ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF SOCIAL SCIENCES

LINKING NATIONAL BUSINESS SYSTEM WITH FIRM LEVEL INNOVATION: THE MEDIATING ROLE OF INTELLECTUAL CAPITAL AND ABSORPTIVE CAPACITY

Ph.D. THESIS

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FİRMA DÜZEYİ YENİLİĞİ İLE BAĞLANTILI ULUSAL İŞ SİSTEMİ:ENTELEKTÜEL SERMAYE VE ÖZÜMSEME KAPASİTESİNİN ARABULUCU ROLÜ

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Bashir AHMAD, a Ph.D. student of ITU Graduate School of Arts and Social Sciences student ID 403132007, successfully defended the thesis/dissertation entitled "LINKING NATIONAL BUSINESS SYSTEM WITH FIRM LEVEL INNOVATION: THE MEDIATING ROLE OF INTELLECTUAL CAPITAL AND ABSORPTIVE CAPACITY", which he prepared after fulfilling the requirements specified in the associated legislations, before the jury whose signatures are below.

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To my family,

FOREWORD

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ABBREVIATIONS

AARS	: Average Adjusted R-squared
ACAP	: Absorptive Capacity
ADF	: Asymptotically Distribution- Free
AFF-BG	: Affiliation with Business Group
AFVIF	: Average Full Collinearity VIF
AMOS	: Analysis of Moment Structures
APC	: Average Path Coefficient
ARS	: Average R-squared
AVE	: Average Variance Extracted
CFA	: Confirmatory Factor Analysis
CFI	: Comparative Fit-Index
CMB	: Common Method Bias
CME	: Coordinated Market Economies
CMIN	: Chi-square equivalent in Confirmatory Factor Analysis
CR	: Composite Reliability
DF	: Degree of Freedom
EFA	: Exploratory Factor Analysis
ER	: Employment Relations
ESDS	: Education/Skills Development System
F- Age	: Firm Age
F-Size	: Firm Size
GLF	: Generalized Least Squares
HC	: Human Capital
IC	: Intellectual Capital
INCRINN	: Incremental Innovation
ILP	: Institutional Logics Perspective
KMO	: Kaiser-Meyer-Olkin
LME	: Liberal Market Economies
ML	: Maximum Likelihood
NBS	: National Business System
NLBCDR	: Nonlinear Bivariate Causality Direction Ratio
OC	: Organizational Capital
OCRD	: Ownership Coordination
PACAP	: Potential Absorptive Capacity
PAF	: Principle Axis Factoring
PCA	: Principle Component Analysis
PLS	: Partial Least Squares
RACAP	: Realized Absorptive Capacity
RADINN	: Radical Innovation
RDB	: Research & Development Budget
RMSEA	: Root Mean Square Error of Approximation
RMR	: Rout Mean Square
RSCR	: R-Squared Contribution Ratio
R Square	: Coefficient of determination in Regression Analysis

SBP	: State Bank of Pakistan
SCEP	: Securities and Exchange Commission of Pakistan
SD	: Standard Deviation
SEM	: Structural Equation Modelling
SFLS	: Scale-Free Least Squares
SOE	: State-Owned Enterprise
SPR	: Sympson's Paradox Ratio
SPSS	: Statistical Package for the Social Science
SRMR	: Standardized Root Mean Square Residual
SSR	: Statistical Suppression Ratio
SST	: The State
TLI	: Trucker Lewis-Index
ULS	: Unweighted Least Squares
VIF	: Variation Inflation Factor
WWR	: Work Relations Values

SYMBOLS

f^2	: Effect Size
N	: Number
α	: Cronbach alpha

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LINKING NATIONAL BUSINESS SYSTEM WITH FIRM LEVEL INNOVATION: THE MEDIATING ROLE OF INTELLECTUAL CAPITAL AND ABSORPTIVE CAPACITY

SUMMARY

As business becomes more fast-paced in the early of 21st century, organizational success relies ever increasingly on innovation. Firm's capability to innovate, however can be influenced by a range factors that reside at different analytical levels. In recent years, institutionalists are increasingly trying to explore the impact of macro-level institutions on micro-level (i.e. firm) phenomena. A large body of research in this field, however, has failed to delineate clear mechanisms to explain such linkages. Therefore, this study develops an integrated model with the aim to explore the link between national business system and innovation output at firm level through examining the mediating role of intellectual capital and absorptive capacity in a developing country context.

To test the research hypotheses, this study has followed positivist philosophical research tradition and has applied quantitative research methodology. This approach statistically tests theories to determine effects or outcomes of the study and facilitates to generalize such outcomes to the overall population. The research design of this study bears the qualities of the cross-sectional survey research. Target respondents of the survey were set as primarily owner/ managers and in case that this criterion was not met; senior managers and managers were set as secondary respondents. This study followed snowball-sampling method consistent with the loosely coupled sampling frame and key informants methodology. In order to consider a firm as a part of sample, this study has set two relatively simple criteria. First, it was specified that sample firms should be driven from knowledge intensive industries in order to observe a variance in the dependent variable, the innovation output. Second, firms to be included in the sample should be driven by the population of private and local firms in order to concentrate our attention in dominant economic actors of the Pakistani setting.

Prior to the data collection, current study engages in an extensive scale development effort to collect representative data about the national institutions and business system of the Pakistani setting, complemented by relevant validity and reliability tests. To do so, this study followed established guidelines and close attention was paid to item wording, structure of the statements, item meaning, item scaling, and appropriate numbers of items so that respondents can understand the statements without any difficulty and confusion which normally result from 'double barreled' items. Likewise, scaling is an important aspect in scale development activity. The research espoused a Likert-type scale that is the best known and widely used in behavioral research tradition. Next, this study has created an initial pool of items that would tap into each construct's domain and considering the centrality of societal institutions and business systems scales, their items, and other constructs' items were reviewed by subject matter experts (SMEs) to assess the face and content validity.

Prior to this, SMEs were briefed about the conceptualizations of all constructs. Based on their feedback, all items of each construct were included in the initial scale and sent to fifteen businesses executives for further identification of any ambiguity or difficulty that might hamper filling the questionnaire out. Furthermore, they were asked to provide suggestions for improvement or any other changes that they deemed necessary. Minor improvements were suggested in wordings of several items, which were adjusted after consulting with the SMEs.

After developing a preliminary version of the scales including cover letter and guidelines, it was decided to launch a pilot study to ensure the reliability and usability of scales. The objective of pretesting was to minimize those errors that can be problematic during final data collection, and these errors generally become apparent due to a poor research design or use of ambiguous wording in the questionnaire. Out of 60 distributed questionnaires, 35 filled questionnaires were received back. Two were having substantial missing data, with the omission of these two, remaining 33 were of use. After reviewing the comments of respondents regarding item wording, sentence structure, and level of difficulty or confusion in understanding the language used in the questionnaire, few suggestions about changing some words and sentence structure for several items, which we incorporated in the final survey. Additionally, exploratory factor analysis (EFA) was carried out to examine the factor structure and internal consistency (reliability) of the scales. The coefficient alpha for each construct achieved the threshold value of 0.70. However, it is suggested that these results should be treated with extra caution because EFA needs relatively larger sample size, particularly in the case of unclear factor pattern. Accordingly, these results were considered as indicative of main study data patterns, rather than final. Therefore, no items were deleted merely based on these findings.

Target population of this study is firm from knowledge intensive industries including textile, pharmaceutical, engineering, information technology, electrical/electronics, and automotive/automobile. In order to reduce potential variation caused by the macro-level factors, extensive effort was put to collect data in a short interval between the months of April, 2016 and October, 2016. Research assistants, who were postgraduate students, collected the data with face-to-face and on-site visits. They were adequately trained about the purpose of the research and theoretical nature of constructs prior to the data collection. Researchers made visits to the companies with one month interval after the initial visit in cases that the data were not collected within the first round.

Out of 1,235 distributed questionnaires, 228 questionnaires collected back with 18.46% response rate. Out of these, 14 questionnaires dropped out due to a large amount of missing data, thus 214 usable questionnaires were included for further data analysis. Before testing the hypotheses of study, several data cleaning methods such as missing data analysis, outliers' detection and assessment of normality were applied to obtain precise results. After cleaning the data, exploratory and confirmatory factor analyses were applied. Lastly, reliability and validity of each scale was tested. The results of all these tests were found satisfactory to proceed the main analysis of the study. The overall theoretical model was tested by structural equations using partial least squares approach. This approach is suitable for small sample size studies and does not require data normality as needed in covariance-based SEM approaches. The results of fit and quality indices of the model achieve the set criteria, thus confirming a high predictive power of the model.

The results of path coefficients of the relationship between latent variables were obtained after controlling firm age, firm size, export, R&D budget, firm type (family or non-family), and affiliation with business group. Firm size significantly influences both the radical and incremental innovation. These results are obtained after controlling firm age, firm size, export, R&D budget, firm type (family or non-family), and affiliation with business group. Almost, all variables have non-significant impact on both types of innovation output, except business group application on incremental innovation. In addition to this, R&D budget and firm size have insignificant negative impact on radical innovation. Export has insignificant negative impact on both radical and incremental innovation output.

The results exhibit strong support for the mediating role of repository (intellectual capital) and enabling (absorptive capacity) cognitive factors in the association of macro and meso level institutional characteristics and firm-level innovation. Thus, this study significantly extends the literature about the national business systems approach by providing a clear-cut mechanism about how abstract institutional templates constituted at the societal and business system level are translated into actionable sets by the help of aforementioned cognitive factors. Moreover, hypotheses on direct links between the study constructs were also supported, thereby indicating variables reside at different analytical levels are closely linked in a top-down manner.

In addition, the particular characteristics of the Pakistani setting also reflect themselves in the empirical results. First, the fragmented and informal nature of the dominant societal institutions necessitated the use of non-ownership based control and coordination mechanisms alongside with ownership based control and coordination mechanisms. Thus, it can be argued that the owners pragmatically resort to any means necessary to control and coordinate the economic resources of their firms by engaging in relationships with a variety of stakeholders including the state, competitors, employees, financial organizations and the community. Although, theoretical discussions in the NBS approach suggest that there are only few possible NBS typologies because of the interdependencies between different institutional templates, the Pakistani setting seems to exhibit the characteristics of a hybrid model. Pakistan's business model generally displays relatively higher levels of direct ownership control and coordination characteristics, lower levels of non-ownership based coordination and control characteristics, and relatively tighter levels of interdependence between employer-employee relations.

The implication of present research is to contribute institutional theory and to elaborate how NBS theory could be used in developing countries. It particularly demonstrates how the Pakistani business system influences firm level innovation outputs and offers guidelines for management in designing successful innovation related policies and practices in Pakistan. Moreover, this study pinpoints for managers how knowledge management activities inside the firms and grasping outside knowledge can enhance innovation output that can lead them to stay ahead of competitors. Although constraints exist in the form of lack of resources or access to the resources, yet firms can manage such constraints by developing network ties be more innovative.

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ÖZET

Örgütler, 21. yüzyılın başlarından beri daha yüksek tempolu bir hale geldiklerinden dolayı giderek daha yenilikçiliğe dayanmaktadır. Bununla birlikte, örgütlerin yenilik yapma kabiliyeti, farklı analitik düzeylerde bulunan bir dizi faktörden etkilenebilir. Son yıllarda, kurumsalcılar daha fazla makro düzeyde kurumların mikro düzey (yani firma) olgular üzerindeki etkisini araştırmaya giderek daha fazla çalışmaktadırlar. Ancak, bu alandaki geniş bir araştırma alanı böyle bağlantıların net bir mekanizmasını tanımlamak için göz ardı edilmiştir. Bu nedenle, bu çalışma, gelişmekte olan ülke bağlamında entelektüel sermayenin ve özümseme kapasitesinin aracılık rolünü incelemek suretiyle ulusal işletme sistemi ile yenilik çıktısı arasındaki firma düzeyindeki bağlantıyı keşfetmeyi amaçlamaktadır.

Araştırma hipotezlerini test etmek için bu çalışma, pozitivist felsefi araştırma geleneğini takip etmiş ve niceliksel araştırma metodolojisini uygulamıştır. Bu yaklaşım, çalışmanın sonuçlarını veya sonuçlarını belirlemek için istatistiksel olarak teorileri test eder ve bu sonuçların genel nüfusa genelleştirilmesini kolaylaştırır. Bu çalışmanın araştırma tasarımı kesitsel araştırma niteliklerini taşımaktadır. Ankete katılanlar öncelikle sahibi / yöneticiler olarak belirlenmiş ve bu kriterin yerine getirilmemesi durumunda; üst düzey yöneticiler ve yöneticiler ikincil katılımcılar olarak seçilmiştir. Bu çalışamda kartopu örnekleme yöntemi kullanılmıştır. Anahtar bilgilendiriciler ve referanslar sayesinde bilgilerin toplanması sağlanmıştır. Bir firmanın örneklemin bir parçası olabilmesi için çalışmada nispeten iki ilişkisel basit kriter ortaya konmuştur. İlk olarak, yenilik çıktısı ile ilgili bağımlı değişkenlerdeki değişimleri görebilmek için örneklem firması bilgi yoğun sanayilerden olmalı. İkincisi, örneklemin içine dahil edilecek firmalar, dikkatimizi Pakistan'ın egemen ekonomik aktörlerine yoğunlaştırmak için özel ve yerel firmaların nüfusu tarafından yönlendirilmelidir.

Bu çalışma, ilgili geçerlik ve güvenirlik testleri ile tamamlanan Pakistan bağlamına ilişkin ulusal kurumları ve ticaret sistemi hakkında temsili veri toplamak için kapsamlı bir ölçek geliştirme çabasıyla içerisindedir. Bunu yapmak için, çalışmada belirlenen yönergeler izlenmiştir ve katılımcıların ifadeleri anlamakta herhangi bir zorluk çekmemeleri için değişkenlerin ifadesi, cümlelerin yapısı, değişkenlerin anlamı, değişkenlerin ölçeklendirilmesi ve uygun sayıda öğe olmasına dikkat edilmiştir. Aynı şekilde, ölçeklendirme, ölçek geliştirme faaliyetinde önemli bir husustur. Araştırma, davranış araştırması geleneğinde en iyi bilinen ve yaygın olarak kullanılan Likert tipi ölçeği benimsemiştir. KOBİ'lere tüm yapıların kavramsallaştırılması hakkında bilgi verilmiştir. Geribildirimlerine dayanarak, her bir yapılanmanın tüm maddeleri başlangıç skalasına dahil edilmiş ve anketin doldurulmasını engelleyebilecek herhangi bir belirsizik veya zorluğu daha derinlemesine tanımlamak için on beş işletmenin yöneticisine gönderilmiştir. Ayrıca,

iyileştirme veya gerekli gördükleri diğer değişiklikler için öneriler sunmaları istenmiştir. Değişkenlerin ifadesinde küçük değişiklik önerileri gelmiştir. Daha sonra bu ifadeler düzenlenmiştir.

İlk ölçeklerle birlikte kapak yazısı ve kılavuzlar da geliştirilmiş, daha sonra ölçeklerin güvenilirliğini ve kullanılabilirliğini sağlamak için bir pilot bir çalışma yapılmasına karar verilmiştir. Ön test etmenin amacı, nihai veri toplama sırasında soruna neden olabilecek hataları en aza indirmektir ve bu hatalar genel olarak kötü bir araştırma dizaynı veya ankette belirsiz ifadelerin kullanılması nedeniyle ortaya çıkar. Dağıtılan 60 anketten 35'i doldurulmuş geri dönüş olan bu anketlerden iki kişininkinde önemli eksikler mevcuttu, bu iki anketin ihmal edilmesiyle 33 anket geçerli sayılmıştır. Katılımcıların, ankette kullanılan dilin anlaşılmasında değişkenlerin ifadesi, cümle yapısı ve zorluk derecesi ya da karışıklığa ilişkin yorumlar gözden geçirilmiş, bazı kelimeleri ve cümle yapılarını değiştirmeye yönelik birkaç öneri gözden geçirilmiş ve anket son halini almıştır. Ayrıca ölçeklerin faktör yapısını ve iç tutarlılığını (güvenilirliği) incelemek için keşfedici faktör analizi yapılmıştır. Her yapı için alfa katsayısı 0.70 eşik değerine ulaştı. Bununla birlikte, özellikle belirsiz faktör örüntüsü durumunda, Keşfedici Faktör Analizi nispeten daha büyük bir örneklem boyutuna ihtiyaç duyduğundan, bu sonuçların daha fazla dikkatle ele alınması önerilmektedir. Buna göre, bu sonuçlar nihai olmaktan ziyade ana çalışma veri modellerinin göstergesi olarak değerlendirilmiş. Dolayısıyla, yalnızca bu bulgulara dayanarak hiçbir değişken silinmemiştir.

Bu çalışmanın hedef kitlesini, tekstil, ilaç, mühendislik, bilgi teknolojisi, elektrik / elektronik ve otomotiv / otomobil dahil olmak üzere bilgi yoğunluktaki sektörler oluşturmaktadır. Makro düzey faktörlerin neden olduğu potansiyel değişimi azaltmak için, Nisan 2016 ve Ekim 2016 ayları arasındaki kısa bir aralıkta veri toplamak için yoğun çaba harcamıştır. Lisansüstü öğrencileri olan araştırma görevlileri, verileri yüz yüze ve yerinde ziyaretlerle toplamıştır. Verilerin toplanmasından önce araştırmanın amacı ve kuramsal nitelikleri hakkında yeterince bilgilendirilmişlerdir. Araştırmacılar, verilerin ilk ziyarette toplanmaması durumunda bir ay aralıklarla şirketlere tekrar ziyarette bulunmuştur.

Dağıtılan 1,235 anketten 228'i geri dönmüştür ve yanıt oranı %18,46'dır. Bunların dışında, çok sayıda eksik veri içermesinden dolayı 14 anket çalışmadan çıkarılmıştır, bu nedenle ileride yapılan veri analizlerine 214 kullanılabilir anket dâhil edilmiştir. Çalışma hipotezlerini test etmeden önce, kesin veri elde etmek için eksik veri analizi, aykırı değerlerin saptanması ve normallik değerlendirmesi gibi çeşitli veri temizleme yöntemleri uygulanmıştır. Veriler temizlendikten sonra keşfedici ve doğrulayıcı faktör analizleri uygulanmıştır. Son olarak, her ölçeğin güvenilirliği ve geçerliliği test edilmiştir. Tüm bu testlerin sonuçları, çalışmanın ana analizini gerçekleştirmek için tatmin edici bulunmuştur. Genel teorik model kısmi en küçük kareler yaklaşımı kullanılarak yapısal denklemlerle test edilmiştir. Bu yaklaşım küçük örneklem büyüklüğü çalışmaları için uygundur ve kovaryans tabanlı SEM yaklaşımlarında gerektiği gibi veri normalliği gerektirmemektedir Modelin uyum ve kalite göstergelerinin sonuçları, belirlenen kriterleri yerine getirmekte ve böylece modelin yüksek öngörü gücünü teyit etmektedir.

Gizli değişkenler arasındaki ilişki yol katsayılarının sonuçları, firma yaşı, firma büyüklüğü, ihracat, Ar-Ge bütçesi, firma tipi (aile veya aile dışı) ve işletme grubu ile olan bağını kontrol ettikten sonra elde edilmiştir. Firma büyüklüğü hem radikal hem de aşamalı yeniliği önemli ölçüde etkiler. Bu sonuçlar, firma yaşı, firma büyüklüğü,

ihracat, Ar-Ge bütçesi, firma tipi (aile veya aile dışı) ve işletme grubuyla olan bağlılığının kontrolünden sonra elde edilmektedir. Artan yenilik üzerindeki iş grubu uygulaması haricinde, hemen hemen değişkenlerin hiçbirinin her iki yenilik çıktı türüne de önemli ölçüde etkisi yoktur. Buna ek olarak, Ar-Ge bütçesi ve firma büyüklüğü, radikal yenilik üzerinde önemsiz bir olumsuz etkiye sahiptir.İhracat hem radikal hem de artan yenilik çıktıları üzerinde önemsiz bir olumsuz etkiye sahiptir.

Sonuçlar, makro ve mezo düzeydeki kurumsal özellikler ile firma düzeyindeki yenilikçilik arasındaki bağlantıda depolayıcı bilişsel faktörlerin (entelektüel sermaye) ve yardım edici bilişsel faktörlerin (özümseyici sermaye) aracılık rolüne güçlü bir destek ortaya koymuştur. Bu nedenle, bu çalışma, toplumsal ve ticari sistem düzeyinde oluşturulan soyut kurumsal şablonların, yukarıda sözü edilen bilişsel faktörlerin yardımıyla uygulanabilir kümelere dönüştürülmesi konusunda net bir mekanizma sağlayarak, ulusal işletme sistemleri yaklaşımı ile ilgili yazını önemli ölçüde genişletmektedir. Dahası, çalışma yapıları arasındaki doğrudan bağlantılara ilişkin hipotezler de desteklenmiş; bu nedenle, farklı analitik seviyelerde yer alan değişkenlerin yukarıdan aşağıya doğru bağlandığı gösterilmiştir.

Buna ek olarak, Pakistan yerleşiminin belirli özellikleri de ampirik sonuçlara kendini yansıtmaktadır. Birincisi, egemen toplumsal kurumların parçalanmış ve gayrı resmi yapısı, sahiplik durumlarına bağlı olarak sahiplik temelli kontrol ve koordinasyon mekanizmalarının birlikte kullanılmasını gerekli kılmıştır. Böylece, sahiplerin pragmatik olarak, devlet, rakipler, çalışanlar, finansal kuruluşlar ve topluluk dahil olmak üzere çeşitli menfaat sahipleriyle ilişkilere girerek firmalarının ekonomik kaynaklarını kontrol etmek ve koordine etmek için gerekli araçlara başvurdukları söylenebilir. NBS yaklaşımındaki teorik tartışmalar, farklı kurumsal şablonlar arasındaki karşılıklı bağımlılıklar nedeniyle yalnızca bir kaç olası UBS tipolojilerinin olduğunu göstermektedir; ancak Pakistan koşulları melez bir modelin özelliklerini sergilemektedir. Pakistan'ın işletme modeli genel olarak nispeten daha yüksek düzeyde doğrudan mülkiyet kontrolü ve koordinasyon özellikleri, düşük mülkiyet hakları ile düşük koordinasyon ve kontrol, zayıf işveren-çalışan ilişkileri özellikleri göstermektedir.

Mevcut araştırmanın sonuçları, kurumsal teoriye katkıda bulunmak ve gelişmekte olan ülkelerde NBS teorisinin nasıl kullanılacağını ayrıntılı bir şekilde ortaya koymaktır. Özellikle Pakistan iş sisteminin firma düzeyinde inovasyon çıktılarını nasıl etkilediğini ve başarılı yeniliğe ilişkin politikaları ve uygulamaları Pakistan'da tasarlama yönergelerini nasıl sunduğunu göstermektedir. Dahası, bu çalışma, yöneticiler için firmalardaki bilgi yönetimi faaliyetlerinin ve dış bilgiyi kavramanın yenilik çıktılarını rakiplerin önünde tutmalarına yol açabilecek şekilde belirler. Her ne kadar kısıtlamalar kaynak eksikliği veya kaynaklara erişim şeklinde olsa da, firmalar bu tür kısıtlamaları iletişim ağlarını geliştirerek yönetebilir ve daha yenilikçi olabilirler.

1. INTRODUCTION

As business becomes more fast-paced in the early of 21st century, organizational success relies ever increasingly on innovation. Since firms' ability to innovate can be influenced by several factors, this thesis focuses on institutional as well as firm-level factors to in order to examine their combined effects on firm level innovation output. This introductory chapter covers the aim of the study as well as the background for the motivation and problems addressed. It further focuses on the research questions and objectives, the literature gap, possible areas of contribution, and the methodology used. Finally, this chapter presents the organizational of thesis in the last section.

1.1. Aim of the Study

In its different forms, institutionalism has a long history in the study of different organizational phenomena including innovation (Werle, 2012). Recently, comparative institutionalists are increasingly trying to identify and explain the impact of institutional context on firm structure, practices and behavior (Whitley, 1999; Hall and Soskice, 200; Morgan, 2007; Allen, 2013; Hotho, 2014; Haxhi and Aguilera, 2017). To conceptualize the national intuitional context, this study adopts national business system framework of Whitley (1999), which encompasses two main elements – societal-level institutions and characteristics of the national business system (NBS). Societal institutions, here, regarded as the national-level institutional arrangements such as the state, financial system, education/skills development system, work relation values, which coordinate and shape the collective behavior of actors (i.e. firms) by governing and controlling the critical socio-economic resources such as human and capital (Whitley, 1999). While, NBS refers to the dominant patterns of doing business, which become established in a particular institutional context, and are reflected in ownership based coordination, non-ownership based coordination (interfirm relations), and employment relations between the employer and employee (Whitley, 1999).

Scholars have argued that societal institutions affect the ways business activities organized and controlled in the country, which, in turn, influence different firm-level outcomes like innovation (e.g., Whitley, 2000; Werle, 2012; Hotho, 2014). Despite such claims, less effort has been put to study the mechanisms of this causal link in an empirical and systematic manner. This is the main issue that this thesis aims to address.

To pursue this aim, the present study focuses on the interaction between the national business system, intellectual capital as a repository of templates stockpiled, absorptive capacity, and firm innovation output in terms of radical and incremental innovations in a relatively less developed setting of Pakistan.

1.2. Background and Problem

Innovation, undoubtedly, enhances the odds of a firm survival and growth, if successful (Fontana and Nesta, 2009; Tohidi and Jabbari, 2012; Damanpour, 2014; Nieves, 2016). Since Schumpeter's (1934) early work on innovation, multiple theoretical and empirical studies in this field have emerged to explain the drivers of firm-level innovation performance. Yet, questions such as *what* determines innovation performance of firms, as well as, *how* and under *which* conditions this holds true, continue to attract scholarly attention. To answer these questions, most of the existing literature typically concentrate either on the *micro-level* features (i.e. firm-level) or *macro-level* (i.e. institutional-level) factors, little evidence exists on the combined effects of both levels on firm–level innovation outcomes (Coriat and Weinstein, 2002).

Studies, which focus on organizational characteristics are mainly concerned with resources (knowledge) (Ahuja and Katila, 2001; Urgal, Quintás, and Arévalo-Tomé, 2013; Agostini, Nosella, and Filippini, 2017), and capabilities (Fosfuri and Tribó, 2008; Forés, and Camisón, 2016). These studies suggest that firms having sufficient knowledge resources/capabilities, and use them wisely, are in a better position to demonstrate significant innovation performance compared with those that lack these. While firm resources and capabilities are closely associated with innovation performance, and are certainly important (Meyer, Estrin, Bhaumik, and Peng, 2009), this stream of research has paid scant attention to the institutional context within which firms are situated.

On the other hand, comparative institutionalists have placed context at the center of their focus, while studying innovation. Recently, a number of scholars from this field have found that innovation is strongly influenced by national level institutions (e.g., Lundvall, 1999; Whitley, 2000; Hall and Soskice, 2001; Werle, 2012; Allen, 2013; Hotho; 2014). From this perspective, firms embed in their institutional context, which is further composed of a set of institutional elements (Whitley, 1999). These institutions function as the *'rule of the game'* to determine the appropriate behavior of economic actors and deviation from these rules could render the conduct of economic actors illegitimate and unacceptable (Meyer and Rowan, 1977). Hence, firms obey higher order logics to secure legitimacy (Thornton and Ocasio, 2008), which in turn limit a firm to exercise its agency and made it "a "passive", black box, "acted" upon by the macro-social determinants in which it is inserted" (Coriat and Weinstein, 2002, p. 274). Consequently, a firm develops only those resources and capabilities that meet institutional expectations to avoid conflicts.

Above discussion, shows that factors situated at different levels are equally important for innovation to happen and prosper and we could not prioritize one over the other. Recently, the field is moving away from such dualities and seeks to integrate 'actor' and 'structure' dualism, as they are increasingly becoming mutually interdependent (Giddens 1984; Jackson, 2010). This implies that a complete understanding of this complex phenomenon without taking organizational and national institutional elements together into account is difficult (Coriat and Weinstein, 2002). Therefore, there is the need for a comprehensive empirical study to inform debates and findings on the combined role of national business systems and firm-level innovation enablers in the determination of innovation output.

1.3. Research Question and Objectives

As discussed above, this research is concerned with the relationship between national-level institutions and firm-level outcomes. It examines the *underlying mechanisms*, which associate macro-level institutional factors and firm level factors in explaining the firm level innovation outputs. In particular, this study analyzes the role of internal knowledge repositories, capabilities, and external conditions under which firms develop and utilize them to innovate. The main research question this study seeks to address is formulated as follows:

How do the national business system and firm-level innovation enablers affect firm-level innovation performance?

Considering the research aim and question, this study has set the following goals.

- Understand and explain innovation behavior of Pakistani private firms.
- Understand and explain institutional pressures firms face to innovate.
- Understand and explain resources and capabilities firms develop within the institutional context of Pakistan.
- Understand and explain the mechanisms through which *macro-level* institutions operate their influence on *micro-level* actors' behavior.

1.4. Research Gap

Although both the innovation and comparative institutionalism literatures are rich in theoretical and empirical aspects, there is little evidence on the links between national institutional context and firm innovation performance. Many scholars have repeatedly called attention to the link between firm-level innovation and the national institutional context, within which a firm is embedded (e.g., Whitley, 2000; Allen, 2013; Pezeshkan, Smith, Fainshmidt, and Sedeh, 2016). Accordingly, there seems to be a recent trending towards a more contextual understanding of firms' innovation behavior (Hotho and Saka-Helmhout, 2016; Barasa, Knoben, Vermeulen, Kimuyu, and Kinyanjui 2017). This has led to the proliferation of theoretical frameworks (Fainshmidt, Judge, Aguilera, and Smith, 2016), which seek to identify and explain innovation patterns of firms in connection with their national institutional contexts (Hall and Soskice, 2001; Hotho, 2014). This study builds on one of such frameworks, namely, national business systems (NBS), originally proposed by Richard Whitley and his colleagues (Quack, Morgan, and Whitley, 2000; Whitley, 1999; Whitley and Czaban, 1998). The basic tenet of this approach is to explain the links between various macro institutions, established patterns of economic activity, and dominant forms of economic organization in a comparative manner. While some of the existing studies significantly enhance our understanding of the link between NBS and the firm innovation (e.g. Whitley 2000; Hotho, 2014; Pezeshkhan et al. 2016), I argue that this stream of research is still underdeveloped due to three main shortcomings.

First, most of the literature on NBS revolves around understanding its nature (Whitley, 1992; Redding, 2002; Rana, 2015), comparisons of different business

systems (Yeung, 2000), validating its typologies (Haake, 2002; Witt and Redding, 2013; Hotho, 2014), and its application in new geographical locations (Pezeshkhan et al. 2016). Consequently, relatively less effort has been put to causally link NBS with various firm-level outcomes in a systemic and robust manner (Witt and Jackson, 2016). Although there are few studies which try to explain the link between NBS and firm innovation (e.g. Hotho, 2014, Pezeshkhan et al. 2016), they only partially employ selected components of NBS in their explanations. Thus, no study systematically examines the influence of NBS in its entirety on the innovation behavior of firms by taking into account multiple analytical levels.

Second, NBS is understood by many scholars alike as a highly abstract construct, components of which reside at multiple analytical levels (Hotho, 2014; Fainshmidt et al. 2016; Novitskaya and Brewster, 2016). Because of its complex composition, which entails elements that are vested primarily in pre-conscious schemata of actors, no direct measurement scales of NBS have been developed yet. Thus, many researchers have employed national and/or international institutions' indicators as proxies for the representation of the social institutions and business system characteristics (e.g. Hotho, 2014, Pezeshkhan et al. 2016). For this purpose, observational or archival data from different sources such as World Bank and/or World Economic Forum are used (Fainshmidt et al. 2016). However, such data on less developed countries are either unavailable or incomplete. Moreover, the data that are served by these institutions are also partially collected by surveys or panels, which make them prone to a similar difficulty about psychometric measurement. As a result, two situations emerge, either to wait for the data to become available, which seems rather difficult (Witt and Redding, 2013), or to develop robust measures to overcome this shortcoming (Fainshmidt et al. 2016).

Third, despite the intensifying accent on the need for more contextualized explanations of firm structures, routines, and outcomes (Hotho and Saka-Helmhout, 2016), existing studies have drawn their data mostly from industrially advanced economies, and overlooked less developed settings, raising questions about the validity and generalizability of the NBS framework (e.g. Hotho, 2014; Whitley, 2000, 2002; Fainshmidt et al. 2016). Hence, extending the empirical efforts in less developed settings, which potentially are inhabited by different institutions to nurture

economic activities and forms, will enrich our insights about the nature of business systems and their impact on firm outcomes.

1.5. Contribution to the Literature

Actually, the limitations of previous literature are the contribution of this Ph.D. thesis. This study makes several theoretical, methodological and managerial contributions to the existing body of knowledge.

First, existing literature highlights that there is an association between the NBS and firm innovation. Very few studies, however, have actually tested this relationship (e.g., Hotho, 2014; Pazeshkhan et al. 2016). These studies have linked macro-level (i.e. societal institutions) factors with micro-level (i.e. firms) to predict firm innovation. No clear explanations, however, have been provided on the mechanisms of these institutional arrangements that drive innovation. This Ph.D. study develops and tests a multi-level and integrated model, which causally links all components of NBS, repositories, and enablers of firm innovation as well as the innovation behavior itself. Following the original work of Whitley (1999), recent works by Hotho (2014), Rana, and Morgan (2016), this study decomposes NBS into two components that reside at different analytical levels, namely, societal-level institutions and business system characteristics. The logics emanating from the macro-level shapes the business system characteristics, which, in turn, provide and legitimize particular templates of organizing at the firm-level. This model stipulates that such templates are first coded and stockpiled at the cultural-cognitive repertoire of actors and forms the basis of firms' intellectual capital. Consequently, repositories of actionable templates are selectively put into motion according to the capabilities of each firm, represented by the absorptive capacity construct. Thus, it is articulated that, as an end result, firm-level innovation is strongly conditioned by a funnel of theoretical factors, through which unarticulated and preconscious ideals, values, and conventions are molded into concrete behavior.

Second, this thesis tries to overcome some methodological weaknesses, particularly in the NBS literature. For example, as discusses above, there are no direct measures of NBS framework (i.e. societal institutions and characteristics of NBS) exist that in turn put limits on the application of this framework in those countries where objective data on theses constructs either unavailable or difficult to access which

highlights the need for valid and reliable scales for these constructs (Fainshmidt et al. 2016). Current research also engages in scale development and introduces a full-fledged scale for NBS, and takes several steps to ensure the validity and reliability of measures. It adds new insights to the extant literature on the NBS and provides benefits to the future researchers interested in this field.

Third, data for this research comes from Pakistani setting, as it represents one of the Asian countries that received scarce attention. Pakistan's unique national history and multi-ethnic structure entail significant opportunities to employ, and perhaps, validate the use of the NBS approach. In particular, the present study is among the very few studies tests this hypothesized relationship in the Pakistani context. Previously, most of the studies on this topic have carried out either in developed or industrially advanced countries. Consequently, this Ph.D. study enhances our insights on the mutual role of national institutional context and organizational factors in explaining innovation at the firm-level in a new geographical location.

Fourth, with respect to practical implications, this research informs managers and policy makers about how national business system facilitates or impedes the development of resources and capabilities, and thereby, influences innovation performance of firms. This may facilitate them to formulate even more sound and effective policies to cope up institutional pressures, which in turn, can stimulate firm innovation performance.

1.6. Research Methodology

This thesis applies quantitative research methods to test the proposed theoretical framework of the study presented in Chapter 5. The underlying philosophical assumption of this research study comes from the positivist tradition, which statistically tests theories to determine effects or outcomes of the study (Hussey and Hussey, 1997; Creswell, 2003), and facilitates to generalize such outcomes to the overall population (Orlikowski and Baroudi, 1991; Sobh and Perry, 2006). This study uses 'hypotheticodeductive' research process that starts with a theory based on abstract but logical links among constructs that are then tested empirically through data collection (Ali and Birley, 1999). To collect data, self-administered printed survey was distributed to target respondents holding a top management position in a firm from seven knowledge intensive industries that are: textile, pharmaceuticals,

chemicals, engineering, IT and services, automotive, and electrical/electronics. Using the snowball sampling method, 1,235 questionnaires were distributed, while 228 were received back. Out of these, 14 were incomplete thus dropped out. Remaining 214 were used in the final analysis. This research uses pre-established measures for most of the constructs. However, the literature lacks scale on NBS framework, therefore a new scale was developed for this construct by following the established guidelines.

To analyze the data, multivariate data analysis technique is used which is considered appropriate when a study uses a quantitative research method. Accordingly, partial least square (PLS) based structural equation modeling was utilized for this study. First, a measurement model was tested to employ the reliability and validity of each measure. Second, a structural model was tested to verify to hypothesize direct relationships. The software used in this thesis is SPSS version 22, AMOS version 22, and WarpPLS 5.0.

1.7. Organization of the Thesis

Table 1.1 summarizes organization of thesis and research focus/activities in each chapter. This introductory chapter has explained the aim, research question, and objectives addressed in this thesis. The chapter also presented literature gap and potential contribution to the existing body of knowledge. This chapter also discussed the research methodology. The remainder of this PhD thesis is organized as follows.

