



**SOUTHERN NEW HAMPSHIRE
UNIVERSITY**

DISSERTATION

**The Obsolescence of Patent Proxies as Country
and Firm Innovation Measures**

Presented by

John G. Chambers, II

Doctor of Philosophy Candidate

December, 2016

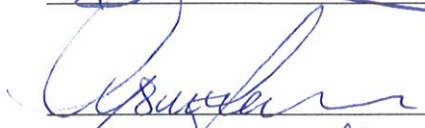
Massood Samii, Ph.D., Chairman
Professor of International Business

 12/15/16

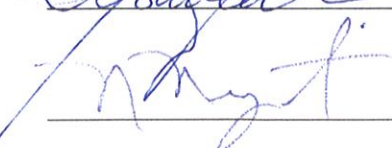
C. Bulent Aybar, Ph.D.
Professor of International Business

 12/15/2016

Aysun Ficici, D.B.A.
Professor of International Business

 12/16/16

Nicolas Nugent, Ph.D.
Professor of International Business

 12/9/16

Tej Dhakar, Ph.D.
Professor of Quantitative Studies

 12-9-16

Acknowledgements

I am indebted to my dissertation committee, for their steady guidance, support and confidence. Advancing the ideals of research, business and most significantly(!) humanity, they embrace the academic excellence and mutual respect, which make our school a New England gem.

Dr. Massood Samii was instrumental in elevating Southern New Hampshire University as a major, global contributor to international business studies. He has been the voice of innovation, long before it became commonplace in the industry lexicon. Dr. C. Bulent Aybar is as meticulous, thoughtful, and professional an educator there ever was, eschewing shortcuts, and tirelessly making time for thorough analysis and student assistance. Dr. Aysun Ficici embraces not only superior academic rigor but also the philosophical insight into how business is, and must ultimately be, illustrative of human decency. Dr. Nicolas Nugent balances theory with pragmatism, delivering with humor, insight and the wisdom of the experienced practitioner. Dr. Tej Dhakar, exemplifying the gentleman scholar, transforms any daunting, mathematical notation or problem set into a real-world scenario that can be felt, appreciated, and always understood. I thank each of them profoundly.

My family's enthusiastic support and encouragement completed this journey for me. My wife Betty led the way; along with my daughter Jacqueline and my son John, they have been the greatest teachers I've ever known.

And finally, I thank my mother for her encouragement and serene strength, as I thank the man whose positive outlook and unfailing optimism shapes me still -- my father. I dedicate this effort to his memory.

Table of Contents

ACKNOWLEDGEMENTS	2
TABLE OF CONTENTS.....	3
LIST OF FIGURES.....	5
LIST OF TABLES	6
ABSTRACT	7
1 INTRODUCTION AND OBJECTIVE	8
1.1 RESEARCH MOTIVATIONS AND OPPORTUNITIES.....	11
1.2 THEORETICAL BACKGROUND OF PATENT SHORTCOMINGS ON INNOVATION	14
1.3 CONTRIBUTIONS TO CURRENT IB AND IB ACADEMIC DISCIPLINES	17
1.4 CONTRIBUTIONS TO FUTURE IB RESEARCH	18
1.5 RESEARCH QUESTION PATHWAY	20
2 LITERATURE REVIEW	25
2.1 THEORETICAL RATIONALE AND FUNDAMENTALS	25
2.2 INTELLECTUAL PROPERTY: UTILITARIAN OBJECTIVES IN INNOVATION	31
2.2.1 <i>Property Rights Justification and Controversy</i>	35
2.2.2 <i>Question on Patents and Firm value</i>	36
2.2.3 <i>Country Comparisons</i>	40
2.3 THREE MAJOR BRANCHES CONCERNING RESEARCH QUESTION	42
2.3.1 <i>Triad Branch 1: Innovation and its Drivers</i>	44
2.3.2 <i>Triad Branch 2: Firm-specific Advantage</i>	48
2.3.3 <i>Triad Branch 3: Institutions</i>	51
2.4 ADVANCED PROPOSITIONS.....	54
3 METHODOLOGY FUNDAMENTALS	56
3.1 ENHANCED VALUE CHAIN THEORY.....	56
3.2 METHODOLOGICAL PRECEDENCE AND HYPOTHESES	63
3.3 METHODOLOGICAL REFINEMENT.....	69
3.4 METHODOLOGICAL CHALLENGES AND MITIGATION.....	71
3.5 MEASURING INNOVATION.....	74
4 MODELING FOR EMPIRICISM.....	76
4.1 INNOVATION AND MULTIFACTOR PRODUCTIVITY	76
4.2 CHALLENGES IN MODEL.....	78
4.3 FORMALIZING THE MODEL.....	79
4.3.1 <i>Innovation Impact Data</i>	83
4.3.2 <i>Legal Framework Data</i>	84
4.3.3 <i>Physical Property Rights Data</i>	86

4.3.4	<i>Intellectual Property Rights Data</i>	87
5	TESTING AND RESULTS	89
5.1	STATISTICAL SOFTWARE AND DATA NORMALIZATION	89
5.2	EMPIRICAL PROCESS	91
5.2.1	<i>Regression Testing</i>	94
5.2.2	<i>Hypotheses Results and Conclusions</i>	108
6	SUMMARY	111
	APPENDIX A	115
	INNOVATION DATA (MFP) DEPENDENT VARIABLE	116
	LEGAL FRAMEWORK DATA (LF)	117
	PHYSICAL PROPERTY RIGHTS DATA (PPR)	122
	INTELLECTUAL PROPERTY RIGHTS DATA (IPR)	126
	APPENDIX B	130
	PRINCIPAL COMPONENT ANALYSIS OUTPUT	130
	SPSS FACTOR ANALYSIS CONFIGURING THREE FACTORS	133
	<i>Factor Analysis – Legal Framework Factor</i>	133
	<i>Factor Analysis Physical Property Rights (PPR) Factor</i>	137
	<i>Factor Analysis Intellectual Property Rights (IPR) Factor</i>	141
	<i>PCA Factor Output Data for LF, IPR, PPR</i>	145
7	REFERENCES	159

