



# Methodology



### 3. Methodology

The PBES research program was initiated in November 2005 by IFC-MPDF and The Asia Foundation (with support from AusAID). It involved four phases of research.

#### 3.1. Phase 1: Census of Private Firms in 10 Provinces

Because equally reliable lists of private firms did not exist for all 10 of the economically most important provinces in Cambodia, it was necessary to undertake a census that recorded all readily identified firms. PBES researchers traveled to each of the ten provinces to conduct a complete accounting of business activity. All firms within the provincial capital and the three next most populous areas were covered. The team considered every business operation that was in a fixed location as an active enterprise. In total, 41,775 business operations were identified. 70% of the businesses were either in Phnom Penh or in the province of Kandal – a belt surrounding the capital. 57% of the businesses were new, having been established since 2000. And all were very small; only 2% had more than 10 employees.

The census also revealed other interesting findings. Two-thirds of the population is involved in small retail/food outlets, while the 11% accounted for the next largest sector – repair and maintenance. Despite non-food manufacturing firms' importance in job creation (they account for 23.8% of the workforce), they represented only 4% of establishments covered by the census.

Women accounted for 55.3% of all private firm owners. This fits with the Cambodian tradition of women holding property titles, even if they do not necessarily control related transactions.<sup>39</sup> The lowest level of female ownership was found in the traditionally male sectors of maintenance (17%) and non-food manufacturing (21%). Women also accounted for 56% of the private sector labor force.

Firms tended to serve local markets. 95% of the firms operated primarily within their provincial borders and catered to consumers in their provinces. The one notable exception was in Siem Reap, where 29% of sales were to foreign tourists.

<sup>39</sup> *A Fair Share for Women*: UNIFEM, World Bank, ADB, UNDP and DFID/UK. 2004. *Cambodia Gender Assessment*. Phnom Penh: UNIFEM, WB, ADB, UNDP and DFID/UK.

<sup>40</sup> World Bank, 2004b.

#### 3.2. Phase 2: Data Collection and Field Testing

After completing the census, the research team focused on two tasks. First, we collected the hard data used in the index and as controls for structural conditions from published sources and third parties. The most important data was derived from provincial budgets and from the Provincial Department of Commerce and Department of Industry, Mines and Energy. Some hard data, such as the availability of information, was constructed from the team's observations during direct visits to the province (See Section 2.3.4).

A 16-page survey was developed which covered 12 major topic areas and generated 391 variables. The survey built upon the World Bank's Mini-Investment Climate Analysis Survey Instrument, which was developed to allow for follow-up on the Bank's 2003 research.<sup>40</sup> The survey was designed in English, translated into Khmer, and the meaning of each question was double-checked by a fluent English speaker who had no involvement with the original survey design.

After the survey's initial design in May/June 2006, six PBES focus groups, each made up of eight people, were conducted to test survey questions and gather further information on aspects of provincial economic governance in the following different populations:

- One-person female-owned businesses in Phnom Penh
- One-person male-owned businesses in Kampong Cham
- Multi-person female-owned businesses in Siem Reap
- Multi-person female-owned businesses in Kampot
- Multi-person male-owned businesses in Battambang
- Multi-person male-owned businesses in Sihanoukville

The average size of the multi-person businesses was 6.3 employees and the average age of the owner about 34 years.

Once the focus groups were completed, the team revisited the survey, dropping or revising many questions to account for the new information acquired in the focus groups. These additions were then circularly translated (as described above) before being added to the research tool.

### 3.3. Phase 3: Survey

#### 3.3.1. Sampling

A stratified random sample of firms was drawn directly from the populations found in the census. Only firms with at least one employee besides the owner were considered eligible for selection. Strata were defined based on the number of employees in the business and the sector in which they operated. Sampling was based on the proportions in provincial populations. An example of the stratification strategy for Phnom Penh is shown in Table 28 below. The minimum provincial sample size was 40 firms, but more were sampled in Siem Reap (65), Battambang (65), and Phnom Penh (90), because of their relatively larger populations.

#### 3.3.2. Face-to-Face Interviews

Face-to-face interviews were conducted in each province because as an approach they were considered less likely to incur intervention by

government officials. Twenty-five respondents did claim to have been contacted about the survey by a third party, but they were spread somewhat equally throughout the 10 provinces. Indochina Research Limited (IRL) conducted a six-day interview training for 25 college-educated enumerators. Their expertly trained staff also provided logistics, management, and quality control for the finished product.

