BTS Group Impact Valuation 2025/2026

Impact of the BTS SkyTrain:
Green Line, Pink Line, Yellow Line, and Gold Line

Content

Introduction

Overview and Objectives: BTS SkyTrain Impact Valuation

In 2025/2026, the BTS SkyTrain Green Line, Pink Line, Yellow Line, and Gold Line carried around 299 million trips for work, school, and leisure. This figure reflects the significant role of the SkyTrain system in improving mobility in Bangkok and its vicinity.

Objectives:

- In addition to its positive impact on mobility, the operation of the BTS SkyTrain offers significant societal benefits, including reducing greenhouse gas (GHG) emissions, improving air quality, and helping to decrease road accidents. These outcomes contribute to enhancing the overall quality of life for residents and visitors in the city, making transportation more efficient and safer.

- Therefore, by quantifying both the positive and negative effects generated on natural and social capitals through its operations, a clearer understanding of its impact is achieved, which helps in managing and enhancing its contributions to both social and natural capitals.

Impacts Comparison

BTS SkyTrain Impact Valuation 2019 & 2025/2026

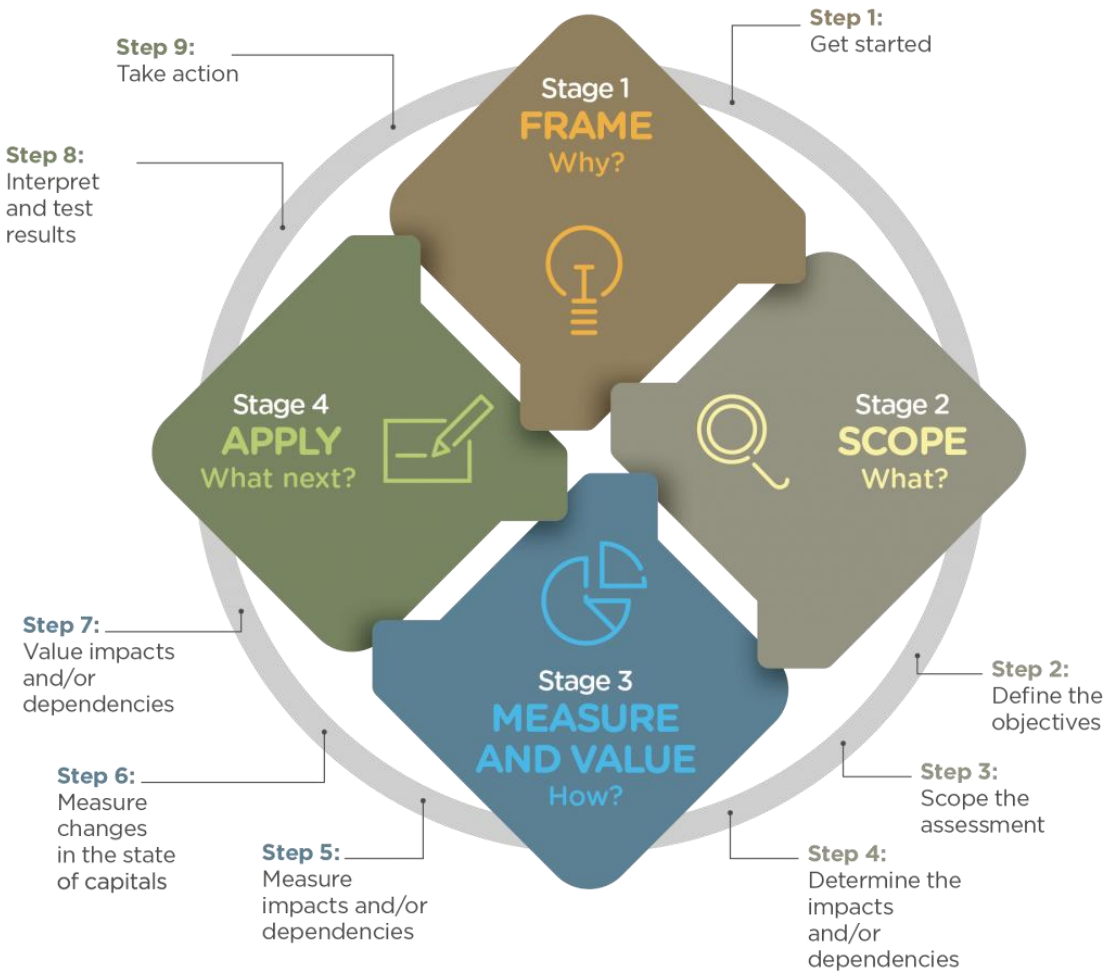
		Economic Impact		Social Impact		Environmental Impact	
	Scope of Impact Valuation	Passenger cost of daily transportation	Employment through BTS SkyTrain Operation	Passenger time in daily transportation	Passenger accidents in daily transportation	Emission associated with BTS SkyTrain operation	Waste associated with the operation of the BTS SkyTrain
Impact Valuation 2019	• Green Line	✓	✗	✓	✗	✓	✗
Impact Valuation 2025/2026	• Green Line • Pink Line • Yellow Line • Gold Line	✓	✓	✓	✓	✓	✓