List of Figures

Figure 1, Pathway to Research Question, evolving from classic IB literature to a focus on literature gap; opportunity for refining scholarship on intellectual property proxies and competitive advantage attributes	21
Figure 2, Fishbone Analysis for Innovation drivers, applicable to both the macro view and micro view ..	44
Figure 3, Fishbone Analysis for Firm-specific Advantage, as related to Innovation motivations and performance	48
Figure 4, Institutional Maturity attributes, as related to Innovation environments and rule of law	53
Figure 5, Enhanced Value Chain Model building upon Porter, recognizing the exogenous and endogenous innovative forces onto and throughout the firm's business processes; dotted lines represent the knowledge spillovers from without and within.	58
Figure 6, Adoption Lifecycle.....	73
Figure 7, Conceptual Structure for Innovation Dependency on Property Rights Institutions.....	83
Figure 8, Empirical approach and rationalization for adjustments in variable testing.....	92
Figure 9, Distribution of Multifactor Productivity across 74 countries	93
Figure 10, Legal Framework Distribution.....	93
Figure 11, Physical Property Rights distribution	93
Figure 12, Intellectual Property Rights distribution.....	94
Figure 13, Regression of MFP vs. Average scores on Legal Framework, Physical Property Rights and Intellectual Property Rights.	95
Figure 14, Regression of MFP vs. All Granular Variables per model, which are subsidiaries of the Legal Framework, Physical Property Rights, Intellectual Property Rights categories.....	97
Figure 15, Snapshot of initial SPSS Factor Analysis execution, showing 10-variable processing and outputting 1 factor	99
Figure 16, Regression following PCA Analysis and Factor construction, showing high significance for Legal Framework only	101
Figure 17, Regression on MFP impact via SW Compliance, Patent Protection, Average Physical Property rights and Average Legal Framework scores.	104
Figure 18, Regression of IPR_SW, Avg_PPR, Avg-LF in Less Developed countries.....	106
Figure 19, Regression on all countries; isolating IPR_Patent predictor to MFP with no significant correlation.....	107
Figure 20, Regression on Less Developed countries; isolating IPR_Patent predictor to MFP with no significant correlation	108

List of Tables

Table 1, Extremely High Correlation among average score predictors of the IPRI structure, as related to regression testing.....	96
Table 2, All granular variables with mostly high correlations among each other	98
Table 3, Snapshot of PCA Factor Output, which was programmed to generate factors according to the IPRI taxonomy -- Legal Framework, Physical Property Rights, Intellectual Property Rights.	100
Table 4, Focused review of variables to modify equation	103
Table 5, Innovation data, represented as multifactor productivity values	116
Table 6, Judicial Independence values, normalized from a 1-7 range into a 0-10 scale	117
Table 7, Rule of Law values; normalized from -2.5 to +2.5 range into a 0-10 scale	118
Table 8, Political Stability values, normalized from -2.5 to +2.5 range into a 0-10 scale	119
Table 9, Control of Corruption values, normalized from -2.5 to +2.5 range into a 0-10 scale	120
Table 10, Legal Framework aggregate values; average of Judicial Independence, Rule of Law, Political Stability, Control of Corruption,.....	121
Table 11, Property Rights Protection, normalized from a 1-7 range to a 0-10 scale.....	122
Table 12, Registering Property ratings.....	123
Table 13, Access to Loans values, normalized from a 1-7 range to a 0-10 scale	124
Table 14, Aggregate scores for Physical Property Rights; average of Property Rights, Registering Property, and Access to Loans	125
Table 15, Software License Compliance, normalized and inverted from % to 0-10 scale	126
Table 16, Intellectual Property Protection scores, normalized from a 1-7 range into a 0-10 scale	127
Table 17, Patent Protection scores, normalized from 0-5 range into a 0-10 scale	128
Table 18, Aggregate Intellectual Property Rights score; average of Software License Compliance, Intellectual Property Protection, and Patent Protection	129

Abstract

Strategic practitioners and business scholars continuously analyze and study competitive advantage through innovation, seeking measurements that provide evidence of cause and effect. As a policy matter and academic matter, the impact of intellectual property rights on innovation is still debated. Despite the argument from authority via some bureaus, institutions and vested interests, who do emphasize some empirical studies, the matter remains unsettled. This would appear perplexing considering the volumes of scholarship surrounding this topic. This dissertation encourages a stepping back and, via refreshed considerations of classical and contemporary international business literature, a baselining of the analysis. A means to balance the holistic with the detailed is necessary; innovation proxies, such as R&D spending or patent activity, are suspect given the fluid nature of innovation. Offering an enhancement to the value chain paradigm, a means to assess innovation as comparative advantage demands respect to the holistic activities of firms and country institutions. Property rights are often employed to show economic growth and innovation; however, property rights require parsing to determine if physical property rights alone are an impetus to innovation without reliance on intellectual property rights. The usage of patent as innovation proxy is challenged in this thesis. Thus, the argument is constructed by viewing multiple, theoretical drivers that effect the firm as well as country-specific institutions. The results indicate that patent protection is not correlated with macro-level views of innovation, and it is not an appropriate proxy for innovation unless confined in the narrowest of scenarios.

1 Introduction and Objective

As a construct for intellectual property (IP), patents have ostensibly been employed and codified into law for the express purpose of fostering innovation. But does intellectual property provide any improvement upon market innovation and a country's comparative advantage? Moreover, if international business studies cite patent counts as proxies for innovation, there is elevated uncertainty whether the intellectual property alone represents the innovation dynamics within the firm. Subsequently, these proxy innovation measures are then associated with the firms' host countries, crediting them and their institutional environment with the innovative influence.

Innovations arise through both exogenous and endogenous factors. The sources of these factors are amorphous and ubiquitous, collated and synthesized in firms via countless knowledge management behaviors and skills. Therefore, patents are suspect innovation proxies, and potentially obsolete in a world that becomes more digitally oriented, informationally accessible, and collaboratively empowered. In empirical studies, measures of patents should only be utilized with utmost care via rationalized and constrained specificity in any applicable research endeavor. Policy makers and the populace at large, in the face of established patent bureaucracies and legalized rent seeking interests, should steadily eliminate and abolish patents. They represent assignment of monopoly power on knowledge, a public good (Jaffe, 2000), ignoring the definitional economic requirement of scarcity (Kinsella, 2001), while erroneously equating this public good as personal or firm-owned "property."

