

AN INVESTIGATION INTO SKILLED LABOUR REQUIREMENT IN SRI LANKAN BUILDING CONSTRUCTION INDUSTRY

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ABSTRACT

The construction industry, being predominantly labour intensive, heavily relies on the adequate supply of workforce and their skills. With the speedy growth of Sri Lankan construction industry after the ethnic war, demand for skilled workforce has been increased. The overall aim of this research is to analyse the present situation of skilled labourers in Sri Lankan building construction industry with respect to skill trades, in order to address the timely need of the present and future context of the industry.

The research was conducted using a questionnaire surveys among project managers in the building construction industry. The questionnaire survey was carried out to identify the significant skill trades and to investigate the current status of the skills and future required skills. Further, the questionnaire used to identify the skill shortage in building construction industry.

Skills related to service installation was identified as significant as the skills related to structural construction. However, the current status of the most of the skill trades is that these are not sufficient to fulfil the demand of the industry, except for bricklaying and plastering. The future supply of the skills also indicated an unbalanced level in likely demand and likely supply of skills. Hence, the government, industry and construction companies are having a responsibility of addressing the shortfall. It is also important to consider more training schemes and attractive remunerations with benefits to create a positive attitude towards the building construction industry among migrants and young generation in Sri Lanka.

Keywords: Construction Industry; Skilled Labour; Skilled Labour Demand and Supply; Skill Shortage; Strategies.

1. INTRODUCTION

In the contemporary world, construction industry holds immense potential for stimulating growth of national economy by providing necessary infrastructure background to other industries and generating substantial employment (Osei, 2013). Being a significant pillar of country's economy, construction industry requires effective and efficient strategies for resource utilization, while minimizing the unstable level of activities which ultimately leads to achieve a successful project completion. Being a major attributer, labour resource impinges on construction activities in terms of quantity and quality. According to Ozorhon *et al.* (2007), special skills and technical knowledge are requisites of the construction industry due to the complexity and solidity of its nature. Similarly, Dainty *et al.* (2005) identified skilled workforce as predominant in the industry, since the paucity and insufficiency of skilled workforce can create poor quality work and delays to the construction works.

Skilled labour demand is associated with construction output, labour productivity, real wage in the construction industry, material price and interest rate (Wong *et al.*, 2011) while the supply of construction skills depends on the recruitment of young people, together with some upgrading of semi-skilled operatives to skilled operatives (Agapiou, 1996). However, demand (requirement) and supply (available) of skilled workforce of each sector are set in accordance with the market conditions. Work load fluctuation of the construction industry directly allied with the skilled workforce and creates either a

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shortage or a surplus of workforce due to inevitable complex nature of projects, sophisticated involvement of construction technology and exposure of dynamic business culture by the industry (Ramasaran and Hosein, 2005). Similarly, absence of planning for skilled manpower generates fluctuations of labour pool triggering surpluses and shortages resulting low quality and wastages in long run.

The fluctuation of the skilled workforce has been identified throughout the world even in developed countries. The Construction Labour Research Council in USA has forecasted the required workforce to be trained and retained up to 2016 as 185,000 to achieve the expected growth of the industry (Olsen *et al.*, 2012 as cited in Oseghale and Abiola-Falemu, 2015) and according to Chan and Dainity (2007) the unrealistic approach of defining the skill levels affected on the skill shortage of UK. Similarly, 17% unemployment rate and 13% underemployment rate have been discovered within the Hong- Kong construction labour market reflecting a mismatch of labour equilibrium (C&SD, 2004). A decade ago, in the local construction industry, only five percent are skilled labourers among 500,000 directly employed workers and it is one third out of the forecasted skilled labour requirement (Weddikkara, 2006).

The upward trend of Sri Lankan construction industry after the end of ethnic war in 2009 has created an immense demand for the workforce in different skills with the construction of landmark buildings and infrastructure development in Sri Lanka. Consequently, skilled labour demand has upturn with the leapfrog in technology for new development projects. Therefore, the aim of the study is to investigate the skilled labour requirement in Sri Lankan building construction industry which has not been thoroughly explored in relation to the Sri Lankan context in recent years under present context.

