

The Tongan construction industry: infrastructure provision in a small economy

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Construction, despite its key role in the provision of infrastructure, is often overlooked in studies of economic development. This is unfortunate, as the industry faces a number of difficulties which are exacerbated in small island states, and which inhibit the achievement of infrastructural development goals. These difficulties are evident in Tonga. After providing an overview of the industry, this paper discusses the current push to privatisation in the industry, the skills shortage and subsequent strong role of foreign firms, the weak regulatory and administrative framework, and financial and environmental issues.

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Economic development implies the need for infrastructural expansion. Development planners in the Tongan government would agree with this. The lengthy preamble to the *Fifth Five Year Development Plan 1986–90* (DPV) places emphasis on ‘commercial private sector development...with government acting as a catalyst through...the provision, where necessary, of supporting infrastructure and services’ (Tonga 1987:2). Infrastructure made up over 37 per cent of development expenditure during the

Fourth Five Year Development Plan (DPIV), increasing to over 40 per cent of planned expenditure over DPV. Implicit in infrastructural expansion is the importance of a construction industry capable of providing the necessary infrastructure. This point is all but ignored in the mainstream development literature—a fact much bemoaned by the few specialists who deal specifically with construction in the developing world (see Edmonds 1979:355; Moavenzadeh 1978:97; and Wells 1986).



Beyond its key role in providing infrastructure, construction is also economically important in developing economies. When ancillary operations, especially the production of building materials, are taken into account, the industry typically accounts for about one tenth of GDP and employment. The amorphous nature of the industry helps explain the official neglect to which it is subjected. The industry is highly segregated, with large foreign (and domestic public works) organisations carrying out complex projects, often to very high standards; small domestic contractors operating in the indigenous market, using a mix of traditional and western technologies adapted, often poorly, to local conditions; and a significant informal and subsistence sector.

Most construction projects are custom-built and immobile, are highly dependent on local supplies of labor and materials during construction, and on local demand for the product on completion. The industry suffers high risk, worsened by the large initial cost of construction products; and further exacerbated by the extreme sensitivity of capital investment to economic fluctuations. Unlike manufacturing, most construction is initiated and financed by the customer, who arranges for a builder to carry out the project. As a result, design and production are usually carried out by separate organisations. Architects and engineers often prepare designs well before a builder is chosen; the builder is then presented with a rigidly-fixed design.

The industry is extremely complex, with numerous projects carried out by specialist sub-contractors who shuttle from job to job, often with critical time

constraints. As a result, workplace discipline is essential. The failure of a single individual to complete a component of a project on time can cause great delays. Unfortunately, developing country construction industries typically suffer from extreme skills shortages at all levels. Inappropriate technologies also are often widespread. These may include western technologies correctly applied, but inappropriate for local conditions (too complex, capital intensive, unsuitable to climactic conditions, etc.); western technologies incorrectly applied; or indigenous technologies inadequate for the type of structures being built.

As a nation with a population of 100,000 and land area of about 600 square kilometres, Tonga is subject to a range of special problems which affect its construction industry. Small economies of scale exist in most factors of production, increasing costs and creating vulnerability (see Bertram 1986; Diggines 1985; Baker 1992; and, especially, Fairbairn 1985 for sources on small island states).

Methods

This paper is based on three strands of research

- a survey of the relevant literature on the industry available in Tonga
- a formal survey administered to 20 key individuals (managers and professionals) working in the industry. The bulk of the survey was composed of a battery of fifty factors—identified from the broader literature, government documents, consultant's reports, interviews, and job-site comments—which were said to be important in construction. Respondents were asked to assess the effects of these factors on the industry



• this research was conducted while the author was employed as a Roads Engineer for the Ministry of Works, from January 1990 to December 1991. As a result, much participant observation is incorporated into the paper. Extensive recent communications have been carried out to update the earlier 1991 research.