Such are observations, considerations and theoretical bases advanced in this dissertation thesis, which seeks to determine the impact of property rights institutions on innovation.

Several academic research groups and “think tanks” have promoted findings that property rights advance economic growth and are, therefore, beneficial for society at large and the improvement of the human condition. The ambiguity in these findings relates to property rights as firm-specific advantages in both physical entities and intellectual entities. Protection of property rights is rooted in country-specific legal frameworks and enforcement mechanisms, which exist to ostensibly provide equitability among the citizenry and the firms who engage in economic competition. This dissertation explores omissions, gaps, and ambiguity in many property rights evaluations, which have the potential for suspect inference. Property rights assessments have been based on various criteria, which still require additional theoretical analysis and empirical testing. One institution of note, the Property Rights Alliance (PRA, 2016), is focused specifically on a property rights oriented framework. Like other similar groups, such as the Global Innovation Index (2014), Fraser Institute (2016), and the Heritage Foundation (Heritage, 2016), the PRA’s message champions a proposition that property rights (*both intellectual and physical*) are positive factors on economic growth. They have developed the International Property Rights Index (IPRI, 2016), which values and ranks countries according to their property rights, legal environment, and associated governmental policies. This qualitative data is ripe for analysis and constitutes a material part of the thesis. Further, the data will be empirically tested. The utilization of qualitative data (as many of the research bodies employ survey data for evaluating institutional impact) is suspect in empirical analysis and, per Kraay (2006), can call into question the validity of the studies. To address this concern, there are several criteria for increasing confidence in subjective data inputs, and these are described in the methodology section of this study.

As IPRI (2016) cites Freyfogle (2009), “property is the complex legal institution that empowers owners to use parts of nature and also to limit uses of those parts by others.” Property is a construct that influences liberty for individuals or groups in arguably both positive and/or negative ways. Property rights are also considered a positive factor on innovation, and this is contended by IPRI (2016); however, from the perspective of this study, the agglomeration of both physical and intellectual property (without separation) is the dilemma.

In this study, intellectual property rights shall be isolated for effects. The advantage of the Property Rights Alliance data, in the IPRI (2016) methodology, is that the property rights indices distinguish between *physical property rights* and *intellectual property rights*. This is complemented by an assessment of the legal and political framework of each nation-state. While various analyses have been conducted by the alliance, with intention of showing this index is positively correlated with economic growth, there has not been an exhaustive analysis of its relationship to innovation; nor is there significant evidence showing an intellectual property component adds explanatory causation. This deficiency in the research is remarkable and provides opportunity for researchers. The core argument for intellectual property (patent protection specifically), is utilitarian in nature. An extensive body of research uses patents as proxies for firm innovation; however, the application of such proxies has not been thoroughly constrained for its specific impact. Patents, and intellectual property proxies for innovation, are extremely limited in macroeconomic analysis. It is, therefore, the aim of this study to better substantiate that innovation is a byproduct of firm value chains as well as exogenous competitive forces. The innovative capacity of a firm lies in its spillovers; these emanate internally and externally, via interfaces among endogenous firm entities and exogenous firm relationships and

observations. It follows, then, that innovation measures at macro levels must include the overall output of the constituent firms, not merely references to those firms that produce patents, nor only those firms with large R&D budgets. The patent itself is questioned and under investigation in this dissertation, in order to ascertain if its singular measurement is valid as an innovation promoter and if institutional protections of intellectual property are the cause of increased innovation. Or is the institution of intellectual property rights an extraneous variable in promoting and instigating innovation?

The general research question, extended by specific propositions, ultimately asks, *are intellectual property rights necessary for advancing innovation when other physical property rights are secured?*

To scientifically analyze a set of associated propositions (later delineated), a comparison of models relative to innovation's impact by property rights will be used to answer the above research question. The differentiation and isolation of country institutions, physical property rights, and intellectual property rights provides a more granular and specific means for future innovation research, as well as a contribution to macroeconomic policy considerations in international business. Within this research the classical proxy for innovation, multifactor productivity, and the decomposition of property rights' underlying factors, shall be analyzed within empirical testing.

1.1 Research Motivations and Opportunities

The challenge in the present research (determining if intellectual property rights are a more significant driver of innovation than physical property rights alone) is the scattered and

inconsistent means of measuring innovation. Innovation proxies have been cited as R&D spending, workforce education levels, spillover dynamics and many others. The impetus for the present research is to offer baseline simplicity, a grounding of the discipline, without ignoring detailed understanding and granular research surrounding innovation as firm competitive advantage and country comparative advantage. Innovation measured as patent or other IP proxies imply acceptance that legally codified, intellectual property promotes creativity. In opposition, innovation is too amorphous a phenomenon to simply isolate to patents. How can these competing arguments for innovation (isolated across sectors, fields, geographies, regions, cultures) be assessed holistically while respecting the granular necessities and nuances of innovation? Academic research requires a problem/issue to be pursued with sufficient specificity to advance the understanding of phenomena. It is incumbent that the subject matter is not overly broad. To guard against ambiguity or generalization, this research addresses the institutional concerns of property rights deconstruction as *innovation linkages*; nevertheless, the innovation dilemma is often one of “missing the forest for the trees”. Innovation is a cross-discipline, *cross value chain phenomenon* and occurs through the virtually infinite number of actions inside and outside the firm; however, one cannot understand the “forest’s vibrancy” without understanding the particular inputs that flourish on the ground. This dissertation thesis seeks to balance the holistic with the detailed.

The study of innovation is broad and daunting. Definitions of innovation are ambiguous due to “apples vs. oranges” product offerings and the ambiguous bundling of intellectual property rights criteria and country institutional maturity. As an example, the fashion industry is an environment with little to no IP beyond brand trademarks. Companies in that sector cannot be

measured against firms in technology, manufacturing, clinical research, etc. What they do have in common, however, is an expectation that classical property rights (physical property rights) are respected. Further adding to empirical challenges, there are many reasons for firms to rely on legacy products and not innovate in certain markets, as transformational efforts are costly and require changes in what had previously been profitable. Nevertheless, innovation represents change and improvement. Is that change promoted through physical property rights and business institutions instead of intellectual property rights? The institutional relationship of property and innovation intersects with international business dynamics of comparative advantage, competitive advantage and the support of a country's lifeblood -- firm-specific advantages (FSA). A key FSA includes intangible assets such as knowledge and information; therefore, firms will exploit this knowledge and seek to protect the knowledge under institutional law -- via intellectual property protection. The protection has been endorsed and rationalized by governments to promote innovation and subsequently to make a home country more competitive. If innovation is advanced by intellectual property protection, then a country with a higher level of protection should manifest a higher level of output and change. The intention is to investigate and test this; the investigation requires consideration of multiple dynamics and influences. An improvement on the value chain construct of a firm shall underscore the importance of information flow and will also contribute to the testing, via recommending that the innovation proxy be one that is contextualized among a myriad of innovative forces.

