

Revolutionizing Over-Dimensional Cargo Transportation in Bangladesh: A Quantitative Analysis of the Impact of Modern Technology

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Abstract:- Asset/non-asset-based domestic and foreign logistics conglomerates are introducing themselves as project logistics experts for heavy equipment handling, over-dimensional cargo (ODC) specialists, multimode transport planners, and project documents handlers to satisfy customer demand and reliability. The transportation of over-dimensional cargo in Bangladesh is vital for economic growth. This paper quantitatively analyzes the impact of modern technology on revolutionizing over-dimensional cargo transportation in the country. This study aimed to analyze the impact of modern technology on over-dimensional cargo transportation in Bangladesh, using quantitative methods and evaluates their effectiveness in improving efficiency, reducing costs, and enhancing safety in transporting oversized goods. The findings offer valuable insights for policymakers and industry stakeholders to leverage technology for sustainable and robust cargo transportation networks. This research contributes to the growing body of knowledge on technology adoption in transportation and provides a foundation for further research in this area.

Keywords:- Project Logistics; Transportation Planning; Over-Dimensional Cargo, Logistics Technology.

I. GENERALITIES OF THE STUDY

A. Introduction

Over dimensional cargo transportation is a critical element of logistics and supply chain management, especially in a developing country like Bangladesh where the demand for heavy-lift cargo transportation is constantly increasing. With the rapid advancement of technology, the over dimensional cargo transportation industry has undergone significant changes. This research paper aims to explore the impact of modern day technology on the over dimensional cargo transportation industry in Bangladesh. The study will examine the different types of technologies used in over dimensional cargo transportation, including software solutions, GPS tracking systems, and specialized equipment. Through a comprehensive review of the literature and a survey of industry experts, this research paper seeks to evaluate the benefits and challenges of modern day technology in the over dimensional cargo

transportation industry and identify opportunities for further technological advancements in the field.

B. Objectives of the Study:

The objective of this research is to investigate the impact of modern day technology in over dimensional cargo transportation in Bangladesh. Specifically, the study aims to:

- Evaluate the role of modern day technology in improving the efficiency and effectiveness of over dimensional cargo transportation in Bangladesh
- Analyze the impact of modern day technology on the safety and security of over dimensional cargo transportation in Bangladesh
- Assess the economic and environmental benefits of using modern day technology in over dimensional cargo transportation in Bangladesh
- Propose recommendations for the adoption and implementation of modern day technology in over dimensional cargo transportation in Bangladesh
- Contribute to the existing literature on over dimensional cargo transportation in Bangladesh by providing empirical evidence on the impact of modern day technology

Overall, the study aims to provide insights into the potential benefits of modern day technology in over dimensional cargo transportation in Bangladesh, and to guide policy makers and industry stakeholders in making informed decisions regarding the adoption of technology.

C. Scope of the Study:

This research aims to explore and analyze the impact of modern-day technology on over dimensional cargo transportation in Bangladesh. The scope of this study is limited to the following aspects:

- Definition of over dimensional cargo transportation: This research will define the term "over dimensional cargo transportation" and explore the current state of this industry in Bangladesh.
- Analysis of the current transportation system: This study will analyze the current transportation system used for over dimensional cargo in Bangladesh and identify the challenges faced by the industry.

- Evaluation of the impact of modern-day technology: This research will evaluate the impact of modern-day technology, such as GPS tracking, automated loading and unloading systems, and advanced communication systems on over dimensional cargo transportation in Bangladesh.
- Recommendations for technology implementation: Based on the findings of this study, recommendations will be made for the implementation of modern-day technology in the over dimensional cargo transportation industry in Bangladesh.

Overall, this research will provide insights into the current state of over dimensional cargo transportation in Bangladesh and how modern-day technology can improve its efficiency and effectiveness.

D. Limitations of the study:

The scope of this study is limited to over dimensional cargo transportation in Bangladesh. Due to lack of availability of time and resource complete logistics of over dimensional cargo will not be discussed or included in the study. Also other modes of transportation and other countries will not be included in this study.

II. LITERATURE REVIEW

A. Theory:

Over-dimensional cargo (ODC) can be distinguished as non-standard weight, size and shape that deviates from the standard ones. Special means of transport and reloading machines are necessary to handle and withstand the weight of the load or unusual shape or size of this type of cargo

(Macioszek, 2019). Handling of over-dimensional cargos requires special types of arrangement. For an example let's consider a HRSG Module of any Combined Cycle Power Plant. This types of Module could have a length of 27M (88 ft). Or a Steam Turbine of a power plant could have a weight around 400 ton. For transportation of this type of cargo with exceptional length will be considered a ODC Cargo. Special types of Preparation and planning is required for safe transportation of this ODC Cargos. And if this is a multimodal transportation it will need even more sophisticated planning. Just like route survey, Jetty Preparation, Roll off Operation, Inland Transportation and installation of the item on the required area. And all the steps of the transportation will be mentioned and clearly defined along with the safety parameters in a document named as Method Statement. A well planned method statement could be defined as the well described process or guideline to finish the transportation.

A modern day logistics company must prepare the method statement using modern day tools such as total station machine for topographical survey(Fig-1) of the area, before constructing the jetty it should be well calculated and well designed in terms of engineering integrity and the roll off operation will be well planned by proper drawing(Fig-02) and guideline. Also they will check the physical movement of the cargo through a simulation software like heavygoods (Fig-03). And all the item of the logistics planning will be checked from the engineering point of view along with the point of view of safety. (Md. T. Islam et al., 2022)

