

ROLE OF INDUSTRY LINKAGES IN EMPLOYABILITY AMONG PAKISTANI
UNIVERSITY STUDENTS

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DEDICATION

To my late father, Raja Gulfam Khan

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ABSTRACT

Universities today are expected to produce highly skilled graduates, who can be readily transferred into workforce and effectively demonstrate their employability skills. Hence, the performance of a university is measured against the employability of its graduates. In order to live up to these expectations, universities have taken different initiatives to enrich the employability of their graduates. University-industry linkages (UILs) is a prime example of such initiatives. Emulating the developed world, Pakistani universities have also started UILs' initiatives. However, the prevailing high graduate unemployment rate of 30% in Pakistan calls into question the effectiveness of UILs' initiatives. Using an integrated human resource development framework, the current study investigates the role of UILs in perceived graduate employability among universities students of Islamabad, Pakistan. This framework stems from human capital theory, where UILs influence the perceived graduate employability through occupational competence and disposition, and in presence of moderating effect of champions' behavior. It bridges gaps existed in UILs and employability research. It maidenly studies perceived graduate employability as an outcome of UILs. It simultaneously uses both; competency and dispositional approaches to explore graduates' subjective employability. Most of earlier studies on UILs are exploratory and descriptive in nature. Explanatory studies which measure the frequency, intensity, and efficiency of UILs are highly looked-for. In this regard, there is no study which solely measures the efficiency of UILs in terms of perceived graduate employability. These UILs studies have predominately used Triple Helix, Mode 2 Production of Knowledge, and Systems of Innovation as grounding pads, which describe the phenomenon at the macro level. The moderating role of champions' behaviour remained neglected despite the fact that organization with high advocacy of UILs are expected to have an advantage in nurturing employability. Using proportionate stratified random sampling strategy, the study uses quantitative research design to analyse the data of 360 final semester students of science and technology related programs at the public-sector universities of Islamabad. After initial data screening, 322 responses were used for final analysis using SmartPLS software for Structural Equation Modelling (SEM). The results indicated that UILs have direct influence on perceived graduate employability. Occupational competence and occupational disposition mediate the relationships of UILs and perceived graduate employability. Whereas, champions' behaviour moderates the relationships of UILs with occupational competence and occupational disposition. The results imply that a graduates' employability can be enriched through UILs initiatives and their advocacy in universities and industries.

ABSTRAK

Universiti pada hari ini diharapkan dapat menghasilkan graduan yang berkemahiran tinggi, yang dapat dipindahkan ke sektor pekerjaan dengan mudah dan menunjukkan kemahiran pekerjaan mereka dengan berkesan. Oleh itu, prestasi universiti diukur melalui kebolehpasaran para graduannya. Dalam memenuhi harapan ini, universiti telah mengambil inisiatif yang berbeza untuk meningkatkan kebolehpasaran graduan mereka. Hubungan antara industri-universiti (UILs) adalah contoh utama inisiatif sedemikian. Mengikuti dunia membangun, universiti-universiti Pakistan telah memulakan inisiatif UIL ini. Walau bagaimanapun, kadar pengangguran siswazah yang tinggi sebanyak 30% di Pakistan menimbulkan persoalan tentang keberkesanan inisiatif UILs. Dengan menggunakan rangka kerja pembangunan sumber manusia yang bersepadu, kajian ini mengkaji peranan UIL dalam jangkaan kebolehpasaran graduan di kalangan pelajar universiti di Islamabad, Pakistan. Rangka kerja ini berpunca dari teori modal manusia, di mana UIL mempengaruhi jangkaan kebolehpasaran siswazah yang berpengalaman menerusi kecekapan dan penglibatan pekerjaan, dan dengan adanya pengaruh penyederhanaan dari tingkah laku juara. Ia merapatkan jurang dalam UIL dan bidans penyelidikan kebolehpasaran graduan seterusnya ia mengkaji kebolehpasaran siswazah sebagai hasil dari UIL. Ia secara serentak menggunakan kedua-duanya; kecekapan dan pendekatan disposisi untuk meneroka kebolehpasaran subjektif graduan. Kebanyakan kajian terdahulu tentang UIL adalah ber sifat eksplorasi dan deskriptif. Kajian penjelasan yang mengukur kekerapan, keamatan, dan kecekapan UIL amat diperlukan. Dalam hal ini, tidak ada kajian yang hanya mengukur kecekapan UIL dari segi jangkaan kebolehpasaran siswazah. Kajian UIL ini telah menggunakan Triple Helix, Mode 2 Production of Knowledge, dan Sistem Inovasi sebagai predikat asas, di mana ia menjelaskan fenomena di peringkat makro. Peranan penyandang juara masih diabaikan walaupun pada hakikatnya organisasi dengan advokasi UIL yang tinggi dijangka mempunyai kelebihan dalam memupuk kebolehpekerjaan. Dengan menggunakan strategi persampelan rawak berkadar dan berstrata, kajian ini menggunakan reka bentuk penyelidikan kuantitatif untuk menganalisis data 360 pelajar semester akhir program sains dan teknologi di universiti awam di Islamabad. Selepas penyaringan data awal, 322 respons telah digunakan untuk analisis akhir menggunakan perisian SmartPLS untuk Model Persamaan Struktur (SEM). Hasilnya menunjukkan bahawa UIL mempunyai pengaruh langsung terhadap jangkaan kebolehpasaran siswazah. Kecekapan pekerjaan dan pelupusan pekerjaan mengetengahkan hubungan UIL dan jangkaan kebolehpasaran siswazah, manakala tingkah laku juara menyederhanakan hubungan UIL dengan kecekapan pekerjaan dan pelupusan pekerjaan. Hasilnya menunjukkan bahawa kebolehpasaran graduan dapat dikembangkan melalui inisiatif UIL dan advokasi mereka di universiti dan industri.

