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12. Potential Infrastructure Enhancements for Ports and Cities

Conclusions, Future Research and Policy Concepts

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12.0 Overview and Conclusions

This monograph maps the research journey undertaken by the policy and finance team within the infrastructure cluster of the Australia-Indonesia Research Centre. An outline of the research approach and collaboration is provided in the paper titled 'Collaborative international industry-university research training in infrastructure projects: an Australian-Indonesian case study' by Hui et al. 2018.[6]

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6 Hui, F, Duffield, C, Wahyuni, S, Parikesit, D, and Wilson, S 2018, 'Collaborative international industry-university research training in infrastructure projects: an Australian-Indonesian case study', 42nd *Australasian Universities Building Education Association* (*AUBEA*) *Conference 2018*: *Educating Building Professionals for the Future in the Globalised World*, *September 26 – 28*, pp. 48 –57.

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The chapters presented have captured the essence of this research project and outline a scope that started with the contextualisation of the economic situations that confront both Australia and Indonesia and then investigated the issues surrounding major investment in infrastructure, focusing attention on the ways by which both countries seek to enhance the services offered in and around their sea ports. Having explored many of the constraints to port investment (like availability of land, planning integration, finance, project implementation approaches) the research progressed to clarifying areas where improvements can best be made, including financing initiatives, improved focus on the integration of hinterland logistics with port operations, areas where efficiency gains may be possible and benchmarking with international best practice. In each of these areas some key findings were:

Synergies between Australia and Indonesia (Chapter 1): Both countries face the need for urgent infrastructure investments to assist in improving their productivity. Australia and Indonesia are rich in natural resources including coal, minerals, gold, copper, nickel, oil, gas and fertile land (giving rise to agricultural products). Unfortunately, however, both countries face more than their share of natural disasters. For Indonesia the impact of being in the ring of fire brings frequent volcanic eruptions, tsunamis and earthquakes as well as frequent floods. Flooding in Australia is also an ongoing concern along with cyclones, bushfires and extreme heat. The vast expanse of both countries places ongoing pressure on fiscal budgets and results in competing demands for investment on worthwhile infrastructure projects.

The positioning of both countries in the Southern hemisphere results in the countries being adjuncts to major trade routes between Europe, the Americas and the emerging powerhouse economies of China and India. The location of major trading partners has both countries looking north for opportunities. The economies of both countries are robust and growing consistently and this growth places further urgency on the need for infrastructure development if their global competitiveness is to be maintained and enhanced.

Infrastructure planning (Chapter 2): It is evident that many worthwhile infrastructure projects have been identified. The Government of Indonesia has recognised this, incorporating targets and strategies into a number of national plans which aim to address

the issues. In Australia, the establishment of Infrastructure Australia in 2008 acknowledged that independent advice would assist to prioritise and progress nationally significant infrastructure. This approach has resulted in a detailed audit of Australian infrastructure needs followed by a plan and ratification of priority projects based on their merit. There remain significant challenges, risks and issues associated with delivering the required infrastructure. Priority areas identified for Indonesia include better integration of transport into and out of the country and the linking of a nation of islands. For Australia, infrastructure is lagging the population growth being experienced in the major centres of Sydney, Melbourne, Perth and Brisbane along with the tyranny of distance and the need for equitable access to services by the population. These priority areas of infrastructure investment led to the focus of the research aligning to major ports and their interface to cities.

To understand the priority barriers to achieving the necessary development in ports a survey of port executives, government officials, financiers and consultants supporting this sector was undertaken in both Indonesia and Australia. The survey considered twenty-nine variables, including the World Bank's ten topics used to measure the ease of doing business and the World Economic Forum's Executive Opinion Survey's most problematic factors for doing business enhanced with the specific infrastructure related topics of affordable energy availability, land acquisition and regulatory uncertainty. Major issues identified in this survey for Indonesia were corruption, inefficient government bureaucracy, policy instability, inadequate supply of infrastructure, regulatory uncertainty and land acquisition. In Australia, inadequate supply of infrastructure, policy instability, affordable energy availability, restrictive labour regulations, and land acquisition were identified as key barriers.