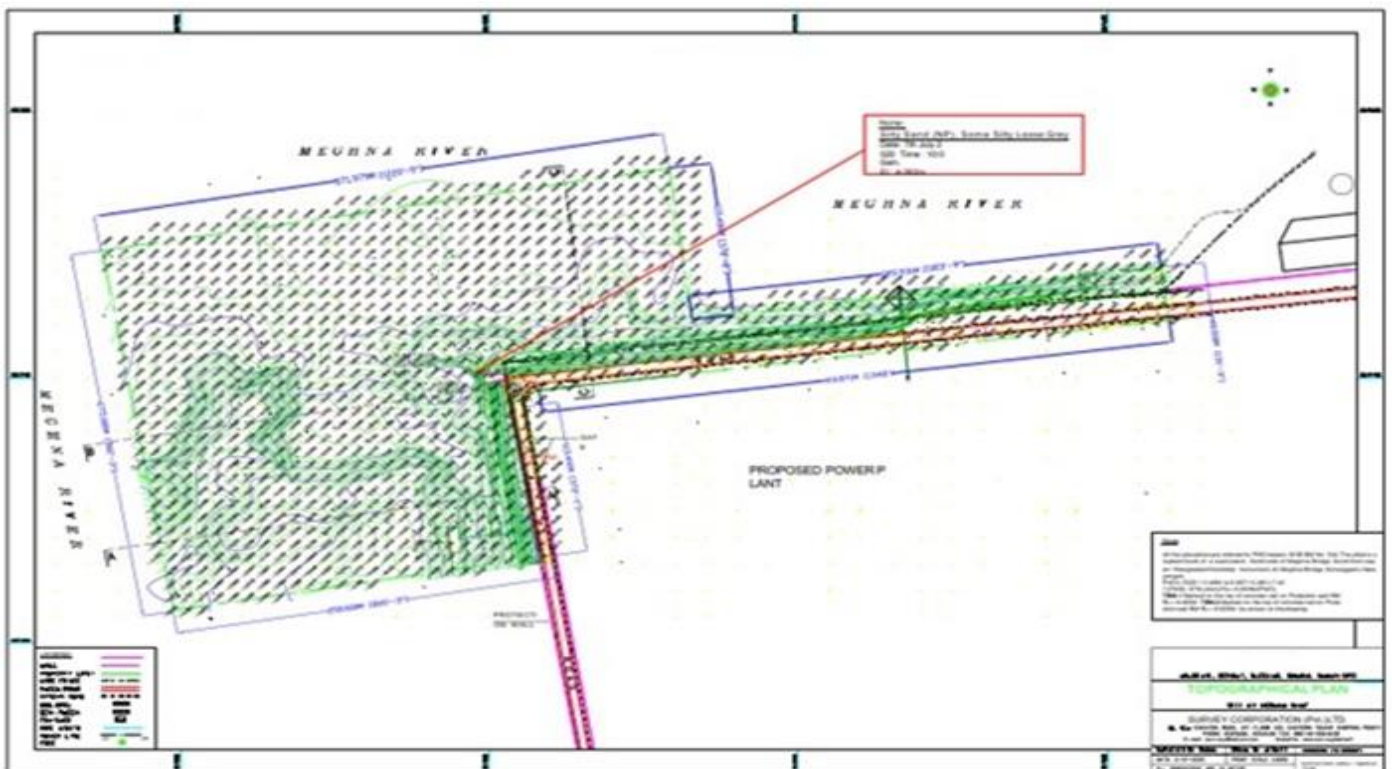


Fig 1 A sample of Topographical Survey Report

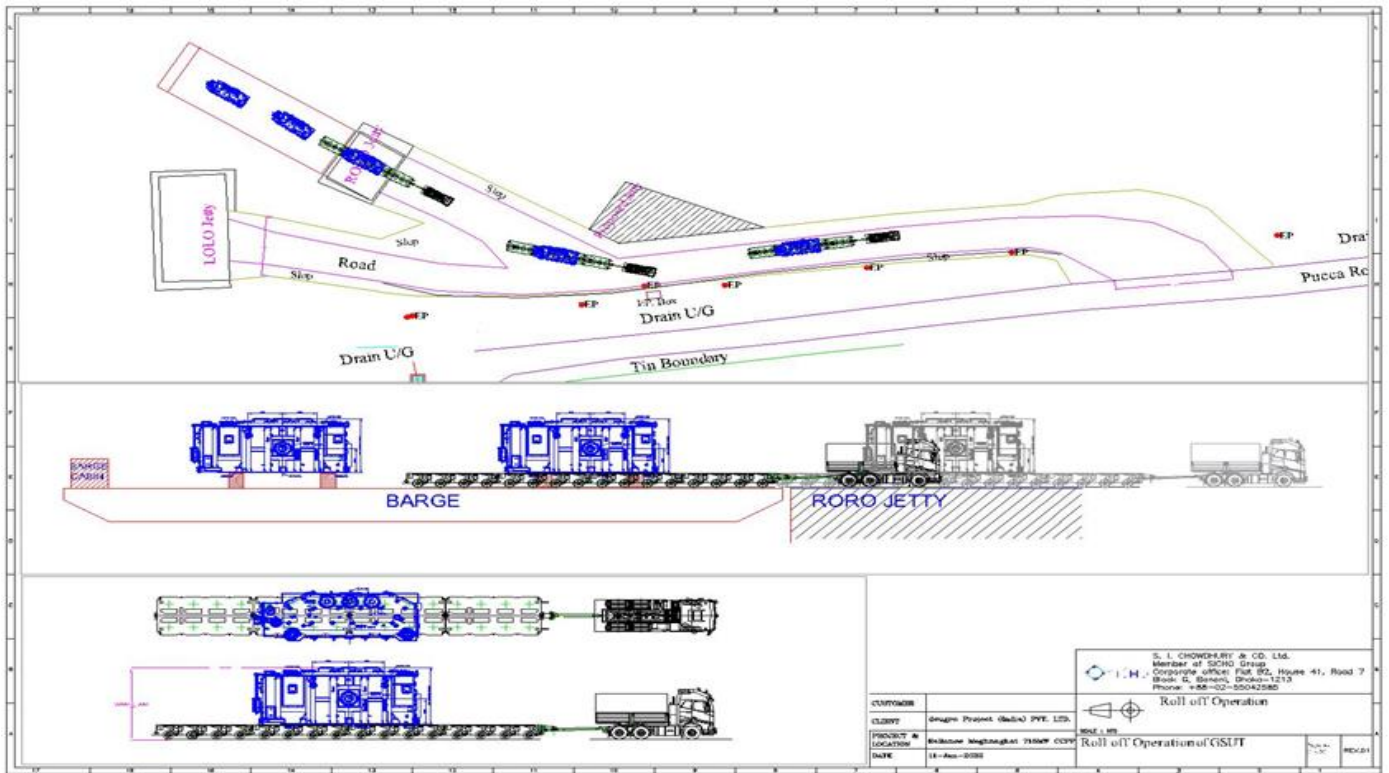


Fig 2 Sample Drawing of a Roll off Operation.



Fig 3 Sample of Transportation Simulation.

B. Previous Study:

Me along with two other researcher tried to understand the current scenario of Bangladeshi companies in logistics industries of Bangladesh though a research named “An Empirical Study on Project Logistics at EPC Projects of Bangladesh” (Md. T. Islam et al., 2022) on that paper we came to conclusion that Local companies are contributing a lot physically but systematically or technologically they need to improve themselves to win the project as the turnkey

basis and due to lack of knowledge in terms of modern-day tools and technologies foreign companies are getting the contract and assigning us as sub-contractor. But as that paper was a qualitative study based on the experience of the authors along with two project logistics expert professional from two business group such as higher management of a leading domestic project logistics company and another higher management from leading international project Logistics Company. As the previous study was on a huge

industry, and due to shortage of time and resource author decided to reduce the scope of the research on over dimensional cargo transportation only. And tried to reach to a conclusion based on the quantitative data.

III. RESEARCH METHODOLOGY

A. Method of Research:

This research is a Descriptive Research (Creswell, 1994) using a Survey Research technique based on set of quantitative data. Upon receiving of all the data a SPSS analysis is been performed to execute the research.

B. Respondents and Sampling Procedure:

49 logistics professional participated on the survey and in between these 49 there was 05 foreign participant on the survey. 44 of them shared their view by google form and 05 of them submitted the answer sheet by e-mail. As the total number of logistics professional in Bangladesh not countable, author decided to use the Non-probability Samples for the number of participant. Due to shortage of

time and resource author was unable to collect more data from more participant.

C. Questionnaire:

20 question is been prepared for the data collection, in between this 20 question there was 03 screening question and 04 demographic question. Answer of the Remaining 13 question is collected in 5-point Likert scale. Detail of the questionnaire is in appendix-01.

D. Statistical Statement of Data:

Upon receiving of all the data a SPSS analysis is been performed. First of all a reliability analysis like Cronbach's alpha (Collins, 2007) of the data is been performed measure the internal consistency.

➤ Reliability

- Scale: All Variables

Table 1 Case Processing Summary

Case Processing Summary			
Cases	Valid	N	%
	Excluded	0	.0
	Total	49	100.0

a. List wise deletion based on all variables in the procedure.

Table 2 Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.793	20

As Cronbach's Alpha Value is 0.793 which is very close to 0.8. (Frost, 2022)

Table 3 Statistics of Screening Questions

Statistics of Screening Questions				
		Are you working/directly involve in over dimensional cargo transportation?	How long you are involve in over dimensional cargo transportation	What is the maximum freight tons you have transported in your carrier
N	Valid	49	49	49
	Missing	0	0	0
Mean		1.00	2.73	3.31
Std. Deviation		.000	1.095	1.489
Percentiles	100	1.00	5.00	5.00

➤ Frequency of Screening Questions.

Table 4 Are you Working/Directly Involve in Over Dimensional Cargo Transportation

Are you working/directly involve in over dimensional cargo transportation?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	49	100.0	100.0	100.0

All the 49 participants of the survey is either working or directly involve in over dimensional cargo transportation. The author of the paper is directly to these participant.

Table 5 How long You are Involve in Over Dimensional Cargo Transportation

How long you are involve in over dimensional cargo transportation					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>less than one year</i>	4	8.2	8.2	8.2
	<i>01 to 03 Year</i>	19	38.8	38.8	46.9
	<i>04 to 07 Year</i>	18	36.7	36.7	83.7
	<i>07 to 10 year</i>	2	4.1	4.1	87.8
	<i>above 10 year</i>	6	12.2	12.2	100.0
	<i>Total</i>	49	100.0	100.0	

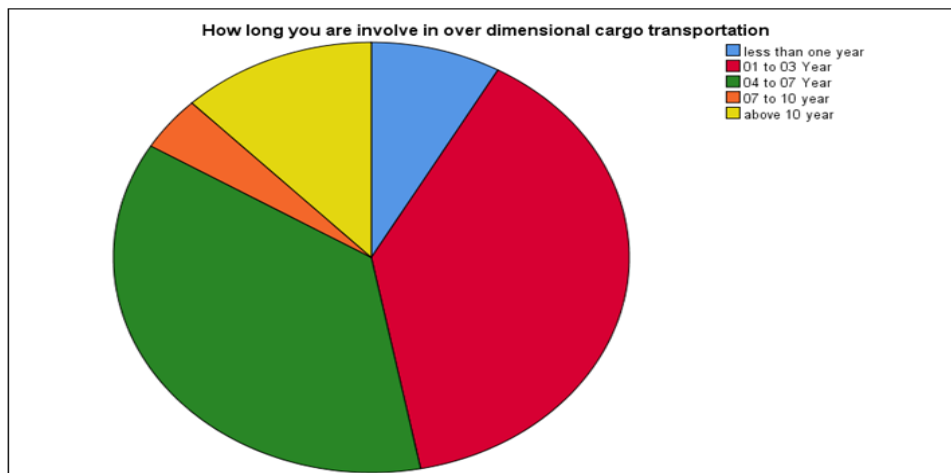


Fig 4 How long You are Involve in Over Dimensional Cargo Transportation

The participant of the survey questionnaire are from all type of experience group and maximum of them 38.8% are working on the sector for 01 to 03 Years and 12.2% of the participants are working in the same sector for more than 10 years.