1.2 Theoretical Background of Patent Shortcomings on Innovation

“Innovation has been a constant proxy for measuring small business success. Patent production has been the most common proxy to measure innovation because data is readily accessible” (Isom and Jarczyk, 2009). Patents have been often cited to account for innovation trends across diverse disciplines, including international business. However suspect and flawed, these measures are still utilized in international business literature, but is this a realistic measure of innovation? Many patents are used for defensive purposes (Boldrin and Levine, 2013), ultimately preventing innovation by other firms. In effect, the registering firm sustains its monopoly rights (and maintains a confined customer base). This provides an artificially extended “first-mover advantage” (Liebermann and Montgomery, 1988) to a firm who initially captured a market. If a firm has a monopoly right on a design or invention, yet does not implement that design, then how can one legitimately state that society is best served by innovation? The firm would be granted competitive protection, which would act as a rent-seeking attribute. The defensive patent, in effect, precludes a first mover advantage to a firm who wishes to implement the same type of design or to improve upon the design. The response to this scenario is a rationalization that the implementing-firm has an option to pay a license to the inventing-firm, implicitly suggesting that the implementing-firm may not have thought of the new design on its own. Patents are not grants to the first who developed or thought of an invention; they are grants to the first firm who applies and registers the invention.

In theory, an industry could be employing old processes, old materials, and old methods simply because an innovation was not allowed to foster. The preventative measure for a competing firm’s innovation is a defensive patent that was never implemented. Therefore, empirically, if

counts of patents are used as innovation proxies then all research must account for patents that were not marketed. The inactive patents should represent a stifling of innovative activity in the market. This limitation (or flaw in the empirical proxy) does not indicate the end of the story, nor does it provide a final response to innovation via intellectual property institutions.

Innovation is change; it is layered change, building upon previous advances, patented or not. As a parallel, “deeply layered change” (Bonthius, 2016) is a teaching strategy, and is also innovation-aligned. Its focus is the evolving changes that are outgrowths of previous findings, inventions, happenings, or even the morphing zeitgeist. So is it with all knowledge, as new capabilities, commerce, and ways of life build upon previous findings and experiential knowledge.

Research efforts have often used patent counts due to limitation of innovation data, and without weighting or regard toward environmental or market transformations (Jong, Kemp and Folkerlinga, 2003). Not every patent is subjectively or objectively equal, and patent “quality” varies from both a legal perspective and economic perspective. “For economists a good patent is generally one that fulfils the key objectives of the patent system, i.e. to reward and incentivise innovation” (Squicciarini, 2013). This is contextualized by Gullec and van Pottelsberghe de la Potterie (2007) within the objective of enabling diffusion and further technological developments.

From a subjective point of few, patents deliver products that offer a new way of executing a process, entertaining a family, expediting an online search, etc. If counting patents is a means to conduct empirical research, then the sector isolation and normalization would become paramount. The research exercise would be constrained to only invention of a registered

capability, and not associated with process improvements. This is a very limiting idea of the term “innovation.”

If patents are flawed as a measurement, why are they continually employed as a scientific metric relative to innovation? Besides the fact that there is a large vested interest in the patent and intellectual property mindset (Ginarte and Park, 1997), patents are an easy means for measuring (Jong, Kemp and Folkerlinga, 2003). But are they indicative of the virtually infinite aspects of innovative change in firm and society?

If an invention assessment is complex, then at what point is the evaluation process mired in an iterative expensive attempt to decipher novelty? As a corollary, Petrosyan (2016) cites extensive difficulties in the appraisal process in science:

“The evaluation of scientific findings is not a strict procedure but, rather, an art implying not so much comparison of them with the established guides and criteria or the demonstration of their consistence with or divergence from the existing knowledge as the revelation of conceptual and practical vistas they open. To cope with the task properly it is necessary not merely to know a lot and to be experienced and well-versed in high-level research. Much more important is to have scientific flair and taste, broad vision and far-reaching intellectual horizon – in order to be able to draw a thread from the subject under evaluation to the complex, sophisticated, and multidimensional context of science and – all the more – to the promising lines of its future progress. It needs more intuition and insight than formal and plain methods.”

Following this argument, then what is the cost and difficulty in an intellectual property bureaucracy, which attempts to assess the uniqueness of an invention, especially since the

foundational knowledge to create that invention is dependent upon varied and diffuse prior knowledge?

1.3 Contributions to Current IB and IB Academic Disciplines

In a recent article for the Academy of International Business, Boddewyn (2016), with reference to Graham Ashley's AIB San Francisco 1990 workshop "The Theoretical Uniqueness of IB Studies", explains the prerequisites for international business studies. He instructs researchers to ensure that their International Business ("IB") foci are truly "international" in nature. Are the underpinnings to IB questions simply derivations and tests of universal theories that may apply to foreign samples, or are the theories specific to the dynamics of international trade theory or competitiveness? The latter is demanded for the research to be considered international. Among these considerations, one must determine if both dependent and independent variables are uniquely attributed to a group of countries/nation-states. Do the underlying drivers and factors help explain the idiosyncratic nature of the specific countries and their comparative advantages/disadvantages? To qualify for IB research, findings and foci must not simply reflect a regional perspective or intra-country view, which does not specifically differentiate among nation-states.

This dissertation satisfies the Boddewyn criteria, in isolating innovation effects by country and isolating independent characteristics of these countries. As discussed in the methodology section, the variables not only have clear demarcation among countries, but are also distinguished and developed by country institutions, without overlap or ambiguity with other nations states.

