MASONS' PERCEPTIONS OF THE FACTORS AFFECTING THEIR COMPETENCY IN ISLAMABAD

by

Chaudhary Bilal Zafar

(2009-NUST-MS PhD CE&M-20)

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science in Construction Engineering and Management

in

Department of Construction Engineering & Management

National Institute of Transportation

School of Civil & Environmental Engineering

National University of Sciences & Technology

Sector H-12, Islamabad, Pakistan

(2012)

This is to certify that the thesis entitled

MASONS' PERCEPTIONS OF THE FACTORS AFFECTING THEIR COMPETENCY IN ISLAMABAD

Submitted by

Bilal Zafar

has been accepted towards the partial fulfillment

of

the requirements

for

Master of Science in Construction Engineering and Management

Dr. Rafiq Muhammad Choudhry, Ph.D

Department of Construction Engineering and Management

National Institute of Transportation

School of Civil and Environmental Engineering

National University of Sciences and Technology, Islamabad

DEDICATION

Dedicated to my beloved Father and Mother for their continuous support and prayers.

ACKNOWLEDGEMENT

I am thankful to Dr. Rafiq Muhammad Choudhry from the core of my heart for his constant help and constructive criticism. Dr. Rafiq Muhammad Choudhry has kept me focused throughout the course of my research. The value of his supervision and assistance cannot be overemphasized. I am extremely grateful to Dr. Hamza Farooq Gabriel, and Dr. Muhammad Babar Khan and Lec. Zia Ud Din for their always-available help, worthy suggestions, moral support, and technical assistance. I could not have taken my research to this high a level without their untiring assistance. I run short of words to express my gratitude to Dr. Tayyeb Akram for allowing me to constantly improve my research with their experience and critical commentary. I am also very thankful to my parents for providing me with an environment where I could optimize on my potential to work and praying for me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Competent masons are the need of good construction. Poor quality and low productivity are common problems on construction projects. One reason for this is incompetency of masons. Masons are responsible for most of the construction activities. There is need to identify the factors that hinder the display of masons' competency in the field. Literature review suggests that competency is governed by several variables including skills, motivation, and personality traits. Factors of skills and motivation were retrieved from the literature review. Factors of personality traits were retrieved from the Big Five Personality Traits theory. The research hypothesized that skills, motivation, and personality traits have equal impact on the masons' competency, and that the impact of factors affecting competency declines with experience. Data was collected through a questionnaire and was analyzed on Statistical Package for the Social Sciences (SPSS). The relative importance of factors was found through the comparison of their relative importance indices. The correlation between factors affecting competency and the masons' experience was drawn. This research found motivation to be the most impactful category on masons' competency followed by skills and then their personality traits. Three factors that were found positively correlated with experience were lack of education of masons, lack of formal training and masons' resistance to change. Knowledge of the relative importance of skills, motivation, and personality traits provides the construction project managers with basis to prioritize their measures to improve the masons' competency. This research acquaints construction project managers with knowledge of the potential

issues that masons encounter and suggests guidelines for their eradication to enhance the competency of masons.

Chapter 1

INTRODUCTION

1.1 General

Competency is one of the most fundamental controlling factors of masons' productivity. Construction project managers tend to look for the most skilled, experienced and competent masons but generally overlook the fact that there are a myriad of factors under their control that decline the competency of even the most competent masons. A significant population of masons is either unskilled or insufficiently trained. Lack of competent masons has exposed the constructors to numerous challenges. Incompetent masons produce poor quality work and show poor productivity. Accordingly, many projects take much longer to complete than required. Competent masons are required to ensure timely completion of projects without additional cost and quality compromises. In order to streamline the efforts of the construction project managers to enhance the competency of masons, it is imperative that factors that decline the masons' competency are identified and measures are proposed to enhance the competency of masons.

1.2 Significance of the study

Several researchers in the past (Kadir et al. 2005, Dai et al. 2009, Rivas et al. 2011) have attempted to study the factors that affect workers' productivity. Other researchers (Smithers and Walker 2000, Gilbert and Walker 2001) have attempted to identify

factors that control the workers' motivation in construction projects, but most of them have involved people on the level of managers in their studies. There has been very little research (Ismail and Abidin 2010) pertinent to the identification of factors affecting competency and motivation of workforce at the level of a tradesman like a mason. There is a gap in the literature regarding the factors that affect the competency of workers in general and of masons in particular. Study of factors affecting the competency of masons in construction is very important since masons make bulk of the construction workforce directly involved in the work and are involved in all kinds of construction tasks. This research fills this gap by studying the factors that affect the competency of masons in construction.

1.3 Objectives

The objectives of this research are as follows:

1. To study the skill development processes to identify pathways to skill acquisition for the masons.
2. To identify factors affecting the competency of masons to understand why they are not able to deliver optimal performance.
3. To propose guidelines for the enhancement of masons' competency.

1.4 Structure of the thesis

The thesis contains six chapters in total. Chapter 1 is the introductory chapter which discusses the significance of studying the factors affecting the competency of masons

and proposing measures to improve their competency. Chapter 2 covers the literature review. In addition, this chapter discusses the factors that affect the competency of workforce in general and masons in particular as identified in previous researches. Certain theories of motivation and personality traits are also included in the literature review. Chapter 3 proposes research methodology. This chapter discusses the process of data collection and the procedures adopted for analysis. Chapter 4 presents the analysis and results. It discusses the statistical procedures applied on the data and the results retrieved from them. Chapter 5 is based on discussion. This chapter discusses the findings of this research in context of the results obtained by previous researchers. This chapter also discusses the measures to enhance the competency of masons. Chapter 6 is of conclusions and recommendations.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review through which, the concepts of competency, motivation, personality traits, and the various factors affecting workers' competency were developed. Different definitions of competency were studied, which revealed the link between competency and skills, motivation, and personality traits. Several theories of motivation and personality traits have been discussed. The organizations involved in the development of vocational competency in workers at national and provincial level have also been studied. In addition, the ways of development of skills for construction workers were explored to provide a holistic view of where masons come from, how they are trained, and what problems they encounter while they work.

2.2 Human resource development in Pakistan

Human resource development (HRD) is the process in which measures are taken to improve the strategic mobilization and capacity building of the human capital to help them increase their productivity and participate in the global trade in order to be integrated into the global economies. An effective HRD system is one which opens the gate for more opportunities for the workers by enhancing their skills to progress in their work and be self-sufficient to deal with the risks. In order to provide a pathway to the low-skilled workforce to become a knowledge-based workforce, government

needs to invest into the areas of workers' competence development. Over the years, HRD has evolved as a potential means of reducing the poverty as well as the inter-generational and gender-oriented inequalities of income. Owing to her poor health and safety conditions, low literacy rate and low per capita income, Pakistan stood 136th out of 175 countries in the Human Development Index (HDI) till 2007 (Kazmi 2007). The implementation of the First Five-Year Economic Plan from 1955 to 1960 followed by the Medium Term Development Framework starting from the year 2005 till 2010 were potential steps in the way of development of human resources in accordance with the requirements of economy. Nevertheless, their implementation has not been as robust as originally intended which is why a lot of programmes devised by these Plans have failed to materialize. According to Wagner (2005), a proper system of professional and vocational training has a very positive effect upon the national competitiveness of the workers.

International competitiveness is one of the most obvious outcomes of globalization. Today, quality of work has become a cardinal driver of the firms' competitiveness both within the country and internationally. Quality in construction has become a key concern in the present age. In order to keep pace with the pressure of competition, it is imperative that the firms achieve greater flexibility and timeliness, ensure price competitiveness, and develop tendency to introduce new services. While human resources determine competitiveness in all of these aspects, there is dire need to place more emphasis upon their development. Education and training of the

workforce is the fundamental pre-requisite of achievement of quality in work and maximization of the workers' productivity.

2.3 Technical and vocational education and training (TVET)

The present structure of the education system has distinct tiers of general education and technical and vocational (TV) education. The academic career of every child commences with the general education and offers entry into TV institutes at different levels. TVET is compulsory for appropriate training and development of the workers. TVET promotes skill culture that is different from the academic culture that students conventionally grow up in and prepares them 'to serve simultaneously the 'hand' and the 'mind', the practical and the abstract, the vocational and academic' (Grubb 1985). Once the occupational skills have been developed through the vocational training, it facilitates optimal utilization of the resources through increased productivity of the workers, job satisfaction and a balance between demand and supply. Workers undertake the vocational training to improve their skills. Most of these workers are the ones that either fail to qualify for admission in the technical colleges and polytechnic institutes or drop out of schools at lower levels i.e. after primary or middle.

2.4 History of TVET in Pakistan

In 1947, there were few vocational institutes in Pakistan. Polytechnic institutions for the development of technicians that would serve as communication link between the skilled workers and engineers were non-existent. TVET was identified as a separate

stream in the middle of 1950s (APACC 2004). In late 1950s, Pakistan Swedish Institute of Technology was established along with two polytechnics. Over the decades, many technical training colleges, polytechnics, vocational and commercial training centers were started. Today, there is a well-developed network of vocational institutes, polytechnics, technical high schools and apprenticeship training centers all over Pakistan, yet their output makes only a small proportion of the total work force in Pakistan. Basic skills do not suffice the demands of the new technological age. From 1991 to 1992, there were 1151 secondary vocational institutions and the enrollment was 135 (Gillani 1996). There are five basic phases of development of the TVET system in Pakistan; namely policy formation, development, experimentation, expansion, and quality improvement, that ranged from 1947-1958, 1959-1970, 1971-1977, 1978-1988, and 1989-2003 respectively. With respect to the development of TVET system in Pakistan, Table 2.1 defines five phases as identified by Shah, Ajmal and Rahman (2010).

Table 2.1: Phases of development of TVET in Pakistan.

