FEASIBILITY ANALYSIS OF FLY-OVER

PROJECT IN LEICESTER

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SECTION A: PROJECT DESCRIPTION

Introduction

Transportation is a major infrastructure component in today's world, and its performance is important for any nation. Construction management is a highly skilled process that entails finishing a project in the shortest time and at the lowest feasible cost. This approach is separated into three stages: planning, scheduling, and management (Anelli and Sica, 2020). The first two phases must be finished before the main project can begin. This third phase happens concurrently with the project's execution. The objective is to detect and resolve issues throughout the execution process. The most critical part of construction management is project planning, which involves cost estimate, job duration, work direction, and consistency (Luque et al., 2019).

The length of the project is contingent upon the availability of resources, labour, and equipment. Project management includes organising, making choices, and resolving issues that emerge during the construction process (Yoon, 2021). This is the conventional (or unintentional) way of identifying planning concerns. When planning a railway line, it is necessary to consider the topological configuration, the number of stations and lines, the frequency of the lines, and the cost. The number of lines available, the time required to park near a station, and the station's pedestrian accessibility contribute to a prospective passenger's decision to utilise the metro (Kasar and Gaikwad, 2019).

Before the line's design, stations should be built in locations that provide access to health care, education, entertainment, and connections to other railway stations. In contrast, other station sites should be chosen based on features that attract or serve more people. In today's reality, flyover construction is critical for lowering fuel consumption, accidents, and travel time in major cities. Additionally, the construction process must be well-organised. This project the

economic feasibility of a flyover at the junction of Leicester's north and west roads. A feasibility study was done, considering the benefits and the flyover cost. The flyover's construction is followed as it progresses through the different stages (Hapsari et al., 2018).

Construction time and cost estimates are provided for two distinct stages of construction. The crucial route of the project is determined by the availability of beds for casting the spine, cantilever, and crash barriers. This construction compared two distinct methods: one that required just one phase and another that required two. From abutment A to abutment B, piling,

A feasibility analysis is a method for forecasting the outcome of an investigation or examination of a proposed project, as well as any anticipated profit. Such analysis thoroughly research and assess any aircraft or business idea and establishes crucial project launch requirements. Feasibility studies are critical for establishing a project's feasibility (Arvanitis and Estevez, 2018). The two most critical components are the site appraisal and cost predictions for the proposed project. Accounting statements, information management techniques, successful advertising, a range of economic situations, domestic and international regulations, and several other issues must be considered. The feasibility studies consider both demands and a variety of excise charges. Most of these queries concerned technology development and execution (Anelli and Sica, 2020).

A detailed analysis assessment is necessary to ascertain the likelihood of project success. A feasibility project is a critical component of running a successful business. According to Anelli and Sica (2020), a significant proportion of projects fail due to erroneous data or assumptions. Consequently, each feasibility study must ensure that we deal with reliable data, unequivocal statements, and current financial records. A feasibility analysis's major objective is to evaluate

three types of feasibility: technical, operational, and economical. This project is just for development and execution. A feasibility study may be impacted by several factors, including

increased mobility, storm-water drainage, and overall sustainable development along the project's alignment due to expanding urbanisation and commercial growth. The proposed Project's primary objectives are to improve transportation connectivity between Leicester and the central business district, to provide a signal-free corridor to reduce travel time, to alleviate traffic congestion at an at-grade (ground level) intersection by converting it to a flyover-improved intersection, and to reduce traffic noise and air pollution caused by vehicles idling at signalised intersections.

a) Stakeholders

Stakeholders	Functions
Project owners	• Approves certain adjustments, payments, and consultant ideas that align with the organisation's and government's aims; and • Resolves right-of-way issues.
Consultant	• Creates the project's design; creates drawings and specifications; and ensures that the project is completed on time, on budget, and agreed-upon quality and standards. • Regularly reports to the project owners on the progress of projects.

Main Contractor	specified by consultants on schedule, within project boundaries, and to a high-quality standard.
Sub- Contractor	Executes and completes the major contractor's work requirements.
Donor/Financier	• Finances the project adequately; ensures that funds are utilised appropriately; confirms that funds are used for this particular activity. • Approves budget increase requests from customers and project owners.
Local Authorities	• Consult with community members about the project and relay queries from the community to the client or consultant. •
	Collaborate with project owners ROW experts to address rightof-way (ROW) concerns.
Environmentalists	• Make suggestions for the best environmental protection strategies to ensure that the project does not pollute the ecosystem during construction.

b) Cost of Project Life Cycle

Activities	Budget
Road works	186.0 Million
Structures	1186.0 Million
Storm water drain	90.0 Million
Electrification	45.0 Million
Other Costs	
Contingencies	268.0 Million
Consultancy	
Utilities relocation	
Total Project Cost	**1718.0 Million**

c) PESTLE Analysis

Political

The national and municipal governments run deficit budgets, which improve GDP in the short term but raise inflation in the long run. The government's debt is rated investment grade. Establishing several government entities lowers the risk of a single agency gaining excessive influence (Kasar and Gaikwad, 2019). On the other side, doing business and acquiring permits and licences requires more time and money. Compared to the preceding decade's degree of quantitative easing, market prices for fly-over commodities and total goods have stayed steady. In a developing country with massive deficits, a fly-over should account for the likelihood of rapid inflation and considerable currency devaluation (Hapsari et al., 2018).