Note: ✓ refers to impacts **included** in the scope of impact valuation

✗ refers to impacts **not included** in the scope of impact valuation

Impact Valuation Process

Impact Valuation Methodology



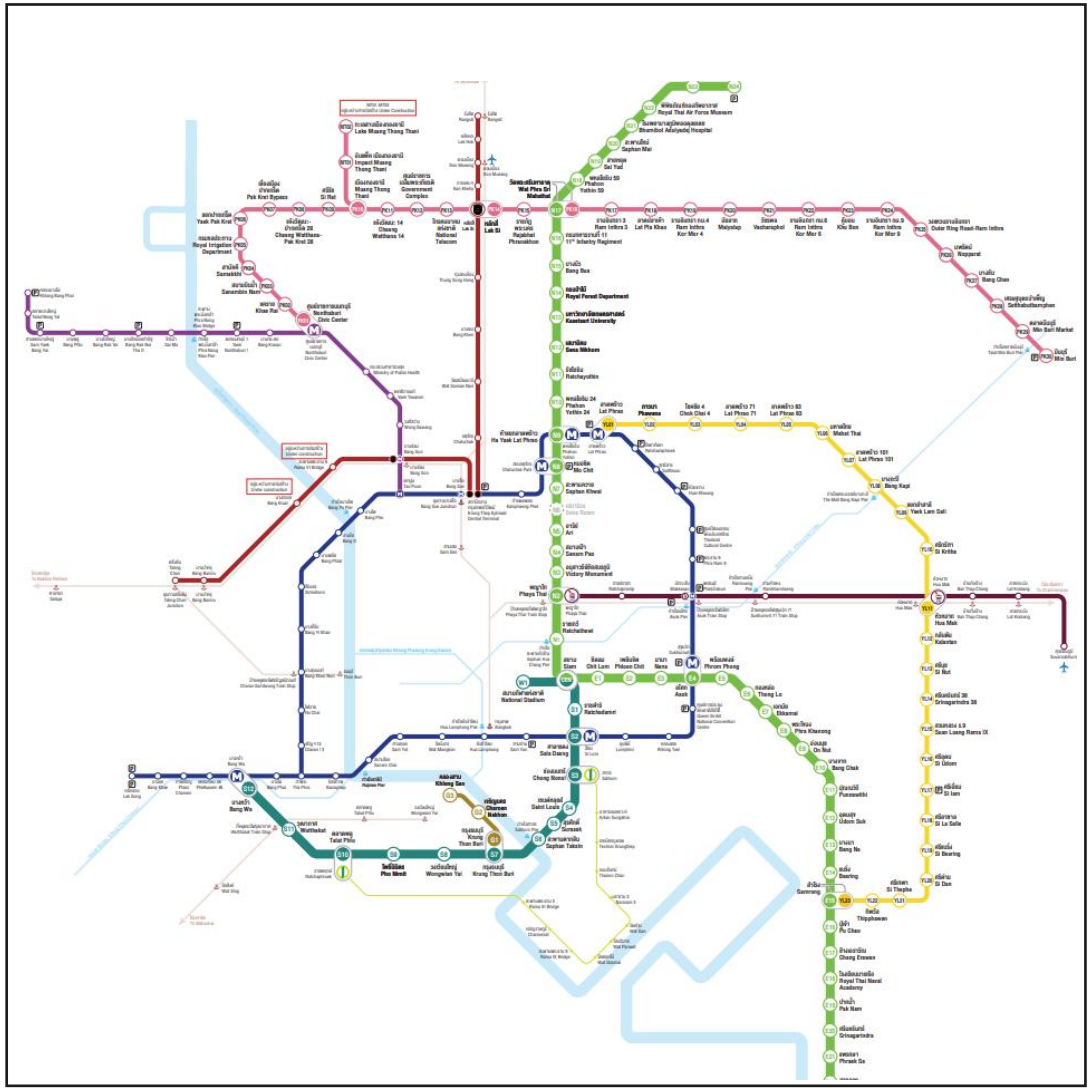
Reference: Capitals Coalition

Stage 1: Frame	Identify risks and opportunities for external stakeholders resulting from the relationships with natural and social capital and explore how an assessment would be relevant to your decision making.
Stage 2: Scope	Identify the objective of the assessment and conduct a materiality process to select the most relevant impacts and dependencies from the perspective.
Stage 3: Measure & Value	Use relevant approaches to measure and value the costs and benefits resulting from material impacts and dependencies on natural and social capital.
Stage 4: Apply	Interpret, validate and verify the assessment process and results and integrate them into existing business processes to inform decision-making.

Step 1: Frame

- **Key Concepts:** The Study uses following concepts to frame the impact valuation methodology,
  - ✓Understand the main externalities associated with BTS SkyTrain activity;
  - ✓Carry out a monetary valuation of the economic, social, and environmental impacts for the main externalities; and
  - ✓Share the methodology for BTS SkyTrain's impact valuation.
- **Natural and Social Capital related to BTS Group:** By embracing natural and social capital, BTS Group strengthens its commitment to its vision: “To serve our community with unique and sustainable solutions that greatly contribute to an improved life.” This approach seamlessly aligns with our core values—Delivering Customer Satisfaction, Creating Shareholder Value, Supporting Sustainable Growth, and Developing Communities—ensuring a lasting positive impact on society and the environment.

Step 2: Scope



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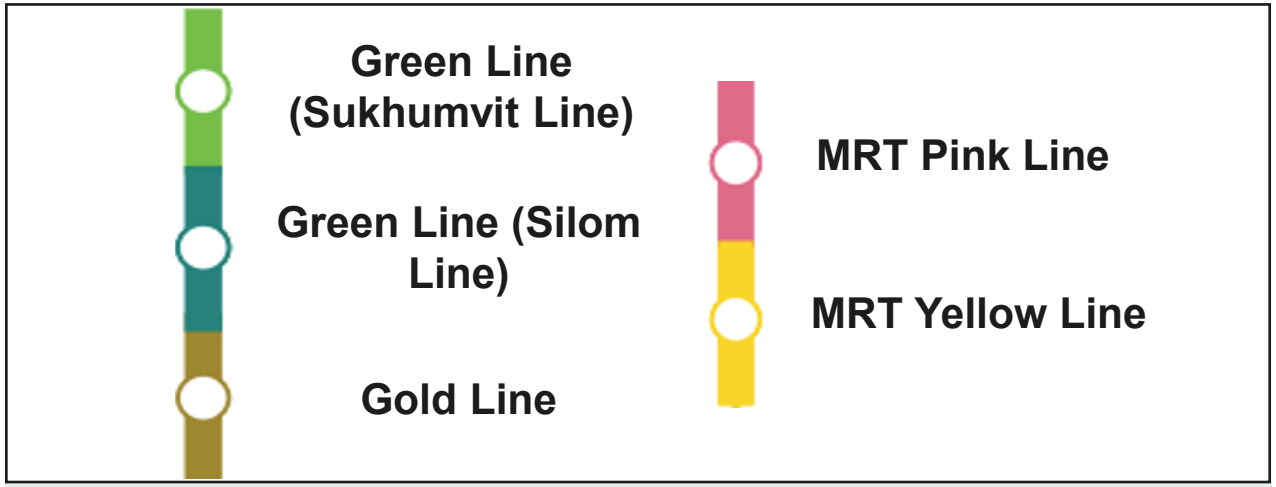


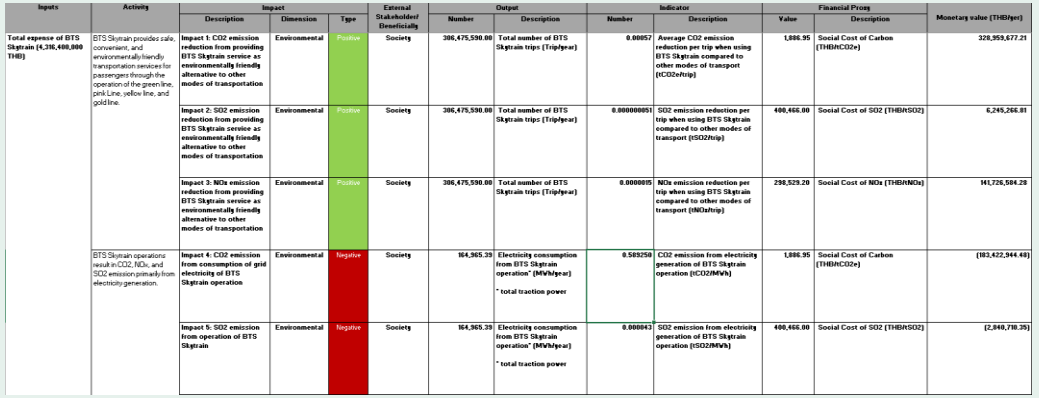
- **Study Scope:** the Impact Valuation of BTS SkyTrain has been conducted for the BTS Green Line, Pink Line, Yellow Line, and Gold Line, which consisted of 118 Stations in total.
- **Timeline of Study:** the Impact Valuation of BTS SkyTrain undertaken for the operation of BTS Green Line, Pink Line, Yellow Line, and Gold Line in fiscal year 2025/2026.
- **The study values:**
  - Economic Impacts: 1) Reduction in passenger cost of daily transportation, 2) Employment creation through BTS SkyTrain operation
  - Social Impacts: 1) Reduction in passenger time of daily transportation, 2) Reduction in accident through BTS SkyTrain operation
  - Environmental Impacts: 1) Emission reduction/increase through BTS SkyTrain operation, 2) Waste from BTS SkyTrain operation