Funding and financing infrastructure (Chapter 3): The ability to afford the extent of required infrastructure investment identified emerged as a major hurdle for delivering the assets in the expected timeframe for both countries. Australia's banking system, and the underpinning financial strength of the country, make Australia attractive as an investment location. This, along with AAA credit ratings for most Australian states and the federal government, has assisted in the development of active international investing in Australian infrastructure assets. At the same

time Australian governments are very sensitive to borrowing limits and maintenance of their good credit rating.

A range of alternate investment approaches were explored that included direct funding and or borrowing by government, private corporations, or international sponsors, the use of Public Private Partnerships, the development of special economic zones to asset recycling and even privatization. Whist there are examples where each of these financing alternatives have been successfully used there were also numerous examples where the approaches either did not work well or were simply not acceptable to the government of the day. Privatisation was clearly considered unacceptable politically in both Australia and Indonesia.

To further understand what financing approach is preferable for port development, the aforementioned survey included questions regarding financing preferences. Conclusions drawn from the survey findings were:

- Current government policies are perceived to be supporting and facilitating direct government investment in Indonesia, more so than in Australia, where investment is dominated by the private sector.
- Australia seems to have access to finance whereas Indonesia would like more.
- Ports appear to get more attention in Indonesia than in Australia. This is not surprising as the Indonesian President has made port enhancements a priority for the country.
- Some think Australia has excessive administration/control mechanisms.

The focus for future attention was to understand how to generalise the good outcomes Australia has achieved from asset recycling strategies, to direct investment towards improving hinterland transport assets surrounding ports, to continue the refinement of Public Private Partnerships such that they deliver value in Australia and that improved mechanisms to facilitate such projects in Indonesia are developed. There was also the need to continue strengthening the banking sector in Indonesia to increase their capacity for involvement in infrastructure investment.

Efficient facilitation of infrastructure assets (Chapter 4): Appropriate structuring and planning for major infrastructure is essential if the investment in correct assets are to be made for an affordable cost and appropriate management of risk. Poor project initiation frequently leads to expensive rework, truncated projects, poor quality or even the building of assets well in advance of the need for the facility. The Indonesian Government have been working to improve project initiation through more attention to the development of business cases, through the undertaking of institutional reform, the identification of funding arrangements, land management and general upskilling of project resources. In Australia, the emphasis for improvement comes by way of independent analysis and recommendation of projects via the conduct of independent project reviews (Gateway Reviews or project assurance mechanisms) in advance of major decisions and an ongoing discipline to undertake business cases that rigorously investigate the need for a project and its alignment with policy, economic benefits, clear investigation of viable options and consideration of how value with be achieved by the recommended procurement approach. In short, for increased project surety focus is required on early risk identification, improved planning and robust decision-making processes.

In addition to the above best practice concepts, the Jokowi government is actively encouraging foreign investment by improving its attractiveness, stability and functionality for other trades, making Public Private Partnerships (PPP) a viable option for procurement of infrastructure projects. It has established a web of supporting government organisations to support the various stages of procurement.

A number of detailed case study projects have been considered in this chapter, these present sobering examples of why further improvements are required.

Integration of port and hinterland facilities (Chapter 5): As domestic and international trade increased in volume and ship technology improved, so did the need for more efficient intermodal transfers and space landside for port functions. Unfortunately, there are few international examples where the landside of seaports function effectively, particularly where city expansion and congestion impact on port operations. Pressures of globalisation, the widespread use of container ships and the need for associated storage, stuffing

and un-stuffing of containers, and port access by road and rail have governments and port operators seeking alternative solutions like dry ports, or intermodal logistics terminals. International ports like the reclaimed land options at Hanshin and Tokyo Bay in Japan along with intermodal concepts such as at Botany Bay in Sydney have been explored.

Port expansion *in situ* can only occur if port activities encroach upon surrounding residential, commercial and industrial areas, or if land is reclaimed from the sea. Both options bring into play the regulatory powers of national, state and local governments. In the case of Port Botany, it has been shown how local government has imposed land-use zoning policies to facilitate port (and airport) related activities. Solutions to the general logistics or supply-chain management problem invariably involve political decisions of government and other stakeholders in the planning of seaports and dry ports in any urban system. The means of regulating urban system growth, mechanisms of resolving environmental conflicts and the relative power of political parties and different stakeholders and the community requires further investigation, but such a solution needs to be found if efficiencies between ports and hinterland areas is to be found.