TABLE OF CONTENTS

| CHAPTER | TITLE | PAGE |
|------------------|-------------------------------------------|-----------|
| | DECLARATION | ii |
| | DEDICATION | iii |
| | ACKNOWLEDGEMENT | iv |
| | ABSTRACT | v |
| | ABSTRAK | vi |
| | TABLE OF CONTENTS | vii |
| | LIST OF TABLES | xii |
| | LIST OF FIGURES | xiv |
| | LIST OF ABBREVIATIONS | xvi |
| | LIST OF APPENDICES | xvii |
| CHAPTER 1 | INTRODUCTION | 1 |
| 1.1 | Background of the Problem | 2 |
| 1.2 | Statement of the Problem | 8 |
| 1.3 | Research Questions | 9 |
| 1.4 | Research Objectives | 10 |
| 1.5 | Scope of Study | 11 |
| 1.6 | Significance of Study | 12 |
| 1.7 | Conceptual and Operational Definitions | 14 |
| 1.8 | Structure of the Thesis | 17 |
| 1.9 | Summary of the Chapter | 18 |
| CHAPTER 2 | LITERATURE REVIEW | 19 |
| 2.1 | Employability | 19 |
| 2.1.1 | Defining Employability | 20 |
| 2.1.2 | Evolution of the Concept of Employability | 24 |
| 2.2 | Employability and Higher Education | 25 |
| 2.3 | Graduate Employability | 27 |

| | | |
|------------------|-------------------------------------------------------------------|------------|
| 2.3.1 | Review of Graduate Employability Frameworks/Models | 27 |
| 2.3.2 | Empirical Studies on Graduate Employability | 34 |
| 2.3.3 | Perceived Graduate Employability | 44 |
| 2.4 | Occupational Competence and Disposition | 45 |
| 2.4.1 | Occupational Competence | 47 |
| 2.4.2 | Occupational Disposition | 50 |
| 2.5 | University Industry Linkages (UILs) | 52 |
| 2.5.1 | National Systems of Innovation | 52 |
| 2.5.2 | Mode 2 Knowledge Production | 56 |
| 2.5.3 | Triple Helix of University, Industry and Government Relations | 59 |
| 2.5.4 | University-Industry Links as an Independent Body of Knowledge | 64 |
| 2.5.5 | University-Industry Linkages in Pakistan | 81 |
| 2.5.6 | Forms of University-Industry Linkages | 84 |
| 2.6 | Champions' Behaviour | 96 |
| 2.7 | The Grounding Theory | 97 |
| 2.8 | Identification of Research Issues and Gap | 99 |
| 2.9 | Hypotheses Development | 103 |
| 2.9.1 | University Industry Linkages and Perceived Graduate Employability | 103 |
| 2.9.2 | Occupational Competence-the Mediator | 104 |
| 2.9.3 | Occupational Disposition-the Mediator | 105 |
| 2.9.4 | Champions' Behaviour-the Moderator | 106 |
| 2.10 | Summary of the Chapter | 107 |
| CHAPTER 3 | METHODOLOGY | 109 |
| 3.1 | Research Philosophies | 109 |
| 3.2 | Research Approaches | 110 |
| 3.3 | Rationale for Choosing Quantitative Approach | 112 |
| 3.4 | Research Design | 112 |
| 3.5 | Population and Sampling | 114 |
| 3.5.1 | Sampling Frame | 114 |
| 3.5.2 | Sample Size | 116 |

| | | |
|------------------|--------------------------------------------------------------|------------|
| 3.5.3 | Sampling Strategy | 118 |
| 3.5.4 | Response Rate | 120 |
| 3.6 | Data Collection | 120 |
| 3.7 | Research Instrument | 121 |
| 3.7.1 | Scale for Occupational Competence | 122 |
| 3.7.2 | Scale for Occupational Disposition | 124 |
| 3.7.3 | Scale for Perceived Graduate Employability | 127 |
| 3.7.4 | Scale for Champions' Behaviour | 128 |
| 3.7.5 | Scale for University-Industry Linkages | 129 |
| 3.8 | Expert Validation | 133 |
| 3.9 | Pilot Testing | 134 |
| 3.10 | Data Analysis | 135 |
| 3.10.1 | Partial Least Squares Structural Equation Modeling (PLS-SEM) | 136 |
| 3.10.2 | Rationale for Using PLS-SEM | 136 |
| 3.10.3 | Data Analysis Process | 137 |
| 3.10.4 | Data Screening | 138 |
| 3.10.5 | Missing Values | 139 |
| 3.10.6 | Univariate Normality Test | 139 |
| 3.10.7 | Common Method Variance | 139 |
| 3.10.8 | Measurement Model | 140 |
| | 3.10.8.1 Internal Consistency Reliability | 142 |
| | 3.10.8.2 Convergent Validity | 142 |
| | 3.10.8.3 Discriminant Validity | 143 |
| 3.10.9 | Structural Model | 143 |
| 3.11 | Summary of the Chapter | 145 |
| CHAPTER 4 | DATA ANALYSIS | 147 |
| 4.1 | Data Screening | 147 |
| | 4.1.1 Missing Values | 148 |
| | 4.1.2 Normality | 148 |
| 4.2 | Common Method Variance | 151 |
| 4.3 | Characteristics of Sample Data | 152 |
| 4.4 | Psychometric Properties of the Study Constructs | 154 |

| | | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 4.5 | Measurement Model | 156 |
| 4.5.1 | Internal Consistency Reliability | 156 |
| 4.5.2 | Convergent Validity | 158 |
| 4.5.3 | Discriminant Validity | 168 |
| 4.6 | Structural Model | 172 |
| 4.6.1 | Step 1: Collinearity Assessment | 173 |
| 4.6.2 | Step 2: Structural Model Path Coefficients | 174 |
| 4.6.3 | Step 3: Coefficient of Determination (R^2) | 176 |
| 4.6.4 | Step 4: Effect Size (f^2) | 177 |
| 4.6.5 | Step 5: Blindfolding and Predictive Relevance Q^2 | 178 |
| 4.7 | Hypotheses Testing (Direct Effect) | 179 |
| 4.8 | Hypotheses Testing (Indirect Effect/Mediation) | 180 |
| 4.9 | Hypotheses Testing (Moderation) | 182 |
| 4.10 | Summary of the Chapter | 184 |
| CHAPTER 5 | DISCUSSION AND CONCLUSION | 185 |
| 5.1 | Research Highlights | 185 |
| 5.2 | Discussion of Research Findings | 189 |
| 5.2.1 | Objective 1: Determination the Effects of University-Industry Linkages on Perceived Graduate Employability. | 189 |
| 5.2.2 | Objective 2: Mediating Role of Occupational Competence in the Relationship of University-Industry Linkages and Perceived Graduate Employability. | 191 |
| 5.2.3 | Objective 3: Mediating Role of Occupational Disposition in the Relationship of University-Industry Linkages and Perceived Graduate Employability. | 192 |
| 5.2.4 | Objective 4: Moderating Role of Champions' Behaviour in the Relationship of University-Industry Linkages and Occupational Competence. | 193 |
| 5.2.5 | Objective 5: Moderating Role of Champions' Behaviour in the Relationship of University-Industry Linkages and Occupational Disposition. | 194 |

| | | |
|----------------------|---------------------------------------|------------|
| 5.3 | Implications of the Study | 195 |
| 5.3.1 | Theoretical Implications | 195 |
| 5.3.2 | Practical Implications | 200 |
| 5.4 | Limitations of the Study | 203 |
| 5.5 | Future Directions and Recommendations | 204 |
| 5.6 | Summary of the Chapter | 205 |
| REFERENCES | | 207 |
| List of Publications | | 233 |
| Appendix A | | 235-241 |