Stage	***Name***	***Duration***
1	Policy formation	1947-1958
2	Development	1959-1970
3	Experimentation	1971-1977
4	Expansion	1978-1988
5	Quality improvement	1989-2003

2.5 Technical and Vocational Education and Training (TVET) system in Pakistan

Technical and Vocational Education and Training (TVET) in Pakistan was identified as a separate stream in the middle of 1950s (APACC 2004). Vocational education and training in Pakistan can be divided into three fundamental tiers:

1. Pre-vocational Education
2. Vocational Training, and
3. Technical Education.

Pre-vocational education makes part of the school education a worker attains. It has little to no contribution in the development of vocational skill in the worker. Vocational education prepares semi-skilled and skilled workers. Technical education is offered through post-secondary courses that combine practical training with education. Mid-level engineering technicians produced thus, fill the gap between engineers, and semi-skilled and skilled workers (APACC 2004). Technical education related to construction in Pakistan is delivered on graduate and post graduate level because it pertains to the interest of engineers and managers that are generally willing to continue developing their academic career. Unfortunately, vocational training institutions have remained far less in number than what are required to adequately meet the needs of construction tradesmen in Pakistan. TVET system in Pakistan suffers from resource constraints, low participation and pass- out rates and distorted linkage with the construction industry (APACC 2004). Funds allocated to the

vocational training institutes conventionally are far lesser in comparison to the general education institutions.

The TVET system in Pakistan has been conventionally provided with limited physical and/or financial resources. Since the emergence of Pakistan on the world map, there has been considerable expansion in the general education but the development of the technical and vocational (TV) education has been very limited. For instance, 'the accreditation bodies in general education namely the Boards of Intermediate and Secondary Education rose from 4 to 5 in 1970s to 34 in 2005-06 while the Boards of Technical Education which are accrediting agencies in Technical and Vocational education are still 3, one in each of the provincial capitals of Punjab, Sindh and North West' (Mahmood and Javed 2007). Pakistan significantly lags behind other South Asian countries in trained manpower (Kazmi 2007). According to Wagner (2005), a proper system of professional and vocational training improves the national competitiveness of workers. This justifies the need to improve the vocational competency development system in Pakistan.

2.6 Skill development processes for masons in Pakistan

2.6.1 The formal training system

In Pakistan, parents have to choose between Madrassahs and Modern School System that comprises both English and Urdu mediums. Majority of the Urdu medium schools are run by government and 73 per cent of the total primary school enrollment is provided by them (Husain 2005). Students that continue studies up to middle school

i.e. 8 years of schooling and leave after that join vocational institutions and become semi-skilled and skilled workers after 1 and 2 years of training respectively (APACC 2004). Different types of vocational training institutions in Pakistan have different criteria for offering admission to masons. Some institutions offer admission after middle while other after SSC. There are also certain schools which offer admission after primary. Just like variation in the admission criteria, there is also variation in the length of course of study. Length of vocational training course ranges from few weeks to two years for masonry.

One of the most important reasons for lack of formal training of masons is lack of education. As per the records of 1991, the primary and secondary enrolment percentages in schools in Pakistan were no more than 46 and 21 per cent of the relevant aged groups respectively which is half the average percentage for the respective levels in all low income countries (Husain 2005). General trends of illiteracy in Pakistan can be estimated by comparing it to other countries in the South Asia. India, Bangladesh and Sri Lanka have 77 per cent, 75 per cent and 100 per cent primary enrolment rates while the rate for Pakistan is only 50 per cent. As much as 40 per cent of the children coming from the poorest quintile in Pakistan abandon education after the fourth grade while the dropout rate for the richest quintile in the same grade is only 12 per cent (Husain 2005). Although the literacy rate in Pakistan surged up to about 47 per cent in 1999, yet the total enrolment trends in the various levels remained the same as before. Pakistan's literacy rate is 52% with 89% enrollment rate in the primary level and 40% dropout rate (APACC 2004).

Many socio-economic factors influence the masons' tendency to seek formal training. A mason's family income is one such factor that plays a decisive role in an individual's access to knowledge. Many masons come from such family conditions that they are the sole bread earners for the family. This huge responsibility requires them to work simultaneously with training and their attendance declines accordingly. Financial stress saps a worker's ability to devote full attention towards studies or training and hence, the learning suffers.

2.6.2 The informal training system

Owing to the shortage of vocational institutions, a lot of workers with huge potential get trained as Shagirds under the supervision and guidance of their Ustads on site. Some students who abandon studies after primary also develop skill through informal vocational training i.e. the Ustad-Shagird system and join work force. The technical expertise and knowledge of the training provider is often questionable as he was also formerly trained by another non-technical Ustad in his own time. Most often, the trainers themselves learn the art the wrong way, and pass it over to their Shagirds down the line. Once the Shagirds get used to the conventional Ustad-Shagird system, management can then make little difference. Even the formal training courses offered by management on site do not bring fruitful results because the Shagirds are reluctant to relinquish the concepts delivered to them by their Ustads. Research carried out by Huda (2008) tells the levels of interest that workers conventionally display in gaining further training. Among engineers, skilled workers, semi skilled workers and unskilled

workers, the category that is 100 per cent interested in seeking further training is of engineers, followed by skilled workers who have 69 per cent interest in further training, then semi skilled workers who have 23 per cent interest in further training and lastly, unskilled workers who have 15 per cent interest in further training (Huda 2008). Analysis of the data provided by Huda (2008) tells that the level of interest is directly proportional to level of skill and hence the competence. Many workers prefer on-the-job training upon formal training in vocational schools. In the research conducted by McCormick et al. (2001), ninety per cent of the interviewees expressed a wish to upgrade their skills through further training. Of them, majority wanted to have on-the-job training. Only eighteen per cent were willing to gain training in formal institutions. There were few who did not want to gain any training at all.

2.7 Accreditation and certification of TVET in Pakistan

2.7.1 Coordinating agencies

The accreditation and certification system in the TVET in Pakistan is very fragmented. It has conventionally been administered by numerous agencies working under the Ministry of Labor and Manpower and the Ministry of Education and the Ministry of Industries. Coordination of the TVET system has been enhanced with the establishment of the Technical Education and Vocational Training Authority (TEVTA) at the provincial level and the establishment of National Vocational & Technical Education Commission (NAVTEC) at the national level. NAVTEC is directly controlled by the Prime Minister of Pakistan. The accreditation and

certification system has become more centralized. On 9 September, 2006, the Balochistan TEVTA was formed by the B-TEVTA Ordinance, 2006. The Sindh TEVTA was formed through the STEVTA Ordinance, 2007 to streamline the Technical Education and Vocational Training in the province. The development of Khyber Pakhtunkhwah TEVTA is in process. NAVTEC was established through an Ordinance on 8 November, 2006.

In order to coordinate vocational training and skill development with the provincial governments, National Vocational and Technical Education Commission (NAVTEC) has been assigned the responsibility of policy formation to guide the technical and vocational training in Pakistan. NAVTEC is officially authorized to assess the training needs, identify changes in the technical requirements and design new pathways to enhance the technical skills of people who drop out of schools. NAVTEC works in conjunction with the provincial TEVTAs while establishing the standards for the development of curriculum and standards for technical training along with national accreditation of the private polytechnics. NAVTEC aims at identifying the areas of deficiency in the TEVT and take necessary measures to eradicate them. TEVTA has primarily focused on improving the enrollments.

2.7.2 Certifying and accrediting agencies

In the provinces of Punjab, Sindh and Khyber Pakhtunkhwah, technical education is certified and accredited by the Boards of Technical Education (BTE) whereas the technical education in the province of Balochistan is accredited and certified by the

Directorate of technical education (DTE). The National Training Board (NTB) Islamabad accredits and certifies the vocational education through the Traded Testing Boards (TTBs) established at the provincial level. The TTBs also certify the skilled workers in the informal sector in accordance with the standards of the International Labor Organization (ILO). Each BTE has its own standards of accreditation and certification. A certificate issued by any institute that is not accredited by any Board has no recognition in Pakistan or abroad.

2.7.3 The post-18th amendment scenario

Until the eighteenth amendment, BTEs made part of the Ministries of Education (MoE) whereas the administration of NTB was done by the Ministry of Labor and Manpower (MoL&M). Therefore, certification and accreditation of the technical education was primarily the responsibility of the MoE whereas the MoL&M accredited and certified the vocational education. After devolution of the MoL&M to the provinces in the eighteenth amendment, the Ministry of Professional and Technical Training (MPTT) has been assigned the complete responsibility of all matters which are related to both technical and vocational education. After the eighteenth amendment, NTB and NAVTEC have both been placed under the administration and supervision of the MPTT. The post-18th amendment accreditation and certification system of TVET in Pakistan is shown in Figure 2.1.

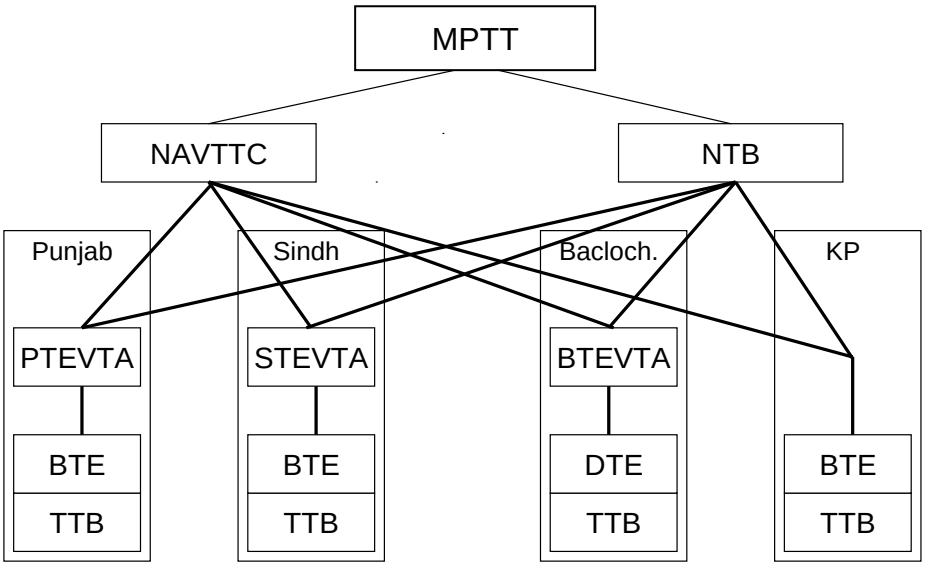

Figure 2.1: Post-18th amendment accreditation & certification system in Pakistan.

