

The logo of the Asian Development Bank (ADB), consisting of the letters 'ADB' in white serif font on a dark blue square background.

# LEARNING FROM SUCCESSFUL ROAD PROJECTS

A Case Study from the 2006 Annual Evaluation  
Review

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**Tyrrell Duncan**  
**Renato Lumain**

Operations Evaluation Department

**Asian Development Bank**

# Abbreviations

ADB	Asian Development Bank
DMC	developing member country
EA	executing agency
EIRR	economic internal rate of return
PCR	project completion report
PNG	Papua New Guinea
PPER	project performance evaluation report
PPTA	project preparatory technical assistance
PRC	People's Republic of China
TA	technical assistance

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# I. Characteristics of Successful Road Projects

1. There were 94 road projects approved, completed, and rated by the end of 1997. Of these, 89% were rated as successful or highly successful by project performance evaluation reports (PPERs) and project completion reports (PCRs). Only 10 road projects were rated as partly successful or unsuccessful. For these completed projects, the Asian Development Bank (ADB) road lending focused mainly on financing traditional investment projects. Sectorwide issues, policy reform, and institutional issues featured less prominently in project design than is currently the case. Most of these projects were approved before ADB adopted its environmental and social safeguard policies.

2. A basic requirement for a successful road project is that it should attract sufficient traffic so that project benefits will exceed project costs. All of the successful road projects examined attracted traffic levels in line with their designed capacity. In most cases, traffic exceeded the appraisal forecasts as a result of rapid growth in vehicle ownership and use. This was a characteristic of successful projects, whether they were in countries that experienced high and sustained economic growth, such as the People's Republic of China (PRC) and Thailand, or in others that had more moderate growth, such as Nepal and Sri Lanka. For some tolled expressway projects in the PRC, traffic was initially less than forecast but later increased.

*A basic requirement for a successful road project is that it should attract sufficient traffic so that project benefits will exceed project costs.*

3. All successful road projects lowered vehicle operating costs and reduced journey times. This contributed to improved economic efficiency. The savings in operating costs and time contributed to economic internal rates of return (EIRRs) that were mostly well above the 12% hurdle rate. Rehabilitation projects had especially high EIRRs—sometimes over 100%—although this was sometimes because previous investments had not been properly maintained and had, therefore, not realized their potential economic returns.

4. Improved roads led to increases in the availability of privately operated passenger bus services and trucking operations in the project areas. This was most marked for rural roads, where road improvement sometimes resulted in the introduction of reliable transport services for the first time. Expressways also generated transport service improvements, but these were more incremental in nature. In most successful projects, at least part of the benefits of lower transport costs were passed on from operators to users in the form of lower unit charges. This varied depending on the extent of competition among transport service operators. The benefits of shorter journey times automatically went to users.

5. Successful rural roads projects had a major impact on communities served by contributing to increased incomes and employment, and improved social services. Better access to markets and to administrative and service centers led to changes in economic activities and in the way of life, and was a significant factor in poverty reduction. People were able to switch from subsistence farming to producing higher value agricultural products, and to develop small-scale manufacturing and service enterprises, and there was growth in wage labor opportunities. Another dimension of impacts was through improved delivery of social services; but this depended on the extent of other complementary programs such as health services and education. In some cases, more could have been done to coordinate with these programs or to incorporate complementary components within ADB road projects.

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6. The impacts of national highways projects tended to be more diffuse. The main impact channel was through the contribution of transport cost and time savings to economic growth, leading to indirect impacts on poverty reduction through rising incomes, employment, and increased government revenues available to finance public programs.

7. Most successful projects used existing alignments that avoided significant environmental impacts and limited the extent of land acquisition and resettlement. The main adverse impacts were through increased road accidents arising from higher vehicle speeds. Developing member countries (DMCs) were especially vulnerable to these impacts, because their road safety programs were still weak. Only toward the end of the sample period did ADB begin to incorporate road safety within its support for the road sector.

8. Sustained ADB involvement in the road sector contributed to successful project outcomes. Successful projects tended to adopt a limited and incremental approach to institutional strengthening and sector reform. Reform initiatives, such as restructuring of road sector institutions or strengthening of road financing mechanisms, were often pursued through a dialogue spanning several lending and technical assistance (TA) operations sometimes covering a decade. This required a consistent agenda to be followed, with a measure of flexibility to adapt to changes in circumstances along the way.

9. Successful projects generally benefited from the lessons learned from ADB's first road sector intervention in the country concerned. First loans have tended to involve a lot of learning that, while sometimes problematic in the short term, contributed to the success of later loans.