Industry profile

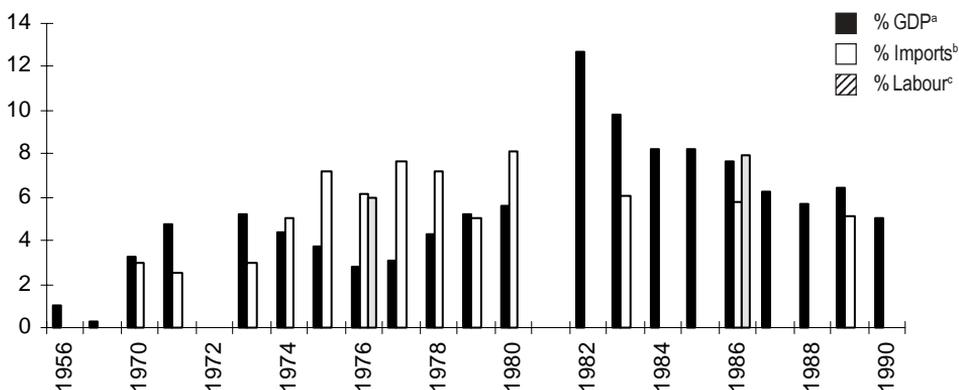
The Tongan construction industry began to grow rapidly with the opening of the Tongan economy upon Taufa'ahau IV taking power in 1965 (Figure 1). Building methods shifted towards those requiring more imported materials from about the mid-1970s. The greater use of capital intensive methods is reflected in the trend for the contribution to GDP to move closer to the figure for the percentage of the labour force employed. The industry

is prone to considerable fluctuations, for instance, the spike in activity in the early 1980s, caused by rebuilding after the hurricane of 1982.

The industry is relatively small, especially compared to the size of major projects. At about five per cent of GDP, the industry would have added perhaps T\$10 million in value in 1995. The 'lumpiness' inherent in a project such as the T\$6 million Lupepau'u Airport, or the recent multi-million pa'anga road programs, is evident.

Estimates of the sectoral breakdown of activity in the Tongan construction industry are provided in Table 1. The industry has been composed of government, quasi-government, private enterprise and small or 'own account' builders. The government construction sector is overwhelmingly dominated by the Ministry of Works. The Tonga

Figure 1 Construction industry trends, 1956–90 (per cent)



^a Construction as a percentage of GDP.

^b A basket of construction materials readily identifiable in trade figures, as a percentage of GDP.

^c Construction as a percentage of the labour force.

Sources: *Statistical Abstracts* (1975, 1983, and 1987); DPV, DPVI.



Table 1 Construction, sectoral shares, 1980 and 1990 (per cent)

| | 1980 | 1990 |
|--------------------------|------|------|
| Ministry of Works | 41 | 25 |
| Tonga Construction Co. | 9 | 10 |
| Large/medium sized firms | 21 | 35 |
| Small builders | 16 | 10 |
| Non-monetary/own account | 13 | 20 |

Source: Derived from Tonga, Statistics Department, 1983. *Statistical Abstracts*, Nuku'alofa; DPIV; DPVI; consultants estimates and survey data.

Construction Company, an arm of the Commodities Board, constituted the quasi-government sector until it was shut down in the early 1990s. Fletcher Constructions, a New Zealand firm, has dominated the private sector for much of the past decade. DPIV reported five 'major private building contractors' in 1981. This sector is very volatile, with firms starting up and folding with great regularity. Own account builders, small builders, and church groups accounted for the remaining construction activity.

Table 2 presents 1991 survey data in which respondents were asked to rate the performance of the six industry sectors shown. Tables 3 and 4 present survey results of the most beneficial and most

Table 2 Industry sectors—performance, 1991

| | |
|----------------------------|-----|
| Ministry of Works | 3.1 |
| Tonga Construction Company | 2.1 |
| Foreign contractors | 4.4 |
| Foreign consultants | 4.5 |
| Tongan private sector | 3.4 |
| Village/ own account | 3.0 |

Note: Likert scale: 1 = very poor; 7 = very good.