2.8 What is competency?

Competency is a very broad term. Every time it has been defined, people have adopted a very generic approach. There exists a lot of debate and confusion about the word "competency". Owing to the immense diversity in the way the term "competency" has been perceived and interpreted by various theorists, it has been impossible to standardize a particular definition for it. According to Stern and Kemp (2004), there are two schools of thought that interpret the term "competency". The first one emphasizes that competency implies skill or knowledge. The second school of thought says that competency is any feature that supports performance. 'Competency can include knowledge or skill as well as any number of other characteristics such as levels of motivation and personality traits' (Stern and Kemp 2004). For this research, the definition of competency of Stern and Kemp has been used. This research is

limited to the study of factors that influence the skills, motivation and personality traits of masons.

2.8.1 Difference between competence and competency

It is noteworthy that the terms “competence” and “competency” have conventionally been used interchangeably, though there actually does exist slight variation in the meanings of both. Generally, “competence” is used to refer to “functional areas” while “competency” is used to refer to “behavioral areas” (Deist and Winterton 2005). Here it is customary to gain a firm understand of the term “motivation”.

2.9 What is motivation?

The term motivation comes from “movere” which is a Latin word (Barnet 2011). Motivation is a very broad concept that may be defined as the internal or external forces that cause an individual to make voluntary effort to achieve a goal (Barnet 2011). The theories of motivation attempt to determine the factors that encourage humans to display certain behaviors. Lack of a unified theory of motivation reflects the complexity of the concept and the diversity of ways in which it has been conceived by different theorists.

2.9.1 Theories of motivation

Numerous theories of motivation have been proposed. Some discuss the importance of individual traits of humans like their attitudes, needs and values while others stress

upon the importance of such environmental factors as work context and the facilities provided to the workers through job. Some of the most prominent theories are discussed below.

2.9.1.1 Maslow's hierarchy of needs theory

Maslow's Hierarchy of Needs theory shows a pyramid that consists of stages of needs. The lowest stage includes needs for the fundamental survival of a human being. As we move towards the top of pyramid, the needs shift from basic to opportunistic. The five needs identified by Maslow from bottom to top include physiological needs, safety needs, love and belongingness needs, esteem needs and the need to self-actualize. Maslow's Hierarchy of Needs theory emphasizes that workers can only opt for self-actualization provided that they are offered to work in such conditions that fulfill all of their basic needs. Many workers simply do not self-actualize because they have their more important needs like safety, family and respect unmet. The implications of Maslow's hierarchy of needs theory upon management is to take care of the lower level needs of the masons to motivate them to optimize on their potential to produce good work.

2.9.1.2 Alderfer's ERG theory

The ERG theory extends the Maslow's hierarchy of needs. Unlike Maslow, Alderfer emphasized that needs can be classified into three categories instead of five. The three needs identified by Alderfer were existence, relatedness and growth. Existence needs

are consistent with the physiological and safety needs identified by Maslow. Relatedness needs relate to the interpersonal skills of humans and are consistent with the belongingness and esteem needs identified by Maslow. Growth needs recognized by Alderfer are comparable to the Malow's esteem and self-actualization needs.

The most basic difference between Alderfer's ERG theory and Maslow's hierarchy of needs theory is that unlike the latter, the former states that upper level needs may become motivational without complete satisfaction of the lower level needs. Alderfer's ERG theory implies managers to take care of the workers' existence, relatedness and growth needs in order to keep them motivated for the work. The ERG theory requires the managers to realize that a worker has numerous needs that have to be simultaneously satisfied. Workers regress to the need of relatedness if they are not provided the opportunities to grow. Thus, managers need to satisfy the relatedness needs of the workers so that they may pursue growth again.

Workers on construction sites frequently find themselves in circumstances that cause demotivation. Demotivation is caused by both a lack of motivators and the existence of demotivators. The productivity of workers immensely depends upon their level of motivation.

2.10 Theories of personality traits

2.10.1 The Big Five Personality Traits theory

The Big Five Personality theory also known as 'The Big Five model' describes the personality with the help of five fundamental traits which are openness to experience,

conscientiousness, extraversion, agreeableness and neuroticism. The acronym OCEAN represents these five personality traits. The five personality traits are discussed below:

2.10.1.1 Openness

Openness encourages an individual to appreciate unusual ideas and explore new ways. Openness distinguishes between people on the basis of imagination. More imaginative people are more creative than others. People who are more closed-off score low in this personality trait. A very important indicator behavior of such people is that they are resistant to change. Such people also consider art a waste of time.

2.10.1.2 Conscientiousness

Conscientiousness causes an individual to act in a dutiful manner. People who score high in conscientiousness behave as they plan rather than spontaneously. Purposeful planning earns them success. Other people recognize them as reliable and responsible. Conscientious people are not lazy, or they are not able to achieve their objectives.

2.10.1.3 Extraversion

Extraversion is an individual's tendency to be in others' company. The individual is moved by his/her profound engagement with and involvement in the external world. Extraverted people are very enthusiastic and action oriented. They are generally quite verbose and draw people's attention towards themselves through their oratory skills.

Introverts tend to be quiet and have a limited interaction with the social world. However, introverts should not be thought of as depressed or shy. They just lack the need to have external factors to stimulate them unlike the extraverts.

2.10.1.4 Agreeableness

Agreeableness is an individual's tendency to cooperate with others. People who measure high on the scale of agreeableness get along with others well. Disagreeable people are generally selfish and are not much concerned about the social well-being. Agreeableness is very important for masons since they have to work in groups and display teamwork.

2.10.1.5 Neuroticism

Neuroticism is an individual's tendency to experience such negative states as anxiety and anger. People who measure high on the scale of neuroticism react severely in stressful situations. Ordinary circumstances seem threatening to them. Highly neurotic people find it very difficult to adapt to stressful circumstances. Such people also get easily angry and often do not know the cause of anger.

It is noteworthy that each of the five personality traits indicates two extremes and encapsulates a range of intensities that lie in between. For instance, agreeableness indicates a continuum between extreme agreeableness and extreme disagreeableness. Most people lie at some point in the very continuum of each of the five personality traits. The Big Five personality traits reflect broad areas of personality. Although in

many cases, the Big Five personality traits occur simultaneously, yet this does not always happen. Personality has a lot of variations.

2.11 Who is a mason?

A mason is a tradesman who is skilled in making and placing masonry items and concrete. Masonry is a labor intensive task. Masons use such tools as trowels of different sizes, levels, cords, plumb bobs, pointing tools, folding rulers, and spirit levels. Skills required of a mason include but are not limited to telling good quality materials from bad quality materials, making the layout of buildings, making footings, doing brick work and stone work, making mortar, making and pouring concrete and conforming to the specified standards of quality etc. To be considered competent, it is imperative that a mason finishes the job within the specified time, cost and as per the required standards of quality. There are a number of factors that keep a mason from achieving these goals.

2.12 Factors affecting the competency of masons

2.12.1 Lack of education

A mason frequently encounters the need to be educated at least to the level that he can read, write and calculate. Masons have to measure lengths and multiply figures. Basic knowledge of math is compulsory for efficient working of a mason. In addition, masons need to be able to read in order to read the precautionary measures on machines and safety precautions on the boards on the construction site. Lack of

education of masons is the biggest hurdle in their formal training. Vocational institutions require the masons to be educated at least till primary in order to grant them admission. Because of their lack of education or lack of education, the only way left for the masons to develop their skills is the informal training system which is known as the "Ustad-Shagird" (In Urdu, Ustad is the word used for the trainer and Shagird means the trainee) training system. Lack of education is one reason why Pakistan significantly lags behind other South Asian countries in trained manpower (Kazmi 2007). A proper system of professional and vocational training improves the national competitiveness of workers (Wagner 2005).

2.12.2 Lack of formal training

Uneducated masons have no certificates for the acknowledgement of their skills on the national or international level. Lack of formal training declines masons' chances of recruitment in companies within the country in general and abroad in particular. Most of the masons who are not certified are trained through the informal training system which is quite faulty as compared to the formal training in vocational institutes.

2.12.3 Lack of method statement

Method statements play an important role in the work produced by the masons. Method statements dictate the requirements and standards of quality that are expected from the work. When masons know these requirements, they are able to conform their work according to them. However, method statements are usually not made specially

in small scale construction. Even in large construction projects, they are hardly narrated by the engineers to the foremen and the masons. Accordingly, masons have no guidelines to follow.

2.12.4 Linguistic differences

Loosemore and Lee (2002) refer to the language problems as the biggest hurdle in the way of integration of migrants into the local workforce. Lim and Alum (1995) found communication problems to be the fifth most important issue that affects productivity of foreign workers in the construction industry of Singapore. Masons are not able to communicate with their coworkers and seniors because of such linguistic differences.

2.12.5 Lack of experience

Masonry is a labor intensive task. A mason is frequently exposed to such challenges which require experience to be handled rightly. Fresh masons are not skilled enough to understand the complexities of the work. Learning is a continual process that does not end with the certification of a mason in the vocational institute. Fresh masons learn a lot from the experienced masons. Lack of experience can affect the skills of masons.