### Characteristics of Successful Road Projects

1. Adequate levels of traffic used the completed roads; traffic growth is associated with economic growth.
2. Vehicle operating and journey times were reduced and transport services improved.
3. Continuity of ADB's engagement in a country's road sector and of ADB staff involvement had a positive influence on ADB's contribution to project success. Reform initiatives were often pursued through a dialogue spanning several lending and TA operations, sometimes covering a decade.
4. Good quality at entry covered the quality of the project preparatory technical assistance (PPTA), the project design, and the incorporation of lessons learned from previous projects.
5. Strong government ownership was evident when ADB supported parts of a major highway investment plan that featured prominently in the DMC's medium-term investment plan.
6. Executing Agencies (EAs) performed well, were sometimes supported by supervision consultants, and often had a track record of having previously handled similar projects.
7. EAs, consultants, contractors, and ADB staff worked together to solve problems and handle unforeseen circumstances that developed during implementation.
8. Supervision consultants and contractors performed satisfactorily.
9. Regular ADB supervision missions were a consistent feature of successful projects, particularly during the first 2–3 years after loan approval, when most problems arise and ADB missions can be of most help.
10. Adequate maintenance is essential for project success and sustainability.

Source: Operations Evaluation Department, Asian Development Bank.

## II. Quality at Entry

10. The quality at entry of successful projects was generally satisfactory. Dimensions of quality included the quality of the project preparatory technical assistance (PPTA), the project design, incorporation of lessons, and extent of government ownership.

11. Most successful projects were preceded by PPTA. In general there was a linkage between good PPTA performance and eventual project success. PPTA was essential in countries where the capacity of road sector institutions was weak. In some countries where the capacity of road sector institutions was relatively strong, such as the PRC, PPTA was less essential. In some cases, PPTA was not required, as the executing agency (EA) had already prepared most aspects of the project to satisfactory standards.

12. Careful selection of road sections for improvement was a common feature of successful projects. When ADB supported parts of a major highway investment plan that featured prominently in the DMC's medium-term investment plan, this usually meant that the

investments were well selected and carefully prepared. It also helped to build in national ownership. In many cases ADB financed successive investments within the same plan, in some cases continuing with new projects for more than a decade.

*Continuity of ADB involvement in the sector, and by individual ADB professional staff, was an important determinant of quality at entry.*

13. Continuity of ADB involvement in the sector, and by individual ADB professional staff, was an important determinant of quality at entry. In PRC, Indonesia, and Thailand, ADB financed a succession of highway loans that contributed to the development of national highway networks. Over time, ADB developed considerable familiarity with the design and implementation factors that affected project success in the respective countries. This meant that ADB was able to incorporate a wealth of experience that ensured high quality of project formulation. It also meant that EAs gradually built up their capacity and familiarity with ADB procedures. In Indonesia and Thailand, this led to a fairly natural progression from project to sector lending, which helped to scale up ADB support and reduce transaction costs.

14. Successful projects often packaged civil works in ways that contributed to building sector capacity. For simple road improvements, local competitive bidding was commonly used to encourage fledgling domestic private contracting industries. International competitive bidding was adopted as a means of promoting competition in civil works, and, when civil works were complex, requiring more sophisticated expertise and greater financial capacity on the part of contractors.

15. The government's share of project financing varied widely over the sample—from a minimum of 9% to a maximum of 80%. This was not correlated with project success or with the extent of government ownership.

16. A feature of some successful expressway projects in the PRC—which was introduced at the end of the sample period—was the inclusion of a feeder roads component to try to increase the poverty reduction impact in the hinterland of the expressway.

### III. Quality During Implementation

17. As is to be expected, even successful projects encountered problems of some kind during implementation. These included technical and design-related problems (e.g., unforeseen site conditions, revised traffic expectations, observed weaknesses in design); difficulties with

consultant recruitment and with civil works or equipment procurement; weaknesses in the performance of consultants or contractors; shortcomings on the part of the EA; and changes in policies, priorities, and institutional responsibilities.

18. A feature of successful projects was the ability to cope with such problems, find solutions, and adapt to unforeseen circumstances. This drew variously upon the initiative of EAs, the performance of consultants, and the contribution of ADB toward problem solving. ADB's role often involved fielding special project administration missions and performing a midterm review. When ADB project officers had good familiarity with the country, technical skills related to the sector, and a close working relationship with EA officials, it was easier for them to help the EA and the consultants to find solutions, and to make sure these were compliant with ADB procedures.

