HUMAN CAPITAL AND PERFORMANCE OF SMALL & MEDIUM MANUFACTURING ENTERPRISES: A STUDY OF PAKISTAN

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FACULTY OF ECONOMICS AND ADMINISTRATION
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ABSTRACT

The study focuses on the role of human capital (HC) and performance of small and medium enterprises (SMEs) in the manufacturing sector of Pakistan. Pakistan has adopted a 'one-size-fits-all' policy to address HC development in SMEs. This has however not brought any difference to the development state of the SMEs, as most of these firms have not been able to survive beyond the first-year of their inception. In this context, this study focused on the role of HC (based on the dimensions and sub-dimensions of HC) on the performance of SMEs in the manufacturing sector of Pakistan. The principal objectives of the study are summarized herein: First, the study derives the human capital index (HCI), accounting for various dimensions and sub-dimensions of HC. Second, the study tests for the differences in levels of HC by industry, size (small and medium) and ownership (foreign and local). Third, the study examines the direct and indirect links between HC and its dimensions, with five vectors of firm performance, namely productivity, export, innovation, technological progress, and survivability of firms. For developing the HCI, the study adopts a three-stage approach. First, appropriate dimensions and sub-dimensions of HC are identified from the literature. In the second stage, 9 dimensions and 35 sub-dimensions of HC are selected through an expert survey of various stakeholders related to SME development in Pakistan. By applying the Analytic Hierarchy Procedure (AHP), those selected dimensions and sub-dimensions of HC are prioritized to form the HCI. Based on this prioritization, the study develops a close-ended questionnaire to collect data on HC and firm performance from 750 manufacturing sector SMEs in Pakistan. The one-way analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and t-tests are applied to examine the differences in the levels of HC across SMEs, by industry, size, and ownership. Subsequently, the structural equation modeling (SEM) is used to investigate the direct and

indirect (through absorptive capacity) effects of HC on productivity, export, innovation, technological progress, and survivability of firms.

The core findings of the study are summarized below. First, the relative prioritization among the HC dimensions rank education at the top, followed by experience, skills, personal abilities, training, employee stability , attitude , health and compliance. Second, the results on the inter-industry differences in HC indicate that HC is highest in textiles, and lowest in furniture and sports industries. Further, the results show that the levels of HC differ by size and ownership. The analysis reveals that the levels of HC are significantly higher in medium firms relative to small firms; and in foreign firms relative to local firms. Finally, the results reveal the significant positive impact of HC on firm performance. Absorptive capacity is also found to mediate the relationship between HC and the five-performance cords of firms'. From the in-depth analysis of the different sub-dimensions of HC, the study concludes that different sub-dimensions of HC are important for different cords of firm performance, and for understanding the channels of those impacts, direct or indirect. Therefore, the study suggests that HC is important for firm performance. However, not all the sub-dimensions of HC are found to be important for overall firm performance. Therefore policy formulation at the macro and micro levels should take into account the sub-dimensions of HC, and not just the HC dimensions on aggregate.

ABSTRAK

Kajian ini tertumpu kepada peranan modal insan (HC) dan perkembangan perniagaan kecil dan sederhana (SMEs) sektor pembuatan di Pakistan. Pakistan mengamalkan polisi 'one-size-fits-all' untuk menanggani pembangunan HC bagi SMEs. Namun polisi yang dirangka untuk membantu perkembangan SMEs tidak membawa perubahan yang diingini, sebab kebanyakan perniagaan gagal untuk beroperasi melebihi jangkamasa setahun. Maka, kajian ini tertumpu kepada peranan HC (dari segi dimensi dan sub-dimensi HC) ke atas prestasi SMEs sektor pembuatan di Pakistan. Objektif kajian ini diringkaskan seperti berikut. Objektif pertama kajian adalah untuk menerbitkan indeks modal insan (HCI) yang khusus bagi sektor pembuatan, yang mencakupi pelbagai dimensi HC. Objektif kedua adalah untuk menguji perbezaan tahap HC mengikut industri, saiz (kecil dan sederhana) dan hak pemilikan (asing dan tempatan). Objektif ketiga pula adalah untuk mengkaji hubung-kait di antara dimensi HC dengan lima penunjuk prestasi firma, iaitu produktiviti, eksport, inovasi, kemajuan teknologi, dan daya ketahanan firma. Untuk menerbitkan HCI, kajian ini telah menggunakan tiga pendekatan: (i) Mengenalpasti dimensi dan sub-dimensi HC dari karya literatur; (ii) Memilih 9 dimensi dan 35 sub-dimensi HC melalui kajian kepakaran (expert survey); dan (iii) Menggunakan teknik *Analytical Hierarch Procedure* (AHP) untuk menerbitkan HCI dengan menggunakan dimensi dan sub-dimensi HC yang telah dipilih. Hasil dari kajian AHP, dimensi HC yang penting yang dikenalpasti adalah tahap pendidikan, diikuti oleh pengalaman, kemahiran, sifat peribadi, latihan, kestabilan, sikap, kesihatan dan ketatakuran. Berdasarkan keutamaan ini, soal-selidik berbentuk *close-ended* diedarkan bagi mengumpul data mengenai HC daripada 750 buah SMEs di dalam sektor pembuatan. Ujian *one-way analysis of variance* (ANOVA), *multivariate analysis of variance* (MANOVA) dan 't-test' telah digunakan untuk menguji tahap perbezaan HC di antara SMEs berkenaan, mengikut industri, saiz, dan hak pemilik. Seterusnya, teknik *structural equation modeling* (SEM), telah digunakan untuk menguji kewujudan kesan langsung dan tidak langsung melalui keupayaan penyerapan (absorptive capacity) bagi hubung-kait HC (secara menyeluruh dan berdasarkan dimensi modal insan) dengan produktiviti, kemajuan teknologi, eksport, inovasi dan daya ketahanan. Keputusan utama kajian ini diringkaskan seperti berikut. Pertama, berdasarkan keutamaan dimensi HC, pendidikan menduduki peringkat teratas, diikuti oleh pengalaman, kemahiran, sifat peribadi, latihan, kestabilan, sikap, kesihatan dan ketatakuran. Kedua, tahap HC bagi setiap industri adalah berbeza, di mana tahap HC adalah paling tinggi bagi industri tekstil, dan terendah bagi industri perabot dan sukan. Selain itu, keputusan lain menunjukkan bahawa tahap HC juga berbeza mengikut saiz dan hak pemilik firma. Analisis kajian juga menunjukkan bahawa tahap HC bagi firma bersaiz sederhana adalah jauh lebih tinggi berbanding dengan firma bersaiz kecil; dan tahap HC lebih tinggi bagi firma pemilik asing berbanding dengan firma milik tempatan. Akhirnya, hasil kajian menunjukkan wujud kesan positif antara HC dan lima penunjuk prestasi firma. Begitu juga, keputusan menunjukkan bahawa hubung-kait pengantara, iaitu keupayaan penyerapan, antara dimensi HC dan kelima prestasi firma adalah bersifat positif. Melalui kajian terperinci kesan sub-dimensi HC, kesimpulan yang dapat dibuat adalah kepentingan sub-dimensi HC bagi pelbagai petunjuk prestasi firma adalah berbeda, dan begitu juga semasa memahami saluran kesan keupayaan berkenaan, samada secara langsung atau tidak langsung. Secara ringkas, HC mempengaruhi prestasi firma. Walau bagaimanapun, tidak semua dimensi HC adalah didapati penting untuk keseluruhan prestasi firma. Oleh itu, perangkaan dasar bagi pelaksanaan di peringkat mikro dan makro perlu mempertimbangkan kesan sub-dimensi HC, dan bukan sekadar melihat dimensi HC secara secara agregat.

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AHP	Analytical Hierarchy Process
APEC	Asia Pacific Economic Cooperation
ASR	Adult Survival Rate
BSC	Balance Score Card
HALE	Health Adjusted Life Expectancy
HC	Human Capital
HCI	Human Capital Index
ICTs	Information and Communication Technologies
ILO	International Labor Organization
MADM	Multi Attribute Data Management
OECD	Organization of Economic Cooperation and Development
PYLL	Years of Potential Life Lost
SMEs	Small and Medium Enterprises
SRM	Stochastic Reward Model

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CHAPTER 1:

INTRODUCTION

1.1 Background of the Study

Small and Medium Enterprises (SMEs) are considered the mainstay of economic growth. Many developed countries including South Korea, Japan and Taiwan have promoted economic growth by contemplating their SME sectors. Many developing countries are following the same strategy. Most of the South Asian nations concentrate on their SMEs especially in the manufacturing sector in order to stimulate economic growth. Pakistan is a prominent example. In the last 15 years, Pakistan has deemed SMEs as a linchpin for promoting economic growth (Bhutta, Rana, & Asad, 2008). In 2014, the government of Pakistan, in announcing its Vision 2025, considered SME-driven growth as the country's leading economic objective (Government of Pakistan, 2014).

A plethora of empirical literature has discussed the role of physical assets in the growth of SME. Since the results of these empirical researches have shown that physical assets played a significant role in the performance of firms, a greater amount of funds are being allocated to improve the physical capital of SMEs. Nevertheless, the factor which can play a more influential and pivotal role in improving a firm's performance is its human capital. A firm's performance depends upon the sustainability of its competitive advantage whereas a sustainable competitive advantage comes from the uniqueness of resources. This point has been well elaborated by the Resource Base Theory. According to the resource base view, the more inimitable resources the company, the stronger competitive advantage it has. The best inimitable resource can be the firm's specifically-trained human capital (Zander &

Kogut, 1995). However, empirical literature has either not or weakly discussed the role of human capital in SME performance. It is hard to find research delving on the effect of human capital on the dimensions of a firm's performance like productivity, value addition, export and innovation. Due to this, neither the government nor firms focuses on human capital in the way it should be. This results in a biased allocation of resources. The larger allocation given to physical capital instead of human capital accumulation may result in the problem of misallocation of resources. There is already anecdotal evidence (Antlova, 2009; Pena, 2002) that human capital accumulation within the SME sector is rather low, resulting in low performance. By unveiling the relationship between human capital and SME performance, this research is linked to the broader agenda of the Government of Pakistan (GoP), that is the development of the SMEs.

1.2 Problem Statement

Since 2004, Pakistan has focused on SMEs, particularly the manufacturing sector to attain a sustainable economic growth. However, 95% of SMEs in Pakistan cannot survive in the first year of their inception (Khalique, Isa, Shaari, & Abdul, 2011). Likewise, the productivity of SMEs in major industries e.g. textile is facing a declining trend (United Nation Industrial Development Organization [UNIDO] 2014, 2006). Further, the level of innovation and technological progress in SMEs is low (UNIDO, 2010; SMEDA, 2013, 2011). Similarly, experts consider among others, lack of human capital capabilities as a major reason for these performance challenges (Marr, Gray, & Neely, 2003). However, in Pakistan, despite the critical role of human capital in SMEs, there is a dearth of in-depth researches on this concept. The issue at SME level in Pakistan lacks information whereby scholastic studies merely focused on exploring this issue: What forms the human capital of an SME? This indicates before analyzing the human capital-performance of a relationship that there is a need to develop a comprehensive proxy/index for human capital to capture its true level (Krueger & Lindahl, 2000). The necessity to develop better proxy (ies)/index for human capital gets more intense when we look into the ambivalent results of researchers whereby some argue on the significant impact of HC on performance whereas others consider it merely frivolous.

Further, human capital (HC) can extensively influence a firm’s productivity, innovation, technological progress and export (Ilmakunnas, Maliranta, & Vainiomäki, 2004; Slaughter et al., 2007). However, to develop the optimum level of human capital (HC) to improve SME performance in Pakistan, it is mandatory to find which dimensions of human capital, and how much they affect the performance cords of a firm. Unless empirical literature clearly identifies those prominent dimensions, the performance leading to the development of human capital is onerous (Teixeira, 2002). Pakistan has implemented a “one fit all” policy to improve the HC of all SMEs simultaneously (UNIDO, 2010). This “one fit all” policy” failed to attain the required objectives. Experts argued that the level of HC can differ by industry, size, and ownership. Therefore, policies to develop HC should account for these variations. In condensed form, there are four major elements lacking policy direction at government and individual SME level. They are namely i) measurement of HC at SME level; ii) HC’s direct and indirect effects on performances of SMEs; iii) identification of the dimensions of HC that affect productivity, survival, export, innovation and technological progress; and iv) difference in the level of HC across industry, size and ownership.

1.3 Research Questions

In backdrop of above problem statement, study sets following research questions:

1. What is the level of human capital in SMEs? By dimensions of human capital?
2. Are there any differences in the level of human capital (overall and by dimensions) across industry, size (small & medium) and ownership (foreign or local)?
3. How important is human capital for the performance of SMEs?
4. Does absorptive capacity influence the interaction between human capital and firm performance?
5. Which of the dimension(s) should the government of Pakistan focus on to improve the performance of SMEs?

1.4 Research Objectives

By keeping in view above research question, following are the objectives of the study:

1. to develop a comprehensive measure of human capital, accounting for various dimensions of human capital.
2. to examine the difference in levels of human capital by industry, size and ownership.
3. to empirically estimate the effects of human capital (overall and by dimensions) on a firm's performance.
4. to assess the role of absorptive capacity on human capital and relationship of firm performance.
5. To provide policy prescription for improving HC in SMEs

1.5 Significance of the Study

According to the Chartered Institue of Professional Development [CIPD] (2006), a major impediment when analyzing the impact of human capital is its measurement. From organizational tenure to job satisfaction, researchers have taken a number of variables to represent human capital at firm and nation level. However, there exists a large disagreement among researchers on the selection of appropriate indicators or a set of indicators to represent human capital (Friedman, Hatch, & Walker, 2001). The issue for SME is more complicated when scholastic studies merely focused on exploring what forms the human capital of an SME. As firms in the SME sectors differ in certain perspectives from the larger firms, a customized criterion to measure human capital is also required. However, until now, there is no such criterion or scale available to capture the level of human capital in the SME sector. By introducing HC measures specific to the manufacturing sector of SMEs in Pakistan, this study bridges this gap.

It is assumed that the dimensions of HC like education, training and experience have similar influence on all the performance cords of a firm (Tavares & Teixeira, 2005; Teixeira, 2002). However, a number of studies contradict it. For example, Berg (1970), Hotchkiss (1993) and Rumberger (1987) mentioned that education has no effect on productivity. Medoff & Abraham (1980, 1981) asserted that experience, a vital cord of human capital, is linked with a higher level of earnings but not with a higher level of performance. Studies conducted have looked at the relationship of the overall HC with the major performance cords like productivity or innovation. However, there is a dearth of empirically researches discussing how different dimensions of human capital affect various performance dimensions like productivity, export, technological progress, innovation and survival (Bontis, 2001). This study focuses on this issue by exploring the effect of overall human capital and its various dimensions on the firm's productivity, export, technological progress, innovation and survival. Identifying these dimensions can help SMEs to develop human capital development relevant to elevate the desired performance objective(s). Similarly, the role of absorptive capacity at SME level is less understood in the context of HC-performance relationship (Vinding, 2006). This study also focuses on this issue by analyzing the role of absorptive capacity in the manufacturing sector of SMEs in Pakistan.

1.6 Contribution of the Study

The study introduces human capital index (HCI) specific to the manufacturing sector of SMEs in Pakistan to gauge the human capital. The uniqueness of this index is the assigning of weightage to selected dimensions and sub-dimensions of human capital (HC) according to their importance. By applying this index, individual firms can assess their actual level of HC and can compare with their benchmark. This index also measures the level of HC at industry level and at overall sector level. This can assist the government to analyze the level of HC in various industries and devise polices accordingly. Further, construction methodology of this index is replicable to develop the human capital index specific to any other industry and sector in Pakistan or in any other country.

By applying developed HCI, the study analyzes the difference of human capital by industry, size and ownership. These findings provide important insights for HC development policies, both for SMEs and the government. In particular, based on findings, the study challenges some aspects of the government of Pakistan's *one-fit-all policy* for HCD in SMEs. Likewise, the study also examines a one-to-one relationship of HC and dimensions of the firm performance and identifies the HC dimensions important for raising productivity, export, technological progress, innovation and survival. It will allow SMEs to focus on the dimensions of HC specific to their performance objectives. For example, if a firm is facing survival challenge, then it will focus only on HC dimensions that are critical for survival rather than focusing on all. The study also provides empirical evidences about the mediating role of absorptive capacity at SME level. This again highlights the importance of HC as it not only directly influences the performance of a firm but it also does through absorptive capacity. In particular, the absorptive capacity's significant impact on a firm's innovation and technological progress highlights the importance of HC for firm performance.

1.7 Organization of the Study

The study comprises of eight chapters. Chapter 2 briefly reviews the literature related to human capital, performance and absorptive capacity. Chapter 3 provides the profile of the SMEs. Chapter 4 describes the methodologies, variables, and their operationalization. Chapter 5, 6 & 7 discuss the findings of the study. Chapter 5 discusses the computation of human capital index in particular. Chapter 6 reports the differences in the level of HC by industry, size and ownership while Chapter 7 assesses the relationship between HC and SME performance. Chapter 8 concludes the study and provides implications of the study.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

Human capital (HC) influences the growth momentum and performance of firms. It includes the accumulation of competencies, knowledge and skills to carry out work that can produce economic value. Though HC was coined since the germination of literature on economics, it was Mincer (1958), Schultz (1961) and Becker (1962) who pioneered this concept.

Earlier researches on HC granted special importance to three cords of HC, namely training, education and experience. For example, Mincer (1958) mentioned training and education as important constituents of HC and explained the difference in income of individuals as the cause of disparity in HC. Along with education and training, Schultz (1961) posed health and internal migration as filaments of HC. To him, HC comprised useful skills and abilities, which can be improved through deliberate investments. Explaining the disparity in productivity, he attributed it to differences in education, health and training. Together with training, education and experience, also benignly important are personal skills, characteristics and attitude (Hatch and Dyer, 2004; Youndt, Snell, Dean, and Lepak, 1996).

Scholastic work found HC equally important at the micro level. If at one end, it augments the performance of a firm, then at the other, it is a major source of economic growth of a country. The companies which concentrate on HC and develop their capacities will have a sustainable competitive advantage. It not only increases the capacity of an organization to further absorb technology, but also enhances its capability to innovate. Heap of scholastic works (Argote and Ingram, 2000; Marimuthu, Arokiasamy, and Ismail, 2009) confirm this argument. For example, Argote, Ingram, Levine, and Moreland (2000) epitomized that the development of HC through experience, and then pooling that experience through cross functional teams to create a common experience base, could augment the process of innovation-like product development. Hatch and Dyer (2004) also supported the same idea. They explained that firm-specific HC investment had a significant influence on the performance of the firm. In particular, selection, training and deployment effectively augments the process of learning-by-doing. Proceeding further, they also revealed that high employee turnover results in lowering the performance of a firm.

Due to rapidly emerging developments and changes in business environments, it is more pertinent for companies to effectively focus on their resources. In the case of small and medium enterprises (SMEs), they have an even greater need to keep and align themselves with the changing horizons of business. Consequently, it is necessary for SMEs to have a competitive and valuable HC base in order to compete in the market.

Empirical studies have ascertained a significant and direct impact of HC development on SME performance. For example, Martin, Ciovica, and Cristescu (2013) highlighted the importance of Information and Communication Technologies (ICT) and HC as major factors influencing SME digitalization. They detected a significant and direct relationship between ICT with HC development. Concomitantly, the study by Ruzzier, Antoncic, Hisrich, and Konecnik (2007) revealed that internationalization of SMEs is directly linked to its HC development. Concisely, among other factors, the SME firm’s performance is tied up with the level of its HC. This chapter is devoted to understanding the links between HC and firm performance.

2.2 Definitions and Dimensions of Human Capital

2.2.1 A Macro Perspective

Though earlier economists contended HC an important filament for economy, they did provide further details in that regard. For example, Smith (1937) who recognized people as an important component of the nation's wealth, defined all acquired and useful abilities of a country's inhabitants as part of capital (human). Much earlier before Smith, Petty and Guthrie (2000) made an estimation of the total HC of England, £520 million, to depict the economic power of the country. Similarly, Farr (1853) also estimated the average net HC of England. These early economists did not provide an adequate definition of HC.

The pioneering work on HC was triggered in the 1960s, when Mincer (1958), Schultz (1961) and Becker (1962) theorized the concept of HC and shed light on its importance. Mincer (1958), in his study, titled "Investment in HC and Personal Income Distribution", exemplified how the difference in incomes could be attributed to the difference in the level of HC development. He defined HC as the useful abilities of a person acquired from formal education and training. Congruently, Schultz (1961) expatiated on the dimensions of HC. To him, HC encapsulated all the useful skills, capabilities and knowledge, which were the result of deliberate investment. Further, he presumed health, on-the-job-training (OJT), formal education (elementary, secondary, and higher), education programs of adults and migrations as important strings of HC. In 1962, the seminal work of Becker (1962) further captured the attention of a lot of scholars. In considering the investment of education and health as HC investment, he described HC as embedded knowledge, skills, health and values that affect the future income of an individual. Explaining further, he predicated education, knowledge, training and health as important strands of HC. Though contemporary researches at that time considered implicitly experience as part of HC, Penrose (1959) detailed the importance of experience for the productivity of HC.

With the passage of time, the concept of HC became multi-dimensional, encapsulating a number of elements that in the past were not brought into discussion. For instance, Nakamura (1981) described HC as an amalgamation of skills like labor, managerial, intrapreneurial and innovative skills, along with physical aspects such as health. This definition covered dimensions like innovation and entrepreneurship, which in earlier explanations of HC was ignored largely. Likewise, Dovern-Pinger (2013), who characterized HC as the capabilities to perform a productive task, considered costs incurred in education and training as HC investment. He argued that education and training increased a person's productive potential, and thus should be considered as HC investment.

Although the axiom of Chicago school economists caught the immediate attention of scholars to work on HC, it was not until the late 1980s that the research took off. One eminent reason was rising competition in the markets and the success of the companies. It was an era when businesses started realizing how the skills, abilities, attitudes, education and training could bring a difference. This resulted in a good scholastic contributions to the field of HC, as many scholars presented innovative dimensions and measures of HC.

For instance, Becker, Huselid, Pickus, and Spratt (1997) described HC as a composite of education, training, and stock of knowledge, skills, abilities, and health. Mathur (1999) also interpreted HC as the accumulated stock of skills and talents. When quantifying HC for the purpose of analysis, he demonstrated that HC can be measured in terms of persons-years of education. However, Dagum and Slottje (2000) defined HC in different perspectives. They divided HC into micro and macro parts. Micro aspects were related to the individuals' abilities, effort, productivity and education, whereas macro perspectives included the institutional and technological structures of the economy. Pearce (2001) provided a concentric version of HC when he referred to HC development as investment in people in the form of training, retraining, education, skilling and re-skilling. Congruently, Frank, Bernanke, and Johnston (2007, p.28) angled this definition to: *"a fusion of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness and initiative that affect the value of a worker's marginal product."* In the same manner, Conley (2012) defined HC as an amalgamation of innate ability, schooling, school quality, non-schooling investment, training and pre-labor market influences.

On reviewing the concept of HC, only a few studies have explicitly mentioned skills, like innovation and entrepreneurship, as part of HC. In this regard, the International Labor Organization (ILO) (2009) comprehensively conceptualized the concept of HC to include skills required to perform a task. Further, in order to find out the skills that can contribute to HC development, the ILO conducted a survey on nine less developing countries (LDCs). The survey results indicated four main categories of skills, foundation skills, core skills for work, technical skills and intrapreneurial and business management skills. The skills are explained in detail hereon.

a) Foundation Skills - Ability to read, understand and use written material and basic numerical information.

b) Technical/ Professional Skills - Skills that facilitate an individual to carry out particular tasks, such a plumbing, carpentry, mason, metal work, welding, auto repairs and shoe making. More advanced technical skills such as veterinary work, engineering, physiotherapy and high-level computer skills are normally referred to as professional skills.

c) Entrepreneurial and Business Management Skills - Management skills and business knowledge skills, like problem-solving, book-keeping, risk measurement, market analysis, planning and goal setting.

d) 21st Century Skills and Competencies – Extra skills and competencies that are more related to the needs of the emerging socio-economic model of development (Kwon, 2009).

At the macro-level (Alexandru and Maria, 2012), HC is defined as the stock of knowledge, abilities, skills, health, the nation's innovations (inclusive of stock, baggage and wealth), culture, spiritualism and humanism. It also includes research, education and health expenditure as factors contributing to HC, which further leads to technical progress and innovation. Since this study is focused at firm level, it is essential to take the micro perspective of HC.

2.2.2 A Micro Perspective

The concept of HC at the micro level is more specific to the firm. Becker (1964) further categorized HC into firm specific and general. Firm specific HC refers to the skills and knowledge that can be applied in a particular firm for the process of production, whereas general HC can be applied anywhere. In this context, firm specific is the narrowest form of

HC while general HC is the broadest. According to Castanias and Helfat (1991), another type of HC is industry specific HC, which lies between firm specific and general HC. Industry specific HC represents the knowledge skills and abilities related to a particular industry, which can be redeployed in a number of firms in that industry (Mayer, Somaya, and Williamson, 2012). Bontis (2001) and Bontis and Fitz-Enz (2002) showed that the level of HC differs significantly across industries that are at different stages of development. Industries that are more developed possess higher levels of HC relative to those at the initial stages of development.

The micro-level studies have spawned precise definitions of HC at the level of firms and organizations. Winter and Nelson (1982) stated that the implicit knowledge of the employees of an organization is the HC of a firm. Since implicit knowledge is obtainable from a number of sources, Brooking and Motta (1996) considered employees' experience, knowledge, competence and creativity as the main strands of HC of a firm. Other researchers, however, argued for a focused description of HC for the purposes of quantifying it. According to Booth (1998), HC refers to employees' skills, training, and attitude. On the same note, Dzinkowski (2000) described HC as an amalgamation of expertise, competence, skills and the professional knowledge of employees of a firm. Putting a focus on education, Blundell, Dearden, Meghir, and Sianesi (1999) illustrated HC as an accumulation of employees' competence through education.

In the 1990s, HC received more attention from management practitioners. In general, management researchers put a greater focus on the intrinsic value of employees while defining HC. For example, Roos, Edvinsson, and Roos (1998), Ulrich (1998) and Wu

(2005) postulated employees' commitment, motivation and attitude as prominent parts of HC. Likewise, citing creativity as an important string of HC, Luthans, Luthans and Luthans (2004) also enlisted personal experience, education, professional skills, knowledge and creativity as the corresponding main constituents. According to Skandia's model, HC is an aggregate of knowledge, skills, creativity and the ability of each employee to meet the tasks at hand (Bontis, 2001). It is considered an important resource for a firm's competitiveness and the profit leverage of a knowledge-based economy.

To capture the level of HC, there is always a need to select the indicators that are truly representative of the former. These indicators primarily emerge from how HC is defined. For instance, using a famous balance scorecard, Kaplan and Norton (1996) suggested three attributes of employees that reflect HC, employee sustainability, employee satisfaction and employee capability, which needed to be quantified. Since these indicators focused more on the implicit ability of employees, they required a well-structured framework to quantify these implicit values. For that, they developed a complete framework to capture these attributes. Edvinsson and Sullivan (1996), on the other hand, used experience, knowledge, skill and innovation as important twines of HC. Likewise, Gimeno, Folta, Cooper, and Woo (1997) illustrated more specific indicators of HC. They predicated similar industry experience, relevant work experience and level of education as main cords of HC.

There is still no agreed upon set of HC indicators. Together with Kaplan and Norton (1996), Bontis (1998) perceived a level of ideal competence, employees' satisfaction, employees' co-operation, and succession training plans, as the major indicators of HC, whereas Hatch and Dyer (2004) argued that a level of education, technical test in selection, training, employees' work participation, problem solving skills and employees' commitment as key factors of HC. Skaggs and Youndt (2004) further asserted that employees' skills, level of education and professional tenure are important strands of HC. Subramaniam and Youndt (2005) added creativity as an important additional dimension of HC. De-Pablos (2002) suggested that employee turnover, education, motivation, satisfaction profile are important measures of HC, while Rompho and Siengthai (2012) stressed the importance of work-related competencies as major indicators of HC.

A review on recent scholastic work (Chen and Xie ,2004; De Pablos 2002, 2005; Engström, Westnes, and Westnes, 2003; Moon and Kym, 2006; Petty and Guthrie, 2000; and Unger, Rauch, Frese, and Rosenbusch, 2011) revealed that two indicators (employee satisfaction and work-related competencies) extensively emerged as proxies of HC.

To denote a common set HC indicators, Han, Lin, and Chen (2008) conducted a comparative study in the context of Taiwan's manufacturing firms to choose the 10 major indicators. The survey respondents agreed upon five common indicators of HC, namely job accountability, employee's competence, professional tenure, employees' commitment and employees' cooperativeness. Employees' professional knowledge, creativity and communication were also in the top ten list of HC indicators. The problem with this study was the selection of respondents. The survey did not focus on qualified industry professional and experts; rather, they made a survey on the working executives irrespective of their experience and relevancy in engaging with employees.

The review of the literature suggests that indicators such as education, training, experience (industrial experience and relevant job experience), satisfaction, commitment, turnover, and work-related competencies are common indicators of HC, whereas surrogates like innovation, health, social status, behavior and emotional intelligence are either used at a very limited level or not used at all. Table 2.1 summarizes the various indicators of HC used based on past researches. The study adopted and updated Table 2.1 from Rompho and Siengthai's (2012) study. The next sections discusses the various measurements of the methodologies of HC.

Table 2.1: Indicators of HC

S#	Dimensions	Abdullah et al. (2013)	Alexandru & Toth Maria (2013)	Bozbura et al. (2007)	Bontis and Fitz-enz (2002)	Bontis et al (1998)	Bontis and Fitz-enz (1999)	Bontis et al. (2001)	Booth(1998)	Brennan and Connel (2000)	Brooking and Motta (1996)	CaRson et al	Chen et al	Dagum & Slottie (2000)	Davis and Noland (2002)	Dzinkowski (2000)	Edvinsson and Malone(1997)	Engstron et al(2003)	Evans(2004)	Fitz-enz (2000)	Gimeno et al (1997)	Hatch and Dyre (2004)	Hitt et al (2001)	Hurwiz et al (2002)	ILO (2008)	JJ Philips(2012)	Kloppenborg & Petrick (1999)	Lengrick-Hall and Lengrick-Hall(200	Leliaert et al. (2003)	Lischka et al(2006)	Liu et al.(2009)
1	% of employees rotating in from or out to co-operation partners																														
2	% of full time permanent employees/total employment																X														
3	% of time spent on rutninizing operations																														
4	Absence Rate																		X												
5	Affect one another positivly					X												X													
6	Age																														X
7	Agreeableness											X																			
8	Aptitudes																														
9	Attitude					X												X													
10	Average age of FTPE																X														
11	Behavior																														
12	Benefit																							X							
13	Capabilities	X																													
14	Charges on employees							X																							
15	Commitment											X					X							X							
16	Communication skills											X																			
17	Competence			X						X																					
18	Compliance				X															X											
19	Cooperativeness of employee							X																							
20	Condition of services																														
21	Conscientiousness											X																			
22	Creativity of employees																														
23	Free from disease		X																												
24	Degree of develoment of new ideas and knowledge by																														
25	Education			X											X																
26	Employee turnover												X				X		X												
27	Employee interpersonal network																														
28	Emoloyees values and beliefs																														

S#	Dimensions	Longo and Mura (2008)	Longo and Mura(2007)	Luthans et al (2004)	Luthans et al (2004)	Mantal (2004)	Moon and Kym(2006)	Molyneux (1998)	Namasivayam and Denizici	OECD(2008)	OECD(2012)	Pablos(2002)	Pablos(2003)	Petty and Guthrie(2000)	Rompho and Siengthai(2012)	Roos and Roos (1997)	Sainte-Onge(1996)	Serano et al	Skaggs and Youndt(2004)	Snell and Dean(1992)	Stewart (1997)	Stephen et al (2011)	Subramaniam and Youndt (2005)	Switzer and Huang	Tayles et al(2007)	Tomer (1999)	Ulrich (1998)	Unger et al.(2011)	Wang and Chang	Wu (2005)	Wu (2000)
1	% of employees rotating in from or out to co-operation partners															X															
2	% of full time permanent employees/total employment																														
3	% of time spent on rutninizing operations															X															
4	Absence Rate		X									X																			
5	Affect one another positivly																														
6	Age																														
7	Agreeableness																														
8	Aptitudes																	X													
9	Attitude								X								X														
10	Average age of FTPE																														
11	Behavior															X															
12	Benefit																														
13	Capabilities																														
14	Charges on employees																														
15	Commitment																										X				
16	Communication skills																														
17	Competence																														
18	Compliance																														
19	Cooperativeness of employee															X															
20	Condition of services																	X													
21	Conscientiousness																														
22	Creativity of employees				X																		X								
23	Free from disease																														
24	Degree of develoment of new ideas and knowledge by																						X								
25	Education			X																											
26	Employee turnover		X									X		X		X					X								X		
27	Employee interpersonal network							X																							
28	Emoloyees values and beliefs																X														

Table 2.1, continued

S#	Dimensions	Abdullah et al. (2013)	Alexandru & Toth Maria (2013)	Bozbura et al. (2007)	Bontis and Fitz-enz (2002)	Bontis et al (1998)	Bontis and Fitz-enz (1999)	Bontis et al. (2001)	Booth(1998)	Brennan and Connel (2000)	Brooking and Motta (1996)	CaRson et al	Chen et al	Dagum & Slottie (2000)	Davis and Noland (2002)	Dzinkowski (2000)	Edvinsson and Malone(1997)	Engstron et al(2003)	Evans(2004)	Fitz-enz (2000)	Gimeno et al (1997)	Hatch and Dyre (2004)	Hitt et al (2001)	Hurwiz et al (2002)	ILO (2008)	JJ Philips(2012)	Kloppenborg & Petrick (1999)	Lengrick-Hall and Lengrick-Hall(200	Leliaert et al. (2003)	Lischka et al(2006)	Liu et al.(2009)	Longo and Mura (2008)	Longo and Mura(2007)	Luthans et al (2004)	Luthans et al (2004)	Mantal (2004)	Moon and Kym(2006)	Molyneux (1998)	Namasivayam and Denizici	OECD(2008)	OECD(2012)	Pablos(2002)	Pablos(2003)	Petty and Guthrie(2000)	Rompho and Siengthai(2012)	Roos and Roos (1997)	Sainte-Onge(1996)	Serrano et al	Skaggs and Youndt(2004)	Snell and Dean(1992)	Stewart (1997)	Stephen et al (2011)	Subramaniam and Youndt (2005)	Switzer and Huang	Tayles et al(2007)	Tomer (1999)	Ulrich (1998)	Unger et al.(2011)	Wang and Chang	Wu (2005)	Wu (2000)
29	Employees partcipation in teamwork																					X																																							
30	Employees engagement							X																																																					X
31	Employee satisfaction							X																																					X												X			
32	Ethics																																																							X					
33	Experience			X	X						X			X		X																			X																X	X									
34	Gender																																																					X							
35	Grievances/Complaints																		X																																										
36	Health		X																																																	X									
37	Implicit knowledge						X																																																						
38	Improvement System					X												X																																											
39	ICT skills							X																	X		X									X																									
40	Innovativeness /Rate of new product or process creativity												X						X													X							X							X					X				X						
41	Intelligence(Congnitive ability)						X					X																											X																						
42	Internal Relations																															X	X						X																						
43	Interpersonal skills							X				X													X											X																									
44	Intrinsic Work Reflection																															X							X																						
45	Itellectual agility					X												X																					X																						
46	Know-how		X																									X																X																	
47	Knowledge sharing																																																						X						
48	Leadership and management skill			X								X																																							X					X					
49	Learing																																																												
50	Level of Education																				X																												X												
51	Level of Employees traning																					X																																							
52	Level of expertise of employees in their field																																																				X								
53	Level of skillfulness of																																																				X								
54	Litigation							X																																																					
55	Longevity							X																		X																																			
56	Loyalty																																																											X	
57	Locus of control											X																																																	

Table 2.1, continued

S#	Dimensions	Abdullah et al. (2013)	Alexandru & Toth Maria (2013)	Bozbura et al. (2007)	Bontis and Fitz-enz (2002)	Bontis et al (1998)	Bontis and Fitz-enz (1999)	Bontis et al. (2001)	Booth(1998)	Brennan and Connel (2000)	Brooking and Motta (1996)	CaRson et al	Chen et al	Dagum & Slottie (2000)	Davis and Noland (2002)	Dzinkowski (2000)	Edvinsson and Malone(1997)	Engstron et al(2003)	Evans(2004)	Fitz-enz (2000)	Gimeno et al (1997)	Hatch and Dyre (2004)	Hitt et al (2001)	Hurwiz et al (2002)	ILO (2008)	JJ Philips(2012)	Kloppenborg & Petrick (1999)	Lengrick-Hall and Lengrick-Hall(200	Leliaert et al. (2003)	Lischka et al(2006)	Liu et al.(2009)	Longo and Mura (2008)	Longo and Mura(2007)	Luthans et al (2004)	Luthans et al (2004)	Mantal (2004)	Moon and Kym(2006)	Molyneux (1998)	Namasivayam and Denizici	OECD(2008)	OECD(2012)	Pablos(2002)	Pablos(2003)	Petty and Guthrie(2000)	Rompho and Siengthai(2012)	Roos and Roos (1997)	Sainte-Onge(1996)	Serrano et al	Skaggs and Youndt(2004)	Snell and Dean(1992)	Stewart (1997)	Stephen et al (2011)	Subramaniam and Youndt (2005)	Switzer and Huang	Tayles et al(2007)	Tomer (1999)	Ulrich (1998)	Unger et al.(2011)	Wang and Chang	Wu (2005)	Wu (2000)
58	Motivation											X																				X							X			X													X						
59	Net Operating revenue/total number of employees																														X																														
60	No. of full time employees																X																																												
61	No. of full-time temporary employees																X																																												
62	No. of part-time employees and full-time contractors																X																																												
63	Occupational assessment																											X																																	
64	Opennes to exPerience											X																																																	
65	Origanizational Tenure																						X																												X										
66	On the job Training(OJT)							X																																	X																				
67	Payroll expense/net sale																																																										X		
68	Personal Attributes																																							X																				
69	Personal injury rate																																									X																			
70	Practical application																															X	X																												
71	Previous Industry Experience																					X																																							
72	Previous trainings of employees																																																X												
73	Professional knowledge/skills																																			X		X																							
74	Problem Solving ability			X																																																									
75	Physical strength																																																			X									
76	Psychometric assessment																											X																																	
77	Quality of alma-matter																						X																																						
78	Quality of education							X																																			X																		
79	Quickness of employees (time to respond)																																													X															
80	Quality of employees as compare to industry																																																				X								
81	Risk Taking ability			X																																																									
82	Reputation of employees																												X																																
83	Safety issues							X																																																					
84	Seniority(Origanizational tenure)									X			X				X																						X			X												X					X		
85	Similar Industry Experience																				X																																								

Table 2.1, continued

S#	Dimensions	Abdullah et al. (2013)	Alexandru & Toth Maria (2013)	Bozbura et al. (2007)	Bontis and Fitz-enz (2002)	Bontis et al (1998)	Bontis and Fitz-enz (1999)	Bontis et al. (2001)	Booth(1998)	Brennan and Connel (2000)	Brooking and Motta (1996)	CaRson et al	Chen et al	Dagum & Slottie (2000)	Davis and Noland (2002)	Dzinkowski (2000)	Edvinsson and Malone(1997)	Engstron et al(2003)	Evans(2004)	Fitz-enz (2000)	Gimeno et al (1997)	Hatch and Dyre (2004)	Hitt et al (2001)	Hurwiz et al (2002)	ILO (2008)	JJ Philips(2012)	Kloppenborg & Petrick (1999)	Lengrick-Hall and Lengrick-Hall(200	Leliaert et al. (2003)	Lischka et al(2006)	Liu et al.(2009)	Longo and Mura (2008)	Longo and Mura(2007)	Luthans et al (2004)	Luthans et al (2004)	Mantal (2004)	Moon and Kym(2006)	Molyneux (1998)	Namasivayam and Denizici	OECD(2008)	OECD(2012)	Pablos(2002)	Pablos(2003)	Petty and Guthrie(2000)	Rompho and Siengthai(2012)	Roos and Roos (1997)	Sainte-Onge(1996)	Serano et al	Skaggs and Youndt(2004)	Snell and Dean(1992)	Stewart (1997)	Stephrn et al (2011)	Subramaniam and Youndt (2005)	Switzer and Huang	Tayles et al(2007)	Tomer (1999)	Ulrich (1998)	Unger et al.(2011)	Wang and Chang	Wu (2005)	Wu (2000)
88	Spirit of employees																																																							X					
89	Stability																																																												
90	Technical Education																					X																																							
91	Technical skills							X																	X		X									X																									
92	Technical test for recruitment																					X																																							
93	Time spend on problem solving																					X																																							
94	Time spend on Training																																																X												
95	Training					X							X				X	X	X					X															X			X				X		X													
96	Training(Profession related)								X																															X	X		X							X											
97	Value-added per worker (Profit+Pay)/no. of employees									X																																																			
98	Vision of employees																																																							X					
99	Vocatinal qualification (Technical education)																											X																X																	
100	Work environment																							X																																					
101	Work related competencies					X							X					X										X		X							X							X											X			X			
102	Work Related Experience																				X																												X												
103	Work related knowledge									X							X											X		X									X																						
104	Work System effectiveness																		X																																										
105	Working experience (Years)																														X																						X							

2.3 Measuring Human Capital

Since HC is linked to employees and is likely to put exigent management control issues, its measurement is essential (Guthrie, 2001; Tayles, Pike, and Sofian, 2007; Widener, 2004). To Marr et al. (2003), HC measurement is vital in taking any strategic decision, like formulating business strategies or taking expansion decisions. Likewise, a company needs to measure its level of HC to analyze the organizational effectiveness.

2.3.1 Macro Measurement Methodologies

Methods to gauge HC stock at the national level fall into two major categories, monetary-based approaches and indicator-based approaches.

2.3.1.1 Monetary Based Approaches

These approaches quantify the contribution or value of HC in monetary values. These approaches have two broader categories, cost-based approach and income-based approach. The details both categories.

*I) Cost-based approaches***:** Engel (1883) developed this approach to measure the national stock of HC. He measured the value of HC based on costs incurred on rearing a human. The method, he explained, was that all of the expenditures incurred in order to rear a child up to the age of 25 would be counted as HC. Since this approach was just a summation of historical costs incurred on a person, this was its major snag (Dagum and Slottje, 2000). Kendrick (1976) ameliorated this approach by dividing HC into tangible and intangible parts. The tangible part referred to expenditure needed to nurture physical human beings, whereas the intangible part focused on expenses that enhanced the productivity. Expenditures like those on health, education, training and opportunity costs of students attending school were included to account for HC. Eisner (1988) further calibrated this approach by allowing the inclusion of the value of a household's non-market activities in child rearing.

Though this approach is now a useful and easy measure, it has some drawbacks. First, it can over (or under) estimate the HC value. For example, there is a possibility that rearing a child who is dull or has some deficiency requires a bigger amount of funds than what a normal child requires. Looking into the costs incurred, the HC of a dull child is greater than the normal child. Yet, in reality, it is not. Secondly, it is very difficult to bifurcate the investment from spending. Physically, it is hard to determine which part of household expenditure contributes to HC and which does not. Thirdly, the marginal contribution of each investment spending is difficult to find. Lastly, Kendrick (1976) adopted the double declining method, which depreciated HC like physical capital. He adopted this method to keep it aligned with the depreciation of physical assets. Contradictorily, HC can also appreciate with the passage of time (Dagum and Slottje, 2000). This approach does not allow for the appreciation of HC.

*II) Income-based approach***:** In contrast to the cost-based approach, the income-based approach is forward-looking. It measures the future value of the HC at a present time. Petty (1963) developed this approach to estimate the HC stock of England. He took the difference of the national income and property income of the United Kingdom (UK) and preserved it at a discounted rate of 5 percent. Farr (1853) extended this technique by applying it on a scientific basis. He considered HC as the present value of a person's total future earnings minus his/her living expenses. Using a 5 percent discount rate, he calculated the present value of the future earning of an individual's net of living expenses and adjusted it for death expenses too. A number of researchers (Barriol, 1910; De Foville, 1905; Nicholson, 1891; Wittstein, 1867) adopted this approach. However, Dublin and Lotka (1930) meliorated the concept of Farr (1853) by constructing a formula. Admittedly, the improved version of this approach was not only productive, but also easy to use; but it had some serious flaws. First, it assumed that the wages of a person's were paid based truly on his HC contribution, which might not be the case in reality. Many exogenous factors can influence wages. For example, the pressure exerted by labor unions can result in high wages, or in the case of unfavorable economic conditions, labor wages can decrease. Secondly, the availability of data on earnings, especially in the case of LDCs was a serious issue.

A number of researchers like Weisbrod (1961) and Graham and Webb (1979) revamped it to remove these flaws. Notably, Graham and Webb (1979) altered its structure to ingest economic growth. Further, Jorgenson and Fraumeni (1992) augmented the method by simplifying the way in discounting future income flows to the present value. They especially observed that the present value of lifetime labor income for an individual of a given age was just his current annual labor income plus the present value of his lifetime income in the next period, which was weighed by survival probabilities.

2.3.1.2 Indicator-based Approaches

The indicator-based approaches are normally based on the physical measures of HC. Two type of approaches are prominently used, education indicator-based approach and health indicator-based approach. Below is a brief discussion of these approaches.

I) Education Indicators: In the education-based approach, HC is measured based on educational indicators, like years of schooling, enrolment rate, literacy rate and dropout rates. The rationale of using educational indicators for HC is the notion that investment in education represents a major portion of investment in HC. The following are some major educational indicators used for HC measurement.

a) Adult Literacy Rate (ALR): Adult literacy means the ability of a person above 15 years of age to read and write. Some prominent researchers like Romer (1990) used this indicator to represent HC. However, ALR has a very limited explanatory power and leaves out many important elements, like advanced knowledge and skills. Researchers mainly recommend using this in a country where the level of education is very low.

b) School Enrolment Rates (SER): School enrolment rates are gauged by dividing the total number of children who should attend school to the students enrolled at a given level. They are further divided into two categories, *gross enrolment rate and net enrolment rate*. The former takes the total number of students enrolled at a given level, whereas the latter excludes the students who do not belong to the designated age group. Barro, Mankiw, and Sala-i-Martin (1995) and Mankiw et al. (1992) used school enrolment rate as a proxy for HC. Researchers recommend taking primary enrolment rate, secondary enrolment rate and higher enrolment rate as proxy for low-income, middle-income and rich countries, respectively. Justifying this proxy, Judson (2002) argued that there exists a direct relationship between growth and HC accumulation at the primary level for poor countries. He further clarified that growth had a positive relationship with HC at the secondary level in middle- income countries and at the higher levels for rich countries.

The reason school enrolment rate is taken as a proxy is that it shows the flow that adds to the present stock of education to establish further stocks. This means it measures the present investment in HC that will be reflected in the future. There is also a drawback on using enrolment rates as a representative of HC, since there is a wide lag effect between enrolment rates and HC addition. A student registering today will be part of a labor force several years later, if he/she continues his/her education without any gap. Secondly, since it gauges the flow of stock that is part of accumulation, it does not encapsulate the total value of HC.

c) Average Years of Schooling: Compared to enrolment rate and literacy ratio, the number of years of schooling is a better measure of HC because it captures investment on education in a better way. Studies which attempt to develop data series on years of schooling can be divided into three groups based on the methods they employ: the census/survey-based estimation method, the projection method, and the perpetual inventory method. These scholars have captured the years of schooling in a more productive and realistic way.

With an adequate availability of data and better theoretical backing, the years of schooling measurement has been enormously employed in empirical researches on HC. This is a common proxy of HC at the firm and national levels. Despite this, it has some serious anomalies. The first irregularity observed is the inter-country and intra-country differences in the quality of education. The years of schooling indicator is incapable of observing these differences. Secondly, the years of schooling measurement is inept in capturing the differences in investments and returns on education at different levels. The years of schooling measurement assumes constant returns from each year of education, but this contradicts with the empirical literature. Empirical studies have depicted decreasing returns to education (Psacharopoulos, 1994). The third and most unrealistic assumption is the substitutability of workers. While taking years of schooling as a proxy, it is assumed that the labor of diverse education streams, have the same type and quality of education.

Education-based approaches for gauging HC are easy to enumerate and have copious international data. These approaches portray an aggregate picture of HC in a specific country. Yet, these approaches have many serious gaps. The main critique is that they do not properly present key facets of HC; this is especially so for the issue of quality, which has been totally ignored. This is the reason why the use of these measures has resulted in contradictory results. For example, Mulligan and Sala-i-Martin (1997), using education as a proxy of HC, found no relationship of HC with economic growth. On the other hand, Mathur (1999) illustrated a significant positive relationship of HC with growth using the same data in other countries.

To glom HC in a better way, the Organization for Economic Cooperation and Development (OECD) developed an index based on different educational indicators. They took three major dimensions of education, investment in education, quality adjustments and results of education. Each dimension was sub-divided into different elements, encapsulating the multidimensional view of HC.

II) Health indicator-based approaches: It is discernible that with any specified combination of capital (physical), technology, skills and the improving health of employees, a firm can produce a higher amount of output. The poor health conditions not only give rise to absenteeism, low work motivation and weak organizational commitments, but it also drastically reduces the productivity level of a firm. At the macro level, the goal of economic development remains unattainable without sustainable health conditions. A number of researchers (Bloom, Canning, and Sevilla, 2004; Lucas, 1990; Qadri and Waheed, 2011) used *health* as a HC surrogate. In the researches, various measures of health have emerged to glom HC. Among them, the self-reported health survey of population is considered the most appropriate. In this survey, a certain portion of population appraised their health on a scale ranging from best to worst. The resulting data were used to represent their health. The average life expectancy at birth in the population is also deemed a prominent indicator. Moreover, indicators like years of health-adjusted life expectancy (HALE) or years of life that are disability free, years of potential life lost (YPLL), Adult Survival Rate (ASR) and Average life Expectancy for Men are also among the widely-used indicators (Bhargava, Jamison, Lau, and Murray, 2001). Some other specific health outcome indicators are infant mortality rates, the incidence of low birth rate babies and morbidity rates. Along with them, incidence of obesity, arthritis, diabetes, chronic pain, cancer, heart disease, suicide, accidents or unintentional injuries or deaths and HIV/AIDS are also used as health indicators. The composite of these indicators are normally used to find health sustainability. Researchers have also used adult survival rates to represent health.

2.3.2 Micro Measurement Methodologies

Numerous researchers and management practitioners used various approaches to ascertain the HC at firm level. Major approaches to gauge HC can be divided into five categories. Scholz et al. (2007) explained them below.

2.3.2.1 Market Value Approaches

In market value approaches, companies measure their HC based on the number of employees, their market values and book value. One of the prominent researches in this category is of Fitz-Enz (2000a). He created various metrics by embedding financial measures of HC in the following way:

- HC revenue factor = Total Sale/full time equivalent (FTE)
- Human economic value added = Net Operating after Tax - Cost of Capital/FTE)
- HC cost factor = Pay + benefits + contingent labor + absence/FTE
- HC value added = Revenue - (expense - pay and benefits)/FTE
- HC return on investment= Revenue-(expense-pay and benefits)/pay and benefits
- HC market value = Market value - book value/FTE

These metrics quantify the market value of HC. Previously, Tobin (1969) adopted similar measures to compute HC. Though these market value-based techniques quantify the different aspects of HC, they overlook some major qualitative facets of HC. With regards to this approach, which computes a rough estimation of HC, Scholz et al. (2007) argued that HC is not a mere financial residual, but a combination of various characteristics of people and human resource activities.

2.3.2.2 Accounting Oriented Approaches

Approaches in this category integrate the HC measurement into the conventional accounting framework. The inception of the accounting-based approach in measuring HC can be traced back to Likert (1961) and Pyle (1966). Flamholtz (1973) developed a comprehensive approach to measure the HC. To him, HC costs had two major strands: acquisition cost and learning cost. Acquisition cost embodied the cost related to recruitment and selection, deployment, promotion and internal hiring, whereas the costs of formal training and OJT were included in the learning costs. His approach quantified both of these costs. In an improved version, Flamholtz (1999) developed the human valuation model called the Stochastic Rewards Valuation Model (SRVM). He explicated a five-step method for human valuation to apply the SRVM. In the Flamholtz model framework, Flamholtz, Bullen, and Hua (2003) also devised a practical approach to calculate returns on investment (ROI) on management development. To them, the Human Resource Accounting approach, which is a method to gauge the contribution of management development, augmented the HC value.

Likewise, Mirvis and Macy (1976) also measured HC in an accounting framework. They incorporated human output (productivity) through behavioral variables. They divided behavior into two categories: (a) behavior that represents employees' participation in work (b) and those representing job performance. The cost of HC was operationalized by taking outlay costs, time costs, fixed costs, variable costs, and opportunity costs. These costs reflected direct and indirect costs, and lost profits. Exemplifying further, they explained that a variable cost would be paid overtime, which is traced to absenteeism; a fixed cost would be salaries plus benefits of the personnel involved in replacing the absent worker, and an opportunity cost would be the profit lost during the replacement process. Their results were robust and they claimed their technique to be more valid, reliable and useful.

Other researchers also presented alternate models. For example, Cascio (1998) suggested indicators like HC innovation, employee attitudes and the inventory of knowledgeable employees as a base to measure HC. This approach gave innovation a key importance. With regards to employees' attitudes as a predictor of customer satisfaction and retention, he emphasized the need to measure HC. To him, an employee's organizational tenure, turnover, experience and learning were important inputs for HC accounting.