Economic

Inflation may influence demand for fly-over products. To sustain regular price increases in line with inflation, inflationary pressures may compel a fly-over, resulting in weaker brand loyalty and ongoing cost-cutting initiatives. Cost-based pricing may be a horrible strategy (Pienaar, 2018).

Social

Fly-over should do ethnographic research to learn more about people's opinions and preferences for recreational activities. According to both millennials and baby boomers, the experience economy is one of the fastest expanding areas of the economy. Before entering a market, Fly-over must first grasp the nature of the social contract between the government and the rest of society (Luque et al., 2019).

Technology

Countries all across the world are preparing to create 5G infrastructure. The flyover will demonstrate how well the local market is for 5G connections. Before entering a new market, Flyover should investigate the status of intellectual property rights (Pienaar, 2018).

Environmental

During the fly-over, customers' environmental concerns must be evaluated. It will help Fly-over produce environmentally friendly goods and cope with public relations difficulties. Environmental enforcement organisations serve a critical role in ensuring that environmental regulations are followed. However, in underdeveloped countries, these organisations often hinder collecting bribes. Fly-overs should be made aware that such practices may occur in certain countries (Hapsari et al., 2018).

Legal

Flyover project managers should do extensive market research before entering the market since each country views health and safety differently. A cursory examination of the country's legislative system should disclose how successfully intellectual property rights are protected. The fly-over project management must understand what consumer protection standards exist, how they are implemented, how authorities see consumer protection regulations, and what role activist organisations play in enforcing consumer protection rules (Luque et al., 2019).

Section B: Feasibility and Economic Analysis of the Flyover Project

Serial #	Feasibility Techniques	Role of Stakeholder
1	Financial Health Assessment	The stakeholders who will be involved in the financial health assessment of the project are creditors of the project, authorities, retail investors, and project contractors. The role of the creditors and investors is to finance the cost which will be predicted in the construction of the flyover. The authorities will assess the impact of cost-benefit in the coming years after the project execution to estimate the project's significance. In

		comparison, the project contractor will ensure that the project was planned and executed within the limit of budget.
2	Sustainability Analysis	In this technique, the stakeholders will be the project manager, customers, suppliers, and shareholders. The role of the manager and shareholders will be to ensure that the project is feasible in terms of its environmental impact. In ver will determine if . On the other hand, ng eco-friendly and m workers' and
3	IRR Method	The major stakeholder of the IRR will be the owner of the project as they have to ensure the completion of the project within the provided budget and deadline.
4	Schedule Feasibility: Critical Path and Work Breakdown Structure	The role of the project contractor and manager will be to determine the tasks which have to be completed for project success within the given period
5	Sensitivity Analysis	The shareholder and creditors of the project will be involved who have the role to ensure the success and impact of the project in the following years

		activities involved in different stages of the project are completed within the budget allocated
7	Critical Assessment of private finance, source of finance	The stakeholders involved in this technique are the owners, banks or lenders, creditors, and employees. The employees have the responsibility to predict and calculate the estimated cost required for project completion. At the same time, the owners have the role of obtaining the estimated cost by identifying the sources of finance. The bank, lenders, and creditors are necessary for providing the finance required in each stage of the project life cycle.
6	Project Life Cycle Cost	In this technique, all project members, including workers and managers, will be responsible for ensuring that the

According to the predicted financials, the project's incorporated business is expected to generate positive cash flow and a 13% return on investment. Therefore, financial viability is assured for the project. Because the project is debt-free, the firm is not subject to the debt-equity ratio (Martin et al., 2020). Tolls would be paid exclusively in cash, resulting in a significant cash inflow and favourable liquidity and current ratio. As a consequence, the project will be permitted to continue. The Benefit-Cost Ratio increases from 1.84 to 2.48 in the first to final year (Appendix 1).

