

Myths of Software Development in Developing Countries

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Developing countries first became consumers of software in the 1950s and 1960s. To a lesser degree they also started producing software around this time. Many myths and stereotypes have arisen around software development in developing countries. These, as discussed below, can be both negative and positive.

The Negative Myths

"It's computers that matter, not software"

National policy and the investment strategies of both multinationals and aid donors have been overly-oriented to the hardware of information and communications. Yet software is known to be the key to successful, localised information systems. Software services are also the best entry point for developing countries into the ICT production complex. They provide wider externalities and much lower entry barriers than hardware, being less capital-intensive, more labour-intensive, with a lower rate of obsolescence, and far fewer scale economies.

"Developing countries can't write software"

In 1998/99, some US\$3bn-worth of software was exported from developing countries, mainly to Western markets. As noted below, such figures create their own myths but software development is nevertheless pervasive, from the one-person enterprise creating customised databases to Asia's 'software factories' winning multi-million dollar contracts. Software development work is often hidden because it is undertaken in-house, but it is clearly no longer the preserve of just a few developing countries, let alone of just the Western nations.

"Piracy is ruining software production in developing countries"

Piracy accounts for 50%-90% of software consumption in developing country markets. Yet this has not crushed local software production. Quite the reverse. Piracy has grown the local market by speeding the diffusion of information technology and of software skills. As piracy diffuses standard imported packages, many local software firms have developed capabilities by producing localised versions through "reverse functional engineering" (Heeks 1996a). Piracy has stimulated innovation and has also helped the diffusion of software production tools.

"Jobs are being lost in the West"

The globalisation of software production has included the outsourcing of work once done in the West to developing countries. However, demand for software labour exceeds supply in the West and will continue to do so for the foreseeable future.

Many projects which are too small, risky, strategic, complex or high-tech are not outsourced. Developing countries may therefore eat into the West's demand-supply gap, but will not eliminate it. In addition, Western nations retain the most highly-skilled tasks of analysis and design, thus creating an international skill division of labour.

"New technology will wipe out developing country software exports"

In theory, automation threatens software development jobs and developing countries' low labour cost advantages. In practice, the threat is far off. New technologies - both product and process - have created new skill requirements and new markets that developing countries are seeking to fill. The spread of open systems has reduced entry barriers for developing countries. Techniques such as program modularity and formal methods have increased, not reduced, the opportunities for software outsourcing.

The Positive Myths

"Developing countries are earning billions from software exports"

The headline figures on software are deceptive. India, for example, may claim US\$2bn-worth of exports in 1998/99 but these are gross figures. The majority of this money subsequently leaves the country to pay for: travel and living allowances of the large number of Indian software workers who undertake their development work in the client's country, not in India; marketing expenses; imports of hardware and telecommunications equipment used for in-India contract components; and repatriation of profits by the many multinational subsidiaries involved in this trade. Net export earnings for 1998/99 were closer to US\$750m and are unlikely to have compensated for India's software import bill.

"Developing countries are cheap locations for software development"

Of course, low labour costs have lain at the heart of interest in developing countries as software development sites. Figures are much-quoted that the salary of a programmer in country X is one-tenth that of an American. However, such figures ignore well-above-average pay for good developers, a large range of non-salary labour costs, and the fact that labour costs are typically only a minor part of total software production costs. Factors such as skills availability, productivity, trust, labour flexibility and access to local markets also underlie outsourcing decisions.

"Telecommunication links are transforming the software export trade"

Over the past five years, any developing country software exporter worth its salt has invested in a telecommunications link. The image has been promoted of virtual development - clients sitting in the West interacting with developers overseas, or even split-site development teams. The reality is more mundane. Fax and email correspondence remain the backbone of communications. The vast majority of contracts still involve extensive periods during which the developers work at the client's site or, more rarely, the client visits the developers. Telecommunications technology is slowly modifying this trade but has yet to revolutionise it.

"This is a market-driven phenomenon"

The Department of Defense was a key driver to the creation of the US software industry, and all subsequent development in other countries has been state-initiated, state-led or state-promoted. From South Africa to Egypt to India to Singapore the story is the same - 'Cherchez l'état' - in the spheres of financing and marketing, in skills and infrastructure development, in procurement, and in the diffusion of best practice (Heeks 1996b). Selective policy liberalisations - such as removal of software import tariffs - may have a role. However, the elimination of all state interventions and the free play of market forces will lead only to the atrophy of local software-related technological capabilities.

"Software exports drive domestic improvements"

Export production - mainly based on services, not packages - is a virtual enclave. Any transfer of skills has been one-way: from domestic to export production. Export pressures have thus diverted resources away from domestic-oriented production and have led these resources to create software that benefits Western companies rather than addressing local needs. Far from assisting, exports are reinforcing weaknesses in the domestic market.

"India is exporting - so can we"

India's apparent success in software exports has encouraged many developing countries to naïvely believe that they can follow the same path. But they cannot.

Adding to its inherent linguistic and size advantages, India has spent more than two decades developing the requisite skills, contacts, policies and infrastructure that are so lacking in many other countries. As a result, it will continue to consolidate its position whilst squeezing out latecomers. New entrants should therefore eschew the competition and fake glister of exports for the solid effectiveness of domestic software applications.

Bibliography

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More details about software production in developing countries can be found at the [Indian software industry Web site](#).

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