Chapter 2 provides review of the most relevant theoretical and empirical literature on the constructs of the thesis, namely national business system, intellectual capital, absorptive capacity, and innovation performance. It provides foundations to develop the theoretical framework of this study. It further introduces and discusses the theoretical model as well as key definitions about its constituent parts, and ascertains how these constructs already have generally been measured and investigated in the past. This part helps to identify the gap in prevailing literature on what is already known regarding the national business system and its influence on innovation performance at the firm level.

Chapter 3 offers detail on Pakistani context, particularly social, cultural and economic aspects of the society. In addition to this, NBS framework of Pakistan is also discussed in this chapter.

Chapter 4 covers theoretical framework and hypotheses of the study that are driven based on the extensive literature review conducted in previous chapters.

Chapter 5 outlines the research methodology this study has utilized to achieve the research aim. It discusses in detail the underlying philosophical assumption and reasons of selecting a particular methodology. Moreover, research design and research process including data collection, sampling, new scale development, reliability and validity tests, and statistical techniques to test the hypothesis are also provided in this chapter.

Table 1.1 : Organization of thesis and research focus/activities.

Organization of Thesis		Research Focus/Activities
Chapter 1	Introduction	
Chapter 2	National business system, intellectual capital, absorptive capacity, innovation	Review of literature
Chapter 3	Context and NBS Of Pakistan	Review of literature
Chapter 4	Theoretical framework and hypothesis	Review of literature
Chapter 5	Research methods	Scale development, Data collection
Chapter 6	Statistical results	Data analysis and hypothesis testing
Chapter 7	Discussion, conclusion, limitations, and future directions	Feedback session

Chapter 6 discusses the results of statistical analyses performed to test hypothesized relationships in the theoretical framework of this thesis. It covers data screening, descriptive statistics, and factor analysis – both exploratory and confirmatory. Moreover, this chapter also includes correlation matrix and partial least squares (PLS) based structural equations modeling to test the direct relationship between variables.

Chapter 7 presents discussion and conclusion of the study followed by limitations and future research directions.

2. LITERATURE REVIEW

The purpose of this chapter is to review the extant literature on each variable of the study. It starts with studies on firm innovation, which covers its definition, types, and an overview of the factors affecting innovation. Then an introduction to the NBS framework is provided, including a concise review of the comparative institutionalism, the origin, characteristics of the NBS, and societal institutions. Finally, it presents the literature about the mediating variables, inducing intellectual capital and absorptive capacity.

2.1. Firm Innovation

Innovation is an important but complex phenomenon. Over the years, research on the innovation construct has grown substantially, covering a variety of aspects, which has led to the emergence of a large body of literature (e.g., Crossan and Apaydin, 2010; Damanpour, 2014; Van de Ven, 2017). In this section, I will try to provide the definition of the innovation as well as present typologies, followed by a review on its important determinants.

2.1.1. Definition of innovation

To date, firm innovation has been studied across many academic fields and scholars have conceptualized it from different perspectives (Garcia and Calantone, 2002; Damanpour and Wischnevsky, 2006). This has caused somewhat conceptual confusion in the innovation literature, which confounds different aspects such as the characteristics of innovation, types of innovation as well as the capabilities and outcomes relate to the innovation (Gatignon, Tushman, Smith, and Anderson, 2002; Forés and Camisón, 2016). All of these definitions, however, share a common understanding about *'newness'* irrespective of their theoretical backgrounds (Johannessen, Olsen, and Lumpkin, 2001; Baregheh, Rowley, and Sambrook, 2009). Before defining innovation performance as the dependent variable of this thesis, a

concise review of the pre-existing conceptualizations of the construct is deemed as necessary.

The concept of innovation has been evolved over the period of time. It is fair to say that Schumpeter led the contemporary conceptualization of the term innovation at the beginning of 20th century with an increased emphasis on the novelty aspect (Hansen and Wakonen, 1997). According to him, innovation refers to "a novel output, which reflected in: new products, new production techniques, new sources of the supply chain, new markets, and new ways of business organization" (Schumpeter, 1934, p. 66). The definition has widely been applied in many disciplines of the social sciences, and still considered as mostly valid, regardless of significant changes in the ways of innovation management (Sapprasert, 2011). While, the definition is clear and explicitly outlines the scope of innovation in firms (i.e. product, process, organizational), scholarly debates over the different aspects on Schumpeter' (1934) conceptualization are still ongoing For example, Hagedoorn (1996) criticize that it is a very broad and vague definition, thus its implementation, its nature, and its scope are somewhat questionable to meet the criteria of the definition of innovation(Klein & Knight, 2005; Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, and Boronat-Navarro, 2004; Damanpour and Aravind, 2012). Thereafter, scholars have used numerous definitions to explain innovation, ranging from domain specific ones to generalist ones.

Dewar and Dutton (1986, p. 1422) define innovation in the perspective of adoption and describe it "as an idea, practice, or material artifact perceived to be new by the relevant unit of adoption". Similarly, Damanpour (1992, p. 376) asserts that "innovation is the adoption of internally developed or externally purchased product/service, device, program, policy, system that is new to the adopting organization". In the recent years, OECD (2005, p. 46) defines innovation as "the introduction of a new or significantly improved product (good or service), process, a marketing approach or a new organizational method in the internal practices of the business, workplace organization or external relations". This definition, somehow, has reached a consensus among scholars (Geldes, Felzensztein, and Palacios-Fenech, 2017), because of its focus on both technical (product or process) and on-technical (marketing, organizational) aspects of the construct, while the latter plays an

important role in the success of former (Schmidt and Rammer, 2007; Geldes et al. 2017).

Recently, some scholars have provided very precise and domain specific definitions of the innovation. For instance, Damanpour and Aravind (2012) conceptualized the concept from an organizational innovation perspective, which refers to newness in organizational structures, practices, administration systems, processes, and methods or techniques that help the organization create value. On the other hand, scholars have particularly focused on technological aspects of the innovation and have described innovations in terms of developing a new (or significantly modified) product/service and/or process (Greeven, 2009; Adeyeye et al. 2017; Barata and Fontainha, 2017).

Considering the above discussion, this thesis uses the term *'innovation performance'* limited to the outputs about innovation and defines it as *'a new or improved product/service and/or process'*, classified under the categories of radical and incremental innovation.

2.1.2. Types of innovation

Innovation literature have differentiated between innovation types since they have disincentive characteristics, and their adoptions are not influenced similarly by the organizational and environmental (institutional) factors (e.g., Zaltman, Duncan, and Holbek, 1973; Damanpour, 1987; Jansen, Van Den Bosch, and Volberda, 2005; Damanpour, Walker, and Avellaneda, 2009). Similarly, industrial patterns to develop different types of innovations, and their adoption by firms, are also not identical (Abernathy and Utterback, 1978; Benner and Tushman, 2003). To understand the nature of innovation in firms, making of a distinction between innovation types is essential (Damanpour, 1991).

Scholars have proposed several theoretical typologies of innovation (Damanpour, 2014). However, three have received greater attention, and accepted generally in the innovation literature. These are: (a) administrative (non-technological) versus technical innovation, (b) product versus process innovations, and (c) radical versus incremental innovations (Damanpour, 1991). There are many other terms used interchangeably with the term administrative innovation, including management innovation (Birkinshaw, Hamel, and Mol, 2008), organizational innovation

(Armbruster, Bikfalvi, Kinkel, and Lay, 2008), and managerial innovation (Damanpour and Aravind (2011). Altogether, they represent a broader category of innovation called non-technological innovation (Geldes et al. 2017).

Table 2.1 : General typologies of innovation.

Innovation Type	Definition	Literature
Non-technological innovation	Refers to non-technological aspects of the innovation such as organizational structure, administrative procedures, marketing and outside relations.	(Evan and Black, 1967; Kimberly and Evanisko, 1981; Damanpur, 1991; Schmidt and Rammer, 2007)
Technological Innovation	It entails a set of activities related to products, services, and processes that used to produce those products or render services.	(Birkinshaw et al. 2008; Damanpour and Aravind; 2011; Damanpour, 2014; Kjellberg, Azimont, and 2015)
Product Innovation	It refers to those products that are perceived new by the firm as well as by the customers.	(Utterback and Abernathy, 1975; Garcia and Calantone, 2002; Francis and Bessant 2005)
Process Innovation	It is concerned with news ways to introduce products and services and help firms reduce cost and/or achieve high performance.	(Damanpour et al. 2009; Dasgupta, Gupta, and Sahay, 2011; Mothe and Nguyen-Thi, 2012)
Radical Innovation	It is a type of innovation that brings fundamental changes in firm activities due to a clear shift from existing practices.	(Ettlie, Bridges, and O'keefe, 1984; Deward and Button 1986)
Incremental Innovation	It entails improvement and modification (both minor and significant) in the existing products, technologies, methods, processes, and structure of a firm.	(Dosi, 1988; Nelson and Winter, 1982; Chandy and Tellis, 1998)

Besides the aforementioned classifications, there are several other types of innovation proposed in the literature that encompasse the characteristics of these broader categories. For example, based on innovation's impact on the organizational competencies, scholars have suggested *competence-destroying versus competence-enhancing innovations* (Tushman and Anderson, 1986; Gatignon, Tushman, Smith, and Anderson, 2002). While, the former needs completely new knowledge, techniques, methods, and abilities to develop and manufacture products, the later builds on existing skills, competencies and experience (Henderson and Clark, 1990). Another distinction is made between *autonomous and systematic innovations* based on their effects on the existing system (Teece, 1996; Chesbrough and Teece, 2002). For example, autonomous innovation modifies products and process in a way that they can easily adjust to the existing system of a firm. Systematic innovations change the existing configurations of the firms' system and create new opportunities by

changing the current technologies. Based on perspective of knowledge, scholars have distinguished between *exploratory and exploitative innovation* (e.g., Tushman and O'Reilly, 1996; Jansen, Van Den Bosch, and Volberda, 2006) which is closely related to the radical and incremental category. Exploratory innovations require new knowledge to produce new products and services for new customers or markets. On the other hand, exploitative innovations are characterized by existing knowledge sets, involving extensions or improvements in the existing products or services for current customers (Benner and Tushman, 2003; Enkel and Gassmann, 2010). Based on the objective of innovation's impact on the subsystems and linking mechanisms, Henderson and Clark (1990) distinguished between *architectural and generational innovations.* The former only has an impact on the linkages between subsystems, while the latter have profound effects on both, and change them completely.

Concisely, while there are many types of innovation, none of these can completely explain the nature of it. Moreover, there is no standardized criterion to classify innovation. Each type has different characteristics, and firms' decision to adopt it depends on different organizational and institutional factors that have profound effects on the innovation. Therefore, without considering the role of these factors, one cannot fully understand the nature of innovation. The following section provides a literature review about the factors that are generally assumed to have important connections to the innovation.

2.1.3. Factors affecting innovation performance

Successful innovative outcomes not only reward firms in the form of increased profit and stability, but also contribute to the overall economic growth of developed and developing economies alike (Zahra and Nielsen, 2002; Zuniga and Crespi, 2013). Although firms in less developed countries operate with outdated technologies as well as less advanced levels of management and production capabilities (Malik and Kotabe, 2009; Goedhuys and Sleuwaegen, 2010), individual firms still play a chief role in producing innovation (Barasa et al. 2017). Whereas significant improvements have been made in the business climate of these countries in terms of access to financial resources, protection of property rights, and availability of qualified human capital (Alvarez and Barney, 2014), firms in these countries yet face variety of challenges that influence innovation activities as well as innovation output (Bradley,

McMullen, Artz, and Simiyu, 2012). They are mainly associated with two chief factors such as *firm*-and *institutional-level* (Barasa et al. 2017).

2.1.3.1. Firm-level factors

Existing research on innovation provides valuable insights on various organizational factors that can be expected to influence a firm's innovation output (e.g., Ahuja and Katila, 2001; Damanpour, 1991; Camisón-Zornoza et al, 2004; Anderson, De Dreu, and Nijstad, 2004; Alegre and Chiva, 2008). Among these factors, internal resources of a firm (i.e. characteristics) are considered as important determinants of innovation (Klette and Kortum, 2004).

Firm size arguably is one of the most widely studied firm-specific factors in association with innovation (Acs and Audretsch, 1987; Cohen and Klepper, 1996). Findings on the link, however, are mixed. For instance, in a meta-analysis by Camisón-Zornoza et al (2004) reveals that the firm size and innovation are positively correlated. While Heimonen (2012) found that the organizational size does not matter for the innovation to prosper, another study by Forés and Camisón (2016) finds that the effects of firm size vary according to the type of innovation. Incremental innovation is found to be positively related to larger firm size, whereas the relationship between the larger firm and radical innovation is negative or insignificant (Abernathy and Utterback, 1978). This perhaps is due to the reason that large firms do not want to lose their strong market position (Chandy and Tellis, 2000). Moreover, radical innovation required a clear shift from existing practices, technologies, and knowledge that large firms avoid due to their stronger knowledge bases that has deeply ingrained in the existing system and technological trajectories (Nooteboom, Van Haverbeke, Duysters, Gilsing, and Van den Oord, 2007).

Another firm-specific factor that is considered important in terms of innovation output is *research and development (R&D)* investment (Ahuja and Katila, 2001). Firms do vary in their tendency to invest in R&D regardless of theirsize (Cohen, 2010). It is found that firms those invest more in R&D have better chances to launch successful innovations (González, Miles-Touya, and Pazó, 2016).

Another firm-level factor that is important to innovation input is the *organizational structure* (Dekoulou, Dekoulou, Trivellas, and Trivellas, 2017). The discussion of the structure is centered on different perspectives. For example, some have particularly

focused on the management control over business activities and its impact on innovation such as centralized vs. non-centralized organizations. Findings for the former with innovation are mixed, while the latter is found to positively correlate with innovation (Damanpur, 1991; Menguc and Auh, 2010). Decentralization is characterized by flexibility and agility, which in turn enable the firm to introduce novel products and services in the market (Wan, Ong, and Lee, 2005).

Firm-level *resources and capabilities* (Barney, 2001; Teece, Pisano, and Shuen, 1997) have long been considered as important contributors to the innovation performance. According to this view, if a firm wants to stay competitive, it needs to innovate by possessing and deploying distinctive capabilities and resources (Teece et al. 1997). Thus, firms having a sufficient stock of such resources and capabilities to exploit can have an advantage over competitors and can demonstrate high innovation performance (Crossan and Apaydin, 2010; Hewitt-Dundas, 2006). But these resources, according to Barney (1991), must have VRIN (i.e. valuable, rare, inimitable, and non-substitutable characteristics, so that the competitor could not easily copy and understand which resource combination is more important.

The last set of firm-level factors that can have an influence on innovation output is *knowledge resources and knowledge capacities*. Organizational knowledge is viewed as one of the prime determinants of innovation in firms, if managed and utilized wisely (Darroch, 2005; Urgal, Quintás, and Arévalo-Tomé, 2013). Organizational knowledge can be tacit as well explicit (Nonaka and Konno, 1998). It is stored in different organizational constituents, namely human capital, social capital, and organizational capital, which together form the intellectual capital of a firm (Nahapiet and Ghoshal, 1998; Subramaniam and Youndt, 2005). Intellectual capital has become an integral part of the innovation process (Buenechea-Elberdin and Buenechea-Elberdin, 2017). However, its effects are only viable, when a firm has the ability to absorb it (Cohen and Levinthal, 1990; Zahra and George, 2002). The empirical evidence shows that both intellectual capital and knowledge absorptive capacity have positive effects on the firm innovation performance (Soo et al. 2016). Detailed discussions on these constructs are given in Section 2.3 & 2.4.

2.1.3.2. Institutional-level factors

Besides organizational factors, firm innovation can be conditioned by institutional factors as well (Van Waarden, 2001). Here *'institutions'* refer to the macro-level

institutions, within which firms are embedded. Several approaches consider the role national level intuitions while studying innovation in firms. Most widely used approaches are: varieties of capitalism (Hall and Soskice, 2001), national innovation system (Nelson, 1993), and national business systems (Whitley, 1999, 2000). This stream of research argues that the firms are socially constructed entities, which are heavily embedded in a national institutional context composed of different institutions. These institutions govern firms' access to critical resources such as human and financial (Whitley, 1999). As a result, firms take these institutions as for granted. Consequently, knowledge resources and capabilities, which are developed by firms to innovate, are the reflection of the effects of these institutions (Whitley, 2000; Lam, 2000). Therefore, institutional explanations of innovation have become imperative in recent years. Detail discussion on the institutional factors is provided in section 2.2.

In sum, innovation performance here is defined as a new or improved product/service or process that is classified into radical and incremental innovation in the firms. There are numerous organizational and institutional factors that can influence innovation activities, and thereby innovation output.

2.2. National Business System Framework

2.2.1. Introduction

Since the late 1950s, an upsurge in international trade, (Held, McGrew, Goldblatt, and Perraton, 1999), an increase in the cross-border flow of capital (Simmons, 1999), and a fast paced replacement of the exports made with conventional production chains by multinational companies (Buckley and Ghauri, 2004) have been witnessed. As a result, economic integration and interdependence between national economies have also increased (Anne and Walgenbach, 2007; Rowley, 2017), which in turn has influenced the patterns of economic organization in each economy. This has led to the emergence of a debate about the convergence or divergence of economic activities worldwide (Dunphy, 1987). Convergence school of thought, on the one hand, claims that the organizational structures, practices, and ways of doing business are increasingly becoming identical around the world (Guillén, 1999; Yoshikawa and Rasheed, 2009; Northrup, 2010). Thus, a 'global' or 'one best system of economic

organization' similar to the notion of 'one best way' of traditional management theories (Rowley, 2017) is going to become established.

On the other hand, proponents of divergence thesis, which mostly are comparative institutionalists, claim that there are continuing differences in the patterns of organization of economic activities and reject the convergence assumption. According to their view, every country has a set of national level institutions, which are shaped by particular historical trajectories and industrialization patterns (Whitley, 1999; Hall and Soskice, 2001), making the coordination and control system of economic activities rather unique (Redding, 2005; Whitley, 2007; Witt and Jackson, 2016). According to these scholars, this is the reason that explains why patterns of business organization vary and they continue to vary in future as well. Thus, comparative institutionalist school of thought firmly rejects the convergence thesis. The proponents of the national business system approach give a similar response because it shares many assumptions with the comparative institutionalist thought (Whitley (1992a).

2.2.2. Comparative institutionalism

Literature on the comparative institutionalism has grown substantially over the years. It sufficiently enhances our understandings about how national institutions vary across countries (e.g., Boyer, 1988; Coates, 1999; Maurice and Sorge, 2000; Hall and Soskice, 2001; Jackson and Deeg, 2006; Storz, Amable, Casper, and Lechevalier, 2013; Witt and Redding, 2013; Witt and Jackson, 2016; Amable, 2016; Fainshmidt, Judge, Aguilera, and Smith, 2016). There are variety of such approaches that appear in the literature, among which three stand out in terms of popularity: *the societal effects approach* (Maurice, Sorge, and Warner, 1980; Maurice and Sorge, 2000), *the varieties of capitalism approach* (Hall and Soskice, 2001), and *the business systems approach* (Whitley, 1992a, 1992b, 1999). While these approaches vary in terms of their emphasis, they share a common theme about focusing on examining the impact of societal institutions on firm structures, practices, and behaviors (Jackson and Deeg, 2008; Haxhi and Aguilera, 2016; Hotho and Saka-Helmhout, 2016). Thus, the core objective of comparative institutionalist approaches is to explain variations in the ways business organized in different countries (Witt and Jackson, 2016).

A consolidated discussion on basic concepts, differences, and similarities among these approaches is provided below to enhance the understanding of readers (see

Table 2.2 for summary) It also highlights the position of the NBS in the comparative institutionalism literature.

2.2.2.1. Societal-effect approach

Primarily, this approach was developed with the aim to study the work organization practices in three European countries namely Germany, France, and the UK through march-pairs comparison method by linking the pairs with the societal institutions of respective countries to judge if there are variations in the pattern of organizing the work (Maurice, Sellier, and Silvestre, 1986; Jackson and Deeg, 2006). To do this, the approach assumes a reciprocal relationship between actors and different societal spheres such as work organizations, education and training, and industrial relations. Empirical results under this approach indicate that work organization practices do vary across countries (Maurice and Sorge. 2000). This analysis confirms that it is appropriate to study the link between societal institutions and the organization of work patterns in order to understand firm level practices properly (Maurice et al. 1986; Hotho and Saka-Helmhout, 2016).

2.2.2.2. Varieties of capitalism

The *'varieties of capitalism approach'* was first proposed by Hall and Soskice (2001) with the intention to "develop a framework to study institutional similarities and differences across the developed economies" (p.1). The fundamental concern of this approach is to examine the quality of interactions between different actors in a national system, which primarily are employees, customers, suppliers, state, and other intermediaries. It assumes that the success of firms is based on their ability to develop a relationship with different actors. In order to substantiate its theoretical claims, the proponents of the approach analyze the ways by which firms establish such linkages as well as the role of five institutional spheres on these linkages, namely "industrial relations, vocational training and education, corporate governance, inter-firm relations, and employees" (Hall and Soskice, 2001: 7). These institutions are important in a way that they are complementary in nature and operate collectively. To contrast the ways through which firms deals with coordination problems, this approach divides capitalistic economies into a dichotomy of coordinated market economies (CME) and liberal market economies (LME) (Hall and Soskice, 2001). In CMEs, hierarchies and competitive market arrangements are the primary mechanisms through which firms coordinate their economic activities,

while firms that operate in LMEs prefer non-market coordination modes to develop ties with other actors. Sharing many assumptions but organized in a more comprehensive manner, the national business system approach is discussed in detail in 2.2.3.

Comparative institutionalist approaches have great explanatory power to identify and describe variations observed in the coordination and control of economic activities in different societies. However, ta common criticism these approaches often face is that they are highly deterministic in nature, and ignore the agency of micro level actors (Hotho, 2014, Morgan, 2007, Rana and Morgan, 2016). Another challenge these approaches confront is the lack of commonly accepted topologies, which often create a problem to generalize results to other institutional settings (Allen, 2004; Fainshmidt, Judge, Aguilera, and Smith, 2016).

2.2.3. Background, conceptualization and components of the NBS

During his stay in East Asia, Whitley (1992a) observed that these economies have a different pattern of business organization that not only have become established, but are very successful as well. This motivates him to extend his research work to confirm these variations through empirical analysis. Based on this work, he claimed that there is no 'one best way' to do business. Rather, there are many possible ways, which can be successful in a particular institutional context, and one could not prefer one over the other (Whitley, 1991; Whitley, 1992a). He grounded his work by asking the questions: how and why these differences appear and become institutionalized, how they can be identified and contrasted. Based on this work, he proposed the notion of NBS (Whitley, 1992a; Rana and Morgan, 2016). Thus, the primary motive of the NBS approach was to compare and contrast the patterns of organization and control of business activities in different societies.

For this purpose, Whitley (1999) considered a set of business activities including "the variety of resources and activities integrated through managerial hierarchies, the organization of ownership and control, degree of cooperation between suppliers and customers and between competitors and extent of organizational integration of employees and long-term interdependence between employers and employees" (p.9), which together can be grouped into three dimensions of the NBS: (a) Ownership coordination, (b) Non-ownership coordination and (c) Employment relations and work management

The aforementioned dimensions encompass several sub-dimensions that reflect in leading firms' practices, strategies and relations with different strategic actors, and labeled as the characteristics of the NBS (Whitley, 2000; Hotho, 2014). These characteristics result from the interaction between leading firms and societal level institutions in the country (see e.g., Rana, 2014). As a result, NBS becomes country specific, and vary significantly from the business system of other countries.

Business systems can be defined as the "particular ways of organizing, controlling, and directing enterprises that become established in different (institutional) contexts" (Whitley, 1992a, p. 7). These systems differ in terms of the organizational integration of economic activities and resources, primary means of coordination and control, and the nature of interactions between economic actors, who cooperate and compete for these resources and activities (Whitley, 1998). According to Whitley (2000), these actors are the providers and users of capital, customers and suppliers, competitors, firms in different sectors, and employers and employees. Primary means by which actors integrate resources and activities are direct owner control, formal and informal contracts, and personal relationships, and they differ across different national institutional contexts (Whitley, 1999).

National institutional context is an integral part of the NBS framework, which is composed of a set of societal level complementary institutions. The notion of complementarity regarded as cohesiveness between these institutions, which improves the quality of their impact on the NBS (Amble, 2000). These institutions are of central importance as they promote certain types of business activities while detaining others. This is primarily achieved by restricting actors' access to the resources that these institutions supply (Whitley, 1999; Morgan, 2007; Jackson and Deeg, 2008; Witt and Jackson; 2016).

Whitley (1999) categorizes them as proximate and background institutions. Former include the state, financial system and education and training systems, whereas, later resemble with cultural-cognitive institutions and include the patterns of trust and authority relations in a society. These institutions are assumed to change very slowly, particularly background institutions because of their historical entrenchment. However, proximate institutions can be changed in case that the background institutions, political system, the technological regime and business system itself change significantly (Whitley, 1992b; Rana and Morgan, 2016). Due to institutional

stability for a longer period of time, business systems are also assumed to be stable, and resistant to change. These systems can change when changes occur in the characteristic of the societal institutions (Whitley, 1999).

Table 2.2 : Comparison of approaches in comparative institutionalism.

Approach	Description	Level of Analysis	Primary focus
Societal - effect approach (Maurice and Sorge , 2000)	- This approach describes how work organization is constructed and influenced by the societal context - Patterns of interaction between social spheres, and how constellation of such relations causes variation in work organization across different countries	- Production units - Country	- Actors-societal context interaction - Interrelations between a set of institutions such as work organization, education and training, and industrial relations
Varieties of Capitalism (Hall and Soskice, 2001)	- This approach considers firms as the key actors in the capitalistic market economy and assumes that their modes of interactions are fundamental processes to understand the variations in the organization of economic activities.	-Country	- Complementarity and coherence of institutions - Institutional advantage - To resolve coordination problems through interfirm relations - Five core spheres – industrial relations, vocational training and education, corporate governance, interfirm relations, employees. - Liberal market economies (LMEs) - Coordination market economies (CMEs)
National Business Systems (Whitley, 1999)	- This approach implies that societal level institutions encourage particular forms of economic organization whereas discourage other ones. In this way, these institutions and leading firms in the country determine a distinctive national business system.	- Firms - Sector - Country	- Societal institutions – the state, financial systems, skills development and control systems, trust and authority relations - Ownership coordination - Non-ownership coordination - Employment relations and work management - Interdependencies between institutions - The interrelationship between societal institutions and business systems' characteristics

2.2.4. Framework of the national business system approach

The NBS framework proposed by Whitley (1999) is composed of two major elements that are critical for a deep understanding of the patterns of business

organization in a society: (i) dimensions/characteristics of the business system and (ii) societal institutions. A detail discussion is provided in the following section.

2.2.4.1. Key dimensions/characteristics of the NBS

2.2.4.1.1. Ownership coordination

Ownership coordination contains different sub-dimensions of an NBS, which provide the foundations for comparing different business systems. First dimension concerns the relationship between owners and salaried managers in a firm. The degree of owner's direct involvement in the management of business operation is an important feature of this dimension that is used to distinguish business systems. Other characteristics used to compare the business system concern the degree and scope of horizontal and vertical integration of business activities (Whitley, 1998, 1999).

2.2.4.1.2. Non-ownership coordination

The second dimension deals with the integration of economic activities through non-ownership coordination mechanisms that mainly involve interfirm relationships developed within and across the sectors as well as with competitors. These relationships range from "zero-sum, adversarial contracting, and competition to cooperative, long-term, and mutually committed" (Whitley, 1999: 37). Differences in non-ownership based coordination are linked with differences in ownership based coordination because owner's direct control over business activities often impedes collaborative relations with competitors as their personal identity is strongly linked with the identity of the firm. If they collaborate, their identity can be lost. Another possible factor is a reluctance to share personal information and authority which is often observed in those societies, where the public has low trust in formal institutions (Whitley, 1998; Anne and Walgenbach, 2007).

2.2.4.1.3. Employment relations and work management

The final set of characteristics deals with the variations in employment relations and internal management of work in firms across different societies. Employment relations here refer to the degree of interdependence between employers and employees. That is, either firm rely on external labor market or show the commitment with employees and develop their capabilities internally to promote them (Whitley, 1998). Patterns of internal work management can be distinguished in

terms of the discretion and delegation of authority to the trusted managers and other employees within in the firm (Whitley, 1999; Anne and Walgenbach, 2007).

In sum, different combinations of these characteristics result in different business systems. Contradictions between these characteristics can cause conflicts between social actors' groupings, which mean only a few numbers of combinations of business system characteristics would be established for a long period of time (Whitley, 1999). Although, these dimensions cover the most important aspects of a business system, they are not necessarily the sole way to contrast business activities; additional dimensions would become relevant when comparing authority-market relations in other parts of the world (Whitley, 1998; Anne and Walgenbach, 2007).

2.2.4.2. Societal institutions

NBS approach assumes that different societies develop different institutions which "encourage particular kinds of economic organization (i.e., business system) and discourage other ones through structuring the ways that collective actors are constituted, cooperate, and compete for resources and legitimacy, including the standards used to evaluate their performance and behavior" (Whitley, 1999: 27). Therefore, an adequate understating of the variations in business systems without considering them is hard (Rana, 2014; Allen, 2014). They altogether form the institutional context, and produce and reproduce different forms of business systems (Whitley, 2000). Although, every society has a variety of institutions, upon which business systems are impinged, Whitley's (1999) considers the following four as the most important: (i) the role of the state, (ii) financial system, (iii) education/skill development system and (iv) work relation values (trust and authority relations in a society).

2.2.4.2.1. The state

The role of states in developing and sustaining different forms of business organization is important in three ways (Hotho, 2014): The first is relative dominance of the state and its willingness to share investment risk with privately owned firms. The second way is the state behavior toward the establishment of intermediate organizations. The last way is the level of state participation in formal market regulation (1999).

First, the state dominance and willingness to share investment risk alludes to the strength of the state with regard to social-pressure groups such as social elites, and state's commitment to the economic development in the country by sharing risky investments with privately owned business firms (Whitley, 1998; Hotho, 2014). Countries, however, do vary in this dimension. For example, most of the Anglo-Saxon economies such as the USA and the UK neither wish to directly interfere in the coordination of economic activities, nor they have to capacity to achieve this (Whitley, 2000). In contrast, state-led economies such as South Korea and Taiwan, have been playing an active role in the organization of business activities since the end of the World War II (Whitely, 1998). In addition, the Taiwanese economy is dominated by export oriented SMEs which depend less on the state, while South Korean firms are larger in size and depends heavily on the policies of the state (Whitley, 1998; Levy, 1991). Similar to South Korea, the state in Japan (post-1950) also plays a dominant role in conducting the business affairs, however, its degree to share business risk is considerably low compared to South Korea (Whitley, 2000).

NBS highlights that in societies where the state is strong, and shares risk with business firms, developing ties with top management and bureaucracy is promoted as a practice (Whitley, 1999). On the other hand, risk sharing promotes business activities as well as long term employment relations. Contrary to this, where state support is lacking, firms adopt different diversification strategies to manage their risks (Whitley, 1992b).

Second feature concerns states' relative tolerance towards the establishment of intermediate organizations, which seek to develop relationships between different actors in a society such as individuals, enterprises, and the state. Different states have different tendencies towards the formation of such associations. For example, German and Austrian states encourage intermediary associations, while other does not allow forming such kind of cartels. This implies that making network ties in the former states is relatively easier than the latter (Whitley, 1999). Clearly, the state plays an important role in the formation of non-ownership based relationships in different societies.

The third feature refers to the role of the state in regulating markets through formal rules and regulations about the trade of a product, capital, and labor (Whitley, 1999). Anglo-Saxon states compared to European states have less formal regulations about

licensing, trade associations, and other industrial groupings (Whitley, 1998). As a result, the degree of the state involvement in regulating the markets determines their segmentation, level of competition, resource mobilization, and flexibility in organizational structure (Whitley, 1999).

In summary, the role of the state can vary from weak to strong. It reflects the degree of firm dependence on formal rules, regulations, and bureaucracy. Moreover, the states can be an active partner of risk sharing with private firms or risk avoider, and let the firms to manage it individually. Similarly, network relationships and alliances also depend on the nature of states. Some states promote such relationships, while others do not. The role of the state in regulating markets directly or indirectly also influences various business activities such as competitions among firms, and mobility of resources which in turn can affect the formation of non-ownership based relationships at the firm level.

2.2.4.2.2. The financial system

Financial systems can vary significantly based on how financial resources (capital) are raised (Hotho, 2014). Generally, financial systems can be categorized into two as the capital market-based systems and credit/bank-based systems (Whitley, 1999; Lee, 2012; De Clercq, Lim, and Oh, 2013). This classification defines the type of financial system in a country. In the capital market-based system, funds are allocated via market competition where both lenders and borrowers remain at arm's length relationships. In the credit-based system, intermediaries directly deal with firms and become locked into their success (Whitley, 2000) by helping firms in mobilizing funds, governing the staff, managing risks, and identifying good projects (Lee, 2012). For these reasons, firms often prefer to maintain relationships with intermediaries. Moreover, credit based finance is an efficient source of industrial expansion in developing countries due to easy access to capital compared to the market based systems (Gerschenkron, 1962; Beck and Levine, 2002). Similarly, credit based systems are more operative where firms need extra funds from external resources for their innovative activities (Stulz, 2000).

In the capital market-based system, funds are raised through a capital market mechanism by selling and buying stocks and bonds where demand and supply are the major determinants of trade and price (Andersen, 2006). In this system, key stakeholders are shareholders (Coates, 1999). Whereas, their commitment is not

limited to a single firm, they only have a short-term interest in its activities (Whitley, 1999). In these systems, banks only fulfill short-term financing needs (Zysman, 1983), and the state interference is minimal (Andersen, 2006). While markets have strong control over corporate affairs such as the trade of ownership rights (Whitley, 1999).

In sum, the distinguishing features of financial systems are (a) capital can be raised either from competitive capital markets or via credit/bank-based system, (b) links between lenders and borrowers can be arm's length, mutual or cooperative, and (c) the role of state and the bank is limited. Although, there are many financial systems, which do not clearly fall into this dichotomy, it still can serve appropriately to compare and contrast different business systems (Whitley, 1999).

2.2.4.2.3. Education/skills development system

The education/skills development system contains two broader but interrelated systems, which are education and training systems, and the organization and governance system of labor markets (Whitley, 1999). The *former* encompasses two features that are crucial to making a distinction between different skill developments systems. *First*, to what extent state agencies, employers, and unions collaboratively organize programs to develop and certify the skills in the country. *Second*, to what extent practical and theoretical knowledge complement each other.

There are three features that are important to analyze different education/skill development systems (Whitley, 1992a). *First*, it is important to define the degree to which trade unions and professional bodies (associations) have control over the provision of skills and competencies. *Second*, it is imperative to understand the extent to which trade unions and other groups are organized in the country based on their professional expertise, sectors, industries, and enterprises, because the way these associations organized, in turn, affects the internal management of a firm (Whitley, 1998). For example, industry based unions/association not only encourage intra-industry network form of relations, but also provide sustenance to develop cooperative employment relations across the industry. *The third* feature is the degree of centralization of wage bargaining, and it affects the nature of the relationship between employers and unions (Whitley, 2007). To serve the collective interest of all actors, the federal union maintains tight control over bargaining system. In such systems, individual firms develop interrelationships to solve their issues on

industrial-relations. In other words, it promotes non-ownership based coordination to deal with common challenges (Whitley, 1999).

In sum, the education/skill development systems can be contrasted by examining the role of trade unions, professional associations and skills development, the level of integration between practical and theoretical learning, unions control over the supply of skills, criteria to form unions, and wage bargains systems. The ways these organized in a society, they strongly affect the characteristics of an NBS.

2.2.4.2.4. The values of work relations (trust and authority relations)

Finally, firm governance structure, inter-firm coordination, and employer-employee relations are also influenced by the societal norms and values that govern trust and authority relations in a society. Trust in formal institutions and their procedures, and the nature of subordination relations, whether they are formal or paternalistic, are considered important features to explain the variations in a business system (Whitley, 1999).

In sum, similar to business systems' characteristics, the features of these institutions are also interconnected. For example, the state with high involvement in coordinating business activities, and risk sharing with private firms discourage the growth of intermediaries that in turn limit the labor unions and employers' associations to become strong in such societies. Such states support credit-based systems to mobilize credit easily, and keep control over economic development in the country (Whitley, 1998; Zysman, 1983). In contrast, the state that has low involvement in the organization of business activities and risk sharing are characterized with capital-market-based systems, no influence of elite class on institutions, strong formal rules and regulations, high trust in institutions, and low collaborative ties between economic actors (Whitley, 1992a).

In societies where intermediaries are strong, they play a prominent role in the organization of business activities including controlling entering in and exit from the market. Biased bargaining, opportunistic behavior, impersonal commitment, and collective loyalties to common goals rather than upholding individuality characterize these societies. Development of collaborative ties between actors becomes easy when these ties are combined with a strong public training system. Low trust in formal institutions, and high favor to families, discourage the establishment of intermediary

associations. Additionally, insignificant capital markets and personal authority relations discourage labor unions to become strong and promote a particularistic business environment (Whitley, 1999).

2.2.5. Past Literature on National Business System Approach

The primary objective of this section is to exhibit the current state of empirical literature on the concept of NBS. However, it is important to clarify at the outset that this study does not intend to cover everything on NBS approach, instead, it considers the most important and relevant literature that has explicitly used the concept. For more detail on how NBS literature has evolved over time, studies by Morgan (2007), and Rana and Morgan (2015) can be very useful. Literature was reviewed chronologically because this strategy is useful to identify the major trends, patterns, and research themes in the field. This review reveals that major research papers that belong to different time periods play critical roles in the theoretical development of NBS.