The main accounting-oriented approaches are that they view HC as an investment account. Nevertheless, accounting base measurements of HC are used in a number of organizations across the globe; researchers argue that there still is a need for fair value accounting (Bullen and Eyler, 2010b).

2.3.2.3 Human Resource Indicator Approaches

A large clump of approaches used HC indicators like employees' competence, motivation, skills, professional knowledge and creativity for measuring HC. These approaches collected indicators related to corporate performance, and then chose the indicators that could be quantified. For example, Gimeno et al. (1997) considered similar industry experience, relevant work experience and level of education as the most important indicators of HC. Likewise, Bontis and Fitz-Enz (2002) crafted a comprehensive approach, taking both qualitative and quantitative factors of HC in order to check the association between HC effectiveness with HC valuation, investment and depletion. Following the methodology used by the Saratoga Institute, they abstracted four factors, revenue per full time equivalent (FTE), expense per FTE and HC (ROI) for HC effectiveness. They calculated these factors using the Saratoga criteria. They collected the data from both qualitative and quantitative measures. The data on factors like revenue, FTE, compensation, training and development expenditure, voluntarily and involuntarily turnover and employees' separation rate were directly collected from companies under the study. They collected the data for qualitative measure through questionnaires. They also gathered the data on 15 HC indicators. Their results showed a significant relationship between revenue (HC effectiveness) and the tenure of supervisors and administrative staff.

A few prominent techniques based on the indicators approach are, the Skandia Navigator, HR Scorecard Intellectual Capital Navigator (Stewart and Ruckdeschel, 1998), Skandia Navigator (Edvinsson and Malone, 1997), HR Scorecard (B. E. Becker, Huselid, and Ulrich, 2001) and HC Indicator (Mohr and Keilholz, 2001). Some of the researchers also used the Analytical Hierarchical Approach (AHP) for HC calibration (Calabrese, 2012; Calabrese, Costa, and Menichini, 2013).

2.3.2.4 Value-added Approaches

Value-added approaches are based on the difference between input and output. These techniques centered to link employees' value addition with HC. Among the famous approaches are the Market Value Added (MVA) approach and the Economic Value Added (EVA) approach (Bennet, 1991; Young, 1997).

I) Economic Value Added (EVA): It is regarded as an essential measure of corporate performance. EVA is calculated by taking the difference between the return on capital and the cost of capital, and multiplying by the capital outstanding at the beginning of the year (or the average over the year if it is used in computing the return on capital). It is the outstanding income that remains after operating profits cover a full return on capital, the cost of capital (Stewart and Ruckdeschel, 1998). In explaining EVA, Young (1997) mentioned that it is the computed difference between the returns on a company's capital and the cost of that capital. A positive EVA indicated that the value was created for shareholders; a negative EVA denoted value destruction. In differentiating EVA from MVA, he notified that MVA was the present value of the firm's expected future EVAs. He also revealed that MVA was less practical than EVA for evaluating and rewarding managerial performance.

II) Market Value Added (MVA): - It is the difference between a firm's market value and capital employed. MVA is a measure of the value that a company has created in excess of the resources already committed to the enterprise (Martin and Petty, 2001). Harvey and Lusch (1997) used this technique for the valuation of intangible assets. They suggested using this approach to get an estimate of the aggregate value of intangibles that are not on the balance sheet. However, they objected to the fact that companies that have publicly traded shares could not use this approach.

2.3.2.5 Market Return Approaches

It is a measure which focuses on the market returns that interpret returns from intangible assets. Examples are the HC Pricing Model (Bender and Röhling, 2001) and the ROI of HC. The Saratoga Institute (Bontis, 1999) created the HC financial index, which combined the following three indices: HC revenue index, HC cost index and HC profit index. Though this approach quantified well the market return of HC, it ignored some of the vital issues. For example, the HC of the company was performing well, but due to external factors, its market value had reduced. In this case, the market return approach tended to undermine the value of HC but in the reverse situation, it would overvalue.

2.3.2.6 Other Approaches

Like the Saratoga Institute, management practitioners developed specific analytical indices for the useful analysis of HC information. Some of the prominent indices are delineated below.

I) Balance Score Card: Originally developed by Kaplan and Norton (1996), its tailored version is extensively used for HC analysis. The unique aspect of the balance scorecard is its systematic representation of multiple objectives as a basis for target setting. It considers HR issues equal to financial issues. Nonetheless, over engineering of it can result in confusion and inconsistent results.

II) HC Monitor: Mayo (2001) configured the HC monitor to assess the worth of the human assets of a company. The main argument of Mayo (2001) is that people are assets, not costs. HC monitor focused on three issues. First, how could a company reveal the implicit diversity of its human resource and how could it be valued? Second, how could people's performance be logged into a metric? Third, how would one find the way to quantify effectively the monetary and non-monetary value to business stakeholders? Thus, Mayo introduced the Individual Asset Multiplier (IAM), the weighted average of factors like HR performance, HR value alignment, HR capabilities and potential to grow. Its key benefit is the quantification of HC in terms of monetary value. However, in order to use this model effectively, it rests on a company's ability to effectively calculate contribution and capabilities (Mayo, 2012).

III) The Organizational Performance Model of Mercer HR Consulting: Developed in 1990 by Mercer Consulting, the model identified six key components of the HC strategy of a company. These components were people, work process, managerial structure, information and knowledge, decision-making and rewards, and the interconnectedness among these elements was a key to the success of the organization.

2.3.3 Limitations of Existing Approaches

Initial measures of HC focused on efficiency and costs. These traditional measures were highly criticized for the reasons they were short term, lagging and backward looking. It gave rise to the development of HC metrics (Garavan, Morley, Gunnigle, and Collins, 2001; Gates and Langevin, 2010). The new concept urged organizations to apply non-financial performance measures for performance management. These researches illustrated how performance is produced within an organization and how its various filaments are interconnected. The Balance Score Card (Kaplan and Norton, 1996) and Skandia's HC indicator (Edvinsson and Sullivan, 1996) are prominent examples, where HC is deemed to contribute in a radical way toward attaining key objectives. Thus, HC measures emerge to gauge more than just efficiency measures, with adapted measures for more complicated jobs (Gates, 2004). However, despite the approaches mentioned in the preceding section, there remains some major issues which need to be addressed pertaining to the effective measurement of HC.

The problem with the traditional approaches of HC is that they focused on either the qualitative aspects of HC, such as attitude, satisfaction, or quantitative aspects like training expenses, labor costs or revenues. For example, Scholz et al. (2007) mentioned that though market value-based techniques adequately quantify various aspects of HC, they overlooked some major qualitative facets of HC. They argued that HC is not a mere financial residual, but a combination of various characteristics of people and human resource activities. Likewise, Bullen and Eyler (2010a) argued that accounting base techniques are not able to quantify HC. The human indicator-based approach though, encapsulates both the qualitative and quantitative aspects of HC, it misses some major strands of HC. For example, Abdullah, Jaafar, and Taib (2013) considered five major qualitative and quantitative dimensions of HC, but these dimensions are limited. Companies need to measure the facets of employee capabilities that are productive for attaining their business goals. The importance of employees' competencies is heavily influenced by the business needs of the firm. This dependence consequently makes it unfeasible to formulate a universal set of measures that will be applicable in all scenarios. It infers that each organization has to strive to identify the most germane measures (Purcell, 2003). Likewise, while analyzing HC-performance relationship, studies consider that all the dimensions of HC equally affect firm performance, which may not be true in reality. For example, education, experience and training are considered to be the main constituents of HC, and they affect firm performance equally. However, studies from Berg (1970), Hotchkiss (1993) and Rumberger (1987) mentioned that education did not have any effect on productivity. Medoff and Abraham (1980, 1981) asserted that experience (a vital cord of HC) was linked with a higher level of earnings, but not with a higher level of performance of the firm.

The non-existence of the common measures makes it impracticable to compare HC contribution across firms, industries or sectors (CIPD, 2006). Hence, to evaluate the impact of HC on business goals, there is a greater demand for HC measures which are more practical (King, 2010). This is only possible if the measures of HC are available and comprehensively take into account both aspects, qualitative and quantitative. Such measures will also help to develop the industry and firm specific HC that will be more inimitable, according to the Resource-Based View (RBV; Wernerfelt, 1984).

2.4 Theoretical Exposition

2.4.1 Human Capital and Firm Performance

The traditional pre-1960 economists viewed the demands for compulsory education as demand for consumption of goods and are dependent on preferences, family income and the cost of education in the form of tuition fees. Most of the economists were satisfied to leave it to sociologists and social psychologists to show that both "preferences" and "abilities" are dependent in turn on the social background of students and particularly on the educational levels of parents.

As discussed in the previous section, this view started to change in the 1960s, when economists like Schultz, Becker and Mincer postulated humans as capital, and considered expenses on education, health and training as investments. Coining the notion of HC, they considered it a major factor affecting the level of productivity at the individual and societal levels. For example, Mincer (1958) explained how the difference in incomes could be attributed to the difference in the level of HC development. He showed that it was investment in HC that was responsible not only for the difference in personal income, but also in productivity.

Congruently, Schultz (1961) discussed the dimensions of HC, explaining how HC could affect national output. Broaching on the subject of the importance of HC, he explicated that for growth at the macro and micro levels, investments in HC was indispensable. At the very outset, in his study entitled “HC Investment”, he expounded the difference between a greater increase in national output compared to an increase in resources (land, labor, physical resources); he pointed out that it was because of investment in HC that this difference arose. He accentuated that HC directly affected the output at the macro and micro levels. In conclusion, he asserted that growth in HC was imperative for the process of growth. Likewise, Becker (1962) in narrating the influences of future real income, explained that investment in HC could raise the future real income of a person. He also illuminated that the investment in HC affected the performance of a firm, and it contributed to the process of economic growth. He considered OJT, schooling and health as constitutive factors of HC.

Penrose (1959) highlighted one fundamental cord of HC, which was equally important. To her, experience directly contributed to the objectives of a firm and its result could be transferred; however, experience itself was not transferable. It was this reason, according to Penrose (1959) that managers with implicit experience of the organization's capabilities, and processes might be more productive to the firm, and their exposure could make a firm set to have better opportunities. She further clarified that some of the companies might have managers with visionary outlooks coincidentally, but most of the companies had to develop them by incorporating the appropriate culture and the best HC development practices, which included an appropriate incentive system, training and best HR practices. This not only augmented the performance of the firm, but also the core competency of the firm. She also mentioned that a binding constraint for the companies might be its own managerial capabilities, which would limit its growth rate, famously known as the *Penrose effect*. Clarifying this point, she submitted that if a firm either intentionally or unintentionally grew at a higher pace than the speed at which its human resource could get to experience and learn new things from each other for the effective operation of the company, the performance of the organization would be badly hampered and there might be a chance for a stagnation in growth. Concisely, experienced employees contribute to the competiveness of a firm.

Likewise, theories discussing the nature and objectives of a firm always considered HC a vital factor for a firm’s competitiveness. In contributing to competitive advantage, according to the RBV, the resources should have four characteristics; they are value addition, non-substitutability, rareness and inimitability. Companies can achieve competitive advantage in two ways. First, they can use training, incentives, recruitment and selection and other such practices to make its HC valuable, rare, inimitable, and non-substitutable (VRIN). The RBV has unveiled HC as a major source of competitive advantage, which can have all the characteristics of VRIN, *ergo* attracting the attention of strategic managers to focus on HC as a source of sustainable competitive advantage. Secondly, companies can pursue competitive advantage by investing in technology and other physical resources (Delery and Shaw, 2001). However, to shape sustainable competitive advantage, knowledge embedded in HC is considered the most valuable, non-substitutable and inimitable resource, because it is specialized and holds implicit specialized knowledge (Coff, 1997; Grant, 1991, 1996). Copying HC is strenuous because one cannot identify the specific facet of its advantage and replicate how it is assembled. Empirical literature is filled with the evidences that HC can be a major source of sustainable competitive advantage (Becker, 1962; Coff and Kryscynski, 2011; Ployhart, Weekley, and Baughman, 2006; Prahalad, 1983).

Epitomizing the same point, Hitt, Ireland, Camp, and Sexton (2001) argued that the ability of human resources to learn, improved as experience grew. Thus, a feedback effect resulted in the relationship between HC (experience) and learning: learning creates specific HC (tacit knowledge) that in turn enhances the firm's learning performance. The RBV predicted that superior HC, when it was firm-specific, could create competitive advantage for a firm as HC improved learning-by-doing, thereby reducing the firm's cost.

Explaining rent seeking, Andrews (1971) exemplified that firms selected their strategy to generate rents based on their resource capabilities. Organizations with the strategic capability to focus and coordinate human effort and the ability to evaluate effectively the resource position in terms of their strengths and weaknesses, had a strong basis for competitive advantage. Latching onto the Dynamic Capabilities theory, it is revealed that long-term competitive advantage based on resource configuration is impossible, without the involvement of HC. Eisenhardt and Martin (2000) in explaining the sources of dynamic competitive advantage, explained that strategic decision-making is the result of pooling various business, functional, and personal expertise, to make the choices that shape the major strategic moves of the firm. These skills are inculcated through HC development. These skills not only enhance the absorptive capacity of an organization, but also augment the process of innovation (see also Helfat and Peteraf, 2009; Felin and Foss, 2005).

Likewise, Hatch and Dyer (2004) mentioned that in the RBV of the firm, HC is frequently assumed to contribute to competitive advantage due to its inimitability based on its intangible, firm-specific and socially complex nature. Consistent with this view, they find that investments in firm-specific HC have a significant impact on learning and firm performance. More specifically, HC selection (education requirements and screening), development through training, and deployment, significantly improve learning-by-doing, which in turn improves performance.

The crowning point of theories related to firm performance is that HC is significantly important for a firm to have sustainable competitive advantage (Fujimoto, 2011; Huselid, Jackson, and Schuler, 1997). Sustainable competitive advantage is a result of a consistent increase in productivity and innovation. It not only gives prominence to a firm in domestic markets, but it also a source for success in the international market. Companies which have strong international competitive advantage will have higher exports.

2.4.2 Human Capital and Structural Characteristics

Researchers also argued that the levels of HC differ by size. The size of a firm is defined in many ways. Most studies (Armstrong and Taylor, 2014; Davis and Henrekson, 1999; Pagano and Schivardi, 2003; Winter-Ebmer and Zweimüller, 1999; Winter and Nelson, 1982) consider employment as the measure of a firm size. There is a strong and systematic relationship between firm size and HC (Davis and Henrekson, 1999). Theories related to differential wage-size view that higher wages create differences in levels of HC (Oi and Idson, 1999). Since large firms are able to pay higher wages, they attract better quality of HC (Fox and Smeets, 2011; López-Bazo and Motellón, 2011).

Besides size and industry, researchers also claimed that ownership of a firm, in terms of foreign or local, heavily influences the level and process of HC development of that firm. Generally, in LDCs, companies with foreign ownership possess a high level of HC compared to local ones. According to Narula and Marin (2003), in the case of Argentina, foreign firms select higher quality HC compared to the domestic firms of similar size, besides investing more in training than national firms. Likewise, Tavares and Teixeira (2005) who focused on Portugal concluded that foreign firms possessed higher general, firm specific and industry specific HC compared to the domestic firms. Researchers also argued that better working conditions and investments in HC development activities are the primary reasons of a high level of HC in foreign-owned companies (Wan, 2007). In the case of Malaysia, Bontis, Chua, and Richardson (2000) asserted that local Malaysian firms had a less inclination to develop HC, and only limited training and other HC development initiatives. Since most of the inward foreign direct investment (FDI) to developing countries come from large multinationals, the small and medium enterprises (SME) in these countries fail to attract substantial foreign investments. Extending the argument, Wizarat (2011) contested that generally, foreign-owned companies are very competitive in terms of their human and financial structure compared to domestic firms of the same size. This necessitates a separate policy framework for domestic firms to improve their competitiveness. However, scholastic work (Ritchie, 2002; Tavares and Teixeira, 2005; Teixeira and Tavares, 2014) revealed that foreign firms do not possess higher quality HC nor provide more training compared to domestic firms.

The above discussion illustrates that the level of HC can differ by industry, size and ownership. The shows that in examining the links between HC and firm performance, the afore-mentioned structural characteristics of the firm need to be accounted for.

2.5 Empirical Evidence

2.5.1 General Findings

Many of the empirical researches characterized the positive impact of HC on various performance dimensions of a firm. Empirical studies revealed its impact, entrenching from the survival of a firm, to technological progress. For example, in taking *productivity* as an important indicator of firm performance, Black and Lynch (1996) showed that HC was an important determinant of the latter. Correspondingly, using 83 countries' data on HC and productivity, Miller and Upadhyay (2000) found a significant effect of HC output. They observed that by including HC in the production function, it lowered the elasticity of output with respect to labor, suggesting a positive relationship between HC investment and total factor productivity.

Congruently, in a cross-country analysis, Kim and Lee (2006) computed total factor productivity (TFP), technological change and technical efficiency in 49 countries for the period starting from 1965–1990. Their analysis found that East Asian countries led the world in technical efficiency and productivity growth, which further led to a higher economic growth. Technological development, HC accumulation and technical efficiency were the major contributors to TFP growth in East Asia. Though these researches encapsulated the macro view of HC, a number of researchers attempted to unveil the HC-performance relationship at the micro level. For instance, Abowd and Kramarz (2005) conducted a study on manufacturing firms in France. Estimating the reciprocity between HC and firm performance, they took sales per worker to represent the latter, while HC was captured through experience, education and OJT.

Similarly, Apergis, Economidou, and Filippidis (2009) explored the association between spillovers, HC and productivity, focusing on secondary data for the manufacturing sector. They found a positive significant impact of HC on productivity. Moving on, they explained that there was reciprocity between HC and technological innovation. To provide richer results, some of the researchers collected primary data for analyzing HC and firm performance (see Menon, 2010). Menon studied how education, work-related competencies and individual skills affected performance based on primary data from 26 Cypriot firms. HC was found to be significant for productivity.

Beyond productivity, the importance of HC for *innovation* was also taken up by several studies. For example, Heckman (2000) and Laursen and Foss (2003) highlighted that HC directly contributed to innovativeness. Similarly, the study by Lööf and Heshmati (2002) supported the HC-innovativeness relationship as HC contributed to organizational competitiveness. Likewise, De Winne and Sels (2010) asserted that HC made organizations more creative and innovative, thereby enhancing their long-term survival.

Some studies analyzed the HC-innovation relationship in the context of the organization's *absorptive capacity*. Researchers viewed that HC increased the absorptive capacity of an organization that further had positive implications on its performance. Romijn and Albaladejo (2002) illustrated this case. They explained that working experience improved the absorptive and innovative capacity of a firm, which in turn influenced its performance. Likewise, Vinding (2006) conducted a similar type of study to find how HC affected the degree of innovation of a manufacturing firm. He found that the inclusion of an educated labor force increased the chances of innovation in a firm, all other things being constant. In that sense, HC had increased the absorptive capacity of a company, which then explained its degree of innovation.

Another factor that accounts for performance is the degree of *value addition*. High performance means greater value addition. Firm specific HC is one of the prominent reasons of value addition. Bontis et al. (2005) conducted an empirical investigation to find out the relation between intellectual capital and the firms' market valuation and financial performance. They found that the firms' intellectual capital had a positive impact on the market value and financial performance. The author mentioned that the role of HC among other constituents of intellectual capital was the most significant for firm performance.

Considering *technological progression* as an important performance indicator, Gimmon and Levie (2009) found a positive association between the founder's HC and technological progression in newly-started firms. Firms with more experts and developed HC did not only receive technology transfer more efficiently and effectively, but their internal technological progress also increased. Similarly, Colombo and Grilli (2005) observed a positive relationship of different dimensions of HC with the technological progression of a firm.

Since the concept of globalization has been popularized, the internationalization of a firm is considered an important parameter for evaluating its performance. The ability of the firm to *export* to the foreign market is considered important to reflect the position and strength of the firm. Studies by Wagner (1995) and Munch and Skaksen (2008) on the HC-export relationship found a positive relationship between the two.

Notwithstanding the above findings, some empirical researches have indicated no or a negligible impact of the HC on the firm performance. Newbert (2007) argued that among the studies on HC- firm performance, only 33 per cent support a positive association between the two. In explaining the equivocal results of past researches, Slaughter, Ang, and Boh (2007) illustrated that previous researches have not separately analyzed the effect of firm-specific and general HC on the performance of a firm. General HC may not affect the performance of a firm, whereas firm-specific HC may exert some impact.

Despite the limited contradictory results, numerous studies maintained a significant positive relationship between HC with productivity, exports (Ilmakunnas, Maliranta, and Vainiomäki, 2004), innovation and technological progress (Barro, Mankiw, and Sala-i-Martin, 1995; Lucas, 1990). Alternatively, human resource quality also explains the inter-firm differences in productivity (Woodruff, 1997).

2.5.2 Evidence from South Asia

The preceding section provided evidences based on developed countries. Among studies conducted on HC and firm performance in South Asia, most of them focused on India, Bangladesh and Pakistan.

To begin with, in the case of Bangladesh, Salim and Kalirajan (1999) expounded that the low processing food sector efficiency in Bangladesh could be considerably increased through HC accumulation in the form of education and job training. Likewise, Bharathi Kamath (2008) carried out an empirical study to find the link between the different components of intellectual capital (including HC) with performance of pharmaceutical firms in Bangladesh. He took profitability, productivity and market valuation as indicators of firm performance. His study concluded that HC was significant for performance.

Concentrating on the productivity-HC nexus, Hamid and Pichler (2009) administered a study on the manufacturing sector of Pakistan from 1979 to 2005. They found that growth and productivity of the manufacturing sector of Pakistan had a significant positive relationship with HC development. Their empirical findings showed that the contribution of productivity and HC was around one-third of the total value-added growth in the manufacturing sector.

Singh (2000) undertook a study to explore the extent of HC development with the firm's performance. Citing productivity (sales per employee), turnover (average annual employee turnover), financial performance (price-cost margin, return on capital employed, return on net worth) as indicators of performance, he found a significant positive impact of HC on the firm's performance. He suggested that Indian manufacturing companies invest on training and employee selection in order to augment the firm's performance.

In a similar study in Pakistan, Mahmood and Siddiqui (2000) measured the Total Factor Productivity (TFP) of Pakistan's manufacturing sector over the period from 1972 to 1997. They ascertained that increased expenditure on research and development (RandD), growth of scientific and technical work force and growth in knowledge and HC had a significantly positive impact on the TFP growth in manufacturing. Knowledge and HC showed 30 per cent and 18 per cent of the variance in TFP respectively. They also found a positive and significant impact of openness and trade liberalization on TFP.

From the perspective of shareholders, anything that affects the shareholders' value positively holds importance for the company. Therefore, there was always a need to see how HC dimensions were related to the financial performance of a firm. Focusing on this issue, Murale, Jayaraj and Ashrafali (2010) probed how the performance of Indian manufacturing firms was influenced by HC. They took return on capital employed, return on average asset, earning per share and market value to look at value as performance indicators. Studies found a strong significant impact of HC on these different performance dimensions. By considering intellectual capital as a major source of competitive advantage, they suggested that investment in HC was indispensable for superior financial performance.

Alike, Chaudhry and Roomi (2010) found a link between the contribution of HC development and the firm's performance. By focusing on 30 textile companies in Pakistan, the study found a significant association between HC development and the performance of firms in the textile sector. The main problem with their research was the small sample size and lack of generalization. The study further highlighted the need of a scholastic work that encapsulated the broader spectrum and multiple dimensions reciprocity of HC and firm's performance.

In order to investigate the HC-performance paradox accurately, some of the researchers divided the manufacturing sector into formal and informal sector. In the same kind of study, Kathuria, Raj, and Sen (2013) explored the contribution of HC to the productivity of the Indian manufacturing sector. They took both the formal and informal Indian manufacturing sectors for an analysis. Using the Cobb-Douglas production function framework, the work estimated the four digit level data of 90 manufacturing industries using the LP method. The study found a positive effect of HC on TFP in the formal and informal sectors. However, the magnitude of TFP varied in both sectors. In concluding their study, they mentioned that HC played a crucial role in the TFP growth of the Indian industry.

Bhat and Siddharthan (2013) concluded that the HC of the Indian manufacturing sector which was represented in terms of higher education and health was a significant contributor of labor productivity. Further, they explicated that labor productivity was higher in areas where a greater portion of children went to secondary and higher secondary schools. Similarly, they highlighted that a healthier population had higher labor productivity.

To date, we had looked into the HC-performance relationship in large firms mostly. As this study primarily focuses on small and medium enterprises (SMEs), it is vital to refer to literature focusing on the HC-performance relationship in SMEs. The proceeding section briefly reviews the scholastic work done in this perspective.

2.6 Human Capital and Small and Medium Enterprises

2.6.1 Focus on SMEs

A large number of manufacturing firms falls under the category of SMEs. At one end, SMEs contribute to output and provide jobs; at the other end, it services the larger firms. Empirical researches highlighted that the SME sector not only contributed to innovation (Simonen and McCann, 2008) and employment (Storey, 1994), but also facilitated emerging industries (Keogh, Mulvie, and Cooper, 2005). It also acted as a change catalyst in a number of existing industries (Pena, 2002).

In the context of SMEs' and HC, Martin et al. (2013) conducted a research on 100 Romanian SMEs to check on factors that influence their productivity and ICT adoption. The study found that a rise in the productivity was mainly because of two elements, technological progress and HC. They also concluded that the adoption of ICT was an important factor for the sustainable development of SMEs.

SMEs' internationalization is predicated as another factor of growth. In order to identify factors of internationalization, Ruzzier et al. (2007) explored how the intrapreneurial dimensions of HC affected the former. Taking international business skills, international orientation, environmental perception and management expertise as components of HC, they showed that the entrepreneur's HC was related positively and significantly to the degree of internationalization of SMEs. They also depicted that the HC construct best explained the firm's internationalization.

Empirical researchers who highlighted the weak areas of the SME sector have often objected to the quality of HC. Rivas, Cano, and Austria (2013) made a point that among employed HC in the SME sector, only slightly more than half of them provided training to their employees; most of the trainings were only imparted to the staff at plants, and to a lesser extent to the owners and partners. Likewise, with SMEs, especially the small ones, the owner makes all of the human resource management decisions. In a number of SMEs, the owners make all decisions without hiring HC that is competitive. This is one of the reasons for the failure of SMEs in their gestation period. Holding on to the same point, if the owner hires competitive staff, the chances of failure can be reduced because of the competitive participation of HC in decision-making. Researchers also explicated that holding HC, will not contribute to HC accumulation without the delegation of authority to them (Dessler, 2001).

As in the organization, the people (human resource) make the decisions to allocate other organizational resources, so the competitiveness of organization in a way directly depends on the competitiveness of its HC. However, for HC to be competitive, it should have skills, like professional competence, innovation, creativity, pro-activeness, motivation, flexibility and availability. Keeping in mind the intensity of competition in the present era, SMEs must have a highly developed HC to have innovative and cost effective solutions to their problems (Rauch, Frese, and Utsch, 2005). According to Dessler (2001), in order to align with the global trends and be competitive, SMEs have to develop a committed and competitive HC. Hence, to be a competitive company, an SME firm has to deliberately develop its HC.

On the same note, Rauch et al. (2005) explained that a changing business environment made it compulsory for the employees to acquire new skills like oral and written communication, teamwork, interpersonal sensitivity, leadership, management planning, analytical reasoning, problem-solving ability, decision making, creativity, entrepreneurship, dynamism, energy and initiative and stress management. Continuing the same argument, Sidik (2012) stated that creativity, capacity and market orientation are important dimensions of HC, which directly affect the performance of SMEs. The following section discusses the relationship of the HC-performance in the case of SMEs in Pakistan.

2.6.2 SMEs in Pakistan

Since the focus of the majority of researches remained in large organizations, there is a dearth of literature focusing on the association between HC and SMEs performance in Pakistan (Batool and Zulfiqar, 2011; Berry, Aftab, and Qureshi, 1998; Khalique, Isa, Shaari, and Abdul, 2011; Lund-Thomsen et al., 2012). Among the major challenges faced by Pakistan's SMEs in the manufacturing sector is the lack of HC as most of the SMEs in Pakistan do not consider education and training as important for business start-ups (Marri, Gunasekaran, and Sohag, 2007; Ullah, 2012). The lack of HC, in turn, has also hindered technological change in these SMEs (Arendt, 2008; Barba-Sánchez, Martínez-Ruiz, and Jiménez-Zarco, 2007).

Existing work on HC supports the HC-SME performance. For example, Burki and Terrell (1998) examined the efficiency of 153 SMEs in Gujranwala, Pakistan. Applying Tobit's regression, they found that education and the experience of entrepreneurs (HC) had a direct effect on the efficiency of SMEs. Similarly, Khalique et al. (2011), having concluded their research on the SMEs of the electronic sector of Pakistan, showed that firms with better human and structure capital performed far better than those which had not. Likewise, Marri, Gunasekaran, and Sohag (2007) conducted an empirical investigation to identify the factors affecting the implementation of advanced manufacturing technologies (AMT) in the SMEs of Pakistan. The study suggests that lack of HC capabilities as prime impediments to implementing the AMT.

Additionally, human management practices in Pakistan revealed a positive impact of HC focused practices like high performance management practices (HPMP) on the companies' productivity and turnover. Raziq (2014) compared the HPMP of service and manufacturing-based SMEs of Pakistan. His study indicated that the service sector had better adopted the HPMP compared to the manufacturing SMEs, thereby accounting for the better quality of HC in the former relative to the latter.

Besides productivity and technological implications, HC has a momentous influence on the survival of SMEs. Approximately 95 per cent of SMEs in Pakistan cannot survive beyond the first year of their inception (Ullah, 2012). This indicates that survival is a critical challenge for Pakistan's SMEs. According to Ullah (2012), the major reason of this failure is deficiency of HC, particularly the lack of intrapreneurial skills, education and training. Apart from the fact that education and training is considered unimportant when hiring employees for the business, many SMEs in Pakistan do not have proper recruitment and selection system to acquire and develop the right mix of HC. Therefore, they remain incapacitated to perform well (Memon, Rohra, and Lal, 2010).

2.6.3 Analyzing HC-SME Performance

Following from the theoretical links between HC and firm performance in Section 2.4 and the scholastic work on that relationship as deliberated in Section 2.5, the general conceptual framework for HC-performance can be caricatured. Major performance dimensions identified are productivity, export, innovation, and technological progress. Survivability of firms, which are undeniably important for Pakistan, however, have been largely ignored in the literature. Rather, according to Teixeira (2002, p.14),

"Survival performance is a rather neglected perspective in what concerns performance and HC-related subjects. Most of these studies, namely those associated with HC theory, implicitly assume that survival is not problematic."

Further, the literature suggests that HC affects firm performance directly, and indirectly. Indirectly, HC increases the firm's capacity to absorb the knowledge, which further affects the performance of a firm. Against this backdrop, the analytical framework is set, which on one end comprehensively takes into account HC, and performance on the other end. Additionally, this framework also takes into account the absorptive capacity, the role of which is specified as a mediator. Figure 2.2 presents proposed analytical framework.

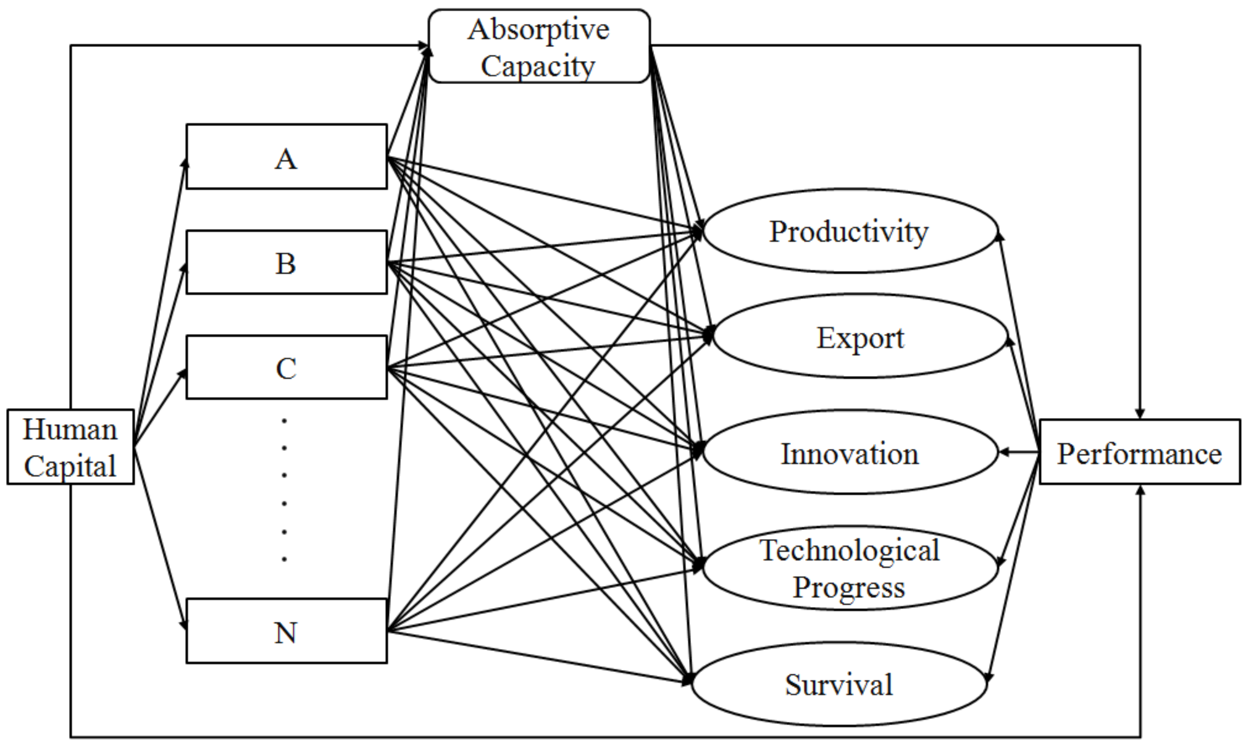


Figure 2.2 Conceptual Framework for Analyzing HC-Firm Performance

The N variables plotted in Figure 2.2 represent HC indicators; the appropriate number of variables would be selected by adopting the technique discussed in the subsequent Chapter 4, whereas the five variables, namely productivity, export, innovation, technological progress and survival proxy firm performance. The dimensions of HC, individually and combined, affect all performance cords directly and through absorptive capacity. Since the size of the firm, industry and ownership (foreign or local) can also influence firm performance, these firm characteristics and accounted for as control variables.

2.7 Summary

This chapter comprises three distinct parts, definitions and dimensions of HC, measurement approaches of HC, theoretical links and empirical review of HC and firm performance. The discussion concludes with a general conceptual framework for analyzing the relationship between HC, absorptive capacity and firm performance. The review suggests that industry, size and ownership be accounted for in the HC-firm performance analysis. From the review of the literature, three key points are identified. First, the need for developing a HC index to measure the level of HC in the SMEs of the manufacturing sector in Pakistan. Second, the need for a comprehensive examination of the HC-firm performance relationship by considering survival as an additional performance cord of a firm. Third, the need to test the differences in the levels of HC by industry, size and ownership.

CHAPTER 3:

PROFILE OF SMEs IN PAKISTAN

3.1 Introduction

This chapter profiles the historical perspective of SMEs in Pakistan as well as the demographic and performance outlook. The first part of the chapter produces a snapshot of the evolution of SMEs in Pakistan and the key institutions developed by the government to support the development process of SMEs. The next section analyzes the population and distribution of SMEs in Pakistan. The last section of the chapter states the performance outlook of the SMEs in the manufacturing sector.

3.2 Evolution of SMEs in Pakistan

Though the term 'small and medium enterprises' (SMEs) is the same across the world in the broader perspective, its strict definitions differ from country to country and even across different institutions within a country. In Pakistan, the official authority promoting SMEs and creating the commonly accepted definitions of SMEs is the Small and Medium Enterprise Development Authority (SMEDA). According to SMEDA (2007), *a firm is referred to as a SME if (a) it has employees up to 250; (b) annual sales up to 250 million rupees; and (c) paid up capital up to 25 million rupeess.* For firms in the manufacturing sector, having employees up to 50 are categorized as small firms whereas the firms which have employees more than 50 but less than or equal to 250 are considered as medium firms. Furthermore, the firms which have less than 10 employees and productive assets up to 2 million worth of dollars come under the category of Micro. Besides SMEDA, some other institutions in Pakistan have devised their own definition of SMEs. Among them are the SME Bank, Federal Bureau of Statistics, State Bank of Pakistan and provincial industrial development departments. The member countries of Asia Pacific Economic Cooperation

(APEC) have also defined SMEs in their own context. Table 3.1 and Table 3.2 depict a brief summary of the definitions in the local and APEC countries respectively.

Table 3.1: SME Definitions Used by Various Institutions in Pakistan

Institution	Small	Medium
SME Bank	Total Assets of Rs. 20 million	Total Assets of Rs. 100 million
Federal Bureau of Statistics	Less than 10 employees	N/A
Punjab Small Industries Corporation	Fixed investment up to Rs. 20 million excluding land and building	N/A
Punjab Industries Department	Fixed assets with Rs. 10 million excluding the cost of land	
Sindh Industries Department	Entity engaged in handicraft or manufacturing, of consumers or producer of goods with fixed capital investment up to Rs.10 million including land & building	
State Bank of Pakistan (SME Prudential Regulations)	An entity, ideally not a public limited company, which does not employ more than 250 persons (manufacturing) and 50 persons (trade/service) and also fulfills one of the following criteria: (i) A trade / service concern with total assets at cost excluding land and buildings up to Rs 50 million. (ii) A manufacturing concern with total assets at cost excluding land and building up to Rs 100 million. (iii) Any concern (trade, services or manufacturing) with net sales not exceeding Rs 300 million as per latest financial statements.	

Source: SMEDA (2007)

Table 3.2: SME Definitions in Selected APEC Member Countries

Country	Sector	Employment	Other Measures
Australia	Manufacturing	Less than 100 employees	
	Services	Less than 20 employees	
Canada	Manufacturing	Less than 500 employees	
	Services	Less than 50 employees	
China	Varies with Industry	Usually less than 100 Employees	
Indonesia		Less than 100 employees	
Japan*	Manufacturing	Less than 300 employees	¥100 million assets
	Wholesaling	Less than 100 employees	¥30 million assets
	Retailing-Services	Less than 50 employees	¥10 million assets
Korea	Manufacturing	Less than 300 employees	
	Services	Less than 20 employees	
Malaysia	Varies (for SMI)	Less than 75 employees (Different for Bumiputra Enterprises)	Less than RM 2.5 million
Philippines		Less than 200 employees	P 40 million assets
Singapore	Manufacturing		less than S$12 million fixed assets
	Services		Less than 100 employees
USA		Less than 500 employees	

Source: SMEDA (2007)

Located at a strategic geographical location, Pakistan is a gateway to South Asia. The state of Pakistan comprises of five provinces: Punjab, Khyber Pakhtun Khawa, Sindh, Gilgit Baltistan, and Baluchistan - with two Federally-Administered Areas -Tribal Areas (FATA); and the Federal Capital, Islamabad. Though the overwhelming majority of the country is Muslims, it has a highly diversified society in terms of language, tribe and custom. Pakistan covers an area of 796,096 square kilometers. According to the World Bank (2007), the population of Pakistan is approximately 162 million whereby 100 million live in rural areas.

Pakistan is a country with an inherited agriculture base. Before the founding of Pakistan, the area was a hub of food production. The agricultural products were produced and exported to the rest of the world. However, after Pakistan became a nation in August 1947, it focused on the manufacturing sector for economic development. The government itself took up the task of growing the industrial sector. It established institutions to develop important industries and then handed them over to the private sector. Since then, every new government has adopted the state-led model of industrialization. This state-led model set off the process of industrialization in a biased way, highly discriminating against the SME sector.

SMEs employ nearly 78 percent of the non-agriculture labor force. Further, the SMEs in the manufacturing sector total 19.72 percent. Presently, the SME sector contributes approximately 30 percent of the GDP. The small-scale industrial sector accounts for 17.2 percent and its contribution to GDP is 4.2 percent. It provides employment to 80 percent of the non-agriculture labor force and almost 90 percent of the firms in the industrial sector fall under this category (SMEDA, 2011).

It is important to note that at one end, the large scale manufacturing sector (LSM) in Pakistan grew at a rate of 7.1 percent from 1947 to 2010 with the full support and concentration of the government; on the other hand, without getting any serious attention from the government, the SME sector posted a consistent growth at a rate of almost 5.6 percent in the same period. The lack of attention by the government can be viewed by the fact that the country does not have any proper source of data on the SMEs except the Census of Establishments 1985, and the Directory of Industrial Establishments, Government of Punjab, 2002 (Bhutta et al., 2008).

Due to the stagnant growth of the LSM, the Government of Pakistan (GoP) thought of an alternative way to increase growth. Therefore, in 1998, the GoP focused on the SME sector. The GoP established the Small and Medium Enterprise Development Authority (SMEDA) for the development of the SME sector this year. SMEDA was responsible in devising policies and assisting stakeholders for the growth of SME. In 2002, the government amalgamated the Regional Development Finance Corporation and Small Business Finance Corporation and established the SME Bank after restructuring certain parameters. This bank was set up to provide required financial support to the SMEs for their growth and development. The GoP also set up various corporations at the provincial level to support the SME development of that particular province. Prominent among them were the Punjab Small Industries Corporation (PSIC), the Sindh Small Industries Corporation (SSIC), the KPK Small Industries Development Board, the Mineral and Azad Kashmir Industrial Development Corporation and the Balochistan Directorate of Small Industries.

Presently, in addition to the above-discussed organizations, the Trade Development Authority of Pakistan, Ministry of Science and Technology, National Productivity Organization and Chambers of Commerce and Industry also assist SMEs in various ways.

3.3 Demographic Profile of SMEs in Pakistan

The total labor force in Pakistan is 58.41 million with an unemployment rate of 5.6 percent. The agriculture sector engages the majority of the workforce with a proportion of 45 per cent whereas the industry and service sector employ a workforce of 20.1 per cent and 34.9 per cent respectively with a per capita income of USD 2800. The major agricultural products include cotton, wheat, rice, sugarcane, fruits, vegetables, milk, beef, mutton and eggs. Moreover, the industrial sector of Pakistan comprises of textiles and apparel, food processing, pharmaceuticals, construction materials, paper products and fertilizer.

There are approximately 3.2 million business enterprises in Pakistan, according to SMEDA (2011). Among them, 99 percent of the total enterprises i.e. 3.168 million are SMEs, 2.99 million establishments and 0.19 million households (Anas, 2014). The dominating sector is the service sector followed by community service and manufacturing. Figure 3.1 portrays the sectorial distribution of the SMEs. The manufacturing sector constitutes 20 percent of the total SMEs. The manufacturing establishment ranks third at 19.72 percent (573183 units) and household is the dominating group with 66.5 percent (126350 units) shares. So, in adding establishments and households, there are a total of 699533 firms in the manufacturing sector, 80 percent is with establishments and 20 percent is contribution from households.

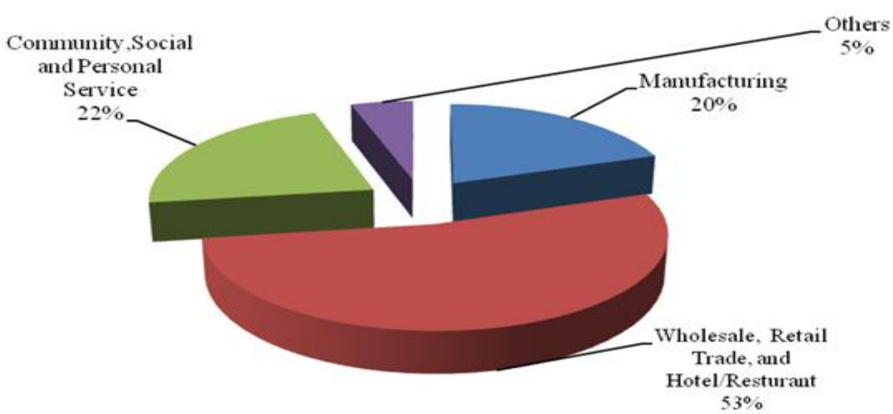


Figure 3.1: Sectorial Distribution of SMEs

Source: SMEDA (2013)

Though Pakistan's manufacturing sector is highly diversified, the major contribution is made of three major sectors (i) textile (24.02%) (ii) chemicals (15.17%) and (iii) food (13.77%). The textile, wearing apparel and leather industries constitute 43.2%, Food, beverage and tobacco stand at second with a 20.9% share, followed by wood and wood products at 10% and fabricated metal products machinery and equipment at 10.0%, Other manufacturing industries and handicraft are at 8.9% and the remaining sectors are at 11.1%. With 85% of the household establishments located in rural areas, 54% of the total rural households contribute to textile, wearing apparel and the leather sectors. In terms of the business sectors, cotton and textile (spinning, weaving processing, garments, sportswear and apparel) are the leading sectors, followed by wood and furniture, auto parts, electric fans, fabricated metal products, beverages, carpets, art silk, and jewelry. It can be seen that almost 50 percent of the total SMEs' businesses comprise of five major activities: cotton weaving, wood and furniture, grain milling, metal products and art silk. According to the Census of Establishments (Government of Pakistan, 2005), there are 72 districts in Pakistan and the majority of the SMEs (more than 50 percent) in the country are in the following ten districts: Karachi, Lahore, Faisalabad, Multan, Hyderabad, Sialkot, Gujrat, Shiekhupura, Gujranwala and Quetta. Furthermore, 25 per cent of the SMEs in the country are in Karachi, Lahore and Faisalabad districts.

Table 3.3: Provincial Distributions of SMEs

Name of area	**SMEs unit**
Pakistan	2.96 million
Punjab	65.26%
Sindh	17.82%
KPK	14.21%
Balochistan	2.09%

Source: SMEDA (2013)

From the perspective of the provincial distribution, according to the Federal Bureau of Statistics of Pakistan, 65 per cent SMEs are located in Punjab, 18 per cent in Sindh, 14 per cent in KPK and the other 3 per cent in Baluchistan and Islamabad (Table 3.3). Furthermore, 53 per cent are in wholesale, retail, restaurants and hotels, 22 per cent in community, social and personal services and 20 per cent are in manufacturing. A noticeable thing is that more than 90 per cent of the SMEs are less than 20 years old (Federal Bureau of Statistics., 2004; SMEDA, 2006).

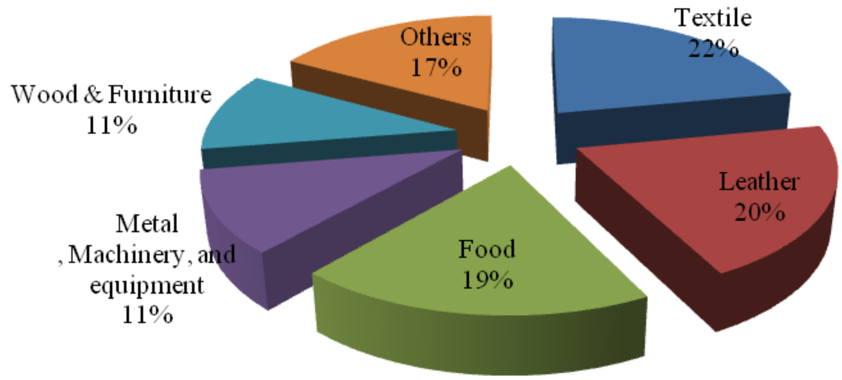


Figure 3.2: Distribution of SMEs in the Manufacturing Sector

3.4 Performance Outlook of SMEs

As discussed, approximately 30% of the GDP is contributed by the SME sector. The small-scale industrial sector accounts for 17.2% and its contribution to GDP is 4.2%. It provides employment to 80% of the non-agriculture labor force and almost 90% of the firms in the industrial sector fall under this category (SMEDA, 2010-11).

Table 3.4: Economic Importance of SMEs

Employment	GDP	Value Added	Export Earnings
78% (6.8 million)	40%	35%	25%

Source: SMEDA (2013)

It is fair to state that the SMEs play a pivotal role in the economic growth of Pakistan while contributing to export, providing employment (especially female employment), eradicating poverty and augmenting productivity, competitiveness and export. It contributes 30% to GDP, 15% to investment, 35% to manufacturing, and 80% to employment (UNIDO, 2013). In retrospect, it is revealed that in some of the eras, SMEs showed a very impressive growth, surpassing many other sectors. For example, according to the Federal Bureau of Statistics (2005), the SMEs sector grew at the rate of 14.7% from 1988 to 1997.

Table 3.5: Distribution of Female Workforce

Total female employees	Self-employed /proprietors	Unpaid family help	Paid employees
0.46 million	15%	30%	55%

Source: SMEDA (2013)

Keeping in mind the present condition of the SMEs, Pakistan is in dire need for the augmentation of the value addition element of its products. Pakistan's low value addition can be viewed from the fact that Pakistan sold one million bales of cotton at USD 1 billion, while India sold one million bales at USD 2 billion, and China at USD 4 billion. SMEs' growth can be categorized into five distinct stages, namely, inception, survival, growth, expansion and maturity. In Pakistan, it has been observed that SMEs which have been established by a certain group of people have performed well and some of them have reached maturity stage. However, the majority of SMEs which are started by individuals have always remained at the survival stage. One more factor is that SMEs with better technological network and educated employees have performed phenomenally well in some sectors. One other major observation is that owner-managers in SMEs seek survival as a major objective rather than growth, involving themselves in day-to-day operations rather than strategic decision-making.

Despite the apex position of SMEs in the growth of Pakistan's economy, it contains many weaknesses. The majority of the firms in the SME sector are small. Owners manage most of these small firms. These firms have very limited prospects of growth and very little employment potential. Rather, growth which is the prime objective of these firms remains at survival mode. Generally, these firms use the family labors for their operation. The growing firms only hire workers, which are very limited in number. The main challenge for the growing firms is to attract and retain skilled human resources. As the SMEs have a shortage of funds, they fail to attract the highly-skilled labor force. The better-qualified and skilled employees move to bigger companies which are able to pay the higher amount of funds. This is usual especially in the case of small firms.

In highlighting the weaknesses of SMEs, Roomi and Hussain (1998) identified some major causes. They asserted that smaller capital bases, lower capital intensity, fewer market or political connections and greater dependence on state or market-provided infrastructure and other services are the key reasons of the mal-performance of SMEs in Pakistan. Quoting an interesting example, they mentioned that the load shedding of electricity affected SMEs more compared to larger firms. The larger firms have the financial capacity to buy alternative energy generation sources like generators but most of the SMEs do not. Even if they have the resources, they might not have enough capacity to justify back-up power capacity.

3.5 Summary

In Pakistan, despite the ignorant behavior of the government, SMEs grew at a considerable rate. The formal effort by GoP was started in 1996 with the establishment of SMEDA (Small and Medium Enterprises Development Authority). The majority of the SMEs in Pakistan belong to the wholesale/ retail sector followed by the service and manufacturing sector. Since the SMEs in the manufacturing sector contribute more than 50 percent to the total output of SMEs, it is the most important and vibrant part of Pakistan's SMEs. The majority of these SMEs are located in three big cities of Pakistan namely, Faisalabad, Lahore and Karachi. In the manufacturing sector, textile is the leading sector followed by leather, sports, furniture and others.

CHAPTER 4:

METHODOLOGY

4.1 Introduction

The chapter comprises of three distinct parts. The first part of the chapter recapitulates the conceptual framework to measure HC and briefly delineates the technique to construct human capital index (HCI). Part 2 explains the analytical framework and methodology to analyze the HC-performance relationship. Along with it, this part briefly explicates the methodology to examine the difference in the level of HC by industry, ownership and size. The final part of the chapter expounds the variables used in the study and their way of operationalization.

4.2 Process Flow of Methodology

Keeping in view the objectives of the study, we organize methodology in two stages (see Figure 4.1). Stage 1 explains the methodology in developing the human capital index. It encapsulates all the steps, starting from the identification of the potential dimensions of human capital to the development of human capital index (HCI). Stage 2 starts with the explanation of the process of data collection by the SMEs. Further, it explicates approaches in analyzing the HC-performance relationship and to test the difference in the level of HC by industry, size and ownership.

