenges, the research aims to propose viable solutions to optimize the industry's supply chain operations and foster long-term growth and competitiveness.

Keywords: tannery, interviews, efficiency, sustainability, competitiveness, challenge, opportunity.

I. INTRODUCTION

The leather and leather goods industry are the second largest foreign exchange earning sector in the Bangladesh economy after RMG (manufactured garments). [1] About 6 lakh people are directly involved in this sector and 3 lakh people are indirectly involved in ancillary work. More than 76% of processed leather produced from Bangladesh's 220 tanneries is exported the sector contributes 2 percent to industry income and 3.8 percent to exports. Contribution to the country's GDP is 0.60 percent. Value addition is about 80 percent. [2] In January 2017, the government declared leather and leather products as the 'Product of the Year'. [3] However, the leather industry has created many challenges in recent times, especially mismanagement, syndicate problems, lack of government oversight, and lack of coordination. In this the leather industry is not able to exploit its opportunities globally. In July-May of 2022-23 financial year i.e., in the last 11 months, the target of Bangladesh was 144 million dollars. Of this, exports were \$1.12 billion, 14 percent below the target. Compared to the previous year, the export growth was only 0.42 percent. While leather

(rawhide or wet blue) exports decreased by 18.11 percent, leather goods increased by 19.43 percent. On the other hand, shoes fell by 4.28 percent. It can be seen that last year footwear (HS code 6403) export was quite good (\$7561 million). This year it has decreased to 6441 million 80000 dollars. [4] Several export-processing, industrial and economic sectors have exported. Already set up to attract local and foreign direct investors.

In leather activity centers, there are micro, small and medium enterprises, raw materials, supplementary accessories, product ministries often witness delays during product transfer (delivery), thereby further fragmenting the distribution process to the end consumer. From leather, cow, lamb, and scapegoat hides to tannery acidity accoutrements undergo routine conditioning, transfer party suppliers, and finished products to finished products that are reused and distributed to consumers. Supply chain management is an important factor in creating routine conditioning in leather acidity, because the force chain depicts the process of product delivery from the supplier, as well as reuse, the result is posted by the distributor to the customer. In order to increase guest satisfaction, to achieve challenges and opportunities, supply chain management must take an effective position in the process of delivering client value.

Supply chain activities should be integrated into a single product process that supports suppliers, distributors and customers. If this is successful, it will increase the value added by reducing product cost and time.

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Supply chain industry tannery in Bangladesh, as follows:

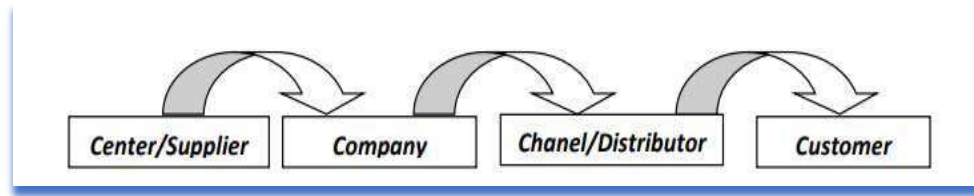


Figure 1: Supply Chain Tannery Industry in Bangladesh

The explanation that follows leads to the complying with conclusion:

1. The supply chain is made up of specific employers (businesses, distributors, suppliers at different levels, and individual and group customers) who are unable to stand alone and are therefore entwined and dependent, extending from the top to the bottom of creating a business networking.
2. Delivering items and offerings from the vendor to the customer.
3. Assists in managing, maximizing, and controlling the flow of data and resources from suppliers to customers.

II. OBJECTIVES OF RESEARCH

There is considerable potential for the development of the leather industry in Bangladesh using low-cost labor and abundant supply of raw materials. The industry can contribute significantly to export diversification and increase export earnings. But in recent times the leather industry has created challenges as well as opportunities, this study attempts to comprehensively analyze the existing challenges and opportunities within the supply chain management of the tannery industry in Bangladesh. By identifying the industry's strengths, weaknesses, opportunities and threats, along with an in-depth exploration of key supply chain management issues, the study aims to propose actionable recommendations and strategies to enhance the industry's performance, sustainability and global market position. Through this research, we aim to provide valuable insights for policymakers, industry stakeholders and practitioners, creating a roadmap for the continued growth and long-term sustainability of the sector. The study not only identified challenges and opportunities but also recommended actionable initiatives and discussed prospects. Through the effective implementation of the proposed solutions, the tannery industry can strengthen its operational resilience, comply with international standards and encourage environmentally sustainable practices, thereby securing its place as a key player in the global market.