2.12.6 Lack of praise

Praise is a reward that incurs the management no expense and yet is a potential motivating factor for the masons. Nanayakkara and Green (2005) carried out research to study the motivation of masons in the construction industry of Sri Lanka. According

to Nanayakkara and Green (2005), expression of gratitude and praise is thought of a reward in Sri Lanka, which is very easy to provide.

2.12.7 Insult from supervisor

Mercer's What's Working Survey involved 30000 workers was meant to identify the demotivating factors for workers. Abuse was identified as one of the biggest demotivating factors by the workers. 'Workers worldwide say that being treated with respect is the most important factor, followed by work–life balance, type of work, quality of co-workers, and quality of leadership' (CCH, 2011).

2.12.8 Job insecurity

Job insecurity causes a lot of emotional and psychological problems in workers and incurs companies a lot of money in terms of lost productivity (Erlinghagen 2007). Comparing the job insecurity in workers in the developing and the developed economies, Green (2009) found that workers felt more insecure with respect to job in the former than in the latter.

2.12.9 Lack of accommodation

Nanayakkara and Green (2005) noted that some of the highly valued rewards by the masons in the construction industry of Sri Lanka include housing and accommodation. Most of the masons in the construction industry of Pakistan are not provided with accommodation by the construction project managers. Those that are provided with

accommodation complain of a whole range of issues with it including lack of sufficient supply of water, electricity and such other facilities.

2.12.10 Delay in payment of salary

Zakeri et al. (1997) conducted research to identify the relative importance of factors that cause demotivation in the construction operatives in the construction industry of Iran, and found on-time payment to be the third most important demotivator. Delay in payment of salary is common in construction work. Many a times, contractors are not able to pay the masons timely because they have not received the cash from the client in time.

2.12.11 Resistance to change

Resistance to change is a common problem wherever a change is implemented. Change is an inherent feature of the construction work. There occur frequent changes in the construction technology, work groups, routine and schedule. Foremen frequently require the masons to be rearranged in different work groups to accomplish different kinds of tasks. Masons may be reluctant to such changes.

2.12.12 Laziness

Workers on construction sites waste a lot of time due to their laziness. Numerous factors including workers' laziness cause a loss of anywhere between 5.1 and 13.6 hours per worker per week. The demotivating factors for construction workers in the

construction industry of Hong Kong cause a loss of 10.6 per cent to 28.3 per cent of the time per worker on a weekly basis, considering a week of 48 hours (Skitmore et al. 2004).

2.12.13 Loneliness

Masons that measure low on the scale of extraversion tend to be alone rather than in the company of other masons. Due to their preference to be alone, they find it hard to integrate into the work group and display the spirit of teamwork. This also increases a mason's tendency to be socially excluded and made fun of by the coworkers which in turn lowers the mason's morale.

2.12.14 Short-temperedness

Owners identified labor-related factors including personal conflicts among workers was identified as the issue with the maximal severity that caused delay in large construction projects (Assaf and Al-Hejji 2006). "[I]t is virtually impossible for people with diverse background skills and norms to work together; make decisions, and try to meet project goals and objectives without conflict" (Verma 1998).

2.12.15 Depression

Depression lowers an individual's morale and self-esteem. Depressed people tend to be alone. Due to the difference between their state of mind and that of their coworkers, depressed masons find it hard to concentrate upon work specially when they have to

work in groups. Depression also increases the individual's irritability. Depressed masons are likely to indulge in dysfunctional conflicts with the coworkers.

2.13 Summary

This chapter provides insight into the concept of competency. From the literature review, competency was found to comprise skills, motivation, and personality traits. Factors were identified for each of the three categories separately. From the literature review, factors of skills found were lack of education, lack of formal training, lack of method statement, linguistic differences, and lack of experience, factors of motivation found were lack of appreciation, insult from supervisor, job insecurity, lack of accommodation, and delay in payment of salary, while the factors of personality traits found were resistance to change, laziness, loneliness, short-temperedness, and depression. Literature review suggested that there are two pathways of vocational training for workers, including the formal and the informal pathway. Currently, MPTT is responsible for the administration and provision of vocational training in Pakistan.

chapter 3

METHODOLOGY

3.1 Introduction

This chapter provides insight into the methodology that was adopted to achieve the research objectives. Development of the questionnaire through incorporation of the factors identified in the previous chapter has been explained. The chapter discusses the formula used for determining the sample size, as well as the statistical procedures applied to analyze the data.

3.2 Research design

Convenience sampling was used because the total population of masons was not known. Due to lack of records, it was not possible to draw the sample size from the total population. Accordingly, non-probabilistic sampling technique was used. Convenience sampling was the most suitable sampling technique because of the time and cost constraints. Convenience sampling is used when the total population cannot be determined and is employed by most students because it is inexpensive, quick, convenient in that the subjects of research are easily approachable. The sample size was found from the following formula used by (Shah and Abdul-Hadi 1993, Enshassi and Aqaad 2011).

$$[n' = S^2/V^2]$$

In this formula,

n' is the size of sample for infinite population

V is the standard error whose value for the confidence level of 95 per cent is 0.05

S^2 is the population elements' standard error variance whose. The formula for S^2 is as follows (Shah and Abdul-Hadi 1993, Enshassi and Aqaad 2011):

$$S^2 = P(1-P)$$

S^2 is maximum at the value of P = 0.5. The sample size according to (Shah and Abdul-Hadi 1993, Enshassi and Aqaad 2011) is calculated as:

$$n' = S^2/V^2 = (0.5)^2/(0.05)^2 = 100$$

Data was retrieved from 100 masons by approaching individually.

3.3 The hypotheses

The hypotheses of this research are:

1. Skill, motivation and personality traits have equal impact on the competency of masons.
2. Impact of factors affecting competency declines with the experience of masons.

3.4 Development of the questionnaire

Since the weight of the three categories i.e. skills, motivation and personality traits was to be determined in the makeup of competency, therefore all categories were assigned equal number of factors. Factors related to skill and motivation were entirely derived from literature review. Factors related to personality traits were kept relevant to the Big Five Personality Traits. The questionnaire was adopted from Dai et al. (2009). A pilot study was conducted to check the reliability and usefulness of the questionnaire. For this, the questionnaire was presented to 20 masons. The questionnaire was tested for the validity of its content, adequacy of structure and effectiveness of the language to make sure the respondents perceive exactly what the statements had been meant to convey. The respondents were encouraged to comment. Slight modifications to the questionnaire were made because the respondents in the pilot study were found to experience difficulty understanding the agreement factors and their scale.

The questionnaires were prepared in both Urdu and Pushto language in order to cater for a significant population of the Pushto speaking masons. The final version of questionnaire contained two parts. The first part was related to the general information about the respondents, which included questions of respondent's education, pathway to vocational training, certification status and experience as a mason. The second part consisted of the 15 factors affecting competency.

The masons were asked to rate the 15 factors depending upon their negative impact upon the masons' competency. To achieve this, a 5 point Likert scale was used.

The points 1, 2, 3, 4, and 5 represented no negative impact, slight negative impact, negative impact, very negative impact and extremely negative impact respectively. Use of the Likert scales for grading the impact of factors provided the masons with an objective way to rank the frequency of the factors and their perceived impacts.

3.5 Data retrieval

A total of 120 questionnaires were filled. After all the questionnaires were filled, 20 were discarded either because they were not adequately filled or the masons had made the same response to all the factors. In total 100 questionnaires were selected for analysis.

3.6 Identification of impacts

Formula for the relative Importance Index (RII) used to rank the impact of each factor on the competency of masons has been derived from Agrawal (2010) as shows below:

$$RII = \sum w / (A \times N)$$

Here :

w = Weight as assigned by each respondent in a range from 1 to 5, where 1 implies "no negative impact" and 5 implies "extremely negative impact";

A = Highest weight (5);

N = Total number of respondents

Spearman's correlation between experience and severity scores of factors was drawn. RII for each category was determined by taking the mean of the RIIs of the constituent factors.

3.7 Testing of the hypotheses

To test the hypothesis that skills, motivation and personality traits are equally impactful on a mason's competency, the RII of the three categories were compared. To test the hypothesis that the impacts of factors decline with experience, Spearman's correlation coefficient was used.

3.8 Summary

This chapter explains the design and development of the survey instrument. Factors affecting the competency of workers were retrieved from extensive literature review. The factors thus identified were incorporated in the questionnaire. Convenience sampling was used to assess the size of sample. Data was retrieved from 100 masons. Masons were required to grade the negative impact of each factor on their competency on a Likert scale. Relative importance of the factors was found through the calculation of their relative importance indices. Spearman's correlation test was used to find the correlation between the experience of masons, and the negative impact of factors on the competency of masons.

Chapter 4

ANALYSIS AND RESULTS

4.1 Introduction

This chapter discusses the techniques used to analyze the data collected via the questionnaire survey, and the results obtained. Percentages of masons educated to various levels were found. Percentages of masons educated via the formal and the informal training system were found. Percentages of masons vocationally trained and otherwise were also found. The formula of relative importance index was applied to calculate the relative importance index of each factor. Factors were arranged according to the decreasing magnitude of their relative importance indices. Relative importance indices of the categories were found by the average of the relative importance indices of the constituent factors. SPSS version 18 was used to find the Spearman's correlation coefficient between the experience of masons and the perceived negative impacts of the factors.

4.2 Education of masons

57 per cent of the masons included in this research never attended any school at all, 33 per cent dropped the schools after primary, 7 per cent received education till middle and only 3 per cent received the secondary school certificate (SSC). Table 4.1 shows the percentage of masons educated to different levels.

Table 4.1: Education of masons.