Although Richard Whitley introduced the concept of NBS in 1992, researchers' interest into it began to grow in the late 1990s. This is understandable because a new theory or concept needs time to become familiar with the researcher community (Rana and Morgan, 2015). Today, research using this concept has grown substantially and the approach has been attaining a prominent position in the comparative institutionalism literature (Morgan, 2007; Hotho and Saka-Helmhout, 2016).

In the early 1990s, discussions about the NBS can be found in some journals and book chapters. The initial work is largely designed to enhance the awareness of NBS approach and its value for comparative analysis of different business systems (e.g., Whitley, 1991; 1992a, 1992b; Romme, 1994). At this stage, very little theoretical and empirical research is undertaken to support NBS approach, the majority of scholarly work during this time period provides a foundation for future understanding of the NBS approach.

In the late 1990s, the NBS concept attracts a great deal of attention and there are a number of articles published in high-quality journals (e.g., Whitley, 1998; Ferner and Quintanilla, 1998) as well as some books (e.g., Foss, 1997; Whitley, 1999). During this stage, researchers put their energy to verify, support, refine or criticize the initial

work and suggest further developments or improvements in the NBS framework (e.g., Lundvall, 1999; Casson and Lundan, 1999; Whitley, 1999; Kristensen, 1999; Foss, 1999). There are some other studies, which attempt to utilize NBS approach in combination with other mature theories such as national innovation system (Lundvall, 1999), corporate governance systems (Pedersen and Thomsen, 1999), and global commodity chain perspective (Whitley, 1996).

From 2000 to onwards, compared with the previous period, articles on the NBS concept became relatively mature. Application of the NBS approach to understand and explain various organizational issues at different levels in different regions of the world increased during the twenty-first century. Some researchers apply NBS approach to study internationalization of MNCs, their practices and behavior to understand how host and home country influence their strategies (e.g., Almond, Edwards, and Clark, 2003; Gamble, Morris, and Wilkinson, 2003; Edwards and Kuruvilla, 2005; Vo and Stanton, 2011; Morgan, 2012; Novitskaya, and Brewster, 2016). Meanwhile, other researchers continue to show interest to expand the geographical scope of this approach to confirm the generalizability (e.g., Jakobsen and Torp, 2001; Psycho and Szamosi, 2007; Wood, Dibben, Stride, and Webster; 2011; Novitskaya and Brewster, 2016; Pezeshkan, Smith, Fainshmidt, and Sedeh, 2016; Rana, 2016).

Similar to the early stage, some researchers take interest to use different theories in conjunction with NBS approach to see what they can learn from each other, and how they can be cross-fertilized. For instance, entrepreneurial cognition perspective (Lim, Morse, Mitchell, and Seawright, 2010), corporate social performance approach (Ioannou and Serafeim, 2012), and new institutionalism (Tempel and Walgenbach, 2007). There are some other studies, which particularly focused on the comparative analysis of business practices across different institutional contexts (e.g., Casper and Whitley, 2004; Bachmann and van Witteloostuijn, 2009; Hotho, 2014).

Others attempt to validate the existing typologies or make amendments the original model of NBS (e.g., Hotho, 2014; Haake; 2002; Redding; 2002). Another research focus surrounds the role of NBS in shaping firm innovation strategies, patterns of innovation (Whitley, 2000), and capacity to develop innovative competencies (Whitley, 2002). In particular Pezeshkan et al. (2016) utilize a configurational approach to examine how NBS shapes firm innovation within a country across 47

emerging and developing economies and conclude that three different institutional configurations have an association with high firm level innovation. (see Table 2.3 for summary).

To sum up, research on the NBS approach is growing with a diversity of research focus. Similarly, researchers are utilizing different methodologies to study NBS and its relation to different firm level practices and behaviors. However, a systematic study on the integrative link between societal institutions, business systems' characteristics, and firm level outcomes such as innovation has remained surprisingly underdeveloped. Most of the research endeavors, as discussed above, concentrated around the issues of conceptualization and operationalization (Casson and Lundan, 19999; Lundvall, 1999), validation of typologies (Hotho, 2014) or application of the theory into new contexts (e.g., Psycho and Szamosi, 2007; Dekocker, Pulignano, Léonard, and van den Broeck, 2012). There are few studies which use quantitative methodology, whereas, a large number of studies are either conceptual or use qualitative methods. One of the possible reasons for such trend is the lack of direct measures for the variables of NBS (Hotho, 2014; Morgan, 2007). Moreover, these studies primarily rely on secondary or archival data and used different indices as proxy measures of variables. Such data is either incomplete or unavailable for most of the less developed countries, which, in turn, put a limitation on the application of NBS approach in such contexts. Bearing these limitations in mind, this study develops measures for the constructs of societal institutions and NBS.

Table 2.3 : Application and progression of NBS approach from 1990 to 2016.

Author (s)	Year	Research Focus/aim	Methodology
Whitley	1991	- Comparison between East Asian economies - Initial work of Whitley toward the development of a new framework - Define the concept, characteristics of NBS and related institutional elements - Preliminary characteristics of NBS were authoritative coordination and control; business domain and development; inter-firm coordination - Societal institutions included authority relations; trust, reciprocity, and loyalty; political and financial systems	Conceptual
Whitley	1992a	- Introduced first the concept of NBS - Comparison of business systems of leading East Asian economies - How and in which ways societal institutions affect forms of business organization	Empirical Secondary and archival data
Whitley	1992b	- Compare and contrast patterns of organization of economic activities (national and sectoral) in Europe. - Degree and ways to which business systems change - The relationship between societal level institutions and business systems' characteristics	Conceptual
Whitley	1994	- Description of the conception of business systems, characteristics, institutional elements, and distinctive types of forms of organization, which was five initially, based on the interrelation between the institutional features and characteristics of business systems.	Conceptual
Romme	1994	- Study of changes in European paper industry in terms of business system framework - The impact of the national business system on the transformation of paper industry in Europe	Empirical Secondary data sources
Whitley	1996	- Compare and contrast the national business system approach and global commodity chains approach. - Integration of these two approaches. - Transnational companies and role of institutions in structuring their behavior	Conceptual
Whitley	1998	- Internationalization of economic activities and their impact on MNCs home national business system. - Used national business system approach to study the structure and behavior of MNCs.	Conceptual
Ferner and Quintanill	1998	- MNCs behavior, management of HRM, and NBS approach	Empirical Secondary data sources
Whitley	1999	- Definition of national business systems, institutional structuring of business activities - Business system framework to identify the variations in forms of business organizations - Types of business systems were extended to six from five.	Conceptual

Table 2.3 (continued) : Application and progression of NBS approach from 1990 to 2016.

Author (s)	Year	- Research Focus/aim	Methodology
Lundvall	1999	- Comparison between the national business system and national innovation systems and what both can learn from each other. - Criticism on the patterns of relationship between societal institutions and business systems' characteristics	Conceptual
Whitley	1999	- Clarification about the ways NBS is conceptualized - Level and unit of analysis - Variations in nature of firms and how institutional context affects their structure and behavior	Conceptual
Peder and Thomsen	1999	- Business systems and corporate governance - Applied business system approach to analyze ownership structures of largest one hundred firms from twelve countries of the continent of Europe	Empirical Secondary data sources
Casson and Lundan	1999	- Criticism on conceptualization, operationalization, and typology of national business system approach - Typology rather than a theory - Does not meet the criteria of a theory	Literature Review
Pedersen and Thomsen	1999	- African business system - History and institutional context led to fragmentation in the business system	Qualitative
Foss	1999	- Review on the business systems approach. How it challenges the field of economics and vice versa - Critical view on NBS approach	Review / conceptual
Kristensen	1999	- Critical review of national business systems approach	Review
Karnøe and Nygaard	1999	- Further development in NBS perspective - Incorporation of the agency, situation rationality, and social action at micro-level	Review / Conceptual
Whitley	2000	- Institutional context, types of business system (six types: fragmented, coordinated industrial district, compartmentalized, collaborative, highly coordinated and state organized), organizational capabilities, innovation patterns, and innovation performance	Qualitative
Yeung	2000	Effects of globalization on Asian business systems	Conceptual
Whitley	2001	- Comparative national business systems analysis of Africa and Asia - Application of NBS framework in new geographical regions	Conceptual
Redding	2002	- Amendment in Whitley's original model and added culture, rationale, and government role as mediator - The amended model applied to study China's private sector.	Conceptual
Haake	2002	- The link between industrial task environment and national business systems - Individualistic and communitarian business system (US, Japan, Germany, and Britain), and organization specificity of knowledge	Conceptual
Whitley	2002	- The impact of institutional elements (public science system, involvement with industry collaboration, reliance on specialist skills, and the ability to change collective competencies radically) on the style of innovative competence development)	Conceptual

Table 2.3 (continued) : Application and progression of NBS approach from 1990 to 2016.

Author (s)	Year	- Research Focus/aim	Methodology
Whitley	2003a	- The role of complementary institutions and types of state in developing country specific business systems - Focused on the role of different types of states (i.e., Regulatory, Dominant Developmental, Business Corporatist, and Inclusive Corporatist states)	Conceptual
Whitley	2003b	- Institutional framework, authority sharing and career incentives, and organizational capabilities - Institutions affect authority sharing and career incentives that in turn influence development of organizational capabilities.	Conceptual
Redding	2005	- Amendment in the existing model of NBS approach of Whitley (1992a) - Introduced culture as a variable and compared the US and French business systems	Conceptual
Tempel and Walgenb	2007	- Systematic comparison of new institutionalism and national business system approach	Review / conceptual
Morgan	2007	- Review on the development of national business system approach	Literature review
Psycho and Szamosi	2007	Greek National Business system and its support to adopt TQM as a new management practice	Conceptual
Lim, Morse, Mitchell, and Seawright	2010	- The relationship between societal institutions (the state, financial system, education system, and trust relations), entrepreneurial cognition and new venture creation decision - The only institutional element of the NBS framework uses to explain the impact	Empirical Secondary data on institutions
Wood, Dibben, Stride, and Webster	2011	- The relationship between HRM and business system theory in Mozambique - Represented NBS through institutional elements of this theory	Empirical Survey
Ioannou, and Serafeim	2012	- By adopting NBS approach, studied the role of national level institutions in determining the corporate performance of a firm	Empirical Secondary data
Dekocker, Pulignano, Léonard, and van den Broeck	2012	- Application of NBS approach in Belgium to study the employment practices of MNCs	Empirical Secondary data
Morgan	2012	- Used NBS approach to study the strategies and behavior of MNCs	Conceptual
Hotho	2014	- Validation of existing typology of NBS framework - Assessed its value to predict innovation patterns in thirty OECD countries	Empirical Secondary data
Allen	2014	- Business system and Employment Relations of MNCs	Empirical Secondary data

Table 2.3 (continued) : Application and progression of NBS approach from 1990 to 2016.

Author (s)	Year	- Research Focus/aim	Methodology
Fainshmidt, Judge, Aguilera, and Smith	2016	- Comparison between NBS approach and Varieties of capitalism and developed a new framework in the broader field of comparative institutionalism	Review Conceptual
Novitskaya and Brewster	2016	- The impact of Russian business system on the HRM practices of subsidized of Western MNCs in Russia	Qualitative
Pezeshkan, Smith, Fainshmidt, and Sedeh	2016	- The impact of the national business system on firm level innovation - Institutional elements were taken into account to see the effects. - The implication of theory in developing countries	Quantitative
Rana and Morgan	2016	- Review of literature on NBS approach and its implication for international business in the context of Bangladesh.	Literature review

2.2.6. The institutional logics perspective

The institutional logics perspective (ILP) is a meta-theory in organization studies useful to analyze the impact of broader societal (institutional) context on organizational behavior and individual cognition (Thornton, Ocasio, and Lounsbury, 2015). The ILP was developed in response to the proliferation of studies that were more concerned with the diffusion and isomorphism of organizational structure and practices to gain legitimacy for long-term survival (Friedland and Alford, 1991). This stream of research is labeled as new institutionalism (Meyer and Rowan, 1977; Zucker, 1977; DiMaggio and Powell 1983). Although, ILP shares a common understanding with the new institutionalism about the impact of cultural and institutional elements on the organizational structure, the focus is no more on isomorphism, but on the influence of different competing logics on organizations and individuals in a wider institutional context (Thornton and Ocasio, 2008).

The notion of institutional logics was first introduced by Friedland and Alford (1991) with an argument that a complete understanding of organizational and individuals' behavior without locating it in broader societal (institutional) context is impossible. This approach helps scholars to understand how organizations and individuals influence, and are being influenced the societal context (Thornton et al. 2015). Friedland and Alford (1991) maintain that there are interrelationships between society, organizations, and individuals. To them, institutions are "supra-organizational patterns of human activity that reflect in a set of material practices and symbolic constructions through which actors conduct their material lives and give meanings to the social reality" (Friedland and Alford, 1991, p.232).

This approach views society as an inter-institutional system containing different institutional orders such as state, family, market, professions, religion, community, and corporation (Thornton, Ocasio and Lounsbury, 2012). Each institutional order can be conceived as a meta-institution having a unique set of institutional contents with differential competing institutional logics that shape the cognition and behavior of actors (Ocasio, 1997). In other words, institutional logics reside at different analytical levels including societal, organizational, and individual levels. Thornton et al. (2012) classified these levels as macro (societal level), meso (organizational level) and micro (individual level). However, these levels are closely interlinked and have cross-level effects (Thornton et al. 2012). Actors nested in such institutional

orders/levels usually conform to the higher order institutional logic, however, they can reinterpret, change, and exploit these logics according to the situation, especially when confronting with conflicting institutional logics (Thornton et al. 2015).

Thornton and Ocasio (1999) define institutional logics as "the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality" (p.804). This definition implies that individuals in an organization have agency and used these institutional logics as guidelines to provide meanings for their reality (Thornton and Ocasio, 1999). Moreover, institutional logics contain both material and symbolic elements, where the former refers to the organizational structure and practices, while the latter is about ideation and meanings. Although both aspects represent different contents, they are tightly interlinked because symbols are embedded in material practices, while material practices are reflected through symbols (Zilber, 2008). Thus, logics are more powerful than institutions and have strong impacts on the organizational structures and actors' behavior.

In sum, ILP focuses on institutional heterogeneity and explain how different competing logics take place within organizations and institutional fields (Dunn and Jones, 2010; Pache and Santos, 2010). Institutional logics are understood as socially constructed phenomena within which actors are embedded and work with these logics as guiding principles to create and maintain meaning for the reality (Friedland and Alford, 1991; Thornton and Ocasio, 1999). In the case of conflicting logics, actors can switch between different logics according to the situation, which in turn, provide an opportunity for agency and change (Thornton et al. 2012). Moreover, the concept of ILP has been applied in different research settings (i.e. publishing, medicine, finance, thrift) at different analytical levels (i.e. individuals, organizational, field, and societal) (Thornton and Ocasio, 2008). This indicates that ILP has become a very influential framework for institutional analysis.

2.3. Intellectual Capital

2.3.1. Introduction

Unlike the past, contemporary firms are operating under a highly dynamic, complex, globalized business environment that constrains firms to continue conventional

business practice for a longer period. Changes are frequent in such environment, and firms' inability to adapt these changes may have adverse effects on performance as well as long term survival. Therefore, a strategic fit between firms and their environment is crucial to seize the opportunities as they arise, which is only possible when firms possess sufficient stock of heterogeneous and immobile resources.

Generally, a firm's resources consist of assets, capabilities, processes, and information/knowledge (Barney, 1991; Peteraf, 1993). Although, every resource deems important, they cannot be a source of competitive advantage. To do so, a resource must be valuable, rare, imperfectly imitable, and not-substitutable (Barney, 1991). In today's knowledge-era, this criterion can only be achieved by intangible resources such as knowledge (Sánchez, 2000), which in this study is conceptualized as intellectual capital (IC). Many other authors also have documented the importance and describe it as one of the prime intangible resources of the present age (e.g., Carlucci, Marr, and Schiuma, 2004; Sharabati, Naji Jawad, and Bontis, 2010). Therefore, firms continuously involve in the management of such resources to create future value (Kaya et al. 2010; Hsu, Chu, Lin, and Lo, 2014).

Considering the importance of IC, several academicians and practitioners have proposed different theoretical, empirical, and review works in the field. As a result, a large body of literature has emerged in this field, which has led to substantial fragmentation. Therefore, this study aims to write a general but concise review on the IC construct to add more insights.

Remaining of this paper is structured as follows. In the next section, the background of IC, concept, definition, and components are presented. In the third section, application of the construct in different research fields is provided. In section four, details on the IC's role in predicting the different organizational outcome are given. Finally, section five contains conclusion of the study.

2.3.2. Background of IC

Although, economic exploitation of IC can be traced back in the prehistoric times, however, in the modern era, discussion on IC started in the first half of the twentieth century (Bratianu and Orzea, 2013). During this period, the concept was merely considered by an economist (e.g., Feiwel, 1975; Patton, 1900; Solow, 1975), therefore, this research stream was growing very slowly. However, research in this

field started to grow in the last decade of the twentieth century (Bratianu and Orzea, 2013), and large number of prominent practitioners and researchers from business and management discipline took interest in the research area and contributed significantly (e.g., Bontis, 1998; Brooking, 1996; Edvinsson, and Malone, 1997, Edvinsson and Sullivan, 1996; Roos, Edvinsson, and Dragonetti, 1997; Stewart, 1997, 1991; Zucker, Darby, and Armstrong, 1994).

Today, the field of IC has become much more mature and has a significant position in the broader field of management sciences (Zambon, 2016). This can be deduced from increasing numbers of conferences, books, articles, and the establishment of consulting firms centered on IC (Petty and Guthrie 2000, p. 155), indicating the field has an extraordinary potential of becoming a '*scholarly hub'* (Zambon, 2016).

2.3.3. Concept of IC

Although, the concept of IC has become a popular organizational construct, a commonly accepted definition of IC is missing (Zambon, 2016; Kristandl and Bontis, 2007). Prior literature indicates many terms that have been used synonyms to IC over the years (see Table 2.4), causing confusion what the term IC actually manifests (Marr and Moustaghfir, 2005; Seetharaman et al. 2004). A potential reason for the use of diverse terminology can be the research background of the scholars who have used the concept IC from their own perspective to explain rather different phenomena (Marr and Moustaghfir, 2005). For example, an accounting scholar uses the term intangibles assets, economist frequently uses knowledge assets, management and strategy researchers intellectual capital, while law scholar often uses the term intellectual property (Kaufmann and Schneider, 2004; Lev, 2001). This implies that every group of scholars strives to promote their own nomenclature, and is not ready to the term of others (Bontis, 2001; Kristandl and Bontis, 2007). Consequently "one still does not know the phenomenological characteristics of the term" (Kristandl and Bontis, 2007, p. 1511). Despite the presence of a wide spectrum of terms, this study uses the term IC due to its wide application in the management and strategy literature (Kaufmann and Schneider, 2004; Marr and Moustaghfir, 2005; Sánchez, 2000).

Table 2.4 : Summary of commonly used terms synonyms to IC.

Synonym Terms to IC	Literature
Knowledge	(Bontis, 1998; Edvinsson and Sullivan, 1996; Seetharaman et al. 2004; Stewart, 1998; Subramaniam and Youndt, 2005)
Knowledge assets	(Bernard et al. 2004; Martı, Delgado-verde, Lo, and Martı, 2011)
Knowledge and knowing capability	(Nahapiet and Ghoshal, 1998)
Intangible resource	(Marr and Moustaghfir, 2005)
Knowledge capital	(Reed et al. 2006)
Knowledge and skills	(Swart, 2006)
Intangible assets	(Choong, 2008; Kristandl and Bontis, 2007)
Intangible resources and capabilities	(Albertini, 2016)

2.3.4. Definition of IC

Despite the importance of the important organizational resource, there is no generally accepted definition of IC exists in the literature. While, a proper definition of this '*elusive intangible*' (Bontis, Janosevic, and Dzenopoljac, 2015) very crucial in order to "understand what we are dealing" (Kristandl and Bontis, 2007, p. 1511).

Table 2.5 : Summary of definitions of IC.

Perspective	Definition	Literature
IC as Knowledge	IC as a knowledge used to create value	(Edvinsson and Sullivan, 1996)
	IC creates value for a firm through the transformation of knowledge,	(Seetharaman et al. 2004)
	IC is a knowledge capability to understand a social phenomenon.	(Nahapiet and Ghoshal, 1998)
	IC is the aggregate of all knowledge which a firm can exploit while undertaking a business activity to achieve competitive advantage	(Youndt et al. 2004; Zéghal and Maaloul, 2010)
IC as Intangible resources/intellectual material	Intangible resources valuable to a firm gained after learning and experience useful in producing more wealth	(Marr and Moustaghfir, 2005)
	IC is strategic resources in the form of intangibles which a firm to create value for a long period of time	(Kristandl and Bontis, 2007)
	IC is a set of a firm's intangible resources and capabilities	(Albertini, 2016)
	Intellectual material consists of knowledge, information,	(Stewart, 1997)

Table 2.5 demonstrates that IC is defined as either knowledge or intangible resource/intellectual material. Former is generally used management & strategy literature, while later conceptualization is employed in accounting and economics literature. Following the tradition of management discipline, this study conceptualized IC as the *sum of knowledge resource embedded in different parts of any organization which enables that organization to create value* (Youndt et al. 2006; Singh and Rao, 2016).

2.3.5. Components of IC

Since its conception, the question what constitutes IC has always remained under investigation in this stream of research because identification of components of any construct is the first step of understanding its nature (Bontis et al. 2015). Despite the conceptual diversity, there is a widely established agreement among scholars that IC is a multidimensional construct (Arvan et al. 2016; Bontis et al. 2015; Singh and Rao, 2016; Youndt et al. 2004) (see Table 2.6).

Prior research has proposed different components of IC, each of which contains different types of knowledge resources. For example, Edvinsson and Sullivan (1996) categorized IC into two main elements consisting of human and structural capital, where the former is about knowledge, skills, and expertise of the people in organization, while latter represents intangible (i.e. technology, databases, plans and procedures) and tangible elements (i.e. physical and financial assets). Afterwards, scholars have generally used more than two dimensions of IC, but most of them are limited their dimensions to three. For instance, some scholars have categorized IC as human, structural and customer capital (e.g., Bontis, 1998; Stewart, 1997), while others have replaced customer capital with relational capital and used the typology of human, structural, relational capital (e.g., Bontis, 1999; Moon and Kym, 2006; Sharabati et al. 2010; Cleary and Quinn, 2016).

Another group of researchers has used a slightly different typology that entails human, social and organizational capital (e.g., Huang and Jim Wu, 2010; Reed et al. 2006; Singh and Rao, 2016; Subramaniam and Youndt, 2005; Youndt et al. 2004). In fact, the latter two components are used in place of relationship and structural capital. Still, there are many other typologies, but more or less they fall within one of the

above-mentioned typologies (e.g., Chen et al. 2004; Swart, 2006; Wang and Chang, 2005; Wee and Chua, 2016).

Considering the above discussion, this study adopts the typology of human, social and organizational capital, as discussed below.

Table 2.6 : Summary of IC components.

Components	Literature
Human Capital and Structural Capital	(Edvinsson and Sullivan, 1996)
Human capital, structural capital and customer capital	(Stewart , 1998, Bontis, 1998)
Human capital, structural capital, relational capital	(Bontis, 1999; Moon and Kym, 2006; Sharabati, Naji Jawad, and Bontis, 2010; Cleary and Quinn, 2016; Andreeva and Garanina; 2016)
Human capital and Structural capital (innovation capital, process capital, relationship capital)	(Joia, 2000)
Human capital, relational capital- external and structural capital-internal	(Seetharaman et al. 2004)
Human capital, social capital and organizational capital	(Youndt et al. 2004; Subramaniam and Youndt, 2005; Reed et al. 2006; Huang and Jim Wu, 2010;)
Human capital, structural capital, innovation capital and customer capital	(Chen, Zhu, and Xie, 2004)
Human capital, innovation capital, process capital, customer capital	(Wang and Chang, 2005)
Human, social, structural and organizational, client and network capital	(Swart , 2006)
Human capital, organizational capital, and customer capital	(Chen, Liu, Chu and Hsiao, 2014)
Human capital information, relational capital information and structural capital information	(Wee and Chua, 2016)
Human capital, relational capital, innovation capital, and process capital	(Scafarto, Ricci,and Scafarto, 2016)
Human, technological, and vertical social capital	(Delgado-Verde, Martín-de Castro,and Amores-Salvadó, 2016)

Human capital (HC): Within IC research stream, human capital (HC) is assumed to be one of the most important and primary constituents of IC, which generally refers to the people or human factor and their accumulated knowledge, skill and abilities (Albertini, 2016; Andreeva and Garanina, 2016; Bontis, 1998, 1999; Edvinsson and

Sullivan, 1996; Massingham and Tam, 2015; Reed et al. 2006; Singh and Rao, 2016; Stewart, 1998; Subramaniam and Youndt, 2005; Tan, Plowman, Hancock, and Hancock, 2008). According to Joia (2000), firms could not own HC, instead, it belongs to employees and they take this form of capital with them when leaving the workplace (Albertini, 2016; Bontis, 1999; Hsu and Fang, 2009; Sánchez, 2000).

Social Capital (SC): Social capital, often termed as relational capital, deals with knowledge embedded in the relationships with external parties including customers, suppliers, and firms within and outside the industry (De Castro and Saez, 2008; Sharabati et al. 2010; Youndt et al. 2004).

Organizational Capital (OC): Organizational capital (OC), frequently referred as structural capital in the literature, deals with the part of organization knowledge, information, and skills that stay with the organization when employees leave the organization at the end of a working day (Bontis, 1999; De Castro and Saez, 2008; Reed et al. 2006a; Subramaniam and Youndt, 2005; Youndt et al. 2004). In other words, it is companies' infrastructure, which encompasses production process, information and technology, and R & D facilities (Zéghal and Maaloul, 2010).

2.4. Absorptive Capacity

2.4.1. Introduction

Absorptive capacity (ACAP) is seen as an important organizational capability that allows a firm to learn from outside knowledge resources and thereby enable it to produce positive outcomes. By bringing into external knowledge, ACAP broadens existing knowledge resource base of a firm. In this way, a firm constantly engages into search and uses external knowledge that enables configuration and re-configuration of knowledge resources to create value. Accordingly, ACAP has become one of the very influential frameworks[1] in the field of management (Tortoriello, 2015) and has attracted increased attention of scholars to test its explanatory power across different research settings, including inter-organizational learning (Lane and Lubatkin, 1998), intra-organizational learning (Minbaeva, Pedersen, Björkman, and Fey, 2014; Peltokorpi, 2017), knowledge transfer (Tsai,

[1] Google Scholar displays that as of June 2017, Cohen and Levinthal's (1989, 1990) two articles on ACAP have received over 42,000 citations.

2001), corporate entrepreneurship (Zahra, Filatotchev, and Wright, 2009), and portfolio alliances (Vasudeva and Anand, 2011).

In their seminal work, Cohen and Levinthal (1989) identified that R&D activities in a firm not only produce new knowledge and innovations, but also groom its capability to integrate external knowledge with the internal one. They named this capability as "absorptive capacity". Albeit the term had already been used by various scholars (i.e., Kedia and Bhagat, 1988), the work of Cohen and Leventhal (1990) is generally believed to be the foundation of the concept due to its significant theoretical contribution in the field (Volberda, Foss, and Lyles, 2010).

Over time, the construct has been re-evaluated, modified, and extended by many other scholars (Gao, Yeoh, Wong, and Scheepers, 2017). These research efforts have been invested in examining different aspects of ACAP such its nature, conceptualizations, dimensions, the level of analysis, its antecedents and outcomes. The general agreement is that ACPA is a multidimensional construct which exists at different analytical levels, and can be influenced by and influence to various factors (e.g., Zahra and George, 2002; Lane, Koka, and Pathak, 2006; Volberda et al. 2010). This has led to the emergence of a large body of literature in this stream of research.

Accordingly, this paper aims to review the important literature on ACAP in order to enhance the understanding of its determinants and outcomes, which prior studies have identified in order to position its research objective in the overall research domain. In doing so, this study first presents a concise overview of the conceptual evolution of the construct followed by a discussion on the antecedents and outcomes, and conclusion.

2.4.2. Overview of conceptual evolution of ACAP

Inspired by cognitive and behavioral theories, Cohen and Levinthal (1990) revisited their preliminary definition of ACAP and reconceptualized it as "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (p.128). This organizational capability, however, is argued to be path dependent, develops gradually, depends on the prior related knowledge base (Van Den Bosch, Volberda, and De Boer, 1999; Fosfuri and Tribó, 2008), and leads to various performance outcomes such as innovation (Gao et al. 2017).

By linking *individual-level* learning and cognition/memory development theories with those of organizational one, Cohen and Levinthal (1990) contend that newly learned knowledge amasses in the memory of individuals which help them in future learning by instituting connections between existing knowledge and new knowledge in the similar domain. Similar logic can be applied at firm-level as well, because a firm also learns new knowledge over time and accumulates it in its memory or knowledge repository, as in the case of intellectual capital development (Youndt et al. 2004).

This implies that a firm's ACAP is the aggregate of ACAPs of individual members. These individuals actually are the human capital of the organizations (Subramaniam & Youndt, 2005). According to Zahra and George (2002), these individuals play the role of gatekeepers by searching and bringing outside knowledge in the organization, and then internalize it for value creation purposes. This suggests a firm's ACAP can also be improved, as it develops the ACAP of its workers (Cohen and Levinthal, 1990).

In addition to the prior knowledge, Cohen and Levinthal (1990) highlight that ACAP can also be influenced by the patterns of distribution of expertise among employees as well as by the structure and processes (i.e. organizational capital) of communication within and outside (i.e. social capital) the firm. Thus, human capital is also a very crucial constituent, which influences the other two as well, and they altogether affect a firm's ACAP.

In sum, combining behavioral and cognitive aspects in the construct of ACAP have enriched its explanatory power. Therefore, organizational and innovation scholars are increasingly researching this construct in order to understand the role of internal capabilities of acquiring and utilizing external knowledge for organizational welfare (Omidvar, 2013).

2.4.3. Extensions and reconceptualizations of ACAP

As already mentioned, the concept of ACAP has been re-examined and reconceptualized over time by many authors (Ali, Ali, Al-Maimani, and Park, 2017). For example, Lane and Lubatkin (1998) introduced the term of *"relative absorptive capacity"* by arguing that that prior definition of ACAP assumes all firms are equally capable of acquiring knowledge and learning from other organizations. While,

ACAP is a relative construct that depends on the context of social relations within which knowledge is embedded. Moreover, inter-organizational learning is the function of the level of similarities in different characteristics of collaring firms (i.e. student and teacher firms). Examples are a knowledge base, compensation practices, organizational structure, dominant logics, and knowledge of underlying problems (Lane and Lubatkin, 1998). According to them, the first dimension of ACAP-recognition of the value of external knowledge (acquisition) depends on the resemblance of knowledge resources (i.e. technical, academic, and scientific) of student-teacher firms, which actually represents the *"know-what"* part of their knowledge repository. The second dimension – assimilation, depends on the similarly between knowledge processing systems of partner firms, and reflects the *"know-how"* portion of a knowledge repository. Lastly, the third dimension-commercialization, is contingent on the similarities between student-teacher firms' commercial purposes and forms the *"know-why"* part of the knowledge repository.

After Cohen and Levinthal (1990), Zahra and George's (2002) proposed a major re-conceptualization of ACAP in their article[2], which appeared in the *Academy of Management Review*. According to them, a firm's ACAP is embedded in its routines and processes, which support reconfiguration of existing knowledge with the new one through the processes of acquisition, assimilation, transformation, and exploitation. They decomposed ACAP construct into two subcomponents of ACAP: potential absorptive capacity (PACAP), representing the acquisition and assimilation capabilities of Cohen and Levinthal's (1990) conceptualization, whereas realized absorptive capacity (RACAP) refers to the transformation (new dimension) and exploitation capabilities, previously proposed by Cohen and Levinthal (1990).

Acquisition ability deals with the acquisition of external knowledge valuable for its internal operations. Assimilation capability deals with the organizational routines and processes, enabling a firm to interpret, understand, and dispense the obtained knowledge. Transmission refers to the capability, which internalizes and reconfigures assimilated new knowledge with existing one. Finally, exploitation capability of a firm concerns itself with refining, extending, leveraging current competencies or building new ones through adding new knowledge into the operations after

[2] Google Scholar shows that as of June 2017, this article has received over 7900 citations.

assimilation. Successful knowledge exploitation generates positive outcomes in the form of new goods, processes, knowledge, systems, and organizational forms (Zahra and George, 2002).

According to Zahra and George (2002), PACAP and RACAP play distinct but complementary roles. Although, the two sub-components coexist in an organization, it is not a sufficient condition to believe that they can lead to improved innovation outcomes. For instance, a firm may have strong acquisition and assimilation capabilities, but weak transformation and exploitation capabilities, thus causing inability to launch successful innovation, and vice-versa. Considering this challenge, they have proposed the ratio of ACAP and label it as "*efficiency factor"* suggesting firms minimize the gap between PACAP and RACAP. In other words, the maximum level of knowledge that a firm can transform and utilize depends on the level of knowledge it acquired and assimilated. Thus, it is essential for innovative firms to maximize ACAP ratio in order to enhance innovation performance (Gao et al. 2017).

Acknowledging Zahra and George's (2002) *efficiency factor view*, Lane, Koka, and Pathak (2006) proposed a capability-based process model and conceptualized ACAP as an "*ability*" of a firm, similar to that of Cohen and Levinthal (1990), and rolled back the transformation dimension of ACAP (Gao et al. 2017) proposed by Zahra and George (2002) by justifying that "transformation element" is assumed and incorporated in the assimilation and exploitation dimensions of their model (Gao et al. 2017). Lane et al. (2006) refer ACAP as the capability of a firm that uses external knowledge via three sequential mechanisms: (1) identify and understand external knowledge valuable to the firm by explorative learning; (2) assimilate that knowledge by the mean of transformative learning; (3) utilization of assimilated knowledge through exploitative learning to produce new knowledge or commercially oriented outputs (p. 856).

Similarly, Todorova and Durisin (2007) called Zahra and George's (2002) splitting of ACAP into two subsets of PACAP and ACAP into question and contended that their reconceptualization had caused serious ambiguities and omissions. These scholars called back "*recognizing the value*" component into the model by arguing that Zahra and George's (2002) component "*transformation*" does not come after "*assimilation*", instead it is linked with assimilation through alternative paths. Thus, they define ACAP as a firm's ability to recognizing the value, acquiring, assimilating

or transforming, and exploiting new external for internal purpose. According to them, where there is a fit between new external knowledge and firm's prevailing cognitive schemas, then assimilated knowledge can be directly used without transformation. In the case of misfit, then knowledge should be transformed first by modifying existing knowledge schemas in order to adapt new idea or knowledge (Lane et al. 2006).

Table 2.7 : Key contributions to ACAP literature.

Study	Year	Key Contribution	Definition	Components
Cohen and Levinthal	1990	Introduced ACAP	ACAP is a firm's ability to recognize the value of new knowledge from the external environment, assimilate it, and exploit it for commercial purposes	Recognizing the value Knowledge assimilation Knowledge application
Lane and Lubatkin	1998	Introduced relative ACAP	ACAP is a firm's ability to learn from partner firm by valuing, assimilating, and applying knowledge for commercial use	Knowledge acquisition Knowledge assimilation Knowledge commercialization
Zahra and George	2002	Introduced transformation capability to ACAP	ACAP is an organizational capability consists of organizational process and routines that enable enterprises to acquire, assimilate, transform, and utilize new external knowledge to create value	PACAP (acquisition and assimilation) RACAP (transformation and exploitation)
Lane et al.	2006	Proposed process-oriented definition of ACAP	ACAP is firm's capability that uses valuable external knowledge through three sequential learning processes explorative, transformative, and explorative learning	Recognizing the value Knowledge assimilation Knowledge exploitation
Todorova and Durisin	2007	Proposed new definition of ACAP	Conceptualize firm's ACAP as an ability to recognize the value, acquiring, transforming or assimilating, exploiting knowledge	Recognizing the value Knowledge acquisition Knowledge transformation or assimilation Knowledge exploitation
Camisón and Forés	2010	Reintroduction of transformation element to ACAP	ACAP is firm's capability to acquire, assimilate, transform, and exploit by recognizing the value of external knowledge	PACAP (acquisition and assimilation) RACAP (transformation and exploitation)

Recently, Camisón and Forés (2010) follow Zahra and George (2002) and bring back *transformation component* into the original concept of ACAP. They argue that almost all previous definitions implicitly incorporate this component into the assimilation component because of their interdependence (e.g., Todorova and Durisin, 2007), but these two components should be detached explicitly as they belong to different subsets of ACAP (i.e. PACAP and RACAP) and depend on different process and routines in a firm. Contrary to Todorova and Durisin (2007) when a firm intends to acquire new knowledge from the external environment, it must be first understood, examined and codified regardless of its relevance with existing knowledge base and scheme because such knowledge is obtained from entirely different settings.

Following Zahra and George's (2002) work, Camisón and Forés (2010) define ACAP as a firm's capability that exists in the form of two subcomponents: PACAP and RACAP. Whereas the former encompasses acquisition and assimilation capabilities, which value, acquire and assimilate external knowledge, the latter deals with the transformation and exploitation capabilities, which integrate, reinterpret and reconfigure already existing knowledge base with the new knowledge, and incorporate it into the firm structure, operations, process and routines, not only to upgrade existing knowledge resources and capabilities but also to generate new ones.

