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## THE ECONOMICS OF SINGAPORE'S RMA

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### Introduction

Much has been written recently about the transformation of the Singapore Armed Forces (SAF) into a *Third Generation* (3G) fighting force. At the heart of this transformation, of course, is the Revolution in Military Affairs (RMA). Here technology plays a central role in changing the nature of warfare – the use of information technology (IT) in command and control, the networking of surveillance capabilities in constructing superior battlespace awareness, and the deployment of smart, long-range precision weapons in surgical strikes.

For Singapore, the attractions of the RMA are self-evident and uniquely suited to its strengths and constraints: using technology as a force multiplier to leverage on a well-educated, technology-savvy workforce to overcome manpower shortage. However, the more prosaic, albeit equally important, question of how much and in what ways the RMA is costing Singapore remains largely unasked. This paper analyses the economics of Singapore's RMA by focusing on three key issues – affordability, technology barriers, and the limits to transformation.

### The Costs of Strategic Transformation

Simply put, the RMA costs money, and the higher the technology content, and the more it costs. For instance, procuring IT systems is a costly exercise, and the savings from scale economies and purchasing 'commercial off-the-shelf' (COTS) cannot overcome the high research and development (R&D) costs of domestic production. This is a defining characteristic of not just IT, but knowledge industries in general, where the fixed costs (i.e. R&D) are high, while marginal costs (i.e. production) are low. Hence, software is expensive to develop but cheap to produce. Furthermore, the name of the game in the high technology defence industries is 'winner-takes-all', where the defence firm that delivers the blockbuster application dominates the market, as is the case with the American mega-firms. The uncertainties associated with the R&D process, and the ever-present possibility that billions of dollars spent on pure research might not lead to a commercially or technically viable product, also mean that the United States is probably the only country that can afford RMA technology investment costs. The financial aspect of technology investment aside, the United States also has the overriding advantage in having a technological infrastructure and knowledge base capable of supporting RMA technology investment.

The consequence of such technology intensification for other countries is that the viability of the domestic defence industrial base (DIB) is called into question. The heavy financial and technology costs of developing high technologies domestically to fuel the RMA is not an option that many countries can choose. Instead, the modernization of armed forces and defence industries tends to occur primarily through various forms of technology transfer, such as joint ventures, licensed production, and defence offsets. These help to cushion the financial blow by circumventing the high costs of domestic development, while rendering the basis of a DIB highly problematic. Why? Because if the existence of a DIB is predicated on defence self-sufficiency and is the expression of sovereignty, then increasing reliance on foreign vendors of hardware and technology erodes its *raison d'être*.

At an even more fundamental level, the related phenomenon of defence globalization calls into question the notion of defence as a public good. The globalization of defence industries has had an uneven impact on different countries. For the United States and other top-tier countries, globalization has resulted in the merger and consolidation of their defence firms, and the consequent monopoly on high technologies. For the small and medium powers, the impact has been mixed: defence globalization, while diffusing technology from the advanced countries to the periphery, has at the same time allowed the leading-edge defence firms to concentrate its power and hold over the recipient countries. Consequently, the smaller countries find themselves more and more in a technology-dependency trap.

The changing nature of the defence industry, and the encroaching technology and commercial costs, creates a paradox: while the provision of defence as a public good remains very much the duty of the nation-state, the procurement of defence *matériel* is increasingly being driven by the imperatives of commercialisation. This is evident in Singapore since the 1990s, where the civilianisation of Singapore Technologies has seen a dramatically lower dependence on Ministry of Defence contracts and greater emphasis on profitability. While Singapore's DIB has thus far successfully balanced the needs of national defence strategy against the imperatives of globalization, the same cannot be said for many other countries. In the case of Sweden, for example, there has been a tacit acceptance since the late 1990s that defence autarky was unfeasible, which has led to a dramatic scaling down of its defence budget and DIB and the turn towards COTS and imports.

### **Technology and the Limits to Transformation**

The discourse on the RMA has spawned a vernacular that is laden with technological terms: dominant battlespace knowledge, real-time information, network-centric warfare and so on. It is thus tempting to regard the RMA as simply a function of technological developments. However, technology, as conceived in economics, is much more than this. At one level, it is the sum total of human knowledge applied in production. However, as the economist Thorsten Veblen put it, technology is also an integral part of material and social relationships, shaping and being shaped by them. In other words, technology consists in the hardware and software, as well as the social relations that underpin their development, usage and propagation.

In this regard, the RMA cannot simply be seen as changes in the defence technologies, but also as the changes that are being wrought in the structure and culture of military organizations. For countries sold on the RMA, the greater challenge will be to assimilate what are essentially disruptive technologies into their militaries that are, by definition, top-down, hierarchical and conservative organizations. One problem could arise

in trying to balance the decentralisation of decision-making with the need to maintain command hierarchy. For example, the accelerating rate of technology adoption within the armed forces has necessitated the recruitment of more capable and resourceful servicemen, who are increasingly able to take decisions in the field autonomously. And yet instead of devolving greater decisional autonomy to the field personnel, communications technologies are ironically enabling commanders to micro-manage battlefield developments to a far greater extent, resulting in the under-utilization of ever-more capable soldiers.

At another level, the RMA as a *strategy* is inherently problematic because it is predicated, as all classical strategy making is, on the separation of planners from doers. Hence, having articulated the RMA strategy, the actual execution of strategy is assumed to be relatively straightforward. It therefore also followed that the necessary structural changes naturally flowed from strategy. In other words, once strategy was formulated, organizational structures easily transformed and adapted in order to execute the strategy. The reality is that organizations, especially militaries, do not easily or willingly undergo self-transformation, because of vested interests, inertia or even recalcitrance within the organization. Furthermore, imperfections and frictions within the organization and its operating environment can often slow down or even thwart the transformation necessary to realize the strategic vision. In any case, these transformations often entail switching costs (as organizations switch from old platforms to new ones), learning costs (as they learn how to use new equipment and new processes), and assimilation costs (the costs of integrating new systems, and the costs of such disruption). In the case of Singapore, the fear is not just of ending up with an ‘RMA-lite’, to use Tim Huxley’s term, but an *incomplete* ‘RMA-lite’.

## Conclusion

Clearly, technology, narrowly defined as military hardware and systems software, cannot be the be-all and end-all of the RMA-driven 3G SAF. The adoption of new systems and the modernisation of existing ones, and their overall integration, are necessary conditions for full strategic transformation, but not sufficient ones. In order to make the full transition, a major overhaul of the SAF will be necessary, and there will be costs incurred. In terms of financial costs, Singapore is at least fortunate in not having to make a stark trade-off between defence and civilian output, even if it is not completely immune from the pressures of commercialisation and defence globalisation. The more telling costs, however, will have to do with the organisational transformation of the SAF itself.

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