LIST OF TABLES

| TABLE NO. | TITLE | PAGE |
|------------------|--------------------------------------------------------------------|-------------|
| Table 1.1 | Conceptual and Operational Definitions | 15 |
| Table 2.1 | Definitions of Employability | 21 |
| Table 2.2 | Perspective on Employability | 22 |
| Table 2.3 | Dimensions of Individual Employability Definition | 23 |
| Table 2.4 | Operational Versions of the Employability Construct | 24 |
| Table 2.5 | Theoretical Frameworks on Graduate Employability | 28 |
| Table 2.6 | Review of Empirical Studies on Graduate Employability | 35 |
| Table 2.7 | Definitions of National Systems of Innovation | 54 |
| Table 2.8 | Differences between Mode 1 and Mode 2 Knowledge Production | 57 |
| Table 2.9 | Contributions of Etzkowitz and Leydesdorff related to Triple Helix | 60 |
| Table 2.10 | Review of Literature on UILs (2011-2017) | 67 |
| Table 2.11 | University-Industry Collaboration in R&D-Pakistan (2006-2017) | 83 |
| Table 2.12 | University-Industry Collaboration in R&D-A Comparison (2016-17) | 84 |
| Table 2.13 | Prevailing Types of University-Industry Activities in Pakistan | 95 |
| Table 3.1 | Alternative Research Designs | 111 |
| Table 3.2 | Students' Enrollment at Islamabad's Public-Sector Universities | 115 |
| Table 3.3 | Details of Sampling Strategy | 119 |
| Table 3.4 | Composition of the Questionnaire | 122 |
| Table 3.5 | Scale Adapted for Measuring Occupational Competence | 123 |
| Table 3.6 | Scale Adapted for Measuring Occupational Disposition | 125 |
| Table 3.7 | Scale Adopted for Measuring PGE | 127 |
| Table 3.8 | Scale Adopted for Measuring Champions' Behaviour | 128 |
| Table 3.9 | Scale Adopted for Measuring UILs | 130 |
| Table 3.10 | Results of Pilot Testing | 135 |

| | | |
|------------|----------------------------------------------------------------------------------------------------------------|-----|
| Table 3.11 | Criteria to Assess Measurement Model | 141 |
| Table 3.12 | Criteria to Assess Structural Model | 144 |
| Table 4.1 | Univariate Normality | 149 |
| Table 4.2 | Principal Component Analysis for Factor Test | 152 |
| Table 4.3 | Respondents' Characteristics | 153 |
| Table 4.4 | Internal Consistency Reliability | 157 |
| Table 4.5 | Initial Outer Loadings | 160 |
| Table 4.6 | Final Outer Loadings | 163 |
| Table 4.7 | Average Variance Extracted (AVE) | 167 |
| Table 4.8 | Cross Loadings | 169 |
| Table 4.9 | Fornell-Larcker Criterion | 171 |
| Table 4.10 | Heterotrait-Monotrait Ratio (HTMT) | 172 |
| Table 4.11 | Collinearity Assessment | 173 |
| Table 4.12 | Results of Structural Model Path Coefficients | 175 |
| Table 4.13 | Indirect Effects (Specific) | 176 |
| Table 4.14 | Coefficient of Determination (R^2) and Predictive Relevance (Q^2) of Endogenous (omission distance =7) | 177 |
| Table 4.15 | Effect Size (f^2) | 178 |
| Table 4.16 | Results of Hypotheses Testing (Direct Effects) | 179 |
| Table 4.17 | Results of Hypotheses Testing (Indirect/ Mediating Effects) | 181 |
| Table 4.18 | Summary of Hypotheses Testing | 184 |
| Table 5.1 | Summary of Findings | 188 |

LIST OF FIGURES

| FIGURE NO. | TITLE | PAGE |
|-------------------|-----------------------------------------------------------|-------------|
| Figure 1.1 | Graduate Unemployment Rate (%)-Trend | 3 |
| Figure 1.2 | Route to the Study Problem | 4 |
| Figure 1.3 | Model of Empirical Research | 14 |
| Figure 2.1 | A Model of Course Provision | 30 |
| Figure 2.2 | USEM Model | 31 |
| Figure 2.3 | CareerEDGE Model | 32 |
| Figure 2.4 | Model of Graduate Attributes (| 32 |
| Figure 2.5 | JET | 33 |
| Figure 2.6 | RAW | 33 |
| Figure 2.7 | Process Model of Perceived Employability | 46 |
| Figure 2.8 | Three Distant Models of Triple Helix | 62 |
| Figure 2.9 | Conceptual Classification of UILs | 65 |
| Figure 2.10 | Wings of ORIC | 82 |
| Figure 2.11 | Forms of UILs by Howells (1986) | 85 |
| Figure 2.12 | Forms of UILs by Vedovello (1998) | 87 |
| Figure 2.13 | Forms of UILs by Geisler and Rubenstein (1989) | 88 |
| Figure 2.14 | Forms of UILs by Geisler and Rubenstein (1989) | 89 |
| Figure 2.15 | Forms of UILs by OECD (2002) | 91 |
| Figure 2.16 | Forms of UILs by Temsiripoj (2003) | 92 |
| Figure 2.17 | Forms of UILs by Brimble and Doner (2007) | 94 |
| Figure 2.18 | University-Industry Linkages Grid | 96 |
| Figure 2.19 | Human Capital Theory | 98 |
| Figure 2.20 | Hypothesized Model of the Theoretical Framework | 103 |
| Figure 3.1 | Data Analysis Flowchart | 138 |
| Figure 4.1 | Conceptual Representation of University-Industry Linkages | 155 |
| Figure 4.2 | Outer Loading Relevance Testing | 159 |
| Figure 4.3 | Measurement Model | 166 |

| | | |
|------------|------------------------------------------------|-----|
| Figure 4.4 | Hypothesis Testing-Direct and Indirect Effects | 182 |
| Figure 4.5 | Hypotheses Testing-Moderating Effect | 183 |
| Figure 5.1 | Tested Framework of the Study | 200 |