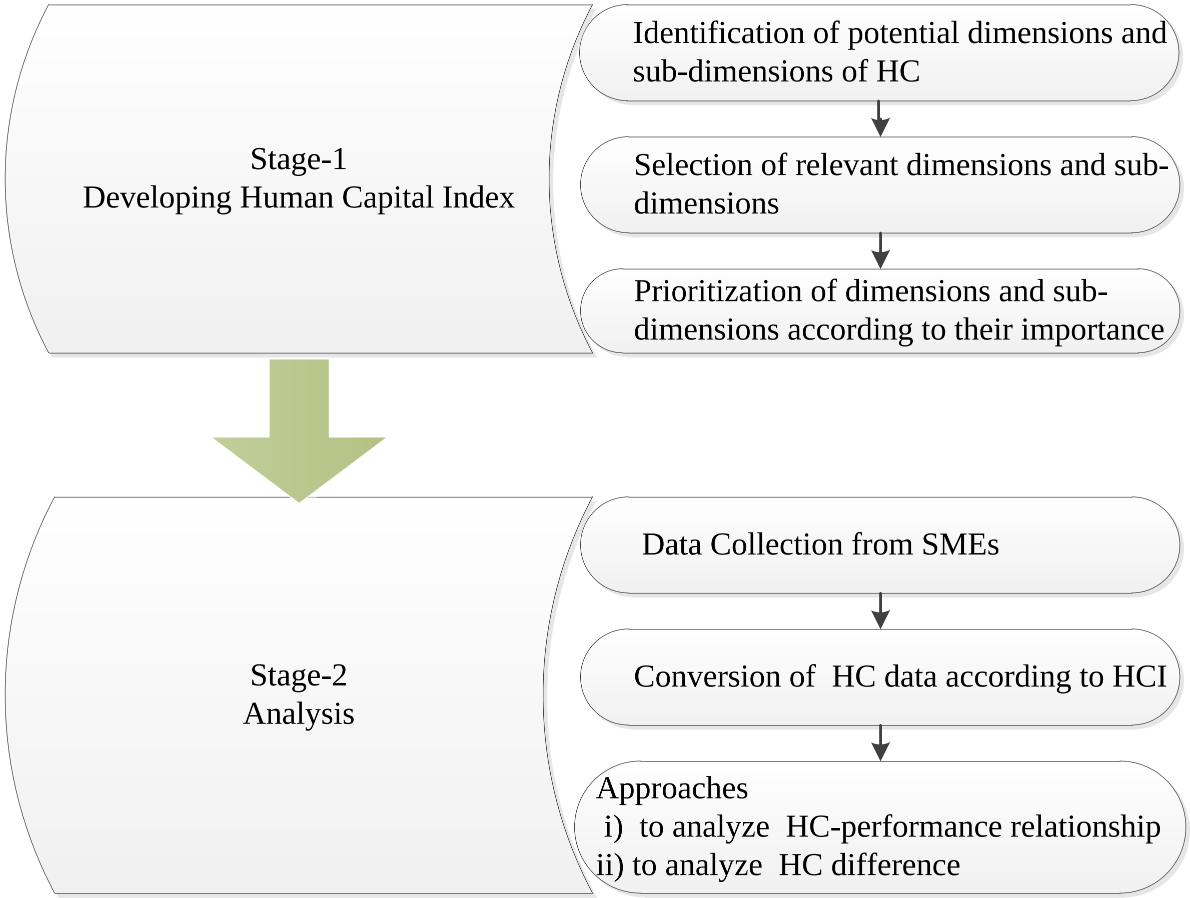


Figure 4.1: Process Flow of Methodology

4.3 Process Flow of Constructing Human Capital Index (HCI)

Stage 1 is organized in three major steps, namely identification, selection and prioritization (Figure 4.2). The first step was to identify and summarize the potential dimensions and sub-dimensions of HC which were extracted from the empirical literature. The second step is selection which is explicating the procedure to select the most relevant dimensions and sub-dimensions. The study names this step as a "preliminary survey". The final step is prioritization which is construing the process of assigning weights to dimensions and sub-dimensions identified in the second step and forming the human capital index. Figure 4.2 explains all the steps in detail.

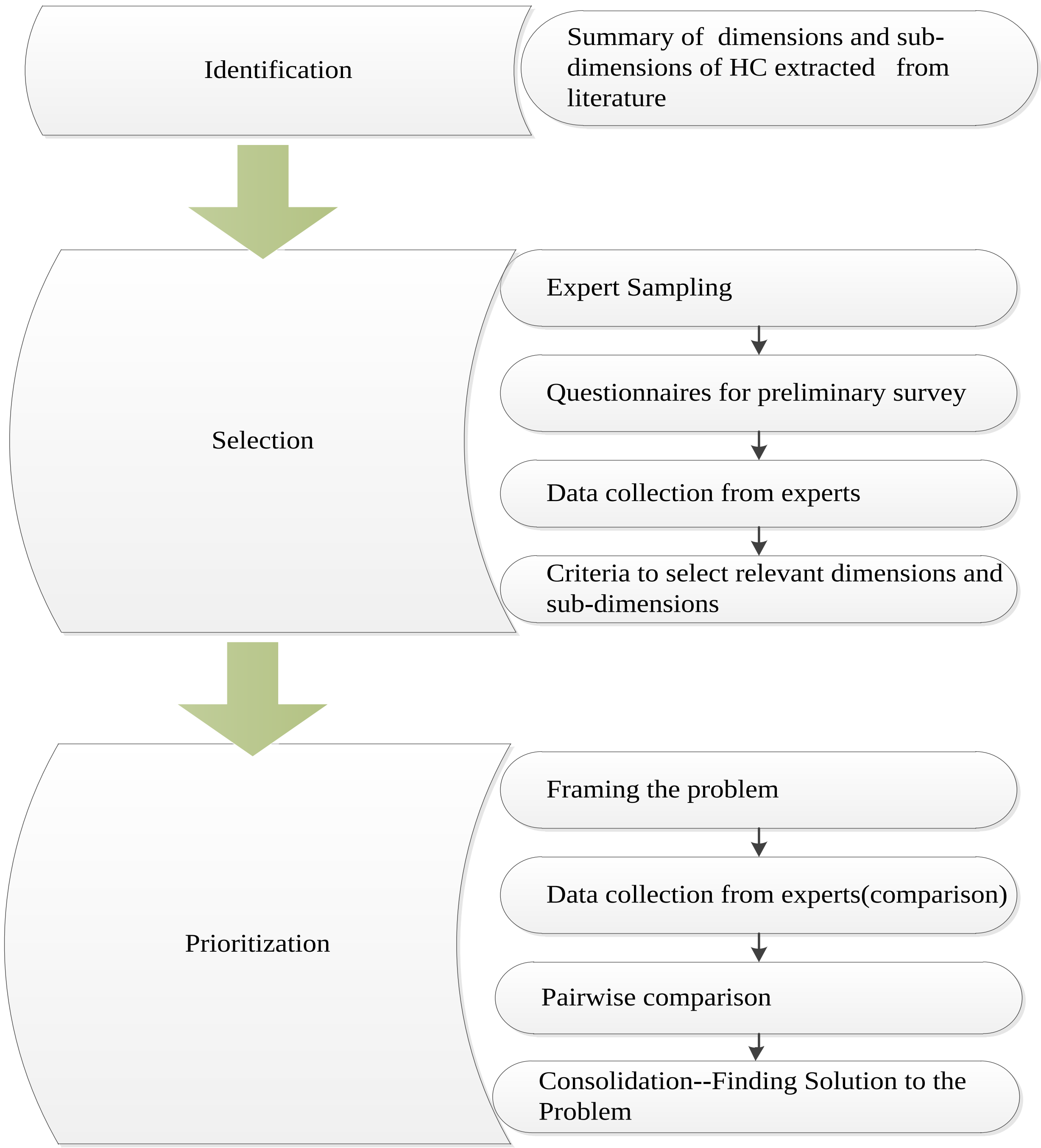


Figure 4.2: Stage 1 Process Flow of Constructing HCI

4.3.1 Identifying Potential Dimensions and Sub-dimensions

From the review of literature on human capital measurement, we identified 95 out of a total of 105 variables (10 of these were overlapping) used as a proxy of HC. Among them, some of the variables directly represented human capital like education, training, etc. We named these variables the dimensions of human capital although some of the variables indirectly represented HC. For example, the quality of education and level of education represent education whereas education is a further proxy of HC. We named such variables the sub-dimensions of HC. Table 4.3 and Table 4.4 show the potential dimensions and sub-dimensions of human capital extracted from literature. In the first step, we select the appropriate dimensions and sub-dimensions with the help of a preliminary survey. Then, in the second step, these dimensions and sub-dimensions are processed to determine the relative priority of each, thus forming the HCI.

4.3.2 Selection of Dimensions and Sub-dimensions

The selection of appropriate dimensions and sub-dimensions depends on experts' opinion gathered through the survey and processed accordingly. The proceeding section explains this process briefly.

4.3.2.1 Defining and Sampling Experts

We take the experts' opinions to select and weigh the appropriate dimensions and sub-dimensions of human capital. We also apply expert sampling which is a non-probability sampling technique to select the SME experts. This technique is a sub-case of purposive sampling in which the researcher relies on his own expertise to select the sampling unit. It involves the consolidation of a sample of individuals with some definitive experience and expertise in a particular field (Guarte & Barrios, 2006). This technique is adopted for two reasons. First, we targeted SME experts working in government institutions, financial institutions, non-governmental organizations (NGOs) and industries. The population of these expert groups is not known. Second, for this research, we require experts with particular experience and expertise, thus necessitating a deliberate selection of sample units. The first step in expert sampling is identifying the experts and what the term meant and represented. We divide the experts into three categories, namely industrial professionals, government officials and institutional executives. The data of government officials are taken from the relevant government departments and from their official websites. The data of the professionals in the industry and institutions are obtained through personal contacts. Table 4.1 provides a brief definition of each category of experts. 100 experts were selected, both for the preliminary survey and for the rating of AHP comparison. Table 4.2 exhibits the details of the experts sampled.

Table 4.1: Category of Experts

Expert Group	Stakeholders	Experience
Government officials	Government officials, who work in • Small and Medium Enterprises Development Authority (SMEDA) , • Trade Development Authority of Pakistan (TDAP), • State Bank of Pakistan • Planning Commission of Pakistan	10 years of experience in managerial capacities dealing with developments in SMEs
Institutional experts	Experts from • Academia • Non-Governmental Organizations • Microfinance institutions	• From the academia, individuals having 10 years of experience in teaching SMEs are considered. • For NGOs and Microfinance institutions, individuals who have been working at least 10 years for the development of SMEs
Industrial Professionals	Professionals who work in the manufacturing sector of SMEs in Pakistan	Individuals working in a managerial capacity for at least 10 years on the human resource issues of SME.

Table 4.2: Experts Sampled

Expert Group	Stakeholders	Number sampled	Total
Government Officials	Planning Commission of Pakistan	3	20
	State Bank of Pakistan	3	
	Small and Medium Enterprises Development Authority (SMEDA)	10	
	Trade Development Authority of Pakistan (TDAP)	4	
Institutional experts	Academia	6	20
	Non-Governmental Organizations	6	
	Microfinance Institutions	8	
Industrial Professionals	Textile	15	60
	Leather	10	
	Food	10	
	Metal	10	
	Furniture	10	
	Electronics	5	
Total			100

4.3.2.2 Data Collection from Experts for the Preliminary Survey

Using the dimensions and sub-dimensions from Table 4.3 and Table 4.4, we developed a questionnaire for the preliminary survey. It consisted of two parts, with questions based on the Likert scale ratio ranging from 1 to 3 *(where 1 denotes not important, 2 somewhat important and 3 very important)*. Part 1 of the questionnaire contained 40 potential dimensions of human capital selected from the empirical literature. Part 2 of the questionnaire encapsulated the 55 sub-dimensions (Appendix A). The questionnaire was sent to 10 SME professionals for inclusion/exclusion of any dimension(s)/sub-dimension(s) of the human capital. From the feedback of the experts, some minor changes were incorporated and then the questionnaire was sent to experts through email.

Table 4.3: Potential Dimensions of Human Capital

Abilities	Intrinsic value of employee
Attitude	Knowledge
Behavior	Leadership abilities
Capabilities	Learning
Commitment	Loyalty
Competence	Motivation
Compliance	Organizational tenure
Creativity	Personal Attributes
Cultural Aspects	Personal ethics
Disease	Personality Traits
Education	Professional technique
Employee interpersonal network	Quickness
Employee turnover	Reputation
Employee's values and beliefs	Safety issues
Ethics	Stability
Experience	Skills
Health	Spirit
Implicit Knowledge	Tacit knowledge
Innovation	Training
Intellect (employee's)	Vision

Table 4.4: Potential Sub-Dimensions of Human Capital

Similar Industry Experience	Level of Education
Work-Related Experience	Quality of Education
Organizational Tenure	Technical Education
Industry Experience	Years of schooling
Professional Competence	Cooperation
On the Job Training	Motivation
Spending on Training	Commitment
Time on Training	Satisfaction
Technical Training	Engagement
Entrepreneurial Training	Passion
Previous Training	Emotional Attachment
Interpersonal Training	Behavior
Professional Training	Vision
Creativity	Absenteeism
Gender	Longevity
Intelligence	Turnover
Diversity	Annual Non-Voluntary Layoffs
Energy	Physical Strength

Table 4.4, continue

Leadership	Age of Employee
Risk Taking	Disease Free
Personal Ethics	Energetic
Loyalty	Charges & Litigations
Work Related Skills	Safety Issues
Problem Solving Skills	Complaints
Communication Skills	Obedience
Technical Skills	ICT Skills
Entrepreneurial Skills	Intrapreneurial Skills
Profession related Skills	

4.3.2.3 Criteria to Select Relevant Dimensions and Sub-dimensions

To select relevant dimensions and sub-dimensions, first, we compute the mean value of every dimension and sub-dimension. It is done by multiplying the percentage of the respondents of a category with its value and adding the resulting products. For example, if 60% of the respondents rated Variable A as *not important*, 30% *somewhat important* and 10% very *important*, then the mean value will be 1.5= [(60% X 1) + (30% X 2) + (10% X 3)], where the values of 3, 2 and 1 represent "important", "somewhat important" and "not important" respectively. Mathematically, it can be written as:

$$MV= \%RNI*1+\%RSWI*2+\%RVI*3$$

Where MV is the mean value

% RNI represents the percentage of respondents who rated it 'not important'

% RSWI represents the percentage of respondents who rated it 'somewhat important'

% RVI represents the percentage of respondents who rated it 'very important'

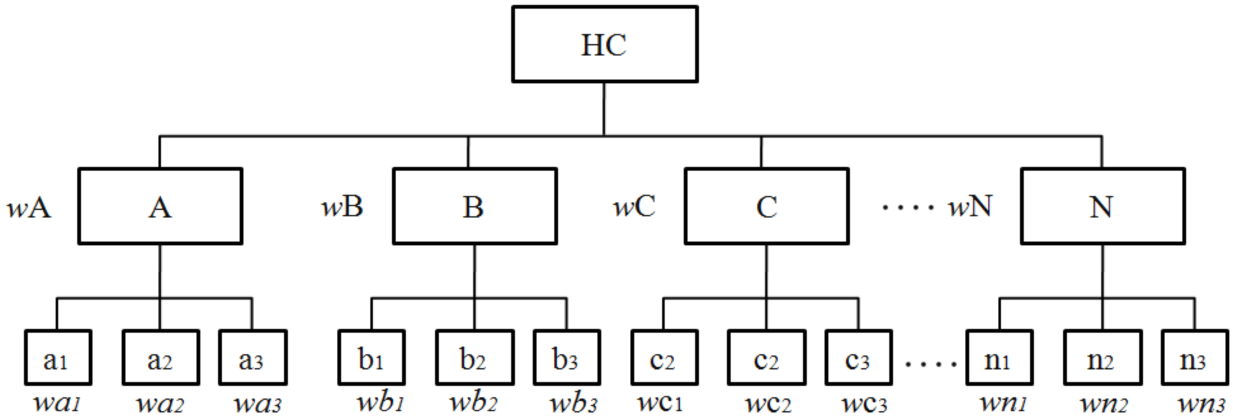
After finding the mean value of every dimension and sub-dimension, a standard mean value is kept as the cut-off criteria to select the relevant dimensions. We have chosen the average of the maximum and minimum mean values as the cut-off criteria. This whole procedure has previously been adopted by Tam and Tummala (2001) for the selection of the factors.

4.3.3 Prioritization Using the Analytical Hierarchy Process (AHP)

The previous stage only identifies the relevant dimensions and sub-dimensions. This stage assigns weightage to the selected dimensions and sub-dimensions according to their importance using the AHP approach. The analytical hierarchy process (AHP) is a multi-criteria decision making approach for dealing with complex decision problems. Saaty (1980) in his seminal work first introduced this approach. This approach uses a pair-wise comparison technique for evaluating different alternatives. Pair-wise comparisons define the relative importance of each alternative with reference to each criterion. From this pair-wise comparison, the AHP extracts weightage of importance to each criterion. Based on each criterion, the approach measures the performance of each alternative. The AHP transforms these assessments into numerical values and then uses these numerical values to elaborate the priorities of each alternative. The final decision is taken on the basis of these priorities. To apply AHP, Saaty (1980) described the four steps namely, framing the problem, collecting data, computing normalized weights and consolidation-finding the solution to the problem. The following lines explain each of the steps briefly.

4.3.3.1 Framing the Problem

In this phase, an appropriate hierarchy of the AHP model consisting of the goal, dimensions and the sub-dimensions are developed. Our prime goal is to develop an index that can encapsulate the level of human capital in a firm efficiently. Figure 4.3 portrays the AHP hierarchy for developing the human capital index. This goal is placed on the top of the hierarchy. The second and third levels of the hierarchy portray the dimensions and sub-dimensions of HC. The dimensions (criteria) and sub-dimensions used in these three levels of the AHP hierarchy are assessed using the basic AHP approach of pairwise comparisons of elements in each level with respect to every parent element located one level above.



where HC represents the overall human capital

A, B, C and N represent the dimensions of HC

a, b, c and n represent the sub-dimensions of HC

w represents the weightage of each dimension and sub-dimension

Figure 4.3: AHP Model

4.3.3.2 Collecting the Data

After constructing the AHP hierarchy, the proceeding step is measurement and data collection. The study designed a questionnaire by using the scale in Table 4.5, developed by Saaty (1980). The questionnaire appears in Appendix A. The questionnaire was sent to the selected 100 experts. The experts had to compare each dimension of the human capital with other dimensions and to compare the specific sub-dimensions with each other within a main dimension.

Table 4.5: AHP Measurement Scale

Degree of Importance	Definition
1	Both Dimensions are Equally Important
3	Weakly/Moderately Important
5	Strongly Important
7	Very Strongly Important
9	Extremely Important
2,4,6,8	Intermediate Values

Source: Saaty (1980)

4.3.3.3 Computing Normalized Weights

The results gathered from the questionnaire are processed to form the corresponding pair wise comparison judgment matrices (PCJMS) to determine the normalized weights as explained in the proceeding section. To calculate the weights for various criterions, a pair-wise comparison matrix P is created. The matrix P is an n×n real matrix, where n represents the number of evaluation dimensions taken. Every entry of the matrix P depicts the relative importance of the *w*th criterion when it compares to the *l*th criterion. If a_{wl}> 1, then the *w*th criterion is more important than the *l*th criterion, whereas if a_{wl}< 1, then the *w*th criterion is less important than the *l*th criterion. Similarly, if a_{wl} =1 then both criteria have equal importance. Perceptibly, a_{ww} = 1 for all *w*. The entries a_{wl} and a_{lw}attenuate the following constraint:

$a_{wl} . a_{wl}$ = 1 (3.1)

(3.1)

$$
P = \begin{array}{c} \\ D_1 \\ D_2 \\ D_3 \\ D_4 \\ D_5 \\ D_6 \\ . \\ D_n \end{array}
\begin{array}{c}
\begin{array}{cccccccc} D_1 & D_2 & D_3 & D_4 & D_5 & D_6 & . & D_n \end{array} \\
\begin{pmatrix}
1 & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} & . & a_{1n} \\
a_{21} & 1 & a_{23} & a_{24} & a_{25} & a_{26} & . & a_{2n} \\
a_{31} & a_{32} & 1 & a_{34} & a_{35} & a_{36} & . & a_{3n} \\
a_{41} & a_{42} & a_{43} & 1 & a_{45} & a_{46} & . & a_{4n} \\
a_{51} & a_{52} & a_{53} & a_{54} & 1 & a_{56} & . & a_{5n} \\
a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & 1 & . & a_{6n} \\
. & . & . & . & . & . & 1 & . \\
a_{n1} & a_{n2} & a_{n3} & a_{n4} & a_{n5} & a_{n6} & \cdots & 1
\end{pmatrix}
\end{array}
$$

Where,

n is the number of dimensions

D represents the relevant dimension up to the nth level

After the construction of the matrix-P, the next step is to derive matrix P_{norm} that depicts the normalized pair wise comparison. This is done by creating the sum of the entries in each column equal to1. This means every entry $\bar{a}_{wl}$ of P_{norm} matrix is calculated as:

$$\bar{a}_{wl} = \frac{a_{wl}}{\sum_{z=1}^{m} zl} \qquad (3.2)$$

In the last step, the elements of every row of $P_{norm}$are averaged, which form the criteria weight vector k. Equation 3.3 depicts this process:

$$k_w = \frac{\sum_{z=1}^{m} \bar{a}_{wz}}{m} \qquad (3.3)$$

The sub-dimension matrix is column vector C where every entry of c_{ij} of C symbolizes the score of the *i*th option with respect to *j*th criterion. To derive at such scores, a pair wise comparison matrix T^j for each of the g criteria, j=1, 2, 3…g. The matrix T^j is *m*x*m* real matrix; m represents the number of sub-dimensions evaluated. Every entry $h_{qx}^{(j)}$of matrix T^jrepresents the assessment of the *q*th option compared to *x*th option with respect to the *j*th criterion. Likewise,

if $h_{qx}^{(j)}$>1 , option *q*th is better than option *x*th.

if $h_{qx}^{(j)}$<1 , option *x*th is better than option *q*th.

if $h_{qx}^{(j)} = 1$, both options have equal importance.

Consequently, $h_{qx}^{(j)}$ and $h_{xq}^{(j)}$attenuate the following equation:

$$h_{qx}^{(j)} . h_{xq}^{(j)}=1$$

$$h_{qq}^{(j)}=1 \qquad \text{[for all } q\text{]}$$

The assessment scale illustrated in Table 3.4 is used for pair wise evaluation of sub-dimensions.

The same (two steps) procedure, when applied on matrix-P, is used to process matrix C. It involves dividing every entry by the sum of the same column entries, then entries on each row are averaged to obtain score vectors $y^{(j)}$*, j=1,…,g. The vector* $y^{(j)}$*carries the scores of the assessed sub-dimensions with respect to the jth criteria.*

Finally, the score matirc $y^{(j)}$ is attained as:

$$Y=[y^1 \ldots\ldots y^m]$$

After computing the weight vector ***k*** and the score matrix **Y**, the next step is to obtain global scores. The global scores are obtained by multiplying the weight vector ***k*** with the score matrix **Y.**

$$Y.k=u$$

The *i*th entry *ui* of **U** represents the global score assigned by the AHP to the *i*th option. Finally, for analysis purpose, the dimensions ranking is done by arranging the global scores in descending order of priority.

Consistency Ratio: When performing pair wise comparisons, one problem often encountered is the problem of inconsistency. It highlights the fact that the decision maker is not consistent when comparing the attributes. Consistency assumption illustrates the following situation:

if A>B , and B>C, then A>C

If this condition does not hold, it reflects the inconsistencies in the comparison. In order to detect the inconsistency, the AHP incorporates an effective approach which is constructing the pair wise matrix i.e. matrix P and matricesT^j involved in the process. This approach depends on the development of a Consistency Index (CI). The CI is obtained by first computing the scalar *x* as the average of the elements of the vector whose *j*th element is the ratio of the *j*th element of the vector **P.*k*** to the corresponding element of the vector ***k***. Then

$$CI = \frac{x - n}{n - 1}$$

Where n represents the number of evaluation criteria

In the same way, the CI for matrices T^j is obtained. When the decision maker is perfectly consistent, then CI will be equaled to zero. The greater the decision maker is inconsistent, the larger the CI will be. If CI <0.1, it is tolerable; however, if the CI exceeds this value, it is not tolerable. In order to get a more precise measurement for accuracy, the CI is divided by the Random Index (RI) given in Table 4.7 for small values. The *RI* depicts the consistency index when P has complete random entries. It is also the case if the value is less than 0.10, then it is acceptable, otherwise it is not.

$$\frac{CI}{RI} < 0.1$$

Table 4.6: Random Index Values

M	2	3	4	5	6	7	8	9	10
RI	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.51

Note: Random Index values for problem $\leq$ 10.

4.3.3.4 Synthesis-Finding Solution to the Problem

Once the normalized priority weights for each PCJM have been calculated, the next step is to synthesize the solutions for the derivation of the Human Capital Index (HCI). The normalized weights of the dimensions and sub-dimensions obtained from the third step are added together with respect to all succeeding hierarchical levels to attain the global composite priority weights of all sub-dimensions used in the third level of the AHP model.

4.4 Stage 2: Processes for Analyses

After developing the index to measure the level of human capital in SMEs, the study analyzes the HC-performance relationship and tests the difference in the level of HC by industry, size and ownership. Section 4.4 briefly explains the processes involved in these analyses.

4.4.1 Analytical Framework for Analyzing HC-Performance Relationship

Figure 4.4 depicts the analytical framework of the study. It illustrates the relationship between human capital and firm performance. The framework is an updated version of the conceptual framework. In the framework, we use the real dimensions and sub-dimensions of HC. The previous sections of this chapter briefly cover the selection and prioritization of these dimensions and sub-dimensions. The framework depicts the impact of human capital on various firm performance cords directly and through a mediating variable i.e. absorptive capacity. It can be disaggregated into two frameworks. The first is the overall relationship of human capital with firm performance, directly and through absorptive capacity. The second is the relationship of each sub-dimension of human capital with each performance cord, directly and through absorptive capacity. The proceeding section discussed in detail all the variables used in this framework.

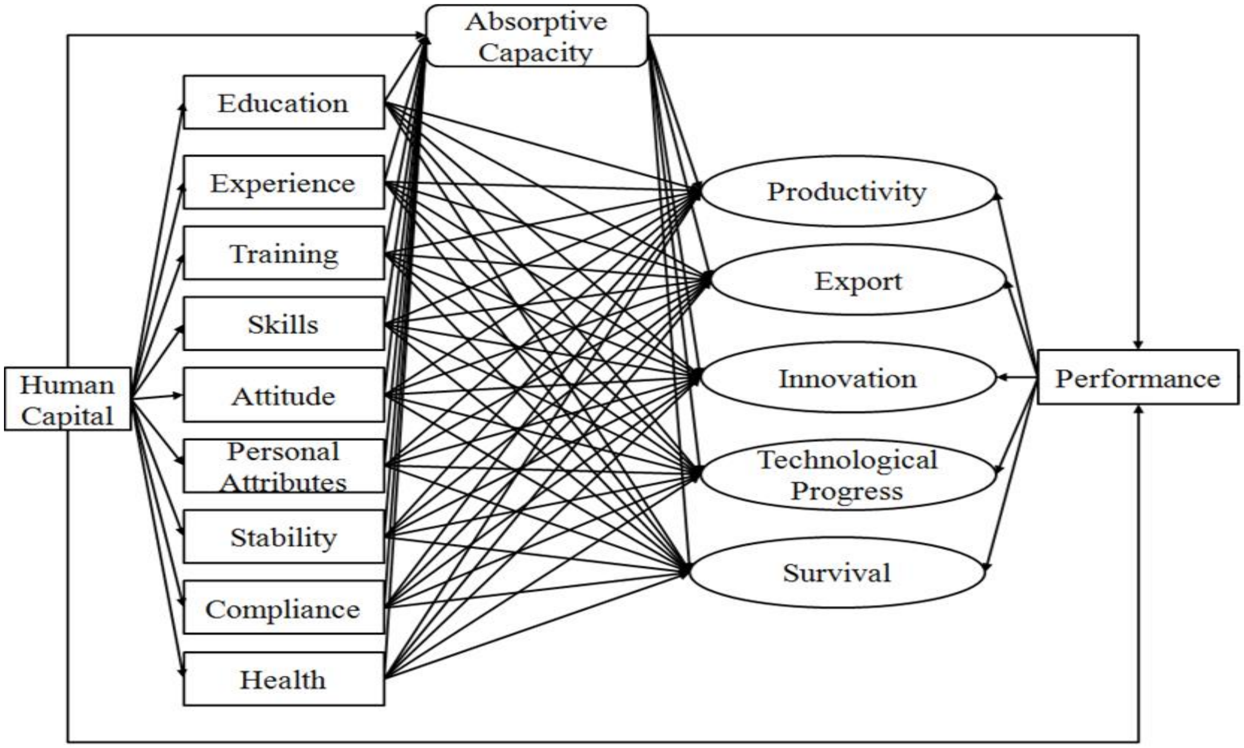


Figure 4.4: Human Capital, Absorptive Capacity and Performance

4.4.2 Data Collection

4.4.2.1 Population & Sampling

According to SMEDA (2011), the total SMEs in Pakistan are 5.2 million. From the provincial distribution perspective, according to the Federal Bureau of Statistics of Pakistan, 56 per cent of the SMEs are located in Punjab, 28 per cent in Sindh, 11 per cent in KPK and the other 3 per cent in Baluchistan and Islamabad (Figure 4.5). Further, 53 per cent comprise of wholesale, retail, restaurants and hotels, 22 per cent are in community, social and personal services and 20 per cent are in manufacturing. A noticeable thing is that a vast majority of the SMEs are less than 20 years old (SBP 2007; SMEDA 2011).

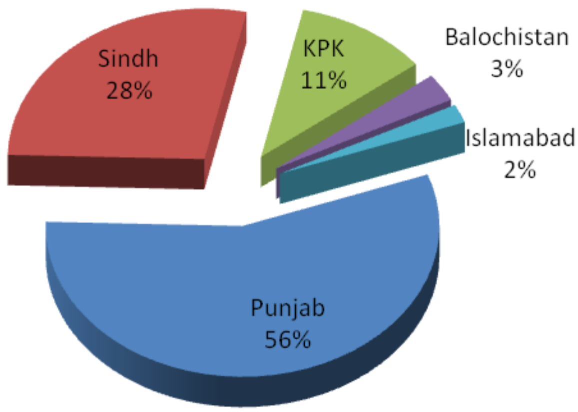


Figure 4.5: Provincial Distribution of SMEs (Source: SMEDA 2013)

We have targeted the manufacturing sector of the SMEs which are approximately 1million. However, the registered SMEs are only 20,550 (Table 4.5). According to the Census of Manufacturing Industries (2005-06), there are 72 districts in Pakistan. Among them, ten districts are the major clusters of SMEs (more than 50%), namely, Karachi, Lahore, Faisalabad, Multan, Hyderabad, Sialkot, Gujrat, Shiekhupura, Gujranwala and Quetta. Furthermore, 25 per cent of SMEs in the country are in Karachi, Lahore and Faisalabad districts. Using the cluster sampling techniques, which were previously adopted by Bhutta et al. (2008) and SME Centre, LUMS, we chose these ten districts for our study. The numbers of firms were selected from each cluster according to its proportion in the total population. Table 4.7 exhibits the number of SMEs taken from each industry for the study. We selected the number of firms from each industry based on its contribution to GDP. According to the economic survey in Pakistan (2013), textile is the leading contributor in the GDP of the manufacturing sector of Pakistan followed by food, leather and sports. In this way, the study selected a total of 750 firms (630 from 6 major industries and 120 from various small industries including carpet weaving, printing, chemical and fan industries) as samples of the study.

Table 4.7: Sampling

S. No	Industry	Percentage	Number
1	Textile	22	165
2	Leather	13	100
3	Sports	11	86
4	Food	20	150
5	Metal	7	50
6	Furniture	11	79
7	Others	16	120
	Total	**100**	**750**

The city-wise distribution of the selected samples, along with the number of SMEs registered in that particular city, appear in Table 4.8. The data of registered SMEs was taken from the Chamber of Commerce listings, Punjab Directory of Industrial Establishments, Jamal Yellow pages. For Hyderabad, and Karachi, stock exchange listings were used.

Table 4.8: Demographic Distribution of Sample

Cluster	Number of organizations	Proportion	Number of firms sampled
Karachi	4777	0.232	200
Lahore	4433	0.216	150
Gujranwala	2927	0.142	100
Faisalabad	2717	0.132	92
Sialkot	1993	0.097	90
Multan	1132	0.055	30
Gujrat	984	0.048	34
Shiekhupura	973	0.047	33
Hyderabad	553	0.027	19
Quetta	61	0.003	2
Total	20550	1	750

4.4.2.2 Construction of Survey Instrument

To collect the primary data from a large number of respondents, the questionnaire proves to be a reliable tool. Social science researches widely use it for data collection. Thus, pertaining to the nature and the unavailability of the data, we developed a close-ended questionnaire to collect the data (See Appendix A). The questionnaire consists of four major parts. Part A contains 33 questions about the basic profile of the firm and quantitative information related to human capital and performance. Part B of the questionnaire contains 75 rating questions related to nine measures of human capital (HC) dimensions. Likewise, Part C contains 14 questions which capture the absorptive capacity of a firm. Part D carries 31 questions to measure the five performance dimensions of a firm. All the items in Parts B, C, and D are measured using the five point Likert scale, ranging from 1 representing ‘strongly disagree’ to 5 ‘strongly agree’. In some of the questions, 1 represents ‘very low’ and 5 represents ‘very high’. Most of the items for a particular latent construct were adopted from the previous studies. However, in some of the cases, to measure the variable precisely, we also included items in view of the past literature. Table 4.9 summarizes the variables, their dimensions, the number of measurement items and the supporting literature for each variable.

Table 4.9: Operationalization of Variables

Construct	**Number of Dimensions**	**Number of items**	**Source(s)**
Education	3	10	Fitz-Enz (2000b), Han et al. (2008)
Experience	3	10	CIPD (2006), Han et al. (2008), T. W. Ng and Feldman (2010), Stajkovic and Luthans (1998), Luthans, Norman, Avolio and Avey (2008)
Training	6	18	Han et al. (2008), Srimannarayana (2011), CIPD (2006)
Personal Traits	6	23	Han et al. (2008), CIPD (2006), Fitz-Enz (2000b), Baer and Frese (2003), Gong, Zhou, and Chang (2013), Hayton (2011)
Skills	5	13	Han et al. (2008), Fitz-Enz (2000), Nicolaidis and Kosta (2011), Arvanitis and Loukis (2009)
Attitude	5	15	Rogelberg, Luong, Sederburg, and Cristol (2000), Saari and Judge (2004), Han et al. (2008), Ostroff (1992)
Compliance	3	11	Griffin and Neal (2000), Bontis (2001), J. Chen et al. (2004)
Health	3	10	A. B. Schultz and Edington (2007), Alexandru and Maria (2012), Stephen and Dhanpal (2012)
Stability	3	12	Glebbeek and Bax (2004), Fitz-Enz (2000b), Bontis, Dragonetti, Jacobsen and Roos (1999)

Table 4.9, Continued	Number of items	Source(s)
Performance		
Productivity	6	Bontis et al (2000), OECD (2001), Spring (2011), Croom and Nal (2000)
Innovation	19	Adegoke (2007), Rosenbusch (2011)
Survival	9	Taylor (1999), Frankish et al (2007), Mata and Portugal (1994), Strotman (2007)
Export	9	White et al.(1998), Gashi et al. (2014) IFC(2009)
Technological Progress	7	Zmud & Apple (1992), Lefebvre et al. (1991) and Mahrtens et al. (2001).
Absorptive Capacity	14	Flatten et al (2010)

4.4.2.3 Pre and Pilot Testing of Survey Questionnaire

We used the three-fold technique to ensure the content and face validity of the instrument. After preparing the first draft of the questionnaire, we discussed the questionnaire with two SME experts, human resource managers and organizational development consultants working for the SMEs in the manufacturing sector in Pakistan. The feedback and discussion helped to improve the suitability of the questionnaire. The improved questionnaire was then sent to eight professionals to check for any irrelevant, meaningless or ambiguous items. They were also asked to suggest any item that needed more explanation. The professionals identified some of the items that needed further improvement. Based on their opinions, we improved the questionnaire. In the third stage, the questionnaire was sent to ten companies, two from each textile, leather, food, metal and sports. The results of the descriptive statistics depicted that the questionnaire did not have any abnormality and was fit to use.

4.4.3 Technique for Analyzing the Human Capital-Performance Relationship

Since our framework requires testing the multiple relationships simultaneously, we used the structural equation modeling (SEM) approach to analyze. SEM is a comprehensive family of statistical techniques used for analyzing the relationship among multiple variables simultaneously (Hair et al., 2009; Hair, Tatham, Anderson, & Black, 2006). These variables may be observed or latent constructs measured by multiple items. Two approaches have appeared for SEM analysis, namely covariance-based SEM and component-based SEM. The first school developed around the concept by Karl Jöreskog. Covariance-based SEM has the ability to check the validity of model being analyzed; however, it is best that it works on large sample size, usually more than 100 observations or preferably more than 200 observations (Schumacker & Lomax, 2010). Primarily, the Maximum Likelihood Estimation (MLE) is used for analyis but it has the ability to apply other methods like Unweighted Least Squares (ULS), depending on the normality and other conditions of data. The component-based SEM, as popular as PLS-SEM, was developed based on the concept by Herman Worl. This approach works in two steps. First, latent variables scores are computed using the PLS algorithm and then the Ordinary Least Square (OLS) is applied on the LV scores to estimate the structural equations. The component-based SEM is best for small sample size. The major drawback of the component-based SEM is its inability to check the model validity. Besides having a sample size of 750, owing to certain deficienies in the component-based SEM, we use the covariance based-SEM for our analysis. In further discussions, the term SEM is referred to the covariance based-Structrual Equation Modelling, unless specified (Byrne, 2013).

4.4.3.1 Why Structural Equation Modeling?

Due to the limitation of existing approaches for cause and effect analysis, SEM has emerged as a powerful alternative. For example, the multiple linear regression analysis. Though it has the ability to accommodate multiple dependent variables, it is limited in specifying the relationships between those variables. Furthermore, in the regression analyis, a variable can be either independent or dependent, but not both. SEM has the ability to accommodate both the analytical situations simultaneously. For example, a set of variables might be used to predict a pair of outcomes that are related in such a way that one is regressed on the other. In the latter, one of the dependent variables is also an independent variable in that it is used to predict the other dependent variable (Awang, 2011; Hoyle, 2012).

SEM integrate and generalize two statistical approaches, namely, factor analysis and regression analysis. It combines an econometric focus on prediction with a psychometric perspective on measurement, using multiple observed variables as indicators of latent, unobserved concepts (Hoyle, 2012). For this purpose, SEM uses restricted factor analysis, commonly known as confirmatory factor analysis (CFA). The benefit of the CFA is its exclusive focus on the relationship between latent variables and their items. The traditional factor analysis model, known as the exploratory factor analysis (EFA) has a major drawback in that an infinite number of factor scores can be derived from the parameters (factor loadings and uniqueness) estimated by it (Steiger & Schönemann, 1978). It also requires the uniqueness to be uncorrelated. Keeping in view these limitations, the SEM models latent variables in a more flexible, mathematically defensible manner allowing a wide array of models that could not be evaluated using the EFA. Furthermore, this approach simultaneously copes with the issues of construct measurement and the structural relationships among the constructs.

4.4.3.2 Steps in SEM Analysis

The SEM analysis is implemented in four major steps, namely specification, estimation, evaluation, intepretation and reporting (Hoyle, 2012). Model re-specification is added as an additional step, if the evaluated model is not fit. Figure 4.5 below explains this methodology. The following lines explain each of the steps below.

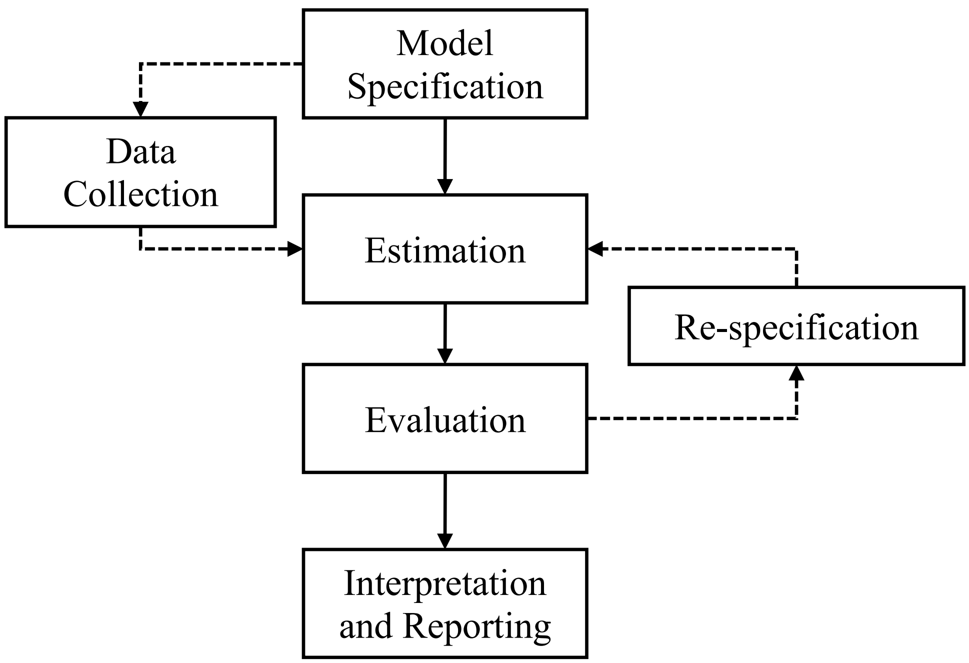


Figure 4.6: Steps in SEM analysis

I) Model Specification: The first step in SEM analysis is the specification of the model. The model is conceived from the theory and other scholastic literature and then specified in graphical form. It entails assigning the variables, their relations and the status of the parameters in the model. Assigning the variables involves which latent variables to include and which variables to observe, if any, in the model. After determining the inclusion of the observed and latent constructs, the researcher then has to decide on the relationships of the variables and their nature. Finally, the status of the parameters in the model is specified. Generally, the researchers fix the parameter by setting a specific value.

Our main research objective is to find the effect of human capital on the firm's performance. As explicated in the previous section of this chapter, the human capital was gauged by nine variables and the performance was captured by five latent variables. For the pupose of the analysis, the researcher stripped the main objectives into two sub-objectives. The first objective was to find the relationship of the overall human capital level with the firm's performance, directly and through absorptive capacity. The second objective was to analyze the impact of each dimension of the human capital (nine dimensions in this case), on every performing dimensions of the firm. In this context, we specified two models, one for each sub-objective. Figure 4.6 and Figure 4.7 depicted these models respectively.

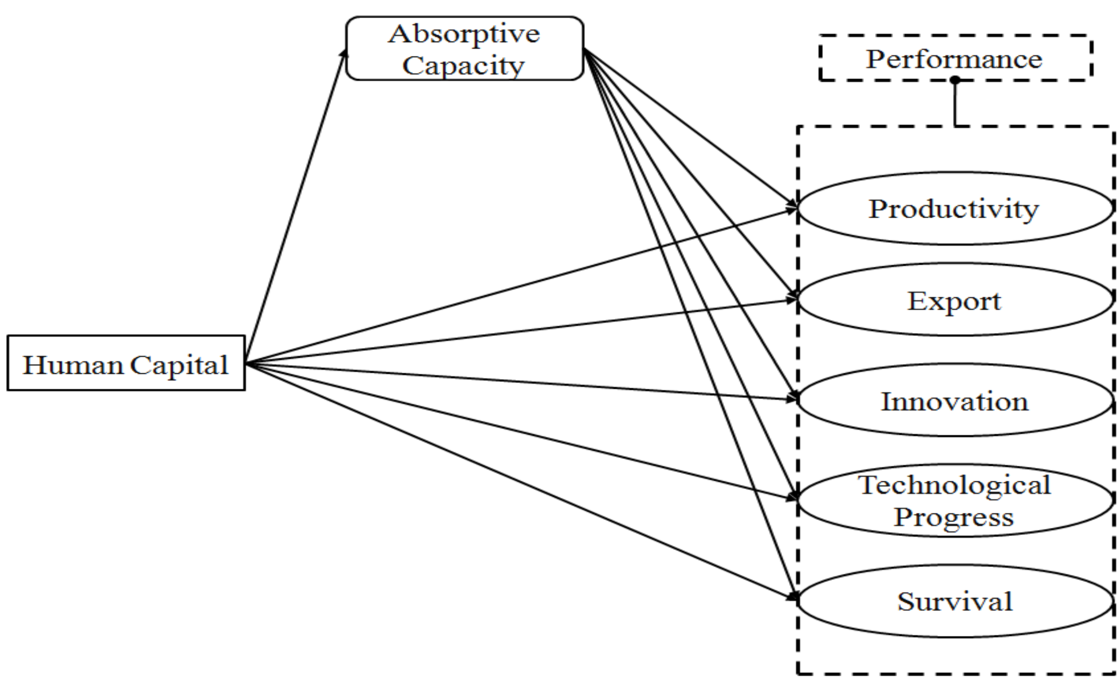


Figure 4.7: Overall Human Capital, Absoptive Capacity and Performance Dimensions

We derived ten hypotheses from Figure 4.5 to test (See Appendix F).

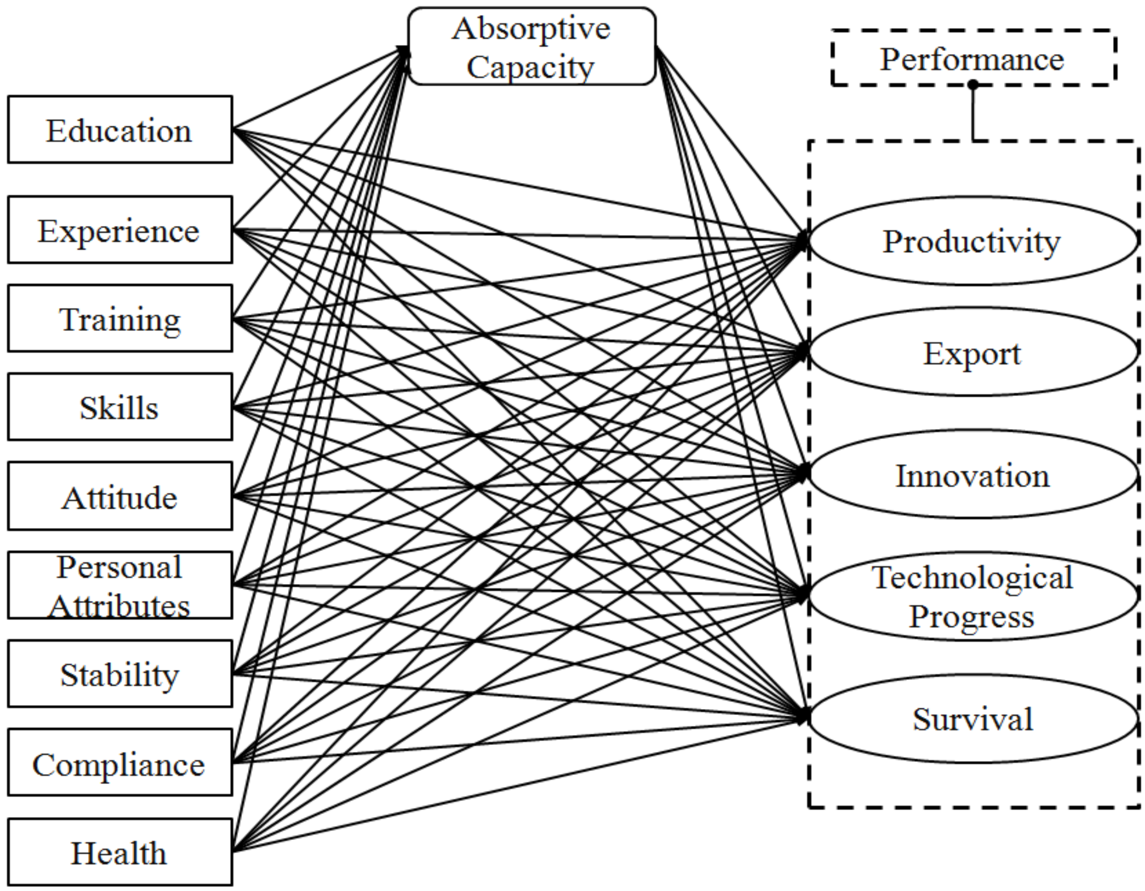


Figure 4.8: HC Dimensions, Absorptive Capacity and Performance Dimensions

Figure 4.7 conceptualizes the relationship of each of the dimensions of the human capital with every firm's performance variable. A total of nine human capital dimensions affect the five performance strands directly and through the absorptive capacity. In this way, a total of 90 hypotheses needed to be tested in Figure 4.6. The details of the hypotheses appear in Appendix F. After specifying them, the next step of the model is to collect the data for further analysis. A brief discussion on the data collection instruments, variable construction and sampling is shown in Section 4.4 to Section 4.6 of this chapter.

II) Model Estimation: After specifying the model and collecting the relevant data, the next step is to analyze the model. To analyse the model, the SEM uses the Maximum Likelihood Estimation (MLE). This approach is more efficient and give unbiased results, provided the data has multivariate normality. In case the data is devoid of the multivariate normality assumption, approaches such as weighted least square (WLS), generalized least square (GLS) or asymtotically distribution free (ADF) estimation can be used to analyze the structural model.

III) Model Evaluation: It is done in two steps. Step one is validating the measurement model of every latent construct and Step two is combining the measurement model to a previously conceptualized relationship to form an appropriate structural model in order to analyze the relationships.

a) Validating Measurement Model: The measurement model of each construct is validated with the Confirmatory Factor Analysis (CFA). The prime purpose of the CFA is to ascertain the extent to which a set of measured items actually reflects the theoretical latent construct these items are designed for, which is construct validity. Hair et al. (2006) suggested major components, namely, convergent validity, discriminant validity, nomological validity and model goodness-of-fit for ascertaining construct validity. Convergent validity is further examined through Factor loading, Average Variance Extracted (AVE), and Construct Reliability (CR). Discriminate validity is checked by comparing the AVE scores with a correlation between two constructs whereas overall model goodness-of-fit is checked through the value of various indices. Literature on SEM recommends several indices for testing the goodness-of-fit. Since researchers have not agreed on a single or a composite of indices to assess the model fit, we report multiple indices, which have frequently appeared in the scholastic work. To Hair et al. (2006), if the researcher reports one incremental and one absolute index in addition to the chi-square value and degree of freedom, it is enough to justify the results. Table 4.10 portrays indices used for measuring the model fit. As observed by Hair et al. (2006), sometimes researchers in pursuit of achieving a better fit, ignore the theory. The practice of reducing the number of constructs to achieve a better fit is common, which sometimes results in a good fit but poorly specified model. Therefore, Hair et al. (2006) suggest that factor loading as low as 0.50 is also acceptable.

Table 4.10: Measurement Indices

Index Name	**Level of acceptance**	
Chi-Square	p>0.05	Hooper, Coughlan, and Mullen (2008), Cheung and Rensvold (2002)
Ratio Chi-Square/df	CMIN/df<5	Marsh and Hocevar (1985)
Goodness-of-fit Index (GFI)	GFI > 0.90	Bentler and Bonett (1980)
Comparative Fit Index (CFI)	CFI > 0.90	Bentler (1990)
Root Mean Square of Error Approximation (RMSEA)	RMSEA<0.08	Browne and Cudeck (1992)
Cronbach alpha	CB alpha>0.60	Cronbach (1951)
Factor Loading	>0.50	Hair et al. (2006)

b) Structural model*:* After validating, to form a structural model, each measurment model is joined together according to the relationship previously conceptualized from the theory. Now this structural model not only tests the theory and structural relationships among variables but also checks the measurement relationships of indicators to the constructs. To analyse the structural model, the SEM uses the Maximum Likelihood Estimation (MLE). This approach is more efficient and gives unbiased results, provided the data holds the multivariate normality. In case the data is devoid of the multivariate normality assumption, approaches such as weighted least square (WLS), generalized least square (GLS), or asymtotically distribution free (ADF) estimation can be used for analyzing the structural model. This research will use the maximum likelihood estimation (MLE) for analysis. After obtaining the results of the ML estimation, the first fitness of overall mode is ascertained by analyzing the results of the indices discussed in Table 4.5. It is worth mentioning that in case the overall structural model lacks in goodness-of-fit, the results obtained from such a model will be spurious.

IV) Interpretation and Reporting: Obtaining a good model fit of the structural model alone is not sufficient. To check the relationships, one need to get the results of regression analysis (direct, indirect and total). These results are used for testing the relationship among the variables. Generally, the significance of p-value and the size and magnitude of the beta coefficient is analyzed to test the relationships. The p-value of less than or equal to 0.05 is considered appropriate in social science.

4.4.4 Techniques to Analyze the Differences in the Level of Human Capital

The study applied three tests to analyze the differences, depending on the condition and normality of the data. These tests include an independent sample t-test, one-way analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA). Table 4.11 summarizes the methodologies used for testing the difference in the level of human capital, overall and dimensions wise, by industry, size and ownership of a firm.

Table 4.11: Methodologies Used for Testing the Difference in Human Capital

Objective(s)	**Methodology (Overall HC)**	**Methodology (by dimensions)**
To test the HC difference by industry	Analysis of variance (ANOVA)	Analysis of variance (ANOVA)
To test the HC difference by size	Independent sample t-test	Multivariate Analysis of variance (MANOVA)
To test the HC difference by ownership	Independent sample t-test	Multivariate Analysis of variance (MANOVA)

The discussion on the rationale to use these tests, key assumptions and the procedure of analyzing emerges in the proceeding lines below.

4.4.4.1 Independent Sample t-test

This test is used to compare the mean scores of two different groups or conditions. However, this test is not suitable for comparing more than two groups or conditions. In our case, to test the difference in the overall level of human capital by firm size, i.e. small and medium and by ownership, i.e. foreign and local we have two conditions to compare. Therefore, we used this test to test these two variables. Nevertheless, the use of this test is not free from some assumptions. The first assumption is that the data should be normally distributed. In order to check the distribution of data, we apply the Kolmogorov-Smirnov test and Shapiro-Wilk test. If the p-values of both tests are insignificant at 5% level, it means the data is normally distributed. The second assumption is that the variance of the score of two groups should be the same. It is called equal variance assumption. This is tested by using the Levene test. To assume equal variance assumption, the Levene test should have an insignificant p-value at 5% level. However, the t-test also provides an alternative t-value for a situation where equal variance assumption is not assumed. This alternative t-value can be used to test the hypothesis (Pallant, 2013).

4.4.4.2 One-way Analysis of Variance (ANOVA)

As mentioned above, in order to compare more than two conditions or groups, an independent sample t-test is not appropriate. In such a case, analysis of variance (ANOVA) is the most relevant technique. Further, a one-way analysis of variance involves one independent variable with more than two levels. We apply the one-way ANOVA to test the differences in the overall level of human capital and in the dimensions of HC, by industry.