Table 6 What is the Maximum Freight Tons You have Transported in Your Carrier

What is the maximum freight tons you have transported in your carrier					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>less than 50 Ton</i>	7	14.3	14.3	14.3
	<i>50 to 100 Ton</i>	11	22.4	22.4	36.7
	<i>100 to 200 Ton</i>	7	14.3	14.3	51.0
	<i>200 to 500 Ton</i>	8	16.3	16.3	67.3
	<i>Above 500 ton</i>	16	32.7	32.7	100.0
	<i>Total</i>	49	100.0	100.0	

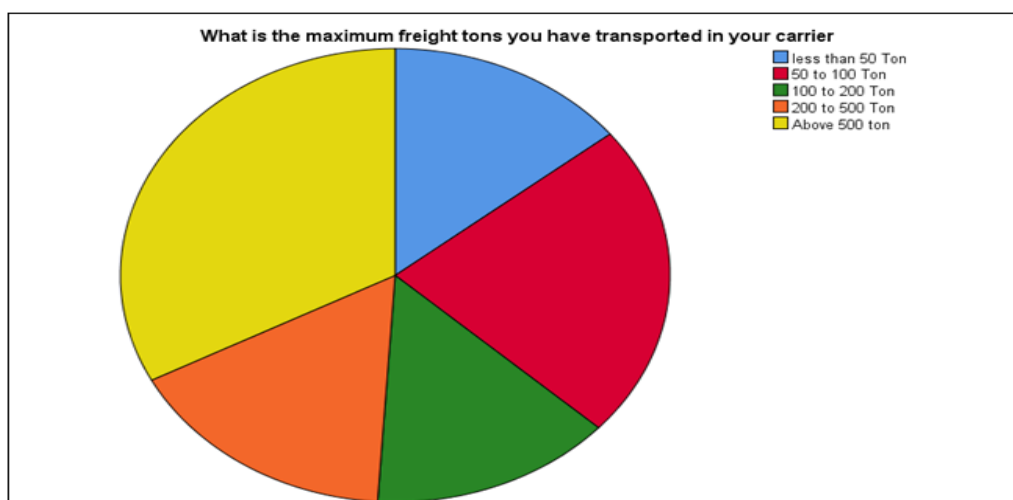


Fig 5 What is the Maximum Freight Tons You have Transported in Your Carrier

Participant of the survey questionnaire are having experience in all the category of freight tons, and maximum 32.7% of them are having experience for freight ton of more than 500Ton.

Table 7 Statistics of Demographic Data

Statistics of Demographic Data					
		<i>Please indicate your gender.</i>	<i>Which of the following age group you are in?</i>	<i>What is the highest level of education you have completed?</i>	<i>Approximately what is your income per month?</i>
<i>N</i>	<i>Valid</i>	49	49	49	49
	<i>Missing</i>	0	0	0	0
<i>Mean</i>		1.02	1.86	1.39	3.18
<i>Std. Deviation</i>		.143	.791	.492	1.439
<i>Percentiles</i>	100	2.00	4.00	2.00	5.00

➤ *Frequency of Demographic Data.*

Table 8 Please Indicate Your Gender

Please indicate your gender.					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Male</i>	48	98.0	98.0	98.0
	<i>Female</i>	1	2.0	2.0	100.0
	<i>Total</i>	49	100.0	100.0	

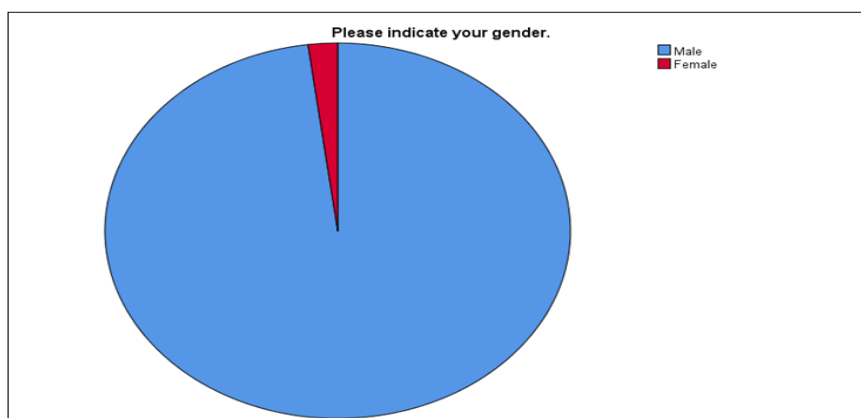


Fig 6 Please Indicate Your Gender

Only 2% of the participant are female, which indicate the toughness of the sector for woman in Bangladesh.

Table 9 Which of the Following Age Group You are in?

Which of the following age group you are in?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>24-30</i>	18	36.7	36.7	36.7
	<i>31-40</i>	21	42.9	42.9	79.6
	<i>41-50</i>	9	18.4	18.4	98.0
	<i>50 and above.</i>	1	2.0	2.0	100.0
	<i>Total</i>	49	100.0	100.0	

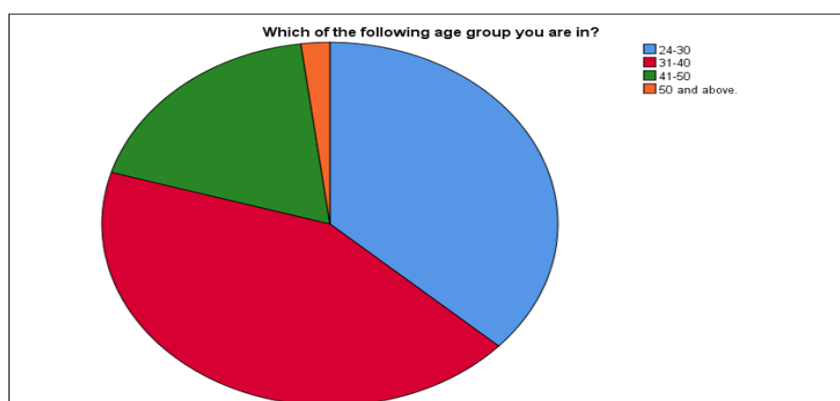


Fig 7 Which of the Following Age Group You are in?

Participant of the survey are from almost all the age group. But maximum of them 42.9% are in the age group of 31 to 40 Years.

Table 10 What is the highest level of education you have completed?

What is the highest level of education you have completed?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Bachelor's Degree</i>	30	61.2	61.2	61.2
	<i>Master's Degree</i>	19	38.8	38.8	100.0
	<i>Total</i>	49	100.0	100.0	

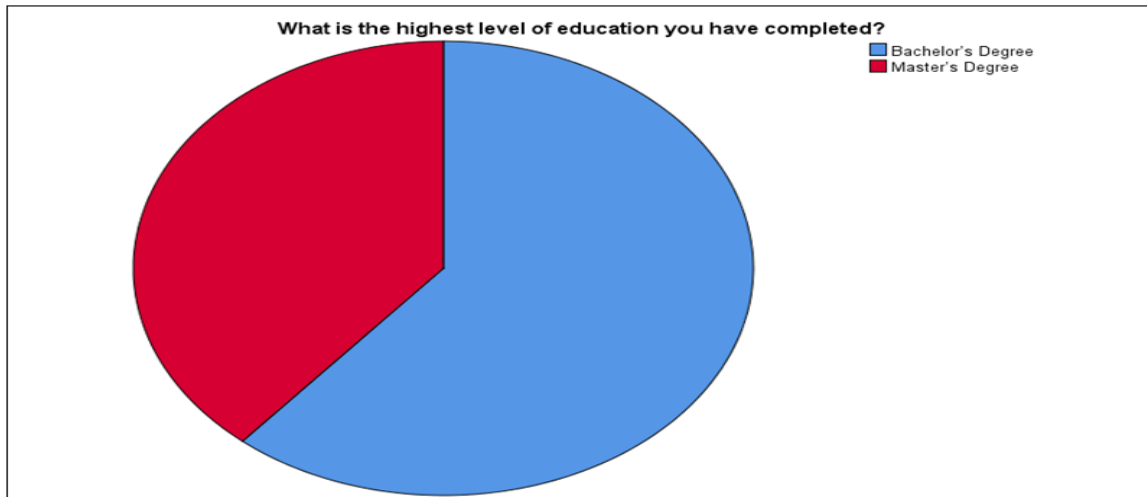


Fig 8 What is the highest level of education you have completed?