LIST OF ABBREVIATIONS

| | | |
|------|---|------------------------------------------------------|
| AVE | - | Average Variance Extracted |
| BIC | - | Business Incubation Center |
| CB | - | Champions' Behaviour |
| HEC | - | Higher Education Commission of Pakistan |
| HRD | - | Human Resource Development |
| HTMT | - | Heterotrait-Monotrait Ratio |
| ICT | - | Information and Communication Technologies |
| JET | - | Journey to Employment |
| OC | - | Occupational Competence |
| OD | - | Occupational Disposition |
| ORIC | - | Office of Research, Innovation and Commercialization |
| PGE | - | Perceived Graduate Employability |
| PLS | - | Partial Least Squares |
| RAW | - | Rewarding, Ability and Willingness |
| SEM | - | Structural Equation Modeling |
| TDF | - | Technology Development Fund |
| UILs | - | University-Industry Linkages |

LIST OF APPENDICES

| APPENDIX | TITLE | PAGE |
|-----------------|---------------|-------------|
| A | Questionnaire | 233 |

CHAPTER 1

INTRODUCTION

Coming together is a beginning, keeping together is progress and working together is the success.

(Henry Ford)

Existing research recognizes the critical role played by education in raising the employability of the graduates (Riddell, & Song, 2011; Grossman, 2005; Oreopoulos & Salvanes, 2009). However, far too little attention has been paid to investigate the specific role of university-industry linkages in graduate employability. Despite the fact that university-industry linkages are part and parcel of today's higher education, where, a university plays a central, redefined and non-traditional role (Bano & Taylor, 2015; Yang, Cheung & Song, 2016). In today's knowledge driven economies, universities are expected to produce highly skilled graduates, who can be readily transferred into the workforce and effectively demonstrate their employability skills (Tomlinson, 2012; Grotkowska, Wincenciak & Gajderowicz, 2015). Universities should provide their graduate with enough employment development opportunities like work experience placements, paid and unpaid work, orientation of applied industry problems and networking with industry people (Harvy, 2005; Pinto & Ramalheira, 2017). To live up to these expectations, universities have taken different initiatives to enrich their graduates with competitive skills. University-industry linkages are a prime example of such initiatives, it allows firms and universities to tap into complementary skills of each other and thus potentially help with saving costs, bridging skills and knowledge gap, and enhancing research outcomes (Ishengoma & Vaaland, 2016; Vaaland & Ishengoma, 2016).

Do university-industry linkages (UILs) manage to fulfill these promises, that is, enriching graduates' employability? The answer is ambivalent, as previous empirical studies measuring the impact of UILs have used macro level outcomes (e.g. invocation indicators; international involvement, global configuration, governance, patent value) to measure its efficiency. Micro/individual level outcomes were rarely used to gauge the effectiveness of UILs (Perkmann *et al.*, 2013). Hereof, perceived graduate employability has been rarely studied as an outcome of UILs. Previous studies pertaining to UILs are mostly exploratory and descriptive in nature and they have used Triple Helix, Mode 2 Knowledge Production, and National Systems of Innovation as their grounding pads. As of late, explanatory studies are also on the rise, still, those which measure the frequency, intensity, and efficiency of UILs initiatives are enticing. The present study takes up the challenge to measure the effectiveness of UILs by using an immediate individual outcome, that is, perceived graduate employability. It is a subjective and individual perspective of employability which overcomes the issues related to objective measurement of employability, for instance, the job quality issue in UK's first destination survey. Precisely, it answers the question; how UILs influence perceived graduate employability through occupational competence and disposition, and in presence of champions' behavior.

1.1 Background of the Problem

Since the beginning of the 1980s, a new kind of policy discussion related to academia/education has emerged, which assumed a transition in academic science. In this transition, universities had a pivotal role to play and are expected to produce practical and socially relevant research, which address the current problems. The universities were assigned with the "third mission" i.e. contribution to economic growth. University-industry linkages are one important outfit of this policy shift. UILs got high attention and acceptance due to the stakeholders' belief that collaboration between academia and industry can be pivotal for innovation (Ambos *et al.*, 2008; Mansfield, 1998) and policy makers' concerns that university research should be relevant to, and accessible by, industry (Tether & Tajar, 2008). Many researchers (e.g. Hansen and Lehmann, 2006; Feng *et al.*, 2011) contend that

collaborations between universities, business, and civil society are prerequisites for improved economic growth, which in turn creates more employment opportunities. Moreover, the changing global economy demands new education and training featuring flexibility, adaptability, and innovation in order to be competitive (Ramdass, 2012). UILs has a two-dimensional relationship with employability; on one hand, an increased UILs increases employment opportunities through innovation and economic growth. On the other hand, it equips the students with newfangled knowledge and skills, which subsequently makes them more employable.

Emulating the developed world, Pakistani universities have started UILs’ initiatives (e.g. setting up the ‘Office of Research Innovation and Commercialization’ at each university along with ‘incubators’) almost a decade ago. Ironically, the graduate unemployment rate in Pakistan is 30% as compared to the overall unemployment rate of 6% (Federal Bureau of Statistic-Pakistan, 2016). These statistics indicate that illiterate Pakistanis more employable as compared to Pakistani graduates. Such situation is reflective of prevailing skills and knowledge gap among Pakistani graduates. Furthermore, the following data also indicates that since the introduction UILs in Pakistan, the graduate unemployment rate has also gone down from 36% to 30%.