Technique 2: Sustainability Analysis

Technique 1: Financial Health Assessment

Because the flyover project's major purpose was to produce a conceptual model for the public transportation plan, the recommended bus terminals sites rely on the BRT project's exact design. The public transportation plan did not undergo an environmental evaluation such as an IEE. As a result, significant environmental and socioeconomic considerations should

be included in the feasibility analysis for the public transportation plan described in the preceding section (Stanitsas et al., 2021). The two most critical points to consider are as follows.

a) Large-Scale Effect of Bus Operations

At the time, minibus operators, drivers, and passengers were the projects most impacted by public transportation reform. BRT adoption will have a significant impact on the project. Large buses would have a devastating effect on these people. As a result, the BRT Feasibility Study's stakeholder meetings will be extremely instructive (Young and Legister, 2018). Environmental and societal issues will be addressed in the feasibility study described before.

b) Terminal Development's Consequences

Even though this research provided an in-depth examination of terminals, their purpose, and distribution, it did not provide specific locations for each terminal. The port's feasibility analysis will consider applicable environmental and social regulations (Stanitsas et al., 2021).

Technique 3: IRR methods:

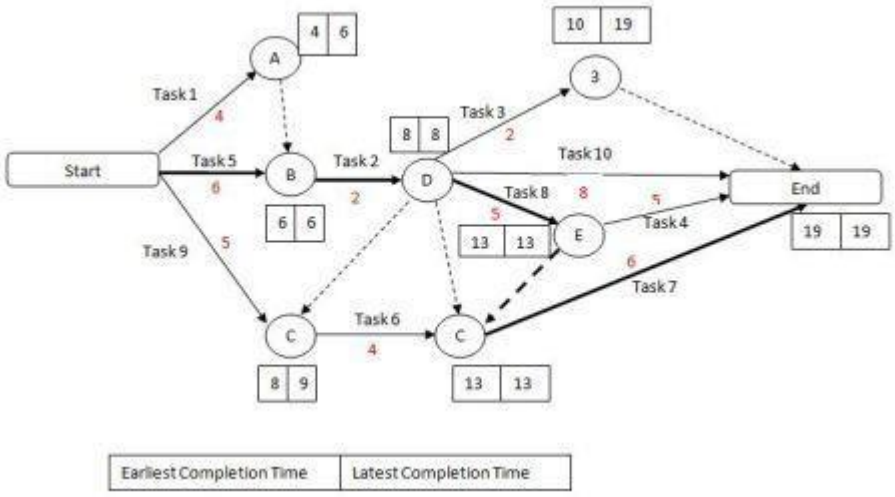
The project is expected to provide a 13% return on investment, demonstrating its feasibility. The financial IRR is calculated to ensure that the suggested efforts are successful. The Munyonyo Route (A) is used in this analysis (Zheng et al., 2020). Prerequisites for the analysis include the following: The analysis is predicated on the absence of tariffs on imports. Since 2010, traffic increase has averaged 1.51 per cent each year, according to traffic demand predictions. Eight years was chosen as the analysis period based on the operational life of large vehicles.

As measured by the UK Bureau of Statistics, annual inflation's composite consumer price index, which is the average of all products, is 0.85 per cent (Tonchia, 2018). According to the Statistical Abstract's transportation and communication price index, the yearly growth rate for big bus tickets is 7.36 per cent. The table in Appendix 2 summarises the anticipated results of the analyses. In Case 1, based on the current loan rate, the lending interest rate is estimated to be 22%. In Case 2, if the bus operating fund is generated in the manner described above, it is set at 17%. Both Case 1 and Case 2 examine three distict bus fare situations that will be passed through the flyover.

Technique 4 : Schedule Feasibility: Critical Path and duration supported by a Work Breakdown Structure

The Critical Path (CP) is a collection of interdependent tasks that must be completed on time for the project to be completed on time (Atin and Lubis, 2019). The critical route approach is vital for project management because it prioritises tasks that must be completed on time, those that may be delayed if necessary, and available float or slack seen in Appendix 4. The work breakdown structure (WBS) is a project management technique that logically enables the completion of huge projects with many moving parts. A work breakdown structure (WBS) may be used to integrate scope, cost, and deliverables into a single tool by dividing the project down into smaller components (Torkanfar and Azar, 2020). In the current flyover project, WBS has been predicted, as shown in Appendix 4, to determine the arrangement of project activities to ensure the project's completion within the deadline.

6	F	15 days	0 days	0 days	Y



Technique 5: Sensitivity Analysis

Financial sensitivity analysis is used to determine the cash flow sensitivity of a project to alternative plans, attendance projections, and operating practices as part of financial and feasibility studies (Kermanshachi and Rouhanizadeh, 2019). The scale and operating circumstances of the project and the pricing and market response should all be taken into account. Future values are difficult to forecast, and the project's completion date is unknown. As a result, it is critical to evaluate how proposed changes might affect the multiple project factors that have been evaluated (Banihashemi and Khalil Zadeh, 2018). Sensitivity analysis was used in this flyover project to account for the following possibilities: A 15% increase in the cost of living. Benefits were reduced by 15%, causing widespread worry, and when both of the above conditions are satisfied (Appendix 5).