2. LITERATURE REVIEW

2.1. SKILLED LABOUR DEMAND AND SUPPLY

Demand of skilled workforce in the industry is influenced by the changing workload in the industry. Similarly, demand for manpower in construction industry of Asian region is unstable due to the rapid changes in the economy. Forecasting labour demand is a crucial factor for manpower planning and development of a country in terms of quantitative and qualitative aspects (Jayalath, 2011). Manpower demand is associated with several factors and these can affect the labour demand in long run and short run (Wong *et al.*, 2006). According to Wong *et al.* (2005), labour demand is highly influenced by type, size, complexity and method of construction of the project. Literature findings emphasise that the demand for skills depends on construction output, technology, wage level, labour productivity, economic growth and labour regulations.

Investigation of the current market conditions and utilization of skills, which relates to the market demand through the institution products and alternative strategies, is the process of manpower planning (Jorssen, 1989). The future supply of construction skills depends on the recruitment of young people, together with some upgrading of semi-skilled operatives to skilled operatives (Agapiou, 1996). According to Briscoe and Wilson (1993), the complexity and problematic nature cause fluctuations in the skill shortage. Adequacy of these skills in the industry depends on the supply which fluctuates with wage rate, population and composition, migration and immigration and geographical mobility.

2.2. STRATEGIES TO ADDRESS SKILLED LABOUR SHORTAGE

According to Rwelamila (2002), the construction industry is not investing in training as the industry heavily depends on informal trained workforce. A major part of this workforce cannot cope up with the pace of technological changes in terms of construction materials and methods. This has led to some of the works in progress and finished works exhibiting poor quality. There is a remarkable diversity in educational background in the construction industry (Kikwasi, 2011) and to tackle different aspects of the skills shortage strategies should be implement. Mackenzie *et al.* (2000) categorised strategies to cater skilled labour demand in to government response strategies and construction organisation response strategies as shown in the Table 1.

Table 1: Strategies to Address Skilled Labour Shortage

Industry and Government Response Strategies	Contractor Response Strategies
<ul style="list-style-type: none"> ▪ Long term training schemes 	<ul style="list-style-type: none"> ▪ Wage increments
<ul style="list-style-type: none"> ▪ Establishment of training institutions 	<ul style="list-style-type: none"> ▪ Positive working environment
<ul style="list-style-type: none"> ▪ Make aware and attract unemployed persons 	<ul style="list-style-type: none"> ▪ Sufficient and accredited training programs
<ul style="list-style-type: none"> ▪ Introduction of new technologies 	<ul style="list-style-type: none"> ▪ Benefits and incentives
	<ul style="list-style-type: none"> ▪ Greater use of machineries
	<ul style="list-style-type: none"> ▪ Motivation and encourage the team work

Source: Adapted from MacKenzie *et al.* (2000)

2.3. SKILLED WORKFORCE IN SRI LANKAN CONSTRUCTION INDUSTRY

In the research of Jayawardhne and Gunawardhne (1998), workers of the local construction industry are identified as “all-rounders” in their field and most of them have trained and educated through informal unsystematic ways. Further, they emphasised that, over 60% of skilled labour gang is not employed efficiently within the local industry. However, the critical situation of the labourers in the industry is highlighted, as the redundancy of construction workers at the project completion who hired on a project basis (Jayawardhne and Gunawardhne, 1998).

Trainings for construction labourers are mainly carried out by public and private training institutions in Sri Lanka (Jayawardane *et al.*, 2008). National Apprentice and Industrial Training Authority (NAITA), Vocational Training Authority (VTA), Department of Technical Education and Training (DTET), Institute of Construction Training and Development (ICTAD) and Chamber of Construction Industry Sri Lanka (CCI) are some training institutions established in Sri Lanka.

Two schemes are established in order to define skill levels of construction labourers in Sri Lankan training institutes. National Trade Test (NTT) and National Vocational Qualifications System (NVQ) are two tests used to measure the skills of local crafts (Jayawardane *et al.*, 2008).