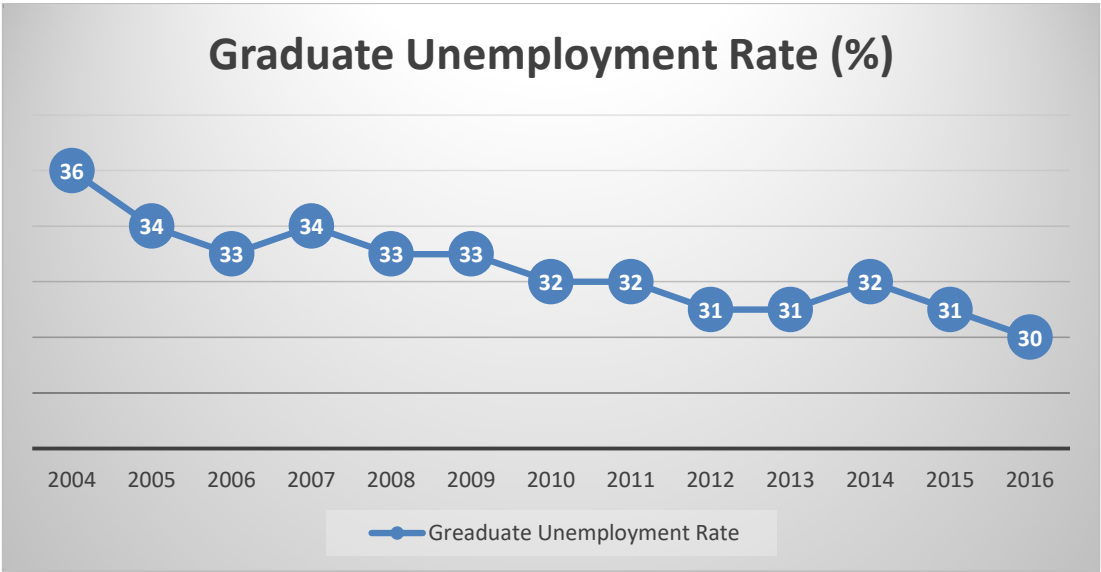


Figure 1.1 Graduate Unemployment Rate (%) -Trend

In Pakistan, there are 163 universities/ degree awarding institutions, and most of them are involved in some form of UILs (Higher Education Commission of Pakistan, 2016) and these UILs initiatives are expected to provide the necessary skills, knowledge, and attitude (Yang, Cheung & Song, 2016; Pinto & Ramalheira, 2017). Nonetheless, the high graduate unemployment rate does not correspond with the introduction of UILs initiatives. This situation has raised questions about the effectiveness of such UILs' initiatives in enhancing the employability of Pakistani graduates. This demand the measurement of the effectiveness of their UILs in terms of graduate employability. Unfortunately, there is no prior empirical evidence exists, which establishes the role of UILs in enriching the employability of Pakistani graduates. In other words, the role of UILs in graduate employability is yet to unfold.

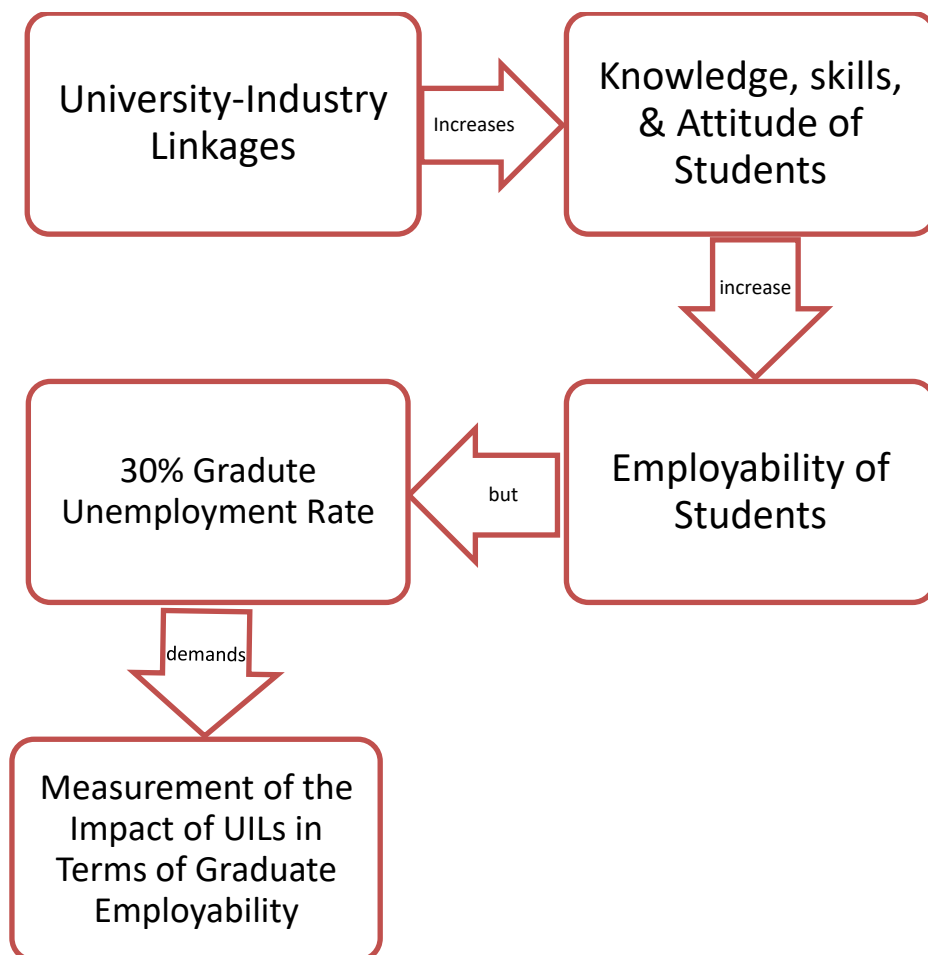


Figure 1.2 Route to the Study Problem

A systematic literature review of UILs' studies expanding over a period of seven years (2011-2017), was particularly carried out in the current study. It

establishes, that, in all explanatory studies, few studies have measured the impact of UILs on perceived graduate employability. The dependent variables investigated in those studies include innovation, trust, international involvement, global configuration, governance, patent value, quality of research, commercialization, and economic growth and development. The study of Ishengoma and Vaaland (2016), also do not entirely focus on the perceived employability of graduates. This research endeavor explores the perception of students, faculty members and employees about the influence of UILs on student employability.

In their review study, Perkmann *et al.* (2013) conclude that UILs studies, which were carried out in last two decades (1989-2011) are mainly descriptive and exploratory in nature. Such studies primarily focus on nature, types, and characteristics of UILs. However, the present review of UILs studies reveals that the empirical studies are on the rise. They are growing in numbers; for instance, in the review of recent literature 15 out of 28 studies are empirical. It connotes the growing interest of researchers in measuring the university industry linkages in terms of frequency, intensity, and efficiency (Teixeira & Mota, 2012). Precisely, they are keen to quantify the impact of UILs initiatives. Such quantification measures the efficiency of the UILs in producing the desired outcomes, especially at the micro level. The present study measures the efficiency of UILs by looking at its impact on graduate employability, as the increasing graduate unemployment is a concern of both; developed and developing world.