Additionally, from an IB subject-matter perspective, the present study intersects with key functional/topical areas in the international business academic curricula: *Strategy* dilemmas are emphasized for firms as they consider the nature of innovation and what constitutes their specific advantage. *Globalization* factors are impacted via the influence of property rights theory, openness to international trade, foreign investment and the dynamics of countries' maturation process. The *institutional factors (whether in emerging markets or developed markets)* are at the core of this theoretical analysis, considering the legal and political strains between developed and developing countries over intellectual property. The *quantitative analysis* is embedded in an empirical approach that employs a widely-accepted measure of innovation (multifactor productivity) vs. theoretically valid explanatory variables. And finally, the *international marketing* discipline is a necessity in the branding, promotion and adoption of innovation; even new marketing methods themselves are innovations and major contributions to the success of firms. With respect to Moore (2006), "crossing the chasm" provokes a realization that adoption is also critical to this dissertation's model, as innovation measured under multifactor productivity implies new products and services have been welcomed and adopted by a customer base.

As many IB disciplines are intertwined with innovation, strategic practitioners must embrace the cross-functional collaboration necessary for optimal delivery and firm success. The improved value chain construct, later discussed in this dissertation, should act as a blueprint for launching strategy improvement.

1.4 Contributions to Future IB Research

There are many vested interests in intellectual property regulations, not just in large pharma firms, nor software behemoths like Microsoft and IBM, some of whom are beginning to

liberalize their approach to IP. Developed countries, whose multinational corporations (MNCs) have profited due to exclusive rights on certain products and processes, are risk averse to a more open view of IP rights (Hassan, Yaqub, and Diepeveen, 2010).

Conversely, developing countries tend to believe that the developed firms are employing rent-seeking opportunities and are even exploiting an institutional construct (IP rights) which is nebulous in nature. This nebulosity is over a property right that does not represent actual “property” (Kinsella, 2001).

The empirical studies are not of one voice. There is ambiguity in measures, often to advance a specific point of view. This study will attempt to add insight into the *fluidity* of innovation, which is ultimately innovation’s value – the open and liberal ability for firms and countries to economically advance, while enhancing the human condition.

Additional opportunities spurred by this research align with internal management effects and strategy, within the value chain, prompting the refinement of knowledge management practices and objectively-measured innovation execution. As firms mandate a culture of innovation, the practitioner toolbox will require skill, expertise and research experience in enhancing corporate culture.

Regarding institutions, additional insight as to the cause and effect of IP legislation may temper government assumptions that all IP is a positive force for country competitiveness.

Finally, the study of innovation adds additional data and analysis in the realm of spillovers.

While a more liberal view of intellectual property may provoke more imitation, this in turn provides firm innovation via servicing customers more quickly, providing better availability of

support, delivering products that are constantly refined and improved. This will foster global efforts for all firms to eschew rent seeking via the obsolete patent process and be more adaptive to consumer references and associated opportunities.

1.5 Research Question Pathway

This dissertation soundly narrows key IB disciplines, which intersect the motivational research; therefore, a pathway construction was developed to illustrate the iterative analysis and deliver assurance that the topic is sufficiently refined. This is shown in *Figure 1, Pathway to Research Question, evolving from classic IB literature to a focus on literature gap; opportunity for refining scholarship on intellectual property proxies and competitive advantage attributes.*

These referential considerations, captured in the diagrammatic boxes, represent both a horizontal and vertical means of confining the research, validating the research approach, focusing the literature survey, and settling on the key issues that molded the propositions.

Initial research motivations included the IB fundamentals of comparative advantage, the root of all trade theories and differentiators among nation-states. These differentiators include country institutions. From the firm's specific view, the value chain construct is one that provides clues to the inner workings of endogenous knowledge interplay and the strategic management of the firm itself.

From these initial issues, Iteration 1, the study of innovation was provoked, whereby specific institutions would provide environments that will help firms embrace innovation as firm-specific advantages. In turn, a country would be characterized by its ability to foster innovation.

Firm-specific advantages could be garnered by the leveraging of country institutions, which allowed the freedom of firms to innovate without excessive constraint. Yet this still did not reconcile the problems of competing innovation measures and the institutional factor that would provoke the highest level of impact.