Queueing of trucks on streets surrounding ports remains an issue in Indonesia. Stevedore vehicle booking systems (VBS) provide potential for a solution involving the use of information technology to reduce congestion around ports. Integration of sea, road and rail systems also appear to offer scope for improvement.

International efficiency of Australian and Indonesian ports (Chapter 6): Benchmarking port facilities internationally provides guidance on areas for improvement. A comparative analysis of efficiency between international ports and port terminals in Indonesia and Australia was undertaken for these close neighbours and major trading partners. The efficiency was examined using Data Envelopment Analysis (DEA) where various logistical inputs that affect overall port performance are determined, and corresponding outputs compared. Ports included in the benchmarking included major Australian, Indonesian and Chinese international ports. It was found that Australian ports are slightly more efficient than Indonesian ports and terminals, with China as a leader in the overall efficiency ranking in the analysis. Constant and variable

returns to scale models were both considered. Comparisons with Singapore or Hamburg (the most efficient international ports) can be misleading due to the high volume of inter-vessel cargo handled in these ports, whereas Indonesia and Australia tend to be destination locations.

It was found that Indonesian ports can improve turn-around times in sea-side operations, while Melbourne was found to have a relatively lower efficiency in crane operations in the sea-side operations. Both areas require transport and logistic improvements along with institutional reform that includes the customs interface with ports and terminals.

Innovation in port development — a quad helix model (Chapter 7): Improving productivity requires ongoing management and detailed planning which is frequently top-down driven by government. Early engagement with wider stakeholders in the port-city interface provides an innovative concept for improvement. This chapter reviewed a comprehensive case study on how Academic-Business-Community-Government plus bank partnerships can be nurtured to create innovation. It was observed from Japan, Shenzen, Hong Kong and other ports in China that there is a need for a systematic cluster strategy that includes: the cultivation of key persons for local industrial vitalisation; analysis for new industries; input into planning through industrial vitalisation; integration of other areas (e.g. city development and SMART technology); and overseas marketing.

It was shown that to develop a successful cluster of supporting activities, there is a need for the development of a systematic cluster strategy and that such a strategy is enhanced with assistance from Academics, Business (particularly banks), Community and Government. This strategy should include cultivation of key resources for local industrial vitalisation and the development of new industries.

Specific competitiveness of Indonesian ports (Chapter 8): Specific factors and problems impacting Indonesian port competitiveness and related financing decisions for seaport projects in Indonesia were explored using a series of focus group discussions with key industry leaders. The focus group meetings were complemented by a detailed questionnaire and in-depth interviews with port experts, financial bodies, port corporations, and government officials.

The results indicate that there is still a gap between policy expectation and the realisation of port development facilitation. Causes for this gap

include inefficient workings of government's bureaucracy, customs clearance, and strategic decision making.

Specific efficiency of Australian ports (Chapter 9): In recent years, efficiency improvements in Australian ports have been sought using asset recycling. This approach facilitates the furtherance of private sector management and development processes along with the release of financial capital from such long-term held assets. In preparation for this transaction there have been a series of Australian Ports reform strategies, development of private investment markets, and consideration of where the released capital can be best re-invested to improve amenity and overall port productivity.

To encourage state governments to participate in the recycling of assets using long-term leases to the private sector, the Australian government provided a 15% cash bonus of the sale price for infrastructure investment for those jurisdictions who participated. Other strategic changes included freeing up investment decisions with landlord decisions being controlled by the private operators rather than by government. Government retained regulator responsibilities with regulation being most important as ports tend to be monopolistic businesses. The development of the private sector port investment market has seen strong commitment from Australian and international superannuation and investment funds. Issues to be overcome as part of the asset recycling processes include: development of techniques to value the assets, management of diverse political positions, and development of processes for future development.

Outcomes from focus group discussions with port industry stakeholders showed that to improve the governance and policy in ports in Australia the government needs to remain as a key player and provide regulations that coordinate the work of the relevant port stakeholders. Further, port stakeholders need to work together to create a clear vision and plan for the port's future and strategies.