The review of UILs studies further recognizes that the influence of the UILs literature is largely concentrated on industrialized world, as most of the reported studies were carried out there. In developed countries, universities possess a strong infrastructure for conducting research and development activities, adequately skilled personnel and the availability of financial resources (Ishengoma & Vaaland, 2016). Although, now the developing world is also responsive towards UILs, which can be witnessed through the growing number of studies from the African region. Pakistan is also a developing country, where UILs initiatives were started a decade ago. Very little is known about the features of these initiatives and their impact is still unknown. To date, there has been no reliable evidence which gauges the efficiency

of Pakistani UILs initiatives, especially in terms of subjective graduate employability. The central thesis of this study is measuring the impact UILs on the employability of Pakistani graduate using a quantitative approach.

Lastly, the review of UILs studies unfolds that, most of the studies investigating UILs have used Triple Helix, Mode 2 knowledge production, and National Systems of Innovation, as their theoretical base. These three underpinning theories are helpful to understand the phenomena at the macro level, that is, country and institution level. Proxies like innovation indicators or indices were used to measure the impact of UILs at national or firm level. The dependent variables (e.g. economic growth and development, international involvement) in the review of UILs studies, also represent institutional and national outcomes. They hardly focus on the impact of UILs on individuals (micro level), especially graduates. Because these three theoretical concepts treat individuals as a contextual factor and to some extent undermine its critical agency role. The current research endeavor takes the challenge of exploring the phenomena at the individual level using the theoretical spirit of human capital theory. It considers UILs as a 'human capital investment' and graduate employability as its outcome and hypothesizes that UILs enhance graduate employability through occupational competence and disposition. The theory of HRD also supports this conjecture (Nafkho *et al.*, 2004)

Another systematic literature review of empirical studies, which deal with individual's perspective of graduate employability was carried out for the current investigation. The findings indicate that except one all the reported studies were carried out in the developed world. It shows a naïve approach of the developing world towards soaring issue of graduate employability. Although they are the first victims of such trolling graduate un-employability. Pakistan, where, the present research endeavor is being carried out, is not different from their other developing counterparts, where the graduate unemployment rate has mounted to 30%. No previous study has investigated the graduate employability subjectively and in the individual context. The current study is aimed at measuring the perceived employability of Pakistani graduate. The subjective/perceptual approach to measure graduate employability is preferred here because it overcomes the weaknesses of

objective approach and it deals the phenomena at the individual level. Furthermore, the measurement of graduate employability is highly desired as the number of focused empirical studies on the subject is far less than studies proposing different employability models.

Review of theoretical models on graduate employability highlights the two common elements among all: competency and disposition. These are basically two routes to employability (Forrier *et al.* 2009). Similarly, the review of empirical studies on graduate employability reveals that they either use competency (Van der Heijde, & Van der Heijden, 2005) or dispositional (Fugate & Kinicki, 2008) based approach to employability. The proponents of competency-based approach claim that higher level of competency (sometimes referred as employability assets) increases the likelihood of employability. Likewise, those who see employability from psychological perspective consider disposition as a main predictive of employability (Forrier *et al.* 2009; Wittekind, Raeder, & Grote, 2010). Current investigation simultaneously explores both; competency and dispositional approaches to individual employability. Vanhercke, De Cuyper, Peeters, De Witte (2014) while making recommendations for future research noted that “both the competency-based approach and the dispositional approach to date are more limited towards the study of the *employed*. We see a potential for research and the development of measurements tailored towards the context of *graduates (students)* and the *unemployed*. This may provide a more complete picture as it did with the perceived employability approach”. Furthermore, occupational competence and disposition only focus the competence and disposition related to occupation. Although, the occupational competence and disposition were theoretically conceived as mediator in UILs and perceived graduate employability relationship, but, this mediation has never been empirically tested before. In the current study, UILs is expected to inculcate the required occupational competency and disposition among students, which in will make them employable.

Forrier *et al.* (2009) in their process model of perceived employability, have proposed and Wittekind, Raeder, and Grote (2010), have empirically tested the moderating role of ‘environment’ on input-output employability relationships.

Building on this premise and considering the context of this study, it is conceptualized that ‘advocacy of UILs’ in universities has a positive moderating impact on the occupational competence and disposition of their graduates. Such advocacy is termed as champions’ behavior by Hemmert, Bstieler and Okamuro (2014). Champions are individuals in universities “who take an inordinate interest in the success of the collaboration and in bridging the two different mindsets and operating philosophies (Chakrabarti & Santoro, 2004)”. These champions are a favorable ‘environmental factor’ as they facilitate the UILs initiatives and get the project off the ground, overcome obstacles, solicit and maintain the ongoing financial and other commitment of both partners, and ‘fight fires’ the difficulties. The role of champions as a moderator in the relationship between UILs and occupational competence and disposition has never been investigated before.

1.2 Statement of the Problem

The graduate unemployment in Pakistan is soaring, even though, Pakistani academia and policy makers have been advocating UILs since the beginning of 21st century. Very little is known about the impact of UILs’ initiatives on the perceived graduate employability of Pakistani students. The effectiveness of UILs in enriching the graduate employability is yet to unveil. The majority of earlier UILs studies are exploratory and descriptive in nature and largely concentrated on the developed world. These studies have used Triple Helix, Mode 2 Knowledge Production, and National Systems of Innovation as underpinning theories, to explain the phenomenon at the macro level. Although empirical studies on UILs, are on the rise, specific studies measuring the frequency, intensity, and efficiency of UILs initiatives are looked-for. The number of focused empirical studies on graduate employability is far less than studies proposing different employability models, especially those, which measures graduate employability *subjectively* while embracing individual perspective of employability. Earlier studies predominately measure employability among *employed* individuals using either competency or dispositional based approach. There is a need to simultaneously use both approaches to measure employability in context of *students (graduate)* and the *unemployed*. The moderating role of

“champions’ behavior’ remained neglected despite the fact that university with high advocacy of UILs is expected to have an advantage in nurturing graduate employability. This study is aimed at proposing a framework to examine the role of UILs in perceived graduate employability using an integrated human resource development approach. This framework stems from human capital theory. It argues that human capital investments (UILs) develop occupational competence and disposition if provided with a favorable environment (champions’ behavior), which in turn leads to a positive effect on perceived graduate employability.

