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A MODEL FOR HUMAN CAPACITY BUILDING OF LARGE-SCALE CONTRACTORS TO FOSTER LEAN CONSTRUCTION IN SRI LANKA

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ABSTRACT

People are at the core of lean implementation more than a set of tools and techniques. Several studies reflect that implementing lean to the construction industry heavily relies on the knowledge and skills of the people and how they respond to changes. Several studies have reflected that building human capacities as one of the most prominent considerations to foster lean concept in construction industry. However, there is a lack of empirical investigation on human capacities and strategies to build human capacities for successful lean construction implementation of large-scale contractors. Therefore, the purpose of this paper is to investigate the human capacities to be built in order to implement lean concept and propose organisational level strategies to build those capacities in large-scale contractors of Sri Lanka to foster lean construction. A qualitative approach was adopted as the research approach and case study was the selected research strategy. Fifteen respondents from three cases were interviewed to gather in-depth input to the study and collected data were analysed using code-based content analysis with NVivo 12 Software. The study identified positive attitudes, values, commitment, trust, adopt to cultural change, physical fitness, technical skills, and team building as human capacities necessary for unskilled and craft level workers. Positive attitudes, managerial and technical skills, team building, communication skills, knowledge, commitment, social skills and interest in new concepts were recognised as human capacities of administrative and professional and managerial levels. Several strategies that can be used by the contractors to build the above capacities have been summarised into a model. The final model presents the unskilled, craft, administrative, and professional & managerial level human capacities to be built by large scale contractors and strategies to be used for building those capacities to foster lean in construction industry.

Keywords: *Human capacity building; Large scale contractors; Lean construction; Strategies.*

1. INTRODUCTION

Lean Construction (LC) is one of the best construction project management approaches, that enhances the successful delivery of construction projects through continuous improvement, reduction of wastage, and value maximisation of client's money (Mano *et al.*, 2021). Major benefits of using LC include reduction of construction cost,

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improvement of the quality of construction, increase of the productivity and customer satisfaction (Demirkesen *et al.*, 2020). However, the implementation of lean in construction industry is not free from barriers. Among the barriers, most of the studies have highlighted lack of lean awareness and understanding, lack of top management commitment, time and commercial pressure, culture and human attitudinal issues, unwillingness to provide training and resources to adopt new systems, and insufficient finances as major barriers for lean implementation in both global and local context (Mano *et al.*, 2021; Ranadewa *et al.*, 2018). When considering the above barriers, it is clear that most commonly identified lean implementation barriers are related to the human aspects. In this context, Bhasin (2012) emphasised that lean is not just a set of tools and techniques, but its heart is the people. According to Koskela *et al.* (2002), LC requires changes in individual behaviour and thus, building individual capacities will accelerate the lean implementation.

In Sri Lankan context, Ranadewa *et al.* (2019) highlighted that human capacity building has the key potential towards the successful lean implementation in small and medium contractors (SMCs) in Sri Lanka. Lack of focus on human capacities has further slowdown lean implementation. Thus, an investigation on human capacity building for successful lean implementation is a paramount research focus in construction industry. Ranadewa *et al.* (2019) have investigated the importance of human capacity building in SMCs to enable lean in Sri Lankan construction industry. However, their study was limited to construction SMCs, that have unique difficulties and way of operations. Further, the difficulties and capabilities of large construction organisations are different from construction SMCs in lean implementation. This has been proven by UN-HABITAT (1996) as the convenience of evaluating the workers and employees of the project, planning of human resources, and better understanding of top management on the skills of human resources of SMCs rather large-scale contractors. Further, the large-scale contractors have the higher organisational conditions including human, material and financial resources rather SMCs (Melo and Machado, 2013). Hence, this paper aims to investigate the human capacities to be built in order to implement lean concept and propose organisational level strategies to build those capacities in large scale contractors of Sri Lanka to foster lean construction.