To test the differences in the levels, ANOVA compares the variance between the different groups with the variability within each of the group. It is assumed that between groups, variance is due to an independent variable and among groups, it is by chance. In this way, by dividing between group variance within the group variance, an F-value is computed. The larger magnitude of the F-value explicates that between the groups, variance is larger than within groups. Therefore, a significant F-value results in the rejection of null hypotheses i.e. no difference exists between the groups. However, to check the nature of difference and for multiple comparisons, post-hoc tests are applied. The Tukey HSD test, for multiple comparisons, is an appropriate post-hoc test when the data has homogenous variance whereas the Games-Howell Test is applied as a post-hoc test, when the data does not meet the homogeneity of variance assumptions. By comparing the mean difference and checking the size effect, the degree of difference between groups is ascertained. Size effect is calculated by dividing the sum of squares between groups with the total sum of squares. If the resulting value is between .01 and .06, its effect is considered small; between .06 and .14, the effect is considered medium and 0.14 onward is a large effect (Pallant, 2013).

Like other tests, one-ANOVA is also subjected to some assumptions of normality and homogeneity of variances. The Kolmogorov-Smirnov test and Shapiro-Wilk test are applied to check the normality of the data and in order to check the homogeneity, the Levene test is applied. However, if the data is normally distributed and does not meet the assumption of equal variance, the Welch and Brown-Forsythe tests are used to proceed with the test.

ANOVA is also used in situations whereby the dependent variables are more than one. For that, the researcher needs to run separate ANOVA tests for each dependent variable. However, by doing this, there are higher chances that Type 1 errors will increase. Normally, if some of the dependent variables have homogenous and heterogeneous variances, then ANOVA is appropriate. In this situation, to reduce the risk of a Type 1 error, researchers need to set a more stringent alpha value. This is done by using the Bonferroni adjustment method whereby the normal alpha value (normally .05) is divided by the number of tests planned for conducting.

4.4.4.3 Multivariate Analysis of Variance (MANOVA)

Having more than one dependent variable, the researchers have two options: run ANOVA on each dependent variable separately or apply Multivariate analysis of variance (MANOVA). Normally, MANOVA is more preferable than ANOVA because of its ability to control the Type-I error, provided that the data fulfills the conditions. However, to apply MANOVA, it requires a number of assumptions explained below:

I. Sample size: Minimum number of cases per cell should be more than the dependent variables.

II. Normality: Data should be normally distributed. Univariate normality of the data is checked by the Shapiro-Wilk tests.

III. Outliers: Data should be free from outliers. It is checked by using the Mahalanobis distances values. If Mahalanobis values are greater that the critical value, then the data has outliers.

IV. Homogeneity of regression: It is important only when a step-down analysis is required to perform.

V. Multi-colinearity: Data should not have a high level of multi-colinearity. It is checked by analyzing the results of correlation among the variables. A correlation of more than 0.75 is alarming and requires removing one variable.

VI. Homogeneity of variance-covariance: Data should have equal variance-covariance. It is checked by assessing the values of Box's M Test of Equality of Covariances Matrices.

After checking the discussed assumptions above, the values of multivariate tests are analyzed. These tests indicate whether the groups are statistically different from each other on a linear combination of dependent variables or not. Since there are a number of multivariate test statistics, the most commonly reported is Wilks' Lambda. If the value of Wilk's Lambda is significant ($p<.05$), it indicates that the difference among groups exists. Further, to check each of the dependent variables, the test of Between-Subjects Effect is conducted. Since a number of dependent variables are analyzed separately here, it is important to set a more stringent alpha level to avoid Type-1 error (Tabachnick & Fidell, 2007). This is done by following the Bonferroni's procedure of adjustment which is discussed above. Additionally, for in-depth analysis, size effect and estimated marginal means are checked.

4.5 Definition and Operationalization of Variables

From the preliminary survey, we chose nine main and 36 sub-dimensions of human capital. After explaining the methodology to analyze the HC-performance relationship, a brief elaboration of variables and their operationalization is essential. The following section undertakes this task by briefly explaining human capital, firm performance, mediating and control variables and their way of operationalization.

4.5.1 Independent Variables: Human Capital

Based on the preliminary survey, we selected nine variables to represent human capital. Each of them is explained below.

4.5.1.1 Education

The first prominent variable which is a representative of human capital is education. Becker (1964) considered it as a formal process of learning. To him, education is a formal form of learning in which knowledge, skills, and habits about particular field(s) are transferred through a formal process. It is considered a fundamental facet of human capital. Heaps of empirical literature (Mincer, 1958; Schultz, 1961; Becker, 964; Romer, 1990) used it as an indicator of human capital. The number of school years, literacy rate, enrolment rate and degree of technical education are taken as indicators of human capital. We selected *level of education, quality of education and professional education* to measure education with the help of experts in a survey. The data on these strands of education has been taken by posting 10 Likert scale questions put forth by Han et al. (2008) and Bontis et al. (1999). Additionally, we have also taken the quantitative data percentage of employees who have been to school for more than 10 years to triangulate the results.

Below is a brief description of each.

a) Level of Education: It measures the degree of education or the maximum level of education attained. The degree or certificate particularly illustrates the level of education in any field.

b) Quality of Education: The most frequent measure to judge the quality of education is the quality of one's alma mater. Measures like test scores etc. are also widely used for measuring the quality of education. However, in the case of the large number of companies, it gets extremely difficult to get the test scores of employees, especially in the case of SMEs (Nel, 2011).

c) Professional Education: It refers to the education pertaining to any particular profession. Here, professional education refers to the relevant professional education. For example, a doctor working on a clerical job in the textile industry will not be counted as having a professional education because his/her education is not relevant to the profession.

4.5.1.2 Experience

The process of personally observing, facing, or enduring a situation is termed as experience. Mincer (1958) defined experience as the most precious human capital. He considered experience as a dimension of human capital. Later, theories like RBV, Dynamic Capability theory and the human capital theory considered experience as the heart of human capital. We selected organizational tenure (Ng & Feldman, 2010), work-related experience (Stajkovic & Luthans, 1998) and the relevant industry experience Hatch and Dyer (2004) to measure experience. We gathered the data based on these three dimensions using the Likert scale. To triangulate this information, we obtained quantitative data on average work-related experience, average organizational tenure and average industry experience.

a) Work-Related Experience: It is the experience of an employee gained while working on a task similar to his job in a present organization (Cook & Heptworth, 1981). Work-related experience can be attained while working in an industry which is different than the present. A marketing professional who has marketing experience in the leather industry has relevant experience while working in the textile industry.

b) Organizational Tenure: It depicts the tenure an employee has served in his present organization regardless of his task (Ng & Feldman, 2010). In order to take the quantitative measure of an organizational tenure, the average organizational tenure per employee is taken. Additionally, we also gathered the qualitative data on the organizational tenure.

c) Similar Industry Experience: It illustrates the experience of an employee in the industry, which is similar to the present industry. To calculate similar industry experience, we attained data on "*average industry experience per employee".*

4.5.1.3 Training

It is the process of learning vocational, practical, or/and interpersonal skills that are linked to specific useful expertise. It is also considered *"activities or deliverables designed to enable end users to learn and use new processes, procedures, systems and other tools efficiently and effectively in the performance of their work*" (Lai Wan, 2007). In addition to the basic training related to a particular profession, human capital experts highlight the need of continuous training for maintaining and/or upgrading skills throughout the professional life. This type of training is referred to as professional development (Huselid et al., 1997; Kotey & Folker, 2007). For this research, we put on job trainings (Blundell et al., 1999), technical trainings (Kotey & Folker, 2007), interpersonal trainings (Gibb, 1997), training budget (Barrett & O'Connell, 2001) and training duration (Patton, Marlow, & Hannon, 2000) as sub-dimensions of training. Data on these sub dimensions has been obtained using Likert scale questions from Han et al. (2008) and Srimannarayana (2011). Additionally, data on the percentage of employees who had received on the job training (OJT), the number of employees who had received technical training in the last two years, the percentage of the total budget spent on training in a year and the proportion of employees who received interpersonal skills or soft skills training have also been taken to triangulate the Likert scale data (ILO, 2008). Below is a brief definition of each of the selected sub-dimensions.

a) On the Job Trainings (OJT): In OJT, employees receive training working directly on the job. In other words, employees receive training at the work place while performing their actual task (Frazis & Loewenstein, 2007). Since this method is inexpensive, realistic and easy to conduct, a numbers of firms use this method to train their employees.

b) Professional Training: Professional training implies technical training related to a particular profession. We have computed professional training in two ways. First, we take the n percentage of the employees of each firm who have received any type of profession-related training Secondly, the number of employees who received technical training in the last two years. Qualitative data related to the technical training programs and their level has also been collected.

c) Previous Trainings: Previous trainings illustrate the trainings which employees have received before joining the particular organization**.** This can include previous profession-related trainings or general trainings like interpersonal or team work. We have taken the percentage of employees who have received training before joining this organization to quantify previous trainings. Along with it, data has also been collected by asking questions related to companies' preference about employees having previous trainings.

*d) Spending on Trainings: I*t shows the companies' budget allocated for training. The companies' preference for training can be evaluated from the amount of budget it allocates for training. We have taken the percentage of total budget spent on training in a year by a company as expenses on training. Questions have also been asked about comparing firm training spending with the industry.

e) Interpersonal Trainings: Interpersonal training refers to training that focuses on communication and the interaction skills of employees. To find out, we took the data on the proportion and the number of employees who received soft skills training in the last two years.

f) Time on Trainings: Training duration or time on training is also a predictor of companies' training preferences. It represents the training hours an employee has gone through in a year. We glommed onto "training hours per employee in the last two years" to quantify training duration.

4.5.1.4 Personal Attributes

Personality traits are distinguishing qualities or characteristics that embody an individual (Zhao, Seibert, & Lumpkin, 2010). The characteristics of these employees have a significant influence on a firm's performance (Fitz-Enz, 2000a). Although a large number of indicators represent employees' personality attributes, we selected six among them through surveys by experts. They are creativity (Baer & Frese, 2003; Gong et al., 2013), intelligence (Achor, 2012; Adidam, Banerjee, & Shukla, 2012; Slater & Narver, 2000), diversity (Orlando C. Richard, 2000), leadership (King, Ngoc, & Ashley, 2006; Storey, 1994) and risk taking (Watson & Robinson, 2003). The following is a brief definition of each dimension.

a) Creativity: Employees' creativity refers to their ability to produce novel ideas to better fulfil their assigned tasks (Madjar, 2005). It is generally measured by analyzing the generation of new ideas/solutions, their quality and execution. Further, the quality of the ideas is gauged by their “originality, desirability, and feasibility” (Williams, 2001).

b) Intelligence: Intelligence is considered the ability to learn, reason, and understand (Neisser et al., 1996). According to Schmidt & Hunter (2000), in order to hire employees without previous experience in the job, the most valid predictor of future performance is general mental ability. The intelligence of an employee can be gauged from his ability to learn quickly, his level of dependency on the already held knowledge, and his effectiveness in a task that requires frequent problem solving. The employee’s effectiveness to work in autonomy can also depict his/her intelligence (Hunter & Schmidt, 1996). Similarly, the employee’s quickness to learn during the OJT period is also a measure of his/her intelligence.

c) Diversity: Diversity represents the composition of employees having different race, ethnicity, gender, sexual orientation, socio-economic status, age, physical abilities, religious beliefs, political beliefs or other ideologies (Loden & Rosener, 1991; Shapiro, 2000). We focused primarily on gender diversity. It represents the proportion of man and woman in a particular organization. Gender diversity is measured by finding out the extent of women hired in the labor force (Herring, 2009).

d) Leadership: Leadership represents the influence of a person which helps others to achieve their goals (Chemers, 2000). For Drucker (1999), it is a course of social influence where one individual supports the others in accomplishing a common task. Leadership is not related to seniority or a person’s position in the hierarchy of an organization.

e) Risk-Taking: Risk-taking refers to the tendency to make decisions that have great potential benefits, yet at the same time can have dangerous consequences. In some situations, employees have to take risk. Sometimes it may be the only step to pursue goals actively. It also refers to employees' capability to reframe risk as an opportunity to succeed rather than a way to failure (Colquitt, Scott, & LePine, 2007; Dewett, 2007). .

We have operationalized these sub-dimensions through 23 Likert scale questions by studying the researches carried out by Baer & Frese (2003), Bontis and Fitz-Enz (2002), Fitz-Enz (2000), Gong et al. (2013), Han et al. (2008), Hayton (2003, 2011), Luiz Antonio (2000) and Wright & McMahan (2011).

4.5.1.5 Attitude

Generally, attitude is the emotion of a person about people, objects or events. It persuades an individual's choice of action and response to challenges, incentives, and rewards (Rogelberg et al., 2000). The attitude of employees is considered their evaluation and feelings about their job and organization (Mohsen Allameh, Shahriari, & Mansoori, 2012). The focal point of an employee's attitude is job satisfaction (Saari & Judge, 2004). Job satisfaction is a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences (Locke, 1976). We selected employee's satisfaction, commitment, motivation, cooperation and engagement to operationalize employees' attitude. A number of studies (Becker, Billings, Eveleth, & Gilbert, 1996; Mowday, Porter, & Steers, 2013; Saari & Judge, 2004) consider these variables pivotal to a firm's performance. The data on the strands of attitude was collected using 15 Likert scale questions from Saari and Judge (2004), Rogelberg et al. (2000), Svetlik, Prien, and Barrett (1964) and Ostroff (1992). Below is a short description of each.

a) Cooperation: The level and extent of direct interactions among workers result in positive outcomes for the organization. Employees who collaborate to resist managerial controls or work on assembly lines whereby the individuals simply perform their tasks in the linear production process are not included in this study (Christensen, Marx, & Stevenson, 2006).

b) Motivation: It is a psychological force that determines the direction of an employee's behavior, his level of effort and persistence in an organization. It can be measured as the willingness and enthusiasm of employees to exert high levels of efforts toward their organizational goals (Rainlall, 2004; Robbins & Everitt, 1996).

c) Commitment: It depicts employees' sense of responsibility to their job. Though employees' commitment has been further divided into sub-categories like affective, behavioral and continuous commitment, this study has decided on affective commitment i.e. an organization's interests and values are compatible with those of the employee, and the employee feels accepted by the social environment of the organization (Meyer, Becker, & Vandenberghe, 2004; Mowday et al., 2013; Mowday, Steers, & Porter, 1979).

d) Satisfaction: According to Locke (1976, p. 1304), employee satisfaction is *"a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences"*. It represents employees' feeling about their jobs and conditions. It is mainly employees' feelings about fairness in the organization, the value of their work, understanding what is expected of them and their perception of having the opportunity to develop their career which can depict their levels of satisfaction (Ostroff, 1992; Van Saane, Sluiter, Verbeek, & Frings-Dresen, 2003).

e) Engagement: It refers to the employees' commitment and connection to work as measured by the amount of discretionary effort they are willing to expand on behalf of their employer (Luthans et al., 2004; Luthans & Peterson, 2002). Highly- engaged employees go above and beyond the core responsibilities outlined in their job descriptions, innovating and thinking outside the box to move their organizations forward - much like volunteers who are willing to give their time and energy to support a cause of which they are truly passionate (Kong, 2009). An engaged employee is emotionally invested in the mission of the organization. The CIPD has defined employee engagement as *"being positively present* *during the performance of work by willingly contributing to intellectual effort, experiencing positive emotions and meaningful connections to others*. Normally, it is gauged by employees' vigor (energy, resilience and effort), dedication (enthusiasm, inspiration and pride) and absorption (Kular et al., 2008; Truss et al., 2006).

4.5.1.6 Skills

It is the ability acquired through deliberate efforts to perform tasks or activities adaptively involving ideas (cognitive skills), things (technical skills) and/or people (interpersonal skills). Generally, problem-solving skills, interpersonal skills especially communication, technical skills and professional skills are considered important. Owing to the broader categorization of skills, it depends on the nature of the job to determine the required skills and their level (Eldridge & Nisar, 2006; Iranzo, Schivardi, & Tosetti, 2008). Therefore, in the context of the SMEs in the manufacturing sector, we selected five skills with the help of experts in the surveys. Below is a brief description of each skill.

a) Work-related Skills: They are skills which help perform one's professional task smoothly and efficiently. These skills involve mastering the latest techniques related to profession, knowing the alternative solutions to the problems faced during the performing of the task (Flouri & Buchanan, 2002).

b) Problem-solving Skills: Problem-solving skills refer to an individual's ability to solve problems by applying abstract thinking and creative ideas (Certo, 2003; Mumford, Baughman, Threlfall, Supinski, & Costanza, 1996). Generally, problems are classified into two types: ill-defined and well-defined. Ill-defined problems are those which do not have clear goals and any particular solution whereas well-defined problems have clear illustrated goals and proper solutions. The term 'problem-solving skills' is applied to the employees' ability to solve ill-defined problems. The ability to understand what the goal of the problem is and what rules could be applied represents the key to solving the problem. Sometimes, the problem requires some abstract thinking and coming up with a creative solution (Runco, 1994; Schraw, Dunkle, & Bendixen, 1995).

c) Interpersonal Skills: Interpersonal skills are referred to as people skills or communication skills. They are also defined as a set of abilities enabling a person to interact positively and work effectively with others. These skills include the areas of communication, listening and delegation of tasks (M. Bhattacharya, Harold Doty, & Garavan, 2014; Garavan, 1997).

d) Technical & Information and Communication Technology (ICT) Skills: It represents skills like the usage of computer, internet and other communication devices to fulfil an organizational task. ICT skills are considered vital ancillary skills for any of the employees (Arvanitis & Loukis, 2009; F. M. Martin et al., 2013; L. M. Martin & Matlay, 2001).

*e) Intrapreneurial Skills***:** An intrapreneur is an employee who acts as an entrepreneur within a corporation. Lockheed Martin (LM) incorporated the concept in 1943, when it created Skunk Works**,** a group within the company that worked on special projects and was given a high degree of flexibility. Later on, Pinchot and Pinchot (1978) academically used this term. It differs from the term 'entrepreneur' from a certain perspective. For example, the intraprenuer has to work within the domain of an organization. Interprenuerial skills refer to the initiatives of employees to undertake any new project profitable to a company or to trigger innovative ways of doing assigned tasks (Nicolaidis & Kosta, 2011).

Data on these variables has been obtained from 13 Likert scale questions with reference to Han et al. (2008), Fitz-Enz (2000a, 2000b), Nicolaidis & Kosta, (2011) and Arvanitis & Loukis (2009).

4.5.1.7 Health

It refers to a physical and psychological state of an employee, which help to extend his competence to perform an organizational task. Normally, diseases, old age and poor physical health of an employee will influence his organizational participation negatively (Alexandru & Maria, 2012; Stephen & Dhanpal, 2012). Through experts in the survey, we selected three variables as sub-dimensions of health. Below is a brief description of each sub-dimension. Data on these variables was gathered from 10 Likert scale questions.

a) Physical Strength: The virility and strength of an employee is a vital indicator of his health. Physically fit employees are less likely to get sick. An employee who is physically fit is generally more resistant to the "bug going around" than one who is not fit (Luthans et al., 2004; Luthans et al., 2008). Reduced absenteeism and reduced health care expenditures are the results of fit employees. Secondly, physically strong employees have more energy. This energy allows the employee to stay focused on the task at hand, giving their best to each task. Similarly, physically fit individuals tend to have a high level of self-confidence, because they have proven to themselves that they can accomplish what it takes to obtain a level of physical fitness. This self-confidence empowers the employees to challenge themselves, and strive for higher levels of achievement in the workplace (Beehr & Newman, 1978; Van Steenbergen & Ellemers, 2009).

*b) Age of employees***:** Age represents the average age of employees in an organization (McEvoy & Cascio, 1989). Bontis and Fitz-Enz (2002) took the average age of executives, administrators, supervisors and workers to gauge the level of human capital. We have also taken the same parameters to gauge it.

c) Disease-free: Employees who are free from any disease are not only more effective in their task but overall, they contribute positively in an organizational environment (A. B. Schultz & Edington, 2007). Diseases not only cause continuous absence from work but also are one of the reasons why employees are demotivated (Beehr & Newman, 1978). Therefore, an employee who is free of any disease is an asset to the company.

4.5.1.8 Compliance

Compliance is either a state of being in accordance with established guidelines, specifications or legislations or the process of becoming so. The term compliance describes the ability to act according to an order, set of rules or request. The earlier studies on human capital did not consider employees' compliance; however, to an extent, researchers consider it an important dimension of human capital (Bontis, 2001; Chen, Tsui, & Farh, 2002). We selected charges and litigations on employees, their safety issues and employees' complaints through experts in the survey. The data on these variables was gathered using 10 Likert scale questions following Griffin and Neal (2000), Bontis (2001), Bontis (1998), Chen et al. (2002) and Puffer (1987). Below are brief definitions of each variable.

a) Charges & Litigations: With reference to Pelled, Eisenhardt and Xin (1999) and Puffer (1987), we define charges as the accusation of an employee in any matter related to his present or previous organization whereas litigation refers to the charges which are in the legal process of justice and the waiting decision from the court of law.

b) Safety Issues: It represents the number of incidents where employees have not abided by the safety instructions (Griffin & Neal, 2000; Zacharatos, Barling, & Iverson, 2005). Examples of safety issues are from a negligence to wear mask to mishandling any machine or equipment (Zacharatos et al., 2005).

c) Complaints: Complaints filed against employees related to their conduct in an organization. It ranges from sexually harassing female workers and disobeying supervisors to not performing an assigned task seriously (Flin, Mearns, O'Connor, & Bryden, 2000; Zohar, 2002).

4.5.1.9 Workforce Stability

One of the major risks associated with human capital is its mobilization since the human being is not a tangible asset and it moves from one firm to other, which affects the firm's overall employees' stability (Huselid, 1995). This refers to the rate of employee turnover and absenteeism. It also refers to employee longevity which is the average length of service of an employee with a firm (Bontis & Fitz-Enz, 2002; Fitz-Enz, 2000; Glebbeek & Bax, 2004). We measured the stability by studying the employee turnover, absenteeism and longevity. Data on these variables was gathered by asking 12 Likert scale questions.

a) Turnover: Employee turnover is the rate at which an employer loses employees. It is measured by dividing the average number of employees with employees who have left an organization in one year (Ozolina, 2014). Researchers consider it as voluntary employee turnover and a significant influence on a firm's performance (Holtom, Mitchell, Lee, & Eberly, 2008).

b) Longevity: It illustrates the length of service an employee gives to particular organizations (Jiang et al., 2012). We took the length of service of the average employees to represent longevity. It is calculated by dividing the total length of service of all employees in a current organization with the total number of employees.

c) Absenteeism: It is the rate of occurrence of habitual absence from work or duty. Companies expect their employees to take some days off each year due to vacation, illness and personal issues/responsibilities, but missing work becomes a problem for the company when the employee is repeatedly absent and/or unexpectedly (Block, Goerke, Millán, & Román, 2014). Though getting disability leave, performing jury duty and observing religious holidays are all legally protected reasons for an employee to miss work, some employees abuse these laws and take time off, thus incurring costs to the employer (Martocchio & Jimeno, 2003). It is measured by daily attendance ratio, sick leave and leave without informing.

4.5.2 Dependent variables: Firm Performance

Empirical researches used numerous indicators to measure the performance of a firm. We focused on four major strands of firms' performances, namely productivity, export, innovation and survival. The reason for choosing these indicators and their way of operationalization are discussed below.

4.5.2.1 Productivity

To build long-term competitive advantage, productivity is indispensable.

According to Drucker (1999 p.26), *"Without productivity objectives, a business does not have direction. Without productivity measurement, a business does not have control."* Representing the ratio of outputs to inputs, it measures a firm's production efficiency. Most of the studies defined productivity as output per worker or employee. Some of the researchers like Dorgan and Dorgan (1994) defined it as an improvement in the performance of an organization. Further, the approach to measure productivity depends on its objective(s). According to Co-operation and Development (2001), the objective of measuring productivity may include measuring technological change, efficiency, cost savings, and the bench marking of production processes. As our study primarily investigates HC-performance relationship, we focused on the cost of production, value-added per worker, output per worker, raw material wastage due to labors and employees' efficiency in the processes of managing production. Besides the Organization of Economic

Co-operation and Development [OECD] (2001), we adopted these measures from Singapore (2011) and Clements and Kaluarachchi (2000). Six Likert scale questions which were developed were related to these questions. In order to ascertain the validity of these questions, two quantitative questions on change in sale and cost of production were also included in Part A of the questionnaire (Appendix A).

4.5.2.2 Export

The firm's activities in the international market illustrate its export performance (Cavusgil & Zou, 1994). Shoham (1998) argues that a firm's export performance can be computed by analyzing its international sales, profitability and export growth. Our export measure is based on the construct of White, David, John, and Jr (1998). The number of researchers adopted this construct to measure the export performance in SMEs. White et al. (1998) took *export intensity, penetration in the foreign markets, management's perception of export profitability,* and *management's satisfaction with export performance* to gauge the export performance. Export intensity (FSTS) measures the firm's foreign sales as a percentage of their total sales. We asked respondents to rank their company's foreign sales compared to the domestic sales on a scale of 1 to 5, from very low to very high. For the number of markets, we asked respondents to provide the number of international countries in which they are doing business. Additionally, we asked firms to rank their growth in the international markets from 1 to 5, from very low to very high. For management's perception of export profitability, firms were asked to assess their export profitability compared to domestic profitability on a scale of 1 to 5, from very low to very high. Similarly, respondents were asked to rate their management's satisfaction with export performance, on a scale of 1 to 5, with 1 being highly dissatisfied and 5 being highly satisfied. Additionally, we also included three quantitative questions on the number of markets tapped for export in the last five years, the percentage of sales in export, and years in export to ascertain the validity of the export construct.

4.5.2.3 Innovation

It is the process that transforms ideas into commercial value (Schumpeter, 1942). Innovation performance measures how well ideas are executed and how much value is generated. Innovation has been divided into two major categories, i.e. product and process innovation (Massa & Testa, 2008). Product innovation is the process of creation and subsequent introduction of a product that is either new or improved from previous products whereas process innovation means the implementation of a new or significantly improved production, marketing, distribution and/or selling process (es). It means the incorporation of any new process (es) in the supply chain of a firm (Salavou, Baltas, and Lioukas, 2004). In measuring innovation, two types of indicators are used: input-based and output-based (Rosenbusch, Brinckmann, & Bausch, 2011). We adopted the scale of innovation from Adegoke, Gerard, and Andrew (2007). This scale not only accounts for questions both on input and output-based measures but it also focused on SMEs. The researchers have included both radical and incremental innovation in this scale. A total of seven questions on the firm’s R&D expenditures, products, and process innovation were put forward to the respondents based on a Likert scale of 1 to 5. Besides that, in order to triangulate the data, we also posed questions relating to the amount of R&D expenditures, the number of new or improved products introduced and the number of patents in the last five years.

4.5.2.4 Technological Progress

Technological progress is referred to as the overall process of invention, improvement and incorporation of a technology or process. In the context of SMEs, technological progress is defined as an improvement or acquisition of process in technologies. The success of investing in these technologies depends on the infusion and routine in an organization (Lefebvre et al., 1992; Lefebvre, Harvey, & Lefebvre, 1991; Zmud & Apple, 1992). Further, there are many types of technological options in a firm ranging from ICTs to the adoption of the latest production technologies. Due to the nature and size of SMEs, they may be incapacitated to adopt the latest production technologies. However, many of them adopt information communication technologies (ICTS) and some other process improvement technologies (Lefebvre et al., 1991; Mehrtens, Cragg, & Mills, 2001). In this context, we have taken three aspects of technological progress, namely improvement in existing technologies, investment in new process technologies and ICTS, and their incorporation and routinization in SMEs. We put forth seven Likert scale questions on these dimensions on a scale of 1 to 5. Our construct of technological progress came from Zmud and Apple (1992), L.A. Lefebvre et al. (1991) and Mehrtens et al. (2001). For data triangulation, we incorporated information based on the percentage of budget spent on adopting new technologies.

4.5.2.5 Survival

Survival of a firm means a firm's ability to remain on a business sphere. The most prominent factors that affect the survival of a firm are its age and scale. A change in a firm's scale of operation also reflects its degree of survival (Taylor, 1999). Along with it, the firm's growth rates, technology properties and product life cycles also influence its survival (Frankish, Roberts, & Storey, 2007). Researchers (Frankish et al., 2007;

Strotmann, 2007; Taylor, 1999) argued that firm size represented by the number of employee; turnover, assets and experience of a firm in the industry in which it is operating are the main cords of a firm's survival. Likewise, Frankish et al. (2007) asserted that a constant decrease in sales coupled with an increase in the cost of production also depicts a challenge to the survival of a firm. With reference to Jose Mata and Portugal (1994), José Mata and Portugal (2002), Strotmann (2007) and Taylor (1999), we placed firm experience in the industry, change in cost of production, decision to reduce operations and employment, degree of losses and management perception on the survivability of the firm as major factors to represent survival. These dimensions are operationalized by posing 6 Likert scale questions on a scale of 1 to 5 from strongly disagree to strongly agree. To triangulate the data, we also added quantitative questions about the firm's years in operation, the per cent of asset sold/acquired, and employees' layoff in the last year.

4.5.3 Mediating Variable: Absorptive Capacity

Absorptive capacity is defined as the "*ability of a firm to recognize the value of new information, assimilate it, and apply it to commercial ends"* (Cohen and Levinthal, 1990). It is also described as an organization's ability to acquire, assimilate, transform and exploit external knowledge (Flatten, Engelen, Zahra, & Brettel, 2011). It affects not only the organizational performance but it also affects an inter-organizational transfer of knowledge and inter-organizational learning. Researchers argue that experienced and educated employees tend to elevate the organization's stock of knowledge (Mangematin & Nesta, 1999). This further promotes the relationships of the firm with other firms of similar competencies; hence, it links organizations to external networks of knowledge (Rothwell & Dodgson, 1991). Zahra and George (2002) disaggregated absorptive capacity into realized *absorptive capacity and potential absorptive capacity* whereby the former illustrates the firm's capacity to transform and exploit the knowledge for commercial purposes and later portrays its ability to acquire and assimilate external knowledge. Researchers have developed a number of measures for absorptive capacity; however, we have adopted the scale developed by Flatten et al. (2011). This scale encapsulates both the potential and the absorptive capacity realized. Further, the researchers have applied this scale in SMEs to test its relationship with strategic alliances (Flatten, Greve, & Brettel, 2011). The scale contains a total of 14 Likert scale questions on the firm's ability to acquire, assimilate, transform and exploit external knowledge.

4.5.4 Control Variables

Literature on the firm's performance (Armstrong & Taylor, 2014; Bontis, 2001; Bontis & Fitz-Enz, 2002; Davis & Henrekson, 1999) argued that the type of industry, firm size and its ownership can influence the performance of a firm. Thus, excluding these variables from the model may be problematic. In this context, we estimated HC-performance relationship by including the firm, size, industry and ownership (foreign and local) as control variables and also estimated the models by excluding these variables to compare the differences, if any. The following is the definition and operationalization of these control variables.

4.5.4.1 Size of firm

Researchers like Armstrong and Taylor (2014) and Davis and Henrekson (1999) mentioned firm size as an important influence of a firm's performance. They argued that firm size affect its performance. However, its degree may differ from firm to firm (Moreno & Casillas, 2007). Keeping the previous researchers' views in mind (Armstrong & Taylor, 2014; Majumdar, 1997; Orlitzky, 2001), we had a number of employees representing the size of a firm.

4.5.4.2 Type of Industry

The types of industry can also influence the firm's performance (Bontis, 2001; Hitt, Ireland, & Stadter, 1982). Studies by Hawawini, Subramanian, and Verdin (2003) suggested that the type of industry can be a major factor affecting the performance of a firm. Our study takes data from major industries. Therefore, by assigning a unique number to every industry, we included the type of industry variable in our data.

4.5.4.3 Firm Ownership

Section 2.3.1 briefly delineates how difference in foreign and domestic ownership can influence the level of human capital in affirm. Among 750 companies surveyed, we found only 66 companies owned by foreign owners or companies. Among them, 20 companies were fully or partially owned by foreign companies whereas 46 of the remaining companies were fully or partially owned by individuals from other countries. Their shares ranged from 51% to 100%. The study showed analysis in two sections; the overall HC with reference to ownership and individual dimensions of HC with ownership.

4.6 Summary

The first objective of the study is to develop an index to gauge the level of human capital. To develop the index, which approach can encapsulate the dimensions and sub-dimensions of human capital? The Analytical Hierarchy Process is the most relevant approach. It assigns weightage to every dimension and sub-dimension according to its importance. Further, it provides a single numerical value which represents the level of that variable, in our case, the level of human capital. The second objective of the study is to find out whether the level of human capital differs by size, sector and ownership, and if yes, what is its magnitude. This is achieved by applying the Analysis of Variance (ANOVA) for the single variable and Multivariate Analyses of Variance (MANOVA) for multiple variables. These tests do not test the difference in the level of HC but also show the magnitude and direction of the difference. For example, if the level of HC is different in small and medium-sized firms, then it will also explain whether the level of HC increases/decreases when the size of the firms increase from small to medium and the magnitude of that change. Objectives 3, 4, 5 and 6 are related to the impact of HC, and its dimensions on the performance and its various dimensions, directly or through absorptive capacity. This is analyzed by applying the Structural Equation Modeling Technique because SEM assesses a series of dependent relationships simultaneously. Additionally, SEM also mediates a hypothesized dependent variable to an independent variable in order to test a subsequent relationship.

Table 4.12: Methodology(ies) vs. Objective(s)

Objectives	**Technique(s) applied**
To develop human capital index	Analytical Hierarchy Process (AHP)
To test the difference in the level of HC by size, ownership and industry	Analysis of Variance (ANOVA) & Multi Analysis of Variance, (MANOVA)
To analyze the relationship among HC, absorptive capacity and firm performance	Structural Equation Modeling (SEM)

CHAPTER 5:

CONSTRUCTION OF HUMAN CAPITAL INDEX (HCI)

5.1 Introduction

This chapter explains the process of developing the human capital index. It begins with a brief overview of the framework for measuring human capital. This part briefly delineates the results of the preliminary survey conducted to choose the appropriate dimensions of human capital. Proceeding further, it explains the AHP (Analytical Hierarchy Process) model which is constructed to prioritize the various dimensions and sub-dimensions of human capital. On the basis of the results of the AHP model, the subsequent section illustrates the human capital index. The final section of this chapter brings into discussion the results of the AHP model to analyze the differences among various stakeholders i.e. the government officials, industrial professionals and the institutional experts.

5.2 Framework for Developing Human Capital Index

The vital issue in the human capital measurement approach was the selection of its appropriate dimensions and sub-dimensions, which truly represented it. The literature reviewed identified more than 95 variables, those which have acted as the surrogates of human capital. Among these dimensions, we selected the relevant dimensions and sub-dimensions with the help of a survey from the experts. Questionnaires were sent to 100 selected experts. A detailed discussion on the preliminary survey of the questionnaire and the experts' selection emerges in Chapter4. The results of the first survey are portrayed in Figure 5.1 and Figure 5.2. The results have been arranged in descending order of their mean values. The results appear in descending order of their mean values. The mean value was computed according to the procedure described in Section 4.4.1. Using Tam and Tummala's (2001) approach to select the important dimensions and sub dimensions, we chose the cut-off criteria by taking the average of the maximum and minimum mean values. In this way, the cut-off mean value for the dimension is 2.45 and sub-dimension is 2.2. Among the 40 identified dimensions, nine dimensions have a mean value greater than 2.45, thus appearing as important dimensions of HC. The dimensions are experience, education, training, skills, attitude personal attributes, compliance, health and stability. Interestingly, dimensions having a mean value lower than 2.45, are either categorized as sub-dimensions or are represented by some other dimensions. For example, “employee turnover” is a sub dimension of “stability”. Likewise, “motivation” and “commitment” are grouped as sub-dimensions of “attitude”. Similarly, “personal traits” is represented by “personal attributes”. Likewise, among the 55 sub dimensions of HC, 36 possessed a mean value higher than the cut-off value i.e. 2.2. These 36 dimensions are placed under their relevant dimensions according to the previous literature. Hence, Figure 5.3 forms the new AHP hierarchy.

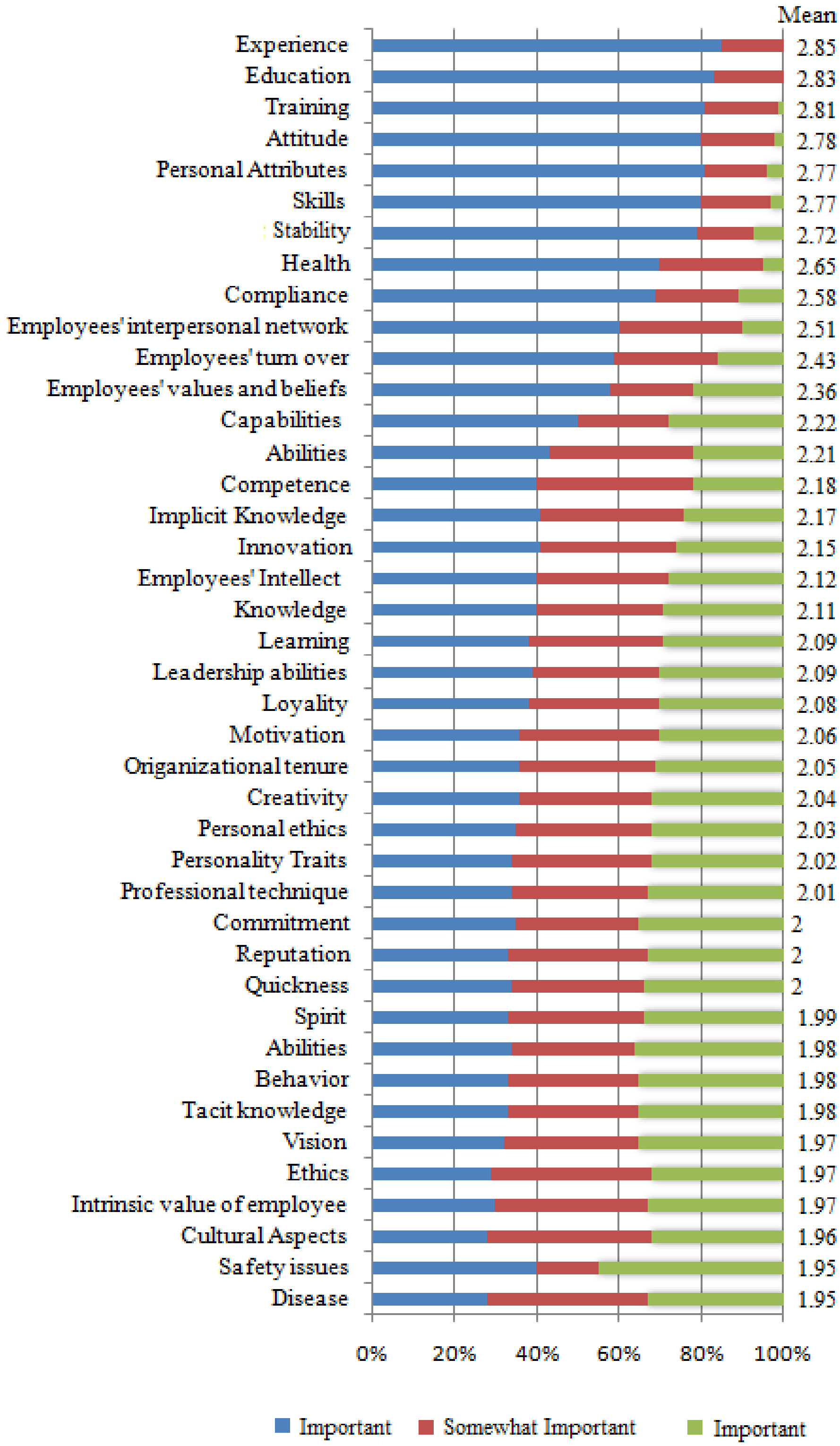


Figure 5.1: Mean value[1] of HC dimensions l

[1] Cut off mean value for selecting dimensions is 2.45

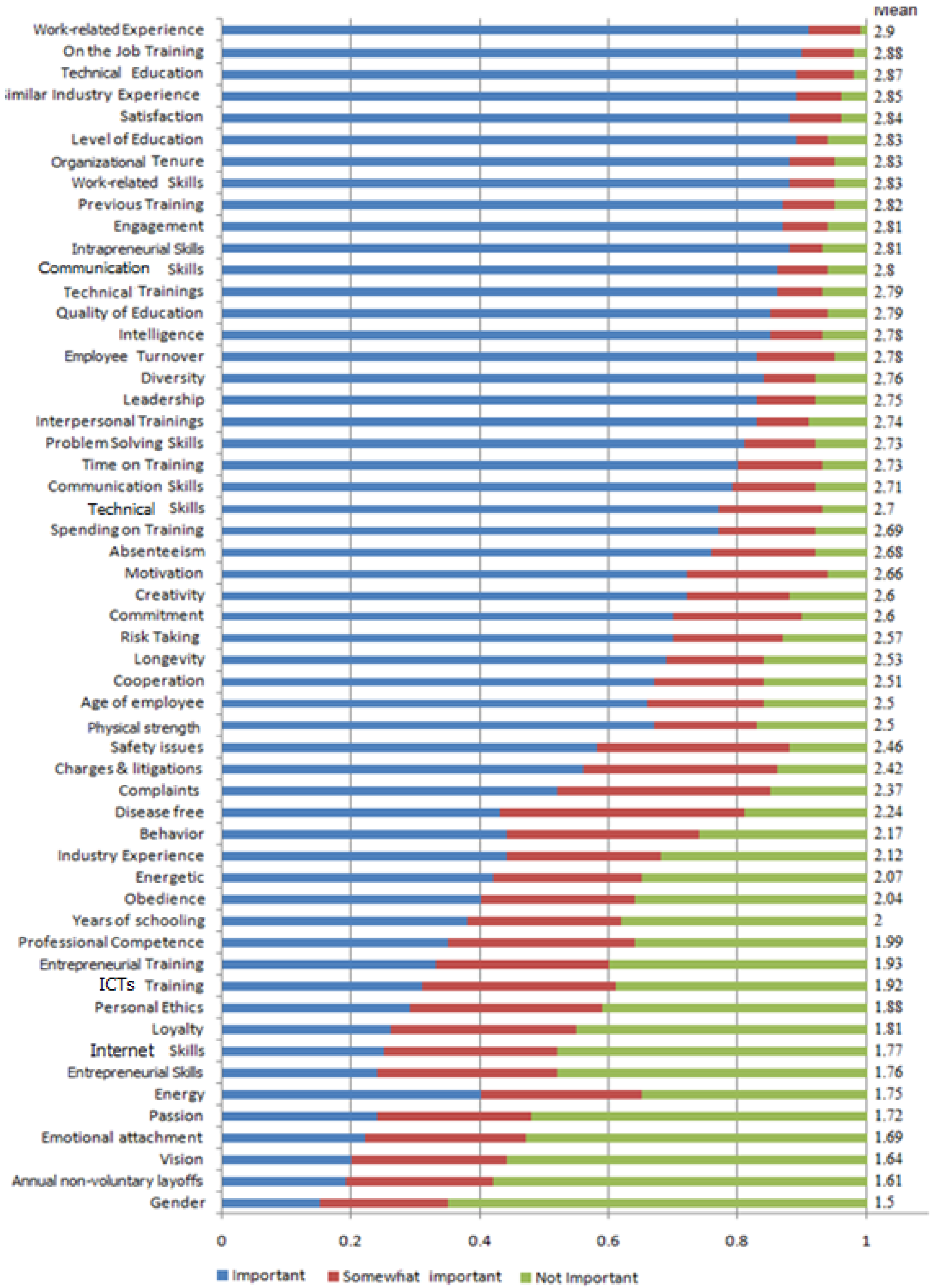


Figure 5.2: Mean value[2] of HC sub- dimensions

[2] Cut-off mean value for sub-dimensions is 2.2

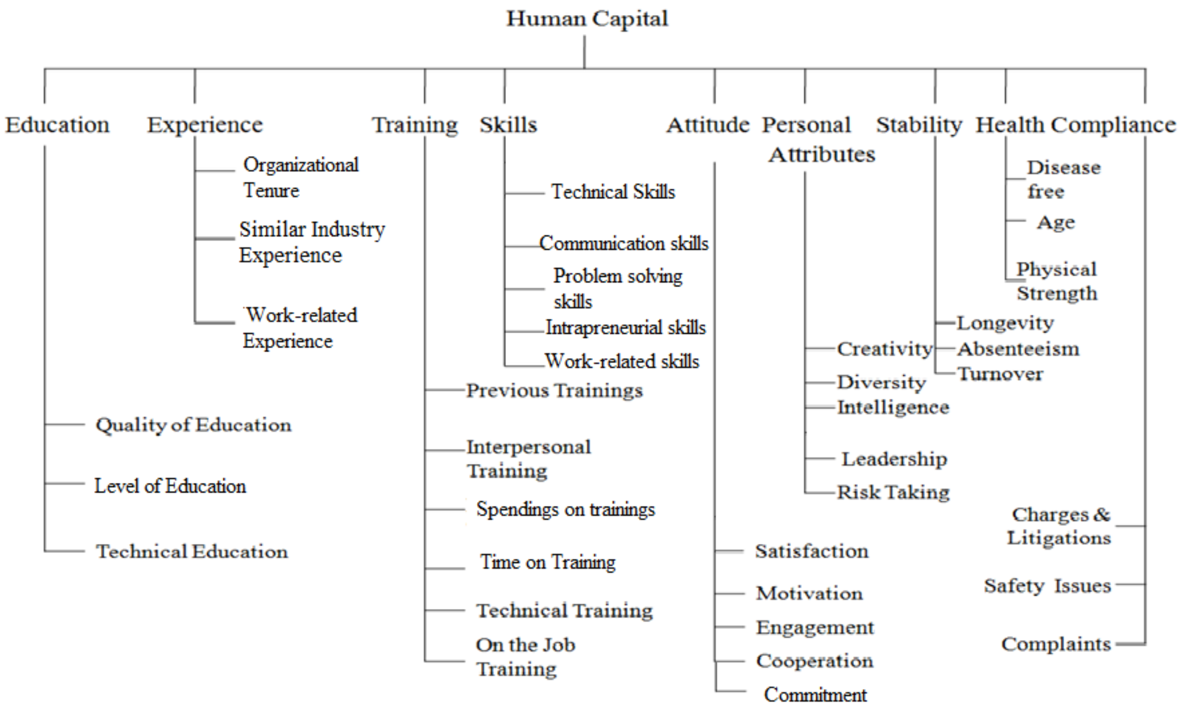


Figure 5.3: Selected Dimensions and Sub-dimensions of Human Capital

5.3 Constructing Human Capital Index

After identifying the relevant dimensions, we applied the AHP approach to derive the human capital index (HCI). Figure 5.3 shows the dimensions and sub-dimensions of HC in the AHP model. This model was processed by applying the AHP approach to calculate Pairwise Comparison Judgment Matrices (PCJM). Before consolidating the PCJM values to make the HC index, it is important to find the consistency ratio**.** It explains the extent to which the respondents have been consistent when ranking one dimension over the other. In Table 5.1, the results of the CR value reveal that the CR of each of the PCJM is below or equal to 0.05, which is well below the rule of thumb with the CR value of 0.10. This clearly shows the consistent behavior of evaluators when making comparisons.

Table 5.1: Consistency Ratio of Dimensions and Sub-dimensions

Dimensions	**Industrial Professionals**	**Government Officials**	**Institutional Experts**	**Total**
Human Capital	0.030**	0.020**	0.0001*	0.017**
Sub-Dimensions				
Education	0.010*	0.002*	0.000*	0.000*
Experience	0.010*	0.004*	0.017**	0.010*
Training	0.06***	0.012**	0.013**	0.030**
Personal attributes	0.060***	0.016**	0.008*	0.060***
Skills	0.010*	0.010*	0.007*	0.008*
Attitude	0.015**	0.013**	0.027**	0.018**
Employee Stability	0.000*	0.010*	0.000*	0.005*
Health	0.010***	0.010*	0.001*	0.007*
Compliance	0.000*	0.000*	0.006*	0.003*

*Note- *, ** and *** show the level of significance at 1 per cent, 5 per cent and 10 per cent respectively*

After ascertaining the consistency ratio (CR), we consolidate the human capital index. The results of a Pairwise Comparison Judgment Matrices (PCJM) for the total sample appear in Table 5.2 and Table 5.3 below whereas the results of the Pairwise Comparison Judgment Matrices (PCJM) of the dimensions and sub-dimensions for each category of experts are seen in Appendix C. The normalized weights (we name it local weights to differentiate from global weights) of the dimensions and sub-dimensions are added together with respect to all the succeeding hierarchal levels to attain the global composite priority weights (GCPW) of all the sub-dimensions used in the third level of the AHP model. Together with the local weights and global weights, the complete Human capital Index is based on the total sample (opinion of all experts) as shown in Table 5.4. The study uses this index to compute the level of human capital from the targeted population for further analysis. For comparison purpose, we also computed the HCI based on the results of each category. These indices are shown in Appendix C. Some of the differences among the experts during the ratings are also observed from the results. To analyze the degree of differences and their probable causes, a detailed discussion on the result is essential. This discussion, on the differences in weighing the dimensions and sub-dimensions comes in the proceeding section. However, before discussing the difference in dimensions and the experts' opinions, it is important to demonstrate how this index is used to calculate the level of human capital. The following section encapsulates this discussion.

Table 5.2: Pairwise Comparison Judgment Matrices of HC Dimensions

Human Capital	Education	Experience	Training	Personal attributes	Skills	Attitude	Employee Stability	Health	Compliance	**Priority**
Education	1	2.342	2.107	1.870	1.834	1.891	2.703	2.313	3.359	0.177
Experience	1.668	1	0.994	0.757	1.701	1.630	1.908	2.921	3.470	0.141
Training	0.513	1.980	1	1.308	0.757	3.403	1.437	2.003	2.752	0.123
Personal Attributes	0.553	1.566	0.913	1	0.801	4.915	1.885	0.902	3.038	0.125
Skills	0.966	0.867	1.384	1.349	1	3.756	1.985	2.236	2.735	0.139
Attitude	0.660	0.824	0.366	0.262	0.331	1	0.524	2.744	3.555	0.078
Employee Stability	0.476	0.641	0.934	0.799	0.617	2.019	1	1.522	3.736	0.097
Health	0.459	0.374	0.607	1.180	0.491	0.508	0.690	1	3.389	0.075
Compliance	0.363	0.310	0.636	0.479	0.538	0.311	0.563	0.330	1	0.046
									CR=	**0.017**

Table 5.3: Pairwise Comparison Judgment Matrices of HC Sub-dimensions

Education	**Level of Education**	**Quality of Education**	**Technical Education**	**Priority**
Level of Education	1	0.880	0.778	0.292
Quality of Education	0.486	1	0.657	0.343
Technical Education	0.303	0.403	1	0.366
			CR =	**0.000**

Experience	**Similar Industry Experience**	**Work Related Experience**	**Organizational Tenure**	**Priority**
Similar Industry Experience	1	0.67	0.76	0.27
Work-Related Experience	0.89	1	1.24	0.45
Organizational Tenure	0.41	0.60	1	0.27
			CR =	0.01

Table 5.3, Continued

Training	On the Job Training	Spending on Training	Time on Training	Technical Training	Interpersonal Training	Previous Training	Priority
On the Job Training	1	0.65	1.14	1.25	0.41	0.58	0.22
Spending on Training	0.60	1	0.78	0.44	0.79	0.49	0.11
Time on Training	0.56	0.92	1	0.58	0.78	0.37	0.10
Technical Training	5.54	1.23	0.76	1	1.18	0.46	0.21
Interpersonal Training	0.54	0.26	0.29	0.48	1	0.61	0.12
Previous Training	0.62	0.77	1.75	0.72	0.63	1	0.24
						CR =	**0.03**

Personal Attributes	Creativity	Intelligence	Diversity	Leadership	Risk Taking	Priority
Creativity	1.000	0.500	1.000	0.625	0.667	0.201
Intelligence	2.000	1.000	0.625	0.167	0.500	0.242
Diversity	1.000	0.600	1.000	0.600	0.429	0.173
Leadership	0.600	0.857	0.667	1.000	0.250	0.257
Risk Taking	0.530	0.444	0.714	0.500	1.000	0.127
						CR = 0.05

Skills	Work-Related Skills	Problem-Solving Skills	Communication Skills	Technical Skills	Intrapreneurial Skills	**Priority**
Work-Related Skills	1.00	0.60	0.80	0.57	1.89	0.30
Problem-Solving Skills	0.52	1.00	0.92	1.00	1.24	0.25
Communication Skills	0.43	0.44	1.00	0.66	0.57	0.12
Technical Skills	0.57	0.56	0.55	1.00	0.67	0.19
Intrapreneurial Skills	0.32	0.48	0.48	0.41	1.00	0.15
					CR =	**0.008**

Table 5.3 , Continued

Attitude	Cooperation	Motivation	Commitment	Satisfaction	Engagement	**Priority**
Cooperation	1.000	0.411	0.806	0.306	0.474	0.142
Motivation	0.880	1.000	0.451	0.458	0.726	0.194
Commitment	0.593	0.500	1.000	0.903	0.552	0.168
Satisfaction	1.822	0.921	1.226	1.000	0.694	0.274
Engagement	0.838	0.508	0.905	0.653	1.000	0.223
					CR =	**0.018**

Stability	Absenteeism	Longevity	Turnover	**Priority**
Absenteeism	1.000	0.493	0.667	0.307
Longevity	0.460	1.000	0.579	0.229
Turnover	0.889	1.000	1.000	0.464
			CR =	**0.005**

Compliance	Charges & litigations	Safety issues	Complaints	**Priority**
Charges & litigations	1.000	0.786	0.528	0.338
Safety issues	1.167	1.000	1.024	0.358
Complaints	0.850	1.056	1.000	0.304
			CR =	**0.003**

Health	Physical strength	Age of employee	Disease	**Priority**
Physical strength	1.000	0.542	0.533	0.211
Age of employee	0.931	1.000	0.595	0.426
Disease	1.556	0.815	1.000	0.363
			CR =	**0.007**

Table 5.4: Human Capital Index (HCI) for SME

Goal	Dimensions	Local Weights	Sub-dimensions	Local Weights	Global Weight
Human Capital	Education	0.177	Level of Education	0.292	0.052
			Quality of Education	0.343	0.061
			Technical Education	0.365	0.065
	Experience	0.141	Similar Industry Experience	0.275	0.039
			Work-Related Experience	0.451	0.064
			Organizational Tenure	0.274	0.039
	Training	0.123	On the Job Training	0.221	0.027
			Spending on Training	0.108	0.013
			Time on Training	0.102	0.013
			Technical Training	0.212	0.026
			Interpersonal Training	0.121	0.015
			Previous Training	0.236	0.029
	Personal Attributes	0.125	Creativity	0.201	0.025
			Intelligence	0.242	0.030
			Diversity	0.173	0.022
			Leadership	0.257	0.032
			Risk Taking	0.127	0.016
	Skills	0.139	Work-Related Skills	0.296	0.041
			Problem-Solving Skills	0.251	0.035
			Communication Skills	0.121	0.017
			Technical Skills	0.185	0.026
			Intrapreneurial Skills	0.147	0.020
	Attitude	0.078	Cooperation	0.142	0.011
			Motivation	0.193	0.015
			Commitment	0.168	0.013
			Satisfaction	0.274	0.021
			Engagement	0.223	0.017
	Stability	0.097	Absenteeism	0.307	0.030
			Longevity	0.229	0.022
			Turnover	0.464	0.045
	Health	0.075	Physical strength	0.211	0.016
			Age of employee	0.426	0.031
			Disease	0.363	0.027
	Compliance	0.046	Charges & Litigations	0.338	0.016
			Safety Issues	0.358	0.016
			Complaints	0.304	0.014
Total					**1.000**

** Here, composite results means that the analysis is based on the results of all three categories of experts*

5.3.1 How to Use the HC index to Calculate the Level of HC

A close-ended questionnaire needs to be used to collect the data on every sub-dimension of human capital. For example, by using the questionnaire in Appendix A, we collected the data on Firm A. The first mean value of all the items of a sub-dimension was calculated. In this case, the mean value of every sub-dimension appears in the column named "MV" in Table 5.5 below. In the second step, the mean value was than multiplied to the global priority weights (GPW). In the third step, all the resulting values (product of MV and GPW) were added. The resulting number, in this case 2.91, represents the level of HC in Firm A. In this way, the level of HC in every firm can be computed. The resulting HCI value can lie between 1 and 5. Though the prime purpose of this index is not to check the level of HC, it has the ability to do so. For example, the resulting value can be interpreted as: from *1 to 1. 99 very low, 2 to 2.99 low, 3 to 3.99 high and 4 to 5 very high level of human capital*. By taking this scale, the 2.91 HCI value of Firm A shows that the company possesses a low level of human capital, emphasizing the need to invest more in its HC. Similarly, the level of every dimension of HC can be computed and interpreted. However, when calculating the level of a particular dimension(s) of the HC in a firm, the local weights of the dimension(s) are used instead of its global priority weights (GPW).