In sum, the examination of relevant literature highlights that since the inception of ACAP, scholars have tried to understand and explain a variety of its aspects. As a result, two identifiable streams of research in this field have emerged. One focuses on the technical aspects of ACAP, such patent and R&D, while the other concerns with a non-technical aspect of the construct such as organizational capabilities (Ali et al. 2017). In a recent literature analysis on ACAP, Gao et al. (2017) classified this strand of research as technical and behavioral aspects and reported that 44 out of 65 articles study the technical aspects of ACAP. It is important to note here that studies center on the technical domain has generally used different proxies such as patents counts and the intensity of R&D expenditure (e.g., George, Zahra, Wheatley, and Khan, 2001; Kostopoulos, Papalexandris, Papachroni, and Ioannou, 2011). While, literature that focuses on behavioral or non-technical aspects follow the capability-view (e.g., Zahra and George, 2002; Camisón and Forés, 2010) by arguing that proxies are static resources, which do not adequately represent the capability aspect

of a firm (Lane et al. 2006; Coombs and Bierly, 2006). The latter domain typically considers ACAP as a firm's capability that is embedded in organizational structure, processes, and routines to acquire, assimilate, transform, and exploit new external knowledge to create value. Accordingly, this study follows the capability-based view, and uses the two-dimensional construct of ACAP encompassing PACAP and RACAP.

2.4.4. Antecedents of ACAP

Although, substantial research effort has been devoted to the analyses that focus on the antecedents of ACAP, it is not clear to what extent these antecedents contribute to the improving of ACAP among many factors (Rezaei-Zadeh, and Darwish, 2016). Given the multidimensional nature of the construct, different antecedents might have differential effects on each dimension, and thereby lead to uneven performance outcomes (Jansen et al. 2005). In their seminal work, Cohen and Levinthal (1990) and many other scholars have acknowledged the role of prior related knowledge that is stockpiled in a firms' knowledge repository as the premier antecedent of ACAP. However, sheer exposure to new external knowledge is not an adequate condition to ensure that a firm can successfully absorb such knowledge as well (Deng, 2010). A firm's ACAP, therefore, also depends on many other antecedents, which can be from a different level of analysis (see Table 2.8) (Van Den Bosch, van Wijk, and Volberda, 2003).

For example, Lane and Lubatkin (1998) propose the concept of relative ACAP by arguing that it is an *interfirm-level* (dyadic-level) construct, which depends more on the extent of similarly between the participating firms' knowledge resources, structure, compensation practices, dominant logics and familiarity with problems than the intensity of R&D. At *firm-level*, Van den Bosch et al. (1999) concede prior related knowledge as a leading factor to ACAP, but as they argue, it works through two other firm-level antecedents namely organizational form (i.e. functional, divisional, matrix) and combinative capabilities (i.e. systems, coordination, socialization). While explaining the mechanism of links, they took into account the role of knowledge environment (i.e. stable vs turbulent) that is assumed as coevolve these antecedents. For example, firms those operate in a stable environment are less intended to search new knowledge, thus have a low level of ACAP compared to those located in a turbulent environment. A firm from such environment is keener to

develop only organizational forms and capabilities that can be more conducive to the absorption of knowledge, thus, have higher ACAP.

Table 2.8 : Summary of ACAP antecedents.

Levels of Analysis	Antecedents of ACAP	Author
Individual/Managerial Level	Prior experience, need for cognition	(Ojo, Raman, and Chong, 2016)
	Knowledge sharing	(Liao, Fei, and Chen, 2007)
	Employees learning orientation	(Yao and Chang, 2017)
	Identification, assimilation, utilization external knowledge	(Enkel, Heil, Hengstler, Wirth, 2017)
	Leadership styles of top and middle management	(Sun and Anderson, 2012)
Firm-level	Organizational Structure	(Ali et al. 2017; Adams, Flatten, Brinkmann, and Brettel, 2016).
	Level of prior relate knowledge, combinative capabilities, organizational forms	(Van Den Bosch et al. 1999)
	Experience of knowledge search	(Fosfuri and Tribó, 2008)
	Unlearning Environment	(Cepeda-Carrion, Cegarra-Navarro, and Jimenez-Jimenez, 2012)
	Organizational knowledge, formalization, social integration mechanisms	(Vega-Jurado, Gutiérrez-Gracia, and Fernández-de-Lucio, 2008).
	External knowledge inflow	(Kostopoulos, Papalexandris, Papachroni, and Ioannou, 2010).
Intrafirm-level	Access to knowledge and network position	(Tsai, 2001)
	Transformational leadership	(Ferreras Méndez, Sanz Valle, Alegre, 2017)
Interfirm-level	Knowledge search strategies	(Ferreras-Méndez, Fernández-Mesa, and Alegre, 2016)

Antecedents of ACAP based on Volberda et al (2010)

At the *intra-organizational-level*: Apart from other antecedents, Cohen and Levinthal (1990) also underscore the structure of knowledge transfer across inter-organizational business units as an important driver of a firm's ACAP. Ferreras Méndez, Sanz Valle, and Alegre (2017) examine the relationship between transformational leadership and ACAP at inter-organizational-level learning, and find a positive relationship. Tsai (2001) also studied ACAP at the business unit level, but did not directly discuss its antecedents. However, units with a central position in the networks were assumed to have more access to knowledge and higher ACAP, and thereby, were able to produce positive outcomes. Some other studies have looked into individual level antecedents. For example, Yao and Chang (2017)

recently examined the role of individuals' characteristics to advance ACAP and found a positive link.

2.4.5. Outcomes of ACAP

In addition to the antecedents, much literature on the AC is centered on studying its benefits or outcomes. In their seminal work, Cohen and Levinthal (1990) describe that knowledge absorption capacity enables firms to improve their innovative capability. ACAP not only allows a firm to transform outsourced knowledge into tangible benefits in an effective and efficient manner but also functions as a means to develop novel products and processes, which leads to better financial performance (Kostopoulos et al. 2010). Apart from potential benefits, Lichtenthaler, (2016) examines the downsides of ACAP and argue that it may have negative effects on long-term financial performance of a firm due to the cost associated with the development of this capacity.

Table 2.9 : Summary of literature on ACAP outcomes.

Outcome	Key Literature
Innovation/Innovation Performance	(Ritala and Hurmelinna-Laukkanen, 2013; Rothaermel and Alexandre, 2009; Tsai, 2001; Vinding, 2006; Belderbos, Gilsing, and Suzuki, 2016; Fosfuri and Tribó, 2008; Chen, Lin, and Chang, 2009; Tseng, Chang Pai, and Hung, 2011; Gray, 2006; Hurmelinna-Laukkanen, 2012; Ali and Park, 2016).
Firm Performance	(Adams et al. 2016; Flatten, Greve, and Brettel, 2011; Wales, Parida, and Patel, 2013; Zahra and George, 2002; Lichtenthaler, 2016; Lee, Liang, and Liu, 2010)
Competitive Advantage	(Zahra and George, 2002; Delmas, Hoffmann, and Kuss, 2011; Liao, Chen, Hu, Chung, and Yang, 2016; Chen et al. 2009)
Financial Performance	Kostopoulos et al. (2010)
Organizational learning	Schildt et al. (2012)

In another study, Mu, Tang, and MacLachlan, (2010) argue that mere possession of knowledge resources does not guarantee organizational success, internal-organizational knowledge transfer is even more important to make such knowledge more valuable which requires a strong ACAP. Schildt, Keil, and Maula, (2012) investigated the association between ACAP and inter-organizational learning, and unexpectedly found a negative influence on the early stage learning but significant

positive effects on the later stage. Table 2.9 provides the summary of ACAP's outcomes. As shown in Table 2.9, majority of scholarly work on the outcomes of ACAP has focused on the innovation outputs and performance, whereas less attention has paid to the individual level outcomes such as employee engagement or learning and firm level outcomes such as financial performance and the degree of competitive advantage.

2.5. Summary

This chapter presents the existing literature on the study constructs, namely firm innovation, societal institutions, NBS, IC, and ACAP. The literature review shows that existing studies have largely researched the direct relationship between more macro-level and micro-level construct, while ignore the mechanism of such linkages. This study has tried to develop and investigate such linkages in a more systematic way. To do this, the literature of these seemingly unrelated constructs is combined in a theoretical framework in Chapter.4. Besides, the next chapter provides the literature review on Pakistani context, covering general context, and NBS framework of the country.

3. THE ISLAMIC REPUBLIC OF PAKISTAN

In the previous chapter, we presented literature review about the study constructs. This chapter will focus on the context of the Islamic Republic of Pakistan (hereafter Pakistan) where the proposed research framework is applied. This chapter consists of two sections. First section covers the introduction of Pakistan, including a historical perspective, an overview of her industrial development, and an assessment of hercurrent situation. The second section covers NBS framework of Pakistan, including characteristics of the NBS and societal institutional setup in the country.

3.1. Introduction

Pakistan is a developing/emerging South Asian economy with unique socio-cultural and religious context (Halkias, 2011). Among others, one of the most interesting features of Pakistani society is its deep division into various ethnic groups, social classes, and sects (Toor, 2005). Consequently, sub-cultures in the country are stronger than national culture, and are reflected clearly in all aspect of life, including businesses. The main ethnic groups in the country are Punjabis (44.68%), the Pashtuns (15.42%), Sindhi (14.1%), Seraiki (8.38%), Muhajirs (7.57%), Balochi (3.57%), and others (6.28%). Islam is the official religion of the state and over 96% of the total population of the country is Muslim (Central Intelligence Agency, 2015).

Although, the country is a relatively young nation it has a great potential to become one of the largest markets and center of business activities, as the country has total population over 180 million, one of the 6th largest economy, and second in the Muslim world after Indonesia (Lisboa and Handford, 2012; World Bank, 2016). The largest share of the population consists of people who are young and in the working age group. English is a widely spoken language in the country because it is the medium of instruction in the universities of the country. Similarly, business community also uses English as the principle mode of business communication (Baker and Jones, 1998; Lisboa and Handford, 2012).

Geographically, Pakistan has a border with India, China, Iran, and Afghanistan. All of these countries are the center of interest in the world due to their special circumstances. This makes Pakistan strategically very important in this region. The relationships with these countries, except China, always remain weak and uncertain throughout the history due to different reasons. For example, disputes between Pakistan and India have started since the partition over the division of resources (i.e. water) among two countries. And they continued to intensify over the time, including clashes between the two countries over Kashmir. Similarly, Pakistan's relationships with Iran and Afghanistan changed radically after Soviet War and become weak and uncertain (Alam, 2004). However, the country has very strong brotherly ties with China all the time (Rakisits, 2012; Shukla, 2013). Administrative units of the country are Punjab, Sindh, Khyber Pakhtunkhwa, Islamabad Capital Territory, Federally Administered Tribal Areas, Baluchistan, and Azad Jammu & Kashmir (autonomous), and Gilgit-Baltistan (autonomous).

3.1.1. Historical perspective

Pakistan came into being with the idea to provide a homeland to the Muslims of India where they can exercise Islamic practices with full freedom in every aspect of life including business (Mehtabdin, Hebert, Pahl, Waite, and Kochian, 2013). At the time of independence in 1947, Pakistan was comprised of two wings, East Pakistan and West Pakistan and ranked as one of the poorest countries in the world with 81% illiteracy rate, 87% rural population, and 71% export of agricultural raw material (Butt and Bandara, 2008). Soon after dependence, a range of social, economic, and political issues was provoked between the two wings that lead to the separation of East part in 1971 and become Bangladesh (Khan, 1999). Post-independence history of Pakistan is full of troubles and chaotic events (Guisinger and Scully, 1991) which include a large scale migration to and from Pakistan, separation of East Pakistan, frequent takeovers of the military, wars with India, and war against terrorism (Khan, 1999). Moreover, the country has faced many other issues in the beginning such as weak institutional setup, poor infrastructure, insufficient financial resources, and severe energy crisis and an immediate attention were needed to address them in order to move ahead (Blood, 1996). However, a young nation with inexperienced leadership and insufficient resources and capacities was not able to deal with those

challenges alone, therefore indulged into severe crises, yet struggling to find the ways to move forward.

3.1.2. Industry

Since the beginning, the industry is also facing similar challenges. Primarily, this part of British India (now Pakistan) was a predominantly agrarian economy and was dominated by few numbers of large landowners (Mohiuddin, 2007). Only five percent of the large-scale industry of the entire British India was located in this part and most of them were operated by Hindu entrepreneurs because they were the major business people in this part of the subcontinent. After partition, they moved to India. Consequently, Pakistan faced the issue of outflow of human capital that created a great industrial disparity between Pakistan and India (Jaffrelot, 2004; Mohiuddin, 2007; Blood, 1996; Ali and Malik, 2009; Zhao and Mudassar, 2013).

During this period, industrial growth was believed one of leading determinant of sustainable economic growth of an economy (Lall and Weiss, 2004). Therefore, it was essential to formulate a prudent industrial policy (Zhao and Mudassar, 2013) "to overcome the major constraints to economic growth and to search for practical solutions-especially in the short term-to revive the economy" (Amjad and Burki, 2015: p. 5). Therefore, some initial effort was made to put the industry on right track. As a result, economic performance in an early decade was impressive (Mahmood, Rehman, and Rauf, 2008) and Pakistan was placed on the top of the manufacturing index after Japan during 1953-1960 (Papanek, 1964)..

Moreover, the government took a different initiative to change the structure of the economy in order to enhance the economic performance. One of the most important developments in this path is the nationalization of all major firms in 1970 to increase the role of public sector enterprises. However, the government rolled back the decision and denationalized all the firms in the early 1980s.Instead, new policies were introduced such as trade liberalization and deregulation in order to attract investment and promote private sector, which impacted the economy positively (Mahmood et al. 2008). But, manufacturing firms, particularly large and state-owned, could not maintain their long term growth for and started to decline in the late eighties (Blood, 1996; Mahmood & Siddiqui, 2000; Mahmood et al. 2008).

3.1.3. Current Situation

After seven decades of independence, the country is facing up with almost similar challenges, such as high population growth, unskilled labor force, use of old technology in industries, instability, energy crisis, (Malik and Kotabe, 2009; Amjad and Burki, 2015), weak institutions (Hussain, 2004), high military interventions in state affairs, and influential feudalists and industrialist (Sheikh, Ahmad, and Farooq, 2016).

Moreover, the country is still an agrarian economy followed by the industrial sector in terms of GDP share and workforce employment (Hyder and Lussier, 2016). The Recent government is increasingly taking the initiative to liberalize the trade and privatize non-performing state-owned enterprises to boost the economic performance. Although the results of such policies do not seem to produce positive results yet there are signs that the situation is getting better. Adding to the challenges, foreign direct investment has decreased significantly, and domestic investors are shifting their businesses to the other countries.

Although, Pakistan is passing through a very critical time in its history, it does not mean that the country has no potential for growth. It has huge quantity of natural resources if deployed properly, which can lead to higher growth rate. Furthermore, it is located between the world's two major economies, China and India, and if she were to establish good relations with both, all of them can benefit a lot (Amjad and Burki, 2015).

3.2. NBS Framework of Pakistan

3.2.1. Societal institutions

3.2.1.1. The state

The political/state structure in Pakistan is a federal parliamentary democracy, in which president works as the head of the state, while the government is headed by the Prime Minister (PM). Generally, parliament elects the PM and is responsible for devising policies and laws for the country, including business (Khan, 2003). In this way, the state of Pakistan plays a regular role and develops different control mechanisms for exit/entry, import/export, investment, access to credit, and allocation of resources in the country. However, as Kemal (2002) explains, instead of facilitation, such rules, however, are believed to be cumbersome, and act as a source

of corruption (Kemal, 2002, p. 319). These policies mainly focus on the large scale firms that are generally owned by the political and ruling elite in the country (Sanchez-Triana, Biller, Nabi, Ortolano, Dezfuli, Afzal, and Enriquez, 2014). Therefore, such policies are considered biased (Khan, 2003) because when these politicians hold a position in the state's politics, it becomes difficult to maintain impartiality between the state interest and business interest. As a result, they misuse the power of the state and exploit the national resources for personal benefits (Saeed, Belghitar, and Clark, 2015). Though the state provides subsidies and incentives to encourage private firms, such initiatives also are not free from the influence of powerful groups in the society (Kemal, 2002). This is mainly due to the weak institutional setup and lack of transparency in the country, which in turn lessens public trust in the rule of law and formal institutions (Ul Haque, Idrees, and Ahmed, 2007).

3.2.1.2. The financial system

The role of financial system in promoting business activities in a country is very crucial. Since the late 1980s, Pakistan's financial system has experienced significant reforms in order to make financial markets and credit based system more efficient to channel the financial resources (Shahid, Saeed, and Tirmizi, 2015). There are two main regulatory autonomous institutions in the country that oversee the financial system, namely the State Bank of Pakistan (SBP), and Securities and Exchange Commission of Pakistan (SECP). They are responsible for making and governing policies to make the system more efficient.

The credit-based system in Pakistan consists of commercial banks, Islamic banks, microfinance banks, specialized banks, and investment banks. These banks can be classified into public and private sector banks, where the latter hold approximately 80% share of the total banking industry (Shah and Jan, 2014). In developing economies, banks play a predominant role in providing funds to conduct business due to the underdeveloped and inefficient financial markets. However, this system is not free from the influence of social elite of the country (Mansoor and Ishaq, 2006). A common feature of the credit-based system in developing economies is that firms often receive political favor in getting credits from the banks (Desai and Olofsgard, 2011). Similarly, Pakistani politicians have significant influence over the policies regarding banking system, and they enrich themselves and their companies by

getting loans/funds from banks, especially from state-owned banks for their businesses, and do not pay back by declaring the business as default (Saeed et al. 2015).

Despite comprehensive reforms, the financial market has failed to mobilize indigenous savings effectively and efficient allocation of resources for productive business investments (Shahid et al. 2015). This is mainly due to the political instability, inconsistent policies, and issues of political economy (Sharif, 2002). To function well, the financial system of Pakistan requires a sound infrastructure that can provide an efficient legal framework for timely and authentic information (Fayyaz, 2017).

3.2.1.3. Education/skill development system

Like other countries of the region such as Bangladesh (Rana and Morgan, 2016), Pakistan also has a dual skill development and control system. It consists of university and technical/vocational education. University education mainly entails various professional degrees such as medicine, engineering, medical, and business, while vocational education is designed for low-level jobs, such as technicians and helper. Although, there are many higher education institutions active in the country, only 183 are recognized by the higher education commission of Pakistan. Out of these, 73 are public sector universities. For vocational education, the country has established approximately 3,581 different public and private institutions in different regions of the country with a special focus on remote areas.

Getting university education mainly has economic and social motives in the country. For example, a university graduate is expected to get a managerial level job, which relatively has a high salary and social prestige in the society. However, access to university education is not possible for every person, particularly in private institutions due to high charges. Therefore, a large portion of the population from lower-middle and lower-class could not attend university and get admitted in vocational education institutions to attain any kind of certificate/diploma to secure a lower-level job in a firm. The main dilemma with such jobs is that they are underpaid and are not perceived as high esteem jobs (Ul Haque et al. 2007).

Today, these institutions are producing thousands of graduates every year, yet scarcity of skilled workforce to fulfill the requirement of the industry prevails. A

possible reason for such situation is the lack of coordination between industry-academia as well as the absence of sound state policies. Although, trade unions and chambers of commerce invoke the state to develop an effective skill development system to overcome this issue, they themselves do not involve in this process directly (Ul Haque et al, 2007). Consequently, there are no uniform criteria to that can be used to assess worker's skills while hiring. As result, "owners and managers trust more on their social and professional network for selecting an individual with specialized skills" (Rana, 2014: 160). Similarly, employee unions and associations are weak in the society (Khan, 2003), which in turn affect employee's bargaining power with the employer.

3.2.1.4. The values of work relations (trust and authority relations)

Pakistan is characterized as low-trust context, high-power distance, and collectivistic society. For instance, managers' trust in formal rules and regulations is low due to wide spread corruption (Williams and Shahid, 2016). The society is deeply divided into a caste system, which, in turn makes some caste members superior to others. As a result, a high-power distance culture automatically emerges in the country, and a similar relationship can be observed between subordinate and superordinate firms. In such societies, people are respected based on the position they hold in an office, while individuals having a high position in a firm earn high esteem in the society. Since collectivism prevails in the society, workers expect that their management will treat them like a family member and give them favor and support whenever they face any critical situation (Cardona and Morley, 2013). To manage the workforce, authoritative management style or paternalistic ties are exercised in the firms (Naseemullah, 2016). While, reciprocity in all types of firms is common, and people use to give and take formula in their relationships. A delegation of authority to outside members of the family is very limited, if essential, then to only those people who are highly trusted by the owner.

3.2.2. Characteristics of the NBS of Pakistan

Following the theoretical framework of the study, it is necessary to elucidate the characteristics of the NBS of Pakistan, which are clustered under three labels by Whitley (1999).

3.2.2.1. Ownership coordination

Regarding ownership, Pakistani firms can be classified into three broader categories: private firm, state-owned enterprise (SOE), and foreign firms (Javid and Iqbal, 2010). Though, the role of SOEs in an economy is considered very crucial, Pakistani SOEs are continuously underperforming due to mismanagement, high political interference, and corruption. Every year, the government is allocating a huge amount of funds to improve the performance of these firms, but has not yielded significant improvements. Consequently, a large number of SOEs have been privatized, and the government is planning a similar strategy for the remaining ones (i.e. Pakistan Steels, Pakistan International Airline) due to incurred high losses every year. However, critiques argue that the motive behind the privatization of SOEs is benefiting their own people, not for the interests of the state.

Although, there are some multinational firms in the country, privately held local firms dominate the economic activity in the country, which is the main concern of this study. These firms range from very large to medium to very small. Most of the large firms are family-owned firms. Therefore, family members are the dominant shareholders in these firms and have occupied the top-management position to directly control the business. A delegation of authority to salaried managers is very limited. The family members take all strategic decisions and managers' responsibility is only to oversee the business activities at operation level to ensure the smooth functioning business operations (Gani and Ashraf, 2005). This can be attributed to low – level of trust between owners and salaried managers (Ul Haque et al. 2007). Most of the Small and Medium Enterprises (SMEs) are affiliated with business groups and function as supplier or contractor, and overall contribution to the value chain of larger firms is minimal. Business groups or conglomerates dominate the national economy and have diversified business operations within the industry as well in different industries.

Overall, the owner-managers control business activities, whereas salaried managers do not have the discretion to make strategic decisions, and larger firms have ownership in vertically and horizontally diversified business units.

3.2.2.2. Non-ownership coordination

As previously discussed, most of the Pakistani firms are affiliated with different business groups, and these business groups have diversified business activities in

different industries. Yet firms need to develop relationships with other firms such as buyers, suppliers, competitors, and firms from the same industry as well as from other industries. In the Pakistani context, these ties generally based on common interests, mutual trust, and commitment (Jajja, Brah, Hassan, and Kannan, 2014). Firms generally hesitate to establish the ties with new or unknown firms due to the risks about opportunistic behavior (Ghani and Khan, 2004).

Generally, trade associations play important role in developing a vertical and horizontal relationship with subcontractors, buyers, and other firms. Vertical ties often are long term in nature, but depend on the type and nature of the firm. For instance, SMEs and small firms rely more on subcontractors than the large ones. Relationships with buyers are considered very critical to obtain technical knowledge and market information. For example, firms from surgical industry in Sialkot established collaborative ties with foreign customers to develop their technical capabilities and new product lines. Although, competitors are considered as rivals, there is evidence of cooperation over common issues through intermediaries such as trade unions (Nadvi, 1999; Jajja et al. 2014).

3.2.2.3. Employment relations and work management

According to Ghayur (2009), harmonious workplace relationships and participative management result in increased productivity, high trust, and reduced antagonism. Employment relations in Pakistan are overseen through industrial relations system that works as a regulatory framework for workplace conflicts, collective bargaining, and unionization in the country (Comboh, 2014). However, firms rarely follow these guidelines while hiring employees, particularly in the case of lower-level and unskilled jobs. Such practices are common in weak institutional contexts.

Employment relations deal with employer and employee dependence regarding work related activities. Interdependency between owner and worker in every organization exists, because the former desires smooth functioning of business operations, while the latter needs income. Consequently, both enter into an agreement with the promise to serve the interest of one another. Yet, disputes arise because these contracts are not often written clearly (Baig, 2005). Large conglomerates often hire workers from the labor market. After hiring, the employer provides work related training to the employees either on the job or through some courses.

In Pakistan, most of the firms are family run businesses with formal and hierarchical organizational structure (Khilji, 1999). As a result, management system in these firms is highly centralized. Decision and policies are made at the top-level and cascaded to the lower-levels. There is a high power distance and employees could not directly approach to the top-management. Employees have less task related autonomy, and organizations do not encourage workers to learn by themselves (Khilji, 2013). Moreover, the delegation of authority and trust depends on the nature of relationships between top-management and employees. Generally, employees who have close proximity to the owners and long-employment tenure in the organization, are trusted more by the upper-level management and enjoy more work related autonomy.

4. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The literature review provided in Chapter 2 & 3 has set a scene for the research framework and hypotheses development. This chapter concentrates on the mechanisms of interaction between societal institutions, national business system characteristics and the determinants of firm level innovation to present a more coherent flow of the discussion. Following the literature review, this study tries to develop an integrated research model, followed by hypotheses which are in line with the aim of this thesis.

4.1. Relationship between Societal Institutions and Characteristics of NBS

The core assumption of NBS approach is that societal level institutions affect the patterns of economic coordination and control in a country (Whitley, 1994, 2003; Matten and Moon, 2008). Since, these institutions reside at the societal level, they are taken for granted and shape the economic behavior within a NBS by promoting or limiting particular business activities (Hotho, 2014; Jackson and Deeg, 2008; Witt and Jackson; 2016). Accordingly, this study infers that national institutional set up (e.g. the state, financial system, education/skills development system, and trust & authority relations) influence the characteristics of the NBS. Indeed, this claim is cross-level where societal-level institutions influence meso-level variables. Although, this claim is not new, literature lacks systematic evidence on such relationships. For instance, state's direct involvement in the management of business activities limits the role of intermediaries in the country. In such systems, owners tend to have direct control over business activities and maintain close relationship with politicians and bureaucracy, while non-ownership form of coordination are uncommon (Whitley, 2000; Hotho, 2014). Low level of trust in formal institutions, paternalist nature of authority, lack of strong mechanisms ensure owners that salaried managers will act according to the owners desire also leading to the direct owner control (Whitley, 1999).

Similarly, credit-based financial systems promote ties between lenders and borrowers. Network ties are encouraged by the state. An example is the European system of capitalism where banks play fundamental role in building network ties between large corporations owned by few numbers of large investors (Matten and Moon, 2008). Likewise, short-term business requires short-term finance, and the value of such finance may increase with the support of industrial relation systems that can develop favorable hiring and firing policies (Jackson and Deeg, 2008).

The education/skills development system significantly influences the prevailing patterns of employment relations and internal work management similar to the dominant norms that govern authority relations in a society (Whitley, 1999).

4.2. Societal institutions and NBS: an institutional logics approach

As NBS refers to the established patterns of economic organization and control within a national setting, which tend to persist over time, and are classified based on three main dimensions: *the dominant type of ownership coordination*, *the type of non-ownership coordination*, and *the type of employment relations* (Whitley, 1999; Hotho, 2014). The first dimension refers to the extent to which owners directly involve in day-to-day management of firms' activities and the mechanisms by which they exercise control over their ownership rights. Non-ownership coordination mechanisms deal with how economic actors within a nation integrate their activities in vertical, horizontal or across industry value chains. Consequently, the types of employment and work relations dimension focus on how employer-employee relations within a national setting varies according to the firms' reliance on external labor markets as opposed to internal mechanisms of mutual commitment and investment. A central tenet of the NBS approach is that the characteristics of local patterns of economic coordination and control are often complementary and interdependent. Such interdependencies engender tight integration between system characteristics and constrain the number of viable combinations among them, resulting in the prevalence of only few NBS typologies across the Globe, namely, *fragmented*, *coordinated industrial district*, *compartmentalized*, *state organized*, *collaborative* and *highly coordinated ones* (Whitley, 1994; 1999).

Another crucial aspect of the business systems approach is that the dominant patterns of economic coordination and control are closely linked to the nature and type of

societal institutions (Hotho, 2014; Rana and Morgan, 2016). Indeed, societal institutions are analytically positioned at a higher-level than the institutions of business system in the original work of Whitley. Societal institutions provide generic templates and logics about the social order, through which patterns of economic coordination and resource-allocation are engendered and reproduced. In this regard, the NBS approach highlights four institutional dimensions: *the role of the state*, *the characteristics of the financial system*, *the education/skill development system*, and *the norms and values that undergird work relations* (Whitley, 1998, 1999). These institutions are important because they guide particular types of ownership and economic coordination by providing templates for their organizing principles and shaping the identities of economic actors (Whitley, 1999). Moreover, they control access to tangible and intangible resources at the societal level and govern the nature of these resources, as in the case of the financial and education system. Thus, this study argues that the three key dimensions of national business system are profoundly shaped by the above mentioned dimensions of the societal level institutions at a national setting.

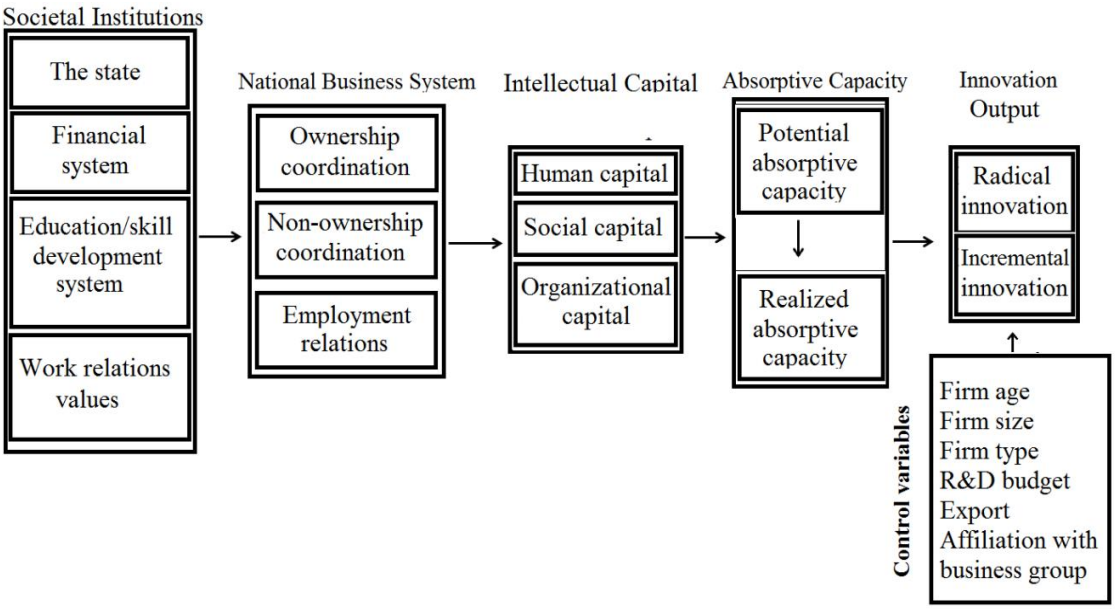


Figure 4.1 : Theoretical framework.

In order to theorize how actors embedded within a national business system are able to make their decisions and perform their routine and non-routine operations in a nondeterministic manner, present study borrows key insights from the recent developing stream about the institutional logics. This study do so, because recent

criticisms about the NBS approach concentrate on the socially deterministic character of the theory, that is, the overarching tendency about the social institutions' and NBS components' significant and inexorable influence over the behavior of economic actors at a national setting (Morgan, 2007). However, recent studies about the comparative and historical institutionalism suggest that because of the complex layering of many institutions at the global scale there is much room for actors to defy, translate and reconfigure practices and meanings induced by the institutional templates (Deeg and Jackson, 2006; Mahoney and Thelen, 2010; Hotho and Saka-Helmhout, 2016).). Thus, this study takes into account these recent critiques and theoretically aligns our arguments with the institutional logics approach, which claim that actors retain their agency even when they are under the influence of logics that reside at multiple analytical levels, i.e. societal, field and organizational levels. Correspondingly, institutional logics approach provides us with robust mechanisms, by which actors embedded in different levels of institutions construct and re-construct their social reality and engage in productive behavior about their material surroundings.

Compatible with the arguments of institutional logics approach, both material (the state, financial system, education system) and symbolic (trust and authority relations that undergird work relations) components of societal institutions in the NBS framework can be conceptualized as supra-organizational patterns of institutional logics, which guide the behaviors of actors and organizations, and help them give meaning to their social reality (Friedland and Alford, 199; Thornton and Ocasio, 1999; Witt and Redding, 2009). Societal logics, therefore, provide templates for possible actions, and encourage only those actions, which are consistent with the logics by influencing access to critical external resources (i.e. labor and capital) (Zhao and Wry, 2016; Meyer Jr and Mamédio, 2016; Wry, Cobb, and Aldrich, 2013). With the provision of templates, societal logics frame lower level categories of meaning, their status and order, as well as actors' allocation of attention to the former (Thornton and Ocasio, 2008).

As a meso-level construct, NBS emerges from the interaction between societal institutions and the firms (Whitley, 1999; Rana and Morgan, 2016). Business system, therefore, reflects the general patterns of business organizing (ownership coordination, non-ownership coordination, and employment relations) in a country,

where common identity matters more (Thornton and Ocasio, 1999; Thornton et al. 2012) rather than firms' individuality (Whitley, 2003). Identification with logics takes place through continuous interaction among firms, state and other formal and informal institutions that operate within a national setting (Stryker and Burke 2000). Firms, over time, get connected with particular institutional actors within the national setting and identify with the established categories of meaning and dominant ways of acting. This process helps entrenchment of common identities among firms at a national setting, enables taken for grantedness of status asymmetries, formulates templates to be used in the classification of social order, and guide attentions to be paid for particular social phenomena (Thornton and Ocasio, 2008). Therefore, this study argues that societal level institutions exert causal forces to influence and shape lower level institutional components of a NBS in a particular national setting.

Hypothesis 1: *The role of the state is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.*

Hypothesis 2: *The financial system is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.*

Hypothesis 3: *The education/skill development system is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.*

Hypothesis 4: *The values of the work relations (trust and authority relations) are directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.*

While theoretical argumentations enable us to posit the above hypothesis, Whitley (1999) argues that in different national settings the effects of societal institutions on each component of the NBS may not always be positive or even significant. Since Pakistan represents a relatively young nation (Toor, 2005), and has experienced repeated military rules and political struggles (Sheikh, Ahmad, and Farooq, 2016), there is considerable risk that the formal institutions suffer from lack of legitimacy

and public trust (Hussain, 2004). Reciprocal ties between the state and industrial elite (Khan, 2000; Hussain, 2004), and weaker rule enforcement processes (Javaid, 2010) fail to provide solid templates for business organizing. Thus, uncertainties associated with the opacity of rule system and weaker rule enforcement processes tend to stimulate owners to exert more control over production and human assets (Javid and Iqbal, 2008). On the other hand, divergent patterns of ethnic and cultural backgrounds (Halkias, 2011), solidified in the diversity of religious sects (Toor, 2005), income dispersion (Khilji, 2012), and variety of spoken languages across different regions (Shamim and Abbasi, 2012), are more likely to inhibit non-ownership based coordination activities to become entrenched at the national scope. Under such conditions, it is more plausible to expect that the owners will be more likely to secure their business operations by selectively prioritizing their vertical value chains, thus, entrenching and fortifying their relations with suppliers and buyers. Although, the country has dual education/skill development system, yet, institutions governing the skill development and control are qualitatively deficient and overall access to them is severely limited because of the prevalent gender segregation and regional disparities (Roomi and Parrott, 2008). Consequently, fragmented social structure, regional disparities and informally governed social order within the Pakistani setting will be more likely to stimulate employers to engage in relatively tighter forms of collaboration between employees. It is so because owners will be more willing to trade off a part of their authority with an internal stakeholder in order to stand firm in the face of uncertainties emanating from the external factors. Hence, this study can at least argue for the below hypothesized relations specific to the Pakistani setting.

H5a: *State structure and policies will be positively associated with higher levels of ownership control in the Pakistani setting.*

H5b: *Social institutions will have a relatively weaker or insignificant impact on the non-ownership based coordination activities in the Pakistani setting.*

H5c: *State structure and policies as well as work relations values (trust and authority relations) will be positively associated with tighter levels of employer-employee collaboration in the Pakistani setting.*

Since existing evidence set about the Pakistan setting enables this study to speculate no further for each possible association between components of social institutions

and the NBS, present research confines its theoretical arguments only to the above hypothesized relationships.

4.3. Bridging NBS and Firm Level Innovation Enablers: The Role of IC and ACAP

In a similar vein, national level institutions of NBS affect the patterns of economic coordination and firms' structure, polices, routines, and outcomes (e.g., Whitley, 2000; Hotho, 2014; Pazeshkhan et al. 2016). For a firm to internalize available templates of organizing offered by the NBS, there is the need to construct and maintain a repository of cultural, cognitive and material resources. It is so because without a prior set of knowledge and/or repertoire of meaning, sense making becomes stalled. Hence, it is hereby stipulated that a significant portion of templates provided by the NBS are stockpiled in the collective memory of a firm, which is often conceptualized as the intellectual capital (IC) construct.