2. HUMAN ENABLING CAPACITIES AND STRATEGIES IN PRACTICE TO FOSTER LEAN CONSTRUCTION

In order to implement the right tools and strategies to create customer value, understanding capacity building concepts is significantly important (Linné and Ekhall, 2012). Howell *et al.* (2017) explained LC as a value seeking process that maximises value and continually redefines perfection construction whereas, UNESCO (2011) defined the term capacity as the ability of individuals, organisations and systems to perform functions efficiently, effectively and sustainably. Further, Groot and Molen (2001) described human capacities as the knowledge, skills and attitudes of human resources in design, development, management and maintenance of institutional, operational infrastructures and organisational process.

Previous literature has emphasized the links between lean implementation and human resources management, capacities, and policies, which provide evidence on the possibility of fostering lean concept through human capacity building (Olivella *et al.* 2008). Hence, it is essential to identify the lean enabling human capacities.

The human capacities to be developed by individuals for successful lean implementation in construction industry are summarised in Table 1.

Table 1: Human capacities required for lean construction implementation

Human Capacities	References														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1.Knowledge	X	X	X	X	X	X	X	X	X			X	X	X	X
2.Education level					X						X	X	X	X	X
3.Technical skills	X	X					X		X						
4.Managerial skills	X	X				X	X	X				X	X		
5.Social skills							X								
6.Attitudes	X	X			X	X	X			X		X	X		X
7.Values/ ethics					X							X	X		X
8.Desires to organisational improvement			X	X	X										
9.Trust	X				X		X								
10.Commitment					X	X	X							X	
11.Experience		X			X	X		X					X		X
12.Training					X	X		X			X	X	X		X
13.Capacity to change				X		X	X	X					X		
14.Adaptation to culture						X		X		X				X	
15.Self-confidence			X				X							X	
16.Continual professional development									X				X		X

References: [1] Groot and Molen (2001); [2] Enemark and Ahene (2003); [3] Bhasin (2012); [4] Alves *et al.* (2016); [5] Alves *et al*. (2016); [6] Aziz and Hafez (2013); [7] Pavez and Alarcón (2006); [8] Ranadewa *et al.* (2019); [9] Kululanga (2012); [10] Maidi (2020); [11] Rashidi and Ibrahim (2017); [12] Jin and Ling (2005); [13] Achanga *et al*. (2006); [14] Ankomah *et al.* (2017); [15] Antosz and Stadnicka (2017)

Considering the human capacities highlighted in the above table, most of the researchers have stressed that knowledge, managerial skills, attitudes, and training are essential to sustain the lean concept in construction industry. Further, some other human capacities emphasised in the table such as educational capacities, desires to organisational improvements, self-commitment, previous experiences, individual's capacity to change and adaptation to the cultural deviations within the organisations seem comparatively important factors for successful lean implementation. Hence, building human capacities can be presumed as an important consideration to foster lean construction. However, majority of local construction organisations in developing countries lack human capacities to implement lean. Therefore, an investigation on lean enabling human capacities and strategies that can be taken by the construction organisations to build those capacities are inevitable for a successful lean journey.

The strategic actions to be taken for building human capacities to foster lean construction can be explained under the individual, organisational, industrial, and governmental levels as shown in Table 2.

Table 2: Strategies for building human capacities to foster lean construction

Strategies for Building Human Capacities to Foster Lean Construction			
Individual Level	**Organisational Level**	**Industry Level**	**Government Level**
1.Continuous urge on learning lean concepts [1] 2.Individual commitment on training lean practices [1] 3.Develop self-confidence and commitment [2] 4. Enhance individual knowledge by self-learning process [3] 5.Enhance the self-awareness of lean practices throughout process [1] 6.Improving individual morale by themselves [4] 7.Self-development of soft skills [2]	1.Support individuals to obtain required lean knowledge [5] 2.Encourage mentoring and enhance individual awareness on lean benefits [5] 3.Promote training and learning within organisation [6] 4.Adopt lean culture within the organisation [7] 5.Persuade individuals in partnership to work with others [8] 6.Promote new developments within an organisation [5] 7.Have a reward scheme to motivate lean implementors [9]	1.Encourage academic-industry partnership in lean research [5] 2.Enhance collaborative practices among parties in construction industry [2] 3.Conduct seminars and workshops on LC [10] 4.Build the innovative models for individuals and organisations [2] 5.Organise lean conference by relevant authorities and institutions [11] 6.Produce lean trainers by lean institutes [11] 7.Pubilsh research on LC by construction industry authorities and institutions [12]	1.Introduce new laws and regulations to support lean implementation [13] 2.Provide loan facilities at concessional interest rates for lean implementing project [11] 3.Provide tax concessions for lean projects [14] 4.Establish stable economic & political environment within the country [14]