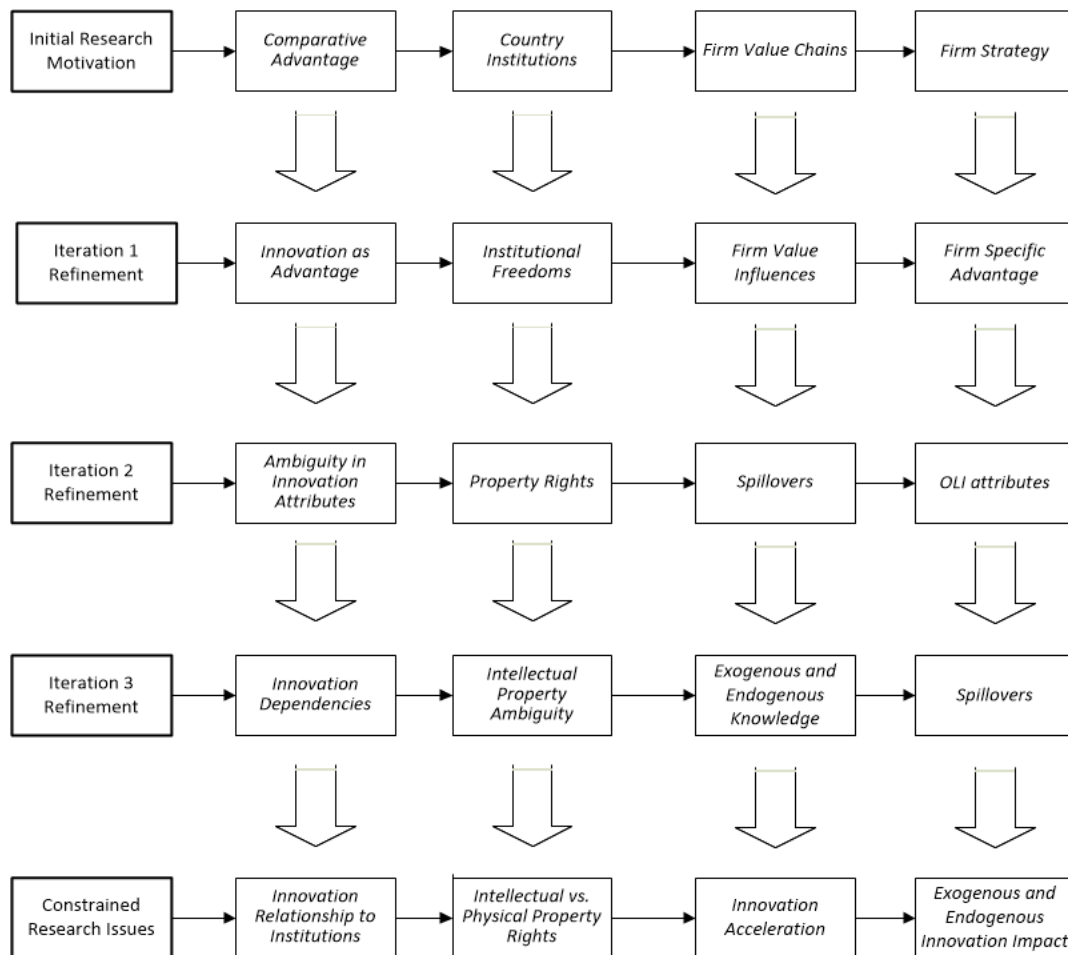


Figure 1, Pathway to Research Question, evolving from classic IB literature to a focus on literature gap; opportunity for refining scholarship on intellectual property proxies and competitive advantage attributes

Further, in Iteration 2, property rights are identified as a significant factor in country comparative advantage and firm competitive advantage. But in Iteration 3, property rights were muddled between physical and intellectual. Property rights need to be assessed in terms of both physical property rights and by intellectual property rights, particularly since IB research often uses patents (an intellectual property construct) as its proxy for innovation. If IP is removed from the equation, then is the institutional environment still positively impacting innovation? The concepts of property rights, their modulations under knowledge spillovers and their various manifestations were key to understanding. Legal frameworks provided ostensible promotion for both, but property rights are too ambiguous; the two types of property rights must be distinguished. Following literature study and research, intellectual property rights were amorphous and did not fulfill the economic requirement of scarcity without overt and complicated legal maneuvering. Intellectual property has become an institutional force unto itself, advanced by proponents as a utilitarian means for supporting the needs of a growing population and balancing the needs of innovators. Yet innovation, based on *value chain studies* cannot be isolated to research and development of a product or service set. Also, the assignment of a property right by invention ignores the dependency that the invention had on historical and current knowledge.

Innovation can be measured by an assessment of input factors into a firms' endogenous characteristics. Country-specific firms deliver output (notwithstanding macroeconomic monetary biases) which is a measure of change – from input factors to innovated output; the firms have added value onto the inputs. Can these measures be correlated with property rights institutions and can those institutions distinguish between physical and intellectual property?

The results of this testing may have marked challenges to worldwide policy justifications. While U.S. companies complain that they have suffered greatly from the lack of rigorous and enforceable intellectual property laws (Long, ed. 2000), the enforcement consistency shall be increasingly important under international trade agreements, such as the Trade-Related Aspect to Intellectual Property Rights (TRIPS) agreement (Ostergard, 2000). However, as many firms in developing countries endeavor to catch up to the developing world's technology capabilities (Kuo, Lin and Peng, 2016), there should be no surprise in the lack of urgency in formalizing intellectual property laws.

In addition, testing a new proxy will offer a better understanding of firm strategy, which must leverage and orchestrate innovation that evolves and modulates throughout its entire value chain. The focus on encouraging innovation is increasingly a nation-state concern, whose only differences lie in their political approach. For example, the policy objective within the Canadian-sponsored Jenkins Report (Sulzenko, 2016) espoused mostly demand-side instruments, such as investments in R&D (subsidies) and increasing quality risk capital for high growth business. Sulzenko's (2016) criticism included insistence that more supply side tactics were necessary, and that government regulators were entrenched in a culture that shied from supply side approaches. Nevertheless, what is clear is that innovation is the concern of governments as much as firms, and the objective analysis of innovation's drivers is paramount. Noteworthy is Sulzenko's comment, "Responses from OECD member countries to the OECD Science, Technology and Industry Outlook 2010 questionnaire indicate that demand-side innovation policy is still considered a low priority compared to supply-side policy approaches, such as tax reduction, liberalized regulation and strict monetary policy" (Sulzenko, 2016). The

undercurrent to his remarks reinforce the validity of *country-by-country* institutional and innovation differences. These differences are at the heart of the empirical testing in this dissertation.

If the policy tendencies of governments vary, then one must surmise that there will be marked differences in their innovation measures and in institutional macro data, later analyzed.

To support the overall thesis that innovation does not depends on intellectual property rights institutions, the literature review will begin with definitional explanations, dilemmas and controversies, and then a focus on three major branches of supporting research.

2 Literature Review

While the research question in this study is macro-oriented on the surface, there is a subtlety that underscores the international firm's dependency on property institutions. MNC performance, efficiency and other competitive measurements are reflective of institutional support mechanisms. Conversely, innovation measured by country, and leveraged by country institutions, is reflective of the firms on which the country depends.

Rationalization and validation of the research question is anchored by a grounding of classical and connected IB literature, historical foundations, and analysis of three major disciplines: institutions, firm-specific advantage, and innovation.