IC is the sum of all knowledge (Youndt et al. 2004), including both tacit (i.e. experiences, values and understandings) and explicit (i.e. information and technology) knowledge components, which firm has accumulated for its current as well as future needs (Stewart, 1997). Thus, it can be defined as "*the sum of all knowledge resources, which reside in different domains of repositories"*. These knowledge containing parts are generally defined as the dimensions of IC, namely, *human*, *social* and *organizational capital* (Reed et al. 2006; Singh and Rao, 2016; Subramaniam and Youndt, 2005; Youndt et al. 2004).

HC is composed of knowledge, skill and ability sets of nascent employees, it is reliant on the dynamic interface between ownership/management of the firm and the national labor market (Bontis, 1999; Joia, 2000; Hsu and Fang, 2009). Thus, HC is potentially conditioned by the available templates about the employee relations and (non)ownership coordination components of the NBS, since all activities relating to the sourcing, retaining and terminating of employment relationships are shaped by these templates. For example, small family controlled firms are more likely to prefer informal instruments for human resource selection, which aim to increase person-job fit by relying on owners' direct social ties and draw on social similarity as a dominant decision criterion rather than using rational selection instruments that are

geared at competency based fit or meritocracy (Gomez-Mejia, Cruz, Berrone and DeCastro, 2011).

SC, often termed as relational capital, deals with the repository of accumulated knowledge, which stems from the relationships with external parties including customers, suppliers, and firms within and outside the industry (De Castro and Saez, 2008; Sharabati et al. 2010; Youndt et al. 2004). Emanating from the existing and durable relations engendered by various external stakeholders, it is plausible to expect that SC will be strongly associated with the non-ownership coordination component of the NBS, which includes collaborative ties developed with firms' vertical and horizontal value chain. Consequently, OC, interchangeably called structural capital as well, deals with the part of organizational knowledge, information, and skills that stay with the organization, even when employees leave the organization at the end of a working day (Bontis, 1999; De Castro and Saez, 2008; Reed et al. 2006a; Subramaniam and Youndt, 2005; Youndt et al. 2004). In other words, it is companies' infrastructure, which encompasses production process, information and technology, and R&D facilities (Zéghal and Maaloul, 2010). Thus, it can be stipulated that the tighter levels of ownership control and non-ownership control are more likely to be reflected in relatively higher degrees of structural approach to integrate various knowledge repositories into the organizational memory. Taken together, IC represents a critical resource (Kristandl and Bontis, 2007) that forms firms' repository of intangible resources and capabilities (Albertini, 2016), which is strongly conditioned by the dominant templates that are established within a NBS.

Hypothesis 6: *The dominant type of ownership coordination is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.*

Hypothesis 7: *The dominant type of non-ownership coordination is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.*

Hypothesis 8: *The type of employment relations is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.*

4.4. Relationship between IC and ACAP

Embedded agency assumption of institutional logics approach suggest that economic actors, be they owners or managers, do not simply follow the scripts written in the templates provided by the societal and national business level institutions. Especially when provided templates contradict with other institutional templates, or when templates cannot provide concrete action guides that are associated with the immediate pressures of the situation, actors improvise, reinterpret and sometimes defy the existing knowledge repertoire stockpiled in the IC (Sahlin and Wedlin, 2008). Thus, in order to theoretically examine firm level innovation there is the need to integrate the ability of economic actors' reflexive orientations in the face of situational necessities, prospective aims and prior repositories of knowledge derived from their institutional templates and experiences. Accordingly, in order for firms to engage in creative and innovative action, they need to develop capabilities to systematically question their existing set of knowledge repositories and take in new knowledge resources, which enable them to build novel and better value added products/services.

Here, we draw on the existing literature on the absorptive capacity construct, which concentrates on *"the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends"* (Cohen and Levinthal, 1990, p: 128). These organizational capabilities are predominantly based on the extent to which firms prioritize and systematize the search for external knowledge, as well as the degree to which they develop systematic processes to transform symbolic forms of knowledge into valuable material outputs (Zahra and George, 2002). The first part of the search process is conceptualized as *potential absorptive capacity* (PACAP), and comprises knowledge acquisition and assimilation capabilities, whereas the second part is dubbed as *realized absorptive capacity* (RACAP), and centers on knowledge transformation and exploitation (Zahra and George, 2002; Todorova and Durusin, 2007). Thus, PACAP is strongly influenced by the IC of the firm since search processes for new knowledge resources almost often builds on existing knowledge repositories, and are strongly conditioned by the similarity of existing and new knowledge components (Lane and Lubatkin, 1998). RACAP represents an almost essential consequence for ACAP, since in order for a firm to produce products or services addressing the market, there is the need to transform

symbolic new and existing knowledge bundles into substantive (often material) forms, which are readily usable (Robertson, Casali, and Jacobson, 2012). Moreover, recent empirical studies that are conducted in other contexts have found significant and positive association between IC and ACAP constructs (Hsu and Sabherwal, 2012; Cassol, Gonçalo, and Ruas, 2016). Thus, this study argues that:

Hypothesis 9: *The repository of templates stockpiled in a firm's human capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.*

Hypothesis 10: *The repository of templates stockpiled in a firm's social capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.*

Hypothesis 11: *The repository of templates stockpiled in a firm's organizational capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.*

4.5. Relationship between ACAP and Firm Innovation Performance

Firm's capacity to explore and assimilate external new knowledge is considered an important determinant of innovation output (Cohen and Levinthal, 1990). As, innovation has been conceptualized under many types and categories within the existing literature (Gopalakrishnan and Damanpour, 1997). In order to obtain variance between types of innovation output and ease the operationalization process, this study opted for the conventional categories of *radical* versus *incremental innovation*. This category deals particularly with the extent of change that a system undergoes by the advent of an innovation. As it has been widely applied, radical innovation refers to fundamental changes in the activities of a firm or an industry, and represents clear departures from the existing practices (Gopalakrishnan and Damanpour, 1997).

Conversely, incremental innovation can be conceptualized as requiring minimal, if any, departures from the existing templates of organizing and production. Many empirical studies have found a significant and positive connection between ACAP and innovation output (Hsu and Sabherwal, 2012; Kostopoulos et al. 2011; Tseng et al. 2011). For instance, Kotabe, Jiang, and Murray, (2017) have found that ACAP,

when complemented by political networking capability, improves firms' radical and incremental innovation, and this effect is stronger for the radical innovation performance. In another study, Engelman, Fracasso, Schmidt, and Zen, (2017) have found differential effects of different components of ACAP on product innovation. Similarly, Kostopoulos et al. (2011) have reported that ACAP contributes directly and indirectly to firm innovation. Following from earlier research, which links ACAP with both innovation outputs, this study argues for the following hypothesis.

Hypothesis 12: *Potential absorptive capacity of a firm is positively associated with (a) radical and (b) incremental innovation output.*

Hypothesis 13: *Realized absorptive capacity of a firm is positively associated with (a) radical and (b) incremental innovation output.*

Since, several authors have endeavored to test the direct relationship between national business system and firm innovation (e.g., Hotho, 2014, Pezeshkhan et al. 2016) while overlooked the intervening mechanism. Therefore, this study proposed the following hypothesis.

Hypothesis 14: *Characteristics of national business system have indirect link with radical and incremental innovation output via intellectual capital and absorptive capacity of a firm.*

4.6. Summary

Overall, this chapter has tried to connect the literature to define and identify the mechanism linkages between variables from different analytical levels. In doing so, first variable-to-variable hypotheses are proposed in order to confirm if such mechanism exists. Finally, an indirect link between NBS with firm innovation output is proposed through all constituents of innovation enablers (i.e. IC and ACAP). Following from these hypotheses, theoretical model of this study can be depicted in Figure 4.1 Since, previous research on firms' innovation outputs have found many linkages with firm characteristics like size, technology and ownership structure, present study includes a number of control variables in the research model. Methodology applied to test these hypotheses and operationalization of all constructs including the control variables are discussed in detail in the next chapter.

5. RESEARCH METHODOLOGY

Following the research aim, the preceding chapter presents the proposed theoretical framework and hypotheses of the study. This chapter outlines the research methodology that is employed to test the hypothesized relationships between constructs of this study. This chapter mainly covers the research philosophy to justify the adopted research methodology, followed by research design, sampling, data collection, scale development, pilot testing, and explanations on study variables including control variables. Final section provides the ethical considerations of the thesis.

5.1. Research Philosophy

A research philosophy can be described as the fundamental assumptions that help scholars to choose a research mythology about the phenomenon of study. In particular, it guides about the appropriate methods of data collection, analysis, and interpretation so that it can be the best representative of the research objectives (Lehaney and Vinten, 1994). A literature scan reveals two major research philosophies that are widely debated in organizational research, namely interpretive and positivist approaches (Lee, 1991).

5.1.1. Positivism

As a branch of philosophy, positivism has its roots in empiricist tradition of hypothetico-deductive research methods (Brannick and Coghlan, 2007) which concern with hypothesis development based on prevailing theory, and then follows an analytical strategy to verify the hypothesis (Wilson, 2014). At its core, the ontological assumption of positivism is "*reality is discrete"* and can be directly observed and measured through collecting, analyzing, and interpreting the data on it (Cunliffe, 2011, p. 63). Therefore, positivism advocates that the social reality can be investigated in the same manner as the natural science studies' physical objects (Bryman, 2003). This approach adheres to the laws of pure scientific research and is

built on factual knowledge with respect to fulfilling "the four requirements of fallibility, logical consistency, relative explanatory power, and survival" (Lee, 1991, p. 343-344). Moreover, it also satisfies the prerequisites described by Brannick and Coghlan, (2007) about a positivist theory, which are:

- There should be constructs and their definitions.
- There should be links (theoretical framework) between the constructs before its empirical testing.
- There should be valid and reliable measures of these constructs.

Although, positivism has long been used in the organization research, (e.g., Burns and Stalker, 1961; Miles and Snow, 1986; Gadiesh and Gilbert, 1998), its dominance is challenged by some other philosophical traditions such as interpretivism because of its limited attention towards the subjective interpretation of the social phenomenon.

5.1.2. Interpretivism

Contrary to positivism, interpretivism emphasizes subjectivity, and argues that there is a fundamental difference between the disciplines of social and natural sciences. Therefore, methods used to study the social reality should not be similar to those of natural sciences (Lee, 1991) because they can adequately enhance our understanding regarding symbolic aspects of the organizations (Prasad and Prasad, 2002). To them, there are no right or specific methods and theories (Walsham, 1993) to knowledge. Instead, it depends on the choice of '*human*' because reality can vary from one context to other (Schutz, 1970). In other words, it believes that the social reality is constructed as individuals continuously create, attach, and interprete the meanings about it (Lee, 1991). Thus, the objective of the social scientist is not just to capture the pre-existing reality, but rather understand and explain those mechanisms that are involved in making the social reality (Schwandt, 1994).

As interpretivism supports qualitative research approaches, the nature of data in such studies are also non-numeric such as observations and interviews (Prasad and Prasad, 2002). The main criticism this approach often faces is in the form of respondents and researchers' biases while taping and interpreting the subjective data, which can lead to reliability and validity problems about the results. These problems, in turn, can affect the generalizability of the findings in different contexts. However, this

approach is getting popular among management scholars in recent years, and they are increasingly using these methods to understand and explain the complex organizational phenomenon (e.g., Zald, 1996; Alvesson and Sköldberg, 1999; Sandberg, 2005).

Both approaches have pros and cons, and one cannot inherently prefer one to other. Rather, the nature of research study decides which research approach can be more appropriate to achieve the underlying study objective. Considering this, present research study finds itself more close to the positivist research philosophy. Thus, it adapts the positivist research approach to explore the links between variables of the study.

5.2. Research Design

A research design is like an architectural design (Srivastava and Rego, 2011), or a blue print (Murthy and Bhojanna, 2009) often used to ensure that the evidence researchers obtain help them answer their question as accurately as possible (De Vaus and Vaus, 2001, p. 8). More specifically, it works as a "*framework of study*" that guides researchers about how to collect and analyze the data to find the truth (Lee and Lings, 2008; Bryman and Bell, 2015). Therefore, research design is an integral part of the overall research process that must be chosen in line with the research aim. The research design of this study bears the qualities of the cross-sectional survey research. The reason behind selecting this research design is its suitability in situations where researchers want to record "quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2013, p. 249).

Malhotra and Grover (1998) describe three distinctive features of this research design compared with others. *First*, it helps to collect the data from key informants in a scientific way. *Second*, it involves quantitative methods based on standardized data to predict the relationship between variables. *Third*, comes from a sample that truly represents the target population. More specifically, it facilitates measuring and explaining subjective feelings of respondents that cannot be measured otherwise (Fowler, 2013). Moreover, it is an important way of generating scientific knowledge or developing a theory (Malhotra and Grover, 1998), and can be applied for descriptive as well as explanatory studies, particularly in large size populations (Rubin and Babbie, 2016). Other advantages, which might become disadvantages as

well, include economy, collection of more data in short time, and standardized data (Rubin and Babbie, 2016; Anderson, 2004).

However, this research design is not free from weaknesses. For instance, it can be expensive with large samples, time-consuming, biased, and under-representative of a population (Gravetter and Forzano, 2015; Anderson, 2004). The major criticism this approach often faces is in terms of its sensitivity to common method bias due to a collection of data from a single respondent at single point of time (Rindfleisch, Malter, Ganesan, and Moorman, 2008). However, researchers have offered different procedural and statistical measures to mitigate the influences of such potential threats. This research study has also adapted these measures to avoid these threats.

Considering the above discussion and bearing in mind the objectives of the research, research design of this study is consisting of four main research activities. Given the scarcity of measures of societal-institutions and national business systems, at *first* we concentrated on scale development that encompasses item generation, item wordings, statement structure, and item scaling. *Second*, scale refinements were carried out. In doing so, experts in this research domain were contacted to identify any ambiguity in item structure, meanings, and the language. *Third*, a pilot study was conducted to ensure the reliability and validity of the measures, and final questionnaire administration and distribution. *Finally*, we analyzed the data using various statistical analysis techniques including structural equation modeling (SEM) to test the hypothesis of study in Chapter 6.

5.2.1. Justification for developing the perceptual measures of NBS framework

As explained earlier, we opted for a perceptive measurement model because of the unavailability of objective metrics, which might have served as proxies for the representation of the social institutional system of Pakistan. Apart from this shortcoming, the dominant type of ownership and non-ownership based controls, and the type of employment relations, which altogether make up the NBS construct, becomes rather hard to observe even with the possibility of data availability. Since NBS is a meso level construct, driven by the ongoing interactions between societal institutional system and firms operating within a national setting, it is based predominantly on the perceptions of organizational level actors. Thus, we argue that any measurement approach that tries to operationalize NBS will suffer from theoretical validity unless the perceptive nature of this construct is unveiled.

Although, we fully understand the risks of capturing valid representations of perceptive reality that are taken for granted by the actors, we believe that by careful administration of a face-to-face interview method and with well-designed structured questions "momentary invoking" of such perceptions is possible.

5.2.2. Sampling and data collection

Even with the decision to construct a perceptive measurement model, we confronted many obstacles such as unavailability of complete lists of companies, inaccurate contact information, and unreliable electronic mail systems (Malik and Kotabe, 2009), which significantly hindered sampling frame construction and data collection procedures. Despite many efforts, we could not find reliable sources to set a specific sampling frame. Therefore, we set two relatively simple criteria to include a firm in our sample. First, it was specified that sample firms should be driven from knowledge intensive industries in order to observe a variance in the dependent variable, the innovation output. Second, firms to be included in the sample should be driven by the population of private and local firms in order to concentrate our attention in dominant economic actors of the Pakistani setting.

Target respondents of the survey were set as primarily owner / managers and in case that this criterion was not met, we set senior managers and managers as secondary respondents. By selecting these actors as key respondents, who represented the most knowledgeable and powerful actors in the organization about the phenomenon under study, it was predicted that the perceptions that guided macro and meso level templates about organizing could be more accurately deciphered (Foroudi, Melewar, and Gupta, 2014; Madhavaram and Hunt, 2017). Consequently, this study followed snowball-sampling method consistent with the loosely coupled sampling frame and key informants methodology (Biernacki and Waldorf, 1981; Cepeda-Carrion, Leal-Millán, Martelo-Landroguez, & Leal-Rodriguez, 2016; Kumar, Stern and Anderson, 1993).

Data were collected by self-administered printed surveys, which were deemed as suitable instruments when sampling frames were missing and longer lists of questions were directed to the respondents (Babin and Zikmund, 2015). Survey scale was translated into Urdu with back translation in English by separate scholars, and administered in both languages (Brislin, 1970). We retained English items alongside with Urdu, since the majority of the industrial elite had a good command of English

because of the Colonial history of the region and high degree of regional disparities, which made Urdu sometimes second or third language after Punjabi, Saraiki, Balochi, Pashtu and Sindhi. All items of the model, excluding control variables, some of which were categorically coded, were measured using five-point Likert-scales.

In order to reduce potential variation caused by the macro-level factors, extensive effort was put to collect data in a short interval between the months of April, 2016 and October, 2016. Research assistants, who were postgraduate students, collected the data with face-to-face and on-site visits. They were adequately trained about the purpose of the research and theoretical nature of constructs prior to the data collection. Researchers made visits to the companies with one month interval after the initial visit in cases that the data were not collected within the first round. We could collect 228 questionnaires out of 1,235 distributed questionnaires with 18.46% response rate with the aforementioned administration methods. Fourteen questionnaires were dropped out due to a large amount of missing data, thus 214 usable questionnaires were included for further data analysis. Low response rate is consistent with studies using top management as key respondents (Schleimer and Pedersen, 2013), as they are "notoriously unwilling to submit themselves to scholarly poking" (Hambrick, 2007: 337).

5.2.3. Scale development

Prior to the data collection, this study engaged in scale development activities to measure each construct that is included in the theoretical model by following established guidelines and procedures (e.g., Churchill, 1979; Clark & Watson, 1995; Hinkin, 2005; Worthington and Whittaker, 2006). Generally, a scale development process involves item creation, scale development, and assessment of psychometric properties of the scale (Hinkin, 2005). It is suggested that researchers should pay a close attention to item wording, structure of the statements, item meaning, item scaling, appropriate numbers of items, and content validity (Hinkin, 1998).

A literature scan revealed many reliable and valid scales for firm innovation output both radical and incremental innovation, absorptive capacity, and intellectual capital, thus we adopted and modified these scales according to the context and purpose of the research. However, to the best of our knowledge, no perceived measurement scales existed for societal institutions and national business system constructs. To

develop measures for these constructs, we adapted Rana and Morgan's (2016) operationalization of the national business systems, which is based on the original work of Whitley (1992a). While developing the items, a careful attention was given to word selection, word meaning, and item structure so that respondents can understand the statements without any difficulty and confusion which normally result from *'double barreled'* items (Hinkin, 1998).

Number of items and type of scaling are two common issues that researchers often face while developing a scale. An effort was made to design a balanced scale in order to overcome this issue. A longer scale can cause boredom which in-turn may serve as source of common method bias, thus can be overcome by keeping scale short. On the other hand, shorter scales (Hinkin, 2005) can be a serious threat to the reliability and validity (Schriesheim and Hinkin, 1990). Likewise, scaling is an important aspect in scale development activity. The research espoused a Likert-type scale that is the best known and widely used in behavioral research tradition (Kerlinger, 1986). Although, different scale points are used in the research 5-point Likert scale is suggested for new items (Hinkin, 2005), as is adopted in this study. As Likert-type scales are self-reported surveys, therefore, are more prone to the social desirability bias which can harm the validity of a measure (Spector and Brannick, 2009). To overcome this issue, several procedural and statistical measures were taken that are presented in section **5.8**.

5.2.4. Scale Refinement and content/face validity assessment

Next, this study has created an initial pool of items that would tap into each construct's domain (Foroudi et al. 2014), and considering the centrality of societal institutions and business systems scales, their items, and other constructs' items were reviewed by subject matter experts (SMEs) to assess the face and content validity. Prior to this, SMEs were briefed about the conceptualizations of all constructs (Ellinger, Baş, Ellinger, Wang, and Bachrach, 2011). Based on their feedback, all items of each construct were included in the initial scale and sent to fifteen businesses executives for further identification of any ambiguity or difficulty that might hamper filling the questionnaire out. Furthermore, they were asked to provide suggestions for improvement or any other changes that they deemed necessary. Minor improvements were suggested in wordings of several items, which were

adjusted after consulting with the SMEs (Gupta, Navare, and Melewar, 2011; Foroudi et al. 2014).

5.3. Pilot Testing

After developing a preliminary version of the scales including cover letter and guidelines, it was decided to launch a pilot study to ensure the reliability and usability of scales. The objective of pretesting was to minimize those errors that can be problematic during final data collection, and these errors generally become apparent due to a poor research design or use of ambiguous wording in the questionnaire (Reynolds, Diamantopoulos, and Schlegelmilch, 1993; Oppenheim, 2000). For pilot testing of the survey questionnaire, the targeted respondents were top management personnel, and they were approached using personal and professional contacts. In so doing, this study has followed the recommendation about the use of those respondents who are similar to, or approximately representative of the intended target population (Supino and Borer, 2012).

There are different views about the use of survey modes to collect data. One group of scholars advocates mix-modes survey approach such as paper-based and Internet-based (e.g., De Leeuw, 2005; Sala and Lynn, 2009), while other draws our attention toward the issue of variations in analytical conclusions that can result from using different modes of data collection in the same study as well as from the same population (e.g., Roster, Rogers, Albaum, and Klein, 2004; Braunsberger, Wybenga, and Gates, 2007). It is obvious that every mode of the survey has pros and cons, and we cannot accept or reject it solely based on these reasons. Instead, it is guided by the research objective, population type, and availability of resources (time & cost). For example, different populations respond differently to different modes of surveys based on their level of comfort with that mode (Shih and Fan, 2008). It is observed that upper-level managers often avoid participating in survey activities, particularly when they are requested to fill a Web-based survey form. Considering these points, we used paper-based questionnaire surveys and distributed them among the respondents by personal visits after taking their consents. Using this mode enabled us to overcome all potential challenges emerging due to the use of multiple survey modes in data collection (Berghman, 2006).

Out of 60 distributed questionnaires, 35 filled questionnaires were received back. Two were having substantial missing data, with the omission of these two, remaining 33 were of use. The question "what is an appropriate sample size to conduct a pilot study" is often asked by the scholars who intend to pretest scales. There is no generally accepted principle to answer this question. According to Connelly (2008), it should be 10 percent of final study sample size. Some scholars (e.g., Hill, 1998) suggest 10-30 participants, while other (e.g., van Belle, 2002; Julious, 2005) reiterate minimum 12 respondents. Burns and Grove (2005), however, have not specified any sample size at piloting stage. Taking this into account, a relatively small pretesting sample size (n=33) consisting of "sophisticated" respondents (top-level executives) is deemed sufficient (Hunt, Sparkman Jr, and Wilcox, 1982; Berghman, 2006).

Table 5.1 : Reliability results of pilot study.

Main Construct	Sub-Construct	No. of Items	α
Innovation (Poorkavoos, Duan, Edwards, and Ramanathan, 2014).	Radical Innovation	03	0.775
	Incremental Innovation	06	0.829
Absorptive Capacity (Soo, Tian, Teo, and Cordery, 2012, 2017).	Potential Absorptive Capacity	11	0.918
	Realised Absorptive Capacity	13	0.919
Intellectual Capital (Youndt et al. 2004).	Human Capital	05	0.849
	Social Capital	04	0.931
	Organizational Capital	04	0.899
National Business System	Ownership Coordination	08	0.903
Newly Developed	Non-Ownership Coordination	08	0.842
	Employment Relations	07	0.830
Societal Institutions	The State	05	0.878
Newly Developed	Financial System	03	0.767
	Education/Skills Development System	05	0.807
	Trust and Authority Relations	03	0.862

Next, we first looked at the comments of respondents regarding item wording, sentence structure, and level of difficulty or confusion in understanding the language used in the questionnaire. There were few suggestions about changing some words and sentence structure for several items, which we incorporated in the final survey. Additionally, exploratory factor analysis (EFA) was carried out to examine the factor structure and internal consistency (reliability) of the scales. The coefficient alpha for

each construct achieved the threshold value of 0.70 (Nunnally, 1978). However, it is suggested that these results should be treated with extra caution because EFA needs relatively larger sample size, particularly in the case of unclear factor pattern (Iacobucci, 1994). Accordingly, these results were considered as indicative of main study data patterns, rather than final. Therefore, no items were deleted merely based on these findings. Results of Cronbach alpha of the pilot study are provided in Table 5.1

5.4. Variable Description and Measures

In this study, five scales were used to measure the variables of the study. Measurement scales include: societal institutions (the state, financial system, education/skills development system and the values of the work relations (trust and authority relations), characteristics of the NBS (ownership coordination, non-ownership coordination and employment relations), intellectual capital (human capital, social capital and organizational capital), absorptive capacity (potential and realized), and innovation performance (radical and incremental innovation). In order to control the confounding effects, several variables were controlled such as firm size, firm age, R&D budget, affiliation with business groups, firm type (family vs. non-family firm), and exports.

5.4.1. Innovation performance

The dependent variable in this study is innovation performance. Prior studies have used different methods based on objective data to measure innovation output in the firms such as R&D budget, the number of patents, and patents citations (Hagedoorn and Cloodt, 2003). However, access to such data in Pakistan is relatively difficult because either the data is unavailable or companies are hesitant to disclose their information. In such circumstances, data through perceptual measure become imperative which has become a common method to measure the innovation performance in recent years (e.g., Forés and Camisón, 2016; Rakthin, Calantone, and Wang, 2016). The study operationalizes innovation performance as radical and incremental innovation in terms of product/service and process, and adopts a nine items scale of Poorkavoos et al. (2014) to measure the both categories. The sample items are "We often introduce new products/services to a new market" *(radical innovation)*, "We often improve or revise existing products or services" *(incremental*

innovation). All the items were rated on a 5-point Likert scale ranging from 1 (*strongly disagree) to* 5 (*strongly agree).* The questionnaire is provided at the appendix, which includes all items.

5.4.2. Absorptive capacity

Absorptive capacity (ACAP) is believed to be an important determinant of firm innovation performance (e.g., Cohen and Levinthal, 1990; Zahra and George, 2002; Rakthin et al. 2016). Following Zahra and George (2002), this study conceptualizes ACAP as a multidimensional construct consisting of potential absorptive capacity (PACAP - knowledge acquisition and assimilation) and realized absorptive capacity (RACAP – knowledge transformation and exploitation). Unlike many other studies which use R&D expenditure as a proxy measure of ACAP (e.g., Rothaermel and Alexandre, 2009) present study adapts twenty-four items scale developed by Soo et al. (2012) to measure the both dimensions of ACAP. The first eleven items are related to the PACAP and sample items are "We regularly scan the external environment for new information, knowledge or technologies"; and "We quickly recognize and understand the usefulness of new external knowledge" *(PACAP).* The remaining thirteen items represent firm *RACAP*. The examples of items are "We record and store newly acquired knowledge for future reference"; and "We regularly consider how to better exploit knowledge and/or technologies". Each item was anchored using a 5-point Likert type scale ranges from *1 (strongly disagree)* to *5 (strongly agree).* All items are displayed in the questionnaire provided at the appnedix.

5.4.3. Intellectual capital (IC)

Building upon the previous work, intellectual capital (IC) is modeled as a multidimensional construct consisting of human capital (HC), social capital (SC), and organizational capital (OC) (e.g., Hsu and Sabherwal, 2012; Singh and Rao, 2016). Most of the studies measure IC using secondary data base proxies (e.g., Sydler, Haefliger, and Pruksa, 2014). However, bearing the limitation of the availability or access to such objective data in mind, the current study used survey items to measure the three dimension of IC adapted from the scale of Youndt et al. (2004). The sample items are "Our employees are highly skilled" *(HC)*; "Our employees are skilled at collaborating with each other to diagnose and solve problems" *(SC*); and "Our organization uses patents and licenses as a way to store

knowledge" *(OC).* Each response was measured using a 5-point Likert type scale ranging from 1 (*strongly disagree) to* 5 (*strongly agree).* The questionnaire is provided at the appendix, which includes all items.

5.4.4. NBS and societal institutions

Based on Whitley's (1992a, 1999) NBS framework and Rana and Morgan's (2016) operationalization, this study has developed twenty-three items to measure the three facets of NBS characteristics, and sixteen-item scale for societal institutions . As mentioned above, this study has followed a set criteria to develop new scale by generating an initial pool of items that were reduced down after the feedback from SMEs.Then based in poilot study we canged the wording of some items. Each item of the characteristics of NBS was rated using a 5- point Likert scale, ranging from 1 (*very low)* to 5 (*very high),* while 5- point Likert type scale ranges from *1 (strongly disagree)* to 5 (*strongly agree)* were used to measure societal institutions. The final items are listed as follow.

National Business System

I. Ownership coodination *(To what extant…….)*

1. Owners delegate authority to the salaried managers
2. Business activities are controlled by the salaried managers
3. Owner has trust on salaried managers and business partners
4. Owner wants to get knowledge about firm's technologies, products, and market
5. Family-ownership controls the business activities without authority delegation
6. Firms have ownership control over production chain assets and activities (Horizontal integration/related diversification
7. Managerial hierarchies (not owner) are allowed to sign contracts with other firms
8. Firms share authority and control of firms with non-family members

II. Non-owership coordination *(To what extant…….)*

9. Firms establish long term cooperative ties with buyers
10. Firms establish long term cooperative ties with suppliers
11. Firms establish long term collaborative ties with competitors
12. Firms collaborate with competitors to influence state polices and decisions
13. Firms collaborate with competitors to make profit from a saturated market
14. Firms establish long-term cooperative ties firms operating in different sectors
15. Firms establish long-term cooperative ties with firms from the same industry
16. These ties are based on personal relations and trust

III. Employment relations *(To what extant…….)*

17. Employer-employee commitment is based on long-term nature of job
18. Employer and employee depends on each other to operate business effectively
19. Firms prefer to promote internal employees rather than hiring skilled people externally
20. Firms provide training to its employees to meet organization specific needs
21. Employees are involved in decision making
22. Employees have task related autonomy
23. Employees are trusted by owner/manager

Societal Institutions

I. The state

1. In my country, government economic (business) policies are independent of pressure from special interest groups (e.g. social elites, power groups).
2. In my country, government grants subsidies to local firms that promote fair competition among firms.
3. In my country, government encourage the establishment of intermediary instructions, like business associations, trade unions etc.
4. In my country, government regulates markets through formal laws, rules and procedures.
5. In my country, it is burdensome for businesses to comply with governmental administrative requirements (e.g. getting license, regulations).

II. Financial system

6. In my country, banking system (credit-based) is the major source of business finance
7. In my country, most of the firms raise capital by issuing share on the stock market
8. In my country, non- bank financial institutions (e.g. insurance companies, Investment Banks etc.) are the major source of business finance

III. Education/skills development system

9. In my country, education system significantly contributes to the development of relevant labor force competencies that meet industry needs
10. In my country, employers and unions jointly conduct training programs to enhance employees' skills
11. In my country, employers and government agencies jointly conduct training sessions to develop employees' skills
12. In my country, employees are employees are densely (heavily) organized in unions
13. In my country, wages are determined by individual companies rather than through a centralized bargaining process (Government involvement)

IV. The values of work relations (trust and authority relations)

14. In my country, formal or governmental institutions and procedures are trusted by the public
15. In my country, managers willingly delegate authority to subordinates
16. In my country, management and workers relations are cooperative

5.5. Control Variables

5.5.1. Firm age

Previous studies have noted that firm age is inversely related to the innovation output in firms (Ayyagari, Demirgüç-Kunt, and Maksimovic, 2011). It is observed that firms accumulate knowledge, and experience over the period of time that aid them to boost their innovation performance (Yi, Wang, and Kafouros, 2013). This research controls firm age and measures it a number of years since the start of business operations.

5.5.2. Firm size

Past studies highlight the positive link between firm size and innovation performance (Minguela-Rata, Fernández-Menéndez, and Fossas-Olalla, 2014). However, findings are mixed. Some studies find smaller firms more innovative as compare to the larger firms (e.g., Plehn-Dujowich, 2009) whereas, others report medium and large sized

firms more innovative than smaller one (Ayyagari et al. 2011). Keeping this in mind, this study controls firm size and measures by taking the natural log of a total number of full-time employees (Wang, Yi, Kafouros, and Yan, 2015).

5.5.3. Export

Numbers of past studies have reported a bi-directional relationship between export and firm innovation output (e.g., Kostevc and Damijan, 2008; Damijan, Kostevc, and Polanec, 2010). It is believed that international orientation of firms by the means of exporting helps the firm to identify and exploit knowledge effectively which in turn increases their innovativeness (Wang et al. 2015). To control the confounding effect of export, this paper measures export as the percentage of the export sale within total revenue.

5.5.4. R&D budget

The relationship between R & D budget (i.e. expenditure) and innovation output is widely acknowledged in the past literature (Shefer and Frenkel, 2005). Evidence shows that those firms that spare more R&D budget exhibit greater innovation performance (Wu, Chen, and Jiao, 2016). Therefore, present study controls R & D budget using a percentage of the share of R & D budget with reference to total revenue as a measure of it.

5.5.5. Affiliation with business group

Firms' affiliation with the business group is accounted as a control variable. According to Chang, Chung, and Mahmood (2006), such firms enjoy greater access to knowledge and financial resources that enable them to demonstrate higher innovation performance as compared to independent firms (Belenzon and Berkovitz, 2010). To account the spurious effect of this variables, respondents were asked either their firm is affiliated with a business group or not.

5.5.6. Firm type (Family vs. non-family)

Existing literature on innovation indicates that family and non-family firms vary in terms of their willingness to invest in innovation as well as innovation output (Llach and Nordqvist, 2010; De Massis, Frattini, Pizzurno, and Cassia, 2015). It is a common belief that family firms are less innovation than the counterpart is, whereas family firms in recent years are blossoming and are introducing significant innovation (Duran, Kammerlander, Van Essen, and Zellweger, 2016). Firm type is

measured as family vs non-family firms and coded as 1 and 0 respectively. All the aforementioned scales including controls are given in appendix.

5.6. Ethical Considerations

Ethics and integrity are central to undertake a research study. Following the guidelines of Ritchie et al. (2013), this study puts in place several strategies to forestall and address these concerns. First, all respondents have participated voluntarily in filling out the questionnaires. Second, they were assured that their identity and confidentiality will be highly respected. Third, this data will be used purely for academic purpose. Fourth, before distributing the questionnaires, participants' consent about becoming the part of this research activity were taken. Finally, participants were free from any pressure, and care was taken to any kind of adverse effect of participation.

5.7. Chapter Summary

This chapter covers research philosophical assumption, research design, sampling, data collection, scale development activities, and justification for the development of a new scale. Further, results of pilot testing of the questionnaires in terms of alpha reliabilities are also presented in this chapter. Finally, individual construct's scale and ethical considerations to undertake have also been presented in this chapter. The statistical methods and data analysis to test the hypothesis are provided in the next chapter.

6. ANALYSIS AND RESULTS

This chapter aims to present the results about the hypothesized relationships after empirical analyses of the data. Data analysis is an integral part in overall research process which starts immediately after data collection (Hair, Black, Babin, and Anderson, 2010; Boddy and Smith, 2009). It consists of different but interrelated analytical methods such as factor analysis and structural equation modelling that can be utilized to test hypotheses of the study (Jambu, 1991; Adèr, 2008). Factor analysis is statistical technique that is used to analyze the relationships between a large numbers of variables, and then cluster those variables based on shared variance under a common factor (Yong and Pearce, 2013). Structural equation modeling (SEM) is a very common and stringent multivariate analytical technique used in studying the causal relationships between variables simultaneously (Hair et al. 2010). The nature of relationships between the constructs of this research also guided us to apply the SEM. However, it is recommended that researchers must pay close attention on data screening and factor analysis before transferring these construct into SEM analysis in order to maximize the estimation power of this method (Hair et al. 2010).

This study has followed four main steps at the data analysis phase: 1) data screening, 2) factor analysis, and 3) hypothesis testing. Detailed discussion on each step is provided below.

6.1. Data Screening

Data screening refers to process of detecting and correcting errors in the data set before conducting a statistical analysis so that unbiased results can be obtained. This is typically important to grape some critical insights on the reliability, validity, and usability of data for testing the causal theoretical frameworks (Hair et al. 2010). In order to obtain some indications of the precision and accuracy of the data, this study has performed three basic data purification strategies, which are:

a. Analysis of missing data

b. Detection of outliers
c. Analysis of normality assumption

6.1.1. Case-wise analysis of missing data

Missing data is common, and almost every research study confronts with this challenge. Common reasons of missing data can be: respondent characteristics, study design, characteristics of measurement, data collection method, and poor management of data (Masconi, Matsha, Echouffo-Tcheugui, Erasmus, and Kengne, 2015; Kamakura and Wedel, 2000). The large amount of missing data can reduce the power of analysis which in turn influences the conclusions drawn from this data. Even, some statistical programs could not function in the presence of missing observations. Therefore, data censorship is important to identify and treat the missing values in order to conduct a statistical analysis without any hurdle, which in turn produces quality results (Hair et al. 2010).

Table 6.1 : Missing data per case.

