

Analysis

5.1 Introduction

It is proposed to analyze the survey data collected in questionnaire stage 1 using a sample of 31 individuals from leading road sector organizations. The purpose of this is to find range demarcators , for Very High, High, Moderate. Low and Very Low categories. Using these qualitative ranking, it is proposed to get data through the questionnaire 2. The sample selected for this survey is 73 individuals from leading road sector organizations.

It is proposed to analyze data in relation to ICT usage in fifteen road sector organizations using the Organizational questionnaire.

5.2 Preliminary Field Survey Questionnaire for Individuals –stage 1

Survey data obtained for above was tabulated. Maximum, minimum and average value of every answer in each column was calculated. These figures are appeared at the bottom of the Table 6.1. Maximum, minimum and average values of maximum figures computed earlier were calculated. Same procedure adopted for minimum figures and average values. These details are appeared in Table 5.1.

Table 5.1- Summary Statistics of Preliminary Survey Questionnaire

Item	Data set parameters for each answer	Data set Statistics (%)		
		Maximum	Average	Minimum
1	Maximum Column	50	40	30
2	Minimum Column	10	5	0
3	Average Column	30.26	19.1	8.12

During the questionnaire survey all respondents indicated that the ICT status in each sub tasks is well below the very high range. Considering the summary statistics in the above table the average value of data sets statistics were taken as range demarcators. Therefore the range demarcators were identified as 0-5%, 5-20%, 20-40% and >40% As the respondents indicated the resistive of the sample data set at the higher end the range >40% has fine tuned to represent very high and high as 40-60% as high and 60 -100% as very high.. Therefore the final ranges for subsequent questionnaire would be as follows.

Very High 100-60 %
 High 60-40 %
 Moderate 40-20 %
 Low 20-5 %
 Very Low 5-0 %

The survey data obtained in this questionnaire was transformed into above ranges and the chart is appeared in Appendix H

5.3 Preliminary Field Survey Questionnaire for Individuals –stage 2

Data collected from a sample of seventy three individuals and was tabulated and is appeared in Appendix I. The data obtained in stage 1 and stage 2 was amalgamated and

the final result sheet is appeared in Table 6.2. From the above results the status of each task in each major component was analyzed graphically.

Considering all tasks in each component the overall assessment of ICT status in Feasibility studies, Engineering Design, Construction and Operation & Maintenance have been computed and the Data is given in Table 6.3

5.4 Organizational status in the ICT use

Fifteen organizations were given the questionnaire to capture the status of the organization and their ICT use in the Road Development activities.

5.4.1 Experience

The organizations having more than 0-5, 5-10, 10, 25, >25 years of experience were considered as those with some, low, medium, high and very high experience in road development work. Out of the fifteen organizations, 50% were having very high experience in the road development activities, whereas 25% and 19% had high and medium experiences respectively. Figure 5.1 shows Organization Experience data with respect to road infrastructure development.

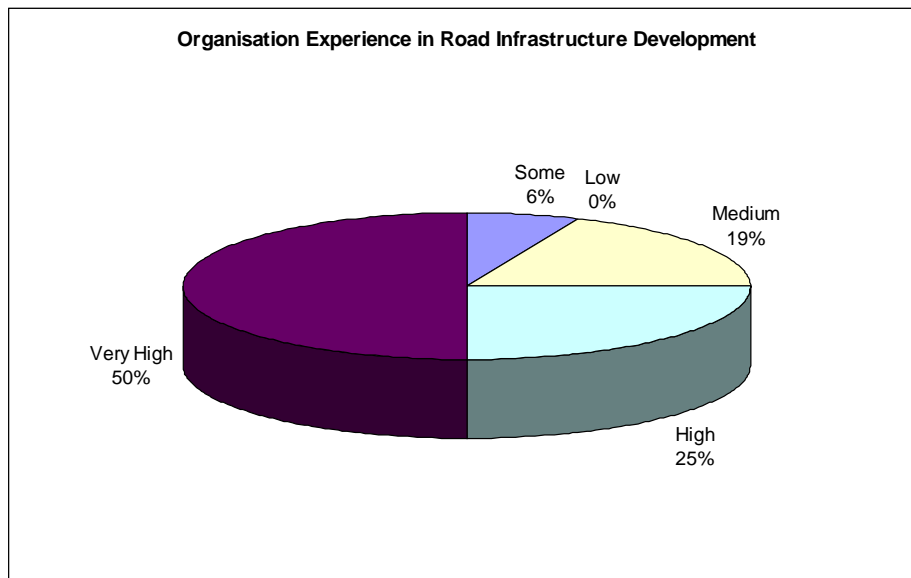


Figure 5.1 Organizational Experiences in Road Development

5.4.2 Type of Work and Staff Strength

Type of work handled by each agency is plotted in Figure 5.2 . Figure 5.2 shows that most of the road development agencies that were interviewed carryout either construction or maintenance of road infrastructure. Two organizations do only the construction (Org. 1 and 13). Five organizations do all tasks in road sector. Only a few agencies practice several tasks. It is noted that the feasibility studies are carried out only by four agencies out of the interviewed sample.