The overall response rate to both screening calls and interview contacts was 45%. This number includes firms that were not available, refused to participate, or canceled after arranging an appointment. While this figure is relatively low for face-to-face interviews by international standards, it is respectable within the Cambodian context for three reasons. To begin with, this was the first time that a survey of such a sensitive nature had been performed in many parts of the country. Second, firms may not have been accustomed to such an endeavor and may not have had faith in the confidentiality of their responses. Finally, the small scale of most operations meant that if an owner was not available when interviewers were in his/her province, there was little chance that anyone else at the firm would have been able to answer knowledgeably. Whenever it was impossible to interview a firm they had originally selected, the interviewers chose a new firm off a replacement list whose members had been randomly selected.

**Table 28: Population and Sample Distribution of Firms of Phnom Penh**

| Population Distribution of Phnom Penh                     |       |     |        |     |         |     |          |     |          |     |      |     |
|---|-------|-----|--------|-----|---------|-----|----------|-----|----------|-----|------|-----|
| # of Employees/<br>Establishment<br>Type                  | Total | %   | 1 to 5 | %   | 6 to 10 | %   | 11 to 20 | %   | 21 to 30 | %   | 31 + | %   |
| Services+Others   | 3,151 | 53% | 2135   | 48% | 600     | 61% | 274      | 74% | 77       | 74% | 65   | 57% |
| Manufacturing,<br>Construction, &<br>Natural<br>Resources | 875   | 15% | 677    | 15% | 133     | 13% | 33       | 9%  | 9        | 9%  | 23   | 20% |
| Commerce  | 1,973 | 33% | 1610   | 36% | 257     | 26% | 61       | 17% | 18       | 17% | 27   | 23% |

| Sample Distribution of Phnom Penh                      |       |     |        |     |         |     |          |     |          |     |      |     |
|--|-------|-----|--------|-----|---------|-----|----------|-----|----------|-----|------|-----|
| # of Employees/<br>Establishment<br>Type               | Total | %   | 1 to 5 | %   | 6 to 10 | %   | 11 to 20 | %   | 21 to 30 | %   | 31 + | %   |
| Services+Others  | 45    | 53% | 31     | 48% | 8       | 61% | 4        | 74% | 1        | 74% | 1    | 57% |
| Manufacturing,<br>Construction, &<br>Natural Resources | 13    | 15% | 10     | 15% | 2       | 13% | 1        | 9%  | 0        | 9%  | 0    | 20% |
| Commerce   | 32    | 33% | 25     | 36% | 5       | 26% | 1        | 17% | 0        | 17% | 1    | 23% |

| Table 29: Correlation of Scores with Response Rate |  |
|--|--|
| Index  | Bivariate Correlation with Response Rate |
| 1. Entry Costs                                     | 0.4838                                   |
| 2. Property Rights                                 | 0.1364                                   |
| 3. Transparency                                    | -0.0285                                  |
| 4. Time Costs of Regulatory Compliance             | 0.5559                                   |
| 5. Informal Charges                                | 0.09                                     |
| 6. Crime Prevention                                | 0.3236                                   |
| 7. Proactivity of Provincial Authorities           | -0.0391                                  |
| 8. Tax Administration and Burden                   | 0.6433*                                  |
| 9. Dispute Resolution                              | -0.7590*                                 |
| 10. Participation                                  | -0.1760                                  |
| Total PBES   | 0.3402                                   |
| * Significant at .05                               |  |

A far more serious concern is that response rates varied greatly across provinces, ranging from a low of 26% in Banteay Meanchey to a high of 71% in Sihanoukville. It is possible that response rates may have been associated with governance in the province. For instance, response rates may have been low because firms in poorly governed provinces were afraid to respond. As a result, provinces with low response rates would end up having better scores than what an objective observer would attribute to them. Alternatively, response rates may have been low because firms were generally satisfied with their situation and did not want to rock the boat. If this were the case, only extremely dissatisfied firms would respond, and provinces with low response rates would have worse scores.

Table 29 checks the bivariate correlation between provincial response rates and scores on the sub-indices and overall PBES. Fortunately, response rates are not associated with higher or lower scores on the final PBES. However, two sub-indices do seem to be affected: Tax Administration and Burden is significantly and positively related to response rate and Dispute Resolution is negatively associated with responses. The two relationships actually cancel each other out. Thus, we can feel fairly confident that differential response rates had little impact on the final ranking.