# of missing values	Industry	Case ID
1	Textile	11
2		42
3		116
4		209
5	Pharmaceutical	18
6		123
7	Engineering	165
8		27
9		149
10	Information Technology	215
11		74
12	Chemical	82
13		160
14	Automotive/Automobile	56

This study has collected from different industries. Out of 1,235 distributed questionnaires, 228 were received back with the response rate of 18.5 percent. Industry-wise responses are: Textile = 56, Pharmaceutical = 41, Engineering = 12, Information technology = 31, Electrical/Electronics = 40, Chemical = 25 and Automotive/Automobile = 23. Foremost, all data entries were cross-checked case by case. Next, we performed descriptive statistical analysis using SPSS-22 and

examined the frequency of missing data in each case. This yielded only one mistake during data feeding process, and confirmed the accuracy of data feeding. In addition to this, it was found that 14 cases contained substantial missing data at least 20 percent or greater in the variable measurement section (see Table 6.1), and were discarded as per the recommendations of Hair et al. (2010). As a result, 214 usable questionnaires were retained for further analysis of outliers and normality.

6.1.2. Outliers

Outliers characterize as *'abnormal'* values in a data set. Presence of these extreme values can distort statistical results (Tabachnick and Fidell, 2007). Therefore, it is crucial to detect and fix them before one proceed to final data analysis. They can be univariate, bivariate, and multivariate (Hair et al. 2010). This study skipped the bivariate analysis and just focuses on the other two because it can be incorporated in the multivariate category (Marzec, 2013).

6.1.2.1. Univariate outliers

After fixing the issue of missing data, an effort was made to single out the extreme values on each variable through box-plot method in SPSS-22. This procedure identified some outliers on few variables of the study. Generally, omission is recommended as the best solution for these abnormal values with the condition of larger sample size since outliers may influence solutions. In case of small sample size, on the other hand, researchers have limited liberty on the exclusion of information. While, scholars argue that outliers are not an issue for those studies which use Likert-type scales because selecting an extreme value (one or five) could not be interpret as an evidence of outlying behavior (Berghman, 2006). Given this, it was decided to retain these cases and preceded for the analysis of multivariate outliers.

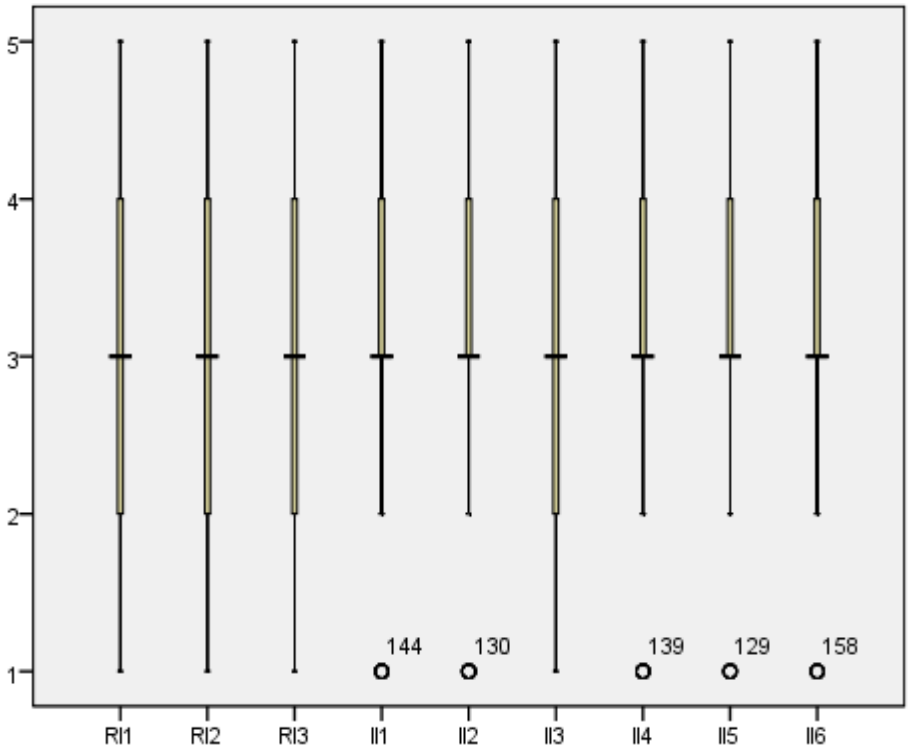


Figure 6.1 : Box-Plot of Innovation.

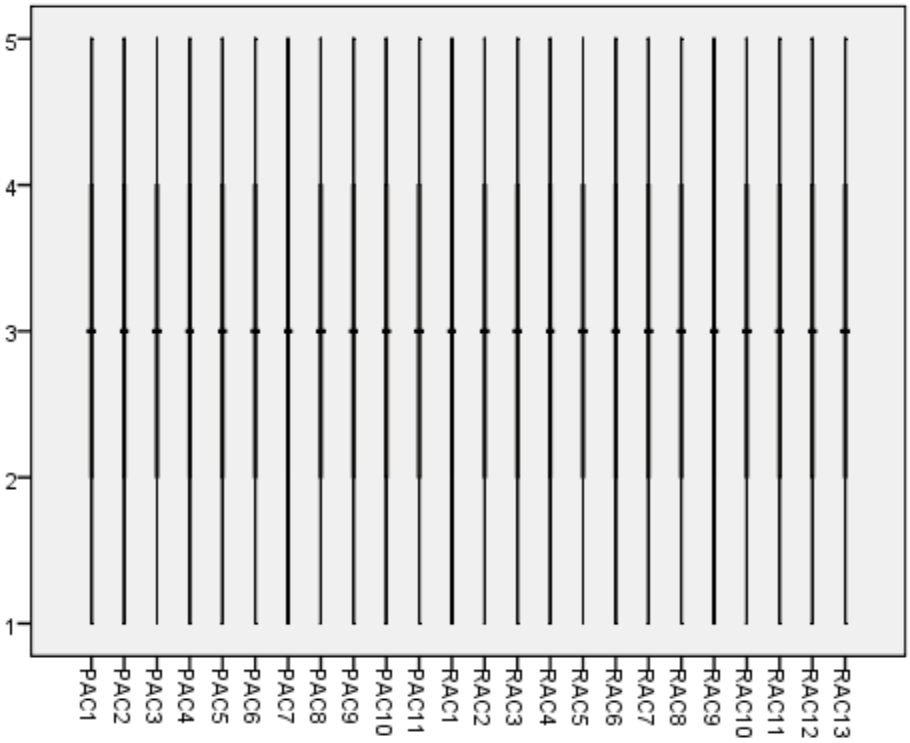


Figure 6.2 : Box-Plot of absorptive capacity.

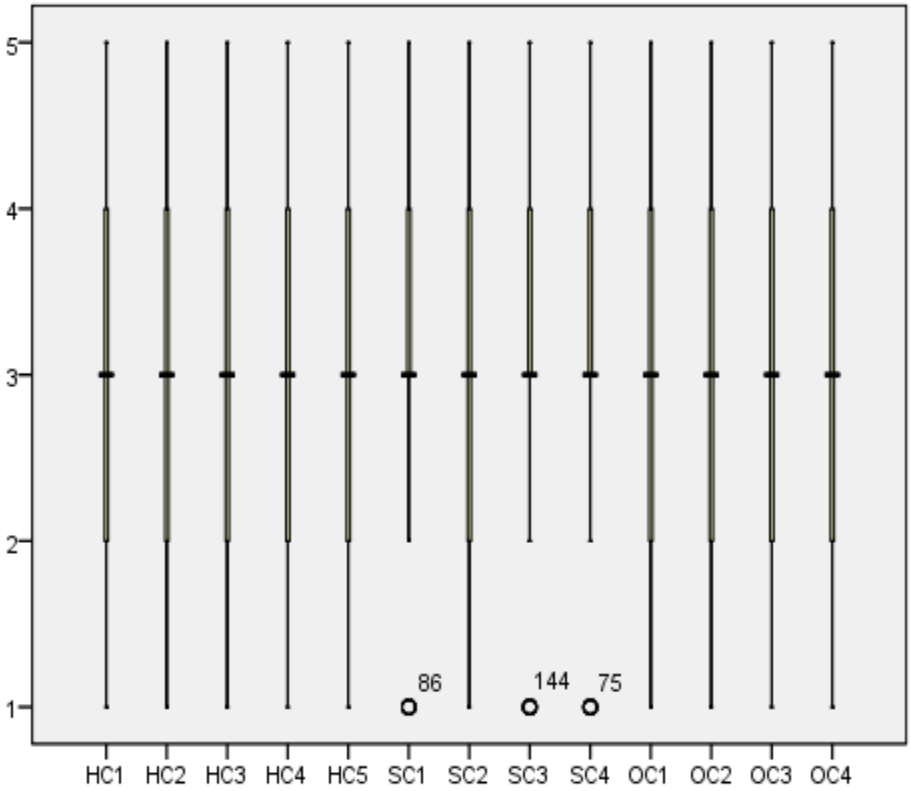


Figure 6.3 : Box-Plot of intellectual capital.

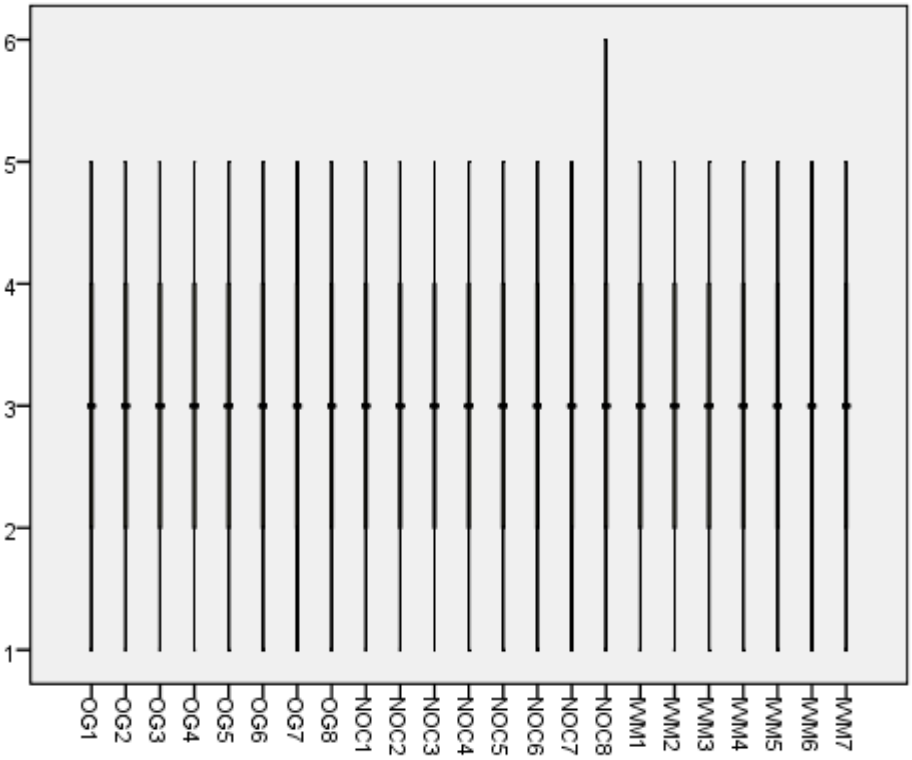


Figure 6. 4 : Box-Plot of national business system.

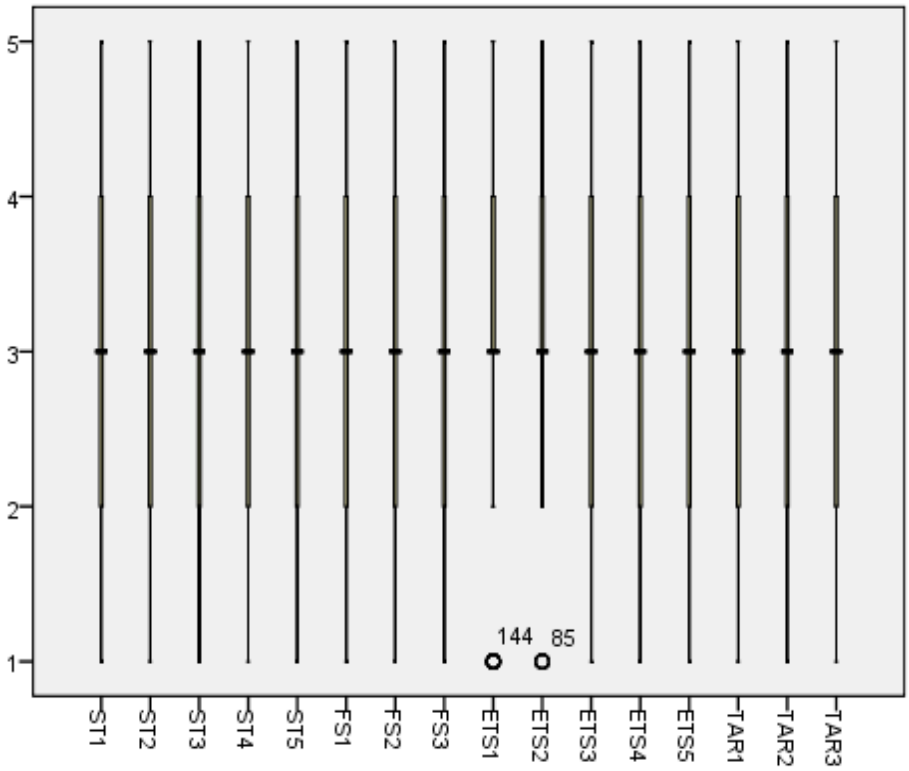


Figure 6. 5 : Box-Plot of societal institutions.

6.1.2.2. Multivariate outliers

It is often noted that multivariable observations cannot be easily spotted as an outlier when each variable is analyzed separately. For such cases, application of multivariate outlier detection methods is the only possible solution to deal with this challenge (Ben-Gal, 2005). Multivariate outliers refer to unusual combined data scores that appear on multiple variables simultaneously and depart markedly from other values. This study has employed Mahalanobis distance technique to detect multivariate outliers in the data set. The key to this approach is that it accounts the distance of an observation from the centroid of data distribution, larger the value, more the distance, and higher probability of becoming an outlier (Rousseeuw and Zomeren, 1990; Ben-Gal, 2005).

Table 6.2 : Mahalanobis distance value and *p-value.*

Case ID	Mahalanobis D^2	*p*	Case ID	Mahalanobis D^2	*p*	Case ID	Mahalanobis D^2	*p*
79	32.212	0.004	**38**	18.859	0.170	**214**	15.113	0.370
139	27.522	0.016	**85**	18.856	0.171	**204**	15.055	0.374
129	27.376	0.017	**99**	18.784	0.173	**183**	15.033	0.376
114	26.813	0.020	**93**	18.753	0.175	**52**	14.928	0.383
5	25.811	0.027	**136**	18.748	0.175	**14**	14.881	0.386
91	25.271	0.032	**83**	18.674	0.178	**29**	14.877	0.387
80	23.803	0.048	**64**	18.640	0.179	**92**	14.752	0.395
185	23.465	0.053	**47**	18.594	0.181	**53**	14.689	0.400
27	23.176	0.057	**153**	18.496	0.185	**10**	14.640	0.403
55	22.920	0.062	**160**	18.409	0.189	**171**	14.533	0.411
177	22.908	0.062	**100**	18.076	0.203	**167**	14.492	0.414
67	22.550	0.068	**101**	17.830	0.215	**23**	14.444	0.417
73	22.481	0.069	**206**	17.826	0.215	**150**	14.374	0.422
60	22.190	0.075	**172**	17.661	0.223	**39**	14.287	0.429
176	22.026	0.078	**144**	17.653	0.223	**146**	14.280	0.429
178	21.982	0.079	**196**	17.327	0.239	**116**	14.173	0.437
192	21.878	0.081	**75**	17.063	0.253	**194**	14.099	0.442
17	21.796	0.083	**105**	17.023	0.255	**189**	14.043	0.446
12	21.759	0.084	**4**	16.980	0.257	**30**	13.997	0.450
110	21.635	0.086	**128**	16.958	0.258	**169**	13.992	0.450
84	21.574	0.088	**199**	16.926	0.260	**119**	13.919	0.456
210	21.560	0.088	**6**	16.688	0.273	**43**	13.896	0.458
28	21.537	0.089	**157**	16.660	0.275	**147**	13.856	0.460
132	21.163	0.098	**137**	16.495	0.284	**140**	13.822	0.463
135	20.904	0.104	**118**	16.384	0.290	**141**	13.789	0.466
46	20.581	0.113	**198**	16.375	0.291	**186**	13.673	0.474
203	20.494	0.115	**24**	16.325	0.294	**74**	13.538	0.485
71	20.381	0.119	**9**	16.089	0.308	**22**	13.522	0.486
65	20.283	0.121	**11**	15.939	0.317	**165**	13.466	0.490
184	19.948	0.132	**149**	15.911	0.319	**42**	13.452	0.491
96	19.893	0.134	**193**	15.859	0.322	**163**	13.384	0.497
205	19.601	0.143	**111**	15.851	0.323	**95**	13.265	0.506
175	19.455	0.148	**126**	15.833	0.324	**201**	13.249	0.507
213	19.409	0.150	**19**	15.824	0.324	**212**	13.216	0.510
68	19.359	0.152	**202**	15.705	0.332	**130**	13.208	0.510
7	19.288	0.154	**138**	15.583	0.340	**195**	13.187	0.512
81	18.908	0.168	**127**	15.430	0.349	**159**	13.046	0.523
106	18.889	0.169	**173**	15.118	0.370	**154**	13.035	0.524

Table 6.2 (continued) : Mahalanobis distance value and *p-value.*

Case ID	Mahalanobis D^2	*p*	Case ID	Mahalanobis D^2	*p*	Case ID	Mahalanobis D^2	*p*
44	13.000	0.526	**1**	10.701	0.709	**57**	8.033	0.888
13	12.945	0.531	**69**	10.505	0.724	**104**	7.933	0.893
181	12.843	0.539	**51**	10.434	0.730	**113**	7.920	0.893
168	12.747	0.547	**131**	10.428	0.730	**88**	7.887	0.895
164	12.400	0.574	**112**	10.327	0.738	**211**	7.704	0.904
108	12.394	0.575	**32**	10.268	0.742	**40**	7.532	0.912
188	12.268	0.585	**21**	10.169	0.750	**41**	7.523	0.913
191	12.202	0.590	**179**	10.167	0.750	**34**	7.458	0.916
207	12.131	0.596	**208**	10.105	0.754	**77**	7.324	0.921
182	12.117	0.597	**124**	10.103	0.755	**25**	7.058	0.932
58	12.072	0.600	**197**	10.058	0.758	**20**	6.886	0.939
76	12.053	0.602	**121**	9.930	0.767	**125**	6.396	0.956
209	12.047	0.603	**170**	9.910	0.769	**133**	6.324	0.958
145	12.029	0.604	**155**	9.884	0.771	**134**	6.227	0.960
148	12.019	0.605	**143**	9.820	0.775	**152**	6.212	0.961
162	11.921	0.613	**166**	9.741	0.781	**59**	6.098	0.964
8	11.917	0.613	**158**	9.595	0.791	**151**	5.935	0.968
48	11.823	0.620	**117**	9.578	0.792	**61**	5.475	0.978
102	11.810	0.622	**156**	9.560	0.794	**89**	4.648	0.990
33	11.744	0.627	**50**	9.540	0.795	**66**	4.088	0.995
103	11.578	0.640	**98**	9.501	0.798	**120**	4.071	0.995
2	11.547	0.643	**97**	9.500	0.798	**31**	4.015	0.995
174	11.509	0.646	**187**	9.441	0.802	**15**	3.504	0.998
161	11.501	0.646	**142**	9.318	0.810	**36**	2.151	1.000
190	11.461	0.650	**109**	9.292	0.812			
26	11.448	0.651	**63**	9.166	0.820			
70	11.284	0.664	**115**	9.143	0.822			
49	11.236	0.667	**72**	9.141	0.822			
87	11.216	0.669	**56**	8.809	0.843			
123	11.215	0.669	**82**	8.789	0.844			
90	11.161	0.673	**180**	8.744	0.847			
37	11.011	0.685	**45**	8.734	0.848			
16	10.998	0.686	**18**	8.730	0.848			
107	10.936	0.691	**200**	8.701	0.850			
3	10.933	0.691	**94**	8.571	0.858			
122	10.929	0.692	**54**	8.524	0.860			
35	10.794	0.702	**78**	8.420	0.866			
86	10.742	0.706	**62**	8.066	0.886			

Mahalanobis distance is based on chi-square distribution and computes the distance of a case from the mean (multidimensional) of a distribution and covariance (multidimensional) relative to other case in the distribution. A case is considered

multivariate outlier if Mahalanobis distance value is significant at *p<0.001* (Table 6.2) (Tabachnik and Fidell, 2001) or critical value of chi-square at given degree of freedom which is equal to the total number of independent variables, exceeding the value of Mahalanobis distance. In this study, critical chi-square value is 36.123. Considering these criteria, this study has not found any multivariate outlier in the study. Graphical representation (Figure 6.6) shows the case number *79* as an outlying value, but we decided to retain the case in the data because every case in this study has important information regarding the study phenomenon (see Table 6.3).

Table 6.3 : Extreme values of Mahalanobis distance.

		Case Number	Value
Highest	1	79	3.22120
	2	139	2.75222
	3	129	2.73761
	4	114	2.68127
	5	5	2.58114
Lowest	1	36	2.15061
	2	15	3.50364
	3	31	4.01548
	4	120	4.07111
	5	66	4.08771

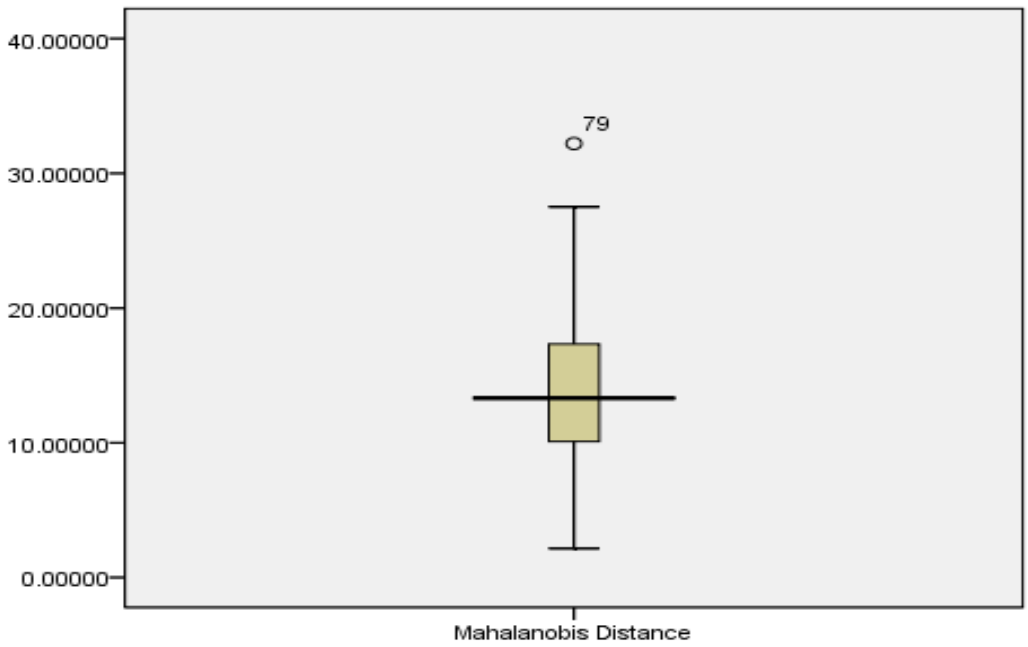


Figure 6.6 : Mahalanobis distance.

6.1.3. Normality assumption

Normality in data set is an important requirement that should be met before starting an estimation process since abnormal data can have adverse impact on statistical analysis and inferences. Therefore, normal or approximately normal data is required in most of analytical approaches. Data normality can be assessed by statistical methods as well as by graphical representation, and this study used both which include kurtosis and skewness, Kolmogorov-Smirnov and Shapiro-Wilk test, and histogram.

Table 6.4 : Descriptive statistics.

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Radical Innovation	1.00	5.00	3.01	1.18	.008	-.649
Incremental Innovation	1.17	5.00	3.24	0.82	-.046	-.263
Potential Absorptive Capacity	1.00	4.55	2.79	0.77	.047	-.399
Realized Absorptive Capacity	1.00	5.00	3.28	0.96	-.357	-.502
Human Capital	1.00	5.00	3.00	0.84	-.116	-.231
Social Capital	1.00	5.00	3.22	0.84	.066	-.215
Organizational Capital	1.00	5.00	3.10	0.98	.002	-.676
Ownership Coordination	1.00	5.00	3.15	1.03	-.179	-.614
Non-Ownership Coordination	1.00	5.00	2.92	1.06	-.059	-.847
Employment Relations	1.00	5.00	3.18	1.14	-.240	-.872
The State	1.00	5.00	2.95	0.91	.035	-.560
Financial System	1.00	5.00	2.96	0.92	.007	-.298
Education/Skills Development System	1.00	5.00	3.08	0.83	.023	-.307
Work Relation Values	1.00	5.00	2.81	1.20	.167	-.915

Skewness and Kurtosis: Using mean score of all variables (i.e. dependent, independent), this study has first conducted descriptive statistical analysis which yielded that scores for both kurtosis and skewness fall within the recommended range in both directions , +2 to -2 (see Table 6.4) (Trochim and Donnelly, 2006; George and Mallery, 2010). Thus, we presume that the data is normally distributed. To confirm this, we performed Kolmogorov-Smirnov test as well.

Kolmogorov-Smirnov and Shapiro-Wilks test: Results of these tests indicate that most of the variables failed to meet the normality assumption ($p < 0.05$). However, these tests are very sensitive to the sample size, larger the sample size, it is more likely that values become significant (see Table 6.5).

Table 6.5 : Results of normality test.

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Radical Innovation	.102	214	.000	.977	214	.001
Incremental Innovation	.052	214	.200*	.989	214	.099
Potential Absorptive Capacity	.065	214	.029	.988	214	.067
Realized Absorptive Capacity	.107	214	.000	.957	214	.000
Human Capital	.064	214	.034	.990	214	.145
Social Capital	.073	214	.008	.983	214	.011
Organizational Capital	.085	214	.001	.975	214	.001
Ownership Coordination	.091	214	.000	.976	214	.001
Non-Ownership Coordination	.096	214	.000	.973	214	.000
Employment Relations	.082	214	.001	.961	214	.000
The State	.051	214	.200*	.988	214	.065
Financial System	.082	214	.001	.979	214	.003
Education/Skills Development System	.078	214	.003	.988	214	.075
Work Relation Values	.087	214	.000	.951	214	.000

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Histogram: Generally, it is recommended to assess normal distribution of data by visualizing the graphs (see Appendix C, Figure 6.2a & b). For this purpose, this study has produced histogram of each construct of the study. Overall, these graphs show that data is normally distribution. Thus, we presume that possible reason of lack of normality in Kolmogorov-Smirnov and Shapiro-Wilk test is relatively the large sample size. Considering this, this study has not applied any treatment to the data to make it normalize. Additionally, this study would conduct main analysis using variance-based partial least squares (PLS) technique that can handle non-normal data (Sosik, Kahai, and Piovoso, 2009).

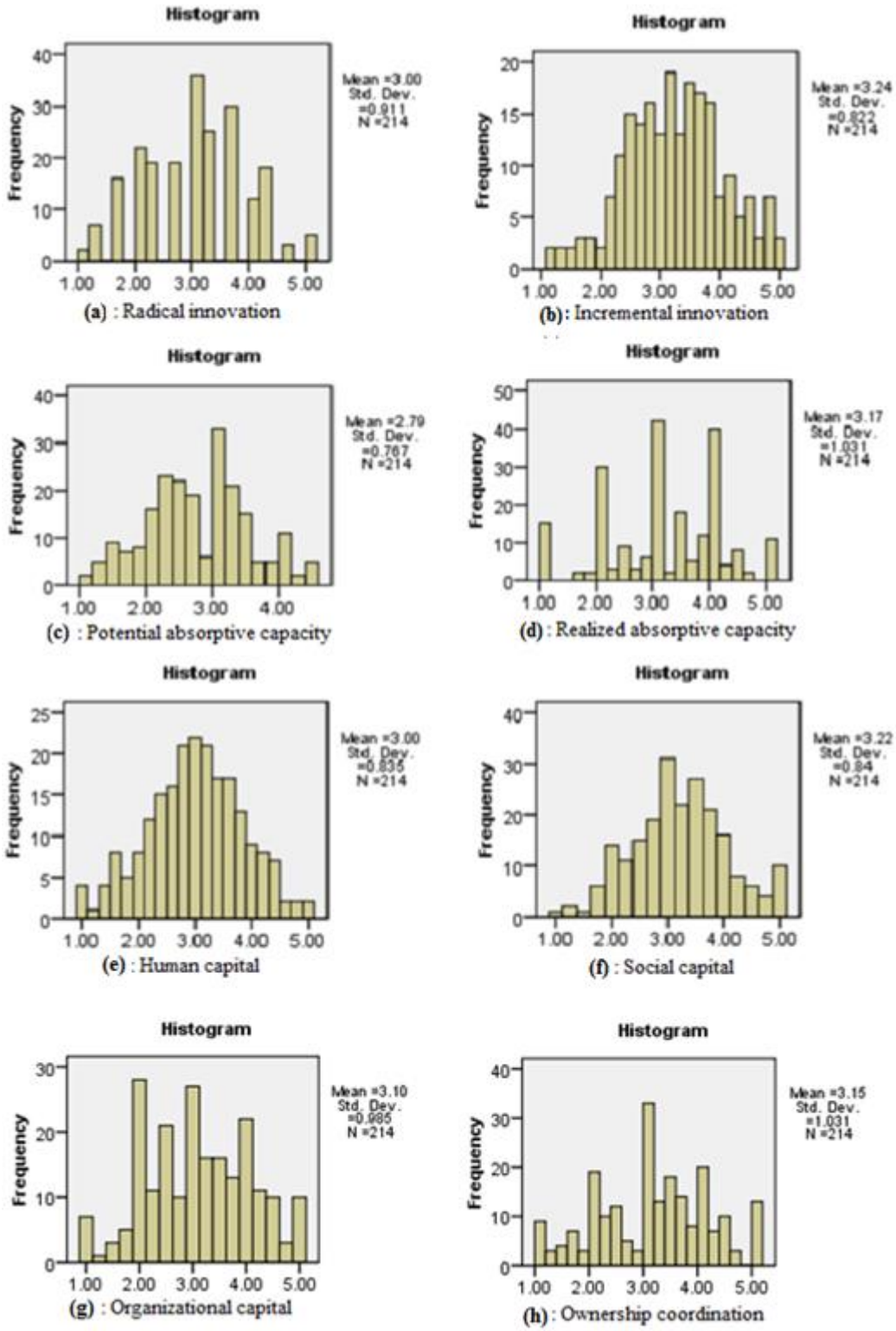
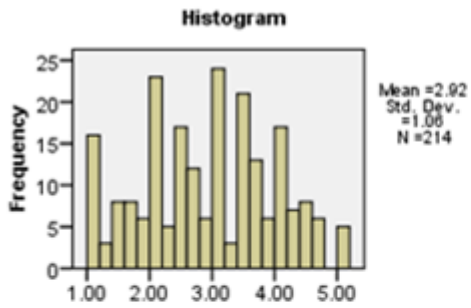
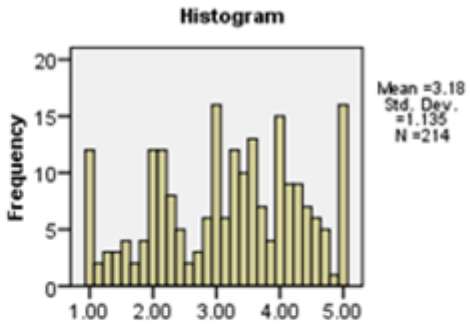


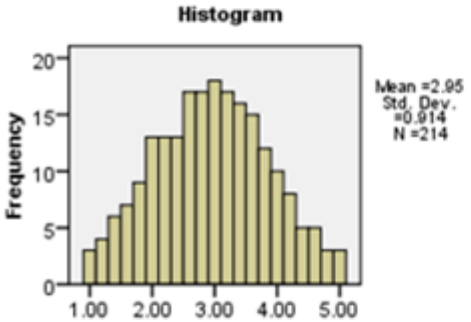
Figure 6.7a : Histograms.



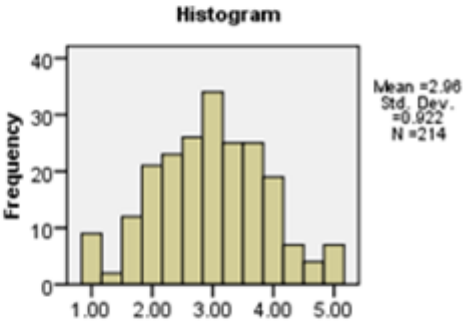
(i) : Non-ownership coordination



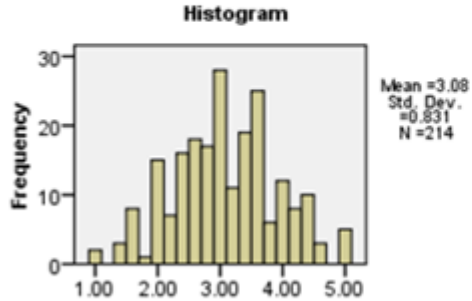
(j) : Employment relations



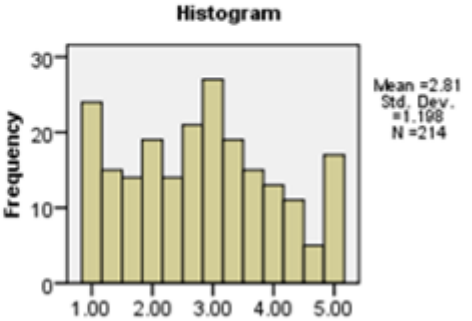
(k): The state



(l) : Financial system



(m) : Education/skills development system



(n) : Work relations values

Figure 6.7b : Histograms.

6.2. Characteristics of Respondents

Table 6.6 shows that 49.5% of respondents are senior-level managers followed by owner-managers (32.2%) and managers (18.2%). Respondents' average years of experience in the firm are 15.2, with a standard deviation of 9.5, indicating that participants were having sufficient experience.

Table 6.6 : Profile of respondents.

Description	Frequency	Percent
Position		
Owner Manager	69	32.2
Senior Manager	106	49.5
Manager	39	18.2
Total	214	100
Experience		
< 5 years	48	22.4
6 to 10	80	37.4
11 to 15	67	31.3
> 15 years	19	8.9
Total	214	100
Mean		15.2
Std. Deviation		9.5
Minimum		4
Maximum		29

6.3. Respondent Firms' Profile

Table 6.7 presents that firms from textile, pharmaceutical, and electrical/electronic industries are in larger proportion, being 25.2%, 18.2%, and 17.8% respectively. While, mechanical/industrial engineering firms form only 4.67% of the total sample size. Overall, the composition of sample seems appropriate for the phenomenon of study, as these are the leading firms in the economy.

Most of the firms are family owned (74.3%), whereas 25.7% are non-family firms. Over half (56.5%) are affiliated with business group. The mean years respondents firms since establishment is 27.4 and the majority of the firm in the sample (63.6%) have over 20 years of experience in the same business. The mean number of employees of participants' firm is 1131and most of the firms (85.5%) have less than 1500 employees which is according to expectation. As the economy is dominated by small and medium sized organizations.

Table 6.7 : Respondent firms' profile.

Description	Frequency	Percent
Industry		
Automotive/Automobile	21	9.81
Chemical	23	10.7
Electrical/Electronic	38	17.8
Information Technology	29	13.6
Mechanical/Industrial Engineering	10	4.67
Pharmaceutical	39	18.2
Textile	54	25.2
Total	**214**	**100**
Firm Type		
Non-Family Firm	55	25.7
Family Firm	159	74.3
Total	**214**	**100**
Affiliation with Business Group		
Affiliates	121	56.5
Non-Affiliates	93	43.5
Total	**214**	**100**
Firm Age		
<20	78	36.4
20-40	87	40.7
41-60	40	18.7
>60	9	4.2
Total	**214**	**100**
Mean		27.04
Std. Deviation		16.8
Minimum		1
Maximum		69
Firm Size (Employees)		
<100	47	22.0
100-500	76	35.5
501-1500	60	28.0
> 1500	31	14.5
Total	**214**	**100**
Mean		1131.5
Std. Deviation		2.6
Minimum		7
Maximum		23000

This section has discussed data cleaning to prepare it for statistical analysis. Then, it elaborated the profiles of participants and respondent firms. Following section will present data analyses procedures and the results will be discussed.

6.5. Analysis of Measurement Scales

This section presents the process of measurement development for all constructs in the theoretical framework. Each set of the measure, representing the research constructs, was analyzed to determine its reliability by estimating the item total correlation and *reliability coefficient (internal consistency). Next,* we performed factor analyses (FA) in two steps. First, an exploratory factor analysis (EFA) was conducted to determine the factor structure with regards to their conceptual domain. Second, a confirmatory factor analysis (CFA) was undertaken to refine and confirm items structure of every construct in order to establish reliability and validity.

6.4.1. Reliability analysis of scales

Reliability can be described as *"consistency"* and a scale is considered to be reliable when it produces consistent results again and again while studying the same subject in the same contexts (Churchill, 1979). The questionnaire survey used in this study is composed of five scales (with sub-scales) to measure the constructs proposed in research model, namely firm innovation performance, absorptive capacity, intellectual capital, national business system, and societal institutions. To confirm the consistence and accuracy of t these instruments in mearing the same constructs as they were hypothesized, we launched a reliability analysis by calculating items internal consistence (Cronbach's Alpha) and item-total correlations statistics provided below.