1.3 Research Questions

Many studies have established the link of education with employability of the graduates (Riddell, & Song, 2011; Grossman, 2005; Oreopoulos & Salvanes, 2009). But the specific role of UILs in graduate employability is still unclear (Ishengoma and Vaaland, 2016). Many factors associated with employability were investigated but the perceived graduate employability has never been studied as an outcome of UILs (Tomlinson, 2012). Previous empirical graduate employability studies have either used competency or dispositional approaches to employability to study the *employed* individuals (Forrier *et al.*, 2009). Likewise, the majority previous decade’ UILs studies are exploratory and descriptive in nature (Perkmann *et al.*, 2013). Explanatory studies are on the rise now to measure the frequency, intensity, and efficiency of UILs initiatives (Hong & Sung Su, 2013). The earlier UILs’ studies have dominantly used Triple Helix, Mode 2 Knowledge Production, and National Systems of Innovation as grounding pads at the macro level (Teixeira & Mota, 2012). The moderating role of contextual factors like “champions’ behavior” remained neglected despite the fact that university having the high advocacy of UILs is expected to have an advantage in producing skilled graduates (Hemmert, Bstieler & Okamuro, 2014). In this context, the framework of current study is developed to answer following specific research questions.

- i How does university-industry linkages (collaborative training and educational activities, collaborative services and consulting activities, collaborative research activities) influence the perceived graduate employability?
- ii How does occupational competence mediate the relationship of university-industry linkages and perceived graduate employability?
- iii How does occupational disposition mediate the relationship of university-industry linkages and perceived graduate employability?
- iv How does champions' behaviour moderate the relationship of university-industry linkages and occupational competence?
- v How does champions' behaviour moderate the relationship of university-industry linkages and occupational disposition?

1.4 Research Objectives

The main objective of the study is to determine the effects of university-industry linkages on the perceived graduate employability of Pakistani university students. It also aimed at identifying the mediating and moderating impacts of occupational competence and disposition, and champions behaviour respectively, on the earlier stated relationship. Precisely, the study will be focusing on following objectives

- i To determine the effects of university-industry linkages (collaborative training and educational activities, collaborative services and consulting activities, collaborative research activities) on perceived graduate employability.
- ii To determine the extent to which occupational competence plays a mediating role in university-industry linkages and perceived graduate employability relationship.
- iii To determine the extent to which occupational disposition plays a mediating role in university-industry linkages and perceived graduate employability relationship.

- iv To identify the moderating effects of champions' behaviour on university-industry linkages and occupational competence relationship.
- v To identify the moderating effects of champions' behaviour on university-industry linkages and occupational disposition relationship.

1.5 Scope of Study

The scope of study demarcates the boundaries of the research endeavor. It specifies the theoretic, geographic, and methodological limits of the study. Current study focuses on examining the perceived graduate employability in relation to UILs, among the Pakistani university students who have opted science and technology as their majors. It tests the impact of UILs on the perceived graduate employability. UILs includes collaborative training and educational activities, collaborative services and consulting activities, collaborative research activities. The mediating roles of occupational competence and occupational disposition, together with the moderating role of champions' behaviour is also examined while establishing the earlier stated causal relationships. Precisely, it has tested an integrated human resource framework, which, narrates that human capital investments (UILs) develop occupational competence and disposition if provided with a favorable environment (champions' behavior), which subsequently translate into higher graduate employability.

The population of the study comprises of the students of 11 federally chartered public-sector universities of Islamabad, Pakistan, who are offering programs in science and technology related disciplines. The study subjects are final semester graduate and postgraduate students, who are enrolled in science and technology related disciplines (engineering, basic sciences and ICT). The choice of science and technology related disciplines is prescribed by the established fact that these disciplines are more fertile for UILs. Final semester students are chosen as they are the ones, who are expected to be largely exposed to UILs' initiatives. Furthermore, they are going to face the employability challenge in near future. Islamabad, being the capital city of Pakistan, had the most developed universities of the country, who were chartered (recognized) by the federal (central) government of

Pakistan. Moreover, being capital city, Islamabad attracts people from all over the country to come here for living. Hence, the students of the universities of Islamabad are representative of all ethnicities of Pakistan.

A deductive, explanatory, and quantitative research paradigm, which uses closed ended questionnaire to collect primary data from the study subjects. The study subjects were selected using proportionate stratified random sampling technique. The study is limited to measure the direct relationship of university-industry linkages (collaborative training and educational activities, collaborative services and consulting activities, collaborative research activities) with perceived graduate employability of the science and technology students, studying in universities of Islamabad, Pakistan. Therefore, the present study examines the students of public-sector universities situated in the capital territory of Pakistan (Islamabad) only. Furthermore, it measures the mediating effect of occupational competence and occupational disposition in earlier stated relationship. This research has limited its scope by including only one environmental factor (champions' behaviour) as moderator in the study framework.

1.6 Significance of Study

The study of UILs in relation to graduate employability can be a learning paradigm for academicians (theorists) and practitioners. In terms of theoretical contribution, it is proposing an integrative human resource development model (the study framework), which describes the route to graduate employability. The study framework fills following gaps in the literature. First, it provides new insights by establishing and testing a novel relationship of UILs and its components with perceived graduate employability. Second, it empirically measures the efficiency of UILs at the micro level by assessing its impact on perceived graduate employability. Third, in contrast to earlier studies, it is theoretically rooted in human capital theory and brings the human resource development (HRD) perspective to gauge the outcome of UILs at the individual level. Fourth, it explores the employability from individuals' perspective, using a subjective/perceptual approach, which overcomes

the weaknesses associated with the objective approach. Fifth, it simultaneously uses competency and dispositional based approaches to understand employability of graduates (unemployed). Lastly, a unique moderating contextual factor was included in the model in to comprehend the phenomena rigorously.

Regarding practical contribution, this study would have practical applicability at macro and micro level. At the macro level, the study findings would provide insights to public policy makers especially to those who are dealing with strategic issues of education, university-industry collaborations, and graduate employability as it reveals the efficiency of UILs' initiatives in terms of graduate employability. It is helpful to the Pakistani government in improving its policies, strategies, and systems related to education, UILs, and graduate employability. This research is providing them feedback on past and ongoing UILs initiatives. It also provides the government a way forward to further improve UILs to have more employable graduates. Furthermore, it also advises them how deal with soaring graduate unemployment in the country.

At the micro level, this research endeavor is beneficial for Pakistani universities in the betterment of their UILs initiatives. It is helpful in the development of appropriate policies and practices for collaboration with industry. It helps them to customize the UILs activities according to their context i.e. industries in the proximity. It highlights the importance of advocacy of UILs in universities in order to inculcate occupational competence and disposition among students.

Furthermore, the unique context of research endeavor signifies its empirical contribution. This is a pioneer study in Pakistan on UILs and employability. Hence, it is unfolding the efficiency of Pakistani UILs initiatives by measuring its impact on student employability. The socioeconomic indicators of Pakistan (the extremely high percentage of youth and prevailing high overall, youth, and graduate unemployment rate), makes the findings of this study a highly marketable product.