Level of education	*Percentage of masons*
Not educated	57
Primary	33
Middle	7
SSC	3
More than SSC	0

4.3 Pathway for skill acquisition

86 per cent masons included in the study were trained through the informal training system while 14 per cent were trained formally in vocational institutions. Table 4.2 shows the percentage of masons trained through the formal or informal system.

Table 4.2: Pathway for skill acquisition.

Training	*Percentage of masons*
Informal (Ustad-shagird system)	86
Formal (Vocational schooling)	14

4.4 Vocational certification

Table 4.3 shows the percentage of vocationally certified or non-certified masons. 68 per cent of the masons included in this study were not vocationally certified while 32 per cent of the rest were vocationally certified.

Table 4.3: Percentage of vocationally certified and non-certified masons.

Vocational certification	*Percentage of masons*
No	68
Yes	32

4.5 RII of factors

The Relative Importance Index (RII) of the five factors of skills namely lack of education, lack of formal training, Lack of method statement, linguistic differences, and lack of experience were 0.356, 0.436, 0.406, 0.344 and 0.298 respectively. The RII of the five factors of motivation namely lack of appreciation, insult from supervisor, job insecurity, lack of accommodation and delays in payment of salary were found to be 0.44, 0.35, 0.312, 0.412 and 0.394 respectively while the impacts of the five factors of personality traits namely resistance to change, laziness, loneliness, short-temperedness and depression were found to be 0.448, 0.254, 0.362, 0.236 and 0.292 respectively. The impacts of the factors are given in Table 4.4.

Table 4.4: RII of factors affecting competency of masons.

Factor	*RII*
Lack of education	0.356
Lack of formal training	0.436
Lack of method statement	0.406

Factor	***RII***
Linguistic differences	0.344
Lack of experience	0.298
Lack of appreciation	0.44
Insult from supervisor	0.35
Job insecurity	0.312
Lack of accommodation	0.412
Delay in payment of salary	0.394
Resistance to change	0.448
Laziness	0.254
Loneliness	0.362
Short-temperedness	0.236
Depression	0.292

The RII of all factors are shown in Figure 4.1. Factors of skills, motivation, and personality traits have been shown in different colors in order to differentiate between the three categories. Factors of skills are shown in Figure 4.1 in red color, factors of motivation are shown in blue color, whereas the factors of personality traits are shown in green color. Factors have been arranged on the horizontal axis whereas the values of RII of factors are shown along the vertical axis.

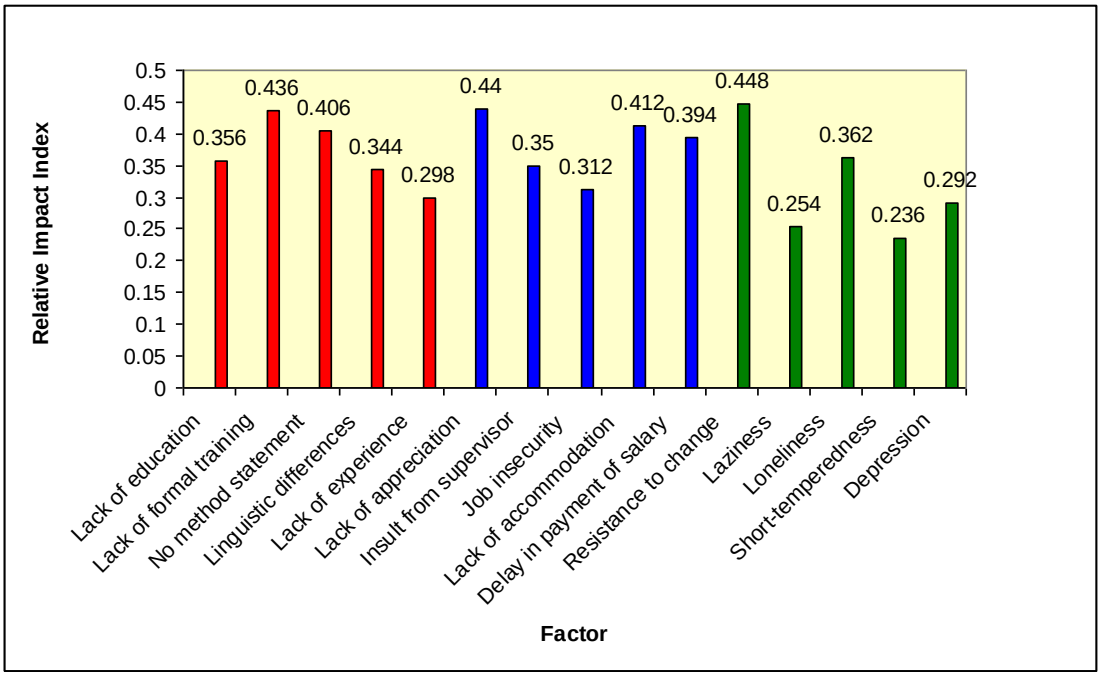

Figure 4.1: RII of factors affecting competency of masons.

4.6 Ranking of factors according to their RII

The RII of the 15 factors were ranked. In Table 4.5, the 15 factors have been listed depending upon the magnitude of their respective impacts. Factors that came first, second, third, forth and fifth were resistance to change, lack of appreciation, lack of formal training, lack of accommodation, and Lack of method statement respectively. Factors that came sixth, seventh, eight, ninth and tenth were delay in payment of salary, loneliness, lack of education, insult from supervisor, and linguistic differences respectively whereas factors that came eleventh, twelfth, thirteenth, fourteenth and fifteenth were job insecurity, lack of experience, depression, laziness and short-temperedness respectively.

Table 4.5: Ranking of factors according to their RII.

Factors	*Rank*
Resistance to change	1
Lack of appreciation	2
Lack of formal training	3
Lack of accommodation	4
Lack of method statement	5
Delay in payment of salary	6
Loneliness	7
Lack of education	8
Insult from supervisor	9
Linguistic differences	10
Job insecurity	11
Lack of experience	12
Depression	13
Laziness	14
Short-temperedness	15

4.7 RII of categories

The RII of the three categories i.e. skill, motivation and personality traits is shown in Figure 4.2. The category of skills, motivation, and personality traits have been distinctly shown in red, blue, and yellow color respectively. Categories have been

arranged along the horizontal axis where their RII have been mentioned along the vertical axis. The RII of the three categories of skill, motivation and personality traits were found to be 0.368, 0.3816 and 0.3184 respectively. The RII of the category of motivation was found to be the maximal, followed by skill and then the personality traits. Thus, the hypothesis i.e. skills, motivation and personality traits have equal weight in competency is rejected.

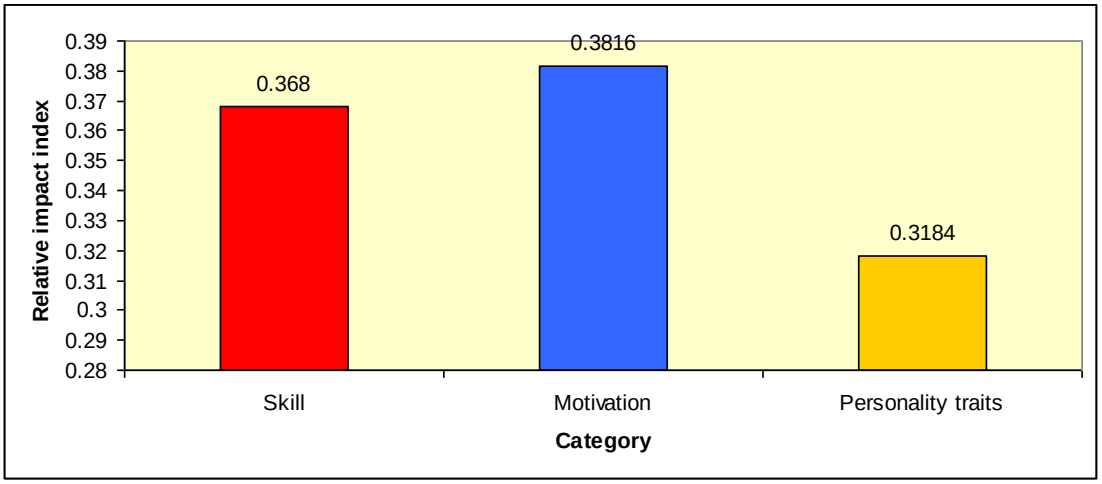

Figure 4.2: RII of categories.

4.8 Correlation between RII of factors and experience of masons

This research finds a strong link between the experience of masons and their competency. Table 4.6 enlists the correlation coefficients of impacts of factors with experience of masons. Since convenience sampling was used to collect the data, the sampling was non-parametric. Accordingly, Spearman's correlation test was used to find the correlation between the impacts of factors affecting the competency of

masons and the experience of masons. Factors whose impacts were positively correlated with the experience of the masons were lack of education of masons whose correlation coefficient was 0.128, lack of formal training with the correlation coefficient equal to 0.188 and resistance to change whose correlation coefficient was 0.404. Factors whose impacts were found to be negatively correlated with the experience of the masons in order of increasing value of correlation coefficient were laziness, short-temperedness, delay in payment of salary, depression, job insecurity, linguistic differences, lack of accommodation, Lack of method statement, insult from supervisor, lack of experience, loneliness and lack of appreciation and their correlation coefficients were -0.038, -0.050, -0.059, -0.093, -0.208, -0.273, -0.326, -0.275, -0.366, -0.433, -0.439 and -0.744 respectively. According to Cohen (1988), correlation between two variables is small if the value of Spearman's correlation coefficient (rho) ranges between 0.1 and 0.29, medium if rho is from 0.30 to 0.49 and large if rho is anywhere between 0.5 and 1 irrespective of the sign. Following the guidelines given by Cohen (1988), it can be estimated that correlation between the experience of masons and lack of education, lack of formal training, Lack of method statement, linguistic differences, and job insecurity is small, correlation between experience of masons and lack of experience, insult from supervisor, lack of accommodation, resistance to change, and loneliness is medium while correlation between experience of masons and lack of appreciation is large.