6.4.1.1. Items internal consistency

Internal consistency can be described as the extent to which items are consistent in measuring what they were intended to measure (Schmitt, 1996). Cronbach's alpha is the most widely used measure of internal consistency (Streiner, 2003). In order to consider a measure reliable, the value of Cronbach's alpha should be greater than 0.70 (Hair et al. 2010; Tabachnick and Fidell, 2007). Table 6.8 shows that Cronbach's alpha for all scales and the values of reliability coefficient range from 0.805 to 0.974, suggesting very good reliability/ internal consistency of scales.

Table 6.8 : Reliability coefficients.

Construct Measure	Number of Items	Cronbach's Alpha
Radical Innovation	3	0.853
Incremental Innovation	6	0.905
Potential Absorptive Capacity	11	0.947
Realized Absorptive Capacity	13	0.974
Human Capital	5	0.877
Social Capital	4	0.865
Organizational Capital	4	0.886
Ownership Coordination	8	0.947
Non-Ownership Coordination	8	0.939
Employment Relations	7	0.934
The State	5	0.884
Financial System	3	0.805
Education/Skills Development System	5	0.906
Work Relations Values	3	0.919

6.4.1.2. Item to total correlations

Item to total correlation (see Table 6.9) refers to the correlation between an individual item and the overall score of a measure of a construct to which that item belongs (Hayes, 1998). This analysis, according to Churchill (1979) is useful to clean the measure by recognizing and omitting those items that fail to represent a measure truly.

There are several cut-off values of item to total correlations are suggested in the literature, but the value of 0.30 or greater is considered good (Cristobal, Flavián and Guinaliu, 2007). Items to fail to achieve the threshold level are indicative of measuring something else. Table 6.8 shows that corrected item to total correlation for each item is greater than 0.30, thus confirming that items are representing their conceptual domain correctly.

Table 6.9 : Item to total correlations.

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RI1	.728	.789	**OC1**	.752	.853
RI2	.709	.808	**OC2**	.695	.874
RI3	.732	.785	**OC3**	.759	.851
II1	.755	.885	**OC4**	.803	.834
II2	.729	.889	**OG1**	.791	.942
II3	.741	.887	**OG2**	.806	.941
II4	.693	.894	**OG3**	.800	.941
II5	.699	.893	**OG4**	.785	.942
II6	.814	.877	**OG5**	.820	.940
PAC1	.744	.942	**OG6**	.820	.940
PAC2	.750	.942	**OG7**	.821	.939
PAC3	.744	.942	**OG8**	.816	.940
PAC4	.722	.943	**NOC1**	.783	.931
PAC5	.760	.942	**NOC2**	.806	.930
PAC6	.777	.941	**NOC3**	.785	.931
PAC7	.804	.940	**NOC4**	.775	.932
PAC8	.784	.941	**NOC5**	.767	.932
PAC9	.788	.941	**NOC6**	.797	.930
PAC10	.718	.943	**NOC7**	.729	.935
PAC11	.806	.940	**NOC8**	.825	.928
RAC1	.861	.972	**IWM1**	.771	.925
RAC2	.883	.972	**IWM2**	.775	.924
RAC3	.856	.972	**IWM3**	.808	.921
RAC4	.860	.972	**IWM4**	.776	.924
RAC5	.856	.972	**IWM5**	.809	.921
RAC6	.863	.972	**IWM6**	.813	.921
RAC7	.854	.972	**IWM7**	.749	.927
RAC8	.805	.973	**ST1**	.725	.859
RAC9	.833	.973	**ST2**	.695	.865
RAC10	.855	.972	**ST3**	.721	.860
RAC11	.858	.972	**ST4**	.703	.863
RAC12	.828	.973	**ST5**	.763	.849
RAC13	.866	.972	**FS1**	.695	.688
HC1	.692	.855	**FS2**	.640	.746
HC2	.659	.862	**FS3**	.622	.764
HC3	.716	.849	**ETS1**	.773	.883
HC4	.732	.845	**ETS2**	.738	.891
HC5	.740	.843	**ETS3**	.752	.888
SC1	.728	.823	**ETS4**	.716	.897
SC2	.668	.848	**ETS5**	.855	.867
SC3	.700	.834	**TAR1**	.855	.869
SC4	.765	.807	**TAR2**	.810	.905
			TAR3	.845	.877

6.4.2. Exploratory factor analysis (EFA)

Although PLS can directly assess the psychometric properties of a measure, yet this study has decided to undertake an independent EFA. The fundamental objective of EFA is to regroup all of those items that have high intercorrelations into smaller clusters with respect to a common underlying factor or construct (Heck, 1998). As an exploratory approach, EFA is useful in developing and validating measures (Hayton,

Allen, and Scarpello, 2004; Conway and Huffcutt, 2003) and arriving at a good understating of the items' structure (Fabrigar, Wegener, MacCallum, and Strahan, 1999). Accordingly, this study has analyzed the collected data using EFA to determine the factors.

To perform EFA, the principal axis factoring (PAF) is used with oblique rotation, rather than a well-known principle component analysis (PCA) which primarily focus on seeking a linear combinations of a set of variables in a way so that maximum variance can be explained (Wang, Zeng, and Ming, 2014). More specifically, it accounts all of the variance of the variable (i.e. common and unique). In addition to this, PCA is generally used for data reduction purpose that definitely this study does not intend. In contrast, PAF considers only common variance and seeks to determine limited number of common factors by eliminating the unique or unexplained variance from the model (Conway and Huffcutt, 2003). Furthermore, PLS will be used in the main analysis of this study also rests on PCA, therefore, adapting different extraction method at this stage can be expected to yield more conservative findings than those provided by PLS analysis (Berghman, 2006).

Considering this, present study has followed a step-wise approach. In the first step, a separate EFA for each conceptual domain was conducted in order to recognize highly correlated variables with regard to the common conceptual domain. In particular, first five EFAs were performed: 1) on the innovation construct: radical innovation (RadInn) and incremental innovation (IncrInn), 2) on the absorptive capacity (ACAP): potential absorptive capacity (PACAP) and realized absorptive capacity(RACAP), 3) on the intellectual capital (IC): human capital (HC), social capital (SC) and organizational capital (OC), 4) on the national business system (NBS): ownership coordination, non-ownership coordination and employment relations, and 5) on the societal institutions: the state, the financial system, education/skills development system (ESDS), and work relations values (WRV). Corresponding items with regard to each construct are provided in the appendix II. In the second step, a combined EFA by entering all the items into the SPSS, discussed below.

Output of the separate EFAs are provided below. Oblique rotation method antagonistic to orthogonal method was used to examine the intercorrelations between the factors as this method maximizes loading scores when factors have correlations.

The factor loadings, commonalities, and KMO from separate EFAs are provided in Tables 6.10 & 6.11.

Table 6.10 : Result of separate EFA.

Innovation	Loading on IncrInn	Loading on RadInn	Commonality	KMO
RI1	.797		.665	.868
RI2	.783		.631	
RI3	.812		.682	
II1		.803	.651	
II2		.751	.598	
II3		.779	.621	
II4		.709	.547	
II5		.719	.540	
II6		.858	.756	

ACAP	Loading on PACAP	Loading on RACAP	Commonality	KMO
PAC1	.763		.586	.958
PAC2	.741		.604	
PAC3	.758		.588	
PAC4	.756		.554	
PAC5	.779		.612	
PAC6	.818		.644	
PAC7	.837		.688	
PAC8	.825		.654	
PAC9	.800		.663	
PAC10	.757		.549	
PAC11	.811		.697	
RAC1		.890	.766	
RAC2		.889	.803	
RAC3		.871	.753	
RAC4		.871	.761	
RAC5		.860	.754	
RAC6		.854	.768	
RAC7		.884	.753	
RAC8		.816	.666	
RAC9		.851	.713	
RAC10		.877	.751	
RAC11		.867	.759	
RAC12		.827	.705	
RAC13		.877	.772	

IC	Loading on HC	Loading on SC	Loading on OC	Commonality	KMO
HC1	.752			.563	.842
HC2	.674			.526	
HC3	.799			.603	
HC4	.790			.625	
HC5	.824			.650	
SC1		.819		.655	
SC2		.685		.541	
SC3		.793		.594	
SC4		.848		.709	
OC1			.856	.676	
OC2			.685	.593	
OC3			.850	.681	
OC4			.856	.761	

Next, proportion of total variation explained for each factor solution, commonalties and factor loadings were inspected and found satisfactory. Although, such measures lack clear-cut criteria about threshold values, higher values, as observed, indicate sound results (Heck, 1998).

Table 6.11 : Results of separate EFA on NBS and societal institutions.

NBS	Loading on Ownership coordination	Loading on non-ownership coordination	Employment Relations	Commonality	KMO
OG1	.815			.663	.934
OG2	.815			.697	
OG3	.830			.681	
OG4	.804			.655	
OG5	.866			.715	
OG6	.848			.718	
OG7	.840			.717	
OG8	.834			.708	
NOC1		.821		.658	
NOC2		.840		.698	
NOC3		.820		.663	
NOC4		.786		.646	
NOC5		.789		.632	
NOC6		.834		.685	
NOC7		.758		.578	
NOC8		.837		.736	
IWM1			.804	.648	
IWM2			.808	.656	
IWM3			.852	.708	
IWM4			.792	.652	
IWM5			.839	.710	
IWM6			.852	.719	
IWM7			.769	.609	

Societal Institutions	Loading on the State	Loading on financial System	Loading on ESDS	Loading on WRVs	Commonality	KMO
ST1	.738				.639	.847
ST2	.745				.562	
ST3	.794				.608	
ST4	.747				.564	
ST5	.853				.690	
FS1		.808			.665	
FS2		.761			.557	
FS3		.710			.530	
ETS1			.816		.676	
ETS2			.767		.611	
ETS3			.775		.649	
ETS4			.789		.583	
ETS5			.927		.848	
TAR1				.936	.855	
TAR2				.831	.732	
TAR3				.906	.810	

This study has followed the following criteria to interpret the results of all EFAs. All EFAs have exceeded the recommended value of 0.60 for Kaiser-Meyer-Olkin (KMO), suggesting that there is a significant relationship between items, an indicative of the appropriateness of EFA as the determinant of a parsimonious factor structure (Tabachnick and Fidell, 2007). Similarly, proportion of variance explained was larger than the suggested criteria of greater than 60% with an eigenvalue > 1 for each factor (Hinkin, 2005). Moreover, commonalities and factor loadings for each item were found greater than 0.50 (Hair et al. 2010) on single item confirming the unidimensionality of the constructs. Overall, the results of each EFA have met the minimum requirements confirming the appropriateness and suitability of the data for

EFA (Gupta, Malhotra, Czinkota and Foroudi 2016) to determine parsimonious factor structures (Tabachnick and Fidell, 2007). To confirm these results, we proceeded for the next step- combine EFA.

6.4.3. Confirmatory Factor Analysis

Reliability is essential but could not be considered as an adequate provision of scale validity (Thompson, 2004). Because, a scale can be reliable due to many other factors or errors such as halo effects or method biases as well (Bagozzi, 1994; Andrews, 1984). Therefore, it is important to ascertain if the data gathered through current measures are fitting appropriately with proposed model before testing the research hypothesis in the SEM (Fornell and Larcker, 1981). This process is called validity and it plays a vital role in measurement theory (Hair et al. 2010). A scale is considered to be valid only when it adequately measures what it is supposed to measure (Hair et al. 2010). It is often said that if a scale is valid, it is reliable as well (Berghman, 2006). Therefore, validity is emphasized more as compared to reliability (Bagozzi, 1994).

To ensure the preliminary factor structure of measurement items, and to assess the psychometric properties of each measure, we performed a confirmatory factor analysis (CFA) which offers more conservative interpretations than those techniques applied in EFA (Anderson and Gerbing, 1988). This method is useful in testing *a priory* latent factor structure, and in confirming, either the latent variables are appropriately connected with the observed variables as identified in EFA (Hair et al. 2010).

For this purpose, we structured a measurement model in the covariance-based SEM technique using AMOS-22. This method is often believed to be sensitive to the sample size. Different scholars have suggested different sample sizes. Some advised minimum should be 150 (e.g., Anderson and Gerbing, 1988) while Boomsma and Hoogland, (2001) consider 200 sufficient. Some recent studies consider even a small size as enough (e.g., Wolf, Harrington, Clark, and Miller, 2013). This highlights that there is a lack of consensus on the exact size of a sample for SEM analysis. However, Weston and Gore's (2006) advised that minimum 200 sample size enough for any SEM.

After model specification and estimation, next important step is to observe the fit-indices in order to assess to what extent the hypothesized model is fitted with the data. However, these fit-indices are very sensitive with sample size. Consequently, several alternative fit indices have been introduced, yet a commonly acceptably fit-index is missing (Ping, 2004). Chi-square is a commonly used fit-index (Browne and Cudeck, 1993), but it reports poor model fit as the number of cases increase (Ping, 2004). Other fit indices such as Adjusted Goodness of fit Index and Goodness of Fit Index tend to decrease as model complexity increases, thus could not be considered appropriate in case of complex research models (Anderson and Gerbing,1988). Accordingly, this study has followed the most commonly used fit indices (see Table 6.12) in the literature which are: relative Chi-square (CMIN/DF); root mean square residual (RMSR/RMR); comparative fit index (CFI); Tucker Lewis index (TLI); root mean square error of approximation (RMSEA); and Root mean square error of approximation (RMSEA).

Selection of appropriate method is also important that generally relies on distribution of data, sample size, and complexity of the research model (Shah and Goldstein, 2006). There are several methods for estimation available such as maximum likelihood (ML), unweighted least squares (ULS), generalized least squares (GLS), scale-free least squares (SFLS), and asymptotically distribution-free (ADF). No method is free from pros and cons, but ML has advantage assuming the data as approximately normal (Bollen, 1989) and can be performed with moderate sample size. Therefore, it was considered suitable to for the analysis of this study.

Table 6.12 : Fit-indices with reference values.

Fit index	Reference Value	Reference
CMIN/DF	<2 ideal; < 5 acceptable	(Ullman and Bentler, 2003.; Schumacker and Lomax, 2004)
RMSR/RMR	<.05ideal; <.08 acceptable	(Browne and Cudeck, 1993; Hu and Bentler, 1998)
CFI	>.95 ideal; >.90 acceptable	(Hu and Bentler, 1998)
TLI	>.95 ideal; >.90 acceptable	(Hu and Bentler, 1998)
RMSEA	<.05 ideal; <.08 acceptable	(Hu and Bentler, 1998)

6.4.3.1. CFA for firm innovation performance

The measurement model on firm innovation performance is consisted of two factors and nine indicators, which account the concepts of radical and incremental innovation. Overall, the model (Figure 6.3) demonstrates a good fit: CMIN/DF =

.934, SRMR/RMR = .028, CFI = .997, TLI = .992, RMSEA = .011. All the factor loadings were above the threshold value of 0.70, provided in the Table 6.13

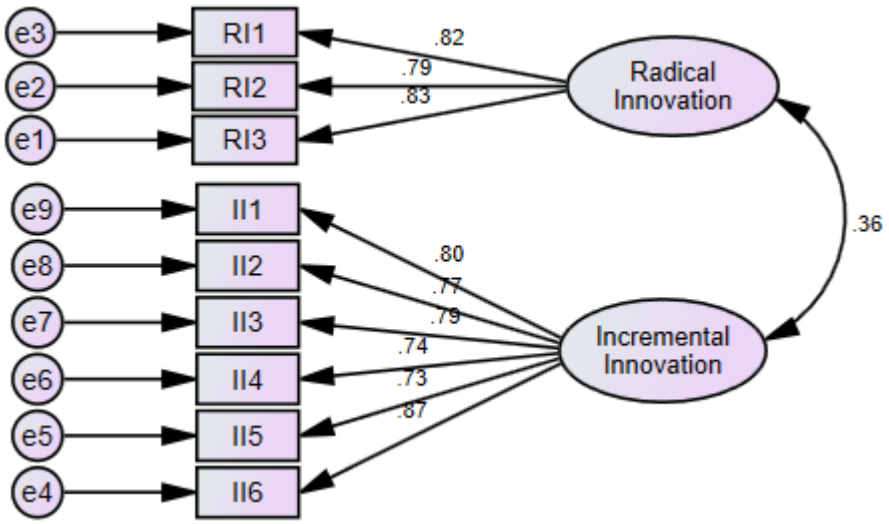


Figure 6.8 : CFA for firm innovation performance.

Table 6.13 : CFA results of firm innovation output.

Firm Innovation Performance	Indicator	Factor Loading
Radical Innovation	RI1	. 827
	RI2	.786
	RI3	.822
Incremental Innovation	II1	.871
	II2	.731
	II3	.740
	II4	.786
	II5	.775
	II6	.800
Model Fit Indices: CMIN/DF = 1.593, SRMR/RMR = .035, CFI = .985, TLI = .980; RMSEA = .053		

6.4.3.2. CFA Results of Absorptive Capacity (ACAP)

We conducted a CFA for the construct of ACAP and results are provided in Table 6.14. The model (Figure 6.4) has exhibited a good fit to the data with acceptable level of fit indices: CMIN/DF =1.527, SRMR/RMR = .046, CFI = .973, TLI = .970, RMSEA = .050. Although, the value of RSMEA is at border of the suggested value, but less than .08 can considerably be accepted (Hu and Bentler, 1998). Moreover, it suggested that at least three indices should show a good fit in the model (e.g., Hair et al. 2010).

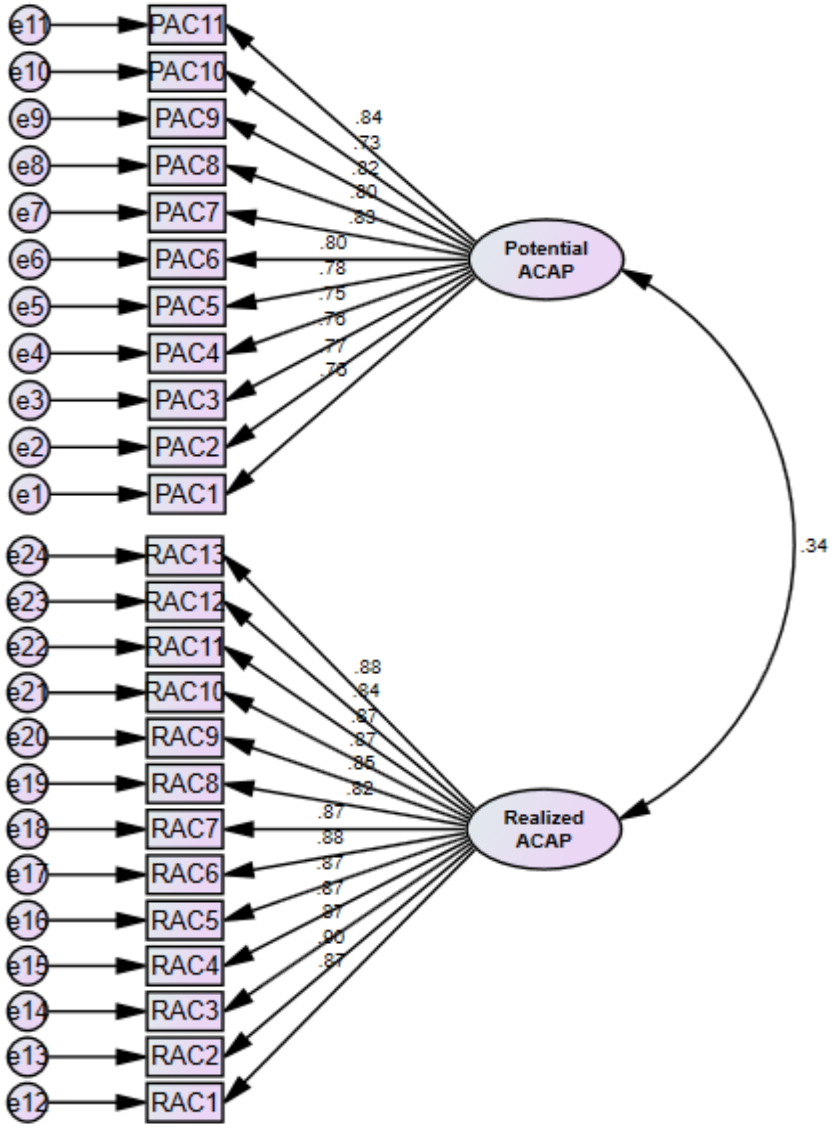


Figure 6.9 : CFA of absorptive capacity.

Table 6.14 : CFA results of ACAP.

Absorptive Capacity	Indicator	Factor Loading
Potential Absorptive Capacity	PAC1	.762
	PAC2	.770
	PAC3	.763
	PAC4	.747
	PAC5	.783
	PAC6	.801
	PAC7	.829
	PAC8	.805
	PAC9	.819
	PAC10	.734
	PAC11	.837
Realized Absorptive Capacity	RAC1	.871
	RAC2	.896
	RAC3	.865
	RAC4	.880
	RAC5	.873
	RAC6	.875
	RAC7	.864
	RAC8	.817
	RAC9	.845
	RAC10	.865
	RAC11	.871
	RAC12	.839
	RAC13	.878
Model Fit Indices: CMIN/DF =1.527, SRMR/RMR = .046, CFI = .973, TLI = .970; RMSEA = .050		

All the factor loadings are greater than the suggest value of 0.70. For the construct of PACAP loadings range from .734 to .837, while for the RACAP construct they are ranging from .817 to .896. Overall, this analysis has confirmed the factor structure of ACAP measure that was preliminary derived in the EFA. Summary of results is provided in Table 6.14.

6.4.3.3. CFA Results of Intellectual Capital

Table 6.15 provides a summary of CFA results of IC construct which entails HC, SC and OC with eleven latent factors. Overall, the model (Figure 6.5) shows a satisfactory fit: CMIN/DF =2.062, SRMR/RMR = .058, CFI = .955, TLI = .944. RMSEA = .071.

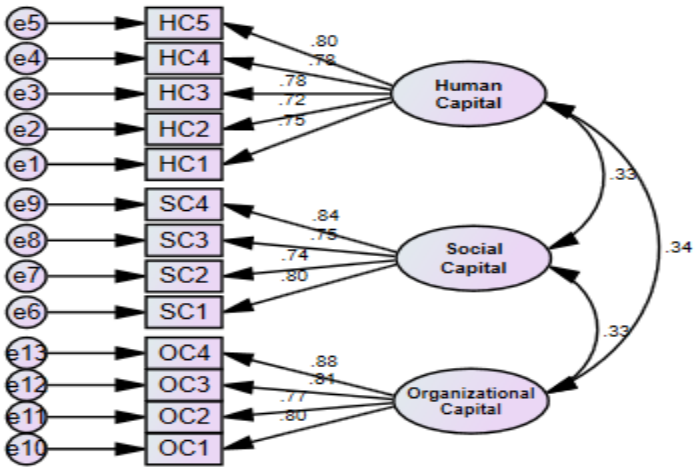


Figure 6.10 : CFA of Intellectual Capital.

Although, the values of SRMR and RMSEA above the ideal range (< 0.05), however they are less than 0.08, thus can be acceptable (Hair et al, 2010). The factor loadings for all indicators are above the cut-off value of 0.70, and confirm the preliminary factor structure of EFA.

Table 6.15 : Results of CFA of intellectual capital.

Intellectual Capital	Indicator	Factor Loading
Human Capital	HC1	.753
	HC2	.721
	HC3	.779
	HC4	.784
	HC5	.800
Social Capital	SC1	.802
	SC2	.744
	SC3	.755
	SC4	.845
Organizational Capital	OC1	.800
	OC2	.773
	OC3	.805
	OC4	.878
Model Fit Indices: CMIN/DF =2.062, SRMR/RMR = .058, CFI = .955, TLI = .944; RMSEA = .071		

6.4.3.4. CFA Results of National Business System

The CFA results for the national business system with three sub-constructs namely ownership coordination, non-ownership coordination and employment relations are present in Table 6.16. The model (Figure 6.7) represents a good fitness to the data with fit indices: CMIN/DF =1.161, SRMR/RMR = .049, CFI = .990, TLI = .989, RMSEA = .027.

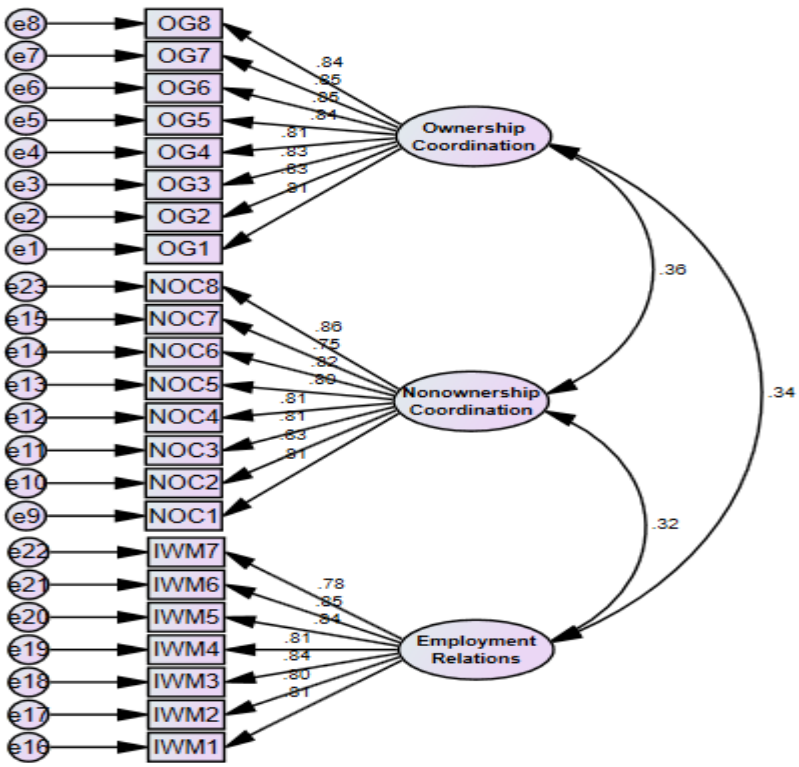


Figure 6.11 : CFA of national business system.

Factor loadings for each sub-construct are above the threshold value of 0.70, and loaded appropriately onto their conceptual domain, similar to the EFA results.

Table 6.16 : CFA Results of national business system.

National Business System	Indicators	Factor Loading
Ownership Coordination	OG1	.815
	OG2	.834
	OG3	.826
	OG4	.809
	OG5	.844
	OG6	.846
	OG7	.846
	OG8	.841
Non-Ownership Coordination	NOC1	.809
	NOC2	.834
	NOC3	.812
	NOC4	.806
	NOC5	.798
	NOC6	.824
	NOC7	.751
	NOC8	.859
Employment Relations	IWM1	.805
	IWM2	.804
	IWM3	.840
	IWM4	.807
	IWM5	.842
	IWM6	.847
	IWM7	.779
Model Fit Indices: CMIN/DF =1.161, SRMR/RMR = .049, CFI = .990, TLI = .989; RMSEA = .027		

6.4.3.5. CFA results of societal institutions

To validate the factor structure of societal institutional construct with four sub-constructs namely, the state, financial system, education/skills development system and work relation values we again performed a CFA that yielded a good fit of model (Figure 6.8). Factor loadings for all indicators are above the threshold value of 0.70. Similarly, fit indices have also achieved the suggested level: CMIN/DF =1.498, SRMR/RMR = .047, CFI = .976, TLI = .971, RMSEA = .048. A summary of results are presented in Table 6.17.

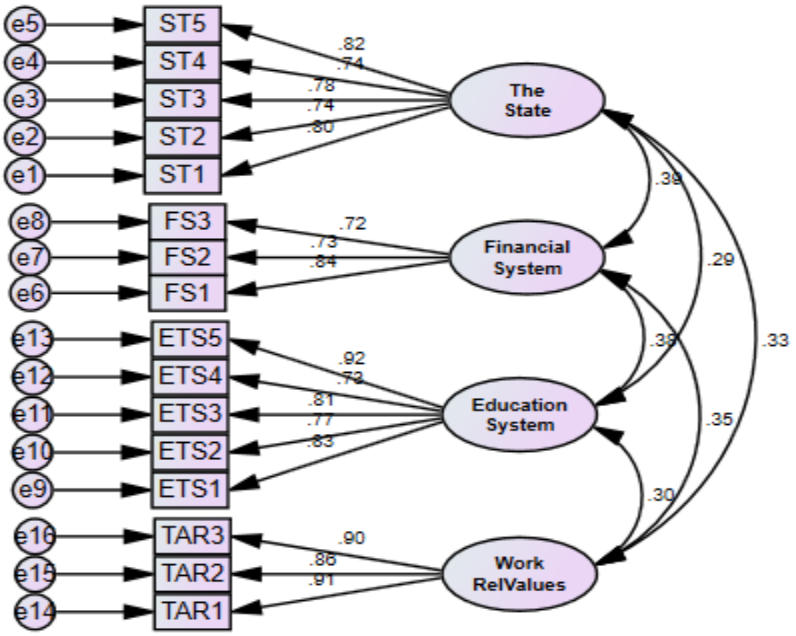


Figure 6.12 : CFA of societal institutions.

Table 6.17 : CFA results of societal institutions.

Societal Institutions	Indicators	Factor Loadings
The State	ST1	.798
	ST2	.744
	ST3	.780
	ST4	.744
	ST5	.823
Financial System	FS1	.835
	FS2	.734
	FS3	.718
Education/Skills Development System	ETS1	.831
	ETS2	.774
	ETS3	.814
	ETS4	.728
	ETS5	.925
Work Relations Values (Trust & Authority)	TAR1	.915
	TAR2	.855
	TAR3	.901
Model Fit Indices: CMIN/DF =1.498, SRMR/RMR = .047, CFI = .976, TLI = .971; RMSEA = .048		

6.4.4. Composite reliability and validity

Preliminary analysis of the reliability coefficient (Cronbach's alpha) of each measure, and determination of similarly data patterns in the CFA as the one earlier appeared in the EFAs are good, indicative of reliability in the data, yet there is a need of deeper analysis of the symmetric properties of these measures to establish a sufficient level of validity and reliability. Reliability was assessed through the score of composite reliability (CR), whereas average variance extracted (AVE) and square root of AVE of intercorrelations were used to determine the convergent and discriminant validity (Fornell and Larcker, 1981; Hair et al. 2010). We used following criteria for statistical inferences: *CR > 0.70*, *AVE > 0.50*, and *square root of AVE > inter-variables correlations* (Fornell and Larcker, 1981; Hair et al. 2010).

6.4.4.1. Composite reliability and convergent validity

Table 6.18 presents the results of CR and AVE. Unlike Cronbach's alpha that explicitly assumes that all indicators should have equal loadings on the construct (Barclay, Higgins, and Thompson, 1995), CR does not assume the equal weight of all indicators (Chin, 1998). Results indicate that CR value for each construct measure has crossed the threshold value of 0.70 that shows that the measures are sufficiently (Fornell and Larcker, 1981).

Table 6.18 : Results of composite reliability and convergent validity.

Construct	CR	AVE
Radical Innovation	0.911	0.772
Incremental Innovation	0.927	0.679
Potential Absorptive Capacity	0.954	0.654
Realized Absorptive Capacity	0.973	0.734
Human Capital	0.911	0.671
Social Capital	0.909	0.713
Organizational Capital	0.922	0.746
Ownership Coordination	0.956	0.732
Non-Ownership Coordination	0.950	0.702
Employment Relations	0.946	0.716
The State	0.915	0.684
Financial System	0.885	0.720
Education/Skill Development System	0.932	0.732
Work Relation Values (Trust& Authority Relations)	0.949	0.881

To assess the convergent validity, we used Fornell and Larcker's (1981) measure of AVE. Basically, it measures the amount of variance captured by the construct

relative to the amount of variance because of measurement error (Hu and Bentler, 1999). Assessment of the values of AVE showed that all measures have crossed the minimum recommended value. Hence, we can believe that all measures have satisfactory level of convergent validity.

6.4.4.2. Discriminant validity

Finally, discriminant validity of each measure was assessed. It used to understand to what extent scales of different constructs differ. Discriminant validity can be assessed through various methods such as items cross loadings, and comparing the square root of AVE with correlation coefficients between variables (Fornell and Larcker, 1981). This study used the latter technique and found that correlations values among the latent variables are smaller than the values of square root of AVE (appear on diagonal). Thus, provide sufficient support of discriminant validity of constructs. Table 6.19 provides the summary of findings.

Cohen (1988) provides guidelines to interpret the magnitude of correlation coefficient among latent variables. According to these guidelines, correlation coefficient can be concluded as small (0.10), medium (0.30), and large (0.50). The strength of relationship among all constructs is medium, as no relationship crosses the low (0.10) and high (0.50) values.

Table 6.19 : Mean, Std. deviation and correlations among l.vs. with sq. rts. of AVEs.

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	RadInn	3.01	1.18	**(0.879)**																			
2	IncrInn	3.24	0.82	0.325	**(0.824)**																		
3	PACAP	2.79	0.77	0.317	0.221	**(0.809)**																	
4	RACAP	3.28	0.96	0.344	0.335	0.326	**(0.875)**																
5	HC	3.00	0.84	0.331	0.319	0.338	0.335	**(0.819)**															
6	SC	3.22	0.84	0.321	0.302	0.337	0.304	0.297	**(0.845)**														
7	OC	3.10	0.98	0.301	0.330	0.289	0.338	0.304	0.293	**(0.864)**													
8	OCRD	3.15	1.03	0.347	0.308	0.364	0.300	0.300	0.302	0.315	**(0.855)**												
9	NOCRD	2.92	1.06	0.342	0.307	0.335	0.292	0.326	0.356	0.346	0.336	**(0.838)**											
10	ER	3.18	1.14	0.316	0.297	0.318	0.302	0.329	0.307	0.325	0.324	0.304	**(0.846)**										
11	STT	2.95	0.91	0.310	0.344	0.299	0.302	0.348	0.301	0.316	0.327	0.336	0.326	**(0.827)**									
12	FS	2.96	0.92	0.314	0.274	0.296	0.309	0.283	0.308	0.280	0.315	0.296	0.321	0.335	**(0.848)**								
13	ESDS	3.08	0.83	0.349	0.320	0.285	0.326	0.331	0.310	0.345	0.320	0.269	0.318	0.275	0.324	**(0.856)**							
14	WRV	2.81	1.20	0.300	0.314	0.286	0.284	0.347	0.301	0.307	0.332	0.295	0.301	0.301	0.312	0.284	**(0.928)**						
15	F- Size	5.82	1.63	0.095	0.139	0.157	0.135	0.110	0.054	0.088	0.105	0.081	0.109	-0.035	0.051	0.015	0.124	1					
16	F-Age	27.04	16.77	0.051	0.099	-0.023	0.006	0.027	-0.079	0.020	0.060	0.020	-0.100	-0.045	-0.137	-0.185	0.102	0.432	1				
17	Export	0.24	0.26	-0.007	-0.015	0.066	0.002	-0.013	0.065	0.012	0.029	-0.024	0.042	0.019	0.106	0.028	-0.003	0.170	0.025	1			
18	RDB	0.04	0.04	0.047	0.026	0.116	0.060	0.014	0.029	0.065	-0.046	-0.047	-0.009	-0.043	-0.062	-0.023	-0.029	0.474	0.295	0.215	1		
19	F-Type	0.74	0.44	-0.024	0.022	-0.077	-0.035	0.090	0.063	-0.019	-0.002	0.051	0.100	-0.042	-0.003	-0.009	-0.025	0.248	0.152	-0.03	0.092	1	
20	AFF_BG	1.43	0.50	0.021	0.033	-0.066	-0.061	-0.076	0.022	0.032	-0.006	0.035	-0.014	0.046	-0.048	0.005	-0.108	-0.214	-0.19	0.052	-0.024	-0.283	1

Note: Square roots of average variances extracted (AVEs) shown on diagonal.

Table 6.20 : P-values for correlations.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	RadInn	1.000																			
2	IncrInn	<0.001	1.000																		
3	PACAP	<0.001	0.001	1.000																	
4	RACAP	<0.001	<0.001	<0.001	1.000																
5	HC	<0.001	<0.001	<0.001	<0.001	1.000															
6	SC	<0.001	<0.001	<0.001	<0.001	<0.001	1.000														
7	OC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000													
8	OCRD	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000												
9	NOCRD	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000											
10	ER	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000										
11	STT	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000									
12	FS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000								
13	ESDS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000							
14	WRV	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.000						
15	F- Size	0.166	0.043	0.022	0.048	0.108	0.432	0.202	0.127	0.236	0.112	0.615	0.460	0.823	0.070	1.000					
16	F-Age	0.459	0.150	0.741	0.928	0.690	0.250	0.775	0.379	0.771	0.146	0.508	0.046	0.007	0.137	<0.001	1.000				
17	Export	0.924	0.826	0.334	0.979	0.852	0.346	0.862	0.671	0.726	0.544	0.777	0.122	0.688	0.961	0.013	0.713	1.000			
18	RDB	0.494	0.703	0.090	0.386	0.840	0.675	0.342	0.501	0.498	0.900	0.532	0.364	0.737	0.673	<0.001	<0.001	0.002	1.000		
19	F-Type	0.724	0.746	0.262	0.610	0.188	0.356	0.780	0.975	0.457	0.145	0.541	0.968	0.899	0.718	<0.001	0.027	0.667	0.182	1.000	
20	AFF_BG	0.758	0.628	0.337	0.373	0.268	0.746	0.638	0.931	0.615	0.834	0.501	0.482	0.945	0.116	0.002	0.006	0.445	0.724	<0.001	1.000

Note: SD = Standard deviation; AFF_BG =Affiliation With Business Group; F-Size = Firm Size; F- Age = Firm Age; RDB = Research & Development Budget. RadInn=Radical Innovation; IncrInn=Incremental Innovation; PACAP=Potential Absorptive Capacity; RACAP=Realized Absorptive Capacity; HC=Human Capital; SC=Social Capital; OC=Organizational Capital; OCRD=Ownership Coordination; NOCRD=Non-Ownership Coordination; ER=Employment Relations; SST=The State; FS=Financial System; ESDS=Education/Skills Development System; WRV=Work Relations Values.