References: [1] Ong and Sui Pheng , 2021; [2] Green and May, 2005; [3] Bakas *et al.,* 2011; [4] Howell, *et al.,* 2017; [5] Mohamed, 2021; [6] Alves *et al.,* 2016; [7] Bortolotti *et al.,* 2015; [8] Srinivasan *et al.,* 2020; [9] Dave, 2013; [10] Bygballe *et al.,* 2018; [11] Ranadewa *et al.,* 2019; [12] Kulatunga *et al.,* 2007; [13] Kululanga, 2012; [14] Sarhan and Fox, 2013.

According to Table 2, the individual employees must be committed to lifelong learning in lean environments and self-develop individual capacities. Support, encourage and mentor employees to enhance knowledge on LC, and promote training and learning on LC within organisation are highlighted as strategies to be adopted in organisational level. Conducting training programme, publishing research, organising conferences, and produce trainers on LC are the industry level strategies summarised in Table 2. Considering the governmental level strategies, providing loan facilities, tax concessions and stable political environment within the country for lean implementers are identified as encouragements for the lean implementation within organisation. Having considered above review, it is important to investigate the human capacities to be built in order to implement lean concept and propose organisational level strategies to build those capacities by large scale contactors in Sri Lanka to foster lean construction.

3. RESEARCH METHODOLOGY

The nature of the research problem, which is to identify the human capacities necessary for successful lean implementation in Sri Lankan construction industry necessitates an in-depth investigation. Moreover, the opinions of respondents regarding the human capacities were also required to be collected. Hence, a qualitative approach was selected as the suitable research stance for this study (Naoum, 2007).

Within the qualitative research approach, case study research strategy was adopted to proceed with the study considering several reasons. Case study strategy could facilitate to accomplish the aim of this study since this strategy enables the in-depth investigation in the context (Yin, 2011). Further, the study investigated a real-life phenomenon, which was human capacity building of employees, using the experiences of top management level employees of a construction projects. Considering the aforementioned reasons, the case study strategy was adopted to the study. The boundary of the case studies was identified as the lean implemented construction projects by large contractors in Sri Lankan construction industry. Hence, three (03) cases were selected for the study, from large contractors (C2 or above) in Sri Lankan construction industry, those who have implemented LC practices. Human capacities necessary for successful LC implementation have been considered as the unit of analysis.

According to Yin (2011), several data collection techniques can be included in case study strategy such as interviews, document reviews and observations. Data was collected using an open-ended interview guideline by allowing respondents to answer independently in this study. The collected data was analysed with code-based content analysis using NVivo software. Five top management respondents from each project were interviewed using an interview guideline. The profile of the respondents has been elaborated in Table 3.

Table 3: Respondent profile

Project	Respondent	Description
Project A	AR1	Project Manager with 20 years of experience
	AR2	Deputy Project Manager with 15 years of experience
	AR3	Planning Engineer with 5 years of experience
	AR4	Site Engineer with 3 years of experience
	AR5	Quantity Surveyor with 12 years of experience
Project B	BR1	Project Manager with 25 years of experience
	BR2	Construction Manager with 18 years of experience
	BR3	Resident Engineer with 20 years of experience
	BR4	Site Engineer 6 years of experience
	BR5	Quantity Surveyor 16 years of experience
Project C	CR1	Project Manager with 23 years of experience
	CR2	Deputy Project Manager with 20 years of experience
	CR3	Planning Engineer with 10 years of experience
	CR4	Site Engineer with 5 years of experience
	CR5	Quantity Surveyor with 8 years of experience

The scope of the study was narrowed to identify human capacities necessary for unskilled, craft level, administrative, and professional & managerial level employees to successfully implement lean concept in large scale contractors and propose strategies to build the human capacities. Moreover, the proposed strategies to build the human capacities necessary in fostering lean construction have been limited to organisational level strategies.