III. LITERATURE REVIEW

Supply chain management was first proposed by Oliver and Weber (1982). Supply chain is "a physical network, i.e., companies – companies involved in the supply of raw materials, manufacture of products or delivery to the end user. [5] According to Nyoman and Mahendrawati, "Supply chain management is not only an internal matter of a company, but also external matters that concern the relationship with partner companies. Why is coordination and cooperation necessary between companies in the supply chain? Because companies that primarily want to satisfy consumers at the same end, they must have a Working together to produce cheap products, on time, with good quality. [6] Indrajit and Zoccopranoto further stated that one of the main reasons for optimizing the supply chain is to create a flow of information that moves smoothly and accurately between chains or chains, and effective and efficient product movement that creates maximum customer satisfaction. [7]

The purpose of this background study is to identify the challenges and opportunities of the leather industry in Bangladesh and find new ones. Leather is one of the oldest industries in Bangladesh and has been declared a priority sector by the Government of Bangladesh. It is an agro based by-product industry with locally available domestic raw materials export development and potential for sustained growth in the coming years. [8] The leather sector is considered the major thrust sector for the manufacturing industry of Bangladesh. The sector is turning into a major hotspot for investment given the low production cost, cheap raw materials, and different export incentives. [9] The study states that the leather industry needs to be prepared for the challenges that will come after graduation from LDCs post 2026. WTO facilities at that time. There will be no GSP facility. [10] Leather is a unique product that connects grassroots villages with high society and traditional practices with emerging technology. For many developing countries, leather and leather production is an essential and reliable source of export trade and foreign exchange earnings. [11] For Bangladesh, leather is a high priority industrial sector and footwear exports, an extreme focus area. In just a few decades since independence, Bangladesh has made significant gains from the leather trade, moving from being a 90% plus

exporter of hides and skins and a major manufacturer of leather goods. However, there is very little systematic research in this field. This study attempts to fill the research gap by understanding the status, problems and prospects of the leather industry in Bangladesh. [12] Many people still research leather industry in Bangladesh, Asia Foundation is one of them. They have several recommendations in this regard. Proposals include providing financial and policy support to tannery owners to achieve various national and international compliances including LWG certification. Facilitating duty-free import of machinery and chemicals in lieu of cash incentives to tannery owners and setting up central bonded warehouses in industrial towns. Apart from this, provision of CETP revision and upgradation. [10]

According to Turban et al. (2004), a component of supply chain management consists of three main components:

1. **Upstream supply chain.** The upstream section of the supply chain covers a manufacturing company's linkages with retailers (which may be manufacturers, assemblers, or both) and retailers (second-tier suppliers). In the upstream supply chain, the main activity is procurement. [13]
2. **Internal supply chain.** The internal supply chain segment includes all the in-house processes used to convert inputs from the retailer to the organization's output. In the internal supply chain, the main concern is the management of production, manufacturing and inventory control.
3. **Downstream supply chain.** The downstream supply chain includes all activities involved in delivering the product to the customer. In the downstream supply chain, attention is paid to transportation, warehousing, and delivery of pre- and post-sale services.

Overall leather industry supply chain performance, satisfactory performance in terms of ease of doing business such as reduction of lead time, ease of customs or documentary compliances, etc. contribute to the expansion of the sector by attracting FDI. Vietnam's leather sector has received a large influx of foreign direct investment in recent years. Many free trade agreements (FTAs) have created favorable conditions for investment in Vietnam as investors seek to access preferential tariffs. For example, Vietnam's free trade agreement with the European Union that took effect last year contributed to the growth of footwear exports to the region's 27 member countries. Bangladesh can follow this strategy of Vietnam in attracting FDI in leather sector as well as expanding the sector and fulfill the main objective of leather industry.