3. RESEARCH METHODOLOGY

A comprehensive literature review was carried out through journals, books, articles, reports, government publications, dissertations, previous research investigations and electronic publications to identify the basic facts and the theories already subjected to discussion on skilled workforce in construction industry. Preliminary investigation was carried out to investigate the applicability of identified facts of literature synthesis to Sri Lankan construction context. Preliminary investigation was conducted among five (5) project managers involved in building construction industry. Subsequently, a detailed questionnaire was distributed to thirty seven (37) project managers to identify further information on skill trades, present and future demand and supply of skill trades and strategies to address the skilled labour shortage. Thirty one (31) project managers were respondents to the questionnaire. Further, the detailed questionnaire was used to investigate the opinions of the respondents regarding the current and future level of skilled labour demand and supply in identified skills trades. Figure 1 shows the rate of responses and experience of the respondents of detailed questionnaire survey.

The gathered data through the questionnaire were analysed using the mean weighted rating and the T test. The analyses focused on ranking the responses of the participants based on their mean values and these mean values were identified as the level of significant. The responses for likely demand and supply of each trade of skill were analysed under the middle value (median) of the responses which indicate the middle response of the practitioners to compare the expected likely demand and supply of skilled labourers. Meanwhile, based on the T test, significant strategies and determinants of supply and demand were identified. Additionally, the identified significant strategies and determinants were ranked based on acquired mean values.

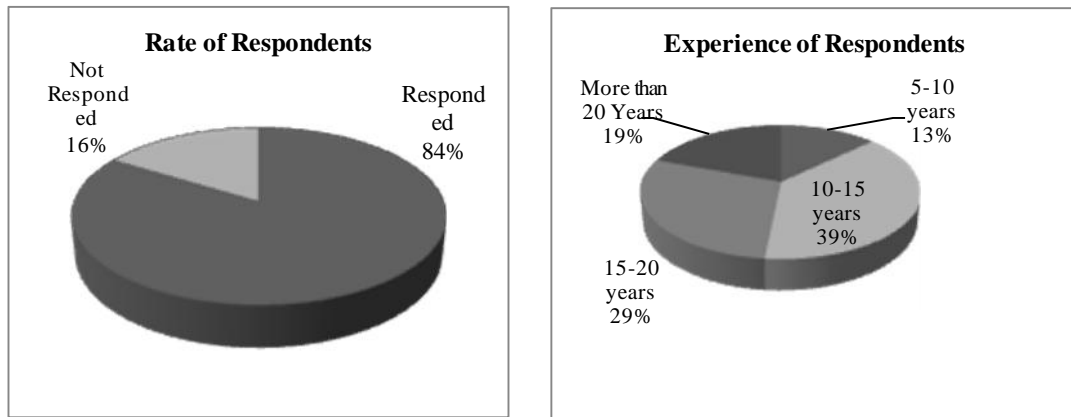


Figure 1 : Rate of Responses and Experience of Respondents

Data obtained through detailed questionnaire survey was analysed using mean weighted rating and statistical one sample t-test.

4. DATA ANALYSIS AND RESEARCH FINDINGS

4.1. SIGNIFICANCE OF SKILL TRADES

The study identified 10 most common skill trades from the literature review and preliminary investigation. Detailed questionnaire survey was used to identify the significance of the traditional skill trades most commonly use in Sri Lankan building construction industry using the mean weighted rating and frequency of responses analysis. The findings are shown in Figure 2.