2.1 Theoretical Rationale and Fundamentals

In nearly all studies of innovation and its economic impact, Schumpeter (1934) is cited. His scholarship in creative destruction is the foundation of competitive evolution and associated dynamics. The construct of nation-state and the administration of tax policy intersects with the performance of resident firms and traders. This research focuses literature and analysis toward the firm paradigm and the nuances and differences in countries. Therefore, the cultural, legal, commercial, and societal forces, which impact the evolution of innovation, are necessary scholarship. This scholarship is denoted in three major branches: *innovation* drivers and its associated political context; *firm-specific advantage* from natural advantage to monopolistic grants; *institutional* characteristics and constructs that influence behaviors and opportunities of firms. These three major factors have been at the core of international business research since Adam Smith's (1776) seminal study of markets as wealth generation, and since Ricardo's (1815) differentiation of countries relative to their idiosyncratic advantages. International patterns of

trade (via nation-state comparative advantages) were then refined by Heckscher and Ohlin (ref. 1991) and explained as factor endowments. These are building blocks (and institutional requirements) that firms leverage to deliver their offerings. Country endowments are distinguished based on economic scarcity and the dynamics of foreign direct investment. These very dynamics are quantified in research, owing to the extensive body of work concerning country competitiveness. From country competitiveness, rationalizations and explanations are offered to describe and explain the relationship between the multinational corporation (MNC) and its engagement in the international world of commerce, with all its variations and phenomena across a virtually endless trough of domains. The point of these IB foundational citations is to reiterate that *countries are assessed by structural differences* – geographical, institutional, legal, cultural, and historical, as well as by economic performance. The explanations for country performance are steeped in detailed analyses of those various domains and subject matter, which have, historically, driven policy arguments and legislative action. The enormous body of knowledge and research surrounding these domains has sought to not only explain but propose environmental and economic policies. These policies are championed for their ability to advance the performance of business, commerce, and society at large. They are utilitarian policy rationales. *Therefore, it is incumbent on researchers to revisit the premises and assumptions underlying their subsequent propositions. Countries will logically seek comparative advantage in any resource that helps improve its economic performance, including the public good of knowledge, and will erect institutions to artificially create scarcity.*

Per Heckscher-Olin (ref. 1991), countries will export products that use their abundant and cheap factors of production, while importing products that that represent its *scarce factors*. Scarcity is

a natural condition of physical entities, but knowledge is not necessarily a scarce entity. From Hymer's (1960) research assigning firm behavior to so-called market imperfections, Vernon (1966) incorporated the time element, implicitly cited by way of a product life cycle. The common-sense explanation for a life cycle submits that products will ultimately saturate the market or else the product becomes obsolete. After a time, there is no longer a need for the product because something else has taken its place. It follows then, that something replacing a product is an improvement upon the former, either in cost, quality, design or other features of attractiveness; the act of product substitution is sourced in rival goods, developed under a competitive environment. A replacement product offers newness, via innovation.

Competitiveness implies performance; performance implies *distinction among rival forces and countries*. Were factor endowments the end of the story, then Vernon's (1966) Product Life Cycle theory would be moot; but the life cycle theory is robust because of the time element and the forces that instigate change. Products experience diminished demand not simply due to market saturation, but obsolescence or comparative inferiority. One of Porter's (1980) five forces underlying strategic execution is the threat of impending or imminent substitutes. Competing substitutes will mandate a firm strategy of risk mitigation and amelioration of this threat. Left unaddressed, competing substitute products shall result in erosion of the firm's product/service market-share. There are several defensive strategies to address this threat, including cost efficiency, higher quality, and improved performance. Each of those enhancements require innovation. Innovation is the outgrowth and the expectation for any MNC to remain competitive; it is a force that underlies that advancement of all value chain contributions, and is not simply a matter of intellectual property. Certainly, fundamental country institutions provide

an environment for MNCs to operate, and the higher the MNC performance the stronger is the associated country's economy.

In international business, the relationship of innovation and country characteristics will continue to explain behavior of firms, and this relationship acts as an objective means to assess those firms one against another. The assessment is sensibly and rationally framed in analytical value assignments and overall rankings. By way of national profiles, political and economic studies, and performance data, countries have been ranked relative to their strength (or weakness) among various economic and business related categories. Subsequent to these rankings, regression and other statistical analyses have been employed to view positive or negative correlation with performance. For example, the Fraser Institute (2016) has analyzed economic freedom attributes and their relationship to economic growth. For innovation, various metrics have been utilized to measure country and firm capability. But one of the challenges in measuring firm innovation relates to innovation definitions and measurement ambiguity. "Innovation means many things to many people...." (Kaplan, 2014).

The measurable economic performance of countries (nation-states) is advanced by the commercial activity of its resident firms, whose ability to deliver goods and services under intense rivalry translates to its competitive advantage. As the speed of change has provoked a mandatory requirement for multinational corporations (MNCs) to find ways to sustain that competitive advantage, the focus on innovation is embraced as a corporate necessity for strategic practitioners. While these competitive forces apply to virtually all firms, the objective here is to consider if innovation is dependent on IP protection and country-specific institutions; therefore, the MNC and associated country can be viewed as differentiators.

The innovation expectation has been an imperative since firms began competing in ostensibly free markets. Technology today would be unrecognizable to consumers from a hundred years ago, just as it shall be a hundred years hence, relative to contemporaries. As the information age has provoked an accelerated means for consumers and producers to communicate, as well as an accelerated means to reach markets, the forces of competition are exacerbated and firms are challenged to differentiate themselves in meaningful, market-capturing ways. The very means of achieving market opportunity is a vehicle by which the competition can undermine advantage *via imitation*. Jay Barney identified four major factors of differentiation (Barney, 2011): value, rarity, imitability and organization, known as his VRIO construct. These were fundamental attributes that provided a firm's product or service competitive advantage. "Value" represented the attractiveness of the service or product offering for the target customers. "Rarity" was the uniqueness of the capability or deliverable. "Imitability" signified how easily the company's offering could be duplicated by a competitor, and "Organization" equated to the firm's execution model and aptitude for delivering the product to a varied and rivalrous market. Three of the four VRIO factors (value, imitability and organization) strike at this thesis' argument. As patent protection is a major component in intellectual property institutions, the Barney framework is a backdrop to rationalizing and validating the current research.

Arrow (1962) has submitted, if firms can imitate an innovation at a cost that is substantially below the cost to the innovator, there may be little or no incentive for the innovator to advance the innovation. Yet, this defies a reasonable expectation that firms wish to provide products and services to willing customers, as well as a diminishment of the first mover advantage argument.

Mansfield, Schwartz and Wagner (1981) found that, contrary to assumptions of many economic models, a patent frequently does not result in a 17-year monopoly over the relevant innovation. Patents do tend to increase imitation costs, particularly in the drug industry, but excluding drugs, patent protection did not seem essential for the development and introduction of at least three-fourths of the patented innovations studied here. On average imitation costs (within their studies) represented about 65% of the original innovation costs (Guellec and Van Pottelsberghe de la Potterie, 2004).