Step 3: Measure and Value

- **Tool:** The impact valuation calculation spreadsheet is designed to systematically assess the environmental, social, and economic impacts of a project or initiative. This assessment process involves identifying specific outputs, selecting appropriate indicators, and applying relevant financial proxies for each impact area. By quantifying these factors, the spreadsheet enables the calculation of the monetary value associated with each impact dimension, with the goal of ultimately determining the monetary value of each impact area.
- **Data:** The data for output, indicators, and financial proxies are from the following source;
  - Data provided by BTS
  - Passenger survey data
  - Data from secondary sources (e.g., research paper, news article, information from official/trusted website)

Note: The impact valuation will use the most appropriate indicators and financial proxies based on the context of the assessment. Both survey data and secondary data sources will be considered, with the most accurate and relevant data selected to ensure a reliable valuation.

Tool



Inputs	Activity	Impact			External Stakeholder/ Beneficially	Output		Indicator		Financial Proxy		Monetary value (THB/per)
		Description	Dimension	Type		Number	Description	Number	Description	Value	Description	
Total expense of BTS Skytrain (4,316,400,000 THB)	BTS Skytrain provides safe, convenient, and environmentally friendly transportation services for passengers through the operation of the green line, pink Line, yellow line, and gold line.	Impact 1: CO2 emission reduction from providing BTS Skytrain service as environmentally friendly alternative to other modes of transportation	Environmental	Positive	Society	306,475,590.00	Total number of BTS Skytrain trips (Trip/year)	0.00057	Average CO2 emission reduction per trip when using BTS Skytrain compared to other modes of transport (tCO2e/trip)	1,886.95	Social Cost of Carbon (THB/tCO2e)	328,959,677.21
		Impact 2: SO2 emission reduction from providing BTS Skytrain service as environmentally friendly alternative to other modes of transportation	Environmental	Positive	Society	306,475,590.00	Total number of BTS Skytrain trips (Trip/year)	0.000000051	SO2 emission reduction per trip when using BTS Skytrain compared to other modes of transport (tSO2/trip)	400,466.00	Social Cost of SO2 (THB/tSO2)	6,245,266.81
		Impact 3: NOx emission reduction from providing BTS Skytrain service as environmentally friendly alternative to other modes of transportation	Environmental	Positive	Society	306,475,590.00	Total number of BTS Skytrain trips (Trip/year)	0.0000015	NOx emission reduction per trip when using BTS Skytrain compared to other modes of transport (tNOx/trip)	298,529.20	Social Cost of NOx (THB/tNOx)	141,726,584.28
	BTS Skytrain operations result in CO2, NOx, and SO2 emission primarily from electricity generation.	Impact 4: CO2 emission from consumption of grid electricity of BTS Skytrain operation	Environmental	Negative	Society	164,365.39	Electricity consumption from BTS Skytrain operation" (MWh/year) " total traction power	0.589259	CO2 emission from electricity generation of BTS Skytrain operation (tCO2/MWh)	1,886.95	Social Cost of Carbon (THB/tCO2e)	(183,422,944.48)
		Impact 5: SO2 emission from operation of BTS Skytrain	Environmental	Negative	Society	164,365.39	Electricity consumption from BTS Skytrain operation" (MWh/year) " total traction power	0.000043	SO2 emission from electricity generation of BTS Skytrain operation (tSO2/MWh)	400,466.00	Social Cost of SO2 (THB/tSO2)	(2,940,718.35)

Data

Data Point (2024-2025)	Value (2024-2025)	Unit (2024-2025)	Reference
INPUT:			
Total BTS Skytrain operational expense	4,316,400,000.00	THB/year	Data sheet provided by BTS
Total BTS Skytrain revenue	8,027,394,973.56	THB/year	Data sheet provided by BTS
Impact 1: CO2 emission reduction from providing BTS Skytrain service as environmentally friendly alternative to other modes of transportation			
Description: BTS Skytrain plays a crucial role in reducing greenhouse gas (GHG) emissions by providing an energy-efficient and environmentally friendly alternative to traditional modes of transportation. As passengers travel by electric-powered BTS Skytrain instead of private cars, motorcycles, and fossil-fuel-powered public transport, there is a significant decrease in GHG Emission.			
Output			
Total number of BTS Skytrain trips	306,475,590.00	Trip/year	Data sheet provided by BTS
Indicator			
Average CO2 emission reduction per trip when using BTS Skytrain compared to other modes of transport	0.00057	tCO2e/trip	https://www.researchgate.net/publication/267247313_Emission_Factor_of_Carbon_Dioxide_from_In-Use_Vehicles_in_Thailand
Financial Proxy			
Social Cost of Carbon (THB)	1,886.95	THB/tCO2e	Calculation from data below
Social Cost of Carbon (USD)	56.00	USD/tCO2e	The Social Cost of Carbon (SCC) is referenced from Interagency Working Group - IWG. (2021) at 3% of Discount Rate and Statistic, year 2025 (https://www.energy.gov/sites/default/files/2023-04/57.%20Social%20Cost%20of%20Carbon%202021.pdf)
Exchange rate per 1 USD	33.70	THB/USD	The exchange rate (THB per USD) is referenced from the Bank of Thailand as of 31st March 2025 (https://www.bot.or.th/th/statistics/exchange-rate.html)
Impact 2: SO2 emission reduction from providing BTS Skytrain service as environmentally friendly alternative to other modes of transportation			
Description: BTS Skytrain has contributed to a significant reduction in sulfur dioxide (SO2), by offering a cleaner alternative to traditional modes of transport. As more passengers choose to travel via the BTS Skytrain instead of private cars, motorcycles, and fossil-fuel-powered public transportation, the overall emissions from road-based vehicles decrease.			
Output			
Total number of BTS Skytrain trips	306,475,590.00	Trip/year	Data sheet provided by BTS
Indicator			
SO2 emission reduction per trip when using BTS Skytrain compared to other modes of transport	0.000000051	tSO2/trip	- Data sheet provided by BTS - Questionnaire Survey 2025 - PRTR Release Estimation Manual for Motor Vehicles in Thailand (2016) (https://www.pcd.go.th/wp-content/uploads/2020/05/pcdnew-2020-05-25_05-13-02_943383.pdf)
Financial Proxy			
Social Cost of SO2 (THB)	400,466.00	THB/tSO2	Calculation from data below
Social Cost of SO2 (EUR)	11,000.00	EUR/tSO2	Social Cost of SO2 is reference from AEA Technology Environment (2005), using the following assumptions , - Particulate matter (PM) Mortality = Value of a Life Year (VOLY) - Ozone (O3) Mortality = Value of a Life Year (VOLY)
Exchange rate per 1 EUR	36.41	THB/EUR	The exchange rate (THB per USD) is referenced from the Bank of Thailand as of 31st March 2025 (https://www.bot.or.th/th/statistics/exchange-rate.html)

Step 4: Apply

Information obtained from stakeholder interviews and evaluation results will be systematically analyzed and synthesized to formulate practical and targeted recommendations for future improvements.