61.2% of the participant are having a bachelor Degree, but none of them are having any Doctorate degree.

Table 11 Approximately what is your income per month?

Approximately what is your income per month?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Below 30,000 BDT</i>	7	14.3	14.3	14.3
	<i>30,001 to 50,000 BDT</i>	12	24.5	24.5	38.8
	<i>50,001 to 75,000 BDT</i>	8	16.3	16.3	55.1
	<i>75,000 to 100,000 BDT</i>	9	18.4	18.4	73.5
	<i>More than 100,000 BDT</i>	13	26.5	26.5	100.0
	<i>Total</i>	49	100.0	100.0	

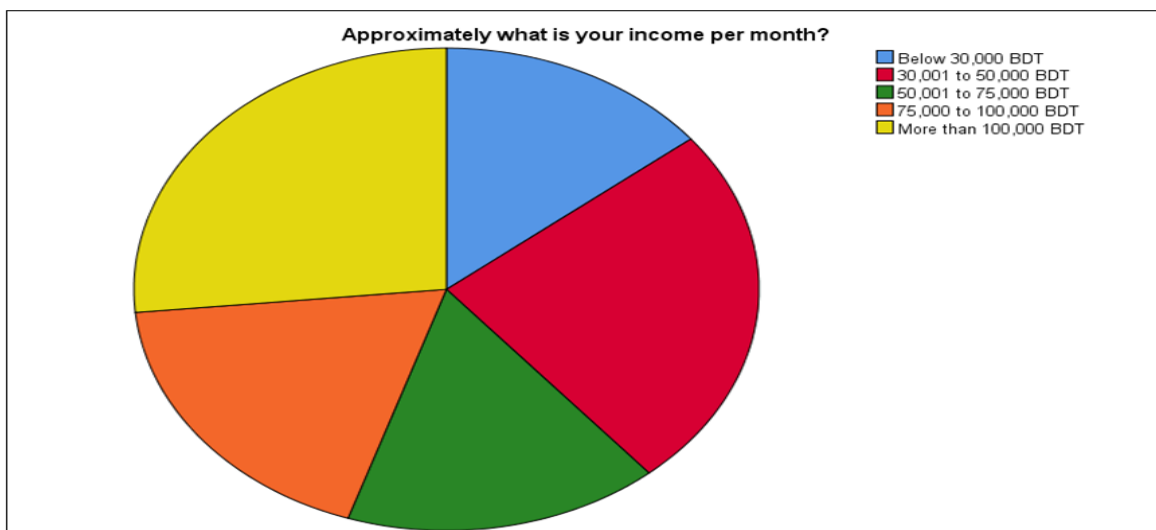


Fig 9 Approximately what is your income per month?

Participant of the survey are from almost all short of salary range.

IV. PRESENTATION OF DATA AND CRITICAL DISCUSSION OF RESULTS

A. Descriptive Analysis for Demographic Factors:

Table 12 Statistics of Question Regarding the Impacts of Modern Day Technology

Statistics of question regarding the impacts of Modern day Technology					
	<i>N</i>		<i>Mean</i>	<i>Std. Deviation</i>	<i>Percentiles</i> <i>100</i>
	<i>Valid</i>	<i>Missing</i>			
<i>Modern-day technology has made over-dimensional cargo transportation safer and more efficient?</i>	49	0	4.04	0.498	5.00
<i>Do you believe that technology has reduced the risk of accidents in over-dimensional cargo transportation?</i>	49	0	4.00	0.612	5.00
<i>Do you believe that modern-day technology has increased the capacity and speed of over-dimensional cargo transportation?</i>	49	0	4.08	0.607	5.00
<i>To what extent do you agree that modern-day technology has reduced the cost of over-dimensional cargo transportation?</i>	49	0	3.59	0.864	5.00
<i>How much do you believe that modern-day technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation?</i>	49	0	4.08	0.607	5.00
<i>How much do you believe that modern-day technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo transportation?</i>	49	0	3.96	0.706	5.00
<i>How much do you believe that modern-day technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?</i>	49	0	4.06	0.689	5.00
<i>How much do you believe that modern-day technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation?</i>	49	0	3.92	0.607	5.00
<i>To what extent do you agree that modern-day technology has made it easier to comply with regulations and standards in over-dimensional cargo transportation?</i>	49	0	3.80	0.676	5.00
<i>To what extent do you agree that modern-day technology has increased the level of transparency and accountability in over-dimensional cargo transportation?</i>	49	0	3.78	0.685	5.00
<i>How much do you believe that modern-day technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation?</i>	49	0	3.86	0.645	5.00
<i>Do You think Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering?</i>	49	0	2.39	0.885	5.00
<i>Do You think, Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development</i>	49	0	4.53	1.043	5.00

Table 13 Modern-day technology has made over-dimensional cargo transportation safer and more efficient?

Modern-day technology has made over-dimensional cargo transportation safer and more efficient?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Neutral</i>	5	10.2	10.2	10.2
	<i>Agree</i>	37	75.5	75.5	85.7
	<i>Strongly Agree</i>	7	14.3	14.3	100.0
	<i>Total</i>	49	100.0	100.0	

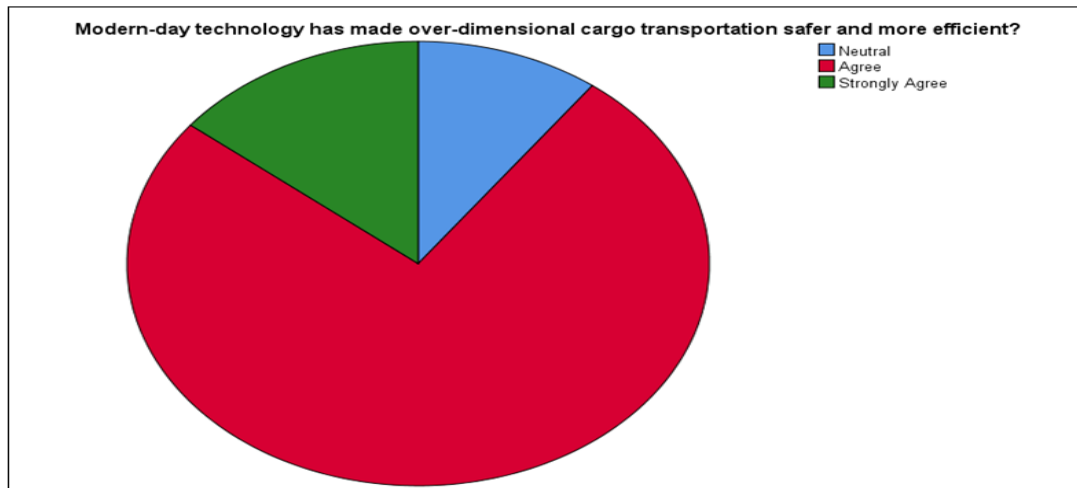


Fig 10 Modern-day technology has made over-dimensional cargo transportation safer and more efficient?

75% of participant believe that modern technology has made over-dimensional cargo transportation safer and more efficient and 14.3% of participant strongly believe the same.

Table 14 Do you believe that technology has reduced the risk of accidents in over-dimensional cargo transportation?