4. RESEARCH FINDINGS

4.1 HUMAN CAPACITIES NECESSARY FOR FOSTERING LEAN CONSTRUCTION IN LARGE SCALE CONTRACTORS IN SRI LANKA

The respondents were questioned regarding the human capacities necessary to foster LC in unskilled, craft, administrative, and professional & managerial level employees as described below.

4.1.1 Human Capacities Necessary for Unskilled Level Employees

Several respondents of all selected projects highlighted that the way of people thinking and practicing within the working environment needs to be changed in a positive manner. Hence, *"positive attitudes"* and *"values or ethical behaviour"* have been identified as two of the critical human capacities that need to be developed. According to AR1 and AR3, due to several lean practices are being adopting in the working environment, the existing culture is changing and hence, the unskilled workers need to be *"adopt to cultural changes".* Further, to be compatible with the working patterns within the lean environment, the necessity of *"commitment"* and *"trust"* between workers have been emphasised by AR1, BR2 and CR4. Considering the above capacities need to be developed, the respondents have further stressed that unskilled workers should have the *"capacity to change"* with the cultural and working process changes within the working environment. Additionally, BR3 have emphasised that having a higher level of *"physical fitness"* will enhance the labour productivity and higher quality of work, which is essential in fostering LC. Moreover, BR1 highlighted that *"higher level of understanding"* of unskilled labours about their responsibilities and achievable individual benefits within the lean environment is another essential human capacity. CR1 has also emphasised that the unskilled level workers need to develop their ability to work with the co-workers as a team to achieve the ultimate objective of enhancing the value of project. Hence, *"team building"* has identified as another human capacity, which is necessary to be developed in unskilled level workers. In addition to all other opinions, CR5 highlighted that the desire to achieve organisational development must be developed not only within the top management, but the lower-level workers must also have the same sense. Hence, *"desire to organisational development"* has been emphasised by CR5.

4.1.2 Human Capacities Necessary for Craft Level Employees

The human capacities identified for the unskilled level workers namely *"positive attitudes"*, *"values or ethical behaviour"*, *"adopt to cultural changes"*, *"trust"*, *"commitment"* and *"capacity to change"* have also been highlighted for the craft level workers by majority of respondents in all three projects. Additionally, AR1 stated that the *"technical skills"* needs to be inculcated in the craft level workers to work with the machinery, lean tools, and techniques. Further, *"team building"* is also highlighted by AR4, since craft level workers are working in a team environment by co-operating with the other co-workers. Further, BR1 has highlighted that *"self-confidence and personal integrity"* is essential to develop within the craft level workers in fostering LC. Moreover, CR5 stressed the idea of having the *"desire to organisational development"* within the craft level workers same as in the unskilled workers.

4.1.3 Human Capacities Necessary for Administrative Level Employees

The respondents from all three projects have highlighted the importance of having *"positive attitudes"* and *"values/ethical behaviour"* in the administrative level staff same as in the unskilled and craft levels. More comprehensively BR1 stressed that administrative level staff is an important category, who should necessarily avoid the attitudinal issues towards the lower-level workers, colleagues and senior staff. Further, the several respondents from all three projects have identified the necessity of having lean knowledge and the technical know-how of administrative level staff in lean implementation. Having *"sound knowledge"* of LC is important to be built in administrative staff to recruit the employees for the project. Moreover, the respondents have highlighted the necessity of *"higher educational level"* since it will ensure the required level of knowledge to execute the lean practices. Moreover, the respondents have highlighted the importance of having *"managerial skills"* to build the collaborative working environment between the workers. Additionally, AR2, AR3 and CR5 have highlighted "technical skills" and having the sound "experience" of LC. Further, BR1 and CR1 have highlighted the importance of *"team building"* and *"communication skills"* in the administrative level staff to encourage co-workers to adhere to the lean environment while establishing the proper interpersonal relationship and networking within the team members. The *"adaptation to culture"* is another important human capacity stressed by AR3. According to AR3, all the human resources within the working environment need to be adhered to the lean culture irrespective of the level. At the same time AR3 highlighted *"commitment"* as another important human capacity of the administrative staff to enhance the effective performance of the workers. According to BR1, *"having interest in implementing new concepts"* is another important capacity, which the administrative staff need to be build up. Further, CR3 has suggested the necessity of having *"social skills"* as it is comparatively important to create the culture to make the subordinates work within the project. According to the respondents, having social skills is significantly important for administrative level staff rather professional and management level.