Table 5.5: Application of HCI to Calculate the Level of HC

Goal	Dimensions	Local Weights	Sub-Dimensions	Local Weights	Global Priority Weights (GPW)	Firm A	
						MV	MV X GPW
Human Capital	Education	0.177	Level of Education	0.292	0.052	2	0.104
			Quality of Education	0.343	0.061	3	0.183
			Technical Education	0.365	0.065	2	0.13
	Experience	0.141	Similar Industry Experience	0.275	0.039	2	0.078
			Work-Related Experience	0.451	0.064	2	0.128
			Organizational Tenure	0.274	0.039	3	0.117
	Training	0.123	On the Job Training	0.221	0.027	4	0.108
			Spending on Training	0.108	0.013	3	0.039
			Time on Training	0.102	0.013	4	0.052
			Technical Training	0.212	0.026	2	0.052
			Interpersonal Training	0.121	0.015	3	0.045
			Previous Training	0.236	0.029	4	0.116
	Personal Attributes	0.125	Creativity	0.201	0.025	5	0.125
			Intelligence	0.242	0.03	4	0.12
			Diversity	0.173	0.022	3	0.066
			Leadership	0.257	0.032	2	0.064
			Risk Taking	0.127	0.016	4	0.064
	Skills	0.139	Work-Related Skills	0.296	0.041	3	0.123
			Problem-Solving Skills	0.251	0.035	4	0.14
			Communication Skills	0.121	0.017	1	0.017
			Technical Skills	0.185	0.026	4	0.104
			Intrapreneurial Skills	0.147	0.02	3	0.06
	Attitude	0.078	Cooperation	0.142	0.011	4	0.044
			Motivation	0.193	0.015	5	0.075
			Commitment	0.168	0.013	4	0.052
			Satisfaction	0.274	0.021	2	0.042
			Engagement	0.223	0.017	3	0.051
	Stability	0.097	Absenteeism	0.307	0.03	3	0.09
			Longevity	0.229	0.022	3	0.066
			Turnover	0.464	0.045	2	0.09
	Health	0.075	Physical strength	0.211	0.016	5	0.08
			Age of employee	0.426	0.031	3	0.093
			Disease	0.363	0.027	2	0.054
	Compliance	0.046	Charges & Litigations	0.338	0.016	3	0.048
			Safety Issues	0.358	0.016	3	0.048
			Complaints	0.304	0.014	3	0.042
HCI							**2.91**

5.4 Discussing the HCI Dimensions and Sub-dimensions

5.4.1 Dimensions of Human Capital Index (HCI)

In the first phase, we discuss the results of the dimensions of human capital. These dimensions directly constitute human capital. As discussed earlier, the three categories of respondents (*Government officials, Industrial professionals, institutional experts*) took part in the process of prioritizing the dimensions and sub-dimensions. In the first step, to discuss the inter-category differences, we did an inter-category comparison. In the second step, the results of all the categories merged to form composite results. This comparison is instrumental to analyze the level of coordination among the various agencies responsible for SME development in Pakistan. Here, it is pertinent to clarify that our human capital index is based on these composite results.

Table 5.6 reports the composite results of all key dimensions of human capital, arranged in descending order of priorities. It is discernible that education (17.7 percent) is top on the least, followed by experience (14.1 percent), skills (13.9 percent), personal attributes (12.5 per cent), training (12.3 per cent), employee stability (9.7 percent), attitude (7.8 percent), health (7.5 percent) and compliance (4.6 percent). On a broader canvas, the ratings of dimensions are consistent with scholastic work already conducted on the topic. For example, Hitt et al. (2001) marked education as the prime aspect of human capital. Similarly, Skaggs and Youndt (2004) ranked experience the second important cord of human capital. However, in-depth analysis of empirical literature reveals mixed results. While some studies favor the results of this study, others contradict it. For example, Han et al. (2008) estimated job accountability and employee competence as the top two dimensions of human capital. Their results did not show education even in the top ten. Likewise, Subramaniam and Youndt (2005) rated skills higher than education for measuring human capital. On the other hand, Hatch and Dyer (2004) ranked education within the top three prominent indicators of human capital. Further, a lot of empirical studies did not consider employees' stability and compliance as dimensions of human capital (Burud & Tumolo, 2004). On the contrary, Bontis et al. (1999) and Bontis and Fitz-Enz (2002) regarded these two variables as essential parts of human capital. Concisely, the results of the dimensions of human capital are broadly consistent with previous empirical findings, with some minor differences. These minor differences are country specific and due to the unique conditions of every country, it can differ from country to country.

Table 5.6: Prioritization of Dimensions of Human Capital

Strategic Dimensions	**Priority**
Education	0.177
Experience	0.141
Skills	0.139
Personal attributes	0.125
Training	0.123
Stability	0.097
Attitude	0.078
Health	0.075
Compliance	0.046
Total	1.000

Table 5.7 presents the weights of different dimensions of human capital based on composite results and individual categories. A comparison of different stakeholders reveals that on a broader perspective, various agencies which are responsible in developing SMEs accord similar importance to key dimensions of the human capital. However, some disparities in opinions prevail. As seen from the difference in *education and experience***,** experts from the government and institutions favor education over experience, while industrial professionals rate experience higher than education. Industrial professionals prefer *experience* over *education* primarily because of the need to train the people who

have education but do not have experience. The person who has experience but does not have education may not require substantial training investment.

Table 5.7: Prioritization of Dimensions of Human Capital, by Stakeholders

Dimensions	Industrial Professionals	Institutional Experts	Government Officials	Composite
Education	0.12	0.17	0.24	0.177
Experience	0.21	0.11	0.10	0.141
Training	0.11	0.12	0.16	0.123
Personal attributes	0.12	0.12	0.14	0.125
Skills	0.16	0.15	0.11	0.139
Attitude	0.06	0.09	0.08	0.078
Employee Stability	0.07	0.15	0.07	0.097
Health	0.07	0.07	0.08	0.075
Compliance	0.08	0.04	0.02	0.046

The composite results, the average of all three categories, rank experience the second most important dimension of human capital. After analyzing the results of each category, it shows that only professionals ranked experience first, almost double that of the other two categories, valuating it at 21 per cent. The argument that industrial professionals ranked experience high on the list is because of the ease of incorporating experienced human capital into existing operations of the SMEs. For experienced human capital, a company does not need to invest time and money heavily on training and other on-the-job learning activities. Institutional experts and Government officials valued experience as 11 per cent and 10 per cent respectively, half of the quantum given by professionals. Both experts from the government and institutions rated "*educatio*n" more important than experience. It also appears as the most important dimension of human capital in the composite results. Education also received higher weightage from the government and institutional experts, which is 24 per cent and 17 per cent respectively. The underlying argument for this is the dynamism of business environment. Since business environment is dynamic and a number of advancements take place in the business, whether it is small or large, an educated human capital can easily absorb these new developments. On the other end, industrial professionals rated education 12 per cent in human capital; they attributed this lower rating to the "irrelevancy of education". They argued that though education equipped human with necessary knowledge, it did not incorporate the skills required to perform organizational tasks. Besides, for industrial professionals, an experienced human capital, though not very educated, knows how to perform his/her tasks in the organization better than an educated but inexperienced person.

The composite results depicted *skill* as the third prominent cord of human capital, with a value of 13.9 percent. Previous scholastic work by Kaplan and Norton (1996) on investigating skill as a strand of human capital also portrayed it among the top five constituents of human capital. Even some researchers (Booth, 1998; McGregor, Tweed, & Pech, 2004; Wright & McMahan, 2011) considered skills more important than education. Professionals and experts have almost homogenously evaluated it at 16 per cent and 15 per cent respectively, while government experts weighted it 11 per cent, somewhat lesser than the other two categories, ranking "personal attributes" higher than "skills".

Since the term 'human capital' came onto the horizon of economics, *training* remained an integral part of it. Our results also confirmed *training* as one of the most important surrogates of human capital. Composite results valuated training at 13.1 per cent, marginally below experience. Heaps of scholastic work (Edvinsson & Malone, 1997; Gimeno et al., 1997; Han et al., 2008; Sveiby, 2001; Sveiby, 1997) concurred with these results. All categories of respondents considered *training* as an important dimension of human capital. Government experts weighted it 16 per cent, showing the government's interest on increasing training activities to develop SMEs.

Personal attributes emerged as the fourth eminent component of human capital, having a combined average value of 12.5 per cent. All stakeholders had a consensus about its prominence. It received a 12 per cent value each from professionals and experts whereas government officials valuated it 14 per cent. Empirical studies also confirmed these results. Studies by Booth (1998), Bukh (2003) and Bukh, Larsen, and Mouritsen (2001) reported personal attributes as the third most important constituent of human capital after education and experience.

Employees' stability which was considered the fifth vital cord of human capital received a 9.7 per cent value in composite results. Here, considerable disparities among the results catch the attention. Notably, opinions of institutional experts seem to be highly different from that of the industrial professionals and government experts. The former gave 15 per cent value to employee stability while the latter 7 per cent. Most of the empirical work ignored *employees' stability* as part of human capital. Nevertheless, some of the studies, for example, Tomer's (1999) recognized employee stability as an influential element of human capital.

Attitude and *health* received almost equal values with composite results of 7.8 per cent and 7.5 per cent respectively. There is also a consensus among experts' opinions on these two dimensions. A number of researchers (Myers, Griffith, Daugherty, & Lusch, 2004; Roos et al., 1998; Saint-Onge, 1996) claimed *attitude* as a true surrogate of human capital.

However, there is a dearth of studies on *health* as a cord of human capital. In this aspect, the results of this study are more comprehensive. The majority of the studies did not consider *complaints and charges* as worthwhile dimensions of human capital. Scholastic work in the field of management, however, revealed employees having no complaints, charges or litigations as assets for a company. It is true since solving these *complaints and charges* require a substantial amount of time, energy and funds. In our analysis, compliance is the last but not the least important cord of human capital. Based on the results of individual categories, some disparities among respondents are observed. The industrial professionals put a value on compliance and safety issues at 8 per cent, which is even higher than health and attitude whereas institutional and government experts weighted them at 4 per cent and 2 per cent respectively. Since empirical researches are less focused on compliance and safety as part of human capital, it is worth investigating this dimension given the lack of consensus amongst the various stakeholders.

5.4.2 Sub-Dimensions of Human Capital Index (HCI)

The results of the sub-dimensions of human capital are shown in Table 5.8 in descending order of their global priority weights (GPW). As explained previously, the global priority weights (GPW) were calculated on the basis of the composite results, following the procedure explained in Chapter 4. It is obvious that experience and education occupy the top-most rankings in the list, followed by turnover and work-related skills. The education factors that are in the top ten rankings include quality, level and technical education. The experience factors that are in the top ten rankings include work-related experience, organizational tenure and similar industry experience. Surprisingly, there is no element of training in the top ten. The GPW prioritization depicted *technical education* and *work-related experience* as the highest ranked sub-dimensions of human capital. The results of the GPW are grossly consistent with previous empirical researches; however, it differs from some of the empirical literature. For instance, scholastic work by Bontis (1998), Scholz et al. (2007) and Han et al. (2008) showed *work-related experience* and *technical education* as prominent constituents of human capital whereas studies by Baptiste (2001), Brooking & Motta (1996), J. Chen et al. (2004), Hatch & Dyer (2004) categorized the *level of education* and *quality of education* among the eminent sub-dimensions of human capital. The reason for ranking *technical education* among prominent cords of human capital is industry specific. As most of the jobs in the manufacturing industry require a particular level of technical skills, professionals from the manufacturing industries prefer *technical education* over normal education. Bozbura, Beskese, and Kahraman (2007), however, found *employee turnover, work-related skills* and *organizational tenure* as the apex of the sub-dimensions of human capital. It is interesting to note that the results of Bozbura et al. (2007) and Han et al. (2008) did not list *technical education* even in the top 10 prominent cords of human capital. However, while Global Priority Weights (GPW) depicts the overall ranking of sub-dimensions to analyze collaboration among stakeholders responsible for SME development in Pakistan, it is important to compare the results of respondents with one another as the cone for key dimensions. Table 5.9 compares the prioritization of the HC sub-dimensions done by three categories of experts. The following section briefly delineates the comparison of intra sub-dimensions to understand the co-ordination among various stakeholders.

Table 5.8: Prioritization of Sub-Dimensions of Human Capital Index

Sub-Dimensions	**Global Weight**
Technical Education	0.0646
Work-Related Experience	0.0636
Quality of Education	0.0607
Level of Education	0.0517
Turnover	0.0450
Work-Related Skills	0.0411
Similar Industry Experience	0.0388
Organizational Tenure	0.0386
Problem-Solving Skills	0.0349
Leadership	0.0321
Age of employee	0.0310
Intelligence	0.0302
Absenteeism	0.0298
Previous Training	0.0290
Disease	0.0272
On the Job Training	0.0272
Technical Training	0.0261
Technical Skills	0.0257
Creativity	0.0252
Longevity	0.0222
Diversity	0.0216
Satisfaction	0.0214
Intrapreneurial Skills	0.0204
Engagement	0.0174
Communication Skills	0.0168
Safety Issues	0.0165
Risk Taking	0.0159
Physical strength	0.0158
Charges & Litigations	0.0155
Motivation	0.0151
Interpersonal Training	0.0149
Complaints	0.0140
Spending on Training	0.0133
Commitment	0.0131
Time on training	0.0125
Cooperation	0.0111
Total	**1**

Table 5.9: Value of Sub-dimensions of HCI (Inter expert categories comparison)

Dimensions	Sub-Dimensions	Industrial Professionals	Institutional Experts	Government Officials	Composite
Education	Level of Education	0.27	0.30	0.30	0.291
	Quality of Education	0.40	0.33	0.29	0.342
	Technical Education	0.33	0.37	0.40	0.365
Experience	Similar Industry	0.27	0.27	0.28	0.29
	Work-Related	0.40	0.40	0.55	0.34
	Organizational Tenure	0.33	0.32	0.17	0.37
Training	On the Job Training	0.18	0.26	0.23	0.220
	Spending on Training	0.10	0.11	0.11	0.107
	Time on Training	0.11	0.10	0.10	0.101
	Technical Training	0.20	0.17	0.26	0.211
	Interpersonal Training	0.12	0.13	0.12	0.120
	Previous Training	0.29	0.23	0.18	0.236
Personal Attributes	Creativity	0.15	0.22	0.14	0.167
	Intelligence	0.24	0.20	0.19	0.208
	Diversity	0.14	0.10	0.18	0.139
	Leadership	0.20	0.22	0.25	0.223
	Risk Taking	0.10	0.10	0.09	0.093
Skills	Work-Related Skills	0.35	0.30	0.23	0.29
	Problem-Solving Skills	0.26	0.33	0.16	0.25
	Communication Skills	0.14	0.12	0.11	0.12
	Technical Skills	0.19	0.17	0.20	0.18
	Intrapreneurial Skills	0.07	0.08	0.29	0.14
Attitude	Cooperation	0.10	0.11	0.21	0.141
	Motivation	0.17	0.21	0.20	0.194
	Commitment	0.10	0.13	0.28	0.167
	Satisfaction	0.26	0.40	0.16	0.273
	Engagement	0.36	0.16	0.15	0.222
Stability	Absenteeism	0.22	0.30	0.41	0.303
	Longevity	0.26	0.22	0.22	0.224
	Turnover	0.53	0.49	0.38	0.467
Compliance	Charges & litigations	0.38	0.27	0.36	0.338
	Safety issues	0.20	0.49	0.38	0.357
	Complaints	0.42	0.24	0.26	0.307
Health	Physical strength	0.24	0.20	0.20	0.210
	Age of employee	0.41	0.41	0.46	0.427
	Free from Diseases	0.35	0.39	0.34	0.362

5.4.2.1 Dimensions of Education

In terms of education, composite results show that *technical education* ranked at the top followed by the *quality* and *level of education*. However, the difference among the three categories of respondents, while prioritizing the dimensions of education, is minor (see Table 4.9). It epitomizes equal importance on all three components of education. In analyzing the figures, it is apparent that government officials and institutional experts rated *technical education* higher than the other two cords of education. The fact that the government officials gave a higher value to *technical education* indeed reflected the cornerstone strategy of the government, which was to grow SMEs by strengthening technical education. A rise in Technical Education and Vocational Training Authority (TEVTA) activities and other such types of bodies in Pakistan are a testimony to this.

5.4.2.2 Dimensions of Experience

The three sub-dimensions namely*, organizational tenure, work-related experience and similar industry experience* represented experience. Among them, according to composite results, *organizational tenure* emerged as the leading dimension of experience followed by *work-related experience* and *similar industry experience*. According to Ng and Feldman (2010), o*rganizational tenure* had a higher influence on organizational performance which is why it should receive greater importance. Notwithstanding, the comparison of the results of the various categories showed some divergence in the rating. For example, in the case of organizational tenure, the government officials rated it much lower than industrial professionals and institutional experts. The officials considered *work-related experience* more important than *organizational tenure*. Besides that, empirical literature considered all three cords equally. For example, Gimeno et al. (1997) ascertained similar industry experience as representing experience whereas Hitt et al. (2001) considered organizational tenure as representing it. On the other hand, Subramaniam and Youndt (2005) took *work-related experience* to represent *experience*.

5.4.2.3 Dimensions of Training

The intra sub-dimensions' comparison on *training* is divided into two categories. The first category comprised of *previous trainings, on the job training (OJT)* and *technical training*. These three factors captured the top ratings. The second category consisted of *soft skill trainings, spending on training and time on training*. These elements were less important comparatively. The empirical studies also granted lesser importance to these three cords. For example, Bartel (2000), Cho, Woods, Jang and Erdem (2006) and Aguinis and Kraiger (2009) depicted *formal training* and *technical training* as enhancing employee's capabilities which further improved a firm's performance. Similarly, Katou and Budhwar (2006) illustrated a positive influence on formal and informal training on the employees' capabilities. When comparing the results of the three categories with one another, considerable differences are apparent. For example, in the case of *technical training and previous training*, the Government officials accorded *technical training* greater importance than others whereas the industrial professionals considered *previous training experience* pivotal. Because the government policy makers viewed *technical training* as the shortest possible solution to upgrade human capital for industrialization, they weighed it more than any other. Nonetheless, interpersonal or soft skill trainings (D. Valle & Castillo, 2009; García, 2005), spending on training (Salas & Cannon-Bowers, 2001) and duration (Mohrenweiser & Zwick, 2009; Zwick, 2006, 2007) also significantly influenced human capital performance (Thang & Quang, 2007, 2011).

5.4.2.4 Dimensions of Personal Attributes

Personal attributes encapsulate highly diversified but interrelated traits of human capital. The comparison of the dimensions on personal attributes unveiled leadership as the most important trait among the personal attributes. Interestingly, all the dimensions of personal attribute held equal importance with minor differences, except for *creativity*. Experts valued *creativity* at 22 per cent, whereas government officials and professionals rated it 14 per cent and 15 per cent respectively. Empirical literature also granted equal importance on all cords of personal attributes that showed intelligence (Jones & Schneider, 2006), creativity (Halim, Ahmad, Ramayah & Hanifah, 2014), diversity (Richard, 2000; Richard, Ford, & Ismail, 2006) energy and risk-taking (M. Bhattacharya et al., 2014) that affected the firm's performance.

5.4.2.5 Dimensions of Skills

Being divided into five sub-dimensions, the composite results revealed *professional or work-related skills* as the most important sub-dimension of skills. It is valued at 29.5 per cent followed by problem-solving skills (25 per cent), ICT Skills (18.5 per cent), Intrapreneurial Skills (14.7 per cent) and Communication Skills (12 per cent). The important point to note is there is a large divergence among stakeholders on the prioritization of *Intrepreneurial skills*. It acquired the highest ranking from industrial professionals and institutional experts with 17 per cent and 18 per cent rating respectively. Contradictorily, the government ranked it the lowest with a rating of 9 per cent. The possible reason for it is the novelty of *intrapreneurial skills* in Pakistan. As "intrapreneurial skills" is relatively a new term, the government officials opined that SMEs in developing countries are not capable of executing such types of ideas. On the contrary, industrial professionals highlighted that some of the SMEs did not only consider *intrapreneurial skills* an essential part of human capital but also encouraged their employees to develop *intrapreneurial skills*. Summing up, it can be concluded that at least increasing some of the intrapreneurial skills is important for the SMEs both at micro and macro level. In a broader context, the results are in line with the previous scholastic work. However, the majority of the empirical literature (Skaggs & Youndt, 2004) viewed work-related skills as the most important skill of human capital. Nonetheless, extensive researches (Bozbura et al., 2007; Hatch & Dyer, 2004) have also revealed problem-solving, communication (Kelliher & Reinl, 2009; Ngah & Jusoff, 2009), intrapreneurial (Alpkan, Bulut, Gunday, Ulusoy, & Kilic, 2010; Antoncic & Antoncic, 2011; Man, Lau, & Chan, 2002) and ICT skills (Hashim, 2007; Shiels, McIvor, & O'Reilly, 2003) important for productive human capital.

5.4.2.6 Dimensions of Attitude

Though attitude encapsulates a diverse set of dimensions, we included its five most important dimensions. Among these five dimensions, according to composite results, *employee satisfaction* emerged as the highest dimension followed by *employees' engagement, motivation, commitment and cooperation* with a minute difference. By anatomizing in detail the results of one category with the others, some considerable differences are apparent. Pivotal among them is the case of employees' *engagement* whereby it captured the highest value at 36 per cent from industrial professionals whereas it warranted only 16 per cent and 15 per cent by institutional experts and government officials respectively. The primary reason of it is attributed to the direct influence of *employees' engagement* on the firm's performance (Bontis & Fitz-Enz, 2002). Besides, industrial professionals considered it a broader dimension than any other, hence valued it the highest. Besides, scholastic work also portrayed satisfaction (Bontis & Fit-Enz, 2002) and motivation (Burud & Tumolo, 2004) as prime sub-dimensions of human capital.

5.4.2.7 Dimensions of Stability

In the preliminary survey, three dimensions, namely absenteeism, longevity and turnover emerged as indicators of stability. Absenteeism was included to measure stability in the short run whereas longevity and employee turnover were considered measures in the long run. Interestingly, the composite results depicted turnover as the apex of the dimension of stability with a value of 46.7 per cent. It is followed by absenteeism at 30.3 percent and longevity at 22 per cent. Though all the experts viewed *turnover* overwhelmingly as an important dimension of *stability,* in the multidimensional perspective, the inclusion of absenteeism and longevity was also to be considered. These results are quite consistent with Bontis and Fit-Enz (2002) who also depicted *turnover* as one of the leading cords of human capital.

5.4.2.8 Dimensions of Compliance

In the case of compliance, all its three cords gained equal valuation with *safety issues* (35.7 per cent) followed by *litigation and charges (33 per cent) and complaints* (30 per cent). The interesting point to note is the higher rating of safety issues. It received the highest valuation from the institutional experts, the policy makers who show their concern for HSE issues that are of importance in SMEs. However, industrial professionals and policy implementers rated it the lowest among them. This divergence shows that s*afety issues (HSE)* are not considered so important by the SMEs. Perhaps it is this reason that most safety accidents happen in SMEs. Grossly, composite results are consistent with extensive researches like Folloni and Vittadini (2010).

5.4.2.9 Dimensions of Health

Age is the only dimension of health that gains attention when gauging the human capital. However, based on a preliminary survey, we also included two other dimensions of health i.e. the physical strength of employees and the level at which employees were free from diseases. The composite results showed age (42.7 per cent) as a pivotal sub-dimension of health. However, interestingly, the d*isease-free employees*, especially from epidemic diseases, also acquired a significant value, i.e. 36.2 per cent. The physical strength of the employees remained the least-rated, having a score of 21 per cent. Primarily, the physical strength of the employee is deemed important for the non-skilled or semi-skilled laborers. The results cannot be compared fully to empirical studies since scholastic literature which focuses on the sub-dimensions of health separately is limited. However, a lot of researchers have indirectly mentioned *age, disease-free and physically strong employees* as productive human capital (Bontis, 2001).

5.5 Summarizing the Discussion on HCI Dimensions and Sub-dimensions

The basic objective in discussing the inter-category difference is to find the extent to which all stakeholders who are responsible for the growth of SMEs in the manufacturing sector have coordinated opinions. Since most of the experts hold high positions in their respective institutions/organizations, their opinions either represent their organization policy or have a significant influence on it. That is why the coordination of the opinions of the respondents represents the coordination among the government, industry, academia, microfinance institutions and non-government organizations (NGOs) working for the development of the SME. Based on the brief analysis and a comparison of the respondents' opinions of one another, it is apparent that basically, all the stakeholders' opinions are on the same note regarding human capital development. However, in a number of cases, there is a significant gap among the ratings which depicts a clear lack of coordination on some serious policy inputs. In a few of the results, there was especially a rather big difference between the government officials' opinions and the other two categories. A case to refer is the rating of *intrapreneurial skills*, whereby the difference between government officials and the rest of the stakeholders was more than 50%. Likewise, the results of the valuation on *skill* also showed a lack of consensus among the government, industry and developmental institutions. Similar disparities are observed in the evaluating of *Health*. Despite the growing importance of health and safety issues in the SMEs, the results of *health* as an indicator of human capital portrayed a huge variation among the stakeholders' opinions. These disparities signify a need to have a closer collaboration among the various stakeholders to develop and execute an effective developing policy of SMEs. The process of ratings also revealed that some government officials' knowledge is outdated or their concepts considered irrelevant for human capital development in the SMEs. For example, despite the increasing importance of Information Communication Technology (ICT) skills, some of the officials rated it very low. Similarly, a few government officials considered *Intrapreneurial skills* as irrelevant for SMEs, stating it an idea for SMEs of developed countries only. It emphasizes the need for closer fraternization among the government, industry, academia and developmental institutions.

In condensed form, in order to devise and implement effective policies to develop human capital in the SMES in Pakistan, a close collaboration of the stakeholders concerned is necessary. As seen from the results, it is non-existent at present. Additionally, all stakeholders should also keep themselves updated with the latest industrial trends in terms of human capital developments. It is worth mentioning that the ranking of dimensions and sub-dimensions of human capital can also be a useful source for developing appropriate levels of human capital in SMEs.

5.6 Summary

The first part of this chapter highlighted the preliminary survey conducted to shortlist the most relevant dimensions and sub-dimensions of human capital. On the basis of the responses from the 100 experts from the three categories, namely the government, industry and institutions (academia and NGOs), nine key dimensions and 36 sub-dimensions of human capital emerged as the most relevant representative of human capital in the SME of the manufacturing sector in Pakistan. The subsequent section of the chapter discussed the course of proceeding with the selected dimensions and sub-dimensions by assigning them the priority weights according to their importance and the further development of human capital index (HCI). This process was done by applying the Analytical Hierarchical Process (AHP) technique. Among the dimensions of human capital, the composite results revealed education had the highest rating (17.7 per cent) followed by experience (14.1 per cent) and skills (13.9 per cent). In the sub-dimensions, again the strands of education i.e. technical education was ranked the highest followed by work-related experience. Based on the composite results of the dimensions and sub-dimensions using the AHP procedure, the human capital index (HCI) was derived. The HCI is to be used in the empirical analysis of the next chapter.

The last part of the chapter encapsulated the discussion on inter-category differences when rating the dimensions and sub-dimensions of human capital. Though the respondents showed considerable consensus during the rating, in some of the areas, there was a serious lack of coordination seen. A prominent example of it was the large divergence among the results of the three categories when rating *health, stability, intrapreneurial skills and health.* The primary reason for this divergence was the lack of coordination among these stakeholders. Hence, based on the results, we recommend a closer collaboration of the government, industry, academia, micro-finance institutions and NGOs to develop human capital in SMEs. The chapter ended with the suggestion to use the results (*ranking of dimensions and sub-dimensions of human capital*) to develop appropriate levels of human capital in the SMES in Pakistan.

CHAPTER 6

LEVEL OF HUMAN CAPITAL BY INDUSTRY, SIZE AND OWNERSHIP

6.1 Introduction

This chapter tests the difference in the level of human capital (HC) by industry, size, and ownership (foreign or local). The rationale to test this is based on the arguments of researchers who felt that a “one fit all” policy is a misfit for all. They declared that the level of HC differs by industry, size and ownership; therefore, the development policies of HC should be devised by keeping in mind these differences. Contrastingly, some researchers suggested that all of the SMEs in Pakistan possessed a low level of HC and needed a comprehensive policy to develop it. These contrasting views explain the need of specific or general development policies of the HC which depend on the difference in the level of HC by industry, size, and ownership. In this context, the aim of this chapter is to test the difference in the level of HC by industry, size and ownership. This will help provide guidelines to the stakeholders when devising HC development policies in SMEs. The chapter summarizes and presents the results of a survey conducted to find out the level of HC from 750 SME firms in the manufacturing sector. The analysis is shown in four major parts. The first part briefly discusses the results related to the level of HC in the manufacturing sector. By applying the various statistical techniques, the second part analyzes whether the level of HC differs from one industry to other or not. Similarly, in the third part, the question of whether the level of HC differs by size in the manufacturing sector has been anatomized. The last part of the chapter encapsulates the analysis regarding firm ownership and the level of HC.

6.2 Reliability of Human Capital Index

In order to find the level of HC, the data of all the nine dimensions of human capital was collected through a close-ended questionnaire[3] from 750 SMES in the manufacturing sector. The profiles of the respondents of the SMEs appear in Table 6.1. Although questions relating to human capital originated from the HCI which was previously developed by adopting a rigorous procedure, it was important to confirm its reliability and validity. The study estimated HC (main construct) on its nine dimensions (sub constructs). The nine latent dimensions were measured from the various numbers of items. We conducted a confirmatory factor analysis in the AMOs. The results of the fitness indices [CFI=0.90, GFI=0.91, RMSEA=.043, $\chi 2$/df=2.376] achieved the required level. Likewise, the factor loading of all dimensions ranged from 0.56 to 0.81. These estimations depicted that the HC construct loaded well on its nine dimensions. The value of AVE and CR was 0.50 and 0.89 respectively. Similarly, the factor loading of each item for its respective dimensions ranged from 0.62 to 0.87 which showed that each dimension of the HC loaded well on its items. The values of AVE and CR for every dimension were also greater than the threshold value, i.e. 0.50 and 0.70 respectively. These results not only prove the construct validity (HC part) but also confirmed the reliability of HCI (See Appendix C -2).

[3] A detailed discussion on the questionnaire development is shown in Chapter 4, Section 4.4.3.2. The questionnaire consisted of four parts, whereby Part A covered the basic demography of a firm, Part B carried questions related to the nine dimensions of human capital, Part C measured the absorptive capacity and Part D measured the performance of a firm. In this chapter, we use Part A to explain the demography of the firm and Part B of the questionnaire is related to the measurement of HC. Information from Part C and Part D of the questionnaire would be discussed in Chapter 7.

Table 6.1: Profiles of SME Respondents

Industry	Number
Textile	165
Leather	100
Sports	86
Food	150
Metal	50
Furniture	79
Others	120
Total	750
Size*	
Small	224
Medium	526
Total	750
Ownership	
Foreign	66
Local	684
Total	750
Years in Operation	
1 - 5 years	155
6 - 10 years	196
11- 15 years	146
16 - 20 years	135
> 20 years	118
SMEs receiving government assistance	131
SMEs taking loan from a bank	188
SMEs having a parent company	205

**Firms having employment size less than 50 are considered small*

6.3 Level of Human Capital in Manufacturing Sector

After confirming the reliability, the collected data of each dimension was then computed according to its weightage in human capital index (HCI). This computation provided the HCI value for each SME, illustrating the level of HC in that firm. Similarly, we also computed the HCI values for every dimension of HC in each SME, showing the level of these dimensions in that SME. By aggregating and taking the mean of these HCI values, we obtained the level of HC (overall and by dimensions) for the manufacturing sector and for each industry (Figure 6.1, Table 6.2). The values lie between 1 and 5, where *1 to 1.99 is* *very low, 2 to 2.99 low, 3 to 3.99 adequate, 4 to 4.49 competitive and 4.5 to 5 a high* level of human capital. Figure 6.1 shows the level of HC (overall and by dimensions) in the manufacturing sector.

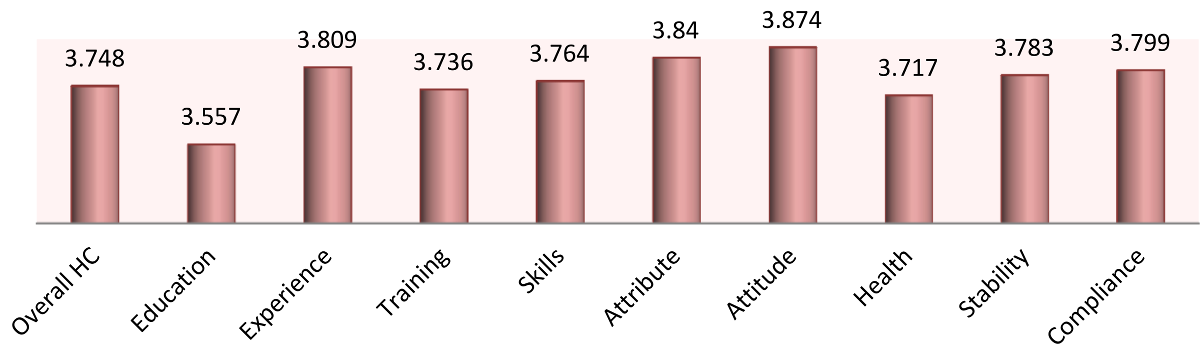


Figure 6.1: Level of Human Capital in the Manufacturing Sector

The mean value of HCI is 3.748 for the manufacturing sector. As the study assumes a HCI score of 4.00 as the minimum required value for HC, the results suggest that SMEs in Pakistan have not reached the adequate levels of HC. Further analyses of individual dimensions of HC reveal that education, training and health possess the lowest HCI value. The results on the low levels of education and training in the SMEs in Pakistan concur with the studies here (Bhutta, Khan, Omar, & Asad, 2009; Bhutta et al., 2008; Khalique et al., 2011). They argue that SMEs tend to focus on informal rather than formal training, as they believe the former to be more cost effective (Barron, Berger, & Black, 1999; Bhutta et al., 2009). According to McRAE and Johnson (1991), education, training and experience are the key differences of the high growth and low growth of SMEs. He adds that by improving *education* alone in terms of its level, quality and relation to the profession, the level of HC can be elevated in the SMEs in Pakistan.

Among the other dimensions, attitude, experience and attributes record high scores, supporting the fact that most employees in the SMEs in Pakistan are hired on the basis of their experience and personal attributes, rather than their education, training and health. Overall, the results suggest that Pakistan's SMEs require a substantial improvement in the HC. These improvements can be attained by focusing on education, training, health and the skills of the employees (Berry et al., 1998; Dasanayaka, 2008; Khalique et al., 2011). To get a precise picture, it is more important to assess the differences in the levels of HC across the industries. Section 6.3 sees to this.

6.4 Level of Human Capital: By Industry

It is pertinent to assess the differences in HC (overall and by dimensions) at industry level to identify the dimension(s) that are important to improve the level of human capital in a particular industry. Table 6.2 illustrates the HCI value of the nine HC dimensions by industry.

The furniture industry records the lowest level of HCI value, particularly for *education and stability* factors. The low levels of stability are reflected in the high turnover rates for this industry (SMEDA, 2009). This is linked to the bad working conditions (Stephen & Dhanpal, 2012) and job stress. Unlike stability, the mean value for experience is high comparatively, implying that experience plays a vital role in the formation of HC in the furniture industry. To elevate the levels of HC, the furniture industry needs to improve on *education, stability* and *compliance.*

The results for the sports industry are almost identical with that of furniture. Here *education, stability, compliance* and *training* have the lowest HCI values. The UNIDO (2010) highlighted that issues related to compliance, low education of workers, high turnover and poor working conditions are the major constraints for growth in the sports industry.

Similarly, the leather industry also possesses low levels of *education*, *stability and health*. Notably, in the case of health, *employees who are free from disease* which is one sub-dimension of health, records the lowest score. Some of the scholars have argued that a low level of health further decreases *stability*, *compliance* and *the attitude* of employees (Bakker, Schaufeli, Leiter, & Taris, 2008; A. M. Grant, Christianson, & Price, 2007). However, reports like Enterprise Survey (World Bank, 2007) maintain that the low level of education is the root cause of the low levels of HC in the leather industry.

In the metal industry, the *education* level is the lowest with a HCI value of 3.26. Similarly, the results reveal that the industry lacks skillful employees. The UNIDO (2010) findings for the metal industries highlight the need to improve the quality of education and designing skills to improve its level of HC. The results also coincide with SMEDA (2007) where the level of education is low and skills are considered a major reason of a firm’s failure in the metal industry. In contrast, *attitude* captures the highest HCI value compared to all other industries. It illustrates that worker satisfaction, motivation and engagement in the metal industry are the highest compared to other selected industries. However, regardless of such high levels of motivation, commitment and engagement, the lower levels of education and skills have reduced the overall level of HC in this industry.

The education level, apart from *skills and training* is again found to be low in the food industry. The UNIDO report (2010) unveils a low relevancy of education with professional requirements as the main reason for a low level of education. The report adds that the food industry also lacks technical skills. A primary reason for this is the lack of institutions necessary to impart the required skills. Besides that, the value of *skills* and training *are also* lower than other dimensions. Explicating the low level of skills, the UNIDO report (2010, p.9) highlights:

> *"Skill deficits are common among underperforming clusters and range from scarce technical competence and low levels of education of the workforce (i.e. industrial skills), through poor business management capacities (i.e. entrepreneurial skills), to weak capabilities of the staff of local institutions and policymakers (i.e. governance skills). These hamper the capacity of the cluster to learn, innovate and upgrade. Skills shortages also reflect the inability of the local training system to supply the cluster with the qualifications required by an innovative private sector."*

Interestingly, the HCI value for attitude (4.01) is the highest recorded score among the other industries, implying that levels of motivation, commitment and cooperation – measures of attitude – are relatively high in this industry.

The textile industry attains the highest levels of *skills (technical, communication and problem-solving skills)* and *attributes (creativity, diversity and leadership)* within manufacturing. As the textile industry is the leading exporting industry, a majority of the government's skills development programs and other assistance are aimed at this industry. In addition, large textile organizations in Pakistan have also taken the initiatives to build institutions to promote HC in this industry (Dasanayaka, 2008). Despite this, *health and compliance* are low in this sector and the problem is crucial and needs to be addressed to compete in the international markets (UNIDO 2010, 2006).

The industry-level analysis has identified *education*, *training*, *stability*, *compliance* and *experience* as having low HCI values. More importantly, *education* has consistently recorded a low HCI value across the industries. It confirms that the low level and quality of education and its relation to the profession is a common problem of firms operating in the manufacturing sector. Next to *education*, the HCI values of *training, compliance, stability* and *experience* record low values in most industries. Previous studies (Abbas & Foreman-Peck, 2008; Bhutta et al., 2009; Bhutta et al., 2008; Dasanayaka, 2008; Syed, Ahmadani, Shaikh, & Shaikh, 2012) have also highlighted these factors as weaknesses of the SMEs in Pakistan. To provide conclusive evidence on the differences in HC, there is a need to conduct a multi-dimensional analysis of HC and its nine dimensions in relation to industry, firm size and ownership. In this context, the proceeding parts of this chapter, using various statistical techniques, conduct a multi-dimensional analysis of the HC and its nine dimensions in relation to the firm size, industry and ownership (foreign or local).

Table 6.2: Level of HC (Overall and by dimensions) in Selected Manufacturing Industries

Sector /Industry	**Overall HC**	**Education**	**Experience**	**Training**	**Skills**	**Attribute**	**Attitude**	**Health**	**Stability**	**Compliance**
Manufacturing	3.748	3.557	3.809	3.736	3.764	3.840	3.874	3.717	3.783	3.799
Furniture	3.571	3.006	3.818	3.574	3.722	3.674	3.845	3.829	3.495	3.568
Sports	3.602	3.301	3.875	3.612	3.721	3.644	3.689	3.660	3.435	3.522
Leather	3.745	3.633	3.739	3.765	3.839	3.832	3.750	3.539	3.730	3.945
Metal	3.748	3.261	3.655	3.885	3.772	3.822	4.058	3.812	4.029	4.047
Food	3.786	3.703	3.932	3.701	3.473	3.853	4.010	3.818	3.911	3.862
Textile	3.845	3.801	3.791	3.806	3.982	4.030	3.832	3.688	3.824	3.748

** The maximum value of the HC index is 5 and the minimum is 1*

Table 6.3: Level of HC Sub-dimensions in Selected Manufacturing Industries

Industry	Education			Experience			Training				Skills				
	Level	Technical	Quality	Work Related	Similar Industry	Organizational Tenure	Technical Training	Training Duration	Interpersonal Trainings	Trainings Spendings	Soft skills	Work related skills	Technical skills	Problem solving skills	Intrapreneurial
Textile	3.83	3.92	3.66	3.62	4.04	3.54	3.81	3.85	3.79	3.75	3.80	3.98	4.27	3.98	3.87
Leather	3.46	3.72	3.70	3.89	3.54	3.93	3.88	3.66	3.68	3.74	3.71	3.97	3.98	3.75	3.80
Sports	3.62	3.81	3.65	3.70	3.80	3.71	3.90	3.82	3.78	3.70	3.78	3.99	4.16	3.90	3.88
Metal	3.51	3.08	3.35	3.94	3.84	3.86	4.01	3.37	3.42	3.53	3.50	3.88	3.88	3.82	3.35
Furniture	3.05	2.96	3.00	3.84	3.75	3.91	3.89	3.47	3.26	3.42	3.28	3.95	3.86	3.87	3.50
Food	3.86	3.62	3.66	3.78	4.06	3.87	3.69	3.69	3.65	3.71	3.43	3.48	3.49	3.45	3.56
Mfg. Sector	3.56	3.52	3.50	3.80	3.84	3.80	3.86	3.64	3.60	3.65	3.58	3.87	3.94	3.79	3.66

Industry	Personal Attributes					Attitude				
	Creativity	Diversity	Risk Taking	Intelligence	Leadership	Cooperation	Commitment	Satisfaction	Motivation	Engagement
Textile	4.03	4.06	4.00	4.02	4.02	3.87	3.90	3.87	3.76	3.80
Leather	3.84	3.83	3.89	3.87	3.72	3.95	4.02	3.39	3.59	3.86
Sports	3.91	3.91	3.91	3.89	3.87	3.86	3.94	3.58	3.67	3.81
Metal	3.66	3.60	3.41	3.70	3.80	3.53	3.46	3.59	3.83	3.90
Furniture	3.86	3.41	3.80	3.83	3.44	3.80	3.78	3.77	3.94	3.87
Food	3.89	3.80	3.88	3.85	3.85	4.02	3.99	4.08	4.00	3.99
Mfg. Sector	3.87	3.77	3.81	3.86	3.78	3.84	3.85	3.72	3.80	3.87

Industry	Health			Stability			Compliance		
	Physical Strength	Age	Disease	Turnoer	Absteteism	Longevity	Employees' Complaints	Safety Issues	Charges & Litigations
Textile	3.72	3.50	3.76	3.73	3.82	3.89	3.62	3.86	3.75
Leather	3.86	3.70	3.25	3.75	3.74	3.71	3.92	3.96	3.95
Sports	3.79	3.65	3.59	3.74	3.77	3.78	3.85	3.88	3.89
Metal	3.66	3.63	3.66	3.38	3.38	3.54	3.58	3.46	3.53
Furniture	3.86	3.81	3.82	3.50	3.52	3.46	3.62	3.52	3.56
Food	3.85	3.75	3.83	3.91	3.90	3.92	3.88	3.86	3.84
Mfg. Sector	3.79	3.68	3.65	2.67	3.69	3.72	3.75	3.76	3.75

6.5 Difference in Levels of Human Capital: By industry

As the previous analysis has pointed out the varying HCI values across HC dimensions and industries, it is now logical to extend the statistical analysis to ascertain if the type of industry, firm size and ownership matter in the differences in HC.

6.5.1 Testing the Difference in Overall HC

The following hypothesis is tested:

H1: *Levels of HC do not significantly differ across the industries.*

We applied a *one-way between groups ANOVA with the post-hoc tests* to test the above hypothesis. Before applying the test, the data was checked for normality and homogeneity. Results show that the data was normally distributed. However, the results of the Levene test (Levene, 1960) indicated that the data violated the assumption of homogeneity. In such a case, where the homogeneity assumption is not met, the Brown-Forsythe test (Brown & Forsythe, 1974) is applied. The values of Brown-Forsythe tests [F=18.835,p<. 0.01] were found to be significant; therefore, we proceeded to test our hypothesis. Significant values of ANOVA [F=11.55, p<0.01] result in the rejection of the null hypothesis at the 1 per cent level (Table 6.3). We can therefore conclude that the levels of HC significantly differ across industries.

Table 6.4: Testing the Difference of the Overall HC by Industry

ANOVA test					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.022	5	1.204	11.555**	.000
Within Groups	65.044	624	.104		
Total	71.066	629			

*** shows significance at 1 percent*

Further, to identify the industries that differ in terms of the level of HC, we applied the Games-Howell test. This test is appropriate when variables did not meet the homogeneity assumption. Table 6.5 presents the results of the Games and Howell (1976) test. The levels of HC are divided into two distinct categories. The levels of HC in sports and furniture industries significantly differ from that of textiles, leather, metal and food. Within both categories, there are no differences in the HC levels of those industries respectively. Additionally, the analysis of the mean differences revealed that the levels of HC are lower in sports and furniture compared to the other industries.

Table 6.5: Comparing Inter-industries Difference in HC (overall)

Games-Howell Multiple Comparison Test

Industry	Mean Difference (Industry-I –Industry-J)					
	Textile	Leather	Metal	Sports	Food	Furniture
Textile		.099	.096	.242**	058	.273**
Leather			-.002	.143**	-.041	.173**
Metal				.146**	-.038	.176**
Sports					-.184**	.030
Food						.214**
Furniture						

Note: Vertical axis represents industry-I and horizontal axis Industry-J
*** shows significance at 1 percent*

6.5.2 Testing the Difference in Dimensions of HC across Industry

Since HC has nine major dimensions, it is important to identify which of the dimensions HC differs across industries. For that, we tested the following nine hypotheses.

H1a: *Levels of education do not significantly differ across industries*

H1b: *Levels of experience do not significantly differ across industries*

H1c*: Levels of training do not significantly differ across industries*

H1d: *Levels of skills do not significantly differ across industries*

H1e: *Levels of attitude do not significantly differ across industries*

H1f: *Levels of personal attributes do not significantly differ across industries*

H1g: *Levels of stability do not significantly differ across industries*

H1J: *Levels of health do not significantly differ across industries*

H1k: *Levels of compliance do not significantly differ across industries*

To test the nine hypotheses above, first, we applied the Multivariate Analysis of Variance (MANOVA). However, the significant value of Box test [F=2.137, sig.=000] highlighted the homogeneity problems of the data. A further analysis of individual dimensions, when applying the Levene test, revealed that only *skills, training* and *attributes* had homogenous error variance whereas the rest of the variables had unequal error variance (Appendix D). Due to this constraint, we used a one-way analysis of Variance (ANOVA) with Turkey post-hoc tests for *skills, training* and *attributes*. As the variables namely, *education, experience, health, attitude, stability* and *compliance* violated the homogeneity assumption, Welch and Brown-Forsythe statistics were used to proceed further. For their multiple comparisons, we used the Games-Howell post-hoc test because it was the most suitable when the assumption of homogeneity is not met.

Proceeding further, we applied a series of one-way Analysis of Variance (ANOVA) with post-hoc tests for each dependent variable. Table 6.6 presented the ANOVA test results. Since the F values of experience, training, and health are insignificant, we fail to reject the null hypotheses *H1b, H1c* and *H1j* at .01 levels. It indicates that levels of experience, training and health do not significantly differ across industries. On the other hand, the significant F-values of *education,* *skills, attitude, attributes, stability* and *compliance* are the reasons *H1a, H1b, H1d, H1e, H1f, H1g,* and *H1k are rejected*. It illustrates that the levels of these dimensions differ across the industry. Further, we applied appropriate post-hoc tests to know in which industry (ies) these variables differed.

Table 6.6: Difference in HC dimensions by industry (ANOVA)

	F	Sig.	Decision
Education	17.203*	.000	Difference exists
Experience	2.048	.079	No difference exists
Training	2.431	.034	No Difference exists
Skills	10.965*	.000	Difference exists
Health	2.053	.070	No Difference exists
Attitude	3.67**	.003	Difference exists
Attribute	5.827*	.000	Difference exists
Stability	8.735*	.000	Difference exists
Compliance	6.423*	.000	Difference exists

*** and * shows significant difference at .01 and .001 level*

The results of the comparison of the dimensions (Tukey HSD and Games-Howell test) appear in Table 6.7. The results suggest that the level of skills in the food industry is significantly lower than that of all the other industries. The level of skills in the furniture and sports industries is found to significantly differ from that of the textile industry. The remaining industries have homogenous levels of skills. For attributes, the results of the post-hoc tests (Tukey HSD) showed a significant difference in the levels of *personal attributes* for sports and furniture industries relative to other industries. The mean differences indicate low levels of *personal attributes* for these two industries. Further results of the Games-Howell test illustrate that there are no significant differences in the level of education for furniture, metal and sports industries (Table 6.7). Similarly, the results portray no difference in the level of education for textile, food and leather industries. When comparing both the former and latter groups, significant differences are noted in the level of education. Analyses of mean differences indicate higher levels of education for textile, food and leather, relative to other industries.

In the case of *attitude*, the level observed for the sports industry significantly differs from that for metal and food industries. The metal and food industries record the highest mean values of *attitude* whereas sports industry is the lowest. The mean value for the rest of the industries does not significantly differ.

As for stability, the results are divided into two parts. While the sports and furniture industries have significantly lower values of stability in relative terms, it is *vice versa* for the metal industry. Hence, from the results of the mean differences, it is maintained that the level of stability varies significantly when comparing sports and furniture industries with the other industries. The results for *compliance* were in contrast to *stability*. The industries surveyed also fell under two categories; furniture, sports and textile have high levels of stability whereas leather, metal and food industries have lower stability. The differences between these two groups were statistically significant.