Table 4.6: Spearman's correlation between RII of factors and experience of masons.

Factor	*Correlation coefficient*	*Significance level (1-tailed)*	*Correlation*	*Rank*
Lack of education	0.128	0.102	Small	3
Lack of formal training	0.188	0.030	Small	2
Lack of method statement	-0.275	0.003	Small	10
Linguistic differences	-0.273	0.003	Small	9
Lack of experience	-0.433	0.000	Medium	13
Lack of appreciation	-0.744	0.000	Large	15
Insult from supervisor	-0.366	0.000	Medium	12
Job insecurity	-0.208	0.019	Small	8
Lack of accommodation	-0.326	0.000	Medium	11
Delay in payment of salary	-0.059	0.279	Nil	6
Resistance to change	0.404	0.000	Medium	1
Laziness	-0.038	0.353	Nil	4
Loneliness	-0.439	0.000	Medium	14
Short-temperedness	-0.050	0.311	Nil	5
Depression	-0.093	0.179	Nil	7

4.9 Results

4.9.1 Rejection of the first hypothesis

It can be seen in Figure 4.2 that the RII of each category is different. Thus, the hypothesis i.e. skills, motivation and personality traits have equal weight in competency is rejected. This would help the managers identify the key areas for improving the competency of masons.

4.9.2 Approval of the second hypothesis

It can be seen from Table 4.6 that the impacts of all the factors except three i.e. 'lack of education', 'lack of formal training' and 'resistance to change' were negatively correlated with the experience, suggesting that their role as the hinderers of competency reduces as a mason gains more experience.

4.9.3 Comparison of average RII of categories

Analysis of Figure 4.2 suggests that motivation of the masons is the most impactful upon their competency followed by the masons' skills and then their personality traits.

4.10 Summary

57 per cent of the masons included in this research never attended any school at all, 33 per cent dropped the schools after primary, 7 per cent received education till middle and only 3 per cent received the SSC. 86 per cent masons included in the study were trained through the informal training system while 14 per cent were trained formally in

vocational institutions. 68 per cent of the masons included in this study were not vocationally certified while 32 per cent of the rest were vocationally certified. Relative importance index of the factors and categories was found. Correlation between the experience of masons and lack of education, lack of formal training, lack of method statement, linguistic differences, and job insecurity was found to be small, correlation between experience of masons and lack of experience, insult from supervisor, lack of accommodation, resistance to change, and loneliness was medium while correlation between experience of masons and lack of appreciation was found to be large while no correlation between experience of masons and the four factors including delay in payment of salary, laziness, short-temperedness, and depression was found.

Chapter 5

DISCUSSION

5.1 Introduction

This chapter discusses the results of the research and draws their comparison with the findings of the past researchers. The chapter discusses which hypothesis was approved or rejected based on the findings of the research, and identifies the relative importance of skills, motivation, and personality traits in depicting the competency of masons. The relative importance of the individual factors is then discussed in light of the findings of the past researchers, and possible reasons of deviations are discussed.

5.2 Skill

Of the five factors of skill, the first, second, third, fourth and fifth positions when the factors were arranged according to the RII were held by lack of formal training, Lack of method statement, lack of education of masons, linguistic differences, and lack of experience respectively. Factors have been ranked according to the magnitudes of their impacts in Table 6.1.

Table 5.1. Ranking of factors of skill, motivation and personality traits.

Factor of skill	***Factor of motivation***	***Factor of personality traits***	***Rank***
Lack of formal training	Lack of appreciation	Resistance to change	1

Factor of skill	*Factor of motivation*	*Factor of personality traits*	*Rank*
Lack of method statement	Lack of accommodation	Loneliness	2
Lack of education of masons	Delay in payment of salary	Depression	3
Linguistic differences	Insult from supervisor	Laziness	4
Lack of experience	Job insecurity	Short-temperedness	5

5.2.1 Lack of formal training

Masons' stance that lack of formal training is the strongest of the five factors of skill in the impact upon their competency speaks of the importance of formal training and certification. 86% of the masons in this research were trained informally through the Ustaad Shagird system. This is consistent with the findings of Kazmi (2007). 'The formal institutions produce a very small proportion of the total increments to the skilled workforce and not necessarily in accordance with the demand and of requisite quality' (Kazmi 2007). Many developing countries have the same trend. For example, only 5% masons in Gujarat, India receive formal training (Shaw et al. 2005). This may be due to lack of education, as admission in vocational institutions requires a mason to be educated till a certain level.

5.2.2 Lack of method statements

Normally, Lack of method statements are provided in the construction projects particularly when the project is as small as the construction of a single house. The

common practice is that a contractor takes complete responsibility of constructing the house. The contractor contacts petty contractors and assigns them works. Method statements are usually not made. However, in large scale construction projects, there is a client who issues the contractor a method statement after consultation with the consultant. The consultant approves the inspection requests after comparing the work with the requirements of the method statements. However, even on such large-scale projects, method statements are often just placed in files and not circulated to the engineers for referral. Even the consultants normally check the work according to the drawings rather than the method statements. Principally, the Project Manager (PM) should provide every engineer with the method statement of his activity. The engineer should make the masons comply with the method statement.

5.2.3 Lack of education of masons

Lack of education of masons has an indirect impact on their competency. Although masons normally don't engage in such work where they have to read or write, yet they need education up to a certain level in order to seek admission in the vocational training institutions. Different vocational training institutions in Pakistan have different criteria for admission in courses of different durations. A mason has to be educated at least up to primary in order to be eligible for admission in a vocational training institution. Lack of education is the fundamental reason why most masons opt for informal training. 57% of the masons included in this research were completely uneducated, 33% were educated till primary, 7% till middle while only 3% had

acquired the Secondary School Certificate (SSC). No mason included in this research was educated beyond SSC. These results are comparable to the findings of Wahab (2010) who found that 58.1% artisans in the construction industry of Nigeria were completely uneducated, 28.6% were educated till primary, while 6.7% artisans had acquired the SSC and Junior School Certificate (JSC).

5.2.4 Lack of experience

This research, found a strong relationship between the masons' experience and competency. There was determined a noticeable decrease in the impacts of most of the factors affecting the competency of masons with more experience than the ones with lesser experience. This explains why highly experienced masons are considered more competent and receive higher salaries. Javeid (2009) found that "employees working in the construction industries maximize their wages at the age of 52 years."

5.2.5 Linguistic differences

Linguistic differences play an important role in the hindrance of display of social competence on the part of the workers. 55% of the Hispanic workers in the construction industry of the USA recognized lack of communication as a major issue on the site. 80% of the Hispanic workers emphasized upon the importance of improvement of communication with the coworkers and supervisors (Canales et al. 2009). One causal factor of the linguistic differences is the lack of education of

masons. Importance of improving communication between the management and workers cannot be overemphasized (Borcherding et al. 1980).

5.3 Motivation

Of the five factors of motivation, the first, second, third, fourth and fifth positions when the factors were arranged according to the RII were held by lack of appreciation, lack of accommodation, delay in payment of salary, insult from supervisor and job insecurity respectively (see Table 6.1).

5.3.1 Job insecurity

This research found a negative correlation between job insecurity and experience of masons. This coincides with the findings of the Labor Force Survey (2009-10) according to which, rate of unemployment was found to be 10.8 for workers aged between 10 and 14 years and 1.8 for workers aged between 40 and 44 years (Economic Survey 2010-2011). Job insecurity causes a decline of competency. Contingent workers are insecure with respect to job and the fact that they know that they are temporarily hired for work keeps them from adopting the organizational culture and play their individualistic role in improving it (Sparks et al. 2001). Job insecurity may also decrease with experience of masons because experience is valued by the construction project managers. Experienced masons are generally preferred over fresh masons even if the former is informally trained and the latter is formally trained.

5.3.2 Motivational theories

Motivational theories lack multi-focusing and are insufficient to give a realistic explanation of the potential ways in which the masons can be motivated (Nanayakkara and Green 2005). There is need to explore new ways of researching motivation in construction that are based on the social research theories (Burrell and Morgan 1979). There are numerous strategies that can be employed to enhance the motivation level of the workers. Hadavi and Krizek (1994) identify the goal-setting technique as an effective way to boost workers' motivation and consider the commitment of top management a fundamental prerequisite of the implementation of this technique.

5.4 Personality traits

Of the five factors of personality traits, the first, second, third, fourth and fifth positions when the factors were arranged according to the RII were held by resistance to change, loneliness, depression, laziness, and short-temperedness respectively (see Table 6.1).

5.4.1 Effect of experience on personality traits

This research found an overall decline in four of the five personality traits as experience of the masons increased. This contradicts the findings of Nave et al. (2010) who found that personality traits don't considerably change over time. However, the difference which surfaced in this research may be due to the fact that Nave et al. (2010) compared the personality traits which the teachers had at a certain point in time

with the very teachers' personality traits after four decades whereas this research compared the personality traits of 100 different masons. However, it is noteworthy that this research found an overall decline in the impacts of nonconscientiousness, intraversion, disagreeableness and neuroticism with more experience of masons, which tells that experience has an overall positive role to play in an individual's personality.

5.4.2 Effect of experience on resistance to change

The only personality trait whose impact increased with experience was openness i.e. resistance to change. This is, however, consistent with the findings of Nave et al. (2010) who found that older workers are more resistance to change as compared to the younger workers. This finding is also consistent with the finding of the research conducted by McGregor and Gray (2002) in which 33.1% construction project managers considered employees aged 30-44 years as flexible whereas only 16.5% construction project managers considered flexibility a trait of employees aged 45-59 years. This is explained by the fact that as masons grow older, their tendency to adjust to a change in the circumstances reduces. Aged masons are used to a certain work setup and construction practices and do not like having to deal with new circumstances. Aged masons prefer being in routine work, so when they are asked to work in new circumstances or with new technology, this can serve as a disincentive for them.