4.1.4 Human Capacities Necessary for Professional and Managerial Level Employees

When considering the human capacities essential in professional and managerial level employees, several respondents have highlighted the same human capacities as suggested for the administrative level employees. More comprehensively, the *"managerial skills"* in professional and managerial staff will contribute to continue better relationship with the subordinate workers to obtain their full capacity towards the lean practices within the working environment. Further, having managerial skills would lead the managers to achieve the higher productivity of human resources. CR5 has further expressed that having the experience in lean implementation would facilitate the top management to adopt lean practices within the project to achieve the goal of cost effectiveness and higher quality. Further, BR1 and CR1 have highlighted the importance of *"team building"* in professional and management level since they need to lay the foundation of team building in order to adopt the co-workers to the lean culture. According to BR1, *"having interest in implementing new concepts"* will lead the top management to take initial step to implement lean within the organisation and project environment. Anyhow, the respondent has specifically stated that *"social skills"* are not significantly important human capacities to be built in professional and managerial level staff.

4.2 STRATEGIES TO BUILD HUMAN CAPACITIES FOR FOSTERING LEAN CONSTRUCTION IN LARGE SCALE CONTRACTORS IN SRI LANKA

Strategies to build human capacities in the construction industry have been identified in four respective levels namely individual, organisational, industrial, and governmental as highlighted in the literature findings. However, this paper focus is limited to organisational level strategies. Hence, the following section provides the strategies that were proposed at the organisational level to develop human capacities necessary to foster LC for unskilled, craft, administrative and professional & managerial levels.

4.2.1 Strategies to Build Human Capacities of Unskilled Level

To enhance the level of understanding, individual responsibilities and to develop positive attitudes within the lean environment, AR1 proposed to conduct *"on-the-job training"* programmes for unskilled workers. This strategy would support to motivate the unskilled workers to provide their maximum productivity in practising LC within the project. BR2 suggested to *"provide reasonable welfare facilities"* to unskilled workers. According to BR2, this strategy would enhance the productivity and capacity of the unskilled workers and allow the top management to promote practices of LC within the lower-level workers. To adopt unskilled workers to the lean culture, suitable culture for the unskilled level workers needs to be built and maintain within the working environment. Accordingly, *"build and maintain suitable culture"* can be proposed as an important strategy. CR4 proposed to *"conduct daily meetings"* with unskilled levels workers to inject the idea on practicing LC and maintaining quality of the work as another important strategy. This will enable the top management to build the suitable interpersonal relationship with lower-level workers. Further, this strategy would contribute to enhance the team building capacity of the unskilled workers and also the desire to organisational development. BR1 suggested another strategy of *"having strong administrative team"*, so that negative attitudes on lean construction practices within project and negative ethical values of unskilled workers could be eliminated through proper administration of workers. According to AR3, *"introducing a flow of inspection"* can be proposed as another strategy to build human capacity of commitment to the work. Further, this strategy would support to avoid the unnecessary wastages of defective works, overproduction and overprocessing by unskilled workers. Further, some respondents highlighted the importance of *"introducing new rules"* to the unskilled workers rather the policies in LC implementation.

4.2.2 Strategies to Build Human Capacities of Craft Level

Similar strategies suggested for the unskilled workers have been proposed by several respondents since the human capacities are also similar in nature for both unskilled and craft level workers. In addition to the aforementioned strategies in unskilled level, BR1 highlighted to *"conduct trade test"* for craft level workers within the project to identify the talents of the workers. This would support to enhance the technical skills of the workers essential in supporting LC implementation and ensure the self-confidence of the workers. Further, AR3 proposed to *"introduce a suitable reward scheme"* to encourage the craft level workers who are contributing to the LC practices implemented within the construction project.