In total, the levels of all nine dimensions of HC statistically varied across the industries. The furniture and sports industries had significantly lower values for *education*, *training*, *stability*, *compliance* and *personal attributes*. The values of *experience*, *attitude*, *health* and *skills*, however, varied from industry to industry. This analysis showed that the levels of HC and the six among nine dimensions significantly differed across industries. It also revealed that industries which were more developed like textile and food, command higher levels of HC compared to lesser developed industries like furniture.

Table 6.7: Difference in dimensions of HC (inter-industries comparisons)

Tukey HSD Test						
	Industry	**Mean Difference (Industry-I – Industry-J)**				
		Leather	**Sports**	**Metal**	**Food**	**Furniture**
Skills	Textile	.142	.260**	.209	.512**	.260**
	Leather		.118	.067	.369**	.117
	Sports			-.051	.251**	-.000
	Metal				.302**	.050
	Food					-.252*
Attributes	Textile	.198	.386*	.207	.172	.356*
	Leather		.187	.009	-.025	.157
	Sports			-.178	-.213	-.029
	Metal				-.034	.148
	Food					.183
Games-Howell Test						
Education	Textile	0.168	.499**	.539**	0.099	.794**
	Leather		0.331	.371**	-0.068	.626**
	Sports			0.040	-.40**	.295
	Metal				-.44**	.254
	Food					.695**
Attitude	Textile	.081	.143	-.226	-.177	-.013
	Leather		.061	-.307	-.258	-.095
	Sports			-.369**	-.32**	-.156
	Metal				.0488	.212
	Food					.163
Stability	Textile	.093	.388*	-.205	-.099	.329*
	Leather		.294	-.298	-.1929	.235
	Sports			-.593**	-.48**	-.059
	Metal				.105	.534**
	Food					.428**
Compliance	Textile	-.196	.226	-0.298	-.106	.180
	Leather		.422*	-0.102	0.089	.377*
	Sports			-.525*	-.333*	-.045
	Metal				0.191	.479*
	Food					.287*

Note: Vertical axis represents industry-I and horizontal axis Industry-J
*** Shows the significance at 1% level*

6.6 Difference in Level of Human Capital and Size of Firm

For this section, we categorized firms into small and medium groups. According to the State Bank of Pakistan [SBP] (2013), a firm would be considered small if it had employees equal to or less than 50 and a firm would be considered medium if it had a number of employees ranging from 51 to 250. The analysis is discussed in two parts, that is, the overall HC in relation to firm size and individual dimensions of HC with firm size.

6.6.1 Testing Difference of Overall HC Level and Size of Firm

In this section, we test the following null hypothesis.

H2: *Levels of overall HC do not significantly differ between small and medium-sized firms.*

To test the above hypothesis, the study conducted an independent sample t-test (see Table 6.8). This test is appropriate when comparing the mean scores of one dependent variable with two different groups. The data was found to be normally distributed at the 1 per cent level but the Levene test value [f=4.47, sig. = 0.035] indicated that the data lacked equal variance. The significant t-values lead us to reject the null hypothesis H2 at the 1 per cent level (Table 6.8). It shows that levels of HC in small firms significantly differ from that of medium-sized firms. Looking at the mean scores of small and medium firms, it was easy to infer that the overall level of HC (M=3.77) in the medium firms was sufficiently higher than that for small firms (M=3.60).

Table 6.8: Difference in HC (overall) by Size

Independent Sample Test		
	t-value	Sig. (2-tailed)
Equal variances assumed	-5.31	.000
Equal variances not assumed*	-4.84**	.000

**as variable violates equal variance, this t-value is relevant to interpret*
*** represents significance at .01 level*

6.6.2 Testing the Difference in HC Dimensions with Size of Firm

As we wanted to ascertain whether individual dimensions of HC diverged with the change in the size of a firm, we developed nine hypotheses here.

H2a: *Level of education does not significantly differ in small and medium firms*

H2b: *Level of experience does not significantly differ in small and medium firms*

H2c*: Level of training does not significantly differ in small and medium firms*

H2d: *Level of skills does not significantly differ in small and medium firms*

H2e: *Level of attitude does not significantly differ in small and medium firms*

H2f: *Level of personal attributes does not significantly differ in small and medium firms*

H2g: *Level of stability does not significantly differ in small and medium firms*

H2J: *Level of health does not significantly differ in small and medium firms*

H2k: *Level of compliance does not significantly differ in small and medium firms*

To test these nine hypotheses simultaneously, the MANOVA is employed. It not only tests the overall differences but also analyzes the significance of the individual variables. However, implementing the MANOVA requires meeting multiple assumptions, as discussed in Chapter 3. They are sample size requirement, normality, absence of outlier, homogeneity of variances and multi-colinearity. We had 750 firms divided in two categories: 224 small and 526 medium. The number showed that the sample size was sufficiently larger than the minimum requirement. The data had also no outliers as the value of the Mahalanobis test (25.59) was less than its critical value (27.88). Further, linearity among dependent variables was ascertained by plotting Scatter-plot of pairs of dependent variables across the groups. Likewise, the results of correlation among variables illustrated a moderate or low association among each other (Appendix-D). It implied that multi-colinearity did not exist in the data.

After checking the above, we processed the MANOVA. To test the assumption of homogeneity, the Box's test of equality of covariance matrices is applied. Here, the Box test value [f=1.614, p= 0.006] is not significant at 1 per cent, implying that the data does not violate the assumption of homogeneity. The results of the Levene statistics suggest that the individual variables do not violate the assumption of equal variance (Appendix D).

Once homogeneity at group and individual levels is confirmed, multivariate tests were applied to check whether any significant differences in variables existed across small and medium firms. Table 6.9 reports the results. Among these various tests, Wilks' Lambda is preferred. It was significant at 5 per cent, implying significant differences in the level of HC between small and medium firms.

Table 6.9: Difference in HC Dimensions by Size

Effect	**Value**	**F**	**Sig.**	**Partial Eta Squared**
Pillai's Trace	.050	4.281*	.000	.050
Wilks' Lambda	.950	4.281*	.000	.050
Hotelling's Trace	.052	4.281*	.000	.050
Roy's Largest Root	.052	4.281*	.000	.050

** shows significance at .001 level*

After identifying the existence of differences in the levels of HC by firm size, it is pertinent to know the results of the tests of Between-Subjects Effects. This is important to test the nine hypotheses and the common way of doing this is to apply the Bonferroni adjustment. According to this, the original alpha level of study should be divided by the number of dependent variables to avoid Type 1 error; in this case, by having nine independent variables and alpha equal to .05, we get the new alpha value .005 [.05/9=.005] (Pallant, 2013). It suggests that when considering results that are significant, their value must be equal to or less than .005. Setting an alpha at .005 levels, the study failed to reject the null hypotheses H2b, H2c, H2f, H2j and H2k. It implied that experience, training, attributes, compliance and stability did not significantly change with the change in firm size. The results however rejected the null hypotheses H2a *(education)*, H2d (*skills) and H2e (attitude).* It confirms that *education, skills* and *attitude* significantly varied with the size of the firm. The Partial eta squared value shows that the 5 per cent variation HC dimensions could be attributed to firm size (Table 6.10). Analyzing the results of the estimated marginal means (Table 6.11), it was apparent that there was a moderate change in the mean in education, skills and attitude when moving from one category to another. Education means changed by 0.39 when moving from the small to medium category, similarly, skills mean changed by 0.21 and attitude by 0.23 positively (Table 6.11).

Table 6.10: Difference in HC Dimensions by Size

Tests of Between-Subjects Effects			
Dependent Variable	F	Sig.	Partial Eta Squared
Education	25.501*	.000	.033
Experience	2.278	.132	.003
Training	1.882	.171	.003
Skills	10.178*	.001	.013
Attitude	10.370*	.001	.014
Health	1.378	.241	.002
Stability	2.277	.132	.003
Compliance	2.239	.135	.003
Attribute	5.244	.022	.007

** shows level of significance at .001 level*

Table 6.11: Estimated Marginal Means

Variables	Mean		Δ in mean
	Small	Medium	
Education	3.223	3.614	.39
Experience	3.727	3.826	.10
Training	3.655	3.750	.10
Skills	3.588	3.797	.21
Attitude	3.681	3.909	.23
Health	3.639	3.732	.09
Stability	3.691	3.805	.11
Compliance	3.707	3.818	.11
Attribute	3.699	3.847	.15

6.7 Human Capital and Ownership

This section aims to analyze human capital relationship with the ownership of a firm in local or foreign terms. Among 750 companies surveyed, only 66 companies were owned by foreign owners or companies. Among them, 20 companies were fully or partially owned by foreign companies whereas 46 of the remaining companies were fully or partially owned by individuals from other countries. Their shares ranged from 51% to 100%. The study showed analysis in two sections; the overall HC with reference to ownership and individual dimensions of HC with ownership.

6.7.1 Testing the Difference in Overall HC by Ownership

Since the focus of this part is to test the difference in levels of HC in locally and foreign- owned SME, we test the following hypothesis:

H3: *Levels of human capital do not significantly differ in foreign and local SMEs*

To test this proposition, we applied the Independent Sample t-test. The main benefit of the test is that it can be used even if the equal variance assumption is violated. The data of a total of 750 firms, that is 66 foreign and 684 locally-owned firms, was processed. The Kolmogorov-Smirnov Test of Normality confirmed that the data was normally distributed (Appendix D). However, the Levene Test value (f=8.60, sig. =.0003) showed that the data violated the assumption of equal variance. Therefore, we used the t-test results to calculate and to consider if there was a violation of equal variance. Table 6.12 showed the results. The t-test value was significant at .01 level, thus rejecting the null hypothesis. It illustrated a significant difference in the level of HC for foreign ownership (M=4.02, SD=.52) and local ownership [3.78, SD=.65; t (748) =3.44, p=.001, two-tailed]. Moreover, looking into the mean score of the foreign and local ownership, it could be deduced that the overall level of HC (*M*=4.02) in the firms having foreign ownership was not only higher than those owned locally but it was also at a good level according to the devised HCI scale.

Table 6.12: HC (Overall) Difference by Ownership

Independent Sample Test		
	t-value	Sig. (2-tailed)
Equal variances assumed	2.863	.004
Equal variances not assumed**	3.440*	.001

***as the variable violates equal variance, this t-value is relevant to interpret*
** represents significance at .001 level*

6.7.2 Testing the Difference in HC Dimensions by Ownership

As the above analysis showed that the level of HC varied in foreign and locally-owned firms, it was imperative to have a more in depth study. For that, we needed to compare all the nine dimensions of the HC individually to check how their levels differed with the change in ownership. The following nine hypotheses were developed to test the relationship of the individual dimensions of HC with the ownership of a firm.

H3a: *Levels of education do not significantly differ in foreign and locally-owned SMEs*

H3b: *Levels of experience do not significantly differ in foreign and locally-owned SMEs*

H3c*: Levels of training do not significantly differ in foreign and locally-owned SMEs*

H3d: *Levels of skills do not significantly differ in foreign and locally-owned SMEs*

H3e: *Levels of attitude do not significantly differ in foreign and locally-owned SMEs*

H3f: *Levels of attributes do not significantly differ in foreign and locally-owned SMEs*

H3g: *Levels of stability do not significantly differ in foreign and locally-owned SMEs*

H3J: *Levels of health do not significantly differ in foreign and locally-owned SMEs*

H3k: *Levels of compliance do not significantly differ in foreign and locally-owned SMEs*

As there are more than one dependent variables, the study applied the Multivariate Analysis of Variance (MANOVA). Before proceeding with the MANOVA, the data was checked for sample size adequacy, normality, outlier and multicolinearity. The sample size was sufficient as 66 firms which have foreign ownership were compared with 684 local firms. The Kolmogorov-Smirnov test checked the univariate normality of the data. Variables, namely education, experience and compliance did not have normal distribution. However, the MANOVA was fairly robust with reference to the normality provided that the data did not violate the multivariate normality. To check that, the Mahalanobis distances test was applied. The statistics also helped to identify the outliers. The Maximum value of Mahal Distance (Maximum=26.245) was less than its critical values (27.88). It noted that all the variables were free from the outlier and met the assumption of multivariate normality (Appendix D). The correlation results ruled out the existence of high multicollinearity and depicted a moderate correlation among variables. After checking these preconditions, the MANOVA was processed. At the very outset, it was critical to check the equality of covariance assumption. As the Box test value (F=1.738, sig. = .002) was greater than its critical value (.001), we accepted the null hypothesis stating that the observed covariance matrices of the dependent variables were equal across the groups. Further, Levene test results illustrated that error variance of all the dependent variables was the same across the group at .05 level except education and experience (Appendix D). However, this problem can be tackled by setting a more conservative value of F. Therefore, by setting the alpha at .001 level, we assumed that all the variables met the assumption of homogeneity.

To ascertain whether there was a statistical difference in the HC dimension in locally and foreign-owned firms, the results of multivariate tests were referred. Table 6.13 represented the results of the three multivariate tests, namely, Wilks' Lambda, Pillai's Trace and Hotelling's Trace. However, Wilks' Lambda statistics were frequently reported. But when the data had two groups, the value of all the tests remained identical. Wilks' Lambda's significant value (f=3.012, sig=.002) clarified that the HC dimensions differed across ownership. Further, the Eta squared value epitomized that 3.5% variation in the level of HC dimensions could be attributed to the change of ownership from local to foreign.

Table 6.13: Difference in HC Dimensions by Ownership

Effect	**Value**	**F**	**Sig.**	**Partial Eta Squared**
Pillai's Trace	.035	3.012	.002	.035
Wilks' Lambda	.965	3.012	.002	.035
Hotelling's Trace	.037	3.012	.002	.035
Roy's Largest Root	.037	3.012	.002	.035

Next, to check which of the dimensions significantly differed across ownership, we look at Table 6.14. It portrayed the results of the Test of between-subject effects. The F-values of Training (F=.25, p>.01), Skills (F=1.88, p>.01), Attitude (F=3.86, p>.01), Health (.012, p>.01) and Compliance (F=.188, p>.01) are insignificant, which fail to reject the null hypotheses H3c, H3d, H3g and H3k at .01 level. On the other hand, the significant values of education (F=15.34, p<.01), experience (F=8.19, p<.01), attributes (F=9.25, p<.01) and stability (F=15.34, p<.1) rejected the null hypotheses H3a, H3b, H3e and H3f at .05 level and H3J at .01 level. Further, from the analysis of the Estimated Marginal Means (Table 6.14), it was clear that the mean value of education, experience, attributes and stability positively increased as they moved from local ownership category to foreign ownership. Importantly, the mean change in education (0.385) was the highest compared to other dimensions.

Table 6.14: Tests of Between-Subjects Effects

Dependent Variable	**F**	**Sig.**	**Partial Eta Squared**
Education	15.347	.000*	.020
Experience	8.198	.004**	.011
Training	.251	.617	.000
Skills	1.880	.171	.003
Attributes	9.256	.002**	.012
Attitude	2.697	.101	.004
Health	.012	.912	.000
Stability	3.335	.068	.004
Compliance	.188	.665	.000

** and ** show the level of significance at 5% and 1% respectively*

Table 6.15: Estimated Marginal Means

Variables	Mean		Δ in mean
	Local	Foreign	
Education	3.523	3.908	.385
Experience	3.789	4.025	.236
Training	3.732	3.776	.044
Skills	3.754	3.868	.114
Attitude	3.86	4.00	.14
Health	3.715	3.726	.011
Stability	3.77	3.945	.175
Compliance	3.794	3.835	.041
Attribute	3.82	4.06	.24

When summarizing the results of this section, it is inferred that the HC and its dimensions, namely *education, experience, attributes and stability* significantly differ in locally and foreign-owned SME firms in Pakistan. However, no significant difference has been found in training, skills, attitude, health and compliance in foreign and locally-owned firms. The prominent reason of a high level of education in foreign-owned companies is due to their proper recruitment system (Khan, Awang, & Zulkifli, 2013; Khan & Khan, 2012). Most of the foreign-operated firm maintains a particular level, quality and technicality of education when recruiting employees. Similarly, due to better working conditions, SMEs under foreign ownership have a higher level of stability (Cui, Walsh, & Gallion, 2011; Mogos Descotes & Walliser, 2013; Pasanen, 2003). On the contrary, the bad working conditions and lower remuneration result in lower stability and experience in locally-owned firms. Companies under foreign ownership encourage their employees to give creative solutions and promote leadership thus possessing a high level of attributes (G.Omerzel & Antoncic, 2008; King-Kauanui et al., 2006; Knight & Kim, 2009; Storey, 2002; Storey, Keasey, Wynarczyk, & Watson, 1987).

6.8 Concluding Remarks

Our analysis of HC (overall and by dimensions) suggests differences in HC levels across industries and by firm size. Robust results from the statistical analysis which is based on the differences in the levels of HC support the evidence that HC significantly differs across industries. Significant levels of HC are found to be higher in textiles, leather, food, and metal industries compared to furniture and sports. The same results are seen when considering the dimensions of HC, namely *education, training, attitude, health and stability*. Results based on firm size suggest that the levels of HC are higher in medium firms compared to small firms. Particularly, the levels of *education, skills, and attitude* are significantly higher in medium firms. The significant differences of HC levels and HC dimensions across industries and firm size suggest the need to have targeted policies for SMEs in Pakistan. The differences in the levels of HC and the dimensions of HC can be an important guide in formulating specific HC development policies; however, it is pertinent to explore the influence of human capital (overall and by dimensions) on various performance cords of SMEs. The next chapter undertakes this task. The results of the findings will lead us to draw concrete policy implications for individual SMEs and the government.

6.9 Summary

The chapter begins with the analysis of the level of HC and its nine dimensions in the manufacturing sector. Attitude, attributes and experience possess the highest level whereas education the lowest. The subsequent section compares the results of HC and its dimensions across the industry. The textile industry has the highest level of overall HC. However, the 3.78 mean value epitomizes that it is still not sufficient. Among the industries, sports, furniture, and metal industries have the lowest level of education whereas the leather industry possesses the lowest level of health and the food industry possesses the lowest level of skills. In the proceeding sections, by applying various statistical techniques, we assess the differences in the level of HC and its dimensions from the industry, size and ownership perspectives. The results show that HC differs across the industry significantly whereby their levels increase when moving from furniture and sports to other industries. A similar case exists with its dimensions like *education, training, attitude, health and stability*. Almost similar results were found when comparing the HC by size and by ownership. The results depicted that the level of HC is higher in medium firms compared to small firms. In particular, education, skills and attitude differed significantly in small and medium firms. Similarly, the level of HC was higher in firms under foreign ownership compared to firms locally owned. Among the dimensions, *education, experience, attributes and stability* differed significantly in foreign-owned and locally-owned firms.

CHAPTER 7:

HUMAN CAPITAL, ABSORPTIVE CAPACITY AND FIRM PERFORMANCE

7.1 Introduction

This chapter analyzes the relationship of human capital, direct and through absorptive capacity with firm performance. The chapter begins by estimating the measurement models, pre-requisite for the SEM analysis. After ascertaining the fitness of appropriate measurement models, two structural models are formed to test the HC-performance relationship. The Model-1 examines the impact of the overall human capital on each performance dimension namely, productivity, export, survival, technology and innovation. The results showed that HC directly influences all five-performance dimensions whereas Model-2 checks the impact of each dimension of human capital on every performance cord, directly and through absorptive capacity.

7.2 Evaluating Measurement Model Validity

The first step in SEM analysis is to validate the measurement models of each construct. The validity of the measurement model depends on the construct validity and model goodness-of-fit (Hair, 2009). Therefore, the process of SEM starts with the Confirmatory Factor Analysis (CFA) to ascertain the construct validity and Goodness-of-fit of model. The validity and reliability of Part B of the questionnaire, dealing with the HC measure, have already been ascertained in Chapter 6. Therefore, we will check the validity and reliability of Part C and Part D; they measure the absorptive capacity and firm performance dimensions, namely productivity, export, innovation, technological progress and survival. We begin by assessing the construct validity in the proceeding lines.

7.2.1 Construct Validity

It depicts the extent to which a set of measured items actually reflects the theoretical latent construct those items are designed for. According to Hair et al. (2006) construct validity can be ascertained by checking the convergent validity, discriminant validity and face validity of each construct.

7.2.1.1 Convergent Validity

It is examined through factor loading (FL), construct reliability (CR) and average variance extracted (AVE). For convergent reliability, the factor loading should be greater than 0.50, CR>0.7, and AVE>0.5 (Hair et al., 2009). Table 7.1 depicts the results of factor loading, AVE and CR. Factor loading of all items ranges from 0.57 to 0.80. Values of CR range from 0.81 to 0.87. Similarly, estimates of AVE are greater than 0.50, except for absorptive capacity (AVE=0.45). In such cases, where the value of AVE is less than 0.50, researchers e.g. Das, Handfield, Calantone, and Ghosh (2000) and Anderson and Gerbing (1988) validate convergent reliability if the value of CR is greater than .70 and the factor loading is greater than 0.50. In our case, CR=0.87, and it shows that the construct has a convergent validity. Similarly, all constructs have a value of CB alpha higher than 0.70, confirming the internal reliability of the constructs. Put together, the results confirm the convergent validity of a model.

7.2.2.2 Discriminant and Face Validity

The stringent approach to ascertain the discriminant validity of the model is to compare the square root of AVE values of each construct with the squared inter-constructs correlations related to that construct. For discriminant validity, these AVE estates should be greater than the inter-construct squared correlations. Table 7.2 illustrates that the AVE values (in bold diagonally) in all the constructs are greater than their squared correlations. This indicates that the constructs have appropriate discriminant validity. It was ascertained by sending questionnaires to the experts of SMEs. A detailed discussion on this is given in Chapter 4.

Table 7.1: Validity Results

Construct	**Item**	**Factor Loading**	**CR**	**AVE**	**Cronbach alpha**
Innovation	INO2	0.72	0.85	0.53	0.77
	INO 3	0.76			
	INO5	0.70			
	INO 6	0.72			
	INO 7	0.74			
Export	Exp1	0.80	0.83	0.50	0.80
	Exp2	0.79			
	Exp3	0.73			
	Exp4	0.57			
	Exp5	0.63			
Productivity	P1	0.74	0.89	0.61	0.81
	P3	0.76			
	P4	0.79			
	P5	0.78			
	P6	0.82			
Survival	SUR1	0.72	0.81	0.51	0.78
	SUR2	0.70			
	SUR5	0.68			
	SUR6	0.76			
Technological Progress	T2	0.75	0.85	0.52	0.83
	T3	0.78			
	T5	0.70			
	T6	0.68			
	T7	0.70			
Absorptive Capacity	AC2	0.68	0.87	0.45	0.76
	AC3	0.63			
	AC5	0.65			
	AC6	0.74			
	AC8	0.65			
	AC9	0.68			
	AC12	0.69			
	AC13	0.65			

Table 7.2: Comparison Correlations and Square Root of AVE

	AVE	Absorptive Capacity	Export	Survival	Productivity	Innovation	Technological Progress
Absorptive Capacity	0.45	**0.67**					
Export	0.50	0.311	**0.71**				
Survival	0.51	0.268	0.307	**0.71**			
Productivity	0.61	0.145	0.288	0.148	**0.78**		
Innovation	0.53	0.304	0.194	0.253	0.19	**0.73**	
Technological Progress	**0.52**	**0.231**	**0.218**	**0.142**	**0.089**	**0.239**	**0.72**

Note: Diagonal values in bold are the square roots of AVE

7.2.1.2 Model Goodness-of-fit

Overall, the model goodness-of-fit is checked through the values of various indices. Literature on SEM recommends several indices for testing the goodness-of-fit. Since researchers have not agreed on a single or a composite of indices to assess the model fit (Maruyama, 1998), we report on multiple indices which have frequently appeared in scholastic work. Table 7.3 portrays indices used for measuring the model fit.

Table 7.3: Measurement Indices

Index Name	**Level of acceptance**
Chi- Square	p>0.05
Ratio Chi-Square/df	CMIN/df<5
Goodness -of-Fit Index (GFI)	GFI > 0.90
Comparative Fit Index (CFI)	CFI > 0.90
Root Mean Square of Error Approximation (RMSEA)	RMSEA<0.08
Cronbach alpha	CB alpha>0.60
Factor Loading	>0.50

In Chapter 4, we specified two models for two underlying sub-objectives. In Model-1, HC, which is calculated using the HCI is an independent variable whereas the five cords of performance, namely productivity, innovation, technological progress, export and survivals are dependent variables. Absorptive Capacity is a mediating variable which is measured by 14 items. In Model-2, nine dimensions of HC are independent variables, and the dependent and mediating variables are the same as in Model-1. Table 7.4 shows the number of dependent, independent and mediating variables in each model.

Table 7.4: Number of Variables in the Model

Model(s)	Dependent variable(s)	Independent Variable(s)	Mediating Variable
Model-1	5	1	1
Model-2	5	9	1

We start by estimating the measurement model for each latent construct, namely innovation, export, productivity, survival, technological progress and absorptive capacity. Since the data of the HC is calculated through the HCI, it is considered a path variable, having no need of the measurement model of validation.

Starting from the construct of innovation, it has been measured by 7 items. The items were subject to Confirmatory Factor Analysis (CFA). Items were pruned at each iteration stage to achieve the appropriate model. At each stage, items having lower factor loading were removed. In this process, we removed Item 1 and 4 to get the appropriate measurement model. Along with it, the Modification Index (MI) showed that the error terms in items 6 and item 7 were correlated. In this way, we got the final measurement model, with five items (2, 3, 5, 6, 7). The factor loading of the final items ranged from 0.70 to 0.76 and Cronbach alpha value was 0.77. Goodness-of-fit indices values [GFI=.995, CFI=.994; $\chi 2$/df =2.378] in Table 7.5 were according to the required level, confirming that the overall measurement model of innovation was appropriate.

Table7.5: Fit Indices for Innovations

Items	χ2	df	P-value	GFI	CFI	RMSEA	χ2/df
All items INO1 to INO7	201.6	14	.000	.93	.884	.134	14.38
Removing INO1	73.2	9	.000	.966	.957	8.13	.098
Removing INO4	59.58	5	.000	.966	.963	.121	11.91
Setting free parameter for INO2 and INO3	9.513	4	.049	.995	.994	.043	2.378

Final items INO 2, 3,5,6,7
Note: error term of INO 2 and INO3 correlates

Export is the second construct measured by five items. The Confirmatory Factor analysis results depicted the model had appropriate GFI and CFI scores but a higher value of RMSEA. After analyzing the MI score, when we correlated the error term of item 4 and 5, all the indices depicted that the model is fit [GFI=.994; CFI=.992; χ2/df=2.938]. Therefore items 1 to 5 were considered final by setting the free parameter of item 4 and 5 (Table 7.7). The factor loading of items ranged from 0.57 to 0.80.

Table 7.6: Fit Indices for Export

Items	χ2	df	p-value	GFI	CFI	RMSEA	χ2/df
All items EXP 1 to 5	43.79	5	.000	.976	.96	.102	8.758
Correlating Error term of EXP4 and EXP5	11.75	4	.019	.994	.992	.051	2.938

Final items EXP 1, 2,3,4,5

Next, we conducted the factor analysis of the construct of productivity. Initially, six items measured it but after using the Confirmatory Factor Analysis, Item 2 was removed due to very low factor loading. The goodness-of-fit indices results [GFI=.997; CFI=.995; χ2/df=2.20] validate the model fitness (Table 7.8). Hence, the construct of productivity comprises of five items (*1, 3, 4, 5, 6). F*actor loading of the items ranges from 0.74 to 0.82. .

Table 7.7: Fit Indices for Productivity

Items	χ2	df	P-value	CFI	GFI	RMSEA	χ2/df
All items P 1 to 6	35.68	8	.000	.986	.985	.068	4.46
Removing 2 (due to low factor loading)	8.804	4	.066	.997	.995	.040	2.20

Final items P 1, 3, 4, 5, 6

The measurement model of survival had initially 6 items. To get the goodness-of-fit, we removed item 6 because of its lowest factor loading (Table 7.9). After removing this, the results [GFI=.999; CFI.998; χ2/df =1.399] showed that the model was appropriate. The factor loading of it ranged from 0.68 to 0.76.

Table 7.8: Fit Indices for Survival

Items	χ2	df	P	GFI	CFI	RMSEA	χ2/df
All items SUR 1 to 6	267.33	8	.000	.888	.908	.208	33.417
Removing3	31.213	4	.000	.984	.961	.095	7.803
Removing 4	2.798	2	.237	.999	.998	.023	1.399

Final items SUR 1, 2, 5, 6

Likewise, the measurement model of technological progress had 7 items. Though the indices results [GFI=.973; CFI=.959; χ2/df=5.128] showed that the model had appropriate goodness-of-fit, we removed item 7 due to very low factor loading (Table 7.10). Hence, the final measurement results [GFI=.986; CFI=.988: χ2/df =3.352] validated the model consisting of six items. The factor loading of items varied from 0.68 to 0.78.

Table 7.9: Fit Indices for Technological Progress

Items	χ2	df	P	GFI	CFI	RMSEA	χ2/df
All items	71.79	14	.000	.973	.959	.074	5.128
Removing 7	26.81	8	.001	.986	.988	.056	3.352

Final items T 1, 2, 3, 4, 5, 6

The measurement model of absorptive capacity consisted of 14 items. After several iterations, items 7, 1, 14, 10, 5 and, 11 were removed step by step to get the appropriate fit model. Finally, the measurement model with 8 items (2, 3, 4, 6, 8, 9, 12, 13) appeared with the appropriate results of all indices [GFI=.98; CFI=.962; $\chi2$/df=2.827] as shown in Table 7.11. The factor loading of the items ranged from 0.63 to 0.74.

Table 7.10: Fit Indices for Absorptive Capacity Measurement Model

Items	**$\chi2$**	**df**	**P**	**CFI**	**GFI**	**RMSEA**	**$\chi2$/df**
All items AC1 to C13	531.07	77	.000	0.892	0.825	.090	6.897
Removing AC7	440.24	65	.000	0.903	0.842	.089	6.773
Removing AC1	313.19	54	.000	0.92	0.877	.081	5.80
Removing AC14	264.07	44	.000	.925	.880	.082	6.002
Removing AC 10	210.71	35	.000	0.934	0.887	.083	6.020
Removing AC4	117.73	27	.000	0.962	0.924	.068	4.361
Removing AC11	56.54	20	.000	0.980	0.962	.050	2.827

Final items AC2, 3, 5, 6, 8, 9, 12, 13

Finally, we checked the goodness-of-fit by joining all latent constructs. Table 7.12 shows the result. The indices values [GFI=0.925, CFI=0.923, RMSEA=.048; $\chi2$/df=2.70] showed that the model is appropriate for analysis.

7.11: Overall Measurement Model Fitness

Items	**$\chi2$**	**Df**	**P**	**GFI**	**CFI**	**RMSEA**	**$\chi2$/df**
HCI, INN, PROD, TECH, SUR, EXP, AbCap	791.74	293	.000	.925	.923	.048	2.70

To check the existence of colinearity of the independent variables, we ran the test on correlation. The results appear in Table 7.13. The moderate level of correlation among the independent variables depict that the variables are not highly collinear with one another.

Table 7.12: Correlations among HC Dimensions

	Stability	Attitude	Attribute	Health	Education	Training	Skill	Experience
Attitude	0.114							
Attribute	0.204	0.051						
Health	0.045	0.16	0.075					
Education	0.16	0.042	0.108	0.04				
Training	0.116	0.007	0.098	0.039	0.109			
Skill	0.148	0.142	0.135	0.041	0.173	0.176		
Experience	0.242	0.165	0.134	0.115	0.139	0.067	0.068	
Compliance	0.147	0.091	0.18	0.062	0.203	0.068	0.149	0.184

After validating the measurement model of each construct, we develop the structural model for each of the discussed models to test the relationship. All analyses in this chapter used the AMOS (4.1 version) to test the fit of measurement models and structural research models with the observed data.

7.3 The Structural Model-1

In Model-1, the effect of HC on productivity, export, survival, innovation and technology was checked directly and through absorptive capacity. Figure 7.1 shows the theoretical model in AMOS setting which is processed for estimation. Figure 7.2 shows the estimated Model-1. The results of the measurement model show that the model is overall fit (Table 7.13). Further, results of hypotheses testing and direct, indirect and total effects emerge in Table 7.14.

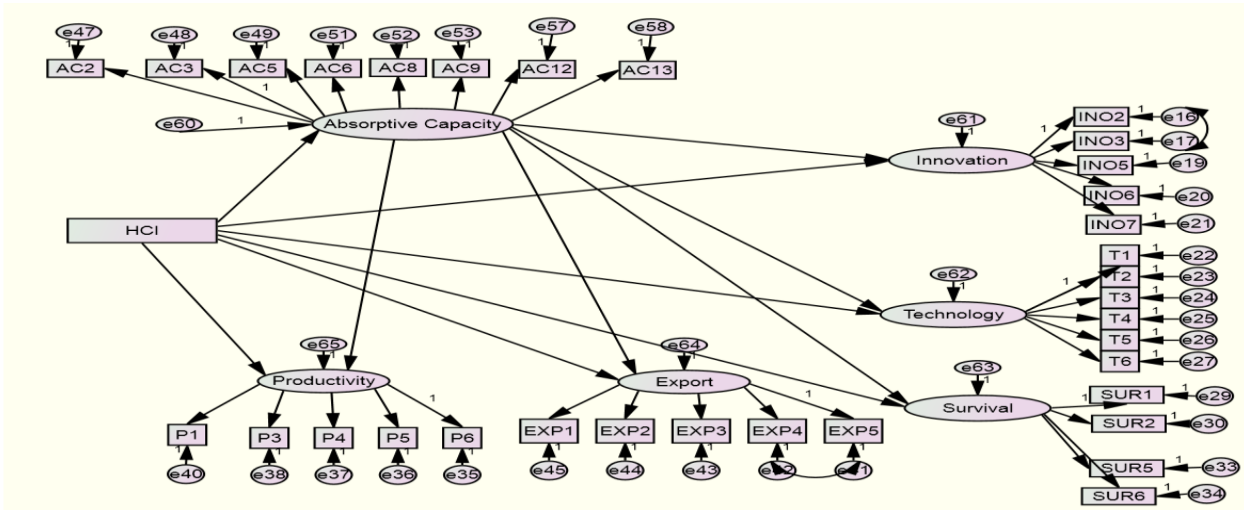


Figure 7.1: Model-1in AMOS setting

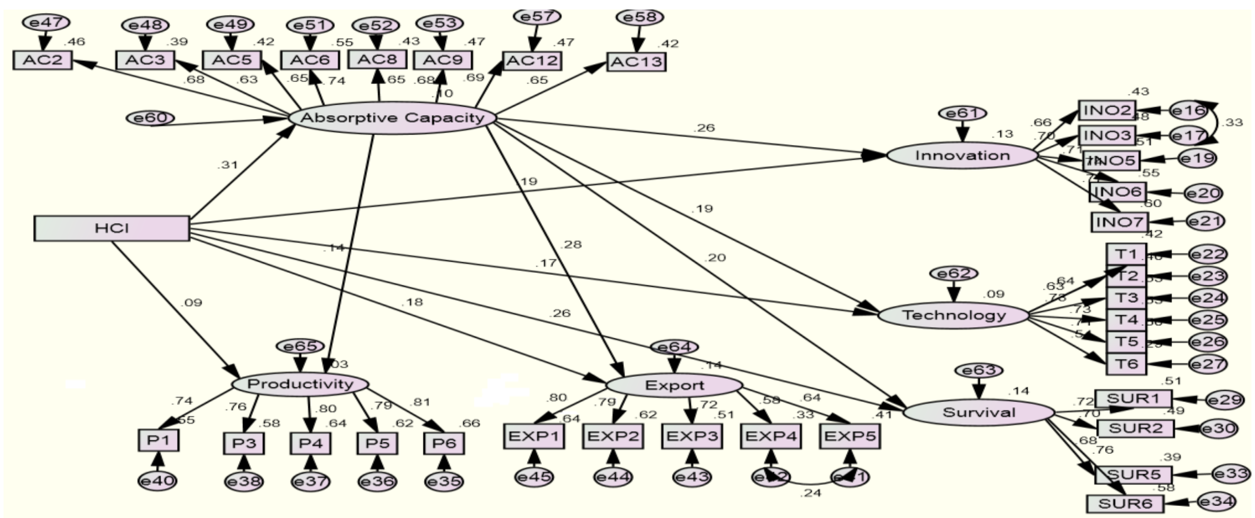


Figure 7.2: Estimated Model-1

Table 7.13: Goodness of Fit, Model 1

	χ2	df	P	GFI	CFI	RMSEA	χ2/df
Model-1	1639.54	596	.000	.901	.90	.048	2.751

The results portray that HC has a directly significant influence on productivity, survival, export, technological progress and innovation at 1% level. When comparing the estimates of direct effect, it is clear that human capital has a greater impact on the firm’s survivability (.263, $p<.01$) followed by export (.191, $p<.01$), innovation (.182, $p<.01$), technology (.171, $p<.01$), and productivity (.087, $p<.05$). While keeping the absorptive capacity as a mediating variable, results illustrate that absorptive capacity also mediates relationship between human capital and technological progress (.186, $p<.01$), innovation (.255, $p<.01$), export (.262, $p<.01$), productivity (.125, $p<.01$) and survival (.195, $p<.01$) relationships. However, the coefficient values demonstrate that mediation is lowest in productivity and highest in innovation and export. Our results are consistent with the empirical studies previously conducted. Starting with survivability, Benhabib and Spiegel (2005) considered human capital as the prime determinant of firm survival. To him, firms with a high level of educated and experienced employees had a greater ability to compete and survive in critical situations. Similarly, Khan and Khan (2012) mentioned that companies with highly-skilled and trained employees have more resilience in surviving.

Though our results portray a positive significant effect of HC on technology, a disagreement is observed among researchers. Gould (2002), for example, argued that the highest technological progress rates observed in recent years had not raised the demand for general human capital but also could be attributed to human capital. On the other hand, Murnane, Willett, and Levy (1995) and Cunha and Heckman (2007) pointed out that a rise in technological progress had reduced the importance of human capital. However, the majority of the empirical work (Bartel & Lichtenberg, 1985; Meindl & Chopra, 2007; Rainlall, 2004; Van Weele, 2005) maintained that HC positively influenced technological progress. Further, the number of studies asserted that HC had a significant direct effect on productivity (Ilmakunnas et al., 2004; V. Kathuria et al., 2013; Khalique et al., 2011; F. M. Martin et al., 2013; Nguyen, Truong, & Buyens, 2010; Sidik, 2012), export (Berry et al., 1998; Carpenter, Sanders, & Gregersen, 2001; Fernández-Mesa & Alegre, 2015; Syed et al., 2012; Wagner, 1995, 1996; White et al., 1998) and innovation (Baron, 2011; Lööf & Heshmati, 2002, 2006; Love & Roper, 2015; Vinding, 2006; Richard et al., 2006; Romijn & Albaladejo, 2002; Rosenbusch et al., 2011) of a firm.

Table 7.14: Standardized Direct, Indirect & Total Effects Model-1

	HC			**Result**
	Direct	**Indirect**	**Total**	
Productivity ← HC	.075*	.039**	.114*	Reject H0
Survivability ← HC	.239**	.059**	.298**	Reject H0
Export ← HC	.185**	.081**	.266**	Reject H0
Technology ← HC	.161**	.057**	.218**	Reject H0
Innovation ← HC	.167**	.079**	.247**	Reject H0
Absorptive Capacity ← HC	.308**	-	-	Reject H0
Productivity ← Absorptive Capacity	.125**	-	-	Reject H0
Survivability ← Absorptive Capacity	.191**	-	-	Reject H0
Export ← Absorptive Capacity	.262**	-	-	Reject H0
Technology ← Absorptive Capacity	.186**	-	-	Reject H0
Innovation ← Absorptive Capacity	.255**	-	-	Reject H0

** and ** show the level of significance at 5% and 1% level*

7.4 The Structural Model-2

Model-2 examines the effect of nine dimensions of HC on five performance dimensions directly and by keeping absorptive capacity as a mediating variable. Figure 7.3 depicts the theoretical model in AMOS setting which is processed for analysis. The estimated model appears in Figure 7.4. Results of fitness indices [GFI=.930; CFI=.927; $\chi 2$/df =2.165] illustrate that the model is overall fit and appropriate for analysis (Table 7.16).

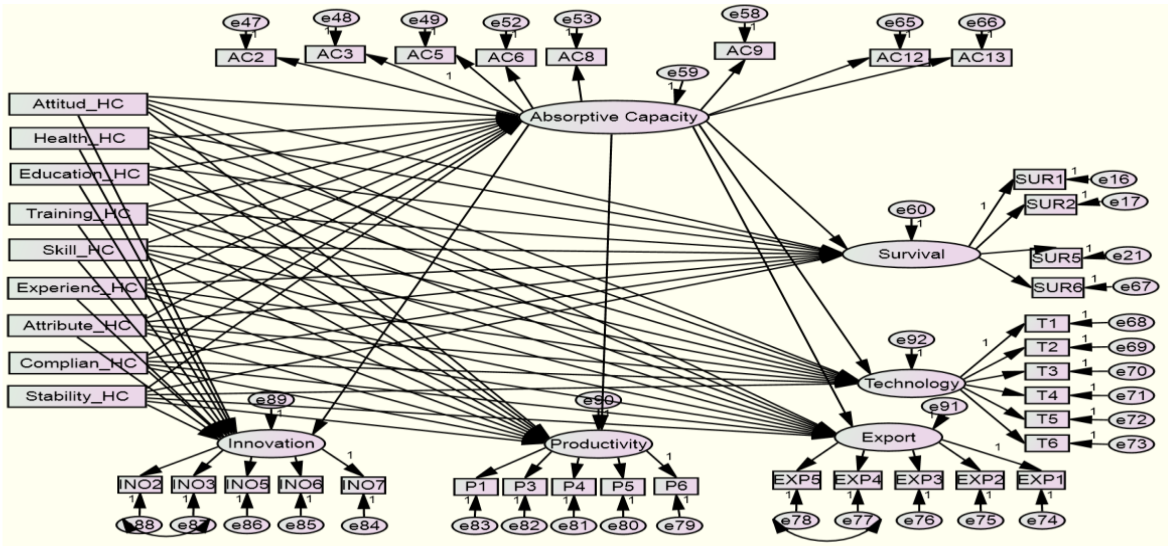


Figure 7.3: Model-2 in AMOs Setting

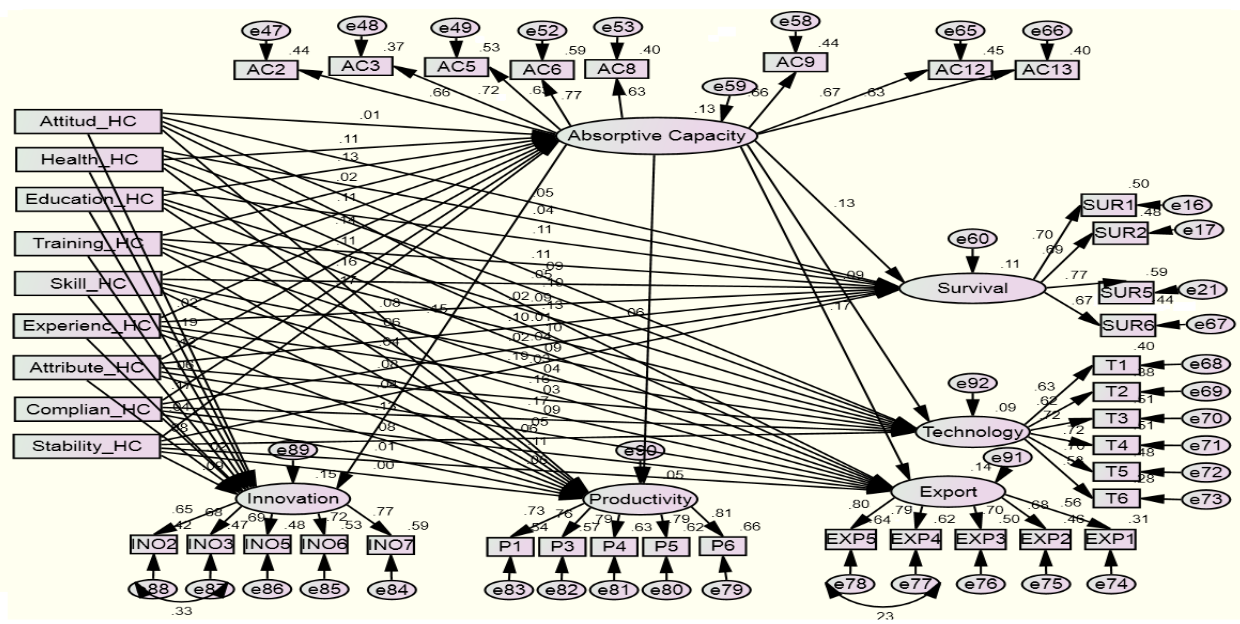


Figure 7.4: Estimated Model-2

Table 7.15: Goodness of Fit, Model 2

	χ2	**df**	**p-value**	**GFI**	**CFI**	**RMSEA**	**χ2/df**
Model-2	1890.045	873	.000	0.930	0.927	0.0390	2.165

The results of the regression analysis have been grouped into two tables, namely direct effect (Table 7.17) and indirect effect (Table 7.18). Direct effect illustrates the direct influence of every dimension of human capital on firm performance, without the help of any mediation or moderation. Indirect effect depicts the influence of human capital dimensions through absorptive capacity. These results show whether absorptive capacity mediates between human capital dimensions and firm performance. The results of the indirect effect are obtained by multiplying the effect of human capital dimensions on the absorptive capacity with beta coefficient of effect of absorptive capacity on performance.

The prime purpose of analyzing this model is to check the influence of nine dimensions of human capital on five major performance cords, namely productivity, export, technological progress and innovation. In order to check that, we have explained the results with respect to every performance cord, starting with export below.

Table 7.16: Standardized Direct Affect Model-2

	Attitude	Health	Education	Training	Skill	Experience	Attributes	Compliance	Stability
Absorptive Capacity	0.011	0.113**	0.13**	0.025	0.114**	0.144*	0.106**	0.158**	0.168**
Survival	0.053	0.037	0.102*	0.099*	0.04	0.005	0.093*	0.023	0.181**
Technology	0.087*	0.10*	0.125**	0.096*	0.085*	0.029	0.025	0.087*	0.065
Export	0.10*	0.017	0.037	0.03	0.15**	0.165*	0.052	0.101**	0.072
Productivity	0.079*	0.04	0.022	0.068*	0.043	0.094*	0.079*	0.01	0.020
Innovation	0.017	0.175**	0.111**	0.052	0.174**	0.009	0.083*	0.001	0.097*

Table 7.17: Standardized Indirect Effects Model-2

	Absorptive Capacity	Attitude	Health	Education	Training	Skill	Experience	Attribute	Compliance	Stability
Absorptive Capacity	-	0.011	0.113**	0.13**	0.025	0.114**	0.144**	0.106**	0.158**	0.168**
Survival	0.128**	0.021	0.02**	0.014**	0.018	0.015**	0.003**	0.017**	0.014**	0.001**
Technology	0.094*	0.016	0.015*	0.01*	0.014	0.011*	0.002*	0.012*	0.011*	0.001*
Export	0.162**	0.027	0.026**	0.017**	0.023	0.019**	0.004**	0.021**	0.018**	0.002**
Productivity	0.062	0.01	0.01	0.007	0.009	0.007	0.002	0.008	0.007	0.001
Innovation	0.158**	0.027	0.025**	0.017**	0.023	0.018**	0.004**	0.021**	0.018**	0.002**

*Note: * and ** show the significance at 5% and 1% respectively*

7.4.1 Export and Human Capital Dimensions

The direct and indirect effect (through absorptive capacity) of human capital dimensions on the exportability of the firm appears in Table 7.18. Among nine dimensions of human capital, four dimensions, namely attitude (0.10, $p<0.05$), skill (0.149, $p<0.05$), experience (0.18, $p<0.01$) and compliance (0.11, $p<0.01$) have significant and direct influence on the exportability of a firm. Experience, with a coefficient value of .182, has the highest impact. It implies that the employee's organizational tenure, similar industry experience and work-related experience all contribute to the performance in export. Similarly, a 0.149 coefficient value of skills, work-related, technical, communication and problem-solving show its substantive effect on export. The results also epitomize that a better attitude from the employees contributes to the exportability of a firm. Further, the significant and positive estimates of compliance explicate its considerable contribution in the export.

The results of the indirect effect are detailed in Table 7.18. Results show that all dimensions of human capital, except attitude and training have a significant influence on the absorptive capacity of a company, which in turn influences the export whereby stability (0.027, $p<0.01$) has a comparatively higher indirect effect followed by compliance (0.025, $p<0.01$), experience (0.023, $p<0.01$), education (0.021, $p<0.01$), health (0.018, $p<0.01$), skill (0.018, $p<0.01$) and attributes (0.017, $p<0.01$). The comparatively lower values of indirect estimates demonstrate the lower effect of these dimensions through absorptive capacity compared to direct impact. It means that though absorptive capacity mediates between human capital dimensions and export, this is a partial and not full mediation. Further results of education portray a very interesting picture. It shows that education does not directly affect the export. However, it has a good significant effect through absorptive capacity. It deduces that education raises the absorptive capacity, which in turn increases export. It is the same case with health, training, attributes and stability. Whilst these factors do not directly influence export, they affect it through absorptive capacity. On the contrary, attitude directly influences export but not through absorptive capacity. One factor which neither directly nor indirectly influences export is training.

Table 7.18: Hypothesis Testing (HC-Export)

	Estimates	**Result**
Attitude → Export	0.099*	Reject Ho
Health → Export	0.023	Fail to reject
Education→ Export	0.043	Fail to reject
Training → Export	0.036	Fail to reject
Skill → Export	0.149*	Reject Ho
Experience → Export	0.182**	Reject Ho
Attribute → Export	0.049	Fail to reject
Compliance→ Export	0.11**	Reject Ho
Stability →Export	0.063	Fail to reject
Attitude → Absorptive capacity → Export	0.002	Fail to reject
Health → Absorptive capacity→ Export	0.018**	Reject Ho
Education→ Absorptive capacity→ Export	0.021**	Reject Ho
Training → Absorptive capacity→ Export	0.004	Fail to reject
Skill → Absorptive capacity→ Export	0.018**	Reject Ho
Experience→ Absorptive capacity→ Export	0.023**	Reject Ho
Attribute → Absorptive capacity → Export	0.017**	Reject Ho
Compliance →Absorptive capacity →Export	0.025**	Reject Ho
Stability → Absorptive capacity →Export	0.027**	Reject Ho

** and ** show the significance at 5% and 1% respectively*

In condensed form, skill, experience and compliance affect the exportability of a firm both directly and indirectly whereas health, education, attributes, and stability influence export through the mediation of absorptive capacity. These results are greatly consistent with the extensive empirical work. With reference to skills, empirical literature mentioned that problem-solving skills (Munch & Skaksen, 2008), interprenuerial skills (Fernández-Mesa & Alegre, 2015), interpersonal skills (Fernandez and Alegre, 2015), ICT (Ruzzier et al., 2007), and work-related skills (Ruzzier et al., 2007) positively affect exportability of the SME firms. In particular, according to Khan and Khan (2012), ICT and the interpersonal skills of employees which were required to communicate and understand clients' requirements, play a pivotal role in the exportability of a firm. On the same note, Fernández-Mesa and Alegre (2015) asserted that companies with a higher interprenuerial and interpersonal skills have a higher degree of resilience to compete in the international market. According to Brambilla, Dix-Carneiro, Lederman, & Porto (2011), employing more skilled workers in firms can increase exports to competitive, high-income countries. However, the skills needed for exporting can differ at different stages of the value chain, for example, work-related skills may play a key role in the early, developmental stages of a project, but interpersonal skills are likely to be more important in terms of commercialization (Herrmann & Peine, 2011). There is also evidence that the managerial skills needed for entering the export markets is different from that required to succeed in the export markets.

Similarly, our results portrayed that a higher level of compliance raises the exportability of a firm. Previously, S. Kathuria and Bhardwaj (1998) who discussed the reasons for low Indian exports of textile, mentioned safety issues as the prime reason. With compliance, our results portrayed that a higher number of charges and litigations against employees negatively affect the export performance of a company. Similarly, the rising complaints of employees about one another or about management can severely affect the exportability of the firm. Equally important are attitude and experience. These two dimensions significantly contribute to exportability. Our results explained that employees' satisfaction, motivation, commitment and engagement not only affected the exportability of a firm but they also had a momentous positive effect on the productivity of a firm. These results are consistent with the studies undertaken (Nalcaci & Yagci, 2014; Nassimbeni, 2001; Nils-Erik & Stanley, 1989; Shaoming & Simona, 1998).

The results also portrayed a significant mediating role of absorptive capacity between absorptive capacity and dimensions of human capital except for attitude and training. It means that education, experience, attitude, skills, stability, health and personal attributes affect the absorptive capacity of a firm. Further absorptive capacity affects the exportability of a firm. These results are extremely aligned to the extensive researches carried out by Love and Roper (2015), Ganotakis and Love (2012), Brambilla et al. (2011), Harris and Li (2009), Knight and Kim (2009) and Freel (2005). The study of Harris and Li (2009) precisely explained this. They mentioned that after entering the market, only a greater absorptive capacity seemed to further boost the export performance in such markets. Interestingly, the results of education showed that education did not directly affect export. However, it had a good significant effect through absorptive capacity. It concludes that education raises the absorptive capacity, which in turn augments export. The same is in the case with health, attributes and stability. Whilst these factors do not directly influence export, they affect it through absorptive capacity. On the contrary, attitude directly influences export but not through absorptive capacity. One factor which neither directly nor indirectly influences export is training.