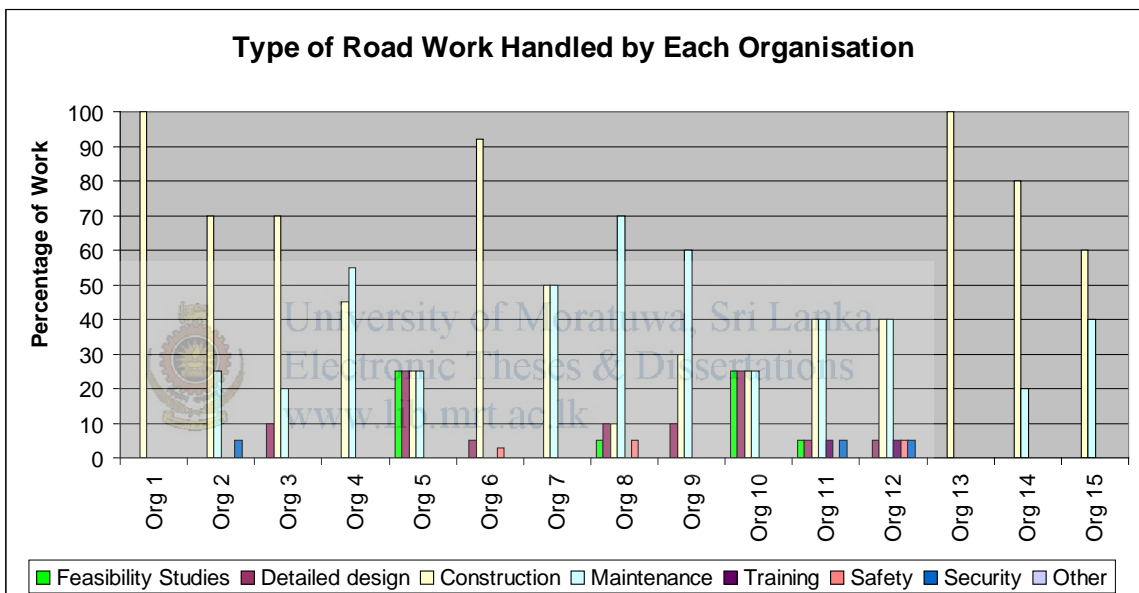


Figure 5.2: Type of Road work handled by Sample Organizations

Staff strengths in each sub tasks as identified earlier were computed from the survey results. Numerical values of 1, 2, 3 and 4 were assigned as strength indicator values for ranges between 0-10, 10-50, 50-100, and >100 respectively. The distribution of values is shown in the Figure 5.3. These values also indicate that the organizations are strong in construction and maintenance work. Out of the entire sample four agencies carryout only construction and maintenance and there is one organization carrying out only construction work of road development works. Considerable number of staff is engaged

in the tasks other than construction and maintenance in two organizations (Org. 11 and 12).