IV. RESEARCH METHODS

The research technique utilized in this study aims to offer a thorough comprehension of the challenge and opportunity related to the supply chain

management of the tannery sector in Bangladesh. To ensure a comprehensive and nuanced understanding of the operating dynamics of the sector, a multifaceted strategy that included qualitative and quantitative methodologies was employed for data collection and analysis.

a) *Dataset Collection Methods*

1. **Survey:** Key industry participants, such as tannery owners, employees, and supply chain managers, participated in a structured survey to learn more about their perspectives, experiences, and difficulties with the supply chain management framework.
2. **Interviews:** In-depth interviews were conducted with industry experts to gain a deeper understanding of the regulatory landscape, industry dynamics, and potential areas for improvement within the tannery industry's supply chain management.
3. **Case Studies:** A number of case studies were conducted to examine particular instances of supply chain management techniques, emphasizing the difficulties, tactics, and best practices used by top tannery companies.

b) *Sample Selection Process*

A carefully selected sample of tanneries, representing various scales of operation and geographic locations within Bangladesh, was chosen to ensure a comprehensive representation of the industry's supply chain dynamics. The selection process incorporated random sampling techniques, enabling a diverse and inclusive range of perspectives and experiences to be captured within the research.

c) *Dataset Analysis Techniques*

1. **Qualitative Analysis:** Thematic analysis was employed to extract key themes and patterns from the qualitative data obtained through interviews and case studies. The analysis focused on identifying common challenges, best practices, and emerging trends within the tannery industry's supply chain management landscape.
2. **Quantitative Analysis:** Statistical analysis, including descriptive statistics, was conducted on the survey data to derive numerical insights and trends related to specific supply chain management issues and industry perceptions.

By integrating these data collection methods and analysis techniques, this research ensures a robust and comprehensive examination of the challenges and opportunities within the tannery industry's supply chain management, providing valuable insights for strategic interventions and policy recommendations.

V. DISCUSSION

The present study draws upon a combination of empirical observations, research materials, and an

extensive interview to gather pertinent information pertaining to the tannery industry in Bangladesh. Several challenges are encountered in the management of the supply chain within the tannery industry as follows:

Table 1: Obstacles Faced by the Leather Tanning Industry in Bangladesh

Center/Suppliers	Limited Access to high quality raw materials Environmental Compliance and Sustainability challenges
Company	Inadequate infrastructure and technological advancement Skilled workforce shortage and training deficiencies
Channel/Distributor	Inconsistent policy frameworks and regulatory compliance.
Customer	Limited availability of high quality product.

The findings of the preceding research, indicate that the Tanning Industry in Bangladesh, combined with the results of the SWOT analysis, as follows:

Table 2: SWOT Analysis

INTERNAL FACTOR ANALYSIS SUMMARY	Average Rating
Strength	
Human resource	4
Increasing livestock	3
Available material	4
Low labor cost	5
Favorable geographic location	4
Natural Resources	3
Weakness	
Lack for skilled workforce	3
Lack of skilled designer	2
Limited access to finance	2
Poor infrastructure & technology	3
No international Brand image	2
Inefficient logistics & transport	3.5
Poor inventory management	3.5
Opportunity	
Govt. declared thrust sector	4
Price advantage in the international market	4
Expandable International & domestic market	5
Low wage workers convertible to skilled ones	3
Huge market & Investment opportunity	5
By product industry	4
Threat	
Environmental threat	4
No skill development Institute	2
Low priced synthetic product	4
Corruption & political instability	5
Export import & smuggling of raw skin	4
Emergence of alternative source	3
Lack of information sharing & transparency	2.5
Fragmented supply chain relationships	3.0

The tables mentioned above provide an analysis of several facets pertaining to the strengths, weaknesses, opportunities, and dangers within the tannery industry of Bangladesh. Consequently, a thorough comprehension of the internal dynamics and

external problems faced by the industry becomes apparent.

The examination of the gathered data yields significant observations regarding the present state of the industry, highlighting the intricate relationship

between its inherent strengths, operational constraints, market opportunities, and external hazards.