7.4.2 Productivity and Human Capital Dimensions

The results of the influence of all nine dimensions of human capital on firm productivity are shown in Table 7.19. These depict the impact of human capital dimensions directly and through absorptive capacity. Starting with the direct impact, the significant and positive estimates of attitude, training, experience and personal attributes depict that these dimensions have a momentous direct influence on productivity. Among these variables, the estimate of experience i.e. 0.13, has the highest value, implying its greater influence on productivity. Attitude, training, and personal attributes have almost an equal influence on productivity with coefficient values of .079, .077 and .076 respectively. It infers that the employee level of training (on the job, profession-related, information technology and soft skill trainings) and a firm's investment in training have a significant influence on its productivity. Likewise, attitude, which is represented by employees' engagement, commitment, cooperation and personal attributes (creativity, intelligence, leadership, and risk taking) are crucial for the productivity of a firm. Interestingly, the results depict that absorptive capacity does not mediate between human capital and firm productivity. In summary, the results portrayed that among the nine dimensions of human capital, four dimensions, namely *training*, *attitude, experience* and *personal attributes* have a direct significance on a firm's productivity. Extensive scholastic work has revealed these variables are significant contributors of a firm's productivity. According to Birdi, Allan, and Warr (1997), with regards to training, effective training programs tender benefits to both firms and employees. Effective trainings increase their level of human capital (capabilities) that in turn influences the firm's productivity and innovation. Employees consider training important because it augments their chances of promotion and re-employment (Latham & Budworth, 2006). That is the reason training has a significant influence on a firm's productivity (Tharenou, Saks, & Moore, 2007). A detailed analysis revealed that for productivity-led trainings, firms should focus on imparting their employees with profession-related trainings (Dearden, Reed, and Van Reenen, 2006), on the job trainings (Dearden et al., 2006; Hansson), information technology trainings (Matteucci, O'Mahony, Robinson, & Zwick, 2005) and interpersonal trainings (Guthrie, 2001; Y. C. Ng & Siu, 2004). Additionally, firms should also consider investment in training (Blundell et al., 1999; Tamkin, Giles, Campbell, & Hillage, 2004) and training durations (Aragon-Sanchez, Barba-Aragón, & Sanz-Valle, 2003; Barro et al., 1995; Zwick, 2006, 2007).

Table 7.19: Hypothesis Testing (HC-Productivity)

	Estimates	**Result**
Attitude → Productivity	0.079*	Reject Ho
Health → Productivity	0.056	Fail to reject
Education→ Productivity	0.042	Fail to reject
Training → Productivity	0.077*	Reject Ho
Skill → Productivity	0.036	Fail to reject
Experience → Productivity	0.13**	Reject Ho
Attribute → Productivity	0.076*	Reject Ho
Compliance→ Productivity	0.013	Fail to reject
Stability →Productivity	0.003	Fail to reject
Attitude → Absorptive capacity → Productivity	0.001	Fail to reject
Health → Absorptive capacity→ Productivity	0.006	Fail to reject
Education→ Absorptive capacity→ Productivity	0.007	Fail to reject
Training → Absorptive capacity→ Productivity	0.001	Fail to reject
Skill → Absorptive capacity→ Productivity	0.006	Fail to reject
Experience→ Absorptive capacity→ Productivity	0.008	Fail to reject
Attribute → Absorptive capacity → Productivity	0.006	Fail to reject
Compliance→ Absorptive capacity→ Productivity	0.009	Fail to reject
Stability → Absorptive capacity→ Productivity	0.009	Fail to reject

** and ** show the significance at 5% and 1% respectively*

Likewise, the results showed attitude, represented by employees' motivation, engagement, commitment, satisfaction, and cooperation as a direct and significant determinant of a firm productivity. Empirical studies (Bontis & Fitz-Enz, 2002; Bontis & Serenko, 2007; Fitz-Enz, 2000a, 2000b; Gerhart, 2005) applaud these results. To Bontis and Serenko (2007), a satisfied employee is more productive for a firm compared to the less satisfied. Further, in considering motivation as an important attitudinal variable, they argue that employees' motivation not only augments the productivity of a firm but also holds a competitive advantage over others. Judge and Bono (2001) mentioned that satisfaction and cooperation not only influence a firm's productivity but also affect its other performance cords. Likewise, Armstrong and Taylor (2014) asserted that employees' engagement acts as a source of competitive advantage for a company. The feeling of pride and advocacy for his firm elevates an employee's interest in the assigned tasks thus augmenting a firm's performance. The third dimension that shows a momentous direct impact on a firm's productivity is experience. The majority of the scholastic work considered it a significant contributor of a firm's productivity. Viewing the dimensions of experience taken for analysis, the study infers that employees with a higher similar industrial experience (Baptista, Karaöz, & Mendonça, 2014; Pfeifer, 2014), organizational tenure (Hitt et al., 2001) and work-related experience (Skaggs & Youndt, 2004) significantly and positively affect the firm's performance. Similarly, results showed that personal attributes were crucial for the productivity of a firm. Empirical literature ascertains that strands of personal attributes like creativity (F. M. Martin et al., 2013), intelligence (Wu, 2005), leadership (Brooking & Motta, 1996) and risk-taking (Luthans et al., 2004) significantly impact the productivity of a firm. Interestingly, the results depicted that education, skills, health, compliance and stability do not directly influence the productivity of a firm. The prime reason for the insignificant effect of education and skill is the lack of relevance of these dimensions to firm requirement (Heckman, 2000; Wizarat, 2002). Becker et al. (1997) elaborated this point well by explaining the difference between firm specific and general human capital. To him, the firm specific of human capital directly influences the productivity of a firm whereas general human capital may not directly affect it. In this context, the employees in the SMEs of Pakistan possess education and skills which contributes to their general human capital, but not firm specific. To augment the firm specific of human capital, firms need to impart trainings to employees (Bontis & Serenko, 2007).

7.4.3 Technological Progress and Human Capital Dimensions

Table 7.20 enumerates the results of direct and indirect relationship of HC dimensions and relationship between firm and technological progress. The significant estimates of attitude (0.087, $p<0.05$), health (0.10, $p<0.01$), education (0.127, $p<0.01$), training (0.10, $p<0.01$), skill (0.09, $p<0.01$) and compliance (0.089, $p<0.01$) entail the momentous direct impact of these dimensions over technology. Among these significant dimensions, education has a slightly higher effect than others. Rests have almost homogenous effects, as evident from coefficient values. Further, experience and stability do not have a direct impact on the technological progress of a firm significantly; however, they have an indirect impact. Similarly, except training and attitude, the rest of the dimensions significantly influence a firm’s technological progress through absorptive capacity. However, the effect of these dimensions is not substantive, that is less than 0.02, thus depicting the role of absorptive capacity as a partial mediator. In summary, attitude and training have only direct effects on the technological progress of a firm whereas the rest of the variables have indirect effects or both.

Table 7.20: Hypothesis Testing (HC-Technology)

	Estimates	Result
Attitude → Technology	0.087*	Reject Ho
Health → Technology	0.101**	Reject Ho
Education→ Technology	0.127**	Reject Ho
Training → Technology	0.101**	Reject Ho
Skill → Technology	0.09**	Reject Ho
Experience → Technology	0.038	Fail to reject
Attribute → Technology	0.027	Fail to reject
Compliance→ Technology	0.089**	Reject Ho
Stability →Technology	0.064	Fail to reject
Attitude → Absorptive capacity → Technology	0.001	Fail to reject
Health → Absorptive capacity→ Technology	0.011*	Reject Ho
Education→ Absorptive capacity→ Technology	0.012*	Reject Ho
Training → Absorptive capacity→ Technology	0.002	Fail to reject
Skill → Absorptive capacity→ Technology	0.011*	Reject Ho
Experience→ Absorptive capacity→ Technology	0.014*	Reject Ho
Attribute → Absorptive capacity → Technology	0.01*	Reject Ho
Compliance→ Absorptive capacity →Technology	0.015*	Reject Ho
Stability → Absorptive capacity→ Technology	0.016*	Reject Ho

** and ** show the significance at 5% and 1% respectively*

As discussed, training, skill, education, compliance, attitude and health directly affect the technological progress of a firm. Grossly, these results are consistent with the literature. For example, our results showed a significant direct effect of training on the technological progress of a firm. Centeno and Corrêa (2010) also depicted similar findings. To them, trainings (especially technical trainings) played a vital role in the technological progress of a firm. In particular, implementing any technology or after the gradation of a process requires employees to be thoroughly trained to continue its operation (Meindl & Chopra, 2007). One of the reasons behind the failure of the Enterprise Resource Planning (ERP) system is the lack of properly-trained employees (Van Weele, 2005). Similarly, intrapreneurial, technical and interpersonal skills heavily influence the momentum of technological progress. All the processes of technological progress like initiating ideas, planning, acquiring, implementing and operating require different levels of skills at each level (Meindl & Chopra, 2007). Equally, the firms that foster interprenuerial skills are more likely to implement and execute new technologies (Love & Roper, 2015).

The majority of scholastic works argue that employees' level of education and its relevancy to profession is the vital factor for technological progress in SMEs (Bontis & Fitz-Enz, 2002). The literature ascertains that more educated employees not only have the ability to understand new technologies but also take the initiative to implement better technologies (Bartel, 2000; Bartel & Lichtenberg, 1985; Rainlall, 2004). Likewise, more compliant employees have a better ability to understand and execute the changes, either procedural or technological, compared to the compliant (Bergquist, Söderholm, Kinneryd, Lindmark, & Söderholm, 2013). Further, researchers consider employees' motivation, satisfaction, commitment and cooperation vital for upgrading processes and adopting new technologies. The results portray that absorptive capacity mediates between HC dimensions and technological progress. The number of studies ascertains these findings. For example, to Lane, Salk, and Lyles (2001), raising human capital elevated a firm's capacity to acquire and implement changes. Lund Vinding (2006) also illustrated similar findings.

7.4.4 Innovation and Human Capital Dimensions

The influence of human capital dimensions on innovation is almost identical to that of technological progress. Table 7.21 below notifies their results. Health (0.186, p<0.01), education (0.12, p<.01), skill (0.172, p<0.01), attributes (0.081, p<0.05) and stability (0.086, p<0.05) emerge as the significant and direct contributors to the innovation of a firm. Particularly, the coefficients of health and skill depict their greater influence on the innovation of a firm. Interestingly, experience and compliance do not directly affect the innovativeness of a firm, however they do so indirectly. It means that these two dimensions increase the absorptive capacity of a firm, which in turn leads to innovation.

Table 7.21: Hypothesis Testing (HC-Innovation)

	Estimates	**Result**
Attitude → Innovation	0.016	Fail to reject
Health → Innovation	0.186**	Reject Ho
Education → Innovation	0.124**	Reject Ho
Training → Innovation	0.06	Fail to reject
Skill → Innovation	0.172**	Reject Ho
Experience → Innovation	0.037	Fail to reject
Attribute → Innovation	0.081*	Reject Ho
Compliance → Innovation	0.016	Fail to reject
Stability → Innovation	0.086*	Reject Ho
Attitude → Absorptive capacity → Innovation	0.002	Fail to reject
Health → Absorptive capacity → Innovation	0.017**	Reject Ho
Education → Absorptive capacity → Innovation	0.02**	Reject Ho
Training → Absorptive capacity → Innovation	0.004	Fail to reject
Skill → Absorptive capacity → Innovation	0.018**	Reject Ho
Experience → Absorptive capacity → Innovation	0.022**	Reject Ho
Attribute → Absorptive capacity → Innovation	0.016**	Reject Ho
Compliance → Absorptive capacity → Innovation	0.024**	Reject Ho
Stability → Absorptive capacity → Innovation	0.026**	Reject Ho

** and ** show the significance at 5% and 1% respectively*

The results portray that human capital dimensions, except for attitude and training, significantly affect the innovativeness of a firm. Notably, health, education, skills, attributes and stability play a critical role in the innovation of a firm as these dimensions affect it both directly and indirectly. It highlights that better health and higher skills (technical, communicational and problem solving) of employees significantly improve the innovation. Likewise, the level, quality and relevancy of profession in the education, employees' creativity, diversity, intelligence and leadership, employees' turnover and layoffs are also the key determinants of innovation performance of SME firms in Pakistan.

Empirically, when discussing education, Mangematin and Nesta (1999) asserted that highly educated employees, through their daily tasks, increased the stock of knowledge of the organization. They further encouraged relationships with other individuals with similar competencies outside the firm, thus facilitating access to the external networks of knowledge, especially in the case of utilizing scientific knowledge (Rothwell and Dodgson, 1991). Likewise, Carter (1989) stated that employees with high levels of education are the main contributors to the innovation of a firm. Similarly, empirical literature confirms the effect of health (Beehr & Newman, 1978; Hadjimanolis, 1999), education (Lund Vinding, 2006), skills (C.-J. Chen & Huang, 2007), attributes (Lööf & Heshmati, 2002, 2006), and stability (Vinding, 2006) on absorptive capacity and innovation.

Intriguingly, experience and compliance do not directly affect the innovativeness of a firm. However, they do so indirectly. It means that these two dimensions increase the absorptive capacity of a firm, which in turn leads to innovation. In the case of experience, empirical literature confirms its indirect effect on absorptive capacity. For example, Senker (1995) considered experience as tacit knowledge and mentioned it as an important component of innovation. Similarly, according to Vinding (2006), absorptive capacity may be developed through the accumulation of experience and the kind of firm-specific knowledge, that is, knowledge established through learning by doing, and may be measured by the work experience of the employees. However, some of the studies like Romijn and Albaladejo (2002) argued that work experience has also a direct effect on the innovation of a firm whereas others like Viding (2006) contradicted it. Though there is a dearth of literature on compliance–innovation relationship, studies that discussed it showed its insignificant impact on innovation. Our findings show partial consistency in it.

7.4.5 Survival and Human Capital Dimensions

Table 7.22 shows the hypotheses testing of direct and indirect influence of the human capital dimensions on the survivability of a firm. Education (0.107, $p<.01$), training (0.107, $p<0.01$), attribute (0.102, $p<0.05$) and stability (0.187, $p<0.01$) have direct and significant influence on the survivability of an SME firm. The results imply that companies that hire employees with a higher level of education in terms of level, quality and its relation to profession, trainings (including on the job trainings), technical and soft skill trainings, and attributes such as creativity have higher chances of survival on the business surface. Similarly, companies with better stability in terms of lesser employees' turnover and layoffs and longer organizational tenures, have more resilience to survive. Put differently, a low level of education, training, attribute and stability and *interalia* are the factors behind the failure of an SME firm. Indirect effect wise, the rest of the dimensions (except training and attitude) significantly and positively affect the survival of an SME firm. It validates the role of absorptive capacity in mediating relationship between human capital dimensions (except for attitude and training) and survivability. Importantly, education, attribute and stability influence the survival of a firm both directly and indirectly, showing their critical role in the survival of a firm. Stability, especially, manifested with employee turnover, longevity and layoffs have the highest impact both directly and indirectly. Further, when comparing results, it is apparent that the estimates of direct affect have higher values compared to indirect effect. It shows that absorptive capacity plays the role of partial mediator between these dimensions and survivability.

Table 7.22: Hypothesis Testing (HC-Survival)

	Estimates	Result
Attitude → Survival	0.054	Fail to reject
Health → Survival	0.039	Fail to reject
Education → Survival	0.107**	Reject Ho
Training → Survival	0.107**	Reject Ho
Skill → Survival	0.053	Fail to reject
Experience → Survival	0.019	Fail to reject
Attribute → Survival	0.102*	Reject Ho
Compliance → Survival	0.025	Fail to reject
Stability → Survival	0.187**	Reject Ho
Attitude → Absorptive capacity → Survival	0.001	Fail to reject
Health → Absorptive capacity → Survival	0.015**	Reject Ho
Education → Absorptive capacity → Survival	0.017**	Reject Ho
Training → Absorptive capacity → Survival	0.003	Fail to reject
Skill → Absorptive capacity → Survival	0.015**	Reject Ho
Experience → Absorptive capacity → Survival	0.019**	Reject Ho
Attribute → Absorptive capacity → Survival	0.014**	Reject Ho
Compliance → Absorptive capacity → Survival	0.021**	Reject Ho
Stability → Absorptive capacity → Survival	0.022**	Reject Ho

** and ** show the significance at 5% and 1% respectively*

As highlighted by Acs, Armington, and Zhang (2007) and Acs and Armington (2004) the impacts of HC on survival are not only ambivalent but puzzling. While some results showed a significant effect of HC on survival, others showed an insignificant effect. Our study suggested that due to the use of different proxies of HC results differed. We found that education, experience and stability have a momentous influence on survivability. The numbers of studies have authenticated this fact. For example, according to Enterprise Surveys (World Bank, 2007) an inadequately educated workforce is among the top 10 business environment constraints for firms in Pakistan. Likewise, Littunen (2003) and Capelleras and Rabetino (2008) mentioned that raising the level of education can increase the probability of survival of a firm. This fact also was highlighted by Acs and Armington (2006) and José Mata and Portugal (2002). They found a significant positive affect of university and college degree on the survivability of a firm. Similarly, Bayus and Agarwal (2007) considered employees' attributes like diversity and experience as important factors of survivability.

7.5 Robustness of Results

As discussed previously in the literature, three variables, namely type of industry, firm size and ownership can have an influence on the relationship of a firm performance. Therefore, by putting these variables as control variables in our model, we re-estimated both the models. The results of these estimates emerge in Appendix F. We compared these results with the above discussed results. When comparing, we did not find any significant difference in the sign and magnitude of any relationship. However, the Model-1 result showed a significant impact of size of firm on all five-performance dimensions whereas the type of industry has a significant impact on productivity, export and innovation. Firm ownership did not affect any of the performance dimensions. The results of Model-2 also depicted that ownership did not affect any of the performance dimensions. However, the size of the firm has a significantly positive influence on survivability, productivity and innovation. Likewise, the type of industry significantly influences the firm’s exportability, productivity and innovation.

7.6 Summary

The chapter starts with validating the measurement models, a pre-requisite for SEM analysis. The measurement model for all dependent variables and mediating variables were validated by checking the goodness-of-fit indices values, factor loading, and squared multiple correlations. Further analysis was conducted by drawing two major models. Model-1 characterized the impact of overall human capital on each of the five performance dimensions individually, directly and through absorptive capacity. Model-2 was more comprehensive, illustrating the relationship of each of the nine dimensions of human capital with five performance dimensions of the firm. Both models were analyzed using the standard SEM approach through AMOS software. Model-2 results showed that human capital had a significant and direct impact on every performance of the dimensions of a firm. Similarly, absorptive capacity also mediated the relationship between overall HC and all five performance cords. Model-2 results showed that except attitude and training, the rest of all the dimensions of HC affected absorptive capacity. Similarly, except for productivity, absorptive capacity had a significant effect on all performance cords.

CHAPTER 8:

CONCLUSION, IMPLICATIONS AND LIMITATIONS

8.1 Conclusion

This study focuses on the role of human capital in the performance of the SMEs of the manufacturing sector of Pakistan. The study has four major objectives. First, to develop the measure of human capital specific to the SMEs of the manufacturing sector of Pakistan, accounting for HC's various dimensions according to their importance. Second, it is to test the differences in the levels of human capital by industry, size and ownership. Third, it is to examine the relationship of the overall human capital and its dimensions with the firm's productivity, export, innovation, technological progress and survival. Fourth, it is to provide the policy prescription for improving the HC in SMEs.

To develop HC, the study adopts a threefold approach. First, appropriate dimensions and sub-dimensions of HC are identified from the literature. Second, appropriate dimensions and sub-dimensions are selected with the help of the experts of the survey. It selects 9 dimensions and 35 sub-dimensions of the HC. By applying AHP techniques, these selected dimensions and sub-dimensions are prioritized to form a human capital index (HCI). Relative prioritization among these dimensions rank *education* at the top, followed by *experience, skills, personal attributes, training, employee stability, attitude, health and compliance.* Similarly, among the sub-dimensions, *technical education* was ranked the highest followed by *work-related experience, quality of education, level of education, turnover* and others. The number of empirical studies such as Baptiste (2001), Bontis (2001), Bozbura et al. (2007), Han et al. (2008) and Hatch and Dyer (2004) consider these dimensions and sub-dimensions as important surrogates of human capital. However, these studies do not shed light on the relative importance of each of them, which this study does. The derived HCI is not only useful to analyze the level of HC at industry level and to compare inter-industry differences in the level of HC but also can be used at firm level to aggregate its level of human capital. The study uses this index to gauge the level of 750 SMEs from the manufacturing sector of Pakistan and tests the difference in the level of human capital by industry, size and ownership. Results depict that levels of HC significantly differ by industry where its level is highest in the textile industry and lowest in furniture and sports industries. Further results conclude that levels of HC also differ by size (small and medium) and ownership (foreign and local). Analysis revealed that the levels of HC are significantly higher in medium firms compared to small firms. Small firms possess lower *education, skills and attitude* compared to medium firms. Similarly, levels of HC are higher in firms under foreign ownership compared to firms locally owned. In particular, *education, experience, attributes and stability* are significantly lower in local firms compared to foreign-owned.

Further, by applying the structural equation modeling (SEM) technique, the study tests the direct and indirect (through absorptive capacity) effect of human capital (overall and by dimensions) on productivity, technological progress, export, innovation and survival. The results show a significant and positive affect of HC on productivity, export, technological progress, innovation and survival of a firm. Similarly, results illustrate that absorptive capacity moderates the relationship between HC and these five performance cords of firm. The results are extremely consistent with empirical studies. For instance, Pennings, Lee, and Van Witteloostuijn (1998) consider human capital as the prime determinant of firm survival. To him, firms with a high level of educated and experienced employees have a greater ability to compete and survive in critical situations. Similarly, Khan and Khan (2012) mention that companies with highly skilled and trained employees have more resilience to survive.

Although our results portray a positive significant effect of HC on technology, a disagreement exists among researchers. Eric D. Gould (2002), for example, argued that the highest technological progress rates observed in recent years have not raised the demand for general human capital but also can be attributed to human capital. Murnane et al. (1995), on the other hand, points out that a rise in technological progress has reduced the importance of human capital. However, the majority of the empirical works (Bartel & Lichtenberg, 1985; Bergquist et al., 2013; Meindl & Chopra, 2007; Rainlall, 2004; Van Weele, 2005) maintain that HC positively influences technological progress. Further, the number of studies asserted that HC has a significant direct effect on productivity (D. Bhattacharya, Guner, & Ventura, 2013; M. Bhattacharya et al., 2014; V. Kathuria et al., 2013; Khalique et al., 2011; Sidik, 2012) , export (Carpenter et al., 2001; Wagner, 1995, 1996) and innovation (Littunen, 2003; Lööf & Heshmati, 2002, 2006; Lund Vinding, 2006; Romijn & Albaladejo, 2002) of firm. Similarly, the study finds a significant mediating role of absorptive capacity between HC and productivity, technological progress, innovation, export and survival. Previously, Vinding (2006), among others, maintains that absorptive capacity plays a significant mediating role between HC and performance.

After analyzing the effect of the individual dimensions of HC on performance, the study concludes that:

I. training, experience, attitude, and personal attributes significantly affect productivity
II. attitude, compliance, experience, and skills significantly affect exportability
III. education, attitude, training, skills, compliance and health significantly affect technological progress
IV. personal attributes, skills, education, health and stability significantly affect innovation
V. training, education, personal attributes and stability significantly affect survivability
VI. absorptive capacity mediates between HC dimensions except for training, attitude innovation, technological progress, survival and export
VII. absorptive capacity does not mediate relationship between HC dimensions and productivity

Table 8.1: Human Capital Index

Goal	Dimensions	Local Weights	Sub-Dimensions	Local Weights	Global Weight
Human Capital	Education	0.177	Level of Education	0.292	0.052
			Quality of Education	0.343	0.061
			Technical Education	0.365	0.065
	Experience	0.141	Similar Industry Experience	0.275	0.039
			Work-Related Experience	0.451	0.064
			Organizational Tenure	0.274	0.039
	Training	0.123	On the Job Training	0.221	0.027
			Spending on Training	0.108	0.013
			Time on Training	0.102	0.013
			Technical Training	0.212	0.026
			Interpersonal Training	0.121	0.015
			Previous Training	0.236	0.029
	Personal attributes	0.125	Creativity	0.201	0.025
			Intelligence	0.242	0.030
			Diversity	0.173	0.022
			Leadership	0.257	0.032
			Risk Taking	0.127	0.016
	Skills	0.139	Work-Related Skills	0.296	0.041
			Problem-Solving Skills	0.251	0.035
			Communication Skills	0.121	0.017
			Technical Skills	0.185	0.026
			Intraprenuerial Skills	0.147	0.020
	Attitude	0.078	Cooperation	0.142	0.011
			Motivation	0.193	0.015
			Commitment	0.168	0.013
			Satisfaction	0.274	0.021
			Engagement	0.223	0.017
	Stability	0.097	Absenteeism	0.307	0.030
			Longevity	0.229	0.022
			Turnover	0.464	0.045
	Health	0.075	Physical strength	0.211	0.016
			Age of employee	0.426	0.031
			Disease free	0.363	0.027
	Compliance	0.046	Charges & Litigations	0.338	0.016
			Safety Issues	0.358	0.016
			Complaints	0.304	0.014
Total					**1.000**

Source: Author

8.2 Implications

Although there are various dimensions of human capital as mentioned in our literature review, the study identified only nine dimensions most relevant to the manufacturing sector of Pakistan. The analysis of these dimensions reveals that improving human capital in the SME sector requires attention both from individual firms and from the government. Among the nine dimensions, *compliance, attitude, attribute, stability and experience of employees* are purely micro in nature and require focus from the individual SMEs whereas *training, education, skill and health* require attention from both SMEs and the government. Therefore, for a better understanding, we explain the policy implication for the government and the individual SMEs separately.

8.2.1 Policy Implications

Despite some common hurdles, different SMEs face different challenges. Presently, as mentioned in the background of the study, the biggest challenge that SMEs are facing is survivability. Regardless of the government support in terms of subsidized loans and technical assistance, the survival rate of SMEs is quite low. In particular, the failure rates of SMEs in the metal and furniture industries are high. This study suggests that focusing on HC dimensions can reduce the failure rate of SMEs. Our analysis portrays a significant influence of human capital dimensions, namely *education, training, personal attributes and stability* on survivability. Among these four dimensions, the government can focus on training and education. For short-term measures, the government can promote training whereas in the long run, the government needs to promote an education that has quality and has its relevance to professions. As the case of survivability is more crucial than other performance challenges, the government can exclusively tailor HCD policies for struggling firms with a special focus on training and education. However, along with education and training, SMEs themselves have also to focus on elevating satisfaction, motivation, engagement and the turnover of their employees.

Likewise, declining productivity is another challenge for SMEs (SMEDA 2013). To enhance productivity, the government can focus on training by continuing its “one-fit-all” policy, as the level of training is low in all selected industries. In particular, the level of interpersonal training is low coupled with low technical training, short training duration and fewer amounts of funds on training. Presently, the SMEs in Textile, Metal and Electronic industry are facing productivity problem (UNIDO, 2013, 2010). Therefore, focusing on training by the government can assist SMEs in these industries to raise their productivity. However, the policy to promote training will not be effective if SMEs themselves do not focus on other dimensions of human capital that affect productivity. Our results showed that besides training, employees’ experience, their personal attributes and attitude also have a significant impact on productivity. Therefore, at SME level, the firm needs to recruit and retain employees with related work experience, promote leadership skills and diversity and focus on employees’ motivation, satisfaction and engagement. These dimensions can be promoted by adopting the better HR practices as a number of studies concluded that incorporating HR practices lead to the developing of HC.

Sports, textile and leather industries significantly contribute to the export of Pakistan. However, after 2000, the exports of these industries have not significantly grown and even decreased in the case of the textile industry. Particularly, SMEs in these industries have been severely affected by international competition (Economic Survey of Pakistan, 2013).

Primarily, rising competition from India and China have made a dent on the sports industry. Due to the lower level of education and skills, most of the SMEs in the sports industry are not able to deal with international clients (Lall & Weiss, 2004; Lund-Thomsen et al., 2012). These factors have also affected the technological progress and innovation of firms in the sports industry. In this perspective, the HC development policies for such industries should focus on the HC dimensions that influence exportability. Our results portray skill, compliance, attitude and experience significantly affect the exportability of SMEs. Among these four dimensions, the government can focus on skill enhancements. However, the government needs to customize the policy of skill enhancement according to the type and size of the industry.

For the developing SMEs, the cluster development approach is very popular (Kharbanda, 2001). In industrialized countries, this literature stream has motivated a shift toward the design of industrial and innovation policies that focused on territorial factors. Industrial poles, clusters and local production systems have become one of the central themes to encourage entrepreneurship, learning and productivity improvements (Belussi, 2006; McDonald, Tsagdis, & Huang, 2006). In the last two decades, hundreds of cluster initiatives have been launched, involving virtually all regions of the world and their number is growing. A case in point is Europe, where two-thirds of the European Union countries have introduced the cluster approach in their innovation policy, while several European initiatives are based on the provision of incentives and funding to boost competitive territorial advantages. Presently, SMEDA with the help of UNIDO and ADB is developing SME clusters in Pakistan (UNIDO, 2010). An example of this is the fan cluster in Gujrat, cutlery in Wazirabad , and wood work in Chiniot (UNIDO,2014, 2006). The major aim of developing clusters is to promote innovation and technological progress among SMEs. Our results showed that all four dimensions of human capital that the government can influence significantly affect innovation and technological progress. This implies that the government policy to promote innovation and technological progress should focus on promoting heath, skills, education and training.

Our above discussion identified and discussed the dimensions of HC that are important for the firm's survival, productivity, export, technological progress and innovation. We suggested to the government to consider these factors when developing the HC development policy for SMEs. However, when devising the policy, the GoP should take into account the differences in the level of these dimensions across industry and size. Our results depict that the levels of education and skill differ by industry and size whereas the levels of training and health are homogenous. This situation requires a blend of policies. The government can adopt a *one-fit-all policy* to promote training and health. However, policies to promote skill and education need to consider the type of industry, its size and ownership. Most of the SMEs only rely on informal training relevant to a particular task. Therefore, the government needs to link the training types, duration and their budget with the type of skills required. For example, our results showed that the food, metal, and furniture industries have deficient software, ICTs, technical and intraprenuerial skills. These skills can be divided into two categories, namely industrial specific trainings and general trainings. Industrial specific trainings can include trainings focusing on the particular skills needed in that industry whereas general trainings focus on ICTs, communication and intrapreneurial trainings.

8.2.2 Managerial Implications

It is pertinent to note that the government may assist SMEs in improving some dimensions of HC as explained in the previous section. However, until SMEs themselves leverage their workforce as a competitive weapon, the improvement in their performance is onerous. The findings of the study portray some implications for SMEs that can help them to augment their performance. We found that the level of education is the lowest in SMEs compared to other dimensions of HC. Most of the SMEs have a few employees who have a college or university degree. In particular, SMEs in furniture, sports, and metal industries possess a very low level of education while it has a significant effect on productivity, survivability and exportability of a firm. Empirical studies (Acs & Armington, 2004; José Mata & Portugal, 2002; Pfeifer, 2014; Wilkinson & Brouthers, 2006) suggest that employees' education is a key determinant of their performance. It entails that SMEs should raise their level of education by attracting employees with a relevant college or university degree.

SMEs, in particular industries can collaborate with larger firms to promote education related to that industry. Previously, firms in textile industry have established the Textile Institute of Pakistan (TIP) and the National Textile University, Faisalabad. The leather industry has also established some institutions to impart formal education related to the leather industry. These institutions have produced a high quality human resource for these industries. Such measures can also be taken by other industries to develop human capital.

The insignificant influence of training on absorptive capacity insinuates that there is a difference in actual and required trainings. Normally, training not only influences the performance of a company but also raises its absorptive capacity. In-depth analysis reveals that companies have very low training budgets and mostly rely on the government training programs. According to World Bank (2007), only 6.7% firms offer formal training. These SMEs, having formal training programs, do not conduct any type of analysis to ensure the type of training they require. Simply providing training is not the key to better performance. SMEs need to look into the needs of the employees and ensure that HC development policies are aligned with both company goals. In this way, SMEs can link their training programs with the skills they require. For example, for exports, improving marketing and communication skills of employees play a pivotal role whereas for technological progress, technical skills and problem-solving skills are more important.

The government also assists the training and education of the SMEs; however, dimensions like employees' satisfaction, engagement motivation, turnover and compliance lie solely in the domain of individual firms. The government may not be able to influence these dimensions directly. This study found that at present, the level of stability and compliance is lowest in all SMEs whereas these two factors influence the survivability, innovation, exportability and technological progress of a firm. It infers elevating the performance.

i) SMEs have to reduce the increase level of stability by decreasing turnovers and absenteeism; ii) SMEs have to make their employees to be better compliant in terms of obeying health , safety and environment (HSE) rules. Simultaneously, SMEs need to have better motivated, engaged and cooperative employees as these dimensions significantly influence the performance of a firm.

The above discussion proposed what the SMEs should do in the light of the findings of this study. However, it is also important to discuss the "how to do", keeping in view the SMEs' lower amount of funds, traditional structure and operations in rural areas. One of the ways to do so is implementing human resource (HR) practices. These HR practices include but is not limited to recruitment and selection, training and development, (in-house and open), rewards, appraisal, empowerment, conducive work environment and motivation (Cassell, Nadin, Gray, & Clegg, 2002; Hayton, 2003, 2011). The number of studies (Andrew & Sofian, 2012; Appiah Fening, Pesakovic, & Amaria, 2008; Billett & Smith, 2003; Gruman & Saks, 2011; Kishore, Majumdar, & Kiran, 2012; Mayson & Barrett, 2006; Saks, 2006; Sels et al., 2006) have considered these practices as the best anchor for retaining human capital. These practices not only formalize the structure of the organization but also attract the educated employees. Similarly, it can also increase the level of the existing employees by influencing their skills, attitude, compliance and creativity.

The SMEs in a number of countries including UK and Korea have improved their overall productivity and survival by adopting HR practices. For example, the UK government views the development of more HRM practices as central to the economic success of the sector (Appiah Fening et al., 2008; Bacon & Hoque, 2005). Recently, Khan et al. (2013) indicate that SMEs in Pakistan that adopted better HR practices performed well. They argue that SMEs which implement practices like training, empowerment and motivation practices have perform better than their counterparts. SMEs, seeking to improve their capacity to engage in innovation and technological progress, should think of investing in HR practices like employee participation, incentives and investments in socialization and orientation activities. Such activities encourage employees' voluntary contributions like helping and cooperative behavior. It supports the development of social and human capital and thereby increases the absorptive capacity of the firms. In this way, HR practices can increase absorptive capacity, risk-taking, and the intrapreneurial culture in these SMEs.

The number of development agencies excessively focuses on developing HC for SMEs. For example, UNIDO works with local training providers to improve the skill base of the clusters, facilitates contact building with external sources of expertise and knowledge, and helps skills providers re-orient their training offer towards the provision of skills that match the needs of the cluster. The study suggests SMEs integrate with such agencies and the government to effectively benefit from their HC development programs.

8.3 Limitations of Study

The study focused on a few selected industries from the manufacturing sector of Pakistan. However, including other industries in the study may improve the results and relative importance of HC dimensions. Similarly, this study is cross sectional and static, as data from SMEs has been taken at a single point in time. Further, the study takes HC as the major factor influencing the performance of SMEs, ignoring other factors like the financial strength of the company, the quality of physical assets and the market reputation of the company. Equally, the study does not take into account the financial constraint that SMEs face. There may be a case when SMEs have appropriate human capital but due to a lack of financial resource, it is not able to perform.

8.4 Future Researches

We suggest future researchers to include the data from other industries, particularly chemical, electronics, surgical equipment and carpet to have a better representation of the manufacturing sector. On the other hand, we urge researchers to narrow the scope of the study and focus on individual industries to give the industry specific pictures. The results of those studies can be compared with this study to ascertain any differences. Secondly, in addition to human capital, researchers can include other variables like financial strength, physical assets and the goodwill of the company to check whether HC sustains its effect on the performance in the presence of these factors or not. Further, we also suggest future researches to take the longitudinal data on these dimensions. Such analysis can provide more in-depth findings which are useful for both the government and individual SMEs.

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APPENDICES

APPENDIX A: QUESTIONNAIRES

APPENDIX A-1: Questionnaire for Selecting dimensions and sub-dimensions of HC

UNIVERSITI MALAYA
KUALA LUMPUR

Human Capital Survey (Phase-1)

Background of research
We are conducting a research to develop a measure to capture the level of human capital in manufacturing sector Small and Medium Enterprises (SME) of Pakistan. The main objective of this survey is to identify the dimensions and sub-dimensions that significantly represent human capital. The result of the survey will help us to construct the measure that can capture the level of human capital.

Part-A Profile of Respondent

Name………………………………………….
Company Name………………………………
Designation……………………………………
Experience in years (related to SME human capital issues)…………………………………

Part-B

Please rate the following dimensions of human capital according to their importance.

Dimensions	Not important	Somewhat important	Very important
Abilities			
Attitude			
Behavior			
Capabilities			
Commitment			
Competence			
Compliance			
Creativity			
Cultural Aspects			
Disease			
Education			
Employee interpersonal network			
Employee turnover			
Employees' values and beliefs			

Dimensions	Not important	Somewhat important	Very important
Ethics			
Experience			
Health			
Implicit Knowledge			
Innovation			
Intellect (employee's)			
Intrinsic value of employee			
Knowledge			
Leadership abilities			
Learning			
Loyalty			
Motivation			
Organizational tenure			
Personal Attributes			
Personal ethics			
Personality Traits			
Professional technique			
Quickness			
Reputation			
Safety issues			
Stability			
Skills			
Spirit			
Tacit knowledge			
Training			
Vision			

Part-C

Please rate the following sub-dimensions of human capital according to their importance

Sub-dimensions	Not important	Somewhat important	Very important
Similar Industry Experience			
Work-Related Experience			
Organizational Tenure			
Industry Experience			
Professional Competence			
On the Job Training			
Spending on Training			
Time on Training			
Technical Training			
Entrepreneurial Training			
Previous Training			

Sub-dimensions	**Not important**	**Somewhat important**	**Very important**
Interpersonal Trainings			
Professional Trainings			
Creativity			
Gender			
Intelligence			
Diversity			
Energy			
Leadership			
Risk Taking			
Personal Ethics			
Loyalty			
Work-Related Skills			
Problem-Solving Skills			
Communication Skills			
Technical Skills			
Intraprenurial Skills			
Profession related Skills			
Level of Education			
Quality of Education			
Technical Education			
Cooperation			
Motivation			
Commitment			
Satisfaction			
Engagement			
Passion			
Behavior			
Vision			
Absenteeism			
Longevity			
Turnover			
Annual Non-Voluntary Layoffs			
Physical Strength			
Age of Employee			
Disease Free			
Energetic			
Charges & Litigations			
Safety Issues			
Complaints			
Obedience			
ICT Skills			
Intrapreneurial Skills			

APPENDIX A-2: Questionnaire for AHP comparison

UNIVERSITI MALAYA
KUALA LUMPUR

Human Capital Survey (Phase-2)

The following dimensions and sub-dimensions have been selected from a survey conducted previously. You are requested to weigh each dimension and sub-dimension according to its relative importance.

Name……………………………………..

Company Name…………………………

From the previous survey, we selected the following dimensions. You are requested to compare and rate the comparative importance of each.

Attributes	Absolutely more important	Very strongly more important	Strongly More Important	Moderately More Important	Weakly More Important	Just Equal	Weakly More Important	Moderately More Important	Strongly More Important	Very strongly more important	Absolutely more important	Attributes
Education												Experience
Education												Training
Education												Personal attributes
Education												Skills
Education												Attitude
Education												Stability
Education												Health
Education												Compliance
Experience												Training
Experience												Personal attributes
Experience												Skills
Experience												Attitude
Experience												Stability

Experience												Health
Experience												Compliance
Training												Personal attributes
Training												Skills
Training												Attitude
Training												Stability
Training												Health
Training												Compliance
Personal attributes												Skills
Personal attributes												Attitude
Personal attributes												Stability
Personal attributes												Health
Personal attributes												Compliance
Skills												Stability
Skills												Health
Skills												Compliance
Attitude												Stability
Attitude												Health
Attitude												Compliance
Stability												Health
Stability												Compliance
Health												Compliance

In the context of dimensions marked in Part-A, please tick the relative importance of each sub-attribute below when it is compared to other sub-attributes.

Dimensions	**Sub-dimensions**	**Absolutely more important**	**Very strongly more important**	**Strongly More Important**	**Moderately More Important**	**Weakly More Important**	**Just Equal**	**Weakly More Important**	**Moderately More Important**	**Strongly More Important**	**Very strongly more important**	**Absolutely more important**	**Sub-dimensions**
	Level of Education												Quality of Education
	Level of Education												Technical Education
Education	Quality of Education												Technical Education
	Similar Industry Experience												Related Work Experience
	Similar Industry Experience												Organizational Tenure
Experience	Related Work Experience												Organizational Tenure
	On the Job Training												Spending on training
	On the Job Training												Time on training
	On the Job Training												Technical Training
	On the Job Training												Interpersonal training
Training	On the Job Training												Previous trainings
	Spending on training												Time on training
	Spending on training												Technical Training
	Spending on training												Interpersonal training
	Spending on training												Previous

													trainings
	Time on training												Technical Training
	Time on training												Interpersonal training
	Time on training												Previous trainings
	Technical Training												Interpersonal training
	Technical Training												Previous trainings
	Interpersonal training												Previous trainings
Personal Attributes	Creativity												Gender
	Creativity												Intelligence
	Creativity												Diversity
	Creativity												Leadership
	Creativity												Risk Taking
	Creativity												Intelligence
	Intelligence												Leadership
	Intelligence												Risk Taking
	Diversity												Leadership
	Diversity												Risk Taking
	Energy												Leadership
	Energy												Risk Taking
	Leadership												Risk Taking
Skills	Intrepreneurial skills												Work-related skills
	Intrepreneurial skills												Problem-solving skills
	Intrepreneurial skills												Interpersonal skills
	Intrepreneurial skills												Technical skills
	Work-related skills												Problem-solving skills
	Workrelated skills												Interpersonal skills
	Work-related skills												Technical skills
	Problem-solving skills												Interpersonal skills
	Problem-solving skills												Technical skills
	Interpersonal skills												Technical skills
Attitude	Cooperation												Motivation

	Cooperation											Commitment
	Cooperation											Satisfaction
	Cooperation											Engagement
	Motivation											Commitment
	Motivation											Satisfaction
	Motivation											Engagement
	Commitment											Satisfaction
	Commitment											Engagement
	Satisfaction											Engagement
Stability	Turnover											Absenteeism
	Turnover											Longevity
	Absenteeism											Longevity
Compliance	Complaints											Charges & litigations
	Complaints											Safety issues
	Charges & litigations											Safety issues
Health	Diseases											Physical strength
	Diseases											Age of employee
	Physical strength											Age of employee

APPENDIX A-3: Questionnaire for HC- Performance Relationship

UNIVERSITI MALAYA
KUALA LUMPUR

HUMAN CAPITAL AND FIRM PERFORMANCE SURVEY

Dear Sir/Madam:

This study is part of PhD research conducted at the Faculty of Economics and Administration, University of Malaya, Malaysia to define the role of human capital in manufacturing sector small and medium enterprises (SMEs) of Pakistan. The main objective of the study is to analyze the interactions between the various dimensions of human capital with indicators of firm-level performance. The results of this survey will guide policymakers in Pakistan to design appropriate policies and allocate resources efficiently for SME development, and direct SME owners in developing their competitive edge by investing in specific dimensions of human capital.

- The information required is for the year 2013; unless otherwise stated.
- Complete confidentiality is assured with this survey. The information that you provide us will be used in an aggregate form only. Individual firm data and firm identity will be completely anonymous.

Your participation is crucial and it only takes 30 minutes of your time to complete the questionnaire. Completed survey forms should be submitted to our representative
or
email: shujaatmubarik@gmail.com
If you have any query please contact undersigned.

Best Regards,

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PART-A

Respondent's Information		
Name... Company Name.. Designation..		
Profile of Firm		
1	Type of Business	Textile/Leather/Sports/Food/Metal/Others
2	Foreign ownership in company: Yes/No	*if Yes,* % of foreign ownership
3	Number of Employees	
4	Years in Operation	
5	Any Parent Company/Group	
6	Estimated annual cost of doing business as % of sale	
7	Number of Products	
8	Annual Sales of your Company	Rupees
9	% of assets Financed through loans	
10	Govt non-monetary assistance in business	(*Yes/No*)
11	Percentage of employees having schooling 10 years or more.	%
12	Percentage of employees with professional/technical education.	%
13	Percentage of employees having experience 2 years or more	%
14	Percentage of employees that received any training (2013).	%
15	Percentage of total annual budget spent on training.	%
16	Percentage of employees who are information technology (IT) savvy.	%
17	Percentage of female employees in work force	%
18	Percentage of employee who voluntarily work after duty hours	%
19	Percentage of employees joined organization in year 2013	%
20	Percentage of sick leave in total leave	%
21	Percentage of employees who left organization. in year 2013	%

22	Daily attendance ratio.	%
23	Percentage of employees breaching safety rules last year.	%
24	Percentage of exports in total sales.	%
25	Percentage change in sales from previous year (+ / -).	%
26	Percentage change in costs of production (+ / -).	%
27	Percentage of fixed assets sold(-) or acquired(+) in the last one year.	%
28	Percentage of budget spent on adopting new technologies.	%
29	Average growth in sales for the past 5 years.	%
30	Number of new markets entered in the last 5 years.	Number
31	Number of new product announcements for the past 5 years.	Number
32	Number of years in the exporting business.	Year(s)
33	Total R&D expenditure for the past 5 years	Rupees

PART-B: HUMAN CAPITAL INDICATORS

Instruction: Please rate each of the statement in context of your company
1 Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree, 5 Strongly Agree
OR 1 Very Low, 2 Low, 3 Neutral, 4 High, 5 Very High

EDUCATION	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	Compared to competitors, our company hires employees with relatively high level of education.					
2	High levels of education contribute to the performance of our company.					
3	We prefer technical education when hiring an employee.					
	Very Low to very High	**1**	**2**	**3**	**4**	**5**
4	The overall level education in our company is ……………..					
5	Compared to our competitor(s), the level of technically educated staff is …………					
6	The quality of the alma mater of our employees are ………………………					
7	Compared to our competitor(s), our employees have high quality of education.					

EXPERIENCE	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	Compared to our competitor(s) our employees have rich work related experience.					
2	Contribution of work related experience to our company's performance is important.					
3	Our employees have high experience as compared to industry.					
4	Contribution of employees' industry experience to our company's performance is important.					
5	Our employees organizational tenure is high as compare to competitors					
6	Longer organizational tenure of employees contributes to our company's success.					

TRAINING	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	On-the-job-training is vital for increasing the employees' level of competence.					
2	On-the-job-training contributes to the performance of our company.					
3	Our company prefers employees who have been trained previously.					
4	Our employees have received training before joining our company.					
5	We have a yearly technical training program.					
6	Training duration needs to be increased for effective training.					
7	Soft skills training increases our employees' productivity.					
8	Our company should increase training budget to improve training outcomes.					
	Very Low to very High	**1**	**2**	**3**	**4**	**5**
Please indicate your company's level as compared to competitors in following elements:						
9	Quality of technical trainings.					
10	Average duration an employee undergoes training.					
11	Level of soft skill trainings.					
12	Investments in training					

SKILLS	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	Employees communicate their messages related to their tasks effectively					
2	Employees have high levels of skills required to perform their tasks.					
3	Employees solve job related problem themselves.					
	Very Low to Very High	**1**	**2**	**3**	**4**	**5**
4	Number of employees with extra ordinary work related skills that are difficult to imitate.					
5	Employees' level of technical skills, necessary for performing smooth operation.					
6	Number of employees possessing extra ordinary technical skills that are rare in industry.					
7	Number of conflicts arising due to miscommunication.					
8	Time an employee spends on problem solving tasks.					
9	Employees' undertake new tasks.					
10	Employees introduce innovative/ creative ways in performing their tasks.					
11	Employees are able to multi-task.					

INTERNAL STABILITY	Strongly Disagree to Strongly Agree	1	2	3	4	5
1	The company is facing trouble because of employees' layoffs.					
2	Majority of employees' come late daily.					
3	Rate of absenteeism in our company is very high as compared to the industry.					
4	Level of absenteeism affects company performance.					
5	Employees desire to stay in this organization over a longer period of time					
	Very Low to Very High	**1**	**2**	**3**	**4**	**5**
6	Average organizational tenure per employee as compared to competitors					
7	Turnover of our company as compared to industry is					
8	The level of involuntary turnover is					

COMPLIANCE	Strongly Disagree to Strongly Agree	1	2	3	4	5
1	The number of complaints of employees who do not complete their task is very high.					
2	Number of employees; in our company, facing charges is very low.					
3	Employees' comply with safety instructions.					
4	Employees are aware of laws job regulations.					
5	Employees' often ignore legal issues when performing their tasks.					
6	Level of unlawful conduct of employees' is very high.					
7	Unlawful conducts of employees have created problems for the company.					

PART-C: FIRM ABSORPTIVE CAPACITY

ABSORPTIVE CAPACITY	Strongly Disagree to Strongly Agree	1	2	3	4	5
Please rate to what extent your company uses external resources to obtain information (e.g., personal networks, consultants, seminars, internet, database, professional journals, academic publications, market research, regulations and law concerning environment/ technique/health/security): ***[Acquisition]***						
1	The search for relevant information concerning our industry is every-day business in our company					
2	Our management motivates the employees to use information sources within our industry					
3	Our management expects that the employees deal with information beyond our industry					
Please rate to what extent the following statements fit the communication structure in your company. ***[Assimilation]***						
4	In our company ideas and concepts are communicated cross-departmental					
5	Our management emphasizes cross-departmental support to solve problems					
6	In our company there is a quick information flow, e.g., if a business units obtains important information it communicates this information promptly to all other business units or department.					
7	Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.					
Please specify to what extent the following statements fit the knowledge processing in your company ***[Transformation]***						
8	Our employees have ability to structure and to use collected knowledge					
9	Our employees are used to absorb new knowledge as well as to prepare it for further purposes and to make it available.					
10	Our employees successfully link existing knowledge with new insights.					
11	Our employees are able to apply new knowledge in their practical work.					
Please specify to what extent the following statements fit the commercial exploitation of new knowledge in your company (NB: Please think about all company divisions such as R&D, production marketing, and accounting): ***[Exploitation]***						
12	Our management supports the development of prototypes.					
13	Our company regularly reconsiders technologies and adapts them accordant to new knowledge					
14	Our company has the ability to work more effective by adopting new technologies.					

Personal Attributes	Strongly Disagree to Strongly Agree	1	2	3	4	5
1	Employees develop new ideas to improve products and processes					
2	Employees give creative solutions to problems during meetings					
3	Creative solutions suggested by employees are original, feasible and desirable.					
4	Increasing woman in workforce has improved organizational performance					
5	Gender diversity increases performance of our company					
6	Employees are energetic while performing their organizational tasks					
7	Employees perform their jobs independently.					
8	Employees never avoid to take risk in their work fields					
9	Employees engage in risks to accomplish their assigned tasks.					
	Very Low to very High	1	2	3	4	5
10	Level of intelligence of employees					
11	Level of comprehension of employees.					
12	The proportion of female in labor force is					
13	Level of diversity among labor force					
14	Spirit of employees during work					
15	Emotional attachment of employees with their work					
16	Level of work concentration of employees.					
17	Level of responsiveness of employees towards assigned tasks.					
18	Employees motivate each other to accomplish assign task					
20	Willingness of employees to share information with one another on handling tasks.					
21	Employees' sense of ownership for their work					

Attitude	Strongly Disagree to Strongly Agree	1	2	3	4	5
1	Level of cooperativeness among organizational members is very high					
2	Our employees go the extra mile to perform their assigned tasks.					
3	Our employees fulfill their task within deadlines					
4	Close supervision is given for employees to get assigned tasks accomplished					
5	Employees are proud of working in this company.					
6	Employees are highly passionate about their work					
	Very Low to Very High	1	2	3	4	5
7	Degree of conflict between/among employees.					
8	Motivation level of our employees					
9	Number of employees participating in company activities, beyond daily tasks.					
10	Number of employee voluntarily extending their work time beyond office hours.					
11	Number of employees willing to invest their efforts for the company.					

Health	Strongly Disagree to Strongly Agree	1	2	3	4	5
1	Our employees are physically fit.					
2	Normally employees posit high energy during work.					
3	We consider the age of employees during the recruitment process.					
4	Number of employees do not come to work because of sick leave is very high.					
5	Number of employees facing health problems is very high.					