Do you believe that technology has reduced the risk of accidents in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	Strongly Disagree	1	2.0	2.0	2.0
	Neutral	3	6.1	6.1	8.2
	Agree	39	79.6	79.6	87.8
	Strongly Agree	6	12.2	12.2	100.0
	Total	49	100.0	100.0	

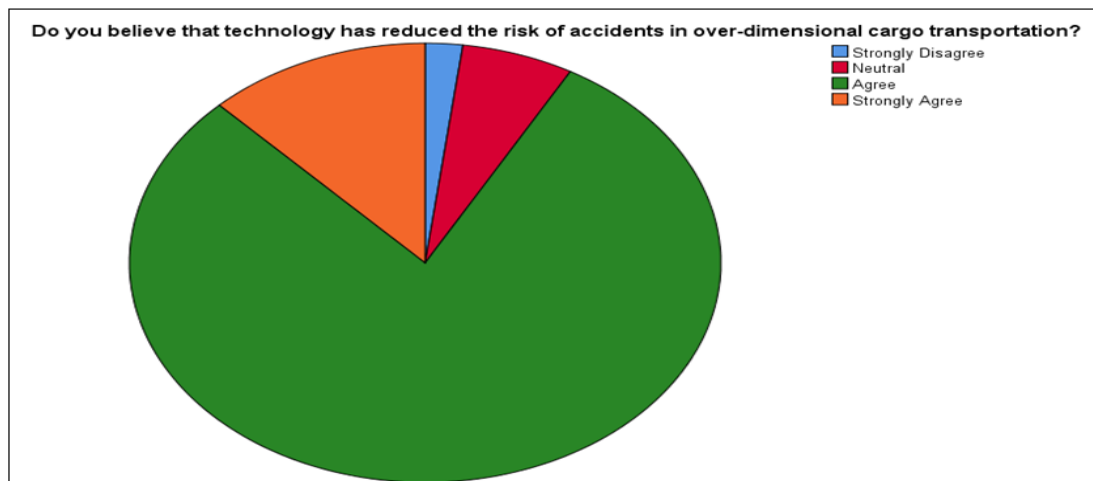


Fig 11 Do you believe that technology has reduced the risk of accidents in over-dimensional cargo transportation?

79.6% of the participant believe that the modern technology has reduced the risk of accidents in over-dimensional cargo transportation.

Table 15 Do you believe that modern-day technology has increased the capacity and speed of over-dimensional cargo transportation?

Do you believe that modern-day technology has increased the capacity and speed of over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	Strongly Disagree	1	2.0	2.0	2.0
	Neutral	1	2.0	2.0	4.1
	Agree	39	79.6	79.6	83.7
	Strongly Agree	8	16.3	16.3	100.0
	Total	49	100.0	100.0	

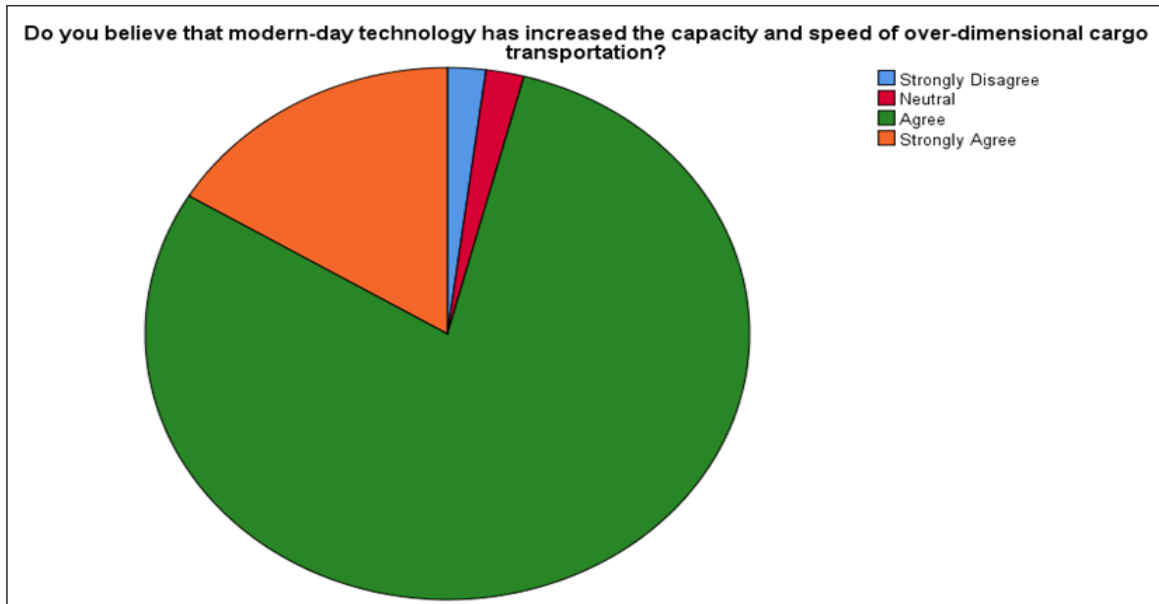


Fig 12 Do you believe that modern-day technology has increased the capacity and speed of over-dimensional cargo transportation?

79.6% of participant believe that modern technology has increased the capacity and speed of over-dimensional cargo transportation

Table 16 To what extent do you agree that modern-day technology has reduced the cost of over-dimensional cargo transportation?

To what extent do you agree that modern-day technology has reduced the cost of over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	2	4.1	4.1	4.1
	<i>Disagree</i>	3	6.1	6.1	10.2
	<i>Neutral</i>	11	22.4	22.4	32.7
	<i>Agree</i>	30	61.2	61.2	93.9
	<i>Strongly Agree</i>	3	6.1	6.1	100.0
	<i>Total</i>	49	100.0	100.0	

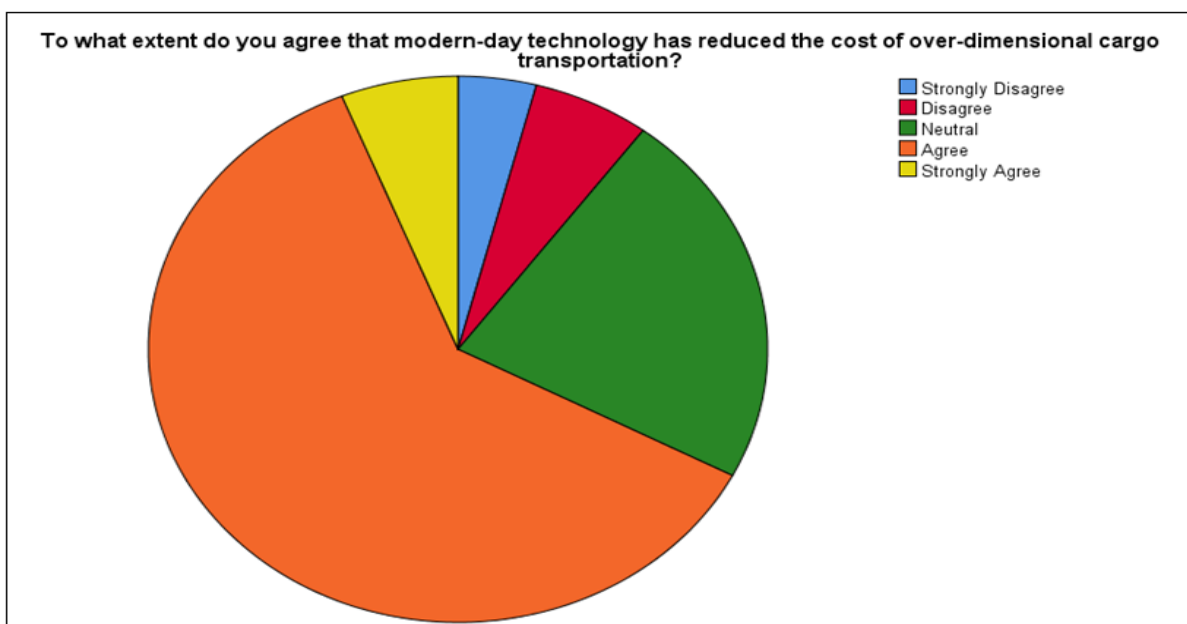


Fig 13 To what extent do you agree that modern-day technology has reduced the cost of over-dimensional cargo transportation?

61.2% of Participant agrees that modern technology has reduced the cost of over-dimensional cargo transportation also 22.4% stays neutral on the same.

Table 17 How much do you believe that modern-day technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation?