5.5 Measures to enhance the competency of masons

This section proposes measures to enhance the competency of masons. These measures can be taken to enhance the competency of all tradesmen involved in construction in general and of masons in particular. Most of the site-specific factors affecting the competency of masons are directly governed by the management. The first and the foremost factor contributing towards the enhancement of the workers' competency is the commitment of the top management. The process immediately terminates unless the top management is committed. Managers primarily assume the decision making power. Once the top management is committed, the focus shifts on the commitment of the first line managers and their subordinate workers. All need to collaborate to achieve optimal results. Managers needs to either prioritize the measures according to the order suggested by the analysis, which is tackling factors affecting motivation first, followed by skills and then personality traits, or preferably simultaneously. The following measures are suggested for the enhancement of the masons' competency:

1. Managers can customize the masons' work according to their requirements by providing the engineers with a method statement. Managers need to make sure that the engineers narrate them to the foremen and they get the work done according to them.
2. Managers need to consider providing the masons with accommodation, pay them timely and consider making their job secure.
3. There is little that managers can do to change the poor personality traits of masons as they are directly linked with nature. Nevertheless, managers are responsible

for developing such a work environment wherein the engineers, foremen and masons respect one another.

4. Managers need to discourage the engineers and foremen from abusing the masons in their conversations and encourage them to appreciate the masons for their good work.

5. A potential way to reduce workers' resistance to change is allowing them to participate (Coch and French 1948). This requires the managers to elaborate the need for change to the masons, discuss the implications of not introducing the change and reach a general agreement with the masons regarding the implementation of change. When it is required to rearrange the work groups, it is advisable for the managers to discuss the need for rearrangement with the masons.

6. On-the-job training is a very suitable method for training inexperienced masons as it not only provides a cost-effective means of building a trained workforce but also enhances the social competence of the masons. When masons learn from one another, they respect one another and work in mutual harmony which in turn minimizes conflicts among them. On-the-job training raises the self-esteem of the trainee as well as the trainer.

7. To reduce the laziness of masons, a little exercise in the start of the day may prove helpful. The process of enhancement of competency is continual.

8. Masons need to seek education at least till primary and preferably middle in order to be eligible for admission in the vocational institutions.

9. Masons need to get certified from such organizations as the National Training Bureau (NTB), so that they may enhance their chances of acquiring the job and have adequate job security.

5.6 Summary

The first hypothesis which considered skills, motivation, and personality traits equally impactful upon masons' competency was rejected. The second hypothesis which considered experience to be a predictor of the masons' competency was accepted because of the negative correlation found between majority of the factors and experience of masons. Motivation of the masons was found to be the most impactful category upon their competency followed by the masons' skills and then their personality traits.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusions that could be drawn from the results and proposes recommendations to fulfill the set objectives. This chapter clearly demarcates the individualistic needs of both less and highly experienced workers so that they can be enabled to optimize on their potential for work.

6.2 Conclusions

- There are two kinds of training systems for masons in Pakistan, i.e. the informal system and the formal system.
- Majority of masons in Pakistan are trained through the informal training system.
- Resistance to change ranks first in its impact on masons' competency.
- Lack of appreciation is the second most impactful factor on masons' competency.
- Lack of formal training ranks third in its impact upon masons' competency.
- Lack of accommodation ranks forth in its impact upon competency of masons.
- Lack of method statement ranks fifth in its impact upon competency of masons.

- Delay in payment of salary ranks sixth in its impact upon competency of masons.
- Loneliness ranks seventh in its impact upon masons' competency.
- Lack of education ranks eighth in its impact upon competency of masons.
- Insult from supervisor ranks ninth in its impact upon masons' competency.
- Linguistic differences ranks tenth in its impact upon competency of masons.
- Job insecurity ranks eleventh in its impact upon masons' competency.
- Lack of experience ranks twelfth in its impact upon masons' competency.
- Depression ranks thirteenth in its impact upon masons' competency.
- Laziness ranks fourteenth in its impact upon masons' competency.
- Short-temperedness ranks fifteenth in its impact upon masons' competency.
- Older masons are more resistant to change of workgroups than younger masons.
- Less experienced masons need more appreciation than more experienced masons.
- More experienced masons feel a stronger need of formal training than the less experienced masons.
- Less experienced masons are demotivated by lack of accommodation more than more experienced masons.
- Less and more experienced masons are equally likely to experience delay in payment of salary.

- Ability to work alone is more in experienced masons than less experienced masons.
- More experienced masons feel a stronger need of education than less experienced masons.
- More experienced masons are less sensitive to insult from supervisor than less experienced masons.
- Masons improve their ability to overcome linguistic barriers with more experience.
- More experienced masons are less insecure with respect to job than less experienced masons.
- Less experienced masons need more experience than more experienced masons.
- Depression affects the competency of less and more experienced masons alike.
- Laziness affects the competency of less and more experienced masons alike.
- Short-temperedness affects the competency of less and more experienced masons alike.
- Motivation has the largest impact on masons' competency, followed by skills and then personality traits.
- Twelve of the fifteen factors studied are negatively correlated with experience of masons.

6.3 Recommendations

The following areas of research are recommended for the future:

1. Factors affecting competency of other tradesmen including plumbers, carpenters, steel fixers and painters need to be identified.

2. Factors related to such others predictors of competency including productivity, experience and education should be identified.

3. Job-specific and training-specific factors need to be explored separately.

4. Future research can also tend to identify the skills needed for individual trades and gaps in vocational training.

5. Vocational teachers' and construction project managers' perceptions of ways to enhance the competency of tradesmen need to be explored.

REFERENCES

Agrawal, R. (2010). *Successful delivery of public - private partnerships for infrastructure development*. Jaypee Institute of Information Technology, Noida, India. <http://www.jiit.ac.in/uploads/Ranjan%20Agrawal-%20Synopsis.pdf> Accessed on Apr. 2012.

Argyris, C. (1971). *Management and Organizational Development: The Path from XA to YB*. McGraw Hill, New York.

APACC. (2004). *Accreditation & Certification for TET Institutions in Pakistan*. <http://www.apacc4hrd.org/conf_workshop/apacc04/CR/PK/> Accessed on Feb. 2012.

Assaf, S. A., and Al-Hejji, S. (2006). "Causes of delay in large construction projects." *International Journal of Project Management*, 24(4), 349–357.

Barnet, T. (2011). *Motivation and Motivation Theory*. Encyclopedia of Business. (2nd ed.). <http://www.referenceforbusiness.com/management/Mar-No/Motivation-and-Motivation-Theory.html> Accessed on Feb. 2012.

Borcherding, J. D., Sebastian, S. J. and Samelson, N. M. (1980). "Improving motivation and productivity on large projects." *Journal of the Construction Division,* ASCE, 106(1), 73-89.

Burrell, G. and Morgan, G. (1979) *Sociological paradigms and organizational analysis: Elements of the sociology of corporate life*. Aldershot, Gower.

Canales, A. R., Arbelaez, M., Vasquez, E., Aveiga F., Strong, K., Walters, R., Jaselskis, E. J. and Jahren, C. T. (2009). "Exploring Training Needs and

Development of Construction Language Courses for American Supervisors and Hispanic Craft Workers." *Journal of Construction Engineering and Management*, ASCE, 135(5), 387-396.

CCH. (2011). *Mercer's what's working survey shows declining employee loyalty worldwide*, <http://www.fasken.com/files/Publication/0be54368-968b-4e61-9ddf-42e857b029b7/Presentation/PublicationAttachment/90949372-355e-4fe4-9395-debf468d06fa/Mercer_CCH_Guide_Nov2011%20-%20Split%20Decision%20on%20Post-Employment%20Restrictions.pdf> Accessed on Feb. 2012.

Coch, L. and French, J. R. P. (1948). "Overcoming Resistance to Change." *Human Relations*, 1(4), 512.

Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences* (2nd edn.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Dai, J., Goodrum, P. M., and Maloney, W. F. (2009). "Construction craft workers' perceptions of the factors affecting their productivity." *Journal of Construction Engineering and Management*, ASCE, 135(3), 217-226.

Deist, F. D. and Winterton, J. (2005). "What is competence?" *Human Resource Development International*, 8(1), 27-46.

Economic Survey (2010-11). *Population, Labour Force and Employment*, <http://www.scribd.com/doc/56933452/Pakistan-Economic-Survey-2010-2011> Accessed on Feb. 2012.

Enshassi, A. and Aqaad, M. (2011). "Assessing the level of the safety practice in construction companies in Palestine." The Islamic University Journal, 19(1), 87-102.

Erlinghagen, M. (2007). *Self-Perceived Job Insecurity and Social Context: A Multi-Level Analysis of 17European Countries*. European Sociological Review, <http://esr.oxfordjournals.org/content/24/2/183.abstract> Accessed on Feb. 2012.

Green, F. (2008). "Subjective employment insecurity around the world." *Cambridge Journal of Regions, Economy and Society*, 2(3), 343–363.

Grubb, W. N. (1985). "The convergence of educational system and the role of vocationalism." *Comparative Education Review*. *29(*4): 526-548.

Hadavi, A. and Krizek, R. J. (1994). "Difficulties with implementation of goal setting for construction." *Journal of Management in Engineering*, ASCE, 10(5), 48-54.

Huda, S. M. K. (2008). Assessment of Deming's Philosophy with Respect to its Link to the Current Scenario in Pakistani Construction Industry. *First International Conference on Construction In Developing Countries (ICCIDC–I).* <http://www.neduet.edu.pk/ICCIDC-I/Conference%20Proceedings/Papers/027.pdf> Accessed on Dec. 2011.