4.2.3 Strategies to Build Human Capacities of Administrative Level

According to majority of the respondents from all the projects, *"conducting training programs"* has been proposed by AR1, BR2, CR5 as an important strategy to be implemented in the administrative level. Provide a suitable training program regarding the LC practices, tools and techniques would be contributing the administrative level staff to develop the implementation of LC. This strategy would be contributing to enhance the knowledge on administrative level staff essential in lean construction implementation. *"Provide promotions"* to the administrative level staff who are actively participating in establishing LC practices within the project would be significantly important in building the human capacities such as attitudes, commitment and adaptation to culture as suggested by BR1. *"Conducting Continual Professional Development (CPD)"* programmes were suggested by BR2 and CR1 as an important strategy to build human capacities of interpersonal skills and interest in new concepts. CPD on LC practices, tools and techniques can be conducted in the organisational level to make aware the administrative level staff about LC. Further, as proposed in previous section for craft level workers, *"allocating an allowance"* to employees who are implementing LC practices within the projects can be proposed for administrative level staff as well. In addition to that, BR1 emphasised the *"introduction of new rules and policies"* is significantly important in supporting the successful lean implementation within the organisation. Further, CR2 identified *"conduct weekly meetings"* and *"provide welfare facilities"* to administrative level staff would encourage to involve more in LC practices.

Additionally, some of the respondents highlighted the necessity of governmental involvement in building human capacities in this level. Accordingly, CR2 stated that government must take the initiative to provide tax concessions and other monetary benefits such as loan facilities to the lean implementing construction organisations. Hence, this will enhance the interest of administrative level workers in the implementation of new concepts such as LC as evidenced in literature findings by Green and May (2005).

4.2.4 Strategies to Build Human Capacities of Professional and Managerial Level

According to the respondents, the same strategies as proposed in the previous section for administrative level have been highlighted for the professional and managerial level as well. More comprehensively AR4 proposed that *"allocating an allowance"* for the lean implementors within the organisation would encourage the professional and managerial level staff to move for lean initiatives. Although, the aforementioned strategies have been proposed in organisational level for professional and managerial staff, some of the respondents have stressed that suitable strategies need to be deployed in the industry level as well. Accordingly, AR1 suggested that the construction industry should take necessary steps to provide training programmes, conducting seminars, workshops, CPDs' and conferences on LC practices as evidenced in the literature findings by Green and May (2005) and Bygballe *et al.* (2018).

4.3 MODEL OF ORGANISATIONAL LEVEL STRATEGIES FOR BUILDING LEAN ENABLING HUMAN CAPACITIES

This study mapped human capacities for fostering lean construction with the strategies required for building those capacities into a model as presented in Figure 1.