Quality control involved checks for out-of-range data. Internal logic checks were used to check for the consistency of responses. For example, firms that used facilitators should not have answered questions about how long it took to receive individual documents. Similarly, the total of inspections from individual agencies had to be less than or equal to the number of

total inspections, as firms were allowed to count agencies not included in the survey.

### 3.4. Phase 4: Index Creation

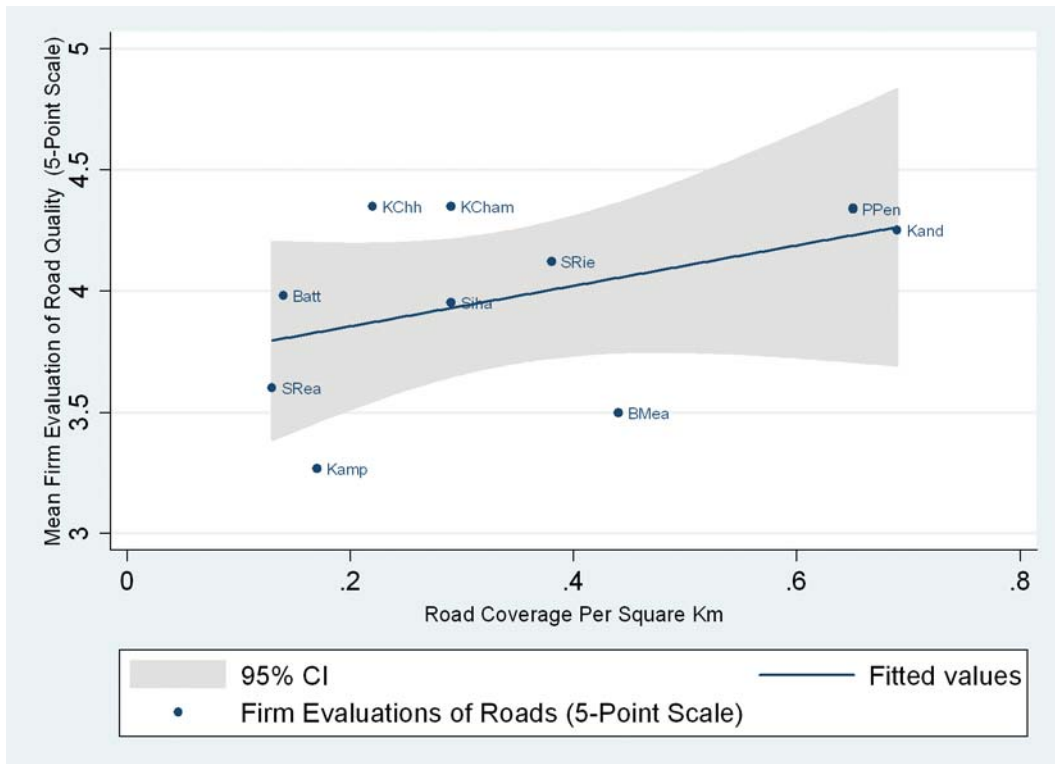
Interviews were completed on August 17, 2006, and data was subsequently processed to create the indices.