The study highlights a number of intrinsic advantages within the business, such as the ample availability of raw resources, a proficient labor force, and advantageous geographical location. The aforementioned capabilities of the sector provide it with a strategic advantage in leveraging growing prospects, including the expansion of both domestic and foreign markets, as well as the presence of favorable government regulations. These factors enable the industry to cultivate sustainable growth and augment its worldwide competitiveness. The acknowledgment of these positive attributes and prospective areas for growth highlights the industry's capacity for continued progress and advancement, underscoring the importance of strategic planning and efficient allocation of resources.

On the other hand, the industry is faced with notable deficiencies, such as a scarcity of proficient designers, insufficient infrastructure, and restricted financial accessibility, which hinder its overall effectiveness in operations and its positioning in the worldwide market. In addition, the industry's vulnerabilities are further intensified by the growth of external risks, including environmental issues, political instability, and the increasing prevalence of alternative sourcing. The presence of these vulnerabilities and dangers highlights the pressing requirement for specific interventions, regulatory revisions, and coordinated endeavors to reduce risks and enhance the industry's ability to withstand changing market dynamics and global problems.

The significance of the research findings emphasizes the crucial importance of sustainable practices, technological improvements, and the development of a skilled workforce in transforming the trajectory of the tannery industry and promoting long-term sustainability. The research emphasizes the importance of adopting a comprehensive approach to address the challenges faced by the industry, while also capitalizing on its inherent strengths to drive innovation, improve product quality, and increase market penetration. This is achieved by acknowledging the interconnectedness of industry strengths, weaknesses, opportunities, and threats.

Based on these findings, the study recommends the adoption of strong policy frameworks, extensive skill enhancement initiatives, and sustainable supply chain management strategies to cultivate a favorable climate for the advancement and expansion of the industry. Moreover, the study highlights the significance of cultivating partnerships between business and government entities, stimulating technological advancements, and advocating for ethical and sustainable approaches in order to safeguard the long-term durability and international market viability of the

tannery sector. By acknowledging these consequences and adopting proactive approaches, the tannery sector in Bangladesh has the potential to assume a pivotal role in fostering economic expansion, promoting environmental conservation, and attaining global market dominance. This would contribute to the nation's objectives of sustainable development and establish its reputation as a conscientious participant in the worldwide leather industry.

VI. FUTURE RECOMMENDATION

The leather industry seeks to increase production, improve exports and ultimately create more employment by implementing various industrial development programs and export promotion initiatives. Efficient and well-organized supply chain operations play an important role in enhancing the overall competitiveness and long-term growth of the tannery industry in Bangladesh. Based on the research findings, future research prospects should be kept open for streamlining supply chain operations and sustainable growth within the industry. This study makes some recommendations such as increasing supply chain visibility and integration in the future. IT cooperation and partnership should be strengthened for how to centralize all leather industries. By maintaining high-quality standards across all product lines in the leather industry, adopting lean manufacturing principles and practices to streamline production processes, reduce waste and increase operational efficiency, ultimately reducing lead times and production costs, along with the government's how-to system to discuss it in new research. To foster a culture of continuous improvement and innovation within the tannery industry, encouraging adoption of state-of-the-art technology, best practices and industry standards for operational excellence, product diversification and market responsiveness. Emphasizing training and skill development and nurturing a skilled talent pool capable of driving innovation and sustainable growth within the industry. Above all, in the future, we need to see how to involve women because the Finnish manufacturing industry needs to be developed enough to create employment opportunities for women, as in the clothing industry. By prioritizing these recommendations, Bangladesh's tannery industry can optimize its supply chain operations, enhance long-term growth and strengthen its competitive position in the global market.