How much do you believe that modern-day technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Neutral</i>	1	2.0	2.0	4.1
	<i>Agree</i>	39	79.6	79.6	83.7
	<i>Strongly Agree</i>	8	16.3	16.3	100.0
	<i>Total</i>	49	100.0	100.0	

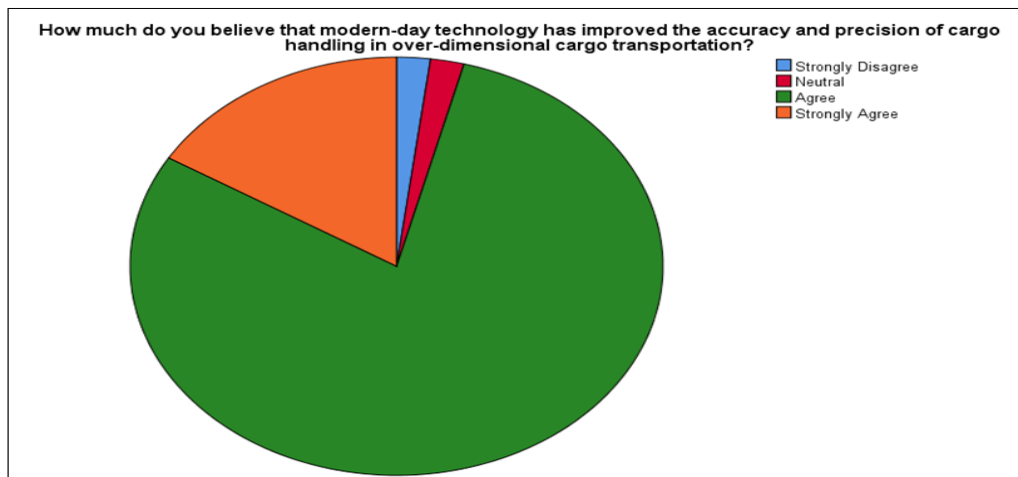


Fig 14 How much do you believe that modern-day technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation?

79.6% of participants believe that modern technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation and 16.3% strongly believe the same.

Table 18 How much do you believe that modern-day technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo transportation?

How much do you believe that modern-day technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Neutral</i>	7	14.3	14.3	16.3
	<i>Agree</i>	33	67.3	67.3	83.7
	<i>Strongly Agree</i>	8	16.3	16.3	100.0
	<i>Total</i>	49	100.0	100.0	

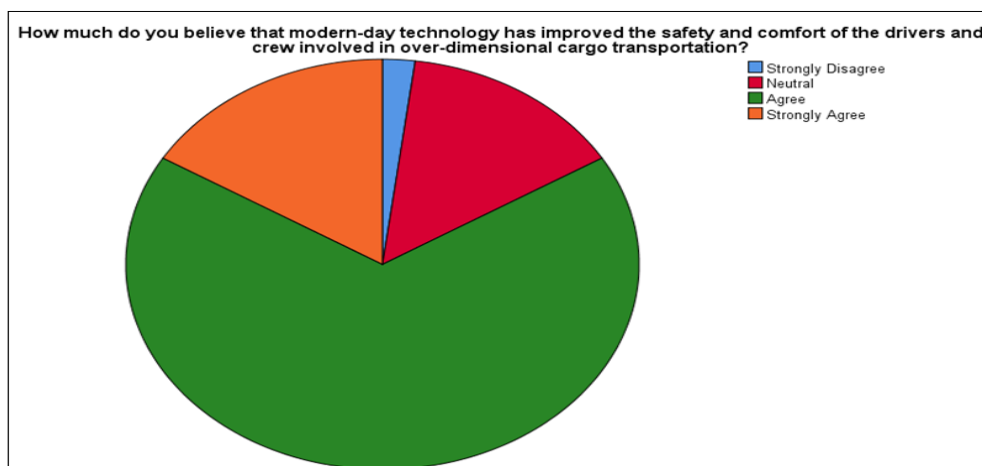


Fig 15 How much do you believe that modern-day technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo transportation?

67.3% of the participant agrees that modern technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo transportation

Table 19 How much do you believe that modern-day technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?

How much do you believe that modern-day technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Neutral</i>	4	8.2	8.2	10.2
	<i>Agree</i>	34	69.4	69.4	79.6
	<i>Strongly Agree</i>	10	20.4	20.4	100.0
	<i>Total</i>	49	100.0	100.0	

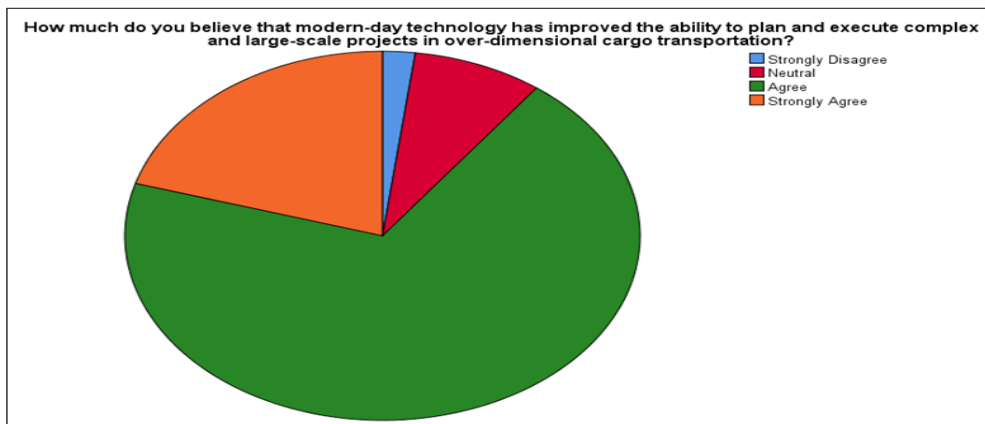


Fig 16 How much do you believe that modern-day technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?

69.4% of participants agrees and 20.4% of participants strongly agrees that modern technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?

Table 20 How much do you believe that modern-day technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation?

How much do you believe that modern-day technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Neutral</i>	5	10.2	10.2	12.2
	<i>Agree</i>	39	79.6	79.6	91.8
	<i>Strongly Agree</i>	4	8.2	8.2	100.0
	<i>Total</i>	49	100.0	100.0	

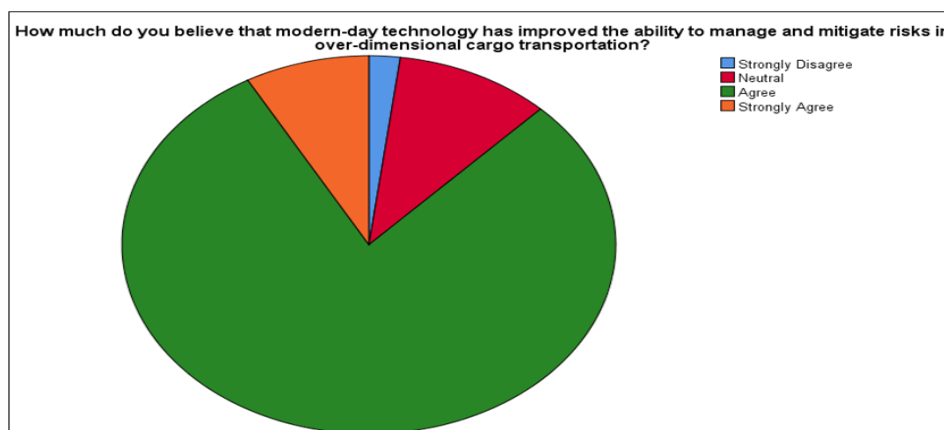


Fig 17 How much do you believe that modern-day technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation?

79.6% of the participant believe that modern technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation

Table 21 To what extent do you agree that modern-day technology has made it easier to comply with regulations and standards in over-dimensional cargo transportation?

To what extent do you agree that modern-day technology has made it easier to comply with regulations and standards in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Disagree</i>	1	2.0	2.0	4.1
	<i>Neutral</i>	8	16.3	16.3	20.4
	<i>Agree</i>	36	73.5	73.5	93.9
	<i>Strongly Agree</i>	3	6.1	6.1	100.0
	<i>Total</i>		49	100.0	100.0