#### 3.4.1. Reliability of Firms' Perceptions

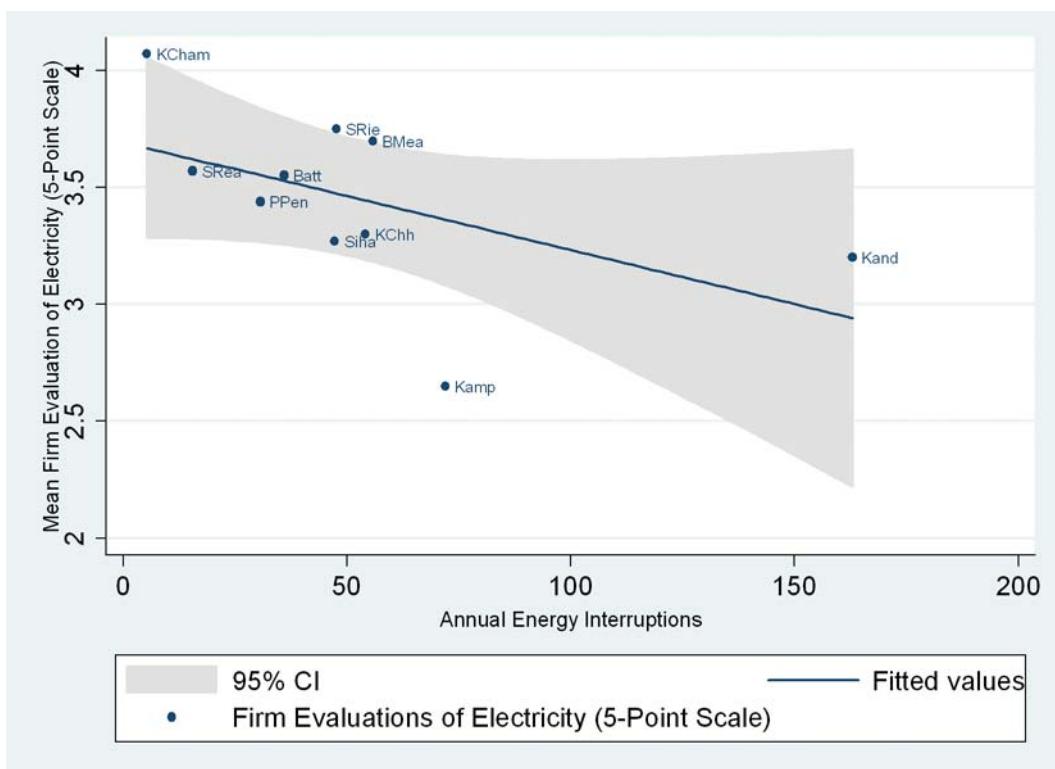
Before construction of the scorecard, the researchers ran two tests to check the external and internal reliability of firms' perceptions and rule out potential bias. External validity was tested by measuring the rank ordering of road coverage (roads per square kilometers) against firms' assessments of road quality in their provinces. The result of this test is shown in Figure 16, where there is a 0.5 bivariate correlation between the two measures. Nevertheless, it is clear that firms in Kampong Cham and Kampong Chhnang tended to overestimate road quality, while Kampot and Banteay Meanchey tended to underestimate it. These differences were likely caused by the fact that road coverage is not perfectly synonymous with road quality. Of all the provinces, Kampong Cham actually has the largest amount of roads (137 km) covered by asphalt or concrete. Both Banteay Meanchey and Kampot lack such high-quality roads.

A second test measured the internal validity of the survey by comparing firms' evaluations of the quality of electricity provisions with the number of outages they experienced in the most recent year. These two measures correlated at -0.52, indicating that firms were consistent in their evaluations throughout the interview process. Results of this test are shown in Figure 17.

**Figure 16: External Validity – Firms Evaluations of Road Quality vs. Actual Coverage**



**Figure 17: Internal Validity – Firms Evaluations of Electricity vs. Number of Outages Experienced**



### 3.4.2. Verification of Indicators

Before indicators could be used in the creation of the index, they had to pass three tests.

- Scaled data had to pass a Chi Square test indicating there were statistically significant differences across provinces as to the percentage of firms that checked particular values on Likert scales. For instance, is the 40% of firms that answered strongly agree or agree in Kampong Cham statistically distinct from the 35% in Battambang? Testing statistical significance incorporates the number of respondents along with the variance within provinces.
- Confidence intervals around mean scores had to demonstrate limited overlap, so that the team could determine that another random sample would not yield a different ordering. Figure 18 gives an example of this exercise with respect to the mean waiting period for Patent Tax registration. There was some overlap, but for the most part, intervals around sample means were

tight. We are fairly certain that the rank ordering would be maintained with another random sample. The major exception is Battambang province, which had extremely large confidence intervals due to a wide variation in provincial scores. With another sample, Battambang's score could potentially be the highest or lowest score in the sample. In cases like this, it was necessary to take median scores to avoid distortions caused by outliers.