19. There was no clear link between timeliness of implementation and project performance. Some successful projects were completed on time, but most took 2–4 years longer than scheduled, sometimes even more. Successful projects generally did not have significant cost overruns. In most cases, the project cost was within the appraisal estimate. If there was an overrun, it was usually less than 10%.

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20. Project success depended on supervision consultants and contractors performing satisfactorily. The consultants played an important role in ensuring contractor performance, and in supporting the project implementation unit of the EA. A common but usually minor problem with consultants was the need for staff replacements—some at the request of the consultant and some requested by the EA. This caused short-term disruptions in consultant capacity.

## IV. Performance of Executing Agency

21. The performance of EAs was generally satisfactory. Where EA capacity was limited, the implementation arrangements usually included provisions for additional support from the supervision consultants. Successful EAs often had a track record of having previously handled similar projects. However, EAs were sometimes weak or slow in decision making and in taking action—especially on consultant recruitment and civil works procurement—and this contributed to the overall delays in project implementation.

## V. ADB's Contribution to Project Success

22. Regular supervision missions were a consistent feature of successful projects. On average these were fielded twice a year, with greatest frequency of missions during the first 2–3 years after loan approval—which is when most problems arise and when ADB missions can be of most help. The duration and composition of ADB missions generally ensured that enough of the required mix of professional expertise was provided to monitor implementation and assist in problem solving. On average, each mission had 13 person–days of staff inputs.

23. Most of the sample of successful projects preceded the shift toward greater delegation of project administration to resident missions, and were supervised from ADB headquarters. In DMCs where ADB had large resident missions, some supervision responsibilities were delegated by the mid–1990s. In the projects, however, most supervision continued to be the responsibility of headquarters staff.

24. Continuity helped to ensure that ADB learned from successive projects and that policy dialogue on the main sector and institutional reform issues was maintained over a sufficiently long period to produce results. Continuity of ADB's engagement in a country's road sector and of ADB staff involvement had a significant positive influence on ADB's contribution to success. Continuity also helped ADB staff to establish close working relationships with their government counterparts and to become trusted sources of support and advice.

## VI. Exogenous Factors

25. In some countries, rapid and sustained economic growth played a major part in the success of ADB highway projects and was a leading factor in determining the volume and pace of road sector investment that ADB could support. Economic growth generated a rapid expansion in the demand for transport and in vehicle ownership, and provided the additional government revenues needed for investing in the road network and building the capacity of road sector institutions.

26. Successful highway projects coped with a variety of exogenous factors, including government reorganizations, restructuring of EAs, decentralization of authority from national to local government institutions, and the impacts of the Asian financial crisis on traffic growth and project implementation activities.

## VII. Cross-cutting Themes

27. Several weaknesses in sector governance were evident, even in the successful projects. These concerned sector level implementation of policies and plans to improve the planning, execution, and financing of road maintenance and to prevent damage through vehicle overloading. The greatest uncertainty associated with successful projects was over future maintenance. Some measure of uncertainty was common to nearly all the sample projects. This particularly concerned the level of future maintenance financing and, in some cases, also the standard of maintenance planning and execution. Many projects had included components, TA, or loan covenants intended to strengthen road maintenance, but these were seldom pursued with vigor during project implementation. Sometimes project performance evaluation reports (PPERs) and project completion reports (PCRs) reported recent trends of improvement, but there was usually a good deal of uncertainty over whether this would be sustained in the future.

*The greatest uncertainty associated with successful projects was over future maintenance.*

28. A related issue is that few projects addressed the problem of truck overloading, which causes premature deterioration in the road condition in many DMCs. Even when the issue was addressed by a project component, it was not pursued vigorously and usually did not lead to a significant reduction in overloading.

29. Comparatively few road projects approved before the mid-1990s included components to improve road safety, although this has since become a more common feature of ADB operations in the sector. PPERs and PCRs frequently found that road accidents had increased due to increased driving speeds. A related issue was the lack of a road safety audit during design of road improvements. Road designs often failed to relocate roads that passed through populated centers.

## VIII. Counterfactual in the Road Sector

30. To better understand the characteristics of successful road projects, their characteristics were compared with road projects that were rated as partly successful (see Table). While highly successful road projects tended to be larger, the sizes of successful and partly successful road projects were about the same. The delay in implementation of successful road projects was 1–1.5 years. The delay was longer (3.2 years) for partly successful projects. There were sometimes

extended delays arising from procurement problems and poor performance of contractors. One of the causes of implementation problems was that EAs lacked capacity and often had little or no previous experience with ADB procedures. In some cases, EAs had staff shortages and high staff turnover, sometimes linked to overall fiscal problems.