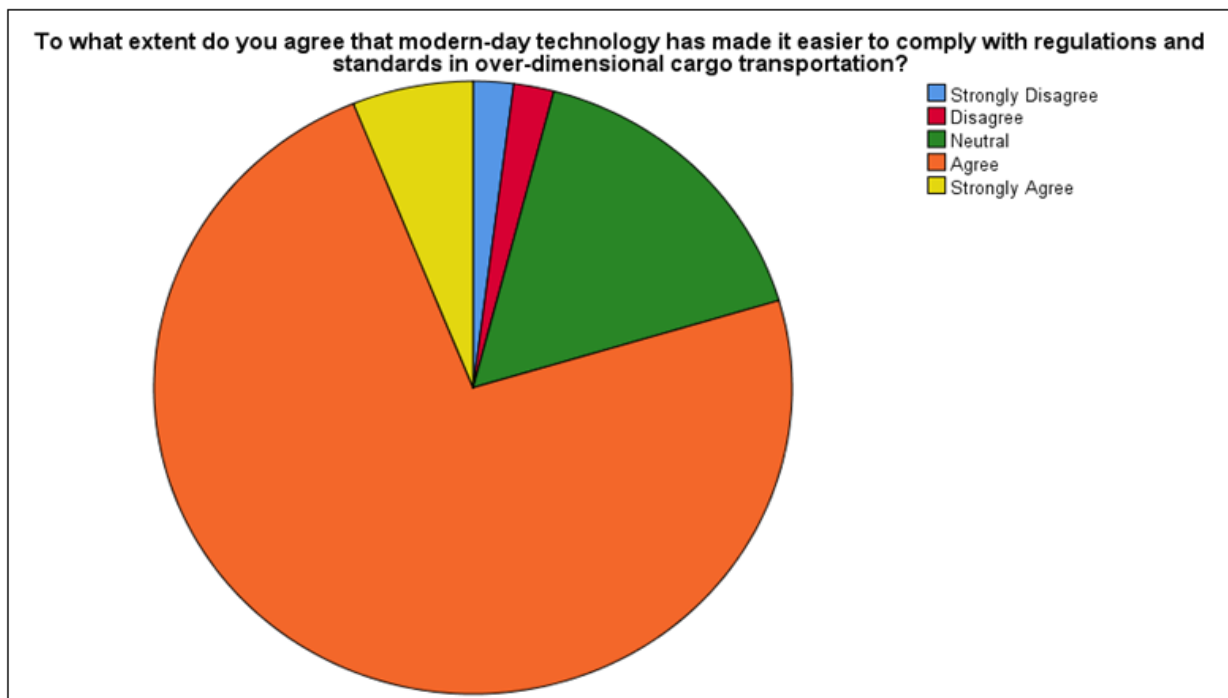


Fig 18 To what extent do you agree that modern-day technology has made it easier to comply with regulations and standards in over-dimensional cargo transportation?

73.5% of participants believe that that modern technology has made it easier to comply with regulations and standards in over-dimensional cargo transportation

Table 22 To what extent do you agree that modern-day technology has increased the level of transparency and accountability in over-dimensional cargo transportation?

To what extent do you agree that modern-day technology has increased the level of transparency and accountability in over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Disagree</i>	1	2.0	2.0	4.1
	<i>Neutral</i>	9	18.4	18.4	22.4
	<i>Agree</i>	35	71.4	71.4	93.9
	<i>Strongly Agree</i>	3	6.1	6.1	100.0
	<i>Total</i>		49	100.0	100.0

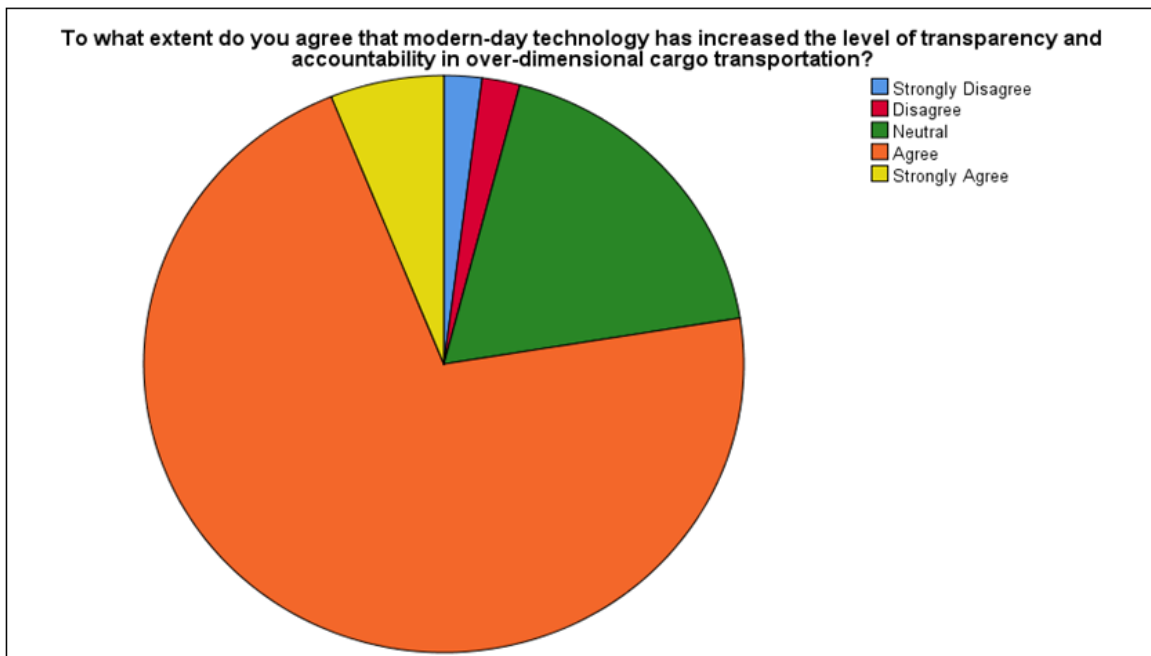


Fig 19 To what extent do you agree that modern-day technology has increased the level of transparency and accountability in over-dimensional cargo transportation?

71.4% of the participant agrees that modern technology has increased the level of transparency and accountability in over-dimensional cargo transportation

Table 23 How much do you believe that modern-day technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation?

How much do you believe that modern-day technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	1	2.0	2.0	2.0
	<i>Neutral</i>	8	16.3	16.3	18.4
	<i>Agree</i>	36	73.5	73.5	91.8
	<i>Strongly Agree</i>	4	8.2	8.2	100.0
	<i>Total</i>	49	100.0	100.0	

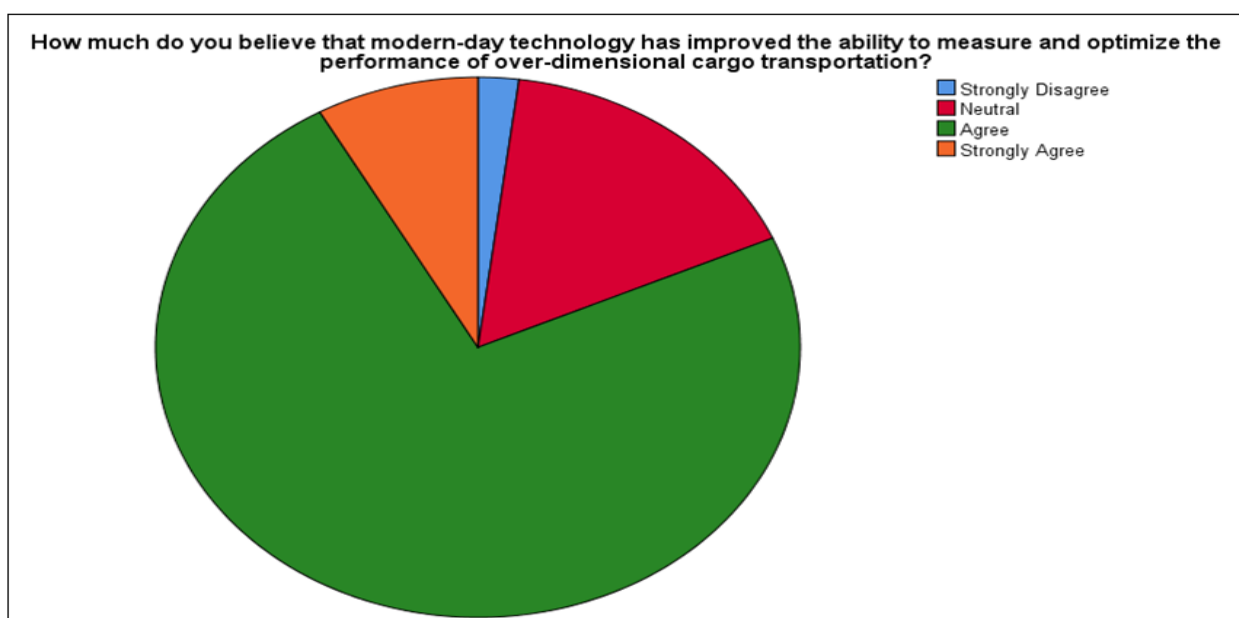


Fig 20 How much do you believe that modern-day technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation?

73.5% of the participant believe that modern technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation

Table 24 Do You think Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering?