Alternative techniques for financing Indonesian seaports (Chapter 10): Current financing arrangements in Indonesia fall short of requirements for port infrastructure investment. Building on an online survey and focus group discussions, a detailed case study was conducted on the New Priok Container Terminal One (NPCT-1). This port development forms part of the Indonesian Governments National

Development Planning Agenda 2015–2019 for sea transportation infrastructure development. Some twenty-four selected seaports were part of the plan (five main seaports and nineteen feeder seaports). This plan includes major developments of Kalibaru (The New Priok) Port, Cilamaya Port, Makassar New Port, Port of Kuala Tanjung, and Port of Bitung (Bappenas, 2014). Investment in these facilities has a major impact on financing schemes and how project risks are allocated.

It was found that Indonesian domestic bank syndication and Public Private Partnership (PPP) schemes with government fiscal support are the two most awaited financing vehicles. In reality, however, the domestic banks have limited capacity and the PPP schemes remain ineffective. The cash flow simulation showed that, if the decision to distribute project dividends is based on a project's internal rate of return, the project sponsors could benefit from adjusting the project's capital structure. The current market continues to rely on government guarantees.

The critical importance of transport when considering port developments (Chapter 11): The importance of integration of the hinterland with port development has been previously discussed. This chapter expands on this concept and considers so called "self-generating ports", which includes the integration between a port and an industrial area, often developed as a single or joint investment. The idea of the self-generating port emerged because the business risk associated with the traffic coming from and going to its hinterland is too complicated to be mitigated by the port operator. Ports can no longer rely on the traffic generated by their hinterland but need to produce their own traffic by having manufacturing industries inside the port area supplying cargos and bulk commodities, as well as receiving them.

Issues surrounding the use of multimodal ports are explored through a review of the international literature followed by consideration of three ports in Indonesia namely: Belawan Port in Medan, North Sumatera; Tanjung Priok Port in Jakarta; and Tanjung Perak/Teluk Lamong Port Terminal in Surabaya.

It was found that whilst the idea of regional or international hub ports and self-generating ports are appealing for both policy makers and investors, most ports still rely on their hinterland. Not only because these new types of ports are costly, but they require delicate

coordination efforts between national and sub-national governments, and between governments and the private sector, especially the main industry players. Small ports in a country like Indonesia are likely to serve as hinterland ports, facilitating economic development of the region, far more than ensuring financial sustainability of those ports. The national and sub-national governments provide large subsidies to fill in the financing gap between the revenue and income from port operations. For instance, many of the ports in Eastern Indonesia are fully financed by the national government and treated as Public Service Agencies.

12.1 Future Research

Each of the chapters articulates how current research has led to an improved understanding of the ways in which Australia and Indonesia can improve infrastructure investment, and, more particularly, investment that enhances port functionality. Ongoing research is considered a vital for continuous improvement in ports. The concept of enhanced outcomes being derived from Academic-Business-Community- Government co-operation was amplified by Sari Wahyuni's study into the Quad Helix model detailed in Chapter 7.

The early chapters elude to the potential for neighbouring countries, having similar commodities, to block trade and thus increase scale and enhance their global returns through enhanced leverage Further research is required as to how to make this ideal a reality. The issue of attracting ongoing international investment and having the strength of economy to repay such debt is also an ongoing problem. Mechanisms to leverage Public Private Partnerships requires development. Improved planning warrants further research, in particular, to overcome the major issues identified: inefficient government bureaucracy; inadequate supply of infrastructure; ongoing issues of corruption; energy affordability; regulatory uncertainty; policy stability; restrictive labour regulations; and poor work ethic in the national labour workforce and tax regulations as they apply to infrastructure finance. It seems that development and refinement of Australia's success with asset recycling is urgently needed so that the positive aspects from this financing mechanism can be applied more effectively for both countries.

Aligned with better infrastructure planning is the need for efficient project management processes to select and procure those projects of highest priority.