31. Over the period studied in detail, five road projects were rated as partly successful or unsuccessful by PPERs—two in the Philippines; and one each in Bangladesh, Papua New Guinea (PNG), and Sri Lanka. Differences were examined between these projects, and the successful and highly successful projects to better understand the factors that contribute to successful road projects.

32. Adverse exogenous factors were often associated with lack of success. In PNG and Philippines, overall macroeconomic problems reduced the demand for transport, and fiscal problems limited the financing available for road maintenance. In Philippines (Mindanao) and Sri Lanka, security problems added to the difficulties experienced during implementation and to the cost of construction.

33. It was a common feature of the partly successful road projects that traffic was significantly less than forecast. Sometimes this was attributed to exogenous factors and sometimes it was because of shortcomings in project preparation. Partly successful road projects generally suffered from weaknesses in the quality of project preparation. In addition to overoptimistic demand forecasts, there were cases of substandard designs that necessitated design changes during implementation, and of the scale of facilities being more than necessary. There were cases of both investment and sector reform components being poorly defined, and this led to lower priority investments being financed and reform activities being ineffective.

34. Sometimes an unsuited lending modality was followed. In one case, a program loan was used when a project loan would have been more appropriate. In another case, sector lending was used, but the EA and supervision consultants were not sufficiently experienced to take on the extra responsibilities associated with this modality. The range of ADB's financial products is expanding under the [Innovation and Efficiency Initiative](#). This finding suggests that it will be increasingly important for mission leaders and team members to be fully conversant with the range of ADB's financial products and loan terms to structure financial products that are appropriate for the situation and meet the needs of the clients.

35. In all cases, project sustainability for the partly successful projects was rated less likely or unlikely. This was due to inadequate road maintenance. Project support for institutional strengthening and sector reform failed to overcome weaknesses in the approach to planning, execution, and financing of maintenance. In some cases, changes in institutional responsibilities contributed to the neglect of maintenance.

**Table 1: Characteristics of Successful Road Projects**

	Highly Successful		Generally Successful or Successful		Partly Successful <sup>a</sup>		Total	
	No. of Projects	Average	No. of Projects	Average	No. of Projects	Average	No. of Projects	Average
<b>Project Characteristics</b>								
Size of Project (\$ Million)	11	373.4	35	184.3	4	198.2	50	227.0
Economic Internal Rate of Return at Appraisal (%)	11	22.2	31	21.2	3	27.7	45	21.9
Economic Internal Rate of Return at Post-Evaluation (%)	4	20.6	7	25.5			11	23.7
Planned Implementation Period (Years)	11	4.0	35	3.9	4	4.7	50	4.0
Actual Implementation Period (Years)	11	5.2	35	5.3	4	7.8	50	5.5
Implementation Delay (Years)	11	1.2	35	1.5	4	3.2	50	1.5
Cost Deviation (%)	11	(3.7)	35	(6.9)	4	(20.9)	50	(7.3)
Cost Overrun (%)	5	15.8	14	10.2	2	13.7	21	11.9
Cost Underrun (%)	6	(20.0)	21	(18.4)	2	(55.5)	29	(21.3)
<b>ADB Inputs</b>								
Project Processing Missions	11	2.3	35	1.9	4	2.0	50	2.0
Project Processing Person Days	11	45.5	35	49.7	4	51.8	50	49.0
Project Administration Missions during Implementation	11	7.8	34	8.2	4	14.0	49	8.6
Project Administration Missions per Year of Implementation	11	1.5	34	1.6	4	1.8	49	1.6
Project Administration Person Days during Implementation	11	72.2	34	98.0	4	239.0	49	103.7
Project Administration Person Days per Year of Implementation	11	14.1	34	19.1	4	29.7	49	18.8

<sup>a</sup> No road project approved during the 1990s was rated as unsuccessful.

Notes:

"Average" refers to simple mean (i.e., unweighted).

Project size refers to the actual cost of the project which includes funding from ADB, government, and other sources.

Implementation period refers to the length of time taken to implement a project (from original date of effectiveness to completion).

Implementation delay is the difference between planned and actual implementation period.

Processing missions comprise fact finding and appraisal missions.

Administration missions are supervision missions carried out from inception to project completion, excluding project completion report missions.

Source: Project Completion Reports and Project Performance Evaluation Reports of approved road projects since 1990 containing a rating circulated as of 31 December 2005.