Source: Survey conducted by the author.

harmful factors in the industry. Development Plan rhetoric refers to the 'private sector' thrust of Tonga's intended route to economic growth, and the construction industry has seen considerable privatisation activity, partly due to the low regard in which the Ministry of Works and the Tonga Construction Company have been held (see Table 2, and ACCA 1987:35, PPK 1987:57, DPV 1987:265, and DPVI 1991:259). Because of the strength of the private sector, the Ministry of Works has steadily pulled out of building activity. The Ministry's activities in this area are generally limited to maintenance, outer island construction, and disaster recovery operations. The Ministry of Works has remained prominent in civil works because of the weakness of the private sector in this area. A few local contractors have started operations, but only the recent Fletcher/Royco partnership, having gained experience through collaboration with New Zealand-based Higgins Constructions, has demonstrated a potential to construct a road even to Ministry of Works standards.

As a result, there has been an increase in private sector activity in the industry. As one consultant put it, Fletcher Constructions 'are still the power behind the building sector'. A number of medium-sized local firms are also active. The technical and quantitative capacity of this group improves yearly, but none has yet developed the capacity to do major work to Fletcher's international standards.

Contractors in the private sector lack access to the many government and aid-sponsored scholarships and training schemes which have given the public sector a relatively highly credentialed workforce. Some local contractors are headed by very experienced builders,



though few have an architect or engineer on staff. Some, though, are headed by individuals with few credentials in the construction industry beyond the ability to arrange Tonga Development Bank funding to start up, and the ability to get contracts to keep going. The private sector also lacks the security of government budgetary support to maintain staff during lean times, as well as a *de facto* priority in getting government-financed construction projects. (See Otter 1994 for a general discussion of privatisation in the South Pacific.)

Smaller builders, the ubiquitous 'village carpenter' and small groups or individuals, specialise in small jobs or private houses, often using client family members as labour. They occasionally come together to do larger jobs. Small builders would appear to have lost some of their market share, probably remaining stagnant in gross terms while the industry's growth has been accounted for by larger firms and own-account builders. At the lower end of the industry, own-account and non-monetary construction has probably increased somewhat. Greater affluence has led to a boom in residential and church construction. While affluence and a desire to maintain status by procuring the services of the higher-quality medium-to-large sized builders has accounted for much of the growth in churches and homes, a great deal of activity is still carried out by non-professional individuals and groups.

If little information is available concerning local building contractors, even less exists concerning small and own-account builders. In the absence of building codes, regulations or supervision of construction within this sector, coupled with a lack of experience with modern building practices, the quality of work in

Table 3 Six most 'beneficial' factors, 1991

| | |
|--|-----|
| Proposed introduction of building codes and land use regulations | 5.9 |
| Overall effect of foreign consultants | 5.2 |
| Quality of expatriate personnel | 5.1 |
| Foreign aid | 5.1 |
| Overall presence of expatriates | 5.0 |
| Privatisation | 5.0 |

Note: Likert scale: 1 = very harmful; 7 = very beneficial.

Source: Survey conducted by the author.

this sector is probably quite low (see Table 2). However, as a survey respondent pointed out, 'village carpenters' provide a service which is probably adequate for the niche in question (gross structural deficiencies excepted). Convenience and low cost acts to offset relatively poor quality work and, in the case of small builders and village carpenters, a degree of quality control could be expected to be exercised by word-of-mouth, at least for the cosmetic, financial and efficiency aspects of the work. Structurally, the case for greater supervision and regulation of this sector is urgent.

One of the most serious factors affecting the overall quality of work in the private sector is the weak administrative and regulatory framework in which it operates. The lack of adequate building codes and land use regulations is especially significant (see Table 3 and DPVI 1991:258). In addition, private contractors often complain about the weak job bidding and contracting procedures prevalent in the industry. These two factors permit firms to win contracts either through unrealistically low bids (contractors have referred to being beaten by a bid which was insufficient to cover even the costs of



materials required for the job in question), or through personal contacts. The contractor, then, in an effort to make a profit on the job, may produce a product of extremely low quality, which is very hard to prevent because of the lack of a building code and/or proper supervision of projects even when constructed under government tenders. As a result, firms which try to maintain reasonable standards of quality can be consistently underbid by those not concerned with such niceties.