Improvement in Transportation Time:

- BTS SkyTrain offers significantly shorter passenger transportation time compared to other modes of transportation, further time reduction could be achieved by increasing train availability and providing real-time train schedules through an online application

Lower Transportation Cost:

- While BTS SkyTrain offers transportation services at reasonable cost compared to other modes of transportation, further cost reduction could be achieved through a consistent fare structure and easier access to promotions, helping to ease the financial burden on daily commuters.

Improvement in Safety:

- BTS SkyTrain provides significantly safer transportation compared to other modes. However, passenger safety and walking convenience still remain concerns from the passengers. To improve overall safety and comfort within the BTS system, it is recommended that BTS implement safety behavioral stimulation and design improvements to create a more user-friendly and secure travel environment.

Good Practices for Impact Valuation

- Regular Monitoring and Evaluation
- Risk Assessment
- Sustainability and Long-Term Impact
- Continuous Improvement

Impact Valuation Result

Disclaimer

The impact valuation of the BTS SkyTrain for 2025/2026 is based on the best available data including data provided by BTS Group, target audience survey data, secondary sources, and a set of informed assumptions. However, it may not fully capture all variables or potential outcomes. The findings and conclusions presented in this report are subject to change as new information becomes available or as valuation methodologies continue to evolve.

It is important to note that while efforts have been made to ensure the accuracy and reliability of the data used, the results should be interpreted with caution. This impact assessment is designed to provide a general overview of the potential benefits and limitations and should not be regarded as definitive or exhaustive. Stakeholders are encouraged to use these findings as part of a broader decision-making process and to seek additional information and perspectives as appropriate.

Value Creation of BTS SkyTrain (1/2)

		Impact 1	Impact 2	Impact 3
Material Issue for External Stakeholders		Climate Action	Infrastructure and Accessibility	Health and Safety for All
Category		Climate Transition & Physical Risks	Product / Service Quality & Safety	Product / Service Quality & Safety
Cause of the Impact		Products/ Services	Products/ Services	Products/ Services
External stakeholders/ impact area evaluated		• Environmental • Society	Consumers/end-users	Consumers/end-users
Topic relevance on external stakeholders		BTS SkyTrain provides environmentally friendly transportation services that can reduce overall CO2, SO2, NOx emissions compared to other modes of transportation.	BTS SkyTrain provides convenient transportation services for passengers, significantly reducing both transportation costs and travel time compared to other modes of transportation.	BTS SkyTrain provides safe transportation services for passengers, significantly reducing the accident rate compared to other modes of transportation.
Output Metric		CO2, SO2, NOx emission created/reduced	Transportation cost and time reduced	Transportation related accident reduced
Impact Valuation		Social cost caused/avoided	Access to product/service with positive impact provided	Access to product/service with positive impact provided
Impact Metric	**Positive (a)**	Decreased social cost of CO2, SO2, NOx by 469.72 million THB	Decreased the transportation cost and time of passengers by 32,982.57 million THB	Decreased cost of accident rate by 39,024.11 million THB
	Negative (b)	Increased social cost of CO2, SO2, NOx by 319.98 million THB	N/A	-
	Overall (a-b)	Decreased social cost of CO2, SO2, NOx by 149.73 million THB	Decreased the transportation cost and time of passengers by 32,982.57 million THB	Decreased cost of accident rate by 39,024.11 million THB

Value Creation of BTS SkyTrain (2/2)

		Impact 4	Impact 5
Material Issue for External Stakeholders		Human Resources Management	Environmental Resource Management
Category		Human Capital Management	Waste & pollutants
Cause of the Impact		• Operation • Supply Chain	Operation
External stakeholder/ impact area evaluated		Society	• Environmental • Society
Topic relevance on external stakeholders		BTS SkyTrain operation generates employment for full-time employees, contractors, and internship.	BTS SkyTrain operations both generate and recycle/reuse hazardous and non-hazardous waste.
Output Metric		Social Benefit in term of Net Value	Cost of waste management created/reduced
Impact Valuation		Increase in household-level income	Social cost caused/avoided
Impact Metric	**Positive (a)**	Increased employment with total value of 232.51 million THB	Decreased the waste management cost by 96,727 THB
	Negative (b)	N/A	Increased the waste management cost by 956,998 THB
	Overall (a-b)	Increased employment with total value of 232.51 million THB	Increased the waste management cost by 860,271 THB

Impact Materiality 1: Climate Action

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain provides environmentally friendly transportation services that can reduce overall CO2, NOx, and SO2 emissions compared to other modes of transportation.	A total of ***299,098,528*** BTS SkyTrain trips were operated[1]	(+) **Environmental Impact:** The BTS SkyTrain provides an environmentally friendly alternative to other modes of transportation, resulting in a reduction of social cost of **CO2** emissions by approximately **316.25** million THB[3,6]	IRIS, 2021. Greenhouse Gas Emissions Avoided (PI2764). v5.2.
			(+) **Environmental Impact:** The BTS SkyTrain provides an environmentally friendly alternative to other modes of transportation, resulting in a reduction of social cost of **SO2** emissions by approximately **7.26** million THB[4,7]	
			(+) **Environmental Impact:** The BTS SkyTrain provides an environmentally friendly alternative to other modes of transportation, resulting in a reduction of social cost of **NOx** emissions by approximately **146.21** million THB[4,7]	
	• BTS SkyTrain operations result in CO2, NOx, and SO2 emission primarily from electricity generation.	A total of ***173,181*** MWh of electricity was consumed by the BTS SkyTrain operations[2]	(−) **Environmental Impact:** The electricity consumed by the BTS SkyTrain operations create social cost of **CO2** emissions by approximately **219.90** million THB[5,6]	IRIS, 2021. Greenhouse Gas Emissions: Indirect (OI9604). v5.2.
			(−) **Environmental Impact:** The electricity consumed by the BTS SkyTrain operations create social cost of **SO2** emissions by approximately **31.09** million THB[5,7]	
			(−) **Environmental Impact:** The electricity consumed by the BTS SkyTrain operations create social cost of **NOx** emissions by approximately **68.99** million THB[5,7]	