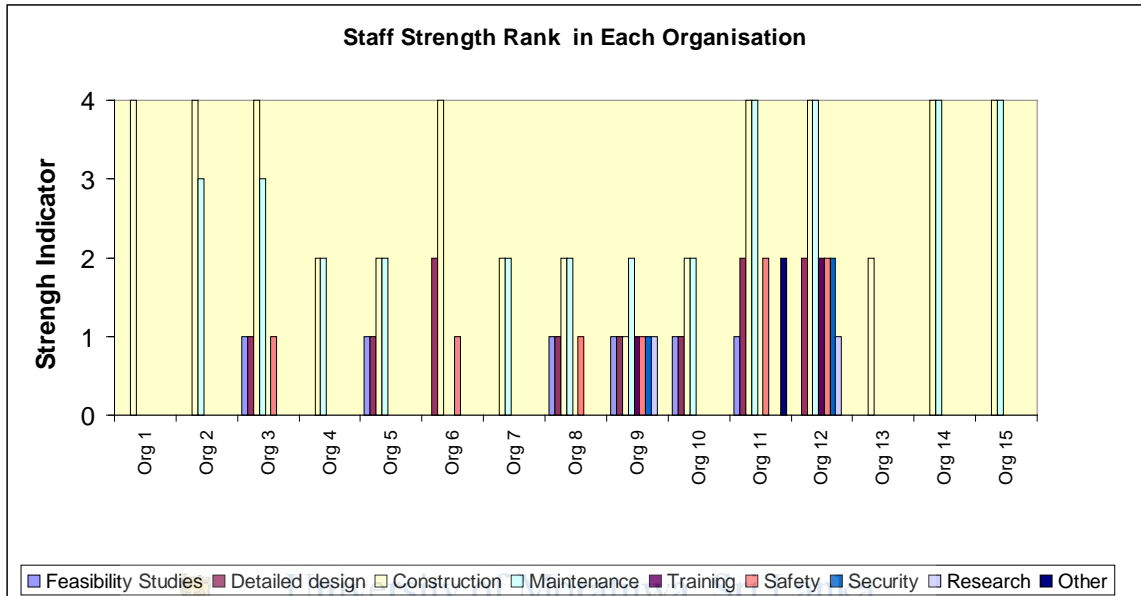


Figure 5.3: Staff Strength Indicator in Sample Organizations

Road development works involve in the categories of expressways, A, B, C and other class of roads. The work type shows a general distribution of types among the surveyed organizations are shown in Figure 5.4

Only one organization carries out all categories of roads (Org. 1). Two organizations do only one category of road. Ten organizations carry out only categories of roads. Only one organization does express ways.