Technique 6: Project Life Cycle Costing

The financial strategy should include money to accomplish these goals and objectives throughout the project's life cycle. The most advantageous SPV conditions allow for selecting a choice of financing sources and financial instruments for each of them. The project's life cycle

analysis suggests the following. Throughout the design process, the project's company must raise a certain amount of money. The cost of project development typically accounts for around 5% of the project's total cost. Throughout the execution stage, the financial capacity of the project is rapidly and effectively raised (Alavipour and Arditi, 2019).

The overall amount of attracted investments reach a high during the item's commissioning phase. Economically, the project is unprofitable at the moment; expenditures are incurred and paid overtime and capitalised as part of the construction cost. Construction does not produce revenue or cash flow for a project (Keshta, 2019). The cash flows repay debts and generate profits throughout the project's lifecycle. The gap between sustaining Capex and generating positive cash flows from these capital expenditures is large in project finance. The graphic in Appendix 6 illustrates the critical stages of a flyover infrastructure project's life cycle, as well as the direction of cash flows and their link to the project company's cumulative total throughout the course of the project's existence.

Technique 7: Critical assessment of Private Finance, Source of Finance

While the project is riskier without funding, due to the enormous flow of visitors and its strategic location as a connecting point, it may still achieve revenue needs. Flyover infrastructure projects need both technical expertise and environmental stewardship. Even a typical or recently built facility design may need to be tweaked to account for the project region's specific soilclimatic and geographic features (Tonchia, 2018). As a result, the design phase of a project may be highly costly. As a result, it can be considered a good idea to begin the financial planning process by putting the sponsors' cash into the project. This is the most basic kind of capital accumulation. Cash contributions made at the beginning of the project will be sufficient to cover operational expenditures throughout the design phase (Alavipour and Arditi, 2019).

Because of the limited quantity accessible via this kind of financing should be supplemented throughout time, especially during the implementation stage, because the project needs continual input of major financial resources, as the project's life cycle chart shows. Flyover infrastructure upgrades, as previously indicated, need a considerable financial commitment. As a consequence, the average road infrastructure investment is £ 121 million. Obtaining private funding for this project may be difficult without some government assistance. Consequently, government funds are the next most probable source of project funding, which may be sufficient. Budget finance might make up a large percentage of a project's capital structure. For example, according to the standards of the UK Investment Fund, public funding may cover up to 75% of a project's costs (Keshta, 2019).

Government contributions to road infrastructure projects make up around a quarter of all investment commitments. While each project costs the government an average of £13 million, it is crucial to note that it strives to keep expenditure to a minimum. Obtaining government assistance may also be difficult since numerous bureaucratic processes may need considerable time commitments. Subsidies, grants, preferential credit, and other budgetary items might be funded through this income source. On the other hand, bank loans may be the Project Company's next funding source. The most common means of funding investment projects is via bank loans. Consequently, the amount of money collected from this source varies greatly amongst programmes (Zheng et al., 2020).

Flyover infrastructure modifications are often carried out in phases. These projects benefit from loan finance since it allows for cash payments at each stage of development. As a result, the interest payments on the loan are lowered. Flyover construction technology includes various fixed and mobile equipment, some of which may cost hundreds of thousands of dollars. Furthermore,

specialised equipment may be necessary due to these endeavours' technological limitations. In this respect, the project business's financial strategy emphasises the significance of financial leasing, allowing the acquisition of critical equipment at the lessor's cost (Tonchia, 2018).

At every level of the product development process, commercial financing is accessible. If a positive relationship with the project business has been created, suppliers and contractors may supply supplies and raw materials for the project and do work with a payment delay, so prolonging commercial responsibilities. Private supplier businesses seeking concessions to own or manage infrastructure assets are more likely to pursue commercial investment. Bonds are required when a large sum of money is required over a lengthy period. Bonds issued in conjunction with public-private partnerships for flyover construction are often held by financial entities such as pension funds (Alavipour and Arditi, 2019).

Operating-stage bonds pay a lower interest rate due to the decreased risk. The bonds' earnings might be used to repay the original investment. The project firm's financial plan culminates with an initial public offering on the stock market (Zheng et al., 2020). This is the most expensive and time-consuming way to raise funds. It seems acceptable when all other funding alternatives have been exhausted since issuing shares increases the number of owners, which may affect the project management process. The overall financing sources of the flyover project is provided in Appendix 7.

This financial method may be used for existing and future public-private flyover collaborations. The environment of the financial markets, on the other hand, has changed. There have been new financial instruments introduced. The environment in which funds are raised has

changed. The economic and financial crisis, for example, had a significant influence on infrastructure finance availability. Bond financing has ceased due to the monoline insurance crisis, and the hunt for other sources of credit enhancement continues (Alavipour and Arditi, 2019). The present state of the capital markets may necessitate a rethinking of one's financial

available financial instruments on the market. The researchers developed a set of criteria for identifying potential finance sources. According to the research staff of the Public-Private Infrastructure Advisory Facility, the use of a source of finance is contingent on several factors, including the source's cost, the nature of the assets to be financed, the required guarantees, the source's adaptability, and market acceptability conditions. Delmon [6] referred to market availability, lenders' willingness to take on certain project or credit risks, as well as their internal risk management plan. However, they do not combine them into a comprehensive financial strategy or plan (Zheng et al., 2020).