6.5. Common Method Bias

Data on dependent and independent variables were collected from the same source at the same time through self-reported surveys, which could cause common method bias (CMB). Several procedural measures were taken to minimize its potential effects (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). First, we administered questionnaires in both English and Urdu languages, which helped abating the possibility of semantic biases. Second, we assured the respondents that the data would be used solely for research purposes and only aggregate results would be reported, therefore their anonymity and confidentiality would be retained (Podsakoff and Organ, 1986). Beside this, we applied Harman's single-factor technique to identify the issue of potential CMB (Chang, van Witteloostuijn, and Eden, 2010; Podsakoff et al. 2003). All variables were loaded into EFA with maximum likelihood factor analysis, principle components analysis, and principle axis analysis by choosing varimax rotation. All identified the existence of sixteen distinctive constructs with eigenvalues large than 1 instead of a single factor (Soo et al. 2017). Although, this test cannot clearly prove the absence of CMB, it suggests that it has no significant influence on the study results.

In addition to this, I also analyzed "full collinearity VIFs" produced by WarpPLS. According to Kock (2015), if full collinearity VIFs is equal to 3.3 or less, then there is no multicollinearity, and thereby no common method bias. Table 6.21 demonstrates that all constructs have value less the recommend criterion. This implies that there is no multicollinearity, and thereby no common method bias.

Table 6.21 : Full collinearity VIFs.

Construct	Value	Construct	Value
Radical Innovation	1.439	Ownership coordination	1.446
Incremental Innovation	1.420	Non-ownership coordination	1.437
Potential absorptive capacity	1.472	Employment relation	1.428
Realized absorptive capacity	1.410	The state	1.431
Human capital	1.439	Financial system	1.417
Social capital	1.403	Education/skills development system	1.462
Organizational capital	1.404	Work relations values	1.412

6.6. Structural Model and Hypothesis Testing

Again, this research used PLS based SEM, using WarpPLS 5.0 software to test the hypothesized relationships. This approach is suitable for small sample size studies (Wold, 1985) and does not require data normality as needed in covariance-based SEM approaches (Lowry, Posey, Roberts, and Bennett, 2014). Given the rigorous background of data analysis, this study directly finalized the tested structural model. Table 6.22 summarizes the results of fit and quality indices of the model. It is observed that the average path coefficient (APC =0.160, P=0.004), average R^2 (ARS =0.211, P<0.001), and average adjusted R^2 (AARS =0.194, P<0.001) are significant at required level and provide a satisfactory fit. Similarly, the values of average full collinearity VIF (AFVIF =1.457 < 3.3) and average block VIF (AVIF =1.169 < 3.3) fall under the ideal range and indicate adequate predictive and explanatory quality of the model (Kock, 2011). Additionally, Tenenhaus GoF (GoF), Sympson's paradox ratio (SPR), R-squared contribution ratio (RSCR), statistical suppression ratio (SSR), and nonlinear bivariate causality direction ratio (NLBCDR) also achieve the set criteria, confirming a high predictive power (Kock, 2011).

Table 6.22 : Model fit and quality indices.

Model fit	Quality indices
Average path coefficient	(APC =0.163, P=0.004)
Average R-squared	(ARS =0.200, P<0.001)
Average adjusted R-squared	(AARS =0.183, P<0.001)
Average block VIF	(AVIF =1.169, acceptable if <= 5, ideally <= 3.3)
Average full collinearity VIF	(AFVIF =1.457, acceptable if <= 5, ideally <= 3.3)
Tenenhaus GoF	(GoF =0.404, small >= 0.1, medium >= 0.25, large >= 0.36)
Sympson's paradox ratio	(SPR =0.930, acceptable if >= 0.7, ideally = 1)
R-squared contribution ratio	(RSCR =0.984, acceptable if >= 0.9, ideally = 1)
Statistical suppression ratio	(SSR =0.977, acceptable if >= 0.7)
Nonlinear bivariate causality direction ratio	(NLBCDR =0.988, acceptable if >= 0.7)

Table 6.25 shows the results of path coefficients of the relationship between latent variables. These results obtained after controlling firm age, firm size, export, R&D budget, firm type (family or non-family), and affiliation with business group. Firm size significantly influences both the radical and incremental innovation. These results are obtained after controlling firm age, firm size, export, R&D budget, firm type (family or non-family), and affiliation with business group. Almost, all variables have non-significant impact on both types of innovation output, except business

group application on incremental innovation (β = 0.108, p = 0.036). In addition to this, R&D budget (β = -0.022, p = 0.391) and firm size (β = -0.022, p = 0.389) have insignificant negative impact on radical innovation. Export has insignificant negative impact on both radical and incremental innovation output. Results are presented in Table 6.23.

Table 6.23 : Non-hypothesized paths.

Paths	β	P-values
R&D budget ……> Radical innovation	-0.022	0.391
R&D budget ……> Incremental innovation	0.022	0.408
Export……> Radical innovation	-0.141	0.236
Export……> Incremental innovation	-0.059	0.304
Firm age……> Radical innovation	0.148	0.163
Firm age ……> Incremental innovation	0.073	0.160
Firm size……> Radical innovation	-0.022	0.389
Firm size……> Incremental innovation	0.122	0.121
Business group affiliation……> Radical innovation	0.082	0.086
Business group affiliation ……> Incremental innovation	0.108	0.036
Firm type……> Radical innovation	0.019	0.385
Firm type ……> Incremental innovation	0.059	0.178

Figure 6.9 depicts the research framework of this thesis with path coefficients, associated p-values, and R^2 values of dependent latent variables. R-square values for radical and incremental innovations are 0.218 and 0.174 respectively, indicated that all variables collectively explain 21.8% variance in radical innovation and 17.4% in incremental innovation output. Table 6.24 shows the values of all latent constructs function as dependent variables in this integrated model.

Table 6.24 : Results of R-squared values.

Constructs	R-squared
Radical innovation	0.218
Incremental innovation	0.174
Potential absorptive capacity	0.211
Realized absorptive capacity	0.241
Human capital	0.192
Social capital	0.239
Organizational capital	0.225
Ownership coordination	0.246
Non-ownership coordination	0.246
Employment relations	0.235

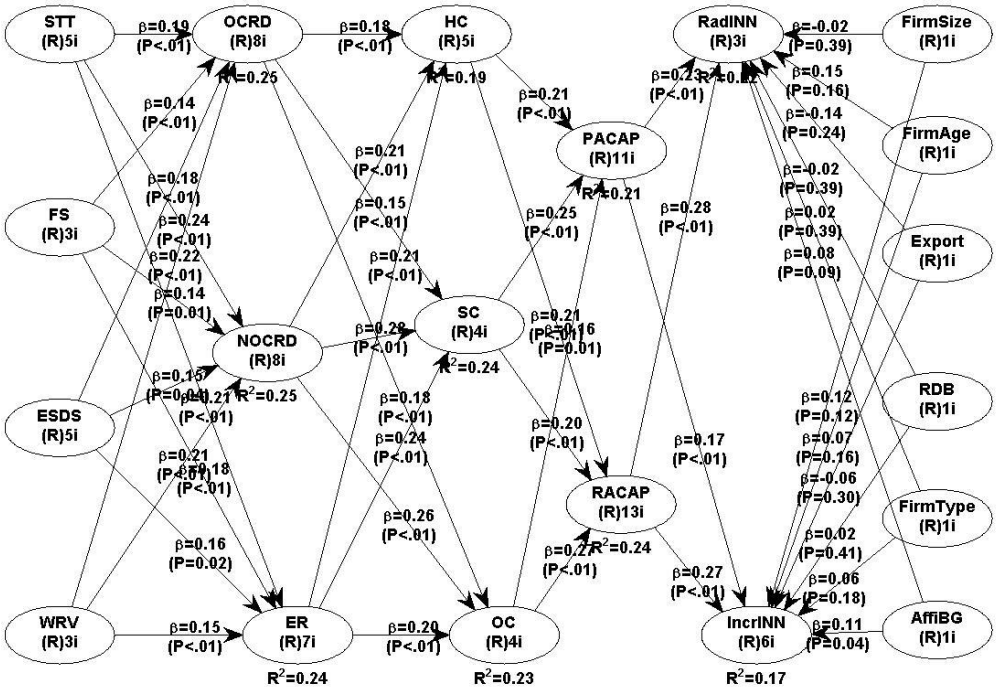


Figure 6.13 : Structural model.

Findings show that societal institutions (i.e., the state, financial system, education/skill development system, and work relations values) have positive and significant ($p < 0.05$) direct association with the characteristics of national business system (i.e., ownership coordination, non-ownership coordination, and employment relations). *Thus, Hypotheses 1, 2, 4 and 4 are supported* (see Table 6.25). Relationship of state structure and policies with ownership control is positive and highly significant ($\beta=0.185$, $p=0.006$), *thereby confirming the H5a*. Results show that societal institutions such as the state ($\beta=0.236$, $p<0.001$), financial system ($\beta=0.142$, $p=0.012$), education/skill development system ($\beta=0.152$, $p=0.043$), and work relations values ($\beta=0.206$, $p=0.008$) have strong positive and significant relationship with non-ownership based coordination activities in Pakistani context. Consequently, *H5b is not supported*. This study found that state structure and policies ($\beta=0.213$, $p<0.001$) as well as work relations values (trust and authority relations) ($\beta=0.154$, $p=0.009$) are positively and significantly associated employer-employee collaboration in the Pakistani setting. Thus, *H5c is supported.*

Table 6.25 : Results of hypotheses testing.

Paths	β	P-values
The state ……> Ownership coordination	0.185	0.006
The state ……> Non-ownership coordination	0.236	<0.001
The state ……> Employment relations	0.213	<0.001
Financial system ……> Ownership coordination	0.143	0.010
Financial system ……> Non-ownership coordination	0.142	0.012
Financial system ……> Employment relations	0.177	0.003
Education /skill development training System ……> Ownership coordination	0.180	0.005
Education/skill development system ……> Non-ownership coordination	0.152	0.043
Education/skill development system ……> Employment relations	0.160	0.015
Work relations values ……> Ownership coordination	0.221	<0.001
Work relations values ……> Non-ownership coordination	0.206	0.008
Work relations values ……> Employment relations	0.154	0.009
Ownership coordination ……> Human capital	0.177	0.007
Ownership coordination ……> Social capital	0.153	0.008
Ownership coordination ……> Organizational capital	0.185	0.007
Non-ownership coordination ……> Human capital	0.206	0.001
Non-ownership coordination ……> Social capital	0.277	<0.001
Non-ownership coordination ……> Organizational capital	0.263	<0.001
Employment relations ……> Human capital	0.210	<0.001
Employment relations……> Social capital	0.242	<0.001
Employment relations……> Organizational capital	0.198	0.003
Human capital ……> Potential absorptive capacity	0.209	<0.001
Human capital ……> Realized absorptive capacity	0.153	<0.001
Social capital ……> Potential absorptive capacity	0.254	<0.001
Social capital ……> Realized absorptive capacity	0.186	0.002
Organizational capital ……> Potential absorptive capacity	0.157	0.013
Organizational capital ……> Realized absorptive capacity	0.171	<0.001
Potential absorptive capacity ……> Radical innovation	0.230	<0.001
Potential absorptive capacity ……> Incremental innovation	0.172	0.009
Realized absorptive capacity ……> Radical innovation	0.279	<0.001
Realized absorptive capacity ……> Incremental innovation	0.270	<0.001

Results demonstrate that business system's characteristics (ownership coordination, non-ownership coordination, and work relations) are positively and significantly linked with human, social and organizational capital. Therefore, *Hypothesis 6, 7 and 8 are supported*. Similarly, firm's human, social and organizational capital found having strong positive relationship with potential and realized absorptive capacities, therefore, *confirming the Hypothesis 9, 10 and 11*. Likewise, potential and absorptive capacities found strongly and positive related with both radical and incremental innovation output. Thus, confirm the Hypotheses 12 and 13. Table 6.25 provides the summary of all tested hypothesis.

6.7. Analysis of Indirect Effects of NBS on Firm Level Innovation Output

In order to analyze the indirect effects of NBS on innovation output via all components of IC (e.g., HC, SC and OC) and ACAP (e.g., PACAP and RACAP) in an integrated manager, this study uses the sum of indirect effects, produced directly by the WarpPLS. Table 6.26 provides aggregate indirect path coefficients, p-values, and effect size. According to Roldan and Sanchez-Franco (2012), effect in independent variable can be 0.02 (low), 0.15 (moderate), and large (0.35) effects. However, effect sizes (f^2) of all indirect connections are small, yet they confirm the existing of a mechanism that higher-level variables influence the lower ones in a top-down manner. Therefore, Hypothesis 14 is also confirmed.

Table 6.26 : Sums of indirect effects.

To	From						
	WRV	ESDS	FS	STT	OCRD	NOCRD	ER
RadInn	β=.042 **p=.004** f^2 = .013	β=.035 **p=.008** f^2 = .012	β=.033 **p=.003** f^2 = .011	β=.047 **p=.001** f^2 = .014	β=.058 **p=.002** f^2 = .020	β=.0.85 **p<.001** f^2 = .029	β=.74 **p<.001** f^2 = .023
IncrInn	β=.036 **p=.008** f^2 = .011	β=.031 **p=.010** f^2 = .010	β=.029 **p=.009** f^2 = .008	β=.041 **p=.006** f^2 = .014	β=.011 **p=.051** f^2 = .016	β=.074 **p<.001** f^2 = .023	β=.064 **p<.001** f^2 = .019
PACAP	β=.079 p=.002 f^2 = .023	β=.067 p=.007 f^2 = .019	β=.063 p=.002 f^2 = .019	β=.088 p<.001 f^2 = .026	β=.003 p=.109 f^2 = .040	β=.161 p<.001 f^2 = .054	β=.142 p<.001 f^2 = .045
RACAP	β=.085 p=.001 f^2 = .024	β=.071 p=.005 f^2 = .023	β=.068 p=.002 f^2 = .021	β=.094 p<.001 f^2 = .028	β=.002 p=0.119 f^2 = .036	β=.172 p<.001 f^2 = .050	β=.148 p<.001 f^2 = .045
HC	β=.114 p<.001 f^2 = .040	β=.097 p=.002 f^2 = .032	β=.092 p<.001 f^2 = .026	β=.126 p<.001 f^2 = .044			
SC	β=.128 p<.001 f^2 = .039	β=.108 p=.004 f^2 = .034	β=.104 p<.001 f^2 = .032	β =0.145 p<.001 f^2 = .044			
OC	β=.126 p<.001 f^2 = .039	β=.105 p=.003 f^2 = .036	β =0.099 p=.001 f^2 = .028	β =0.139 p<.001 f^2 = .044			

Table 6.27 : Summary of hypotheses.

No.	Research Hypotheses	Remarks
Hypothesis 1	The role of the state is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.	Supported
Hypothesis 2	The financial system is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.	Supported
Hypothesis 3	The education/skill development system is directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.	Supported
Hypothesis 4	The values of the work relations (trust and authority relations) are directly associated with (a) the dominant type of ownership coordination, (b) the dominant types of non-ownership coordination and (c) the type of employment relations at a national setting.	Supported
H5a	State structure and policies will be positively associated with higher levels of ownership control in the Pakistani setting.	Supported
H5b	Social institutions will have a relatively weaker or insignificant impact on the non-ownership based coordination activities in the Pakistani setting.	Not-supported
H5c	State structure and policies as well as work relations values (trust and authority relations) will be positively associated with tighter levels of employer-employee collaboration in the Pakistani setting.	Supported
Hypothesis 6	The dominant type of ownership coordination is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.	Supported
Hypothesis 7	The dominant type of non-ownership coordination is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.	Supported
Hypothesis 8	The type of employment relations is significantly and positively associated with (a) human capital, (b) social capital and (c) organizational capital.	Supported

Table 6.27 : (continued) : Summary of hypotheses.

No.	Research Hypotheses	Remarks
Hypothesis 9	The repository of templates stockpiled in a firm's human capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.	Supported
Hypothesis 10	The repository of templates stockpiled in a firm's social capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.	Supported
Hypothesis 11	The repository of templates stockpiled in a firm's organizational capital is strongly and positively associated with (a) potential and (b) realized absorptive capabilities.	Supported
Hypothesis 12	Potential absorptive capacity of a firm is positively associated with (a) radical and (b) incremental innovation output.	Supported
Hypothesis 13	Realized absorptive capacity of a firm is positively associated with (a) radical and (b) incremental innovation output.	Supported
Hypothesis 14	Characteristics of national business system have indirect link with radical and incremental innovation output via intellectual capital and absorptive capacity of a firm.	Supported

7. DISCUSSION AND CONCLUSION

The purpose of this research thesis was testing the empirical relationships between business system level institutions and innovation output at firm level by examining the role of some intermediate factors such as intellectual capital and absorptive capacity. This chapter intends to provide discussion and conclusion. In doing so, first study findings are in order to align them with research aim, previous literature, and hypothesized theoretical framework. Second, a conclusion about this research is drawn followed by the limitations and future research recommendations.

7.1. Discussion

This study has empirically tested the hypothesized linages among institution level variables and firm level outcomes as depicted in Figure 1. To test these relationships statistically, path analysis was performed using WarpPLS 5.0, a variance based-SEM software setup. This technique is useful in case of small sample size and absence of data normality (Kock, 2011).

Building on the theoretical framework of the NBS approach, this study extends the previous empirical work by introducing an integrative and multi-level theoretical model, which includes firm level repository and enabler factors that mediate the causal effects of macro and meso level institutional factors on the innovation output of firms. The integrative nature of our framework allows us to explain the causal links between various perceived categories and empirically justify the mechanisms, by which abstract templates legitimized through various institutions gradually transform into actionable decisions sets (Barley and Tolbert, 1997). As previous empirical work did not particularly theorize the mediating role of the repository and enabling factors about the innovation (e.g., Hotho, 2014; Pezeshkan et al. 2016), the overall significance of the model and the individual significance of the paths between constructs provided empirical support for a novel theoretical claim.

Overall, the ACAP of a firm has strong positive significant impact on innovation output, thus confirming the previous studies (e.g., Chen et al, 2009). Interestingly, Pakistani firms are more involved in radical innovation activities compared to incremental innovation activities, indicating that development of new products/services for the domestic market is often perceived as radical. Consistent

with the previous studies (i.e., Soo et al. 2017; Engelman, et al. 2017), intellectual capital (i.e. human, social and organizational capital) significantly affects absorptive capacity (i.e. potential and realized absorptive capacities). Cohen and Levinthal (1990) also report that quality workforce facilitates firms to produce internal knowledge and absorb new external knowledge. Consequently, ACAP of an organization is also improved, which leads firms to produce more innovative outcomes. Social capital is the knowledge resource embedded in internal and external relationships of firm. Thus, firms that have developed relationships with their buyers, suppliers and competitors are more likely to have access to new external knowledge and hence, higher levels of ACAP. Likewise, organizational capital significantly and positively affects ACAP, although the results show lower intensity. Besides, findings indicate that firms that invest more in organizational infrastructure are more able to create and absorb knowledge to create innovation. On average, social capital has stronger relationships with both components, PACAP (β = 0.254) RACAP (β= 0.198), followed by human capital. This suggests that Pakistani firms should focus more on developing their relationships with other firms in order to enhance their ACAP and innovation output.

Aside from the significance of the overall model, it is important to note that further tests, which exclude the repository (IC construct) and enabling (ACAP construct) mechanisms have received substantially less empirical support. As, we construct and test another model, which links societal institutions with the NBS components and then directly link each component of the NBS (ownership control and coordination, non-ownership control and coordination and employer-employee relations) with radical and incremental innovation constructs. While this model is also statistically significant with minor loss of quality in some measures like the average R squared (0.187), average adjusted R squared (0.173) and nonlinear bivariate causality direction ratio (0.889), the paths that causally link the NBS and the radical innovation become insignificant at p=0.05 level. Thus, the mediation role of the IC and ACAP has received significant empirical support, suggesting that the socially constructed rules, values and norms, which are legitimized by the institutions that reside at the societal and business system level require further cognitive accumulation and elaboration mechanisms to guide decisions about the radical and, to a lesser extent, incremental innovation.

In addition to the mediating role of firm level factors that guide innovative action, it should be noted that the particular characteristics of the Pakistani setting also reflect themselves in the empirical results. First, the fragmented and informal nature of the dominant societal institutions necessitated the use of non-ownership based control and coordination mechanisms alongside with ownership based control and coordination mechanisms. Thus, it can be argued that the owners pragmatically resort to any means necessary to control and coordinate the economic resources of their firms by engaging in relationships with a variety of stakeholders including the state, competitors, employees, financial organizations and the community. Although, theoretical discussions in the NBS approach suggest that there are only few possible NBS typologies because of the interdependencies between different institutional templates, the Pakistani setting seems to exhibit the characteristics of a hybrid model. Pakistan's business model generally displays relatively higher levels of direct ownership control and coordination characteristics (mean=3,15; std=1.03), lower levels of non-ownership based coordination and control characteristics (mean=2.92; std=1.06) and relatively tighter levels of interdependence between employer-employee relations (mean=3.18; std=1.14).

The possible reason for tighter ownership control over business activities is the dominance of family-owned firms, which are affiliated with larger business groups (i.e. the Nishat group, the Dewan group, the Dawood group, the Sitara group) in the Pakistani economy. In these business groups, key positions are held by family members or acquaintances, who are directly involved in the management and control of business operations and strategic decision making, similar to other Asian economies such as South Korea. These offices generally deals with planning, financial, personnel, investment, internal audit, and technology related matters. Moreover, the family owned and controlled business groups are characterized by higher degrees of vertical and horizontal integration. (Sorge, Noorderhaven, and Koen, 2015).

The lower-level of non-ownership coordination of economic activities indicates that these firms tend to be more self-reliant, unless it becomes extremely necessary to develop ties with other firms. This is mainly due to the diversity of business groups as well as low-levels of trust among the firms of the business system. Firms from such kind of business models tend to develop short-term business contract and avoid

developing long term ties with other firms due to high competition, and fear of losing the authority and control. The cooperation between firms are generally contingent on the nature of relationship and the evel of trust between top-level executives of these firms. Consequently, the higher level of employer-employee interdependence in the Pakistani business system shows that employers and employees have enduring relationships, which are based on high levels of trust that develops over time (Sorge, et al. 2015).

While our study is not a comparative one and thus, it is impossible to assert stronger claims about the typology of Pakistan's national characteristics relative to other nation states, such characteristics exhibit an amalgam of state organized and coordinated industrial district typologies.

7.2. Conclusion

This study shows that Whitley's (1999) NBS approach can be useful in less developed societies such as Pakistan, and has considerably extended the empirical work which has elaborated the effects of national institutions on the innovation output of firms. Whereas the earlier works have concentrated on the direct links between business system components and the firm level innovation outputs (e.g., Hotho, 2014; Pezeshkan et al. 2016), the current study revealed that there is the need to develop a more comprehensive theoretical model to explain both the cultural/symbolic and cognitive/rational components of the institutions. Thus, we build on the institutional logic framework to theorize the mechanisms by which nested levels of institutions frame lower order institutional templates and then, how such templates are stockpiled and selectively put into motion by firm level cognitive processes (Lam, 2000; George, Chattopadhyay, Sitkin, and Barden, 2006). Accordingly, our model theoretically incorporates both taken-for-granted rules, norms and values and how such abstract categories are transformed into concrete actionable sets that guide radical and incremental innovation decisions. In this context, the study is the first to our knowledge that reveals the role of firm level cognitive processes, which mediate the links between societal and business system level institutions and the firm level innovation output.

Additionally, the study extends the NBS approach by empirically analyzing a developing country context in Asia, which has received scarce attention up till now.

Even though several other works have also tried to extend the contextual frontiers of the NBS approach by analyzing different developing contexts (Rana and Morgan, 2016), Pakistan's relatively weak formal macro institutions and fragmented social structure enable us to test and validate the claims of NBS approach under these conditions. The significance levels of the overall measurement model and the causal paths that link the societal institutions and the NBS provide empirical support for the use of NBS approach in the Pakistani setting. However, the positive and significant links between societal institutions and all components of the NBS suggest that Pakistani setting deserves further theoretical attention for extending the established typologies of the NBS. Furthermore, the psychometric measurement scales which were developed to represent the societal and business system level constructs of the NBS received considerable statistical support. Thus, it can be argued that the study also contributes significantly to the measurement development part of the NBS by developing and testing a scale about the perceptions of the societal institutions and national business system components.

7.3. Practical Implications

The main implication of present research is to contribute institutional theory and to elaborate how NBS theory could be used in developing countries. It particularly demonstrates how the Pakistani business system influences firm level innovation outputs and offers guidelines for management in designing successful innovation related policies and practices in Pakistan. Moreover, this study pinpoints for managers how knowledge management activities inside the firms and grasping outside knowledge can enhance innovation output that can lead them to stay ahead of competitors. Although constraints exisit in the form of lack of resoruces or access to the resources, yet firms can manage suuch constraints by developing network ties be more innovative.

7.4. Limitations of the Study

Despite its contributions, the study has suffered considerably from data limitations. As it has explained earlier, the lack of systematic and objective data required the use of perceptive measures. Even though the measures and the measurement model were developed by the most rigorous methodology available, the use of perceptive

measures from the same respondents and the limited size of sample still imposed considerable threats to the validity and reliability of the findings. Besides, the use of such perceptive measures in one context constrains the capacity of making comparisons between different national contexts, which represent one of the building blocks of the NBS approach. Nonetheless, further use of the same measures in different contexts will enable not only the comparison of different business system characteristics but also will validate the constructs' robustness with additional data. Moreover, this study only considerd Pakistani business system, thus the empiricaly results can have geographical limitations.

7.5. Future Recommendations

Future studies may consider the following suggestions:

- Data collection from different respondents such as top-management and R&D employees order to minimize the response bias.
- Multilevel modeling techniques such as hierarchical linear modeling can produce better insights about this multilevel research framework.
- It would be worthwhile if future studies statistically analyze the impact of NBS on other types of innovation such as management innovation.
- Similarly, scholars can test the relationship between NBS and entrepreneurial activities in a particular context.

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APPENDIX: Questionnaire

Section A.

Please read the following question and answer to the best of your knowledge.

Note: Click in the box to select your answer and move to the next. Similarly, where asked to put the answer by you, "Click here to enter text", to fill it, and move to next.

Your position in the firm:	Owner-Manager ☐ Senior Manager ☐ Manager ☐
Your work experience (year):	Less than 5 ☐ 6 to 10 ☐ 11 to 15 ☐ More than 15 years ☐
Total number of employees in your firm?	
Please write the year foundation (establishment) of your organization.	
Please write the primary industry (sector) of your business.	
Does your company have export experience? If no, skip the question, If yes, please write the export share of sale (in %) of your company.	
Does your company allocate budget for R & D? If no, skip the question. If yes, please write the percentage of its share with reference to total revenue:	
Type of Firm:	Family Firm ☐ Non-Family Firm ☐
Is your firm affiliated or related with a business group in the country?	Yes ☐ No ☐
City and Province of location?	

Section B.

Please **indicate your level of agreement** with each of the statements below.

SD = Strongly Disagree, **DA** = Disagree, **SA** = Strongly Agree

1. Innovation (Product /Service and Process)	SD DA Neutral Agree SA
We often introduce new products/services to a new market.	☐-----☐-----☐----☐-----☐
We often introduce new products/services to an existing market.	☐-----☐-----☐----☐-----☐
We develop new product/services that require significantly new technology, process or ideas that did not exist in the market before.	☐-----☐-----☐----☐-----☐
We often improve or revise existing products or services.	☐-----☐-----☐----☐-----☐

We often reposition existing products or services.	☐-----☐-----☐----☐-----☐
We often change the way we make products or deliver services.	☐-----☐-----☐----☐-----☐
We exploit the potential of the established design.	☐-----☐-----☐----☐-----☐
We introduce new or significantly improved processes for producing or supplying products (goods or delivering services) which are new to our firm.	☐-----☐-----☐----☐-----☐
We often introduce new or significantly improved processes for producing or supplying products (goods or delivering services) which are new to our industry.	☐-----☐-----☐----☐-----☐

2. Knowledge acquisition (PACAP)	SD DA Neutral Agree SA
We regularly collect industry information through informal means (e.g., lunch with industry friends, talks with trade partners)	☐-----☐-----☐----☐-----☐
We regularly scan the external environment for new information, knowledge or technologies	☐-----☐-----☐----☐-----☐
It is common for our employees to approach customers, suppliers or third parties (i.e. consultants, financial advisors, etc.) to acquire new knowledge	☐-----☐-----☐----☐-----☐
The search for relevant information necessary for every-day business operation is highly prioritized in our organization.	☐-----☐-----☐----☐-----☐
We keep ourselves constantly updated with the latest technologies or state of the art knowledge related to our organization's business	☐-----☐-----☐----☐-----☐

3. Knowledge Assimilation (PACAP)	SD DA Neutral Agree SA
We quickly recognize and understand the usefulness of new external knowledge	☐-----☐-----☐----☐-----☐
We quickly analyze and interpret the impact of changing market demands on our products and/or services	☐-----☐-----☐----☐-----☐
New opportunities to serve our customers are quickly understood	☐-----☐-----☐----☐-----☐
We are slow to recognize and interpret changes in our market (e.g. competition, regulation, demography).	☐-----☐-----☐----☐-----☐
In our organization, new external information or knowledge is quickly communicated across all business units or departments	☐-----☐-----☐----☐-----☐

Our management demands periodical cross-departmental meetings to exchange and analyze new knowledge or technological developments from the external environment	☐-----☐-----☐----☐-----☐

4. Knowledge Transformation (RACAP)	SD DA Neutral Agree SA
We record and store newly acquired knowledge for future reference	☐-----☐-----☐----☐-----☐
We have the ability to successfully link existing knowledge with new knowledge or insights	☐-----☐-----☐----☐-----☐
We regularly meet (employee and management) to discuss how to utilize new knowledge to improve our current products, services or internal processes	☐-----☐-----☐----☐-----☐
We have the ability to apply new knowledge into the practical work	☐-----☐-----☐----☐-----☐
We regularly consider the consequences of changing market demands in terms of new (or improved) products and/or services	☐-----☐-----☐----☐-----☐
We periodically meet (employee and management) to discuss consequences of market trends and new product development	☐-----☐-----☐----☐-----☐

5. Knowledge Exploitation (RACAP)	SD DA Neutral Agree SA
In this organization, management supports the development of prototypes, new products, services or processes	☐-----☐-----☐----☐-----☐
Our organization regularly reviews current products, services or processes and adjusts them in accordance with new knowledge or technologies	☐-----☐-----☐----☐-----☐
Our organization has the ability to work more effectively by adopting new technologies or knowledge	☐-----☐-----☐----☐-----☐
We regularly implement new technologies to develop new products, services or processes	☐-----☐-----☐----☐-----☐
In this organization, we are proficient in transforming new knowledge into new (or improved) products, services or processes.	☐-----☐-----☐----☐-----☐
We regularly consider how to better exploit knowledge and/or technologies.	☐-----☐-----☐----☐-----☐
Our organization has difficulty implementing new products and services.	☐-----☐-----☐----☐-----☐

6. Human Capital	SD DA Neutral Agree SA
Our employees are highly skilled.	☐-----☐-----☐----☐-----☐
Our employees are widely considered the best in our industry	☐-----☐-----☐----☐-----☐
Our employees are creative and bright.	☐-----☐-----☐----☐-----☐
Our employees are experts in their particular jobs and functions.	☐-----☐-----☐----☐-----☐
Our employees develop new ideas and knowledge.	☐-----☐-----☐----☐-----☐

7. Social Capital	SD DA Neutral Agree SA
Our employees are skilled at collaborating with each other to diagnose and solve problems.	☐-----☐-----☐----☐-----☐
Our employees interact and exchange ideas with people from different areas of the company.	☐-----☐-----☐----☐-----☐
Our employees partner with customers, suppliers, alliance partners, etc., to develop solutions.	☐-----☐-----☐----☐-----☐
Our employees apply knowledge from one area of the company to another when some problem or opportunity arises.	☐-----☐-----☐----☐-----☐

8. Organizational Capital	SD DA Neutral Agree SA
Our organization uses patents and licenses as a way to store knowledge.	☐-----☐-----☐----☐-----☐
Much of our organization's knowledge is contained in booklets, databases, etc.	☐-----☐-----☐----☐-----☐
Our organization's culture (stories, rituals) contains valuable ideas, ways of doing business, etc.	☐-----☐-----☐----☐-----☐
Our organization embeds (inserts) much of its knowledge and information in structures, systems, and processes.	☐-----☐-----☐----☐-----☐

Section C.

In this section, we are interested in the **general patterns of doing business** in your country. We ask you to assess these patterns in each question .

1. Ownership and Governance Structure

To What Extent ……	Very Low Very High
Owners delegate authority to the salaried managers	☐--☐--☐--☐--☐

Business activities are controlled by the salaried managers	☐--☐--☐--☐--☐
Owner has trust on salaried managers and business partners	☐--☐--☐--☐--☐
Owner wants to get knowledge about firm's technologies, products, and market	☐--☐--☐--☐--☐
Family-ownership controls the business activities without authority delegation	☐--☐--☐--☐--☐
Firms have ownership control over production chain assets and activities (Horizontal integration/related diversification)	☐--☐--☐--☐--☐
Firm have ownership control over businesses in different sectors (Vertical integration/ unrelated diversification)	☐--☐--☐--☐--☐
Managerial hierarchies (not owner) are allowed to sign contracts with other firms	☐--☐--☐--☐--☐
Firms share authority and control of firms with non-family members	☐--☐--☐--☐--☐

2. Interfirm relationships (Non-ownership Coordination)

To What Extent ……	**Country** Very Low Very High
Firms establish long term cooperative ties with buyers	☐--☐--☐--☐--☐
Firms establish long term cooperative ties with suppliers	☐--☐--☐--☐--☐
Firms establish long term collaborative ties with competitors	☐--☐--☐--☐--☐
Firms collaborate with competitors to influence state polices and decisions	☐--☐--☐--☐--☐
Firms collaborate with competitors to make profit from a saturated market	☐--☐--☐--☐--☐
Firms establish long-term cooperative ties firms operating in different sectors	☐--☐--☐--☐--☐
Firms establish long-term cooperative ties with firms from the same industry	☐--☐--☐--☐--☐
These ties are based on personal relations and trust	☐--☐--☐--☐--☐

3. Employer-Employee relations and Work Management

To What Extent ……	Very Low .Very High
Employer-employee commitment is based on long-term nature of job	☐--☐--☐--☐--☐

Employer and employee depends on each other to operate business effectively	☐--☐--☐--☐--☐
Firms prefer to promote internal employees rather than hiring skilled people externally	☐--☐--☐--☐--☐
Firms provide training to its employees to meet organization specific needs	☐--☐--☐--☐--☐
Employees are involved in decision making	☐--☐--☐--☐--☐
Employees have task related autonomy	☐--☐--☐--☐--☐
Employees are trusted by owner/manager	☐--☐--☐--☐--☐

Section D.

Please **indicate your level of agreement** with each of the statements below.

SD = Strongly Disagree, **DA** = Disagree, **SA** = Strongly Agree

1. The State Structure and Policies	SD DA Neutral Agree SA
In my country, government economic (business) policies are independent of pressure from special interest groups (e.g. social elites, power groups).	☐-----☐-----☐----☐-----☐
In my country, government grants subsidies to local firms that promote fair competition among firms.	☐-----☐-----☐----☐-----☐
In my country, government encourage the establishment of intermediary instructions, like business associations, trade unions etc.	☐-----☐-----☐----☐-----☐
In my country, government regulates markets through formal laws, rules and procedures.	☐-----☐-----☐----☐-----☐
In my country, it is burdensome for businesses to comply with governmental administrative requirements (e.g. getting license, regulations).	☐-----☐-----☐----☐-----☐

2. Financial System	SD DA Neutral Agree SA
In my country, banking system (credit-based) is the major source of business finance.	☐-----☐-----☐----☐-----☐
In my country, most of the firms raise capital by issuing share on the stock market.	☐-----☐-----☐----☐-----☐
In my country, non- bank financial institutions (e.g. insurance companies, Investment Banks etc.) are the major source of business finance.	☐-----☐-----☐----☐-----☐

2. Education and Training System	SD DA Neutral Agree SA
In my country, education system significantly contributes to the development of relevant labor force competencies that meet industry needs.	☐-----☐-----☐----☐-----☐
In my country, employers and unions jointly conduct training programs to enhance employees' skills.	☐-----☐-----☐----☐-----☐
In my country, employers and government agencies jointly conduct training sessions to develop employees' skills.	☐-----☐-----☐----☐-----☐
In my country, employees are employees are densely (heavily) organized in unions.	☐-----☐-----☐----☐-----☐
In my country, wages are determined by individual companies rather than through a centralized bargaining process (Government involvement).	☐-----☐-----☐----☐-----☐

2. Trust and Authority Relations in the Country	SD DA Neutral Agree SA
In my country, formal or governmental institutions and procedures are trusted by the public.	☐-----☐-----☐----☐-----☐
In my country, managers willingly delegate authority to subordinates.	☐-----☐-----☐----☐-----☐
In my country, management and workers relations are cooperative.	☐-----☐-----☐----☐-----☐

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