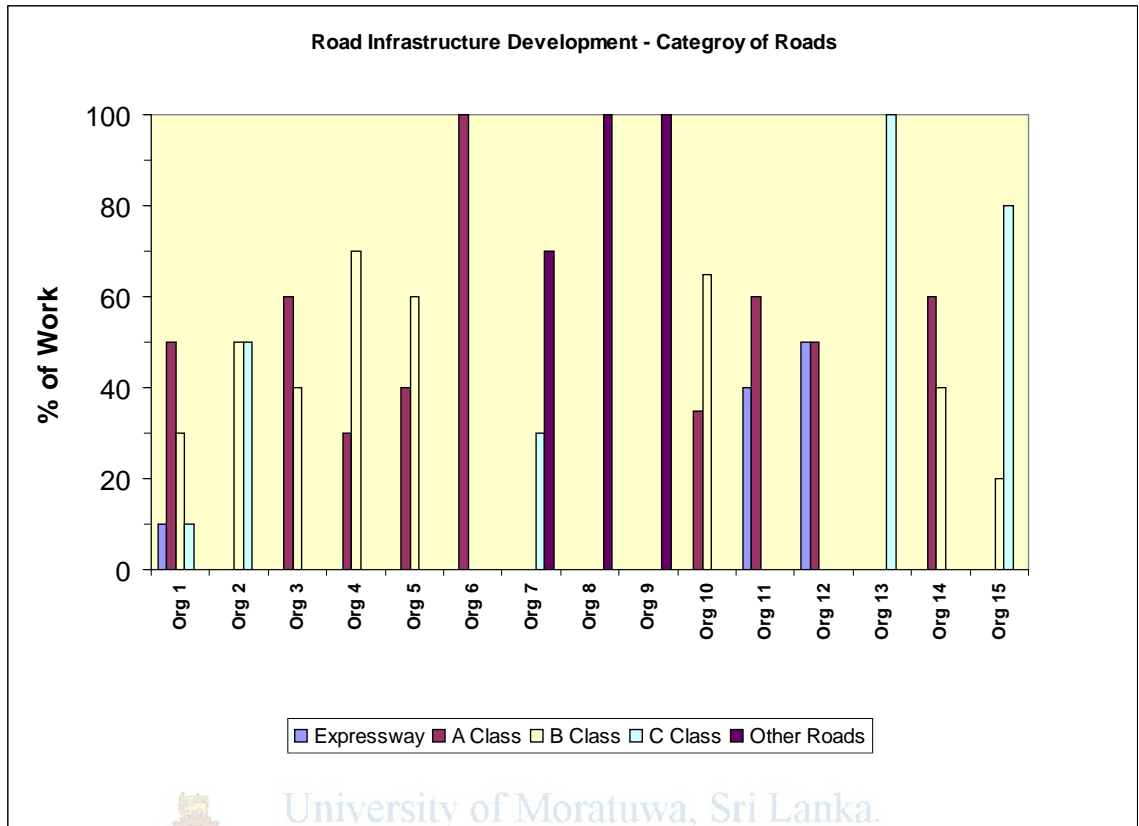


Figure 5.4: Road Infrastructure Development by Organizations – Category of Roads

5.4.3 Enabling Environment

The enabling environment related to the ICT usage of organization was assessed by the cumulative effect of two major components. They are 1) providing an enabling environment through appropriate policy and goals, 2) Facilitation by means of funds and staff. In the Questionnaire the components, in 2.1, 2.2, 2.3, 2.4 and 2.14 were aggregated to identify the enabling framework status. Details obtained from Questions 2.6, 2.7, 2.9, 2.11, 2.12, and 2.13 were summed to obtain the facilitation status. Each question was treated equally. Each answer was coded with a numerical range which had 1 for the minimum range while each incremental range was added with one more than the next lower value. These coding were then rescaled to a normalized scale having 1 as the minimum and 9 as the maximum. Normalized values for each selected question as given by the respondent agencies are tabulated and shown in Table 6.4 The nature of

equipping with clear goals and policies creates a multiplicative effect on the facilitation environment. This assumption was used to identify the cumulative indicator value for the enabling environment. Since each question was normalized to a uniform scale the expected maximum indicator value that is possible for an agency to obtain could be identified as 1620. Based on this the enabling environment indicator value was computed as a percentage of achievement from the expected maximum. The variation of enabling environment indicator is shown in Figure 6.45. According to this figure, enabling environment is very high (more than 80%) in two organizations. Very low (less than 10%) in two organizations. In four organizations the enabling environment is above 40%.

5.4.4 Institutional Role

Assessment of institutional role was done by considering the organizations institutional framework for ICT use and the financial support towards the development of this framework. Questions 3.1, 3.3, 3.4, 3.5, 3.6 and 3.7 were taken as the contributory factors indicating an organizations institutional role in the use of ICT for its activities. Since the organizations selected were all in the area of road sector development, the cumulative indicator of these answers would be the institutional role of each organization towards the use of ICT for road infrastructure development. The answers for each question were ranked similarly in the case of enabling environment. Summary results are shown in the Table 6.5 Indicator value was taken as a percentage of the maximum rank that could be obtained by the questionnaire answers is plotted in Figure 6.46. From this figure it is observed that in eight organizations, the institutional role for ICT use is above 50%. Organization 9 shows the highest value which is 90%. Three organizations have a value of 80%.

5.4.5 Management Instruments

Organizational management instruments in the use of ICT was assessed by the availability of professional staff both in numbers and in capability, availability of a consultant to strengthen the application of ICT, availability of facilities both general and road development specific, software for road development applications and the staff training status. The questionnaire responses for each question was assigned a rank in a similar way to the enabling environment and institutional role and then normalized to the scale of 1 to 9.

In the staff strength assessments it was taken that the total staff strength contributing to ICT use are the technical staff and the professional staff. The staff with postgraduate qualifications was considered as a percentage of the total staff while the contributions that could be made by the staff with road specific education were given separate consideration. Facilities assessment was considered as two components namely the general ICT equipment and the professional ICT equipment specific road infrastructure development. The equipment availability with respect to the above two is shown in Figure 6.48.

5.4.6 Overall ICT Status Indicator

The overall ICT use indicator was taken to comprise of 1) Enabling Environment, 2) Institutional Role and 3) Management Instruments. In the computation of the overall indicator these three were taken to contribute equally and hence no weights were allocated. Component indicator values were averaged to compute the overall indicator.

5.4.7 Self Assessment by the Organizations

Each organization responded by indicating their perception about the ICT use in Road infrastructure development by providing detailed information about 1) Level of Organizational competence with respect to each task, 2) Individual Experience in road

development, 3) Self expression of ICT capability 4) Self assessment of the national level of ICT use in Road Sector and 5) Self assessment of National trend of ICT use. Scores were assigned to answers to each subcomponent in a similar manner as indicated for the other component indicators. The normalization was carried out to identify the factors on a same platform. The final answers were converted to percentages by making assessments with respect to the maximum value that could be obtained with respect to the questionnaire assessments.

5.5 Summary

Considering the summary statistics in the questionnaire stage 1, the range demarcators were identified. These qualitative ranking values were used for the questionnaire 2 which were distributed to a sample of 73 individuals. The status of ICT in each task and in each major component was analyzed.

Organizational questionnaire was distributed to fifteen leading road sector organizations. The ICT usage was analyzed under four major components namely, experience, enabling environment, institutional role and management instruments. The overall ICT use indicator was taken to comprise of above three factors.