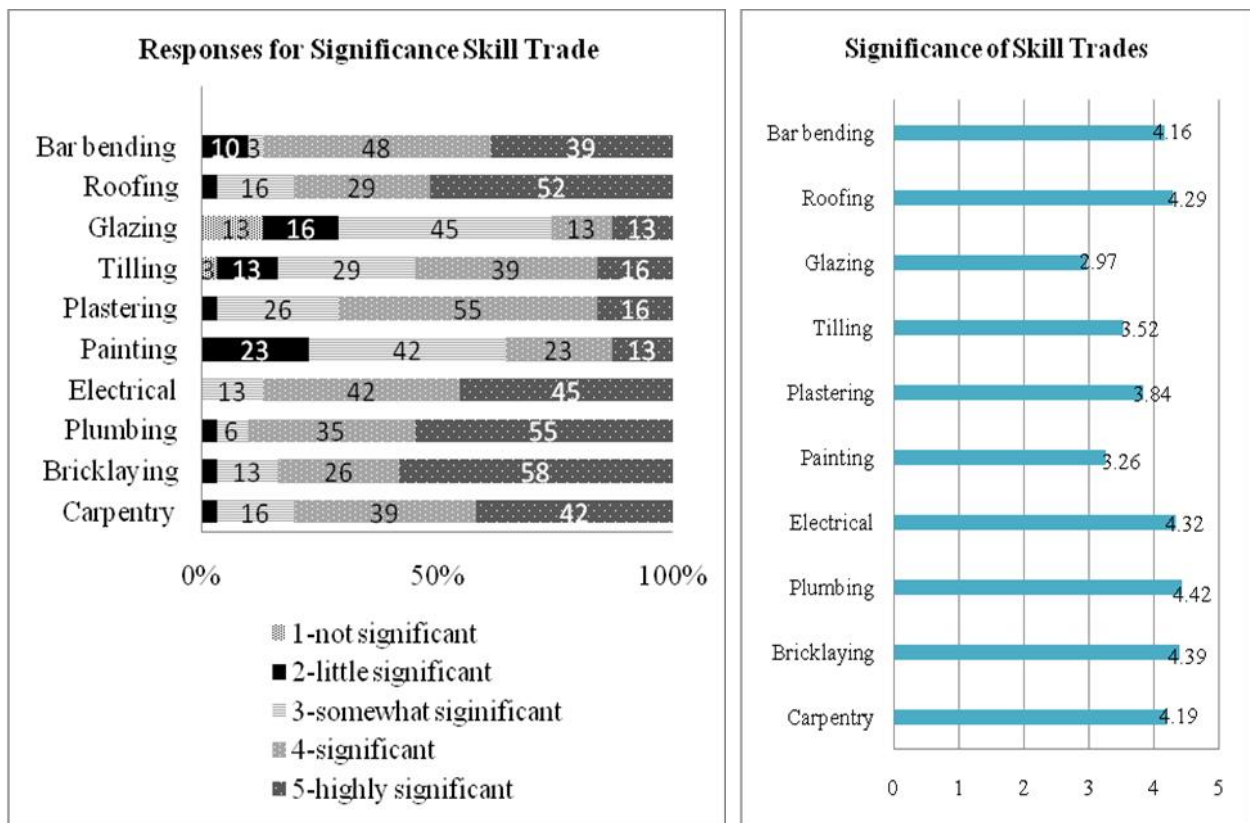


Figure 2: Mean Values and Responses of the Significance of Skill Trades

According to the findings, skills related to structural construction and services have been ranked between “highly significant” and “significant” and skills related with finishes in building construction has received “somewhat significant”. As shown in Figure 2, more than 70% of respondents ranked all the trades as highly significant or significant except for glazing, tiling and painting. Plumbing was ranked as the most significant skill trade with a mean value of 4.42, where 90% of respondents ranked it as a highly significant or significant skill trade for building construction. Further, more than 50% of the respondents have given high significance to plumbing, bricklaying and roofing. The analysis further revealed that the skills related to service installation and structural constructions are significant and essential skills in building construction disregarding the type of the project. However, glazing has been ranked as the least significant skill of trade with mean value of 2.97, where 61% of respondents have experienced it as little significant or somewhat significant trade.

4.2. CURRENT DEMAND AND SUPPLY OF SKILLED LABOUR IN SRI LANKAN CONSTRUCTION INDUSTRY

The current level of skilled labour demand and supply was investigated under the identified skill trades and the opinions of the respondents are presented in Figure 3. The opinions of the respondents regarding the current demand and supply of skills were analysed through mean weighted rating and frequency of responses.