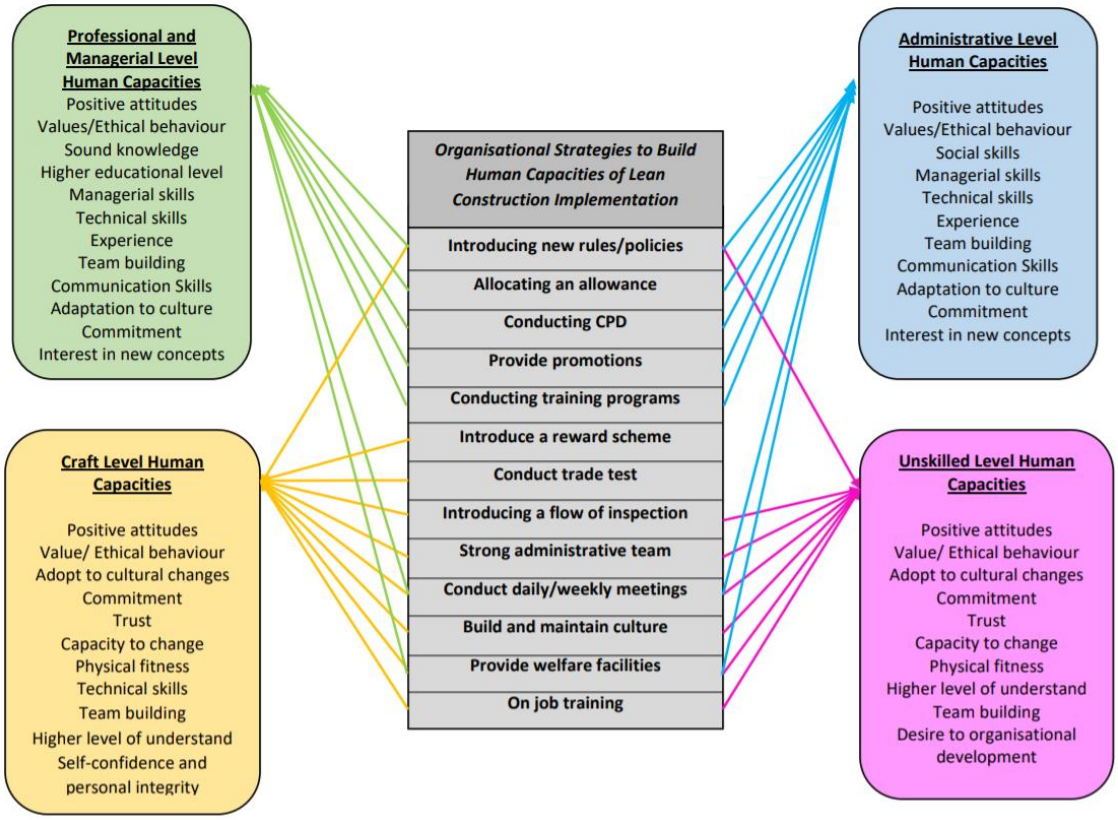

Figure 1: Model of organisational level strategies for building lean enabling human capacities

According to Figure 1, the study has identified several human capacities to be built by unskilled, craft, administrative, and professional & managerial level employees to foster lean construction in large scale contractors. Organisational level strategies that can be proposed to develop human capacities have been illustrated separately for unskilled, craft, administrative, and professional and managerial levels in the model. According to Figure 1, human capacities such as level of understand, positive attitudes can be improved by conducting on job training for unskilled and craft level workers and attending to the training programs conducting by the organisations. Moreover, several human capacities such as communications skills, technical skills, and team building can also be improved by attending the training programs. The impact of promote training and learning within the organisation have also been proven in literature by Alves *et al.* (2016). Further, the importance of introducing a reward scheme to motivate the employees who are involve in the lean implementation within the organisation was highlighted in the literature by Dave (2013). The same strategy has been identified by the respondents to foster the lean construction through building the necessary human capacities such as commitment and interest in new concepts. Except the identified strategies in the literature, several strategies to foster lean construction through human capacity building have been illustrated in Figure 1 such as introducing new rules and policies, conducting CPD for administrative and professional and managerial level employees, trade tests for craft level workers, conducting daily or weekly meetings and provide welfare facilities, introducing a flow of inspection and introducing a strong administrative team within the project structure. According to the findings summarised in Figure 1, the proposed strategies for human capacity building is similar in nature for both administrative, and professional & managerial levels. Further, the strategies identified for unskilled and craft level workers

are similar in nature as categorised in Figure 1, while introducing new rules and reward scheme is significantly important for capacity building of craft level workers.

5. CONCLUSIONS

There has been a notable growth in lean implementation in the construction industry. Hence, there is a need to investigate the human capacities that are necessary in implementing lean in large scale contractors in Sri Lankan construction industry and suitable strategies to build the respective human capacities. The human capacities have been identified with respect to the unskilled, craft, administrative, and professional & managerial levels. Positive attitudes, values, or ethical behaviour, adopt to cultural changes, commitment, trust, capacity to change, physical fitness, higher level of understanding, team building, and desire to organisational development have been identified as human capacities necessary for unskilled level. In addition to the aforementioned capacities, technical skills and self-confidence, and personal integrity are the human capacities identified for the craft level. Considering the administrative and professional & managerial levels, some of the major human capacities have been identified as sound knowledge, educational level, managerial skills, social skills, experience, team building, capacity to change and adaptation to culture. Anyhow, comparative to the professional and managerial level, the study has identified that social skills are highly important human capacity to be built for administrative level. Further, the strategies have been identified to build the human capacities in unskilled, craft, administrative, and professional & managerial levels to successfully implement LC. The model developed in this study will guide the large-scale contractors to identify the organisational level strategies to build human capacities in unskilled, craft, administrative and professional & managerial levels to foster lean construction in large scale contractors in Sri Lankan construction industry.

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