For ports a continuing theme was that of hinterland/port integration. It is worth speculating on the value of research into ports and their hinterlands both for Australia and Indonesia. Difficulties in achieving this is the lack of appetite to fund evidence-based policy analysis in the Australian transport sector. As one anonymous, senior government transport bureaucrat put it: "there are no votes in conducting such studies: Ministers love to cut the ribbon on an infrastructure project and not to worry about on-going maintenance nor potential problems." Nevertheless, given the Federal Government's policy of making gateway ports (seaports and airports) the "engines of economic productivity" it seems that port-hinterland research funding is needed to learn from the outcomes of past policies and to determine those transport policy options that will not burden future generations with economic, social and environment costs. Independent analyses are needed in the era of Public Private Partnerships for inter-modal terminals as demonstrated by the controversy surrounding Moorebank Intermodal Terminal.

Throughout the stages of acquiring data and performing DEA analysis, it was recognised that there are limitations in our current research approach and future research into Australian and Indonesian port efficiency can benefit from detailed investigation into global benchmarks. The current DEA approach used in this study did not consider the time temporal scale efficiency. It would be beneficial in future research to include datasets of various time periods to investigate temporal changes which can further strengthen the DEA results. Conceptually, a complete port operational review study, including landside data from ports and terminals could be included in the analysis.

For Indonesian ports there remains the need to identify how to improve the government's consistency and commitment to further encourage investor interest. Furthermore, transportation and energy infrastructure need to be made more accessible. Road connectivity, intermodal transportation, and energy need to be enhanced to increase operational performance.

12.2 Lessons Learnt and Policy Implications

This study has identified the "low hanging fruit" for financing infrastructure. Policy makers would benefit from focusing attention on these achievable mechanisms for financing future infrastructure projects. At a macro scale a trading alliance between Indonesia and Australia may provide break throughs for future trade.

Collaborative international research as kindled by this research creates a model for capacity building and knowledge transfer.

Specific to infrastructure and ports, the importance of land connectivity in ensuring lower logistics' costs cannot be underestimated. To further develop this area, it has been identified that although land connectivity is considered as the most important issue in port productivity, policy intervention is often neglected, or is not the focus of the authority. In the case of Tanjung Priok Port, the government realised that land connectivity is an important element of logistics costs because 70% of the container movements, mostly for export purpose, are transported from Cikarang Industrial area to the port. Traffic performance on the existing toll road has been unsatisfactory in terms of punctuality and cost of travel. The existing dry port, which is running below its capacity, has not been successful in attracting cargo owners to use their rail facility. Another on-going initiative is using river/drainage channel transport from the industrial zones directly to the port terminal. The latter scheme is designed as a PPP to attract private investors for the project. Some of the project risk, especially demand risk, will be absorbed by the government.

Land connectivity is also important not only because it determines the biggest cost of commodities, but because it is a factor expressing the competitiveness of a commodity in the global market. For an island country, Indonesia will largely depend on the combination of sea and land transport in moving goods for both the domestic and international market. The number of mode changes, cost of travel, time required to reach port gate, number of companies involved in moving containers or bulk products, are all factors important to consider in creating competitive pricing. In the case of Tanjung Perak Surabaya, because of the geographical separations of different port terminals, the operator (i.e. Pelindo III and its subsidiaries), needs to find an innovative solution to deal with inter-terminal movements.

In all ports researched in the case studies presented in this research monograph, the transport authorities focused on infrastructure solutions, ranging from rail access and elevated toll access for Tanjung Priok Jakarta port, and rail access from the special economic zone for Belawan Medan port. In the case of Tanjung Priok port the Indonesian government has an ongoing PPP project in preparation to implement inland water transport connecting the Cikarang Industrial area directly to the port terminals. An inter-terminal container rail connection system for Tanjung Perak Surabaya has been studied for implementation.

To fulfil the needs of information technology-based transactions, Tanjung Priok Port has collaborated with PT Telkom, a state-owned telecommunication company. This partnership is manifested in a project with the Indonesia Logistic Community Service (ILCS) based on information and communication technology to create an integrated online platform. This platform covers operational, financial, technological, and human resource aspects. In addition, this helps the strategic partnership develop the National e-Trade Logistic system that mainly supports the implementation of the Indonesian National Single Window.