Do You think Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering?					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	3	6.1	6.1	6.1
	<i>Disagree</i>	32	65.3	65.3	71.4
	<i>Neutral</i>	8	16.3	16.3	87.8
	<i>Agree</i>	4	8.2	8.2	95.9
	<i>Strongly Agree</i>	2	4.1	4.1	100.0
	<i>Total</i>	49	100.0	100.0	

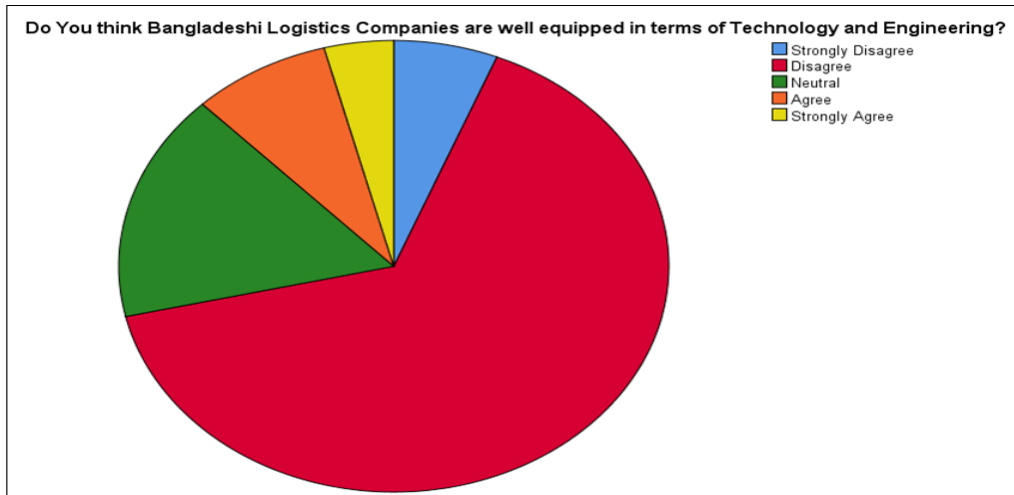


Fig 21 Do You think Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering?

65.3% of the participant disagrees that Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering, also 16.3% of participants are neutral of the same.

Table 25 Do You think, Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development.

Do You think, Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development.					
		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Valid</i>	<i>Strongly Disagree</i>	3	6.1	6.1	6.1
	<i>Neutral</i>	2	4.1	4.1	10.2
	<i>Agree</i>	7	14.3	14.3	24.5
	<i>Strongly Agree</i>	37	75.5	75.5	100.0
	<i>Total</i>	49	100.0	100.0	

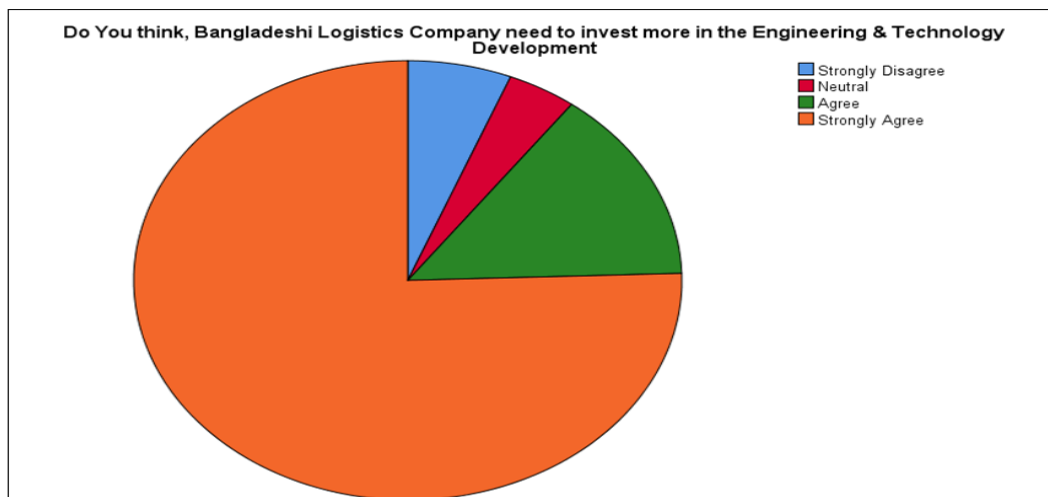


Fig 22 Do You think, Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development.

14.3% of the participant agrees and 75.5% of the participant strongly agrees that Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development, which is a clear indicator for the current scenario of logistics companies of Bangladesh.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. Summary of Findings:

Table 26 Summary of Findings

<i>Detail of Question</i>	<i>Answer Type</i>	<i>Percent</i>
<i>Modern-day technology has made over-dimensional cargo transportation safer and more efficient?</i>	Strongly Agree	14.3
	Agree	75.5
<i>Do you believe that technology has reduced the risk of accidents in over-dimensional cargo transportation?</i>	Strongly Agree	12.2
	Agree	79.6
<i>Do you believe that modern-day technology has increased the capacity and speed of over-dimensional cargo transportation?</i>	Strongly Agree	16.3
	Agree	79.6
<i>To what extent do you agree that modern-day technology has reduced the cost of over-dimensional cargo transportation?</i>	Strongly Agree	6.1
	Agree	61.2
<i>How much do you believe that modern-day technology has improved the accuracy and precision of cargo handling in over-dimensional cargo transportation?</i>	Strongly Agree	16.3
	Agree	79.6
<i>How much do you believe that modern-day technology has improved the safety and comfort of the drivers and crew involved in over-dimensional cargo</i>	Strongly Agree	16.3
	Agree	67.3
<i>How much do you believe that modern-day technology has improved the ability to plan and execute complex and large-scale projects in over-dimensional cargo transportation?</i>	Strongly Agree	20.4
	Agree	69.4
<i>How much do you believe that modern-day technology has improved the ability to manage and mitigate risks in over-dimensional cargo transportation?</i>	Strongly Agree	8.2
	Agree	79.6
<i>To what extent do you agree that modern-day technology has increased the level of transparency and accountability in over-dimensional cargo transportation?</i>	Strongly Agree	6.1
	Agree	71.4
<i>How much do you believe that modern-day technology has improved the ability to measure and optimize the performance of over-dimensional cargo transportation?</i>	Strongly Agree	8.2
	Agree	73.5
<i>Do You think Bangladeshi Logistics Companies are well equipped in terms of Technology and Engineering?</i>	Disagree	65.3
	Neutral	16.3
	Strongly Agree	75.5
<i>Do You think, Bangladeshi Logistics Company need to invest more in the Engineering & Technology Development</i>	Strongly Agree	75.5
	Agree	14.3

In all the cases modern-day technology is improving the impacts of over-dimensional cargo transportation and in an average 70% of the participants of survey agree with that and 10% of the participants strongly agree with that.

65.3% of participants disagreed that Bangladeshi logistics companies are well equipped in terms of modern day technology.

Also 75.5% of participant strongly agreed and 14.3% agreed that Bangladeshi logistics companies should invest more in development of Engineering & Technology

B. Conclusions:

In conclusion, the transportation of over-dimensional cargo in Bangladesh has been a significant challenge for the country's logistics and supply chain management as there are lot of infrastructure development work going on throughout the country (“Logistics Industry in Bangladesh: From Origin to Destination,” n.d.). However, the modernization of technology has provided an opportunity to revolutionize this sector. This study aimed to analyze the impact of modern technology on over-dimensional cargo transportation in Bangladesh, using quantitative methods. The findings suggest that the adoption of modern

technology can significantly improve the efficiency and safety of transportation, reducing transportation time and cost, and minimizing the risks associated with cargo damage or accidents. The results of this study provide insights and guidance for policymakers, over dimensional cargo transport companies, and stakeholders in the logistics and supply chain industry to develop more efficient and effective strategies to improve the transportation of over-dimensional cargo. Also it’s clear through the study that the Bangladeshi logistics or over dimensional cargo transportation companies should invest more in the Research and development of Modern day technology. Also they should try to adopt the technology which is been used globally. The future research should explore the long-term effects of modern technology on over-dimensional cargo transportation in Bangladesh, including the economic, environmental, and social impacts.

C. Recommendations:

Based on the findings presented in the study, it is recommended that stakeholders in the transportation industry in Bangladesh explore and implement modern technologies to improve the transportation of over-dimensional cargo. The research demonstrates that the use of modern technology can significantly improve

transportation efficiency and reduce costs. Therefore, it is recommended that stakeholders invest in the necessary infrastructure and partnerships to integrate modern technology into over-dimensional cargo transportation in Bangladesh, thus improving the country's economic growth and competitiveness in the global market.

D. Further Study:

Further Study can be conducted with more participant in survey which will increase the accuracy of the study. Also impact of modern technology for complete logistics system of over dimensional cargo from manufacturer to user can be included in future studies.

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