

Global infrastructure asset management best practices review



Introduction

Infrastructure is the backbone of our economy, diligent and orderly management of these assets is vital to strengthening our economy by creating more jobs, delivering public services at a high level and increasing overall efficiency of the society. Infrastructure asset management is a process of making optimal decisions regarding acquisition, building, operating, maintaining and disposing of infrastructure assets in order to maximize utility. The end result is greater public satisfaction and reduced risk of catastrophic failure.

Background

Although the scope of this case study is around the globe, we intend to compare our current practices with other international examples to examine our strengths and shortcomings.

Figure 1 shows the trend of historical investment in capital stocks in Ontario. From mid-fifties to mid-seventies, it was the era of visionary investment and funds were made available to support infrastructures. Since then, the era of neglect follows which shows little or no investments were made during the period. From the beginning of 21st century onwards, it has been era of renewal in infrastructure investment as people started to realize the huge cost of underinvestment.

To address the question “ why is infrastructure asset planning/management important to us? ” , we can view from two different perspectives. Viewed from the standpoint of macroeconomics theory, timely and orderly investment in infrastructures not only create more jobs but also increases

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the productivity of future economy as a whole, which brings significant welfare to the entire society. It also makes sense from financial perspective, all tangible assets need to be maintained and repaired so that satisfactory level of services can be achieved. Small but timely investment in infrastructures is actually much more cost-effective than replacing assets when they are deteriorated. This effect is illustrated in the Figure 2, it is clear to see timely investment from proper asset management saves money while keeps asset in good condition.

Discussion

Australian Infrastructure Report Card

The 2010 report card was completed on a national level by Engineers Australia. Eight individual state report cards of same methodology and format were combined to develop this national report card, thanks to advanced asset management systems supported by infrastructure Australia. This 2010 Infrastructure Report Card for Australia is distilled from individual state and territory outcomes, with appropriate weighting given to the relative size and economic importance of each. [3]

The grades were assessed based on condition, availability, reliability, sustainability and resiliency of infrastructure assets. The infrastructure grades are assigned based on the “ fitness”, which is defined as the degree to which the infrastructure is meeting the current needs of the community, economy and environment in terms of sustainability, effectiveness, efficiency and equity. [4]

It aims to direct infrastructure policies across federal, state and local governments with very detailed policy, regulation and framework recommendations and solutions. The authors call for a holistic regulatory framework that can be used to set priorities between levels of government and across infrastructure sectors. However, the report lacks quantitative and objective methodology in assigning grades to infrastructure assets, it uses qualitative grades that are established based on “ fitness” of infrastructure to meet current and future needs. This process itself is subjective and cannot be repeated without biases.

Strengths:

1. It aims to direct infrastructure policies across federal, state and local governments with very detailed policy, regulation and framework recommendations and solutions
2. Advanced asset management systems across the country supported by Infrastructure Australia to all levels of government
3. Successful establishment of national infrastructure council

Drawbacks:

1. The grading and weighting methodology is not clearly stated, and the process is subjective and lacks important quantitative measures
2. The overall presentation and layout of the report is inadequate, it is difficult for average readers to grasp

2017 ASCE USA Report Card

This Infrastructure report card is overall very well prepared that provides a level of detail that clearly identifies current underinvestment in national infrastructure and specific solutions and recommendations to change the

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situation. When viewed alongside report summary on the website [5], it presents desired headline figures and interactive graphs that do not overwhelm users through intelligent interactive user interface designs. This kind of balance between high-level summaries and detailed analysis by asset categories is unseen from other reports

It addresses to readers the importance of infrastructure investment needs in a concise manner- failing to close infrastructure investment gap will cost hardworking American families upwards of \$3400 in disposable income each year [6]. Grading methodology for each infrastructure type is based on following eight factors: capacity, condition, funding, future need, operation and maintenance, public safety, resilience and innovation. Comprehensive solutions to raise the grades are provided for each asset type through three aspects- Investment, leadership & planning and preparing for the future.

However, it also suffers from the problem of lacking quantitative method to calculate grades and how grades were subjectively determined. This affects clarity of the report and future consistency & comparability among reports.

Strengths:

1. Excellent balance between high-level summaries and detailed analysis by individual asset category.
2. It created an interactive website with all key information presented in a map format.
3. Use of comprehensive 8-factor model to assess grade of each asset and Recommendations of real-world solutions to raise the grade

Drawbacks:

1. It lacks quantitative method to calculate grades and how grades were subjectively determined. This may affect clarity of the report and future consistency & comparability among reports.
2. Current funding requirements and status are left unexplained.

2014 UK State of Infrastructure Report card

UK report card is prepared by Institution of Civil Engineers (ICE) which is an organization formed by experts in all different fields of infrastructure asset management, it aims to raise awareness and stimulate debate so that necessary actions can be taken to improve overall state of infrastructures. Each sector grade is determined by surveying members of ICE with a set of eight questions covering four key areas –resilience, leadership, economic and social, and capacity and condition. Much like Australian report card, the grades are assessed based on adequacy and fitness of the assets.

The overall presentation of the report is concise, it is shorter in length compared to report cards from other countries. Resilience factor of infrastructure assets is emphasized in the report, and two of the biggest concerns are rapidly changing climate and growing population. Three recommendations are made to each of the six asset categories covering strategy, leadership, policy, funding and research and development.

However, the sheer number of recommendation in this report is likely to lead readers overwhelmed. Eighteen sector-specific and more than a dozen other recommendations should be reduced into a more cohesive set of recommendations. Much like other report cards, it uses a subjective and

qualitative methodology when developing grades and perhaps the methodology warrants some level of quantitative measures.

Strengths:

1. Emphasis on risk management and resilience of infrastructure assets
2. Readers may find it easy to read due to its shorter length

Drawbacks:

1. Overwhelming number of recommendations and absence of a cohesive set
2. It lacks quantitative methods of developing grades and elaboration of its subjective measures

Conclusion and Recommendations

This case study on infrastructure asset management practices investigates three examples from the globe and compares them from structure, presentation, content, techniques and innovation aspects. Strengths and shortcomings of each report card has been discussed in detail and a summary.