2. Status of PRIN1 and PRIN2

Tongzon is at fault, in my opinion, when he defines PRIN1 as an 'index of overall port performance' (p. 174, 3rd para). PRIN1 is merely a sizing factor, based on a linear combination of number of cranes, berths, TEUs and ship size, all of which are highly inter-correlated. As to the Tongzon's second index, PRIN2, I had difficulties to attach any meaningful interpretation to it (what is 'port mobility'?). I would argue that Tongzon's groupings using composite indices such as PRIN1 is even unnecessary since similar groupings can be done by using direct data (e.g. TEUs). Surprisingly, despite the statistical sophistication in devising indices, Tongzon makes his final and most important groupings decision in a rather cursory fashion. How is the borderline between low, medium and large PRIN1 being determined? It seems, for example, that there is no compelling reason why the centre circle in figure 1 (p. 176) would not include ports s and o.

3. Summary

In summary, my contention is that if one wishes to group ports for the purpose of benchmarking performance, one may use either the input or the output side – but not both. Groupings can be assisted by FA, although the FA analysis should serve only as a pretext for an inferential model, not as a substitute. However, since port operations are generally understood, I do not see value in re-dimensioning the data and developing composite factors such as PRIN1 and, especially PRIN2. My preference is for simple, single-factor indices that carry tangible meaning (e.g. Calls/Berth, TEUs/Crane, TEUs/Yard-Acre). Composite indices are not amenable to interpretation by port management and may thus negate the practical end of the entire exercise to measure and improve operational efficiency. Multi-factor, input/output indices may be based on Data Environment Analysis (DEA). My own experience and that gleaned from other publications suggests that DEA also suffers from problems in interpretation [1,2].

A final comment. I had several problems with Tongzon's definitions and data:

(*a*) Operational performance should be assessed at a terminal level, especially in light of the fact that many of the included ports are landlords.

(*b*) The performance analysis ignores the stock components of terminals (container yards), which are broadly considered as their most constraining component.

(*c*) Hong Kong's data on vessel calls and the respective Calls/Berth (9,236) seem way off range. I suspect that the data include mid-stream (off-berth) transfer.

(*d*) Puerto Rico is not a port but a country with several ports. If the data refers to San Juan, as the TEU count attests, then this port has only five gantries (two belong to Sealand and three to Navieras), not seven.

(*e*) San Juan should not be assigned the role of transhipment port. Its transhipment (ship-to-ship) activities only account for about 15%, which is much smaller than that of Singapore and Hong Kong.

(*f*) Brisbane has no gantry cranes. Since gantries are generally considered as the most distinctive feature of container terminals it seems that this port should not be included here (besides, how would one calculate TEUs/Crane?).

References

1. ROLL, Y., and HAYUTH, Y. (1993), Port performance comparison applying data envelopment analysis (DEA). *Maritime Policy and Management*, **20** (2), 153–161.

2. ASHAR, A., STOPHER, P., APPFEL, C., (1994), Defining Performance Measures for an Intermodal Management System. *Journal of Transportation Research Forum*, November 1994.