Note: [1]The number BTS SkyTrain trips are referenced from data total ridership (all lines) provided by BTS Group.
[2]The electricity consumed by BTS SkyTrain operation is referenced from data provided by BTS Group.
[3]The amount of CO2 emission from other modes of transportation is reference from Nilrit, S. & Sampanpanish, P. (2012). Emission Factor of Carbon Dioxide from In-Use Vehicles in Thailand. Modern Applied Science.
[4]The SO2 and NOx emission from other modes of transportation is reference from Pollution Control Department, Department of Industrial Works, Industrial Estate Authority of Thailand, Japan International Cooperation Agency. (2016). PRTR Release Estimation Manual for Motor Vehicles in Thailand. The Development of Basic Schemes for PRTR System in Kingdom of Thailand.
[5]The amount of CO2, SO2, and Nox emission from electricity production is referenced from Patumsawad, S. & Gariviat, S. (2011). Emission Inventory of Electricity Generation in Thailand. Journal of Sustainable Energy & Environment 2.
[6]The social cost of CO2 is reference from IWG. (2021). Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990. Interagency Working Group on Social Cost of Greenhouse Gases, United States Government.
[7]The social cost of SO2 and NOx is referenced from AEA Technology Environment. (2005). Service Contract for Carrying out Cost-Benefit Analysis of Air quality Related Issues, in particular in the Clean Air for Europe (CAFE) Programme: Damages per tonne emission of PM2.5, NH3, SO2, NOx and VOCs from each EU25 Member State (excluding Cyprus) and surrounding seas.

Impact Materiality 2: Infrastructure and Accessibility

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain provides convenient transportation services for passengers, significantly reducing both transportation costs and travel time compared to other modes of transportation.	A total of ***299,098,528*** BTS SkyTrain trips were operated[1]	⊕ **Economic Impact:** The BTS SkyTrain reduces **transportation cost** for passenger compared to other modes of transport by approximately **9,517.46** million THB[2] ⊕ **Social Impact:** The BTS SkyTrain reduces **transportation time** for passenger compared to other modes of transport, valued at approximately **23,465.12** million THB[3,4]	IRIS, 2021. Number of Routes Served (PI6504). v5.2.

Note: [1]The number BTS SkyTrain trips are referenced from data total ridership (all lines) provided by BTS Group.
[2]The reduction in transportation cost for passenger compared to other modes of transport is referenced from passenger survey data.
[3]The reduction in transportation time for passenger compared to other modes of transport is referenced from passenger survey data.
[4]The Value of Time (VOT) in Bangkok on transportation is reference from Department of Rail Transport. (2023). โครงการศึกษาเพื่อพัฒนาแบบจำลองคาดการณ์ความต้องการเดินทางด้วยระบบรางและการพัฒนาโครงข่ายระบบขนส่งมวลชนทางรางในแขตกรุงเทพมหานครและปริมณฑล (พื้นที่ต่อเนื่อง) ระยะที่ 2. รายงานขั้นสุดท้าย (Final Report) 2/3.

Impact Materiality 3: Health and Safety for All

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain provides safe transportation services for passengers, significantly reducing transportation related accident	A total of ***819,780*** passengers used the BTS SkyTrain[1]	⊕ **Social Impact:** The BTS SkyTrain reduces **accident rate** for passenger compared to other modes of transport. The total value of accident avoided is approximately **39,024.11** million THB[2,3]	IRIS, 2021. Target Stakeholder Injuries (PI7161). v5.2.

Note: [1]The number BTS SkyTrain trips are referenced from data average ridership/day (all lines) provided by BTS Group.
[2]The yearly accident rate of other modes of transportation is referenced from passenger survey data.
[3]The cost of accident of other modes of transportation is referenced from NSO. (2014). สถิติอุบัติเหตุจราจรทางบก. Retrieved from https://ittdashboard.nso.go.th/preview2.php?id_project=64 & TDRI. (2024). การประเมินมูลค่าความสูญเสียจากอุบัติเหตุทางถนนของไทย. ฉบับที่ 209 กุมภาพันธ์ 2567.

Impact Materiality 4: Human Resources Management (1/2)

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain creates employment opportunities for full-time employees	A total of ***591*** full-time employees were hired to support BTS SkyTrain operation[1]	⊕ **Economic Impact:** The total wages and compensation received by full-time employees amounted to **120.35** million THB[2]	• IRIS, 2021. Jobs Created at Directly Supported/Financed Enterprises (PI3687). v5.2. • IRIS, 2021. Jobs Type (OD0660). v5.2. • IRIS, 2021. Full-time Employees: Hired (OI5479). v5.2. • IRIS, 2021. Full-time Wages: Total (OI5887). v5.2.
	• BTS SkyTrain creates employment opportunities for contract workers	A total of ***182*** contract workers that were hired to support operation activities of BTS SkyTrain[1]	⊕ **Economic Impact:** The total wages and compensation received by contract workers hired to support BTS SkyTrain operation activities amounted to approximately **29.33** million THB[3]	
		A total of ***247*** contract workers that were hired to support maintenance activities of BTS SkyTrain[1]	⊕ **Economic Impact:** The total wages and compensation received by contract workers hired to support BTS SkyTrain maintenance amounted to approximately **50.32** million THB[3]	
		A total of ***231*** contract workers that were hired to support security and cleaning activities of BTS SkyTrain[1]	⊕ **Economic Impact:** The total wages and compensation received by contract workers hired to support BTS SkyTrain security and cleaning activities amounted to approximately **31.06** million THB[3]	

Note: [1]The number full time employee and contractor hired by BTS Group is referenced from data provided by BTS Group.
[2]The amount of wages and compensation received by full-time employees is referenced from data provided by BTS Group.
[3]The amount of wage and compensation of contract worker in operational activities, support and maintenance activities, and security & cleaning activity is referenced from ค่าจ้างรายอาชีพ. (2023). ค่าจ้างตามลักษณะการจ้าง แหล่งข้อมูล อายุ วุฒิการศึกษา ภาคอุตสาหกรรม และอาชีพ. ค่าจ้างรวมทั้งประเทศ ภูมิภาค และรายจังหวัด.