As a consequence of the above debate and investigation, it is obvious that flyovers constructed over level crossings have been ineffective at resolving conflicts between trains, road traffic, and pedestrians, nor have they significantly increased mobility or safety. However, it seems as if these flyovers create more problems than they solve due to poor design and disjointed construction. The most realistic solution seems to be a full-grade separated flyover with an integrated design that handles flyover and pedestrian traffic. Rather than installing costly flyovers at each level crossing, this full-grade separated flyover design provides a long-term transportation solution that includes an above-ground commuter train system, at-grade level crossings, and no-congestion traffic flows (Tonchia, 2018).

New concepts may not get momentum immediately and so fail to prosper. This danger, along with the possibility of increased initial construction costs, is a significant impediment to the widespread usage of transformable buildings and demountable building components in practice. Innovators such as Skilpod, NewCraft, and Llexx had also needed substantial finance yet faced market share constraints due to high development expenses. Clients seek long-term asset value (market or rental) and a high degree of flexibility throughout the early stages of product development. There is no purchase order connected with the cost of the research at the start of the project, implying that funds for the investigation are unavailable (Alavipour and Arditi, 2018).

Typically, financing is not made available until the board of directors approves the project. While feasibility studies are affordable and quick to do, they need consideration. Experiential project teams are aware of this dynamic and have strategies in place to assist facilities groups in taking the first step toward the clarity and confidence that come with a firm grasp on the scope of a project and how it can be completed within the constraints of a wellresearched and fully documented cost estimate. By bringing together important stakeholders and agreeing on the project's scope, a facilities group may begin to empower decision makers and successfully drive the project forward (Stanitsas et al., 2021).

Section D: Summary

Effective urban service delivery is critical to a city's or suburb's development. Rapid urbanisation is placing further pressure on the country's transportation system. Increased traffic demands adversely affect mobility. High vehicle speeds, heavy traffic, the potential of pedestrian deaths, and a lack of appropriate infrastructures, such as symbols, signals, and signs, contribute

to this intersection's high accident rate. Numerous approaches and decision-making procedures exist for assessing a project's financial and other feasibility. Additionally, a sensitivity analysis has been conducted.

Despite the difficulties inherent in forecasting future cash flows, we examined the impact at different levels by applying a percentage shock to both costs and benefits and analysing the effect when both were applied simultaneously. Because the IRR is predicted to be 13% and the Re is expected to be 8%, the project will be declared viable after a cost-benefit analysis. As a consequence, the project's net present value is positive. Whilst sensitivity analysis indicates that income is more sensitive than cost, they become supersensitive when both are simultaneously exposed to a negative shock.

References

Alavipour, S.R. and Arditi, D., 2018. Optimising financing cost in construction projects with fixed project duration. *Journal of Construction Engineering and Management*, *144*(4), p.04018012.

Alavipour, S.R. and Arditi, D., 2019. Time-cost tradeoff analysis with minimised project financing cost. *Automation in Construction*, *98*, pp.110-121.

Anelli, D. and Sica, F., 2020, May. The financial feasibility analysis of urban transformation projects: a quick assessment model application. In *INTERNATIONAL SYMPOSIUM: New Metropolitan Perspectives* (pp. 462-474). Springer, Cham.

Arvanitis, S. and Estevez, L., 2018. Feasibility Analysis and Study. In *The Emerald Handbook of*

Entrepreneurship in Tourism, Travel and Hospitality. Emerald Publishing Limited.

Atin, S. and Lubis, R., 2019, November. Implementation of Critical Path Method in Project Planning and Scheduling. In *IOP Conference Series: Materials Science and Engineering* (Vol. 662, No. 2, p. 022031). IOP Publishing.

Banihashemi, S.A. and Khalil Zadeh, M., 2018. Sensitivity analysis for estimating the cost of project execution with EVM technique by considering factots of quality and risk. *Iranian Journal of Trade Studies*, *22*(87), pp.187-214.

Hapsari, A., Erwandi, D. and Syam, A.F., 2018. Risks Control for Launching Gantry Activity Assembly at Kapten Tendean Flyover Project (Seskoal Package). *KnE Life Sciences*, pp.159-173.

Kasar, R. and Gaikwad, P., 2019. Application of BIM: A Case of Flyover. *Proceedings of Sustainable Infrastructure Development & Management (SIDM)*.

Kermanshachi, S. and Rouhanizadeh, B., 2019, June. Sensitivity analysis of construction schedule performance due to increased change orders and decreased labor productivity. In *7th CSCE International Construction Specialty Conference (ICSC)* (pp. 12-15).