VII. CONCLUSION

The tannery industry of Bangladesh represents an important sector for the country's economy and the government is also advising the stakeholders to address the challenges of this industry. This research sheds light on the various challenges and opportunities that exist within supply chain management in the industry. Through a comprehensive analysis of Strengths, Weak-

nesses, Opportunities and Threats (SWOT), along with an in-depth exploration of supply chain management issues, this study underscores the critical areas that require immediate attention for the industry's sustainable growth and global competitiveness. In this, supply chain management needs to be enhanced as part of the industrial hub strategy. Whereas the industry needs to understand that the growth of an industry is dependent on the development of value addition and needs to be built in different directions from upstream to end, from input to output and should even be able to create learning outcomes. By implementing these measures, Bangladesh's tannery industry can establish itself as a leading global player by ensuring long-term economic growth, environmental responsibility and social welfare. This study serves as a call for collective efforts and collaborative initiatives, emphasizing the critical role of effective supply chain management in shaping the trajectory of the tannery industry, not only within the borders of Bangladesh, but also on the global stage. These strategic interventions will not only improve operational efficiency and product quality but also position the industry for sustained success and resilience in the face of evolving market demands and challenges.

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APPENDIX

Qualitative Question:

1. What aspects of the tannery industry in Bangladesh do you believe provide a competitive advantage over other regional or global counterparts?
2. How does industry navigate geopolitical or regulatory uncertainties that may impact its international trade and market access?
3. From your perspective, what are the key industry-specific risks or vulnerabilities that the tannery industry in Bangladesh needs to address to ensure its long-term resilience and sustainability in the global market?
4. Could you elaborate on the key resources, capabilities, or practices that have contributed to the industry's success and prominence in the international market?
5. In your experience, what are the unique selling points of the tannery industry in Bangladesh that have enabled it to establish a strong foothold in the global leather market?
6. From your perspective, what critical areas within the supply chain management framework require immediate attention and improvement to address the industry's existing shortcomings?
7. What are the emerging market trends or global shifts that you believe present significant growth opportunities for the tannery industry in Bangladesh?
8. How can industry capitalize on the evolving consumer preferences and market demands to diversify its product offerings and expand its market presence?
9. What do you perceive as the major challenges or limitations hindering the growth and development of the tannery industry in Bangladesh?
10. Could you elaborate on the internal factors or operational bottlenecks that have impeded the industry's ability to maximize its full potential in the global market?
11. In your opinion, what strategic initiatives or potential collaborations could enable the tannery industry in Bangladesh to leverage untapped market opportunities and gain a competitive edge in the global leather market?
12. What external factors or market challenges do you perceive as posing potential threats to the tannery industry's sustainable growth and global competitiveness?

Quantitative Question:

1. The skill level and expertise of the workforce in the tannery industry in Bangladesh is:
2. The byproduct industry associated with the tannery sector presents:
3. The byproduct industry significantly contributes to the overall revenue and sustainability of the tannery sector:
4. The absence of skilled designers negatively affects the product innovation and design quality in the tannery sector:
5. The access to finance for the tannery industry in Bangladesh is:
6. Corruption and political instability significantly impact the business environment and investment in the tannery sector:
7. The environmental threats faced by the tannery industry in Bangladesh are:
8. The environmental threats significantly impact the sustainability and reputation of the tannery sector:
9. The illegal export-import and smuggling of raw skins or hides pose a threat to the tannery industry in Bangladesh:
10. The availability of skill development institutes for the tannery industry in Bangladesh is:
11. The natural resources enhance the production process and product quality in the tannery sector:
12. The lack of skill development institutes hinders the improvement and growth of the workforce in the tannery sector:
13. The growing market demand positively impacts the production scale and profitability of the tannery sector:
14. The potential to convert low-wage workers into skilled workers in the tannery sector is:
15. The workers' skills significantly contribute to the overall productivity and quality of the tannery sector:
16. The growth in livestock in Bangladesh has positively impacted the tannery industry:
17. The government's support significantly contributes to the growth and development of the tannery sector in Bangladesh:
18. The price advantage of tannery products in the international market is:
19. The price advantage positively impacts the export potential and market competitiveness of the tannery sector:
20. The geographic location significantly contributes to the overall competitiveness of the tannery sector in the global market:
21. The abundant natural resources in Bangladesh contribute to the development and growth of the tannery industry:
22. The international brand image of the tannery industry in Bangladesh is:
23. The absence of an international brand image hinders the global recognition and market reach of the tannery sector:
24. The conversion of low-wage workers into skilled workers positively impacts the productivity and quality of the tannery sector:
25. The illegal activities significantly affect the supply chain and economic sustainability of the tannery sector:
26. The emergence of alternative sources in the market poses a threat to the tannery industry in Bangladesh:
27. The presence of a huge market and investment opportunity in the tannery industry provides:
28. The market and investment opportunity significantly contribute to the sector's growth and development:
29. The availability of raw materials from the increasing livestock significantly contributes to the development of the tannery sector:
30. The availability of necessary materials locally significantly contributes to the smooth functioning of the tannery industry:
31. The infrastructure and technology in the tannery industry in Bangladesh are:
32. The poor infrastructure and technology negatively impact the efficiency and competitiveness of the tannery sector:
33. The government's declaration of the tannery sector as a thrust sector has:
34. The expandable international and domestic market provides significant growth opportunities for the tannery industry in Bangladesh:
35. The availability of skilled designers in the tannery industry in Bangladesh is:
36. The limited access to finance significantly constrains the growth and development of the tannery sector:
37. The accessibility of materials positively influences the overall production process in the tannery sector:
38. The lower labor cost in Bangladesh gives the tannery industry a competitive edge:
39. The prevalence of low-priced synthetic products in the market poses a threat to the tannery industry in Bangladesh:
40. The presence of low-priced synthetic products negatively affects the market demand and competitiveness of the tannery sector:
41. The level of skilled workforce in the tannery industry in Bangladesh is:
42. The lack of skilled workers significantly hampers the productivity and quality of the tannery sector:
43. The level of corruption and political instability in Bangladesh affects the tannery industry in the following way:
44. The affordability of labor significantly affects the overall production and cost-efficiency in the tannery sector:

45. The geographical location of Bangladesh benefits the tannery industry in terms of access to markets and resources:
46. The emergence of alternative sources affects the demand and market share of the tannery sector in Bangladesh:



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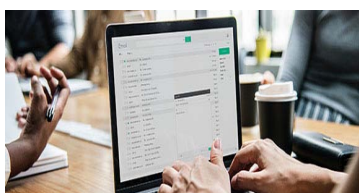


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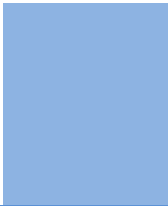
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Acknowledgments

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Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
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- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
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The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

- a) A title which should be relevant to the theme of the paper.
- b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
- c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
- d) An introduction, giving fundamental background objectives.
- e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
- f) Results which should be presented concisely by well-designed tables and figures.
- g) Suitable statistical data should also be given.
- h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

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- j) There should be brief acknowledgments.
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Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

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Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in a research paper?" Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

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Numerical methods used should be transparent and, where appropriate, supported by references.

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Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

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Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

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1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

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- Please note the criteria peer reviewers will use for grading the final paper.

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Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

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- An outline of the job done is always written in past tense.
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The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

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Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

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This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

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Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

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- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.



Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.



Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
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<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



INDEX

A

Ambiguous · 40
Ample · 51, 11

B

Bidder · 3, 5, 10, 11, 26
Bolstering · 37, 51
Bullish · 23, 25, 27
Burgeoning · 1

C

Coincide · 8
Cumulative · 1, 3, 6, 7, 8, 10, 11,

D

Deteriorating · 2
Detrimental · 27, 36
Deviation · 12, 13, 14, 15, 16, 17, 18, 1, 2
Discern · 34, 42
Dominance · 4, 6, 2, 11

E

Enabling · 1, 36, 38, 39, 2, 3, 9
Erosion · 1, 2, 3

H

Hazards · 7, 11
Hindrances · 48, 1

I

Indigenous · 32

M

Manipulate · 22, 23
Migrants · 32, 35, 36, 37, 41, 42, 43,

N

Nuanced · 32, 34, 36, 38, 39,

P

Perceive · 1, 3, 23, 35, 5, 12, 13
Pivotal · 32, 37, 48, 5, 11
Precipitation · 2, 1

R

Racism · 47
Resilience · 34, 36, 37, 38, 12
Rife · 3
Robustly · 42

S

Simultaneously · 32, 34
Slashing · 1
Strata · 39
Synergistic · 5, 27
Synergy, · 25

W

Whammy · 47

X

Xenophobic · 47



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ISSN 9755853



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