Impact Materiality 4: Human Resources Management (2/2)

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain creates opportunity for internship	A total of **63** paid-internship students were hired to support BTS SkyTrain operation[1]	⊕ **Economic Impact:** The total wages and compensation received by paid-internship students for BTS SkyTrain operation amounted to approximately **835,758** THB[3]	• IRIS, 2021. Jobs Created at Directly Supported/Financed Enterprises (PI3687). v5.2. • IRIS, 2021. Jobs Type (OD0660). v5.2. • IRIS, 2021. Full-time Employees: Hired (OI5479). v5.2. • IRIS, 2021. Full-time Wages: Total (OI5887). v5.2.
	• BTS SkyTrain hires a certain number of internship students for full-time employment	A total of **3** paid-internship were hired as full-time employees[2]	⊕ **Economic Impact:** The total wages and compensation received by full-time employees that were paid-internship student amounted to **610,920** THB[4]	

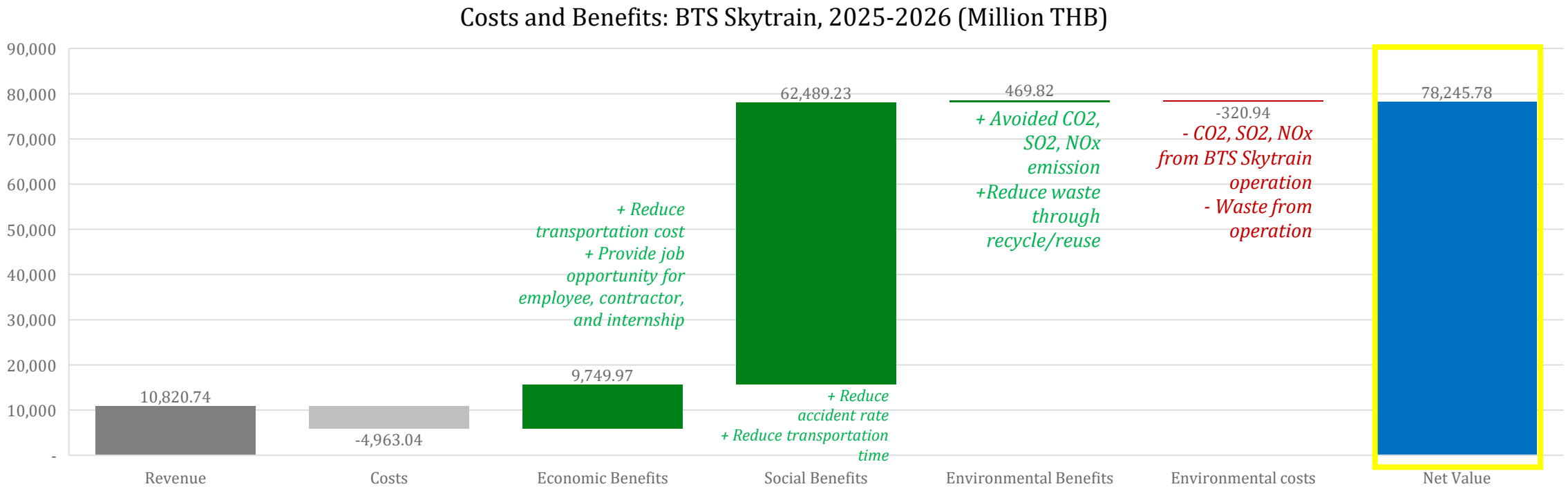
Note: [1]The number paid-internship students hired by BTS Group is referenced from data provided by BTS Group.
[2]The number paid-internship were hired as full-time employees of BTS Group is referenced from data provided by BTS Group.
[3]The amount of wage and compensation of paid-internship students is referenced from data provided by BTS Group.
[4]The amount of wage and compensation of paid-internship were hired as full-time employees is referenced from data provided by BTS Group.

Impact Materiality 5: Environmental Resource Management

Input	Activity	Output	Impact	IRIS Metric
• Operating expenses of the BTS SkyTrain	• BTS SkyTrain create waste from operation and maintenance service.	A total of ***157.26*** tons of hazardous waste from BTS SkyTrain operation and maintenance service[1]	− **Environmental Impact:** The cost of hazardous waste management from BTS SkyTrain operation and maintenance service is approximately **373,492.50** THB[5]	IRIS, 2021. Waste Produced: Hazardous Waste (OI1346). v5.2.
		A total of ***792.09*** tons of non-hazardous waste from BTS SkyTrain operation and maintenance service[2]	− **Environmental Impact:** The cost of non-hazardous waste management from BTS SkyTrain operation and maintenance service is approximately **583,506.30** THB[6]	IRIS, 2021. Waste Produced: Non-Hazardous Waste (OI7442). v5.2.
	• BTS SkyTrain recycle/reuse a signification portion of waste from operation and maintenance service.	A total of ***22.70*** tons of hazardous waste from BTS SkyTrain operation and maintenance service can be recycled/reused[3]	+ **Environmental Impact:** The cost of hazardous waste management from BTS SkyTrain operations and maintenance services that can be avoided through recycling and reuse is approximately **53,912.50** THB[5]	IRIS, 2021. Waste Produced: Hazardous Waste (OI1346). v5.2.
		A total of ***58.12*** tons of non-hazardous waste from BTS SkyTrain operation and maintenance service can recycle/reuse[4]	+ **Environmental Impact:** The cost of non-hazardous waste management from BTS SkyTrain operations and maintenance services that can be avoided through recycling and reuse is approximately **42,815.07** THB[6]	IRIS, 2021. Waste Produced: Non-Hazardous Waste (OI7442). v5.2.

Note: [1]The amount of hazardous waste from BTS SkyTrain operation and maintenance service is referenced from data provided by BTS Group.
[2]The amount of non-hazardous waste from BTS SkyTrain operation and maintenance service is referenced from data provided by BTS Group.
[3]The amount of hazardous waste from BTS SkyTrain operation and maintenance service that was recycled/ reused is referenced from data provided by BTS Group.
[4]The amount of non-hazardous waste from BTS SkyTrain operation and maintenance service that was recycled/ reused is referenced from data provided by BTS Group.
[5]The cost of hazardous waste management is referenced from สถาบันวิจัยสภาวะแวดล้อม จุฬาลงกรณ์มหาวิทยาลัย. (2023). โครงการศึกษาเพื่อจัดทำนโยบายสาธารณะ ปฏิรูประบบการจัดการขยะและส่งเสริมเศรษฐกิจหมุนเวียน (ระยะที่ 2), เล่มที่ 3
[6]The cost of non-hazardous waste management is referenced from Ministry of Natural Resources and Environment & Pollution Control Department (2017). ข้อแนะนำอัตรากลางค่ากำจัดของเสียอันตรายจากชุมชนสำหรับองค์กรปกครองส่วนท้องถิ่น

Costs and Benefits from BTS SkyTrain



Recommendations

Recommendations (1/2)

Increase Ridership:

- Although BTS SkyTrain currently operates a sufficient number of trips to serve its existing passengers effectively, there remains an opportunity to expand its ridership base. Doing so can generate additional positive and negative impacts, which can be managed and optimized through the following approaches:
  - **Expand operating period:** Currently, BTS SkyTrain operates from 6:00 AM to 12:00 AM to align with the working hours and travel needs of most passengers. However, there is strong potential to expand ridership by targeting individuals who need to travel earlier in the day, such as those with early work shifts or long commutes. Introducing a small number of additional trips before 6:00 AM could significantly increase the number of active passengers and improve accessibility for a wider range of commuters.
  - **Offer reduced fares during off-peak hour:** Implementing a discounted fare/increased incentive structure during off-peak hours, such as mid-morning, early afternoon, or late evening, can help distribute passenger traffic more evenly throughout the day. This approach not only alleviates congestion during peak travel times, but also makes the BTS SkyTrain system more accessible to cost-sensitive groups.