Keshta, I., 2019. A model for defining project lifecycle phases: Implementation of CMMI level 2 specific practice. *Journal of King Saud University-Computer and Information Sciences*.

Luque, J.P., Ikromov, N. and Noseworthy, W.B., 2019. Financial feasibility analysis: planning for the possible. In *Affordable Housing Development* (pp. 81-87). Springer, Cham.

Martin, J.D., Keown, A.J. and Titman, S., 2020. *Financial management: principles and applications*. Prentice Hall.

Pienaar, L., 2018. THE FLYOVER PROJECT. *AgriProbe*, *15*(4).

Stanitsas, M., Kirytopoulos, K. and Leopoulos, V., 2021. Integrating sustainability indicators into project management: The case of construction industry. *Journal of Cleaner Production*, *279*, p.123774.

Tonchia, S., 2018. Project Cost Management and Finance. In *Industrial Project Management* (pp. 153-170). Springer, Berlin, Heidelberg.

Torkanfar, N. and Azar, E.R., 2020. Quantitative similarity assessment of construction projects using WBS-based metrics. *Advanced Engineering Informatics*, *46*, p.101179.

Yoon, D., 2021. Policy Feasibility Analysis Model. In *Preliminary Feasibility for Public Research and Development Projects*. Emerald Publishing Limited.

Young, J.H. and Legister, A.P., 2018. Project-based learning in international financial management. *Journal of Teaching in International Business*, *29*(1), pp.76-87.

Zheng, G., Jing, G. and Shuangying, Z., 2020. The Application Limitations and Relevant Amendments of IRR. *The Frontiers of Society, Science and Technology*, *2*(15).

Appendix

Appendix 1: Financial Health Assessment-Benefit/Cost Ratio Analysis

Year (1)	Construction cost (2)	Maintenance Cost		const amount (5)	Total Cost up to that year (6)	Total benefits (7)	benefits up to that year (8)	benefits – cost(1) (9)	benefits – cost(2) (10)	benefits/ cost Ratio (11)
		Routine (3)	Periodic (4)							
2022			431.72	13337.0	13768.82	3344.25	25435.31	11666.4	3344.25	1.84
2023		90.939		14670.8	14761.74	3633.92	29069.23	14307.4	3542.98	1.96
2024		95.777		16137.8	16233.66	3954.72	33023.95	16790.2	3858.94	2.03
2025		100.87		17751.6	17852.55	4310.65	37334.6	19482.0	4209.77	2.09
2026		106.23		19526.8	19633.08	4707.57	42042.17	22409.0	4601.33	2.14
2027			559.45	21479.5	22038.99	5150.74	47192.91	25153.9	4591.28	2.14
2028		117.84		23627.4	23745.34	5647.43	52840.34	29095	5529.52	2.22
2029		124.11		25990.2	26114.36	6207.21	59047.55	32933.1	6083.09	2.26
2030		130.71		28589.2	28719.99	6841.51	65889.06	37169.0	6710.79	2.29
2031		137.66		31448.2	31585.87	7564.09	73453.15	41867.2	7426.42	2.30
2032			724.96	34593.0	35317.99	8389.53	81842.68	46524.6	7664.56	2.31
2033		152.70		38052.3	38205.04	9339.7	91182.38	52977.3	9186.99	2.38
2034		160.83		41857.5	42018.41	10439.6	101622.0	59603.6	10278.8	2.41
2035		169.38		46043.3	46212.72	11717.9	113339.9	67127.2	11548.5	2.45
2036		178.39		50647.7	50826.07	13216.4	126556.4	75730.3	13038.0	2.48