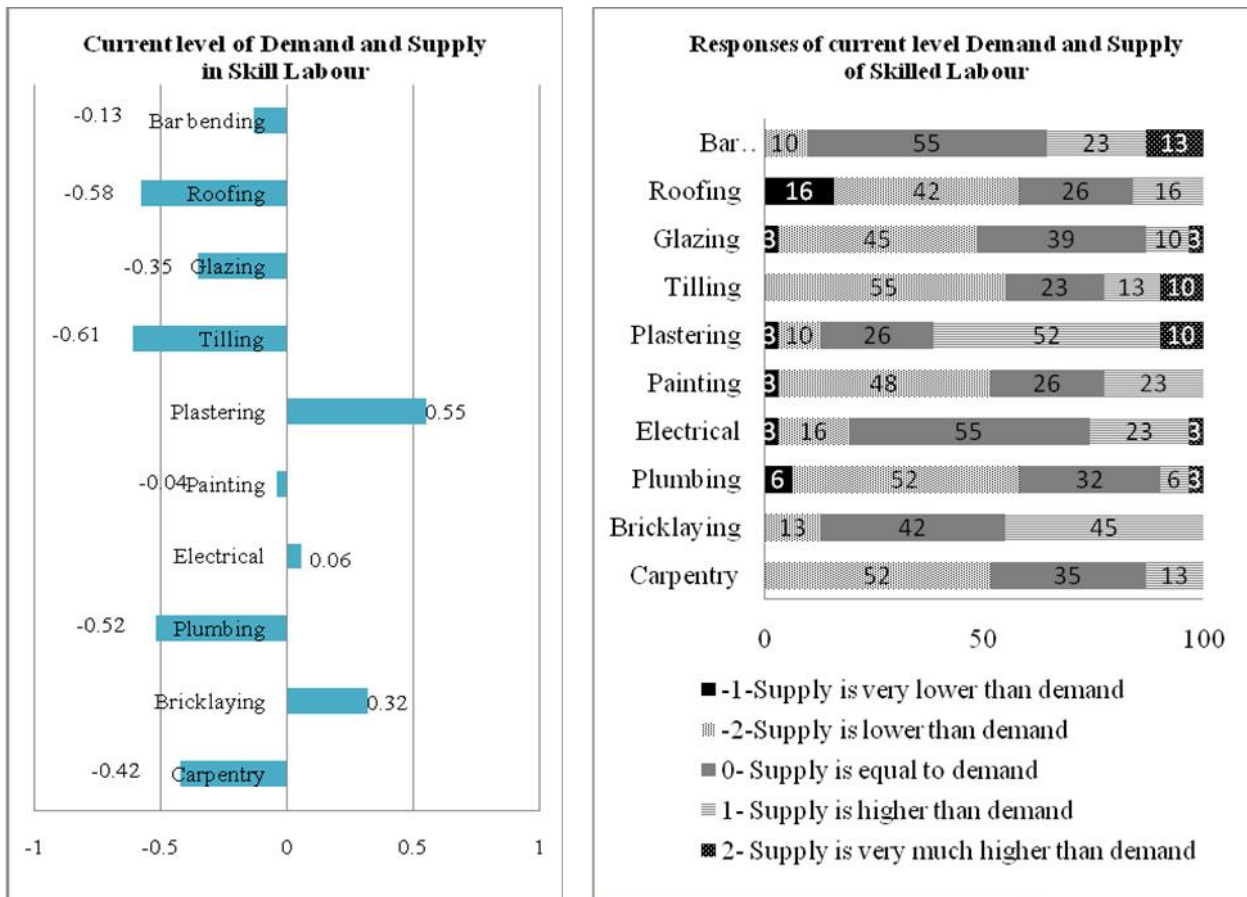


Figure 3: Mean Values and Responses of the Current Level of Demand and Supply in Skilled Labour

Respondents have ranked plastering with the highest mean value of 0.55, revealing the current supply of the skilled labourers for plastering is higher than the current demand level in the industry. According to the respondents’ opinions, more than 50% of respondents have ranked plastering as highly supplied skilltrade than the current demand. Bricklaying (mean value 0.32) was ranked as another significant skill trade where, 87% of responses obtained between high supply of skilled labourers than demand and very much high supply of skilled labourers than demand. Electrical was ranked marginally in between high supply than demand and equal demand and supply. However, more than 50% of respondents indicated

electrical as nonaligned skill trade where the supply of skilled labourers equal to the demand. Painting was raked in the similar way, inclined to the negative of electrical. Roofing, tiling and plumbing were identified as the skill trades where the supplies of particular trades do not match with the current demand level.