The Ministry of Works, and especially the private consultants, have been able to provide some supervision on larger projects. However, smaller works are unaffected. Churches, commercial establishments and homes are typically built largely at the builder's discretion. Properly enforced building codes exist elsewhere in the world to protect consumers from both ineptitude and avarice on the part of builders. Despite the obvious, oft-stated need for a building code, at least one local architect in 1991 believed the writing and legislation of a building code to be a decade away. As of 1997 his prediction has held. In the meantime, another architect has suggested the expedience of using the existing business regulation powers of the Ministry of Labour and Commerce to deregister especially corrupt or inept builders.

Considerable evidence exists which suggests that government infrastructural development plans are outrunning the personal development of the Tongan people. Skills shortages are a recurring theme in reports on construction in Tonga (see NZAT 1975:2-4, PPK 1987:6, DPV:331, and DPVI 1990:257, among others), and the large number of expatriates and foreign firms in the industry indicates that an extreme

shortage of skilled personnel exists. In 1991 about half of all management and professional personnel were expatriates, though this situation has since improved somewhat. In 1991 expatriates were evident even at the skilled labour level, with Fijian Indians becoming increasingly prominent. Chinese workers have also been significant in construction in Tonga. Three Chinese engineers supervised the construction of the Crown Prince's new luxury villa on a low rise outside of Nuku'alofa; while a developer brought in 80 Chinese workers for the (still unfinished) airport hotel project (*Tonga Chronicle* 19 September 1991:3). Recent reports indicate that this trend has been halted (see also *Ko e Kelea* June 1992).

Outside involvement has been especially evident in the widespread use of overseas contractors and consultants. Japanese, Australian and New Zealand firms have routinely come into the country for specific projects. Fewer firms have made long-term commitments to the country—prominent among these are Fletcher Constructions, Australian consultant Kinhill, Riedel & Byrne, and Fiji-based Jaime Associates. Each of these

Table 4 Ten most 'harmful' factors, 1991

| | |
|------------------------------------|-----|
| Slow receipt, non-payment of bills | 1.9 |
| Limited professional opportunities | 2.0 |
| Theft of equipment and supplies | 2.0 |
| Corruption | 2.0 |
| Limited educational opportunities | 2.2 |
| Lack of government planning data | 2.3 |
| Cost of construction equipment | 2.5 |
| Quality of maintenance services | 2.5 |
| Availability of loan capital | 2.5 |
| Land shortage in Nuku'alofa | 2.5 |

Note: Likert scale: 1 = very harmful; 7 = very beneficial.

Source: Survey conducted by the author.



Table 5 Survey—foreign involvement, 1991

| | Overall performance | Overall effect |
|---------------------|---------------------|----------------|
| Foreign contractors | 4.4 | 4.0 |
| Foreign consultants | 4.5 | 5.2 |

Note: Likert scale: 1 = very poor; 7 = very good.

Source: Survey conducted by author.

have maintained a prominent presence since the 1980s.

The performance of foreign contractors and consultants in Tonga is generally well regarded (Tables 2 and 3). It is worth noting in Table 5 the lower rating of the overall effect of foreign contractors relative to foreign consultants. This reflects a widespread belief that foreign contractors create a 'crowding out' effect, depriving local firms of opportunities. The local consulting industry is very weak, so support for the foreign presence here is much less ambiguous.

Finance

Finance in construction consists of two separate elements: the financing of the builder and the financing of projects. Contractors require both investment capital (to purchase equipment) and working capital (to purchase project materials and to cover costs until payments from clients are received). Working capital is especially important in an environment where delays in the receipt of payments from clients are common, as is the case in Tonga (Table 4).

Both investment and capital needs tend to be high and 'up front'. As construction is also characterised by high-

risk and great volatility, with this especially the case in developing countries, lenders are reluctant to extend credit to (especially small) contractors. Government finance for construction enterprises also tends to be hard to get, perhaps because of the general neglect which tends to characterise government attitudes to construction (Edmonds 1979:364; Moavenzadeh 1978:105–6; and Table 3).