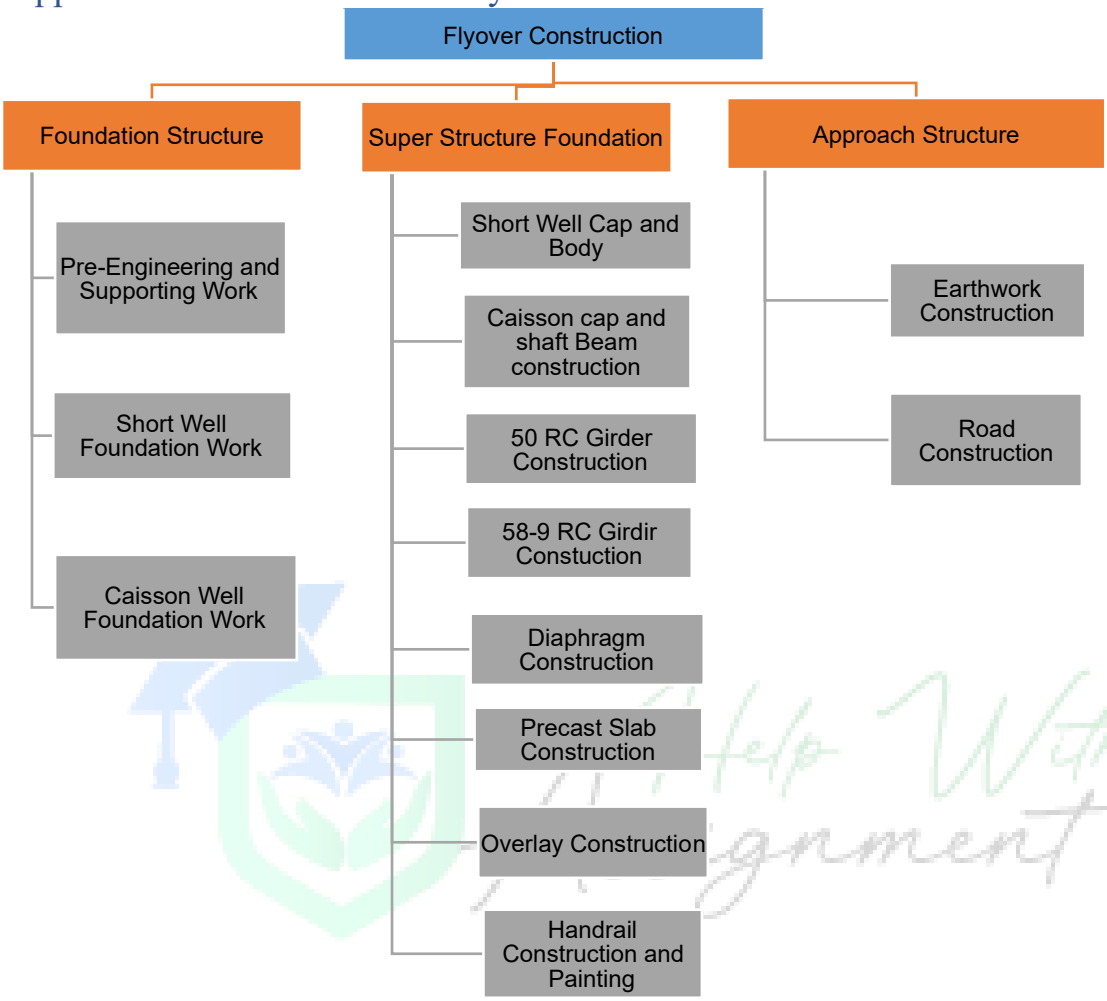
Appendix 2: IRR Method

	Lending interest rate	Fare
Case 1-A	22%	Present minibus level
Case 1-B	22%	5% raising from minibus level
Case 1-C	22%	10% raising from minibus level
Case 2-A	17%	Present minibus level
Case 2-B	17%	5% raising from minibus level
Case 2-C	17%	10% raising from minibus level

Appendix 3: Schedule Feasibility: Critical Path

Sr. No	WBS	Duration	Total Slack	Free Slack	Critical
1	A	116 days	0 days	0 days	Yes
2	B	65 days	0 days	0 days	Yes
3	C	243 days	0 days	0 days	Yes
	C.1	97 days	0 days	0 days	Yes
	C.2	97 days	0 days	0 days	Yes
	C.3	49 days	0 days	0 days	Yes
4	D	28 days	0 days	0 days	Yes
5	E	75 days	0 days	0 days	Yes
	E.1	30 days	0 days	0 days	Yes
	E.2	30 days	0 days	0 days	Yes
	E.3	15 days	0 days	0 days	Yes
6	F	15 days	0 days	0 days	Yes
7	G	40 days	0 days	0 days	Yes
8	H	20 days	0 days	0 days	Yes
9	I	60 days	15 days	15 days	No
10	J	16 days	0 days	0 days	Yes
11	K	30 days	0 days	0 days	Yes
12	L	14 days	0 days	0 days	Yes
13	M	80 days	55 days	55 days	No
14	N	80 days	0 days	0 days	Yes