1.7 Conceptual and Operational Definitions

Constructs are conceptually defined variables and conceptual definitions are subjective. They vary from person to person. Hence, it is necessary for the researcher to conceptually define all the variables of his/her study in advance for the sake of clarity of audience (Hagan & Forster 2004). Conceptual definition provides the basis to accurately operationalize certain variable. A clear conceptual definition yields a high correspondence between the construct and the scores obtained from measures at the operational level. This phenomenon is called construct validity (Veal, 2005). In other words, construct validity is dependent on a proper match between conceptual and operational definitions of research variables (Schwab, 2013).

The Figure 1.3 presents a model of empirical research. It shows how conceptual and operational definitions are interrelated. The top horizontal line (a) represents a causal conceptual relationship, generally expressed in form of hypotheses. Line (d) represents empirical relationship. It refers to the correspondence between scores on measures of X and Y. Line (d) is solid to signal that this relationship can actually be observed, typically by using some statistical procedure. Lines (b1) and (b2) represent the relationships between measures and their respective constructs; this is denoted by construct validity. Table-1.1 shows the conceptual and operational definitions of all variables included in this study.

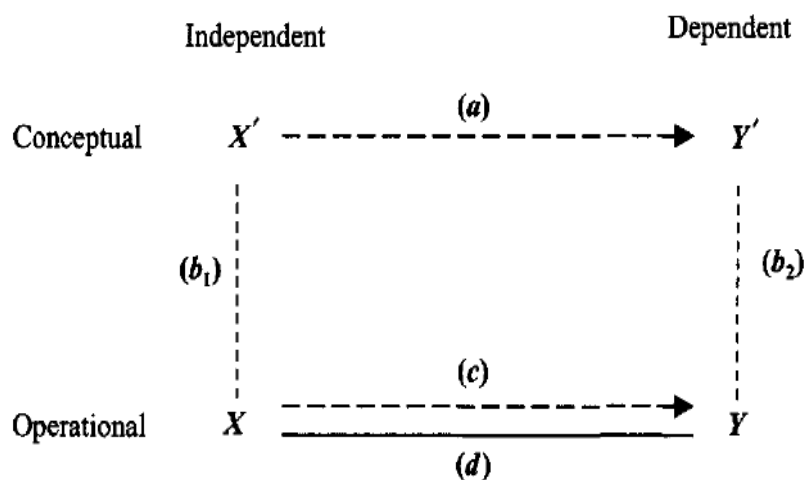


Figure 1.3 Model of Empirical Research (Source: Schwab (2013))

Table 1.1 Conceptual and Operational Definitions

| Constructs | Conceptual Definitions | Operational Definitions |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Employability | Employability is having a set of skills, knowledge, understanding and personal attributes that make a person more likely to choose and secure occupations in which they can be satisfied and successful (Dacre Pool & Sewell, 2007). | Individuals' ability to gain and maintain a job. |
| Graduate Employability | A set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (Yorke, 2006). | Students' ability to gain and maintain a job. |
| Perceived Graduate Employability | The individual's perception of his or her possibilities of obtaining and maintaining employment (Vanhercke <i>et al.</i> , 2014; Berntson & Marklund, 2007). | Graduates' perception of his or her possibilities of obtaining and maintaining a job. |
| University-Industry Linkages (UILs) | Interactions between all parts of the higher educational system and industrializing economy (Ankrah <i>et al.</i> , 2013). | UILs will be operationalize through measuring the existence and intensity of collaborating training and educational activities, collaborating services and consulting activities, and collaborating research activities. |
| Occupational Competence | A set of observable performance dimensions, including individual's work-related knowledge and skills (Heijde, & Van Der Heijden, 2006) | The term refers to occupational expertise of the graduates. |

| Constructs | Conceptual Definitions | Operational Definitions |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Occupational Disposition | The ability of identifying and realizing career opportunities. It comprises of openness to changes at work, work and career resilience, work and career proactivity, career motivation, work identity and optimism at work (Fugate & Kinicki, 2008). | It will measure the pro(active) adaptability of students in identifying and realizing career opportunities. |
| Champions' Behaviour | The behaviour of those individuals who take an inordinate interest in the success of the collaboration and can bridge the two different mindsets and operating philosophies (Hemmert, Bstieler & Okamuro, 2014). | Champions' behaviour refers to advocacy of UILs initiatives in an organization. |

1.8 Structure of the Thesis

This thesis follows a linear structure comprising of five chapters: introduction, literature review, methodology, conclusion and recommendations. The introduction chapter starts with general introduction of the current study, which explains the rationale of the study. Then, it discusses the background of the problem, defines the problem to be addressed, frames the research questions to be answered and research objectives to be achieved. It also highlights the significance and scope of the study along with defining the study constructs as conceptual and operational levels.

The second chapter starts with systematic review of the existing literature on each concept of the study (employability, employability and higher education, graduate employability, occupational competence, occupational disposition, university-industry linkages, champions' behaviour). Then, it highlights the gaps existent in current literature, which were identified through the systematic literature review. Lastly the study hypotheses and conceptual framework were developed by providing the underlying theoretical support.

The chapter three describes the methods and procedures used to conduct the study along with justification of each methodological choice. Firstly, it elaborates the research philosophies, research approaches and research design (i.e. unit of analysis, key respondent, target sample frame, sample size and survey administration). Secondly, it details the procedure to validate the measurement (reliability and validity) and structural model of this study.

The chapter four presents the details of the data analysis. The collected data was analysed using two statistical packages (Statistical Package for the Social Sciences, SPSS and SmartPLS) and in three phases. The first phase comprises of data screening, identifying the respondents' characteristics, and common method bias. In second phase the measurement model got validated by establishing the internal consistency reliability, convergent and discriminant validity. The last phase validates the structural model of the study by assessing coefficient of determination (R^2),

coefficient paths, effect size (f^2), and predictive relevance (Q^2) along with moderation analysis. The last chapter (chapter 5) of the thesis recap the whole research process, discusses the study findings in relation to the research objectives, draws theoretical, managerial and policy implications, and narrates the limitations of the study along with future directions and recommendations.

1.9 Summary of the Chapter

The current chapter highlights the need and importance of university-industry linkages in perceived graduate employability. It states the problem that is being investigated in the current study along with its unique background. Specific research questions are framed to be answered and corresponding research objectives are set to be achieved. The theoretical and practical contribution of the study is highlighted along with delineating its boundaries. All the constructs are defined at conceptual and operational level for the sake of accurate operationalization of these constructs.

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