PART D: FIRM PERFORMANCE INDICATORS

EXPORT PERFORMANCE	**Very Low to Very High**	**1**	**2**	**3**	**4**	**5**
1	Company's export sale compare to domestic is ………...					
2	Level of our management's satisfaction with export performance is…….					
3	Export profitability of our company is…….					
4	Our growth in international market is……..					
	Strongly Disagree to Strongly Agree	**1**	**2**	**3**	**4**	**5**
5	Over the past 5 years our exports markets have increased					

PRODUCTIVITY IMPROVEMENTS	**Very Low to Very High**	**1**	**2**	**3**	**4**	**5**
As compared to our competitors:						
1	Our cost of production is… ……					
2	Our output per worker is ……					
3	Value added per worker is…….					
4	The overall productivity of our employees' is…….					
	Raw material wastage due to employee is …………					
	Strongly Disagree to Strongly Agree	**1**	**2**	**3**	**4**	**5**
6	Employees' manage production processes efficiently					

INNOVATION	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	Our company experiments with new ideas.					
2	Our company comes with new products to remain competitive in market.					
3	Our company is creative in its mode of operations.					
4	Our company constantly improves products to suit the customers' requirements.					
5	Our company has implemented new production processes.					
6	Our R&D expenditures are sufficient to meet innovation requirements					
7	Our company frequently introduces new products to meet customer requirements					

TECHNOLOGICAL PROGRESS	**Very Low to Very High**	**1**	**2**	**3**	**4**	**5**
In our company:						
1	Wastage of workers time due to technological breakdown/repairing…..					
2	Level of investment in new acquiring new technologies ……					
	Strongly Disagree to Strongly Agree	**1**	**2**	**3**	**4**	**5**
Our company :						
3	Uses internet to communicate with customers and suppliers					
4	Adopts the latest production technologies.					
5	Uses contemporary information technology (IT) systems.					
6	Has new and efficient production equipments					
7	Implementation of new technologies have increased the processes efficiency					

SURVIVABILITY	**Strongly Disagree to Strongly Agree**	**1**	**2**	**3**	**4**	**5**
1	We have reduced or planning to reduce our employment size to compete with business challenges.					
2	For past 2 years, our company is operating in loss					
3	Our company is new in this industry					
4	For the past 2 years, the costs of production are decreasing.					
5	We have reduced or planning to reduce our operations to cope up with surviving challenges.					
6	Our company is facing survivability challenge					

-End of Questionnaire-

APPENDIX-B: EXPERTS' CATEGORY WISE RESULTS OF PAIR WISE COMPARISON JUDGMENT MATRICES (PCJMS) AND HUMAN CAPITAL INDICES (HCI)

Table B-1: PCJMS of HC sub-dimensions (based on Industry Experts Results)

Human Capital	Education	Experience	Training	Personal attributes	Skills	Attitude	Employee Stability	Health	Compliance	**Priority**
Education	1	0.25	1.91	1.91	0.52	1.12	3.27	1.91	1.71	0.12
Experience	3.98	1	1.91	1.12	1.12	2.92	2.03	4.22	4.72	0.21
Training	0.52	0.52	1	1.91	0.65	3.27	1.44	2.76	0.78	0.11
Personal attributes	0.52	0.89	0.52	1	0.52	7.00	2.76	1.12	1.12	0.12
Skills	1.91	0.89	1.53	1.91	1	6.08	2.47	1.71	1.00	0.16
Attitude	0.89	0.34	0.31	0.14	0.16	1	0.58	1.12	2.54	0.06
Employee Stability	0.31	0.49	0.69	0.36	0.41	1.71	1	1.91	0.78	0.07
Health	0.52	0.24	0.36	0.89	0.58	0.89	0.52	1	2.47	0.07
Compliance	0.58	0.21	1.29	0.89	1.00	0.39	1.29	0.41	1	0.08
										CR=0.03

Table B-2: PCJMS of HC sub-dimensions (based on Industry Experts Results)

Education	Level of Education	Quality of Education	Technical Education	**Priority**
Level of Education	1	0.75	0.75	0.27
Quality of Education	0.33	1	0.33	0.40
Technical Education	0.33	0.75	1	0.33
				CR=0.01

Experience	Similar Industry Experience	Work Related Experience	Organizational Tenure	**Priority**
Similar Industry Experience	1	0.75	0.75	0.27
Work Related Experience	0.33	1	0.33	0.40
Organizational Tenure	0.33	0.75	1	0.33
				CR=0.01

Table B-2, continued

Training	OJT	Training Expenditure	Time on Training	Technical Training	Interpersonal Training	Previous Training	**Priority**
On the Job Training	1	0.57	0.75	0.89	0.50	0.67	0.18
Training Expenditure	0.63	1	1.00	0.43	0.75	0.38	0.10
Time on Training	0.57	1.00	1	0.67	0.83	0.33	0.11
Technical Training	0.13	0.57	0.57	1	2.00	0.50	0.20
Interpersonal Training	0.67	0.33	0.20	0.50	1	0.50	0.12
Previous Training	0.50	1.43	3.00	0.83	0.33	1	0.29
							CR= 0.06

Personal Attributes	Creativity	Intelligence	Diversity	Leadership	Risk Taking	**Priority**
Creativity	1	0.500	1.000	0.625	0.667	0.186
Intelligence	2.000	1	0.625	0.167	0.500	0.276
Diversity	1.000	0.600	1	0.600	0.429	0.176
Leadership	0.600	0.857	0.667	1	0.250	0.236
Risk Taking	0.59	0.444	0.714	0.500	1	0.136
					CR=	**0.04**

Skills	Work Related Skills	Problem Solving Skills	Communication Skills	Technical Skills	Intraprenurial Skills	**Priority**
Work Related Skills	1	0.333	0.800	1.111	4.000	0.352
Problem Solving Skills	0.750	1	0.333	0.250	1.500	0.255
Communication Skills	0.429	0.500	1	0.714	0.500	0.137
ICT Skills	0.400	0.800	0.429	1	0.333	0.187
Intrapreneurial Skills	0.250	0.286	0.444	0.333	1	0.070
					CR=	**0.01**

Table B-2, continued

Attitude	Cooperation	Motivation	Commitment	Satisfaction	Engagement	Priority
Cooperation	1	0.500	1.000	0.333	0.333	0.103
Motivation	0.889	1	0.400	0.571	0.400	0.175
Commitment	1.000	0.500	1	0.333	0.333	0.097
Satisfaction	3.000	0.714	1.750	1	0.500	0.265
Engagement	1.556	0.857	1.714	0.833	1	0.361
					CR=	**0.015**

Stability	Absenteeism	Longevity	Turnover	Priority
Absenteeism	1	0.857	0.4	0.22
Longevity	0.166	1	0.5	0.26
Turnover	1	2	1	0.53
			CR=	**0.00**

Compliance	Charges & litigations	Safety issues	Complaints	Priority
Charges & litigations	1	0.857	1	0.38
Safety issues	0.5	1	0.5	0.20
Complaints	1	2	1	0.42
			CR=	**0.00**

Health	Physical strong	Age of employee	Disease	Priority
Physical strong	1	0.625	0.6	0.24
Age of employee	0.571	1.000	0.286	0.409
Disease	0.667	0.778	1.000	0.354
			CR=	**0.01**

Table B-3: Pair wise Comparison Judgment Matrices of HC dimensions based on Government Experts

Human Capital	Education	Experience	Training	Personal attributes	Skills	Attitude	Employee Stability	Health	Compliance	**Priority**
Education	1	5.593	2.924	1.442	3.557	3.271	3.659	1.859	5.130	0.239
Experience	0.179	1	0.237	0.405	3.271	0.776	2.759	2.466	3.271	0.103
Training	0.342	4.217	1	1.326	1.000	5.278	2.268	2.268	5.130	0.157
Personal attributes	0.693	2.466	0.754	1	1.000	5.593	2.268	0.620	5.130	0.137
Skills	0.281	0.306	1.000	1.000	1	3.271	2.537	1.710	4.718	0.109
Attitude	0.306	1.289	0.189	0.179	0.306	1	0.620	4.718	5.278	0.083
Employee Stability	0.273	0.362	0.441	0.441	0.394	1.613	1	1.119	6.257	0.068
Health	0.538	0.405	0.441	1.613	0.585	0.212	0.894	1	5.130	0.083
Compliance	0.195	0.306	0.195	0.195	0.212	0.189	0.160	0.195	1	0.022
									CR=	**0.02**

Table B-3: Pair wise Comparison Judgment Matrices of HC sub-dimensions based on Government Experts

Education	**Level of Education**	**Quality of Education**	**Technical Education**	**Priority**
Level of Education	1	1	0.75	0.30
Quality of Education	1	1	0.75	0.29
Technical Education	0.375	0.333	1	0.40
			CR=	**0.002**

Experience	**Similar Industry Experience**	**Work Related Experience**	**Organizational Tenure**	**Priority**
Similar Industry Experience	1	0.5	0.778	0.28
Work Related Experience	2	1	3	0.55
Organizational Tenure	0.571	0.333	1	0.17
			CR=	**0.004**

Table B-3, continued

Training	On the Job Training	Spending on Training	Time on Training	Technical Training	Interpersonal Training	Previous Training	Priority
On the Job Training	1	0.667	0.667	0.857	0.333	0.778	0.23
Spending on Training	0.6	1	0.333	0.4	0.857	0.6	0.11
Time on Training	0.6	0.75	1	0.4	0.75	0.429	0.10
Technical Training	16	1.111	1.2	1	0.75	0.222	0.26
Interpersonal Training	0.5	0.167	0.333	0.375	1.2	0.667	0.12
Previous Training	0.571	0.667	0.571	0.833	1	1	0.18
						CR=	**0.012**

Personal Attributes	Creativity	Intelligence	Diversity	Leadership	Risk Taking	Priority
Creativity	1	0.5	0.6	0.444	0.8	0.188
Intelligence	0.833	1	0.111	0.571	0.286	0.238
Diversity	0.667	0.889	1	0.6	0.875	0.138
Leadership	0.5	0.714	0.667	1	1	0.298
Risk Taking	0.556	0.5	0.5	0.4	1	0.138
					CR=	**0.016**

Skills	Work Related Skills	Problem Solving Skills	Communication Skills	Technical Skills	Intraprenurial Skills	Priority
Work Related Skills	1	0.667	0.400	0.143	0.667	0.23
Problem Solving Skills	0.600	1	2.000	0.750	0.500	0.16
Communication Skills	0.500	0.500	1	0.600	0.500	0.11
Technical Skills	0.875	0.375	0.714	1	0.667	0.20
Intraprenurial Skills	0.429	0.857	0.400	0.500	1	0.29
					CR=	**0.01**

Table B-3, continued

Attitude	**Cooperation**	**Motivation**	**Commitment**	**Satisfaction**	**Engagement**	**Priority**
Cooperation	1	0.333	0.750	0.250	0.200	0.21
Motivation	0.750	1	0.667	0.429	0.778	0.20
Commitment	0.333	0.500	1	2.000	0.571	0.28
Satisfaction	0.800	0.714	0.500	1	0.333	0.16
Engagement	0.833	0.556	0.667	0.750	1	0.15
					CR=	**0.013**

Stability	**Absenteeism**	**Longevity**	**Turnover**	**Priority**
Absenteeism	1	0.222	1	0.41
Longevity	0.5	1	0.667	0.22
Turnover	1	0.556	1	0.38
			CR=	**0.01**

Compliance	**Charges & litigations**	**Safety issues**	**Complaints**	**Priority**
Charges & litigations	1	1	0.333	0.36
Safety issues	1	1	0.571	0.38
Complaints	0.75	0.667	1	0.26
			CR=	**0.00**

Health	Physical strong	Age of employee	Disease	**Priority**
Physical strong	1	0.5	0.5	0.20
Age of employee	0.222	1	0.5	0.46
Disease	2	0.667	1	0.34
			CR=	**0.01**

Table B-4: Pair wise Comparison Judgment Matrices of HC dimensions based on Institutional Experts Results

Human Capital	Experience	Education	Personal attributes	Employee Stability	Skills	Attitude	Training	Health	Compliance	**Priority**
Experience	1	1.180	1.484	2.254	1.423	1.283	1.179	3.167	3.237	0.168
Education	0.847	1	0.833	0.748	0.713	1.191	0.937	2.081	2.420	0.110
Personal attributes	0.674	1.200	1	0.684	0.616	1.660	0.599	0.982	2.351	0.099
Employee Stability	0.444	1.337	1.463	1	0.881	2.153	0.628	0.968	2.865	0.117
Skills	0.703	1.403	1.623	1.135	1	1.913	0.950	3.287	2.487	0.146
Attitude	0.780	0.839	0.602	0.465	0.523	1	0.366	2.396	2.851	0.091
Training	0.848	1.067	1.668	1.592	1.052	2.733	1	1.534	4.175	0.155
Health	0.316	0.481	1.018	1.033	0.304	0.417	0.652	1	2.571	0.074
Compliance	0.309	0.413	0.425	0.349	0.402	0.351	0.240	0.389	1	0.041
									CR=	**0.001**

Table B-5: Pair wise Comparison Judgment Matrices of HC sub-dimensions based on Institutional Experts Results

Education	**Level of Education**	**Quality of Education**	**Technical Education**	**Priority**
Level of Education	1	0.889	0.833	0.300
Quality of Education	0.125	1	0.889	0.332
Technical Education	0.200	0.125	1	0.368
			CR=	**0.00**

Experience	**Similar Industry Experience**	**Work Related Experience**	**Organizational Tenure**	**Priority**
Similar Industry Experience	1	0.750	0.750	0.271
Work Related Experience	0.333	1	0.400	0.405
Organizational Tenure	0.333	0.714	1	0.324
			CR=	**0.017**

Table B-5, Continued

Training	On the Job Training	Spending on Training	Time on Training	Technical Training	Interpersonal Training	Previous Training	Priority
On the Job Training	1	0.71	2.00	2.00	0.40	0.29	0.26
Spending on Training	0.57	1	1.00	0.50	0.78	0.50	0.11
Time on Training	0.50	1.00	1	0.67	0.75	0.33	0.10
Technical Training	0.50	2.00	0.50	1	0.78	0.67	0.17
Interpersonal Training	0.44	0.29	0.33	0.56	1	0.67	0.13
Previous Training	0.78	0.22	1.67	0.50	0.57	1	0.23
						CR=	**0.013**

Personal Attribute	Creativity	Intelligence	Diversity	Leadership	Risk Taking	Priority
Creativity	1	0.143	1.200	0.167	0.778	0.252
Intelligence	0.875	1	1.333	0.857	0.778	0.232
Diversity	0.375	0.375	1	0.333	0.167	0.132
Leadership	0.857	0.167	1.667	1	2.000	0.252
Risk Taking	0.571	0.571	0.857	0.500	1	0.132
					CR=	**0.008**

Skills	Work Related Skills	Problem Solving Skills	Communication Skills	Technical Skills	Intraprenurial Skills	Priority
Work Related Skills	1	0.800	1.200	0.444	1.000	0.302
Problem Solving Skills	0.222	1	0.429	2.000	1.714	0.334
Communication Skills	0.375	0.333	1	0.667	0.714	0.117
Technical Skills	0.444	0.500	0.500	1	1.000	0.168
Intraprenurial Skills	0.286	0.286	0.600	0.400	1	0.079
					CR=	**0.007**

Table B-5, continued

Attitude	Cooperation	Motivation	Commitment	Satisfaction	Engagement	Priority
Cooperation	1	0.400	0.667	0.333	0.889	0.110
Motivation	1.000	1	0.286	0.375	1.000	0.205
Commitment	0.444	0.500	1	0.375	0.750	0.127
Satisfaction	1.667	1.333	1.429	1	1.250	0.396
Engagement	0.125	0.111	0.333	0.375	1	0.162
					CR=	**0.027**

Stability	Absenteeism	Longevity	Turnover	Priority
Absenteeism	1	0.400	0.600	0.299
Longevity	0.714	1	0.571	0.216
Turnover	0.667	0.444	1	0.486
			CR=	**0.000**

Compliance	Charges & litigations	Safety issues	Complaints	Priority
Charges & litigations	1	0.5	0.25	0.27
Safety issues	2	1	2	0.49
Complaints	0.8	0.5	1	0.24
			CR=	**0.006**

Health	Physical strong	Age of employee	Disease	Priority
Physical strong	1	0.5	0.5	0.20
Age of employee	2	1	1	0.41
Disease	2	1	1	0.39
			CR	0.001

Table B-6: Pair wise Comparison Judgment Matrices of HC dimensions based on Composite Results

Human Capital	Education	Experience	Training	Personal attributes	Skills	Attitude	Employee Stability	Health	Compliance	**Priority**
Education	1	2.342	2.107	1.870	1.834	1.891	2.703	2.313	3.359	0.177
Experience	1.668	1	0.994	0.757	1.701	1.630	1.908	2.921	3.470	0.141
Training	0.513	1.980	1	1.308	0.757	3.403	1.437	2.003	2.752	0.123
Personal attributes	0.553	1.566	0.913	1	0.801	4.915	1.885	0.902	3.038	0.125
Skills	0.966	0.867	1.384	1.349	1	3.756	1.985	2.236	2.735	0.139
Attitude	0.660	0.824	0.366	0.262	0.331	1	0.524	2.744	3.555	0.078
Employee Stability	0.476	0.641	0.934	0.799	0.617	2.019	1	1.522	3.736	0.097
Health	0.459	0.374	0.607	1.180	0.491	0.508	0.690	1	3.389	0.075
Compliance	0.363	0.310	0.636	0.479	0.538	0.311	0.563	0.330	1	0.046
									CR=	**0.017**

Table B-7: Pair wise Comparison Judgment Matrices of HC sub-dimensions based on Composite Results

Education	**Level of Education**	**Quality of Education**	**Technical Education**	**Priority**
Level of Education	1	0.880	0.778	0.292
Quality of Education	0.486	1	0.657	0.343
Technical Education	0.303	0.403	1	0.366
			CR=	**0.000**

Experience	**Similar Industry Experience**	**Work Related Experience**	**Organizational Tenure**	**Priority**
Similar Industry Experience	1	0.67	0.76	0.27
Work Related Experience	0.89	1	1.24	0.45
Organizational Tenure	0.41	0.60	1	0.27
			CR	0.01

Table B-7, continued

Training	On the Job Training	Spending on Training	Time on Training	Technical Training	Interpersonal Training	Previous Training	Priority
On the Job Training	1	0.65	1.14	1.25	0.41	0.58	0.22
Spending on Training	0.60	1	0.78	0.44	0.79	0.49	0.11
Time on Training	0.56	0.92	1	0.58	0.78	0.37	0.10
Technical Training	5.54	1.23	0.76	1	1.18	0.46	0.21
Interpersonal Training	0.54	0.26	0.29	0.48	1	0.61	0.12
Previous Training	0.62	0.77	1.75	0.72	0.63	1	0.24
						CR	**0.03**

Personal Attributes	Creativity	Intelligence	Diversity	Leadership	Risk Taking	Priority
Creativity	1.000	0.500	1.000	0.625	0.667	0.201
Intelligence	2.000	1.000	0.625	0.167	0.500	0.242
Diversity	1.000	0.600	1.000	0.600	0.429	0.173
Leadership	0.600	0.857	0.667	1.000	0.250	0.257
Risk Taking	0.530	0.444	0.714	0.500	1.000	0.127
						CR=0.05

Skills	Work Related Skills	Problem Solving Skills	Communication Skills	Technical Skills	Intraprenurial Skills	**Priority**
Work Related Skills	1.00	0.60	0.80	0.57	1.89	0.30
Problem Solving Skills	0.52	1.00	0.92	1.00	1.24	0.25
Communication Skills	0.43	0.44	1.00	0.66	0.57	0.12
Technical Skills	0.57	0.56	0.55	1.00	0.67	0.19
Intraprenurial Skills	0.32	0.48	0.48	0.41	1.00	0.15
					CR=	**0.008**

Table B-7, continued

Attitude	Cooperation	Motivation	Commitment	Satisfaction	Engagement	**Priority**
Cooperation	1.000	0.411	0.806	0.306	0.474	0.142
Motivation	0.880	1.000	0.451	0.458	0.726	0.194
Commitment	0.593	0.500	1.000	0.903	0.552	0.168
Satisfaction	1.822	0.921	1.226	1.000	0.694	0.274
Engagement	0.838	0.508	0.905	0.653	1.000	0.223
					CR=	**0.018**

Stability	Absenteeism	Longevity	Turnover	**Priority**
Absenteeism	1.000	0.493	0.667	0.307
Longevity	0.460	1.000	0.579	0.229
Turnover	0.889	1.000	1.000	0.464
			CR=	**0.005**

Compliance	Charges & litigations	Safety issues	Complaints	**Priority**
Charges & litigations	1.000	0.786	0.528	0.338
Safety issues	1.167	1.000	1.024	0.358
Complaints	0.850	1.056	1.000	0.304
			CR=	**0.003**

Health	Physical strong	Age of employee	Disease	**Priority**
Physical strong	1.000	0.542	0.533	0.211
Age of employee	0.931	1.000	0.595	0.426
Disease	1.556	0.815	1.000	0.363
			CR=	**0.007**

Table B-8: Human Capital Index based on Composite Results

Goal	Dimensions	Local Weight	Sub-Dimensions		Global Weight
Human Capital	Education	0.177	Level of Education	0.292	0.052
			Quality of Education	0.343	0.061
			Technical Education	0.365	0.065
	Experience	0.141	Similar Industry Experience	0.275	0.039
			Work Related Experience	0.451	0.064
			Organizational Tenure	0.274	0.039
	Training	0.123	On the Job Training	0.221	0.027
			Spending on Training	0.108	0.013
			Time on Training	0.102	0.013
			Technical Training	0.212	0.026
			Interpersonal Training	0.121	0.015
			Previous Training	0.236	0.029
	Personal attributes	0.125	Creativity	0.201	0.025
			Intelligence	0.242	0.030
			Diversity	0.173	0.022
			Leadership	0.257	0.032
			Risk Taking	0.127	0.016
	Skills	0.139	Work Related Skills	0.296	0.041
			Problem Solving Skills	0.251	0.035
			Communication Skills	0.121	0.017
			Technical Skills	0.185	0.026
			Intraprenurial Skills	0.147	0.020
	Attitude	0.078	Cooperation	0.142	0.011
			Motivation	0.193	0.015
			Commitment	0.168	0.013
			Satisfaction	0.274	0.021
			Engagement	0.223	0.017
	Stability	0.097	Absenteeism	0.307	0.030
			Longevity	0.229	0.022
			Turnover	0.464	0.045
	Health	0.075	Physically strong	0.211	0.016
			Age of employee	0.426	0.031
			Disease	0.363	0.027
	Compliance	0.046	Charges &Litigations	0.338	0.016
			Safety Issues	0.358	0.016
			Complaints	0.304	0.014
Total					**1.000**

Table B-9: Human Capital Index (HCI) based on results of Industry Experts

Goal	Dimensions	Local Weight	Sub-dimensions	Local Weights	Global Weights
Human Capital	Education	0.12	Level of Education	0.27	0.0333
			Quality of Education	0.40	0.0495
			Technical Education	0.33	0.0405
	Experience	0.21	Similar Industry	0.27	0.0570
			Work Related	0.40	0.0847
			Organizational Tenure	0.33	0.0693
	Training	0.11	On the Job Training	0.18	0.0201
			Spending on Training	0.10	0.0112
			Time on Training	0.11	0.0119
			Technical Training	0.20	0.0223
			Interpersonal Training	0.12	0.0136
			Previous Training	0.29	0.0330
	Personal	0.12	Creativity	0.18	0.0223
			Intelligence	0.28	0.0331
			Diversity	0.18	0.0211
			Leadership	0.24	0.0283
			Risk Taking	0.14	0.0163
	Skills	0.16	Work Related Skills	0.35	0.0573
			Problem Solving Skills	0.25	0.0415
			Communication Skills	0.14	0.0222
			Technical Skills	0.18	0.0304
			Intraprenurial Skills	0.07	0.0114
	Attitude	0.06	Cooperation	0.10	0.0061
			Motivation	0.17	0.0104
			Commitment	0.09	0.0058
			Satisfaction	0.26	0.0158
			Engagement	0.36	0.0216
	Stability	0.07	Absenteeism	0.22	0.0146
			Longevity	0.26	0.0173
			Turnover	0.53	0.0359
	Health	0.07	Physical strong	0.24	0.0160
			Age of employee	0.41	0.0277
			Disease	0.35	0.0240
	Compliance	0.08	Charges & litigations	0.38	0.0286
			Safety issues	0.20	0.0153
			Complaints	0.42	0.0315

Table B-10: Human Capital Index based on results of Government

Goal	Dimensions	Local Weight	Sub-dimensions	Local Weights	Global Weights
Human Capital	Education	0.239	Level of Education	0.3	0.0727
			Quality of Education	0.29	0.0703
			Technical Education	0.4	0.0955
	Experience	0.103	Similar Industry Experience	0.28	0.0291
			Work Related Experience	0.55	0.0564
			Organizational Tenure	0.17	0.0174
	Training	0.157	On the Job Training	0.23	0.0357
			Spending on Training	0.11	0.0179
			Time on Training	0.1	0.0151
			Technical Training	0.26	0.0413
			Interpersonal Training	0.12	0.0182
			Previous Training	0.18	0.0288
	Personal Attributes	0.137	Creativity	0.188	0.0258
			Intelligence	0.238	0.0326
			Diversity	0.138	0.0189
			Leadership	0.298	0.0408
			Risk Taking	0.138	0.0189
	Skills	0.109	Work Related Skills	0.23	0.0256
			Problem Solving Skills	0.16	0.0179
			Communication Skills	0.11	0.012
			Technical Skills	0.2	0.022
			Intrepreneurial Skills	0.29	0.032
	Attitude	0.083	Cooperation	0.21	0.0176
			Motivation	0.2	0.0169
			Commitment	0.28	0.0232
			Satisfaction	0.16	0.0133
			Engagement	0.15	0.0121
	Stability	0.068	Absenteeism	0.41	0.0275
			Longevity	0.22	0.0147
			Turnover	0.38	0.0255
	Health	0.083	Physical strong	0.2	0.0163
			Age of employee	0.46	0.038
			Disease	0.34	0.0285
	Compliance	0.022	Charges & litigations	0.36	0.0079
			Safety issues	0.38	0.0084
			Complaints	0.26	0.0056

Table B-11: Human Capital Index based on results of Institutional Experts

Goal	Dimensions	Local Weight	Sub-dimensions	Local Weights	Global Weights
Human Capital	Education	0.168	Level of Education	0.30	0.0504
			Quality of Education	0.33	0.0559
			Technical Education	0.37	0.0619
	Experience	0.110	Similar Industry Experience	0.27	0.0298
			Work Related Experience	0.40	0.0446
			Organizational Tenure	0.32	0.0357
	Training	0.155	On the Job Training	0.26	0.0397
			Spending on Training	0.11	0.0169
			Time on Training	0.10	0.0158
			Technical Training	0.17	0.0268
			Interpersonal Training	0.13	0.0194
			Previous Training	0.23	0.0360
	Personal Attributes	0.099	Creativity	0.252	0.0249
			Intelligence	0.232	0.0230
			Diversity	0.132	0.0131
			Leadership	0.252	0.0249
			Risk Taking	0.132	0.0131
	Skills	0.146	Work Related Skills	0.3018	0.0440
			Problem Solving Skills	0.334	0.0487
			Communication Skills	0.1169	0.0170
			Technical Skills	0.1679	0.0245
			Intrepreneurial Skills	0.0794	0.0116
	Attitude	0.091	Cooperation	0.1098	0.0100
			Motivation	0.2053	0.0186
			Commitment	0.1271	0.0115
			Satisfaction	0.3956	0.0359
			Engagement	0.1622	0.0147
	Stability	0.117	Absenteeism	0.30	0.0349
			Longevity	0.22	0.0252
			Turnover	0.49	0.0567
	Health	0.074	Physical strong	0.20	0.0148
			Age of employee	0.41	0.0304
			Disease	0.39	0.0288
	Compliance	0.041	Charges & litigations	0.27	0.0112
			Safety issues	0.49	0.0200
			Complaints	0.24	0.0098

APPENDIX-C: VALIDITY AND RELIABILITY OF HUMAN CAPITAL MEASURE (QUESTIONNAIRE PART B)

Table C-1: Respondents' Profile

	Number
(1) Designation	
Business Owner	113
Partner	21
Director	35
Deputy Director	46
General Manager	75
Deputy General Manager	77
Senior Manager	10
Manager	160
Deputy Manager	130
Assistant Manager	83
(2)Function	
Human Resource	184
HR &Accounts	147
Admin & HR	241
HRD	24
HR & Marketing	39
Admin, HR & Accounts	115

Table C-2: Validity of HC dimensions (sub-constructs)

	Items	Factor Loading	AVE	CR
Experience	Exp1	0.67	0.5	0.86
	Exp2	0.71		
	Exp3	0.81		
	Exp4	0.69		
	Exp5	0.7		
	Exp6	0.65		
Education	E1	0.66	0.54	0.89
	E2	0.74		
	E3	0.75		
	E4	0.76		
	E5	0.74		
	E6	0.76		
	E7	0.75		
Training	TRG1	0.66	0.5	0.92
	TRG2	0.68		
	TRG3	0.66		
	TRG4	0.71		
	TRG5	0.74		
	TRG6	0.73		
	TRG7	0.72		
	TRG8	0.74		
	TRG9	0.67		
	TRG10	0.69		
	TRG11	0.76		
	TRG12	0.69		
Skill	SKILL1	0.677	0.5	0.93
	SKILL2	0.686		
	SKILL3	0.87		
	SKILL4	0.74		
	SKILL5	0.729		
	SKILL6	0.77		
	SKILL7	0.746		
	SKILL8	0.702		
	SKILL9	0.735		
	SKILL10	0.721		
	SKILL11	0.747		
	ATT1	0.625	0.51	0.93

Table C-2, Continued

	Items	Factor Loading	AVE	CR
Attitude	ATT2	0.665		
	ATT3	0.712		
	ATT4	0.719		
	ATT5	0.72		
	ATT6	0.736		
	ATT7	0.79		
	ATT8	0.785		
	ATT9	0.655		
	ATT10	0.616		
	ATT11	0.832		
	ATT12	0.86		
Personal Attributes	ATR1	0.63	0.5	0.94
	ATR2	0.674		
	ATR3	0.675		
	ATR4	0.703		
	ATR5	0.79		
	ATR6	0.732		
	ATR7	0.697		
	ATR8	0.702		
	ATR9	0.706		
	ATR10	0.676		
	ATR11	0.705		
	ATR12	0.628		
	ATR13	0.661		
	ATR14	0.76		
	ATR15	0.78		
Stability	STB1	0.86	0.55	0.91
	STB2	0.75		
	STB3	0.66		
	STB4	0.72		
	STB5	0.74		
	STB6	0.77		
	STB7	0.73		
	STB8	0.71		
Compliance	COMP1	0.65	0.5	0.87
	COMP2	0.68		
	COMP3	0.77		

Table C-2, Continued

Items	Factor Loading	AVE	CR	Items
	COMP4	0.75		
	COMP5	0.79		
	COMP6	0.69		
	COMP7	0.58		
	Hth1	0.74	0.56	0.87
	Hth2	0.72		
Health	Hth3	0.80		
	Hth4	0.78		
	Hth5	0.71		

Table C-3: Validity of HC (main construct**)**

		Factor Loading	AVE	CR
	Experience	0.79	0.5	0.89
	Education	0.81		
	Training	0.71		
	Skills	0.59		
HC	Attributes	0.75		
	Attitude	0.65		
	Stability	0.79		
	Health	0.56		
	Compliance	0.65		

Table C-4: Goodness of Fit of HC Measure

Items	P	GFI	CFI	RMSEA	$\chi 2/df$
HCI	.000	.903	.90	.043	2.376

APPENDIX D: DIAGNOSTIC TESTS FOR HC DIFFERENCE

a) Diagnostic Tests for testing HC difference by Industry

Table D-1: Test of Homogeneity(overall HC)

Tests	**Statistic.**	**Sig.**
Levene test	18.845	.000
Welch	13.835	.000
Brown-Forsythe	13.49	.000

Table D-2: Levene's Test of Equality of Error Variances (HC dimensions)

Dimensions	**F**	**Sig.**	**Decision**
Skills	1.623	.152	Accept null hypothesis
Training	1.177	.319	Accept null hypothesis
Attributes	.548	.740	Accept null hypothesis
Education	2.875*	.014	Reject null hypothesis
Experience	5.149*	.000	Reject null hypothesis
Attitudes	7.133*	.000	Reject null hypothesis
Health	10.003*	.000	Reject null hypothesis
Stability	3.558*	.004	Reject null hypothesis
Compliance	4.764*	.000	Reject null hypothesis

** Represents rejection of null hypothesis that the error variance of the dependent variable is equal across groups at .05 level*

Table D-3: Robust Tests of Equality of Means

Dimensions	**Welch statistic.**	**Sig.**	**Brown-Forsythe Statistic.**	**Sig.**
Education	18.182*	.000	17.480*	.000
Attitude	3.889*	.002	3.885*	.002
Stability	11.049*	.000	9.662*	.000
Compliance	7.546*	.000	6.844*	.000

** Shows significance at .01 level*

b) HC difference by size

Table D-4: Descriptive Statistics

	Size	**N**	**Mean**	**Std. Deviation**
HC	Small	213	3.60	.033
	Medium	534	3.77	.012

Leven Test for Equality of variance F=4.47, Sig.=.035

Table D-5: Kolmogorov-Smirnov Test of Normality

Dimension	**Size**	**Statistic**	**Sig.**
HC	Small	.062	.200*
	Medium	.027	.200*

Table D-6: Correlation HC dimensions

	Education	Experience	Training	skills	Attitude	Health	Stability	Compliance
Education								
Experience	.133**							
Training	.123**	.10**						
Skills	.145**	.073*	.113**					
Attitude	.245**	.11**	.056	.033				
Health	.020	.025	.012	.028	.104**			
Stability	.145**	.13**	.087*	.125**	.092*	.083*		
Compliance	.082*	.007	.023	.097**	.160**	.17**	.067	
Personal Attributes	.21**	.11**	.075	.054	.18**	.12**	.09	.18**

***and * represent correlation significant at 1% and 5% respectively*

Table D-7: Homogeneity Tests

Tests	F	Sig.
Box's Test	1.614	.006
Levene's Test		
Education	.743	.389
Experience	2.674	.102
Training	3.661	.056
Skills	.385	.535
Attitude	3.022	.083
Health	.504	.478
Stability	.054	.817
Compliance	.330	.566
Attribute	6.352	.012

** represents significance at .05 level*

c) By ownership

Table D-8: Descriptive Statistics

	Ownership	N	Mean	Std. Deviation
HC	Foreign	66	4.0251	.52009
	Local	684	3.7888	.65050

Leven Test for Equality of variance F=8.61, Sig.=.000

Table D-9: Kolmogorov-Smirnov Test of Normality

Dimensions	Ownership	Statistic	Sig.
HC	Local	.017	.200*
	Foreign	.066	.200*

Table D-10: Kolmogorov-Smirnov Test of Normality

Dimensions	Ownership	Statistic	Sig.
Education	Local	.088	.000
	Foreign	.133	.006
Experience	Local	.094	.000
	Foreign	.129	.008
Training	Local	.067	.000
	Foreign	.118	.023
Skills	Local	.060	.000
	Foreign	.085	.200*
Attributes	Local	.073	.000
	Foreign	.103	.081
Attitude	Local	.051	.000
	Foreign	.115	.030
Health	Local	.080	.000
	Foreign	.188	.000
Stability	Local	.057	.000
	Foreign	.107	.058
Compliance	Local	.057	.000
	Foreign	.175	.000

Table D-11: Critical value of Mahalan. Distance

Number of dependent variables	**Critical Value**	**Number of dependent variables**	**Critical Value**	**Number of dependent variables**	**Critical Value**
2	13.82	5	20.52	8	26.13
3	16.27	6	22.46	9	27.88
4	18.47	7	24.32	10	29.59

Table D-12: Homogeneity Tests

Tests	**F**	**Sig.**
Box's Test	1.738	.002
Levene's Test		
Education	4.910	.027
Experience	8.610	.003
Training	1.359	.244
Skills	.004	.949
Attributes	1.082	.299
Attitude	.005	.943
Health	2.585	.108
Stability	.310	.578
Compliance	1.828	.177

APPENDIX E:

Appendix-E: RESULTS BY CHANGING THE TYPE OF MODEL

Table E-1: Model-1 Standardized Effects

	HC			Result
	Direct	**Indirect**	**Total**	
Productivity ← HC	.075**	.039*	.114**	Reject H0
Survivability ← HC	.239*	.059*	.298*	Reject H0
Export ← HC	.185*	.081*	.266*	Reject H0
Technology ← HC	.161*	.057*	.218*	Reject H0
Innovation ← HC	.167*	.079*	.247*	Reject H0
Absorptive Capacity ← HC	.308*	-	-	Reject H0
Productivity ← Absorptive Capacity	.125*	-	-	Reject H0
Survivability ← Absorptive Capacity	.191*	-	-	Reject H0
Export ← Absorptive Capacity	.262*	-	-	Reject H0
Technology ← Absorptive Capacity	.186*	-	-	Reject H0
Innovation ← Absorptive Capacity	.255*	-	-	Reject H0

** and ** show the level of significance at 1% and 5% level*

Table E-2: Model-1 Effect of Control Variables

	Size	**Industry**	**Ownership**
Productivity	.146*	.219*	.017
Survivability	.147*	.033	.056
Export	.098**	.109*	.05
Technology	.085**	.053	.038
Innovation	.141*	.014*	.034

** and ** show the level of significance at 1% and 5% level*

In order to check whether change in type of model affects the results or not, we also processed the framework by making path model. Figure- 1 and 2 show the Path model of Model-1 and Model-2 , being illustrated . Results depict that both model are have appropriate fitness level and can be proceeded for analysis. Further results of both model has been summarize in Table- and Table . While comparing these results with results of model-1 shown in Figure 7.2, no significant difference can be observed. Primarily, the role of absorptive capacity remains as full mediator in both of the models. For example, magnitude of productivity was 0.078 in first analysis, 0.81 in second and 0.72 in third analysis. It portrays that changing the type of model and integration of constructs does not bring any significant difference on the values of the coefficients.

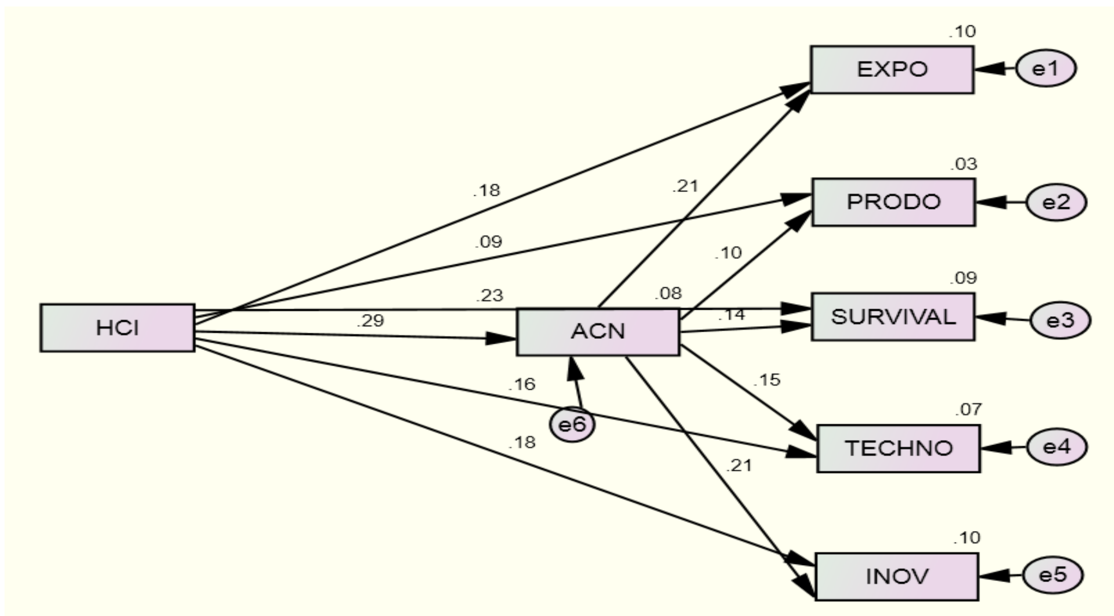

Figure Model-1

TableE-1: Results of Model-1

	HC			Result
	Direct	Indirect	Total	
Productivity ← HC	.094**	.030*	.124**	Reject H0
Survivability ← HC	.239*	.040*	.279*	Reject H0
Export ← HC	.185*	.081*	.266*	Reject H0
Technology ← HC	.161*	.045*	.206*	Reject H0
Innovation ← HC	.167*	.06*	.227*	Reject H0
Absorptive Capacity ← HC	.29*	-	-	Reject H0
Productivity ← Absorptive Capacity	.10*	-	-	Reject H0
Survivability ← Absorptive Capacity	.14*	-	-	Reject H0
Export ← Absorptive Capacity	.21*	-	-	Reject H0
Technology ← Absorptive Capacity	.186*	-	-	Reject H0
Innovation ← Absorptive Capacity	.21*	-	-	Reject H0

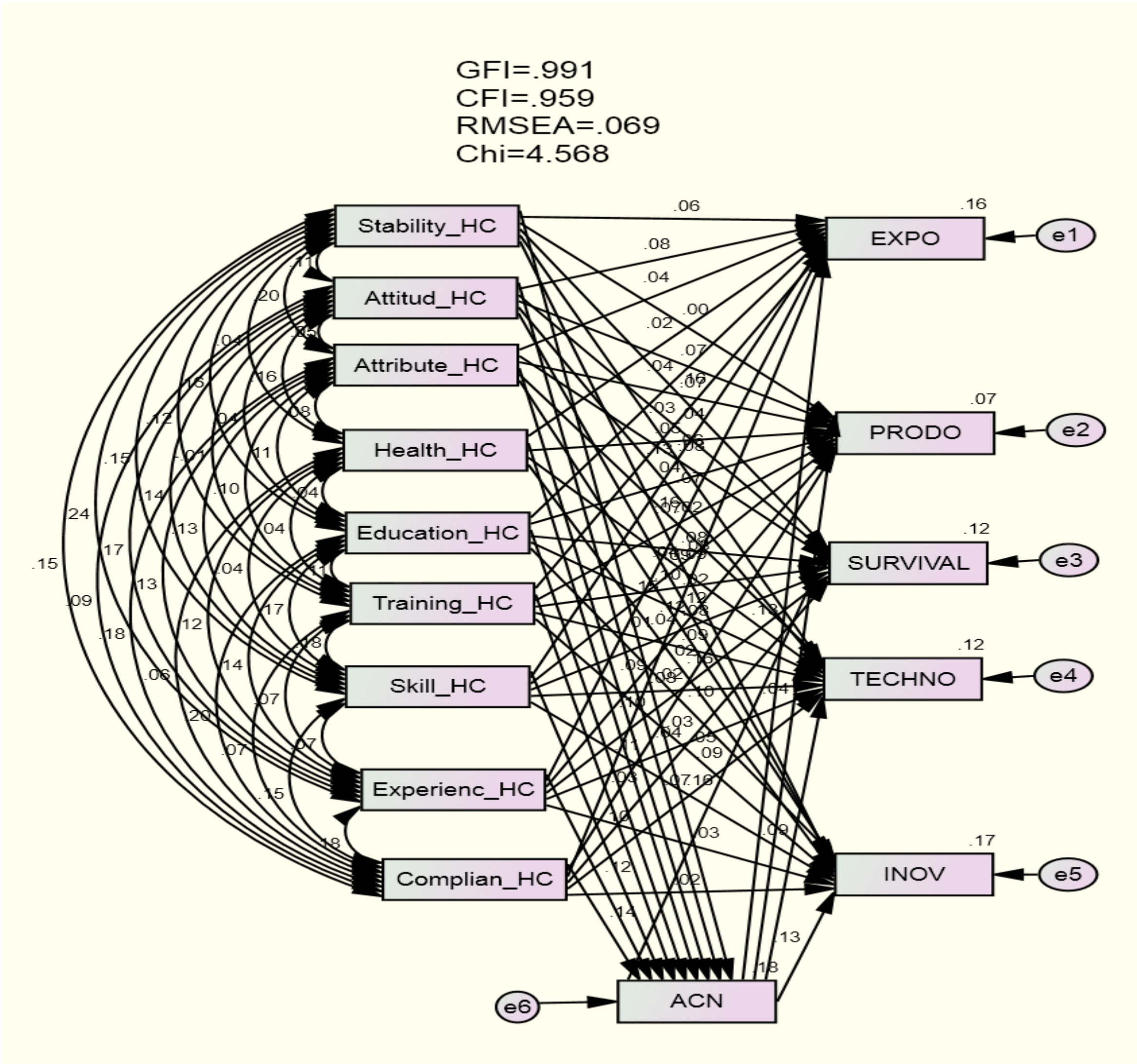

Figure Model-2

Table E-2: Direct Effect

	Attitude	Health	Education	Training	Skill	Experience	Attributes	Compliance	Stability
Absorptive Capacity	0.011	0.113*	0.13*	0.025	0.114*	0.144*	0.106*	0.158*	0.168*
Survival	0.053	0.037	0.102**	0.099**	0.04	0.005	0.093**	0.023	0.181*
Technology	0.087**	0.10**	0.125*	0.096**	0.085**	0.029	0.025	0.087**	0.065
Export	0.10**	0.017	0.037	0.03	0.15*	0.165*	0.052	0.101*	0.072
Productivity	0.079**	0.04	0.022	0.068**	0.043	0.094*	0.079**	0.01	0.02
Innovation	0.017	0.175*	0.111*	0.052	0.174*	0.009	0.083**	0.001	0.097**

Table E-3: Indirect Effect

	Attitude	Health	Education	Training	Skill	Experience	Attribute	Compliance	Stability
Survival	0.019	0.019*	0.012*	0.017	0.013	0.004*	0.018*	0.013*	0.002*
Technology	0.015	0.014**	0.01*	0.014	0.09	0.003**	0.011**	0.010**	0.001**
Export	0.024	0.023*	0.014*	0.018	0.014	0.004*	0.019*	0.016*	0.003*
Productivity	0.02	0.01	0.005	0.008	0.007	0.004	0.007	0.005	0.001
Innovation	0.024	0.022*	0.017*	0.021	0.017*	0.005*	0.023*	0.016*	0.002*

Appendix F: Results by including Industry, Ownership and Size as control variables

Table E-4: Model-2 Standardized Direct Affect

	Attitude	Health	Education	Training	Skill	Experience	Attributes	Compliance	Stability
Absorptive Capacity	0.011	0.113*	0.13*	0.025	0.114*	0.144*	0.106*	0.158*	0.168*
Survival	0.053	0.037	0.102**	0.099**	0.04	0.005	0.093**	0.023	0.181*
Technology	0.087**	0.10**	0.125*	0.096**	0.085**	0.029	0.025	0.087**	0.065
Export	0.10**	0.017	0.037	0.03	0.15*	0.165*	0.052	0.101*	0.072
Productivity	0.079**	0.04	0.022	0.068**	0.043	0.094*	0.079**	0.01	0.02
Innovation	0.017	0.175*	0.111*	0.052	0.174*	0.009	0.083**	0.001	0.097**

Table E-5: Model-2 Standardized Indirect Effects (HC affect on Absorptive Capacity X Absorptive capacity affect on HC)

	Absorptive Capacity	Attitude	Health	Education	Training	Skill	Experience	Attribute	Compliance	Stability
Absorptive Capacity	-	0.011	0.113*	0.13*	0.025	0.114*	0.144*	0.106*	0.158*	0.168*
Survival	0.128*	0.021	0.02*	0.014*	0.018	0.015*	0.003*	0.017*	0.014*	0.001*
Technology	0.094**	0.016	0.015**	0.01**	0.014	0.011**	0.002**	0.012**	0.011**	0.001**
Export	0.162*	0.027	0.026*	0.017*	0.023	0.019*	0.004*	0.021*	0.018*	0.002*
Productivity	0.062	0.01	0.01	0.007	0.009	0.007	0.002	0.008	0.007	0.001
Innovation	0.158*	0.027	0.025*	0.017*	0.023	0.018*	0.004*	0.021*	0.018*	0.002*

Table E-5: Model-2 Effect of Control Variables

	Industry	Ownership	Size
Survival	0.026	0.06	0.138*
Technology	0.024	0.042	0.067
Export	0.086*	0.046	0.071
Productivity	0.209*	0.019	0.122*
Innovation	0.138*	0.043	0.112*

** and ** show the level of significance at 1% and 5% levels*

APPENDIX G: LIST OF HYPOTHESES

a) Model-1 2 (HC-Performance Relationship)

H1a: HC positively affects export performance of a firm
H1b: HC positively affects productivity of a firm
H1c: HC positively affects survival of a firm
H1d: HC positively affects Innovation of a firm
H1e: HC positively affects Technological Progress of a firm
H1f: HC positively affects export performance of a firm through absorptive capacity
H1g: HC positively affects productivity of a firm through absorptive capacity
H1j: HC positively affects survival of a firm through absorptive capacity
H1k: HC positively affects Innovation of a firm through absorptive capacity
H1l: HC positively affects Technological Progress of a firm through absorptive capacity

b) Model 2 (HC dimensions-Performance Relationship)

H3a: Education has positive effect on export of a firm
H3b: Education has positive effect on productivity of a firm
H3c: Education has positive effect on technological progress of a firm
H3d: Education has positive effect on innovation of a firm
H3e: Education has positive effect on survivability of a firm
H4a: Experience has positive effect on export of a firm
H4b: Experience has positive effect on productivity of a firm
H4c: Experience has positive effect on technological progress of a firm
H4d: Experience has positive effect on innovation of a firm
H4e: Experience has positive effect on survivability of a firm
H5a: Training has positive effect on export of a firm
H5b: Training has positive effect on productivity of a firm
H5c: Training has positive effect on technological progress of a firm
H5d: Training has positive effect on innovation of a firm
H5e: Training has positive effect on survivability of a firm
H6a: Skills has positive effect on export of a firm
H6b: Skills has positive effect on productivity of a firm
H6c: Skills has positive effect on technological progress of a firm
H6d: Skills has positive effect on innovation of a firm
H6e: Skills has positive effect on survivability of a firm
H7a: Attitude has positive effect on export of a firm
H7b: Attitude has positive effect on productivity of a firm
H7c: Attitude has positive effect on technological progress of a firm
H7d: Attitude has positive effect on innovation of a firm
H7e: Attitude has positive effect on survivability of a firm
H8a: Personal Attributes has positive effect on export of a firm
H8b: Personal Attributes has positive effect on productivity of a firm
H8c: Personal Attributes has positive effect on technological progress of a firm
H8d: Personal Attributes has positive effect on innovation of a firm
H8e: Personal Attributes has positive effect on survivability of a firm

H9a: Stability has positive effect on export of a firm
H9b: Stability has positive effect on productivity of a firm
H9c: Stability has positive effect on technological progress of a firm
H9d: Stability has positive effect on innovation of a firm
H9e: Stability has positive effect on survivability of a firm
H10a: Compliance has positive effect on export of a firm
H10b: Compliance has positive effect on productivity of a firm
H10c: Compliance has positive effect on technological progress of a firm
H10d: Compliance has positive effect on innovation of a firm
H10e: Compliance has positive effect on survivability of a firm
H11a: Health has positive effect on export of a firm
H11b: Health has positive effect on productivity of a firm
H11c: Health has positive effect on technological progress of a firm
H11d: Health has positive effect on innovation of a firm
H11e: Health has positive effect on survivability of a firm
H12a: Education has positive effect on export of a firm through absorptive capacity
H12b: Education has positive effect on productivity of a firm through absorptive capacity
H12c:Education has positive effect on technological progress of a firm through absorptive capacity
H12d: Education has positive effect on innovation of a firm through absorptive capacity
H12e: Education has positive effect on survivability of a firm through absorptive capacity
H13a: Experience has positive effect on export of a firm through absorptive capacity
H13b: Experience has positive effect on productivity of a firm through absorptive capacity
H13c: Experience has positive effect on technological progress of a firm through absorptive capacity
H13d: Experience has positive effect on innovation of a firm through absorptive capacity
H13e: Experience has positive effect on survivability of a firm
H14a: Training has positive effect on export of a firm through absorptive capacity
H14b: Training has positive effect on productivity of a firm through absorptive capacity
H14c: Training has positive effect on technological progress of a firm through absorptive capacity
H14d: Training has positive effect on innovation of a firm through absorptive capacity
H14e: Training has positive effect on survivability of a firm
H15a: Skills has positive effect on export of a firm through absorptive capacity
H15b: Skills has positive effect on productivity of a firm through absorptive capacity
H15c: Skills has positive effect on technological progress of a firm through absorptive capacity
H15d: Skills has positive effect on innovation of a firm through absorptive capacity
H15e: Skills has positive effect on survivability of a firm
H16a: Attitude has positive effect on export of a firm through absorptive capacity
H16b: Attitude has positive effect on productivity of a firm through absorptive capacity
H16c: Attitude has positive effect on technological progress of a firm through absorptive capacity
H16d: Attitude has positive effect on innovation of a firm through absorptive capacity
H16e: Attitude has positive effect on survivability of a firm
H17a: Personal Attributes has positive effect on export of a firm through absorptive capacity

H17b: Personal Attributes has positive effect on productivity of a firm through absorptive capacity
H17c: Personal Attributes has positive effect on technological progress of a firm through absorptive capacity
H17d: Personal Attributes has positive effect on innovation of a firm through absorptive capacity
H17e: Personal Attributes has positive effect on survivability of a firm
H18a:Stability has positive effect on export of a firm through absorptive capacity
H18b: Stability has positive effect on productivity of a firm through absorptive capacity
H18c: Stability has positive effect on technological progress of a firm through absorptive capacity
H18d: Stability has positive effect on innovation of a firm through absorptive capacity
H18e: Stability has positive effect on survivability of a firm
H19a: Compliance has positive effect on export of a firm through absorptive capacity
H19b: Compliance has positive effect on productivity of a firm through absorptive capacity
H19c: Compliance has positive effect on technological progress of a firm through absorptive capacity
H19d: Compliance has positive effect on innovation of a firm through absorptive capacity
H19e: Compliance has positive effect on survivability of a firm
H20a: Health has positive effect on export of a firm through absorptive capacity
H20b: Health has positive effect on productivity of a firm through absorptive capacity
H20c: Health has positive effect on technological progress of a firm through absorptive capacity
H20d: Health has positive effect on innovation of a firm through absorptive capacity
H20e: Health has positive effect on survivability of a firm