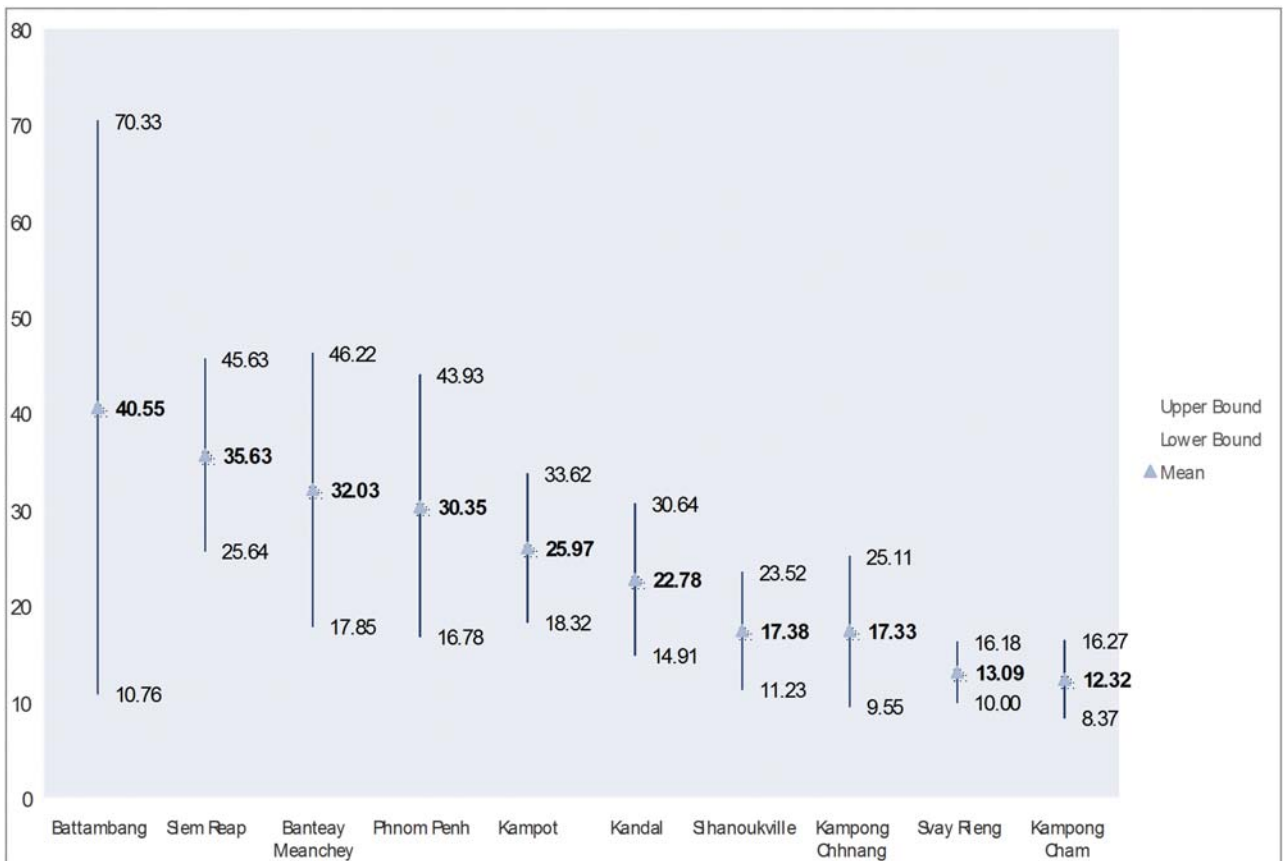
- Differences in responses among provinces could not be caused by variation in the type, legal status, or size of firms concentrated in particular provinces. Section 2.1.1 on the percentage of fully formal firms describes a test of this analysis.

### 3.4.3. Re-scaling of answers

All indicators were re-scaled to a 10-point scale using the formula

$$9 * \left[ \frac{\text{Province}_i - \text{Minimum}}{\text{Maximum} - \text{Minimum}} \right] + 1$$

**Figure 18: Confidence Intervals around the Mean Waiting Period for Patent Tax Registration**



where  $Province_i$  is the individual provincial value, minimum is the smallest provincial value, and maximum is the largest provincial value in the sample. An example of such an indicator would be the percentage of firms that agreed that the province had a positive attitude toward private business.

For some items, a large number had a negative interpretation. In these cases, we reversed the index by subtracting the entire quantity from 11. An example of such a negative indicator would be the number of total inspections experienced by each firm.

$$11 - \left[ 9 * \left[ \frac{Province_i - Minimum}{Maximum - Minimum} \right] + 1 \right]$$

#### 3.4.4. Hard Data in Sub-Indices

When hard data was used in a Sub-Index, our rule was that the indicator must account for 40% of the total index. If hard data was used in a Sub-Index that had multiple dimensions, however, the rule was adapted so that the hard indicators accounted for only 40% of the particular dimension. This way the overall meaning of the index was not distorted. Readers should check the table of individual sub-indices for specific coding rules.