4.3. *FUTURE LIKELY DEMAND AND SUPPLY OF SKILLED LABOUR IN SRI LANKAN CONSTRUCTION INDUSTRY*

The analysis of likely demand and supply of each skill trade in future is given in Table 2. The responses for likely demand and supply of each trade of skill were analysed under the middle value (median) of the responses which indicate the middle response of the practitioners to compare the expected likely demand and supply of skilled labourers.

Table 2: Comparison of Likely Supply and Demand of Skilled Labour

Trades of Skills	Median Values for Likely Demand	Responses for Likely Demand	Median Values for Likely Supply	Responses for Likely Supply	Comparison
Carpentry	3	Average demand	2	Low supply	D>S
Bricklaying	3	Average demand	3	Average supply	D=S
Plumbing	4	High demand	3	Average supply	D>S
Electrical	4	High demand	3	Average supply	D>S
Painting	4	High demand	3	Average supply	D>S
Plastering	4	High demand	4	High supply	D=S
Tiling	4	High demand	3	Average supply	D>S
Glazing	3	Average demand	3	Average supply	D=S
Roofing	4	High demand	3	Average supply	D>S
Bar Bending	4	High demand	3	Average supply	D>S
Truss Working	4	High demand	3	Average supply	D>S
Cladding	4	High demand	3	Average supply	D>S
Ironworking	3	Average demand	3	Average supply	D=S
Welding	4	High demand	3	Average supply	D>S
Landscaping	4	High demand	2	Low supply	D>S
Pile Working	5	Very high demand	3	Average supply	D>S

The analysis revealed the gap between likely demand and likely supply trades in future according to the opinions of the respondents. However, likely demand and likely supply of bricklaying and plastering shows the equal level of demand and supply of skilled labour with considered to the median values of the opinions of the respondents. Pile working and landscaping reveals a sizeable divergence between likely supply and likely demand. The significant difference of demand and supply has been caused due to an unavailability of training in the Sri Lankan construction industry.

4.4. *STRATEGIES TO ADDRESS SKILL SHORTAGE*

The identified strategies through literature, preliminary questionnaire survey and detailed questionnaire survey, were analysed using statistical one sample t-test to investigate the significance and mean weighted rating to rank the strategies. The findings are presented in Table 3. Level of effectiveness of the strategies were collected by the using a likert scale of 1-5, where 5 represents very high effectiveness, 4 represents high effectiveness, 3 represents average effectiveness, 2 represents low effectiveness and 1 represents very low effectiveness.

Table 3: Effectiveness of the Strategies to Cater the Demand of Skilled Labour

Determinants of Supply	t Value	Significance/ P Value (1-tailed)	Mean Difference	Mean
Industry and Government Response Strategies				
Greater economic stability within the industry	2.716	0.005	0.613	3.613
Long term training schemes	2.540	0.008	0.484	3.484
Establishment of training institutions	2.327	0.013	0.516	3.516
Considerate short term training schemes	2.528	0.008	0.452	3.452
Make aware and attract unemployed persons	2.208	0.018	0.419	3.419
Introduction of new technologies	2.752	0.005	0.645	3.645
Contractor Response Strategies				
Manpower planning	3.057	0.002	0.581	3.581
Wage increments	2.867	0.004	0.645	3.645
Positive working environment	2.706	0.006	0.484	3.484
Sufficient and accredited training programs	1.871	0.036	0.290	3.290
Benefits and incentives	3.580	0.001	0.742	3.742
Greater use of machineries	0.338	0.369	0.065	3.065
Motivation and encourage the team work	0.895	0.189	0.161	3.161
Subcontracting	0.329	0.372	0.065	3.065
Hiring multi-skilled labourers	-2.284	0.015	-0.484	2.516
Rescheduling the work	3.684	0.000	0.839	3.839
Instruct labourers to work overtime	3.437	0.001	0.548	3.548
Greater use of prefabricated items	1.545	0.067	-0.258	2.742