Increase the proportion of renewable energy in operation:

- Increase the proportion of renewable energy used in BTS SkyTrain operations to reduce emissions of CO2, SO2, and NOx from electricity generation. This will significantly contribute to lowering the carbon footprint of urban transportation. The transition to cleaner energy sources can also strengthen BTS's position as a sustainable urban mobility provider, attract environmentally conscious passengers and stakeholders, and potentially lead to an increase in ridership.

Recommendations (2/2)

Improvement in Transportation Time:

- BTS SkyTrain offers significantly shorter passenger transportation time compared to other modes of transportation, further time reduction could be achieved by increasing train availability and providing real-time train schedules through an online application.
  - *"The BTS SkyTrain schedule should be accurately available through online applications such as Google Maps or BTS Official Application."* - Passenger 1
  - *"During peak hours, the number of train services should be increased to better accommodate the high volume of passengers, reduce overcrowding, and shorten waiting times."* - Passenger 2

Lower Transportation Cost:

- While BTS SkyTrain offers transportation services at reasonable cost compared to other modes of transportation, further cost reduction could be achieved through a consistent fare structure and easier access to promotions, helping to ease the financial burden on daily commuters.
  - *"The BTS SkyTrain should implement a flat-rate fare for travel across the entire BTS SkyTrain line to reduce travel costs."*- Passenger 1
  - *"The BTS SkyTrain should offer more frequent fare promotions or discounts to reward regular users and encourage continued use of the service."* - Passenger 2

Improvement in Safety and Comfort:

- BTS SkyTrain provides significantly safer transportation compared to other modes. However, passenger safety and walking convenience still remain concerns from the passengers. To improve overall safety and comfort within the BTS system, it is recommended that BTS implement safety behavioral stimulation and design improvements to create a more user-friendly and secure travel environment.
  - *"BTS SkyTrain should encourage passengers to keep right on escalator and walkway to ensure smooth flow during peak hours."*- Passenger 1
  - *"BTS SkyTrain should ensuring trains consistently stop with full alignment on flat, level platforms to improve passenger stability, reduce the risk of tripping, and enhance overall boarding comfort."* - Passenger 2
  - *"BTS SkyTrain should Install platform doors at all stations to prevent accidental falls and improve safety while waiting."* - Passenger 3

Good Practices for Impact Valuation

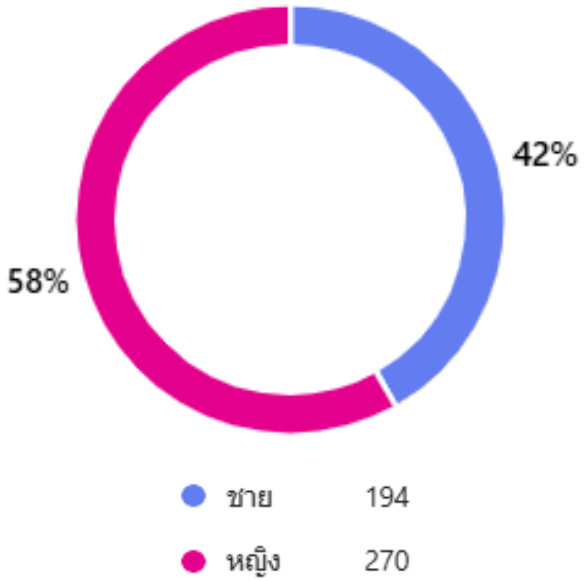
- **Regular Monitoring and Evaluation**
  - Periodically review and update the impact valuation to reflect changes and new data.
  - Implement a regular monitoring and evaluation system to track progress and impact over time.
- **Risk Assessment**
  - Conduct a thorough risk assessment to identify potential obstacles and mitigation strategies.
  - Incorporate risk management plans to address identified risks and ensure project success.
- **Sustainability and Long-Term Impact**
  - Focus on the sustainability and long-term impact of the project.
  - Assess the project's ability to generate sustained benefits and its resilience to potential future challenges.
- **Continuous Improvement**
  - Foster a culture of continuous improvement by learning from each valuation.
  - Implement feedback loops and regularly update processes based on lessons learned and stakeholder input.