1991 estimates of the sources of finance in the Tongan construction industry are shown in Table 6. The greatest change which would have occurred in this data to the present would involve an increase in the role of personal savings and current income in financing housing construction, especially as a result of the recent pumpkin export boom. The increased share of this sector would have come largely at the expense of churches, as the church-building surge in the 1980s has slowed.

Foreign aid remains the major source of finance for construction projects in Tonga. This is especially the case with major infrastructural works. Perhaps not surprisingly, aid is well regarded within the industry (Table 3). Aid is a mixed blessing, though (see Sevele 1987 for a

Table 6 Construction demand—sources of finance, circa 1990 (per cent)

| | |
|-------------------------|----|
| Foreign aid | 60 |
| Government revenues | 5 |
| Foreign investment | 1 |
| Tonga Development Bank | 2 |
| Bank of Tonga | 10 |
| Remittances | 5 |
| Personal savings/income | 2 |
| Churches | 15 |

Sources: DPVI, consultants' estimates, survey data.



general discussion of aid in the South Pacific context). A first problem with aid as a source of finance of construction demand in Tonga has been the *ad hoc*, chaotic nature in which it is disbursed. There are a plethora of aid sources—a recent Budget statement listed 18 donors (eight bilateral, nine multilateral, one bond issue), with a residual category for 'others'. As many aid requests are turned down by donors, Tongan government aid requests represent ambit devices. Far more aid is asked for than can be handled, in the expectation that a manageable amount will eventually be received. For instance, having carried out an average of T\$800,000 of roadworks annually through DPV, DPVI projected projects totalling over T\$ million annually, with 'possible' aid donors listed for each. Further complicating things, aid disbursements are often held up by donors. This has led to planning difficulties, as budgets have to be prepared and plant and workers committed to projects without firm finance. Some progress has been made in rationalising this situation, as donors and the Tongan government have been notably effective in sequencing major building projects through the 1990s, so that the small cadre of top quality workers can flow from job to job, avoiding cycles of labour shortages followed by periods of no work.

A second problem with aid is that much of it comes 'tied', that is, given on the understanding that donor country goods and services be used whenever possible. The Japanese-funded Nuku'alofa Foreshore Protection Project, for instance, included the proviso that

the Government of Tonga has understood the system of Japanese Grant Aid and the necessity of consulting services of

a Japanese consulting firm and Contractor for the implementation of the project (JICA 1988:A.3).

Such tied aid denies the Tongan government the opportunity to choose either the least expensive bid or the most appropriately qualified firm for the project in question. In addition, in areas such as equipment acquisitions this donor policy has contributed to the existence of a profusion of makes and models of everything from typewriters to bulldozers, greatly complicating maintenance and repair (see, for instance, NZAT 1975:4). Again, progress has been made. More recent Japanese-funded projects, especially, have seen non-Japanese contractors working under the umbrella of a Japanese consultant.

Perhaps the most harmful effect of foreign aid is its tendency to distort investment decisions in Tonga. Projects tend to be built larger and more complex than would otherwise have been the case. The new airport terminal was built despite a consultant's report that existing and reasonable projections of usage levels made a costly new terminal too expensive both to build and to maintain (ACCA, 1987:83-4), yet on its opening Tongan officials spoke of the need for further expansion in ten years (*Islands Business* July 1991:45). Similarly, a new harbour for the island of 'Eua went ahead despite a consultant's report that the project was uneconomic (Riedel & Byrne 1987:23, 39). A consultant's recommendation to raise Ministry of Works' morale through construction of a new, 400 square metre Ministry Headquarters (PPK 1987:9) resulted in a structure three times that size (*Tonga Chronicle* 26 September 1991:1).

Unlike foreign aid, the financial role of remittances on the Tongan construction



industry is largely unknown. Data on overall remittances are weak, and detailed information on the amount flowing into construction is non-existent. Little evidence exists pointing to a substantial role for remittances in financing builders. This is certainly the case at the top and middle of the industry. Among small builders it is likely that a moderate amount of money is flowing in from overseas to finance these operations.