Husain, I. (2005). *Education, employment and economic development in Pakistan*. <http://ishrathusain.iba.edu.pk/speeches/humanDevelopment/Edu_Emp_Dev_Apr_15.pdf>. Accessed on Feb. 2012.

Ismail, R. and Abidin, S. Z. (2010). “Impact of workers’ competence on their performance in the Malaysian private service sector.” *Business and Economic Horizons*, 2(2), 25-36.

Javeid, Z. (2009). “Impact of Training on Earnings: Evidence from Pakistani Industries.” *Asian Social Science,* 5(11), 76-85.

Kadir, M. R. A., Lee, W. P., Jaafar, M. S., Sapuan, S. M. and Ali, A. A. A. (2005). “Factors affecting construction labour productivity for Malaysian residential projects.” *Structural Survey*, 23(1): 42-54.

Kazmi, S. W. (2007). “Vocational education and skills development: a case of Pakistan.” *SAARC Journal of Human Resource Development,* 3, 105-117.

Kinyanjui, M. and Mitullah, W.V. (1999). “Inter-Firm Dynamics in the Construction Sector.” University Nairobi, IDS Discussion Paper No. 296.

Kvarnström, S. (1997). *Stress prevention for blue-collar workers in assembly-line production*. 1-32, ILO, Geneva.

Mitullah, W. V., and Wachira, I. N. (2003). Informal labour in the construction industry in Kenya: A case study of Nairobi, <http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_policy/---invest/documents/publication/wcms_asist_8175.pdf> Accessed on Feb. 2012.

Lawrence, P. R. (1969). “How to Deal With Resistance to Change.” *Harvard Business Review*, 49-57.

Leung, M. Y., Chan Y. S. and Yuen K. W. (2010) "Impacts of stressors and stress on the injury incidents of construction workers in Hong Kong." *Journal of Construction Engineering and Management*, ASCE, 136(10), 1093-1110.

Lim, E. C. and Alum, J. (1995). "Construction productivity: issues encountered by contractors in Singapore." *International Journal of Project Management*, 13(1), 51-58.

Loosemore, M. and Lee, P. (2002). "Communication problems with ethnic minorities in the construction industry." *International Journal of Project Management*, 20(7), 517–524.

McCormick, D; Mitullah, W.V and Kinyanjui, M. (2001). *Enhancing Institutional Capacity for Policy Development, Dialogue and Advocacy: The Role of Associations and other Community Based Organisations*, University of Nairobi, Institute for Development Studies.

McGregor, J., and Gray, L. (2002). "Stereotypes and older workers: the New Zealand experience." *Social Policy Journal Of New Zealand Te Puna Whakaaro*, 18, 163-177.

Nanayakkara, L. and Green, S. (2005). *The Motivation of Masons in the Sri Lankan Construction Industry*, <http://www.irbnet.de/daten/iconda/CIB6348.pdf> Accessed on Feb 2012.

Nave, C. S., Sherman, R. A., Funder, D. C., Hampson, S. E. and Goldberg, L. R. (2010). "On the contextual independence of personality: teachers' assessments

predict directly observed behavior after four decades." *Social Psychological and Personality Science*, 1(4), 327-334.

Rivas, R. A., Borcherding, J. D., Gonzalez, V. and Alarcon, L. F. (2011). "Analysis of Factors Influencing Productivity Using Craftsmen Questionnaires: Case Study in a Chilean Construction Company." *Journal of Construction Engineering and Management*, ASCE, 137(4), 312-320.

Shah, A. and Abdul-Hadi, N. (1993) The effect of contractor size on mark-up size decision in Saudi Arabia. *Construction Management and Economics*, 11, 421–429.

Shaw, R., Gupta, M. and Sharma, A. (2005). *Mason's association in Gujarat, India: an innovative approach of linking knowledge and practice in non-engineered construction through government-non-government partnership*. <http://www.iedm.ges.kyoto-u.ac.jp/publication/workshop/Mason%20association%20in%20India.pdf> Accessed on Feb 2012.

Skitmore, R. M., Ng, S. T., Lam, K. C. and Poon, A. W. C. (2004). "Demotivating factors influencing the productivity of civil engineering projects." *International Journal of Project Management*, 22(1), 139-146.

Smithers, G. L. and Walker, D. H. T. (2000). "The effect of the workplace on motivation and demotivation of construction professionals." *Construction Management. and Economics*, 18(7), 833-841.

Sparks, K., Faragher, B., and Cooper, C. L. (2001). "Well-being and occupational health in the 21st century workplace." *Journal of Occupational and Organizational Psychology*, 74, 489–509.

Stern, D. J. K. and Kemp, L. K. (2004). *Competency-Based Human Resource Management*. Davies-Black Publishing, USA.

Verma, V. K. (1998). Conflict Management, <http://www.iei.liu.se/pie/olsson-rune/material/konflikthantering/1.320924/conflManagementVer.pdf> Accessed on Feb 2012.

Wagner, K. (2005). "Productivity and skills in industry and services – a British-German comparison." *The Pakistan Development Review*, 44(4), 411-438.

Wahab, A. B. (2010). "Stress Management among Artisans in Construction Industry in Nigeria." *Global Journal of Researches in Engineering*, 10(1), 93-103.

WorkCover New South Wales (2010). Masonry wall safety during construction work. <http://www.deir.qld.gov.au/workplace/resources/pdfs/Masonry_Wall_Safety.pdf> Accessed on Feb 2012.

Zakeri, M., Olomolaiye, P., Holt, G. D., and Harris, F. C. (1997). "Factors affecting the motivation of Iranian construction operatives." *Building and Environment*. 32(2), 161-166.

Appendix 1

Experience, education, training and certification of masons

Mason No.	*Experience*	*Education*	*Training*	*Certification*
1	3	2	1	1
2	5	2	1	1
3	3	2	1	2
4	4	1	1	2
5	4	2	1	1
6	2	1	1	1
7	2	2	2	2
8	5	2	1	1
9	2	3	1	1
10	1	3	2	2
11	4	1	1	1
12	3	1	1	1
13	4	1	1	1
14	1	1	1	1
15	2	4	2	2
16	5	2	1	1
17	4	2	1	1
18	8	2	1	1
19	2	2	1	1
20	6	1	1	1
21	5	1	1	1
22	4	2	2	2
23	2	1	1	1
24	1	2	2	2
25	3	1	1	1
26	2	3	1	1
27	2	1	1	1
28	5	1	1	1
29	4	1	1	1
30	1	3	1	1
31	2	3	2	2
32	5	4	2	2
33	5	3	2	2
34	8	2	1	1
35	5	2	1	1
36	2	1	1	1

Mason No.	*Experience*	*Education*	*Training*	*Certification*
37	1	1	1	1
38	7	1	1	1
39	2	1	1	2
40	9	1	1	1
41	7	1	1	1
42	5	1	1	1
43	2	1	1	2
44	4	1	1	1
45	3	2	1	1
46	6	2	1	1
47	8	2	2	2
48	4	2	2	2
49	5	2	1	1
50	5	2	1	1
51	11	2	1	2
52	12	2	1	2
53	15	3	1	2
54	18	1	1	2
55	14	2	1	1
56	14	1	1	1
57	13	1	1	1
58	11	1	1	1
59	17	1	1	1
60	16	1	1	2
61	19	1	1	2
62	14	1	1	1
63	12	1	1	1
64	15	1	1	2
65	11	1	1	1
66	15	1	1	1
67	15	1	1	1
68	12	1	1	1
69	15	4	2	2
70	14	1	1	1
71	15	2	1	1
72	11	1	1	1
73	12	1	1	1
74	13	1	1	2
75	17	1	1	2
76	18	2	1	1
77	19	2	1	2
78	15	2	1	1

Mason No.	*Experience*	*Education*	*Training*	*Certification*
79	14	1	1	1
80	19	1	1	1
81	18	1	1	1
82	12	2	2	2
83	16	1	1	1
84	18	1	1	1
85	18	2	2	2
86	17	2	1	1
87	18	2	1	2
88	16	2	1	1
89	14	2	2	2
90	19	1	1	1
91	15	1	1	1
92	15	1	1	2
93	18	1	1	1
94	13	1	1	2
95	16	1	1	1
96	14	1	1	1
97	17	1	1	2
98	18	1	1	1
99	15	1	1	1
100	18	1	1	1

Appendix 2

Questionnaire

1. How educated are you?

1. Not educated
2. Primary
3. Middle
4. SSC
5. More than SSC

2. How did you become a mason?

1. Through the Ustad Shagird system
2. Studying in a vocational school

3. Are you a certified mason?

1. No
2. Yes

4. Please state your number of years of experience as a mason ……

5. Please rank the following factors on the scale from 1 to 5

Question No.	Factors	No negative impact	Slight negative impact	Negative impact	Very negative impact	Extremely negative impact
1	Lack of education	1	2	3	4	5
2	Lack of formal training	1	2	3	4	5
3	Lack of method statement	1	2	3	4	5
4	Linguistic differences with supervisor	1	2	3	4	5

Question No.	Factors	No negative impact	Slight negative impact	Negative impact	Very negative impact	Extremely negative impact
5	Lack of experience	1	2	3	4	5
6	Lack of appreciation from the supervisor for good work	1	2	3	4	5
7	Insult from the supervisor	1	2	3	4	5
8	Job insecurity	1	2	3	4	5
9	Lack of accommodation	1	2	3	4	5
10	Delay in payment of salary	1	2	3	4	5
11	Change of workgroup	1	2	3	4	5
12	Laziness	1	2	3	4	5
13	You prefer being alone than with coworkers	1	2	3	4	5
14	Short-temperedness	1	2	3	4	5
15	You feel depressed	1	2	3	4	5