Appendix:
Survey Responses

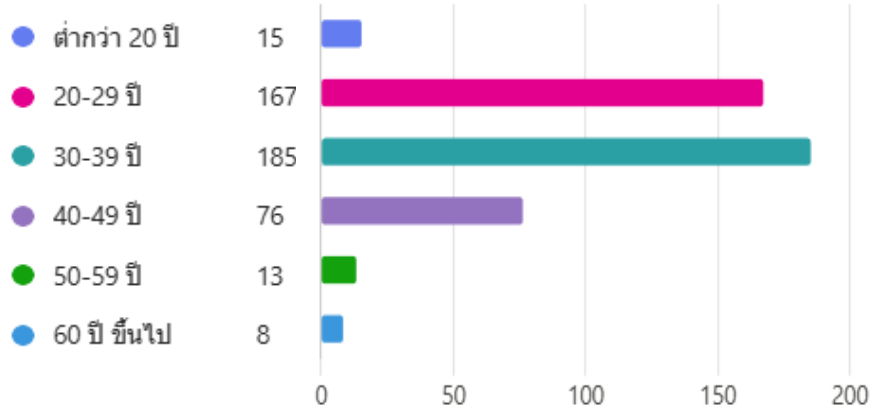
Appendix: Responses Overview

Total Responses: 464

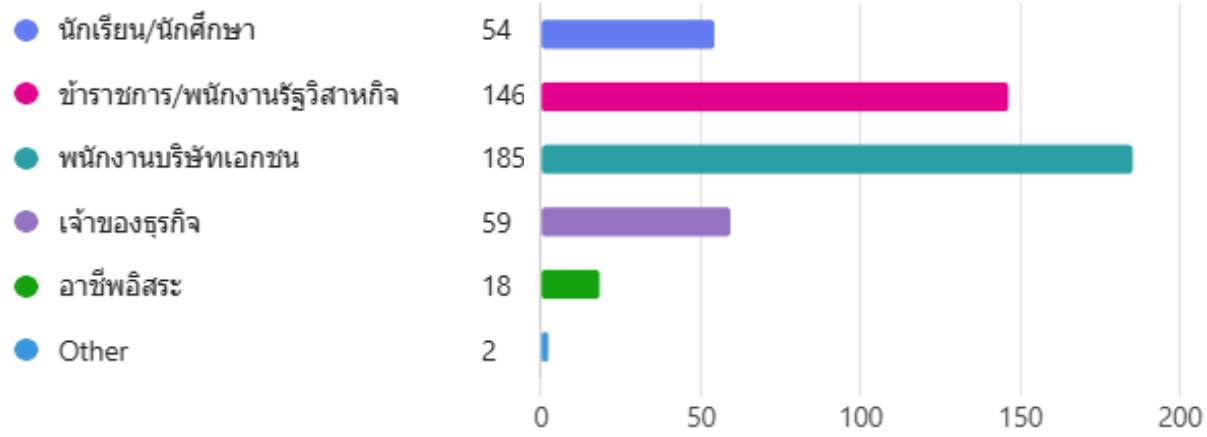
Gender



Age

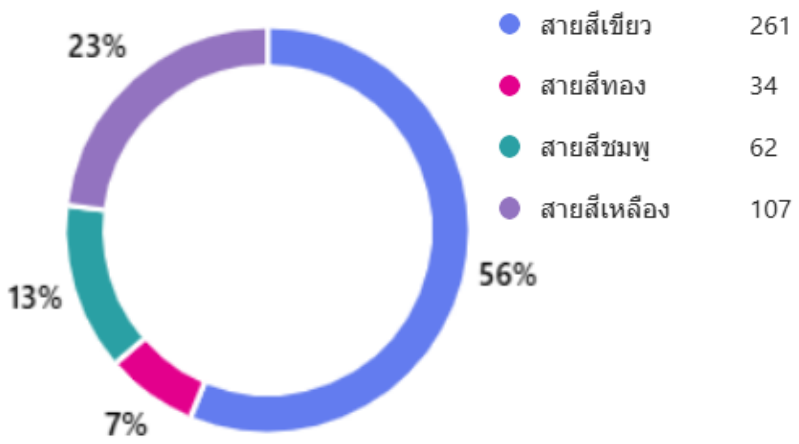


Occupation

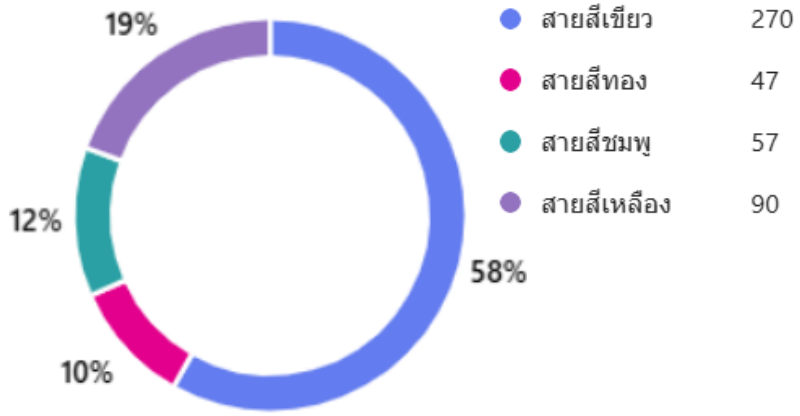


Appendix: BTS SkyTrain Usage

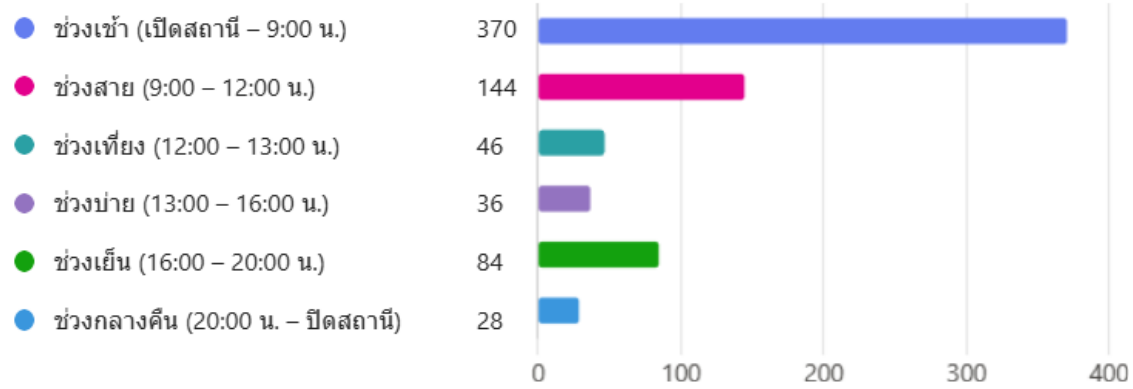
Origin Station



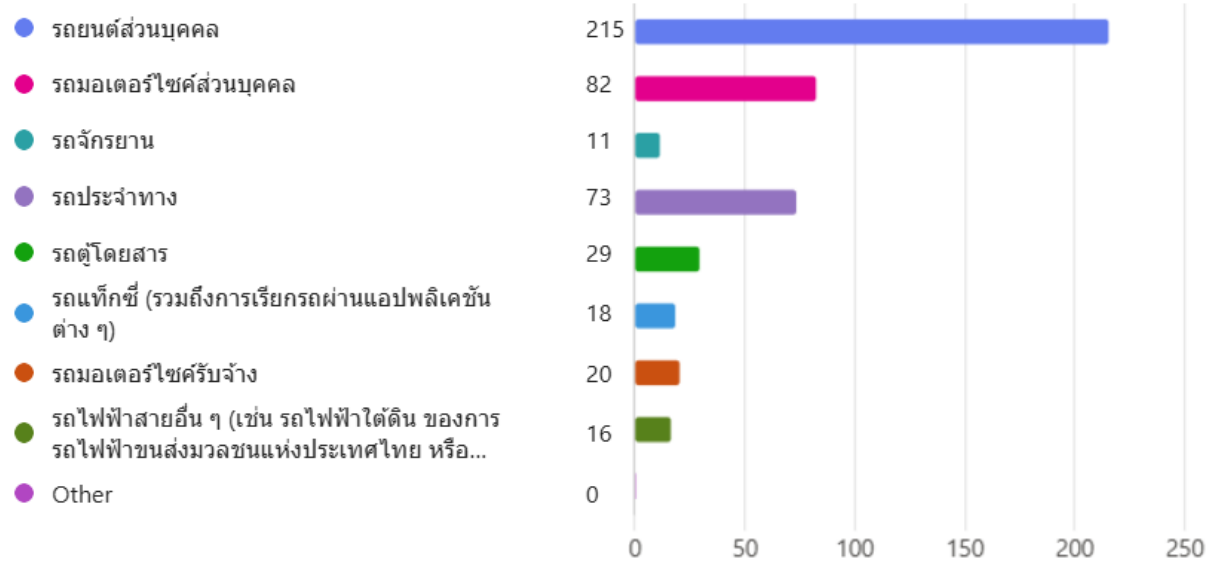
Destination Station



Time to use BTS SkyTrain



Alternative Transportation



Limitation

This study focuses on the Impact Valuation of the BTS SkyTrain and is not intended as a statistical or behavioral research study. As such, the questionnaire sample is considered appropriate for the purpose of impact valuation analysis, although it may not be sufficient for drawing broader statistical or behavioral insights for each BTS SkyTrain line. Future studies may consider increasing the sample size for each line to enhance the robustness of the analysis.

Thank you

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