The major role of remittances in construction lies in effecting real demand for projects largely in the private housing sector. Remittances would also figure in financing church buildings (see Prescott 1986:73 and DPVI 1991:255 for two rare references to remittances and construction finance).

The banking sector in Tonga consists of the Bank of Tonga and the Tonga Development Bank. The Bank of Tonga is a commercial enterprise jointly owned by the Tongan government and overseas banks. Its role in construction is great: over 40 per cent of its credit is loaned for housing construction, with up to an additional 5 per cent loaned for non-housing construction (DPVI 1991:255). This amounted to from two to four million Pa'anga through most of the 1980s. The role of the bank in financing the supply side of the construction industry is far less significant, as less than one per cent of its credit is lent to the industry (DPV 1987:29).

The supply side of the Tongan economy is more the province of the Tonga Development Bank. It, too, has lent relatively little to the industry. DPVI (1991:51) reports that 2.5 per cent of Tonga Development Bank loan approvals had gone to construction from 1986 to 1990. On the demand side, the Bank does

not typically make finance available for private housing construction. Its role as a demand generator is significant to the extent that construction is indirectly stimulated through Tonga Development Bank lending for other purposes, as for the construction of hotels, industrial and commercial buildings, and so forth.

It should also be pointed out that the Bank of Tonga has reported a surplus of loanable funds due to a lack of 'appropriate' investment opportunities in the country (DPV 1987:28). Despite this, availability of loan capital is a serious problem for the construction industry (Table 4). Two explanations might be offered for this apparent contradiction. First, financial institutions may be reluctant to lend to the high risk construction industry, as normal loan approval criteria may be weighted against the peculiar requirements of construction (Moavenzadeh 1978:102). Second, the presence of the government-funded Ministry of Works and Tonga Construction Company in the industry, and the past tendency for these to be favoured in job tendering procedures, plus the presence of foreign firms in the industry, has probably tended both to stymie the development of the local industry and to discourage the two banks from lending to domestic firms in the face of this formidable competition.

The environment

Environmental damage is a harmful side-effect of construction. At present, construction takes place in an almost entirely unregulated manner with regard to environmental concerns (United Nations 1990:31-8). Environmental concerns raised concerning construction include the filling of mangroves and



altering drainage patterns, but focus largely on the effect of mining sand and coral aggregates as construction materials (see, for instance, Hau'ofa 1977:4–6; *Matangi Tonga* Oct–Nov 90:22; and United Nations 1990:27–39). Sand has traditionally been mined by scooping up beach deposits and is used in Tongan graveyards. Its construction applications centre largely on its use in concrete. Coral deposits are mined both for use as concrete aggregates and as road building gravel. Mining of both materials result in an aesthetic loss. Mining beach sand destroys beaches and also creates a risk of wave erosion of unprotected shores. Quarrying for coral, on the other hand, leaves huge, ugly open pits which pose a contamination threat to the water lens on which the islands depend for much of their water (Harrison 1993; Tappin 1993).

A second area of environmental concern lies in the depletion of forests in the country. A local architect has suggested that local timber resources could provide an alternative to concrete as a construction material, thereby reducing the demand for sand and coral. He notes, however, that local timber resources are scarce and declining. Government commercial timber plantations on 'Eua will not come into full production for another decade, and even then will be insufficient to support the local construction industry (Prescott 1986:59).

Conclusion

Construction plays a key role in Tonga as the provider of the infrastructure required for the country's development plans and is a critical, yet under-studied economic sector. Perhaps the greatest

problem facing construction in Tonga has been the weak administrative and regulatory framework in which it operates. A building code has yet to be adopted, environmental concerns remain unaddressed, and weak job bidding and contracting procedures lead to uncertainty and create incentives for firms to take advantage of the weak regulatory and administrative framework. The industry continues to be dependant on foreign sources for finance and for skilled personal, leading to the problems routinely cited in the foreign aid and technical assistance literature.

Dissatisfaction with the performance of the public sector has led to privatisation in the industry. While this implies a leaner Ministry of Works, it also requires a technically robust public sector to monitor and regulate the industry, so that the benefits of infrastructural development can occur without negative externalities.

Note

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