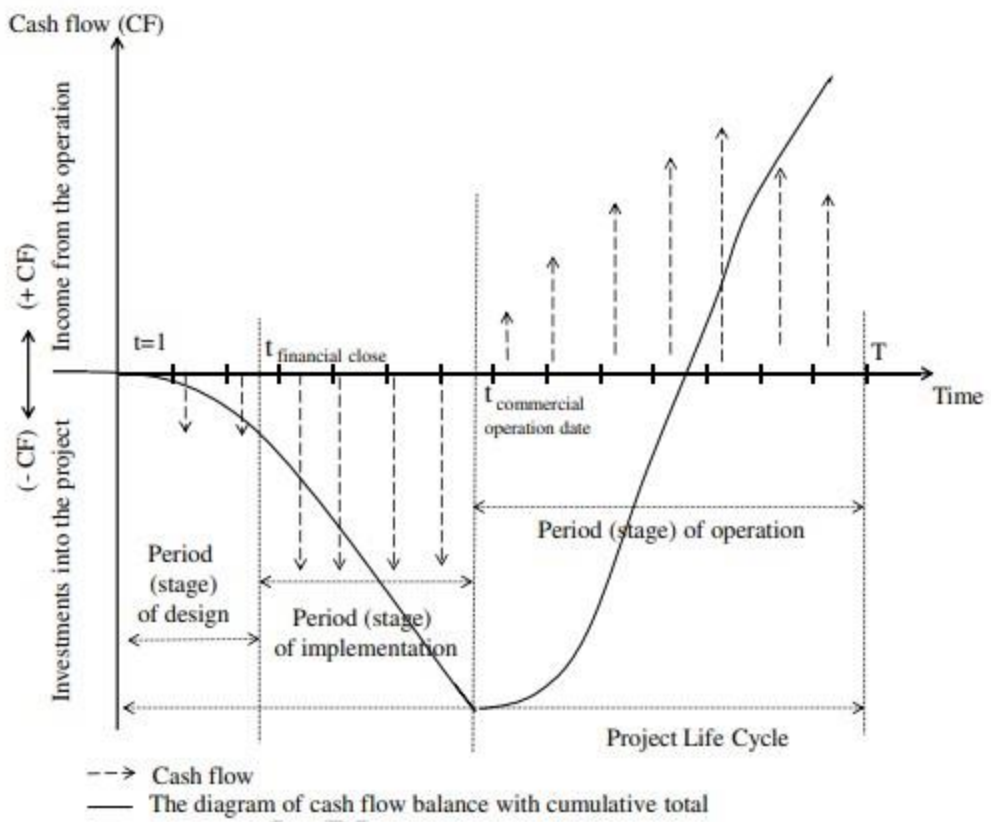
Appendix 4: Schedule Feasibility: Work Breakdown Structure



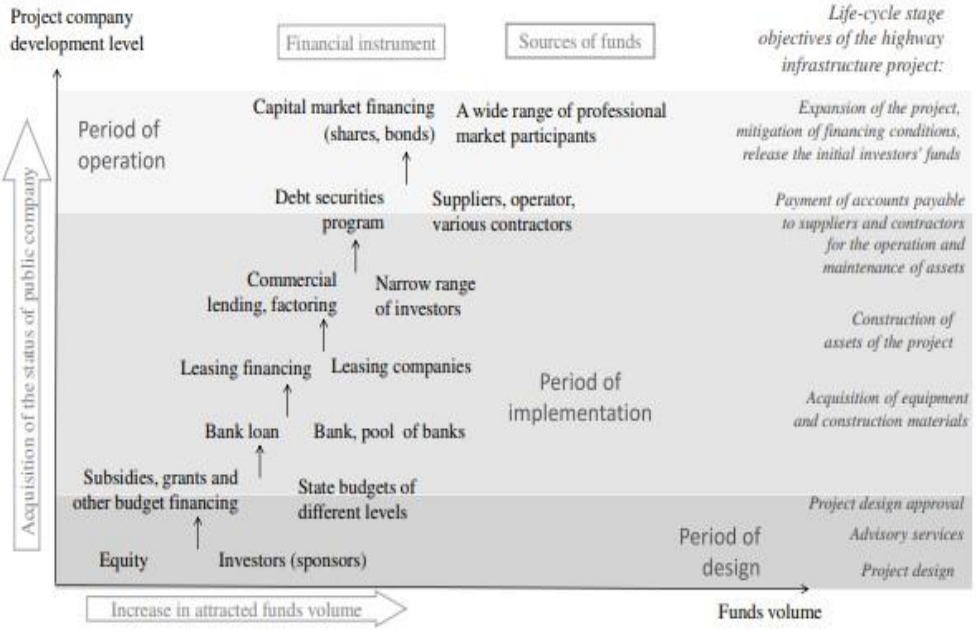
Appendix 5: Sensitivity Analysis

		8%	9%	10%	11%	12%	IRR (%)
Actual cost and benefits	benefit/cost	3.91	3.12	2.49	1.99	1.60	14.805%
	break-even year	2022	2022	2023	2023	2023	
Increase in cost by 15%	benefit/cost	3.40	2.71	2.17	1.73	1.39	13.955%
	break-even year	2023	2023	2023	2017	2024	
Decrease in benefits by 15%	benefit/cost	3.32	2.65	2.12	1.69	1.36	13.832%
	break-even year	2023	2023	2024	2024	2024	
Both Increase in cost and Decrease in Benefits by 15%	benefit/cost	2.89	2.31	1.84	1.47	0.82	12.955%
	break-even year	2024	2025	2024	2024	-----	

Appendix 6: Project Life Cycle Costing



Appendix 7: Sources for Financing



Appendix 8: Algorithm of Financing