There has not been a comprehensive study/ex-post analysis of the commercial and economic viability of the abovementioned infrastructure projects. The rail operation from the special economic zone to Belawan Medan was discontinued after several trials. The traffic volumes for the elevated toll road access are less than predicted, resulting in lower revenue to the government.

It appears that there is scope for local authorities and port operators to work more closely on traffic management solutions.

Even within the transport portfolio there is scope for refined use of integrated road/rail connectivity to ports, and the role of government support for commercial rail operations. This could provide an uninterrupted service, without exposing its services to traffic congestion, even when a grade separation is not provided. The Indonesian Railway Act has mandated authority to give a top priority to rail service in land transport operations. Using the existing configuration of 12–30 carriageways of 40 TEU, the use of rail will obviously relieve the pressure of traffic congestion, reduce traffic congestion, and improve the air quality along the corridor and in the port area. However, in

the two ports where rail services were introduced both have shown unsatisfactory results. For Belawan port, the service from the special economic zone stopped after several service trials; for Tanjung Priok port, the rail service from Bandung Gedebage dry port was unsuccessful and currently services have been reduced to one train operation per day.

If the Indonesian government wants to keep the balance of traffic between road and rail, there are several policies that should be considered. Infrastructure investment for rail services should be separated from rail operation using a vertical separation/unbundling framework. Therefore, investment projects should be procured by government either using the government/national budget or by attracting private sector investment using PPP schemes. The second policy that should be undertaken, in cooperation with the Ministry of Industry and the Ministry of Trade, is to have a regulation on the mandatory use of rail transport for raw materials to industrial areas, especially for the import of raw materials used in export-oriented products. This regulation allows for the higher return of cargo from ports to the special economic zones, industrial areas and dry ports. This regulation will dramatically reduce the freight cost using rail to and from the ports.

There are several other policies that can be introduced. The first policy is to reduce the fuel tax for diesel use in rail operations. At the moment, the Indonesian government is applying zero fuel tax for the trucking industry and imposing industry fuel tax for rail operations. Although in recent years the government has eased the fuel tax by introducing a quota system for fuel consumed in rail operations, an excess of fuel above the quota is still charged with a fuel tax. Encouraging the transport industry to consolidate road and rail operations would create the most effective solution for cargo owners. This latter solution has already been tested by dry port operators in Cikarang. In recent years it has resulted in an increasing demand for rail services. If the government can promote the above solution across the industry, dry port with rail operations will have an opportunity to be the breakthrough needed to reduce logistics costs in Indonesia.

Managing land uses around ports remains unresolved. The Spatial Plan Act was introduced in 2007 and imposed stringent controls over land use in urban areas. All local governments must submit a spatial plan for approval by local parliaments, which comply with the National

Spatial Plan of the Indonesian Government. This is an ongoing process and currently not all local governments have submitted nor received approvals from local parliament/national governments for their local spatial plans. This continues to create difficulties.

The recommendation to the Indonesian Government is to separate local and regional traffic as well as access traffic to the port areas. Whilst the current traffic management scheme introduced by the government of Jakarta is the "odd-and-even" plate number scheme for different days in a working week, the use of traffic management measures, such as lane separation, rerouting of through traffic; introducing a time windows scheme and truck appointment schemes for entering the port, can be introduced to alleviate traffic congestion around the port area. A specific traffic problem in Tanjung Priok Port in Jakarta is the fact that export activities are concentrated during the Friday-Sunday period, which is affected by international mother vessel schedules in Singapore port.

Local governments can start improving land use by relocating freight forwarding company offices to dedicated inland container depots to allow stuffing and un-stuffing activities around ports. Inland Container Depot (ICD) Lat Krabang in Thailand has provided international evidence on how relocation of container stuffing and un-stuffing activities can make transport moving to and from ports more effective. Indonesian ports could test such a solution to immediately release the pressure of congestion around ports caused by inefficient land-use configurations.

Ongoing development of hub ports and "self-generating ports" provides the possibility for quantum change in port efficiency. Such changes will require policy enhancement.

Questions as to how and when subsidies, guarantees or gap funding warrant support requires further investigation for both small ports acting as hinterland ports and the national and sub-national governments support of larger facilities.