From the respondents' perceptions, it is clear that introduction of new technologies within the industry is one of the best approaches to tackle the construction industry skills shortage. Greater economic stability within the industry and establishment of training institutions were identified as most important strategies to cater the demand of the skilled labour with mean values of 3.613 and 3.516 respectively. All most all the other strategies identified under industry and government response strategies were ranked as effective strategies around the value of 3. Hence, the strategies proposed can be considered as important in contributing to the resolution of the skills shortage.

The majority of the strategies under contractor responsive strategies were identified as high effective strategies to the construction industry. Rescheduling the work has gained more responses as a high effective strategy for contractors' in a skilled workforce shortage. This is followed by wage increments, positive working environment, benefits and incentives, instruct labourers to work overtime and manpower planning as primary solutions to the skills shortage. Subcontracting (mean value = 3.065) and hiring multi skilled labourers (mean value = 2.516) was ranked as less effective strategies. Hence, the respondents did not favour the strategies of recruiting alternative sources of construction labour. The mean value for greater use of prefabricated items and greater use of machineries indicated the poor response towards the substitution of new technologies and design changes attributable to the skill shortage. This is strongly supported by the mean value obtained for the greater use of machineries.

However, the positive working environment, benefits and incentives, motivation and encourage the team work and wage increment have a considerable impact to the workforce to reside in the industry. Hence, these strategies are significant in retaining the exiting the workforce in the industry.

5. CONCLUSIONS AND RECOMMENDATIONS

It is an accepted fact that the construction sector plays an important role as being crucial and strategic to the development of the economy. Construction sector remains as an important part of an economy and it contributes to economic stabilization both in boom and bust. Therefore, construction materializes to have a fair relationship with national output. Construction is not only an integral part of the modernization process, but its labour-intensive nature makes it particularly attractive as a means of creating employment in developing countries. Labour intensive nature of the construction industry has created an immense role for the skilled labourers within the industry. However, the instability nature of the industry has been affected on the stabilization of the skilled labour demand and supply. Therefore, this research provides a useful starting point for determining the probable future skill shortages in skills trades relate to building construction.

Questionnaire survey was used to fulfil the aim of the study on investigating the future requirement of skilled labour in Sri Lankan building construction industry. Survey was carried out among 31 Project Managers in construction industry.

Findings highlighted that the most of the identified skills are significant to the building construction sector. In fact, out of the thirty one survey respondents who employ skilled labour in their projects, majority reported that skills related to service installation is significant as much as the skills related to structural construction.

The current demand and supply of the skill trades shows an unbalanced level in considerable skills due to lack of training programmes. Lower wage level, poor attitude of younger generation and working conditions have created scarcity in skill supply which adversely influenced on skilled labour demand with the increment of construction output in the present days of Sri Lankan construction industry. Hence, most of the skills have a shortfall except in plastering and bricklaying.

Similarly, most of the skill trades identified within the study, reveals a mismatch in likely skill supply and demand attributable to scantiness of skill workforce planning in the industry. There is a likely demand for some of the traditional skills in the building market in Sri Lanka. However, the likely supply does not show an adequacy level in both traditional skills and upcoming skills. An action plan considering should be developed by employers and trade associations to cater the demand of skilled labour in the industry.

The industry response for the skilled shortage in the industry is in a low level and stabilisation of the construction industry becomes a major determinant of the skilled labour shortage. If the construction industry hopes to sustain or increase the number of people entering the industry in future years, construction employers must be actively encouraged to reconsider their current approach to develop through accredited training programmes. Consequently, firms should adjust their operations to adapt to available supplies of labour and other inputs. In the meantime, government and industry level perception towards this global phenomenon is a necessity.

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