As Comin (2006) writes, “A significant fraction of innovations are not patented. For some, this is because they are not embodied in any new good or are not a recipe for a new chemical process and, therefore, are not patentable. Others are not patented because innovators simply decide not to apply for a patent.” Further, he refers to studies where patents were not necessary to recoup innovation costs (Comin, 2006).

When a patent is registered, assuming it is not registered for proactively defensive measures with no expectation of development and distribution, the patented product or service of value is recognized for its uniqueness and precedence. The patent represents an invention of sorts, something different that is attractive to the consumer or beneficial to the public, the buyer, or society at large. This includes other intermediate firms in a connected or exogenous supply chain, wishing to incorporate the offering into its own value chain or development process.

The necessity for innovation, under the Barney (2011) paradigm, is embedded not only with invention development, but also with the “organizational” attribute, the ability to repeatedly deliver the offering, manage the delivery process, and exploit its competitive advantage. If an invention is worthwhile then it has an application-specific value. It is a desired input into the

lifestyle of the customer or the needs of other value chains (and endogenous or exogenous suppliers). A patented product or service is not an end unto itself. Its purpose is to create a valuable capability for the consumer, whether that is higher quality, faster capability, durability, cost effectiveness. The acquired patent pertains to an allegedly new way of accomplishing something, providing entertainment, or acting upon something. The accomplishment, entertainment or acts themselves are the end goals. If the end goal is the customer's satisfaction in employing a physical object, then *the innovative opportunity to satisfy a customer can be differentiated by a firm without the intellectual property construct*. The intellectual property is not a prerequisite for innovation, nor an expeditor.

Nevertheless, patents have been widely accepted in research as an innovation proxy. A review of literature has demonstrated the need for additional research, and the need for a holistic perspective in evaluating innovation. This holistic paradigm can be used in a macro or micro setting.

2.2 Intellectual Property: Utilitarian Objectives in Innovation

“The importance of intellectual property was first recognized in the Paris Convention for the Protection of Industrial Property (1883) and the Berne Convention for the Protection of Literary and Artistic Works (1886)” (WIPO, 2016).

As the administrator of these treaties, the World Intellectual Property Organization would not exhibit insouciance. Citing humanity's “progress and well-being” as the outgrowth of innovation, the evidence is conspicuous. It seems absurd to question whether new inventions enhance the health and welfare of human beings; it is a self-evident and historical fact. The

question is not whether innovation advances humanity but, rather, if intellectual property amplifies innovation. The promotion of intellectual property by WIPO (2016), similar to many other self-interested parties, is advanced as a utilitarian measure and associated with expeditiousness -- a catalyst for rapid development. Further, WIPO submits that “commitment of additional resources for further innovation” is an outgrowth of their recommended IP promotion; i.e., legal codification shall foster a wave of resource mobilization toward the innovative forces for the progress of humanity. Continuing, WIPO claims that economic growth is the resultant condition of intellectual property regimes for the enhancement, enjoyment and quality of life. The intellectual property system, WIPO emphasizes, is the equitable arrangement of the “interest of innovators and the public interest.” It is precisely here where scientifically precise logic seems to be ignored. The premises by which WIPO advances its promotion and championing of IP are absent relative to ambiguous entities called “innovators” and “public.” The proposed argument ignores the root provocation of innovation, which is necessity. Innovation is the evident, observed or implied changes in a product or process borne out of need. That need may be the desires of a customer. And why does the customer desire such a need? Why is a change necessitated? Why are rivalrous firms competing to provide the modification? Sakichi Toyoda is identified as the father of the Japanese industrial revolution (Serrat, 2010). He developed the Five Whys means for determining root cause. The application is not necessarily isolated to root cause analysis for problem solving, but is effective in the present case for analyzing the provocation for innovation.

Ultimately services are aimed at delivery of change. The vehicle for development is knowledge, the understanding of how to construct something or how to effect change. Knowledge can be

tacit or codified (Caragliu & Nijkamp, 2008) but in either case the motivation is to effect change in the party who receives that change. If one considers the “five-step why ” methodology to determine root cause, this can be applied to transaction theory (Coase, 1988). Why is change desired? What is the motivation for one party to ascertain knowledge or to transfer knowledge? Why is the receiving party desirous of knowledge reception? To what end? Ultimately the transfer of knowledge is employed to effect change in materials, instruments, necessities, products. Even the internet is an example of an institution whose value lies not in itself but in its ability to facilitate the improvement of a service or a product. If some knowledge transfer is desired by receiving parties such that the new knowledge provides them with new skills, the root cause analysis is extended by asking, why do they wish to have new skills? The layering of the question will always point to the acquisition of a physical product or environmental comfort that will satisfy their specific desire. Innovation is the means to utilize a product in a more effective, accelerated, or seamless manner. Its result is ultimately utilized within or via a physical entity.

Firms are desirous of innovation as a skill and cultural behavior because it helps to differentiate the firm’s offerings, making them more effective and valuable. From the micro economic perspective, firms wish to become more innovative for the purposes of competitive advantage. The innovative firm (or any firm) wishes to become the preferred supplier to the consumer. From the consumer’s perspective, the choice of supplier is rationally based on quality or capability of the service being offered. The product or service is better than those offered by the competition. The end game in transactions is, for example, the more comfortable chair, the more nutritious food on the table, the smoother pavement on the road. (Note, there is a body of

research concerning copyright and trademark, intangible entities, which is not excepted by IP opponents; however, that research is out of scope for this paper). Perhaps a firm wishes to impart knowledge in a more efficient manner; therefore, the value add to the knowledge is the ability to compartmentalize the knowledge, make it easier to understand, or demonstrate how the knowledge can be used in other work streams.

From a macroeconomic viewpoint, innovation is the means for a country's products and services to become more attractive to global consumers than products and services developed and sold elsewhere. Country innovation is, again, not an end in itself. It is a means for creating "better" goods and services for a worldwide customer base. The country's tax revenue is enhanced by the inflow of foreign investment or purchases from abroad; the FDI or purchases from abroad emanate from desires -- better or more cost effective products or services. For a nation's policy makers, innovation is promoted by way of institutional mandates or policy measures. These measures are offered as utilitarian frameworks, mandates whose end goals will make the country more competitive; as FDI inflows will expand, the country's goods and services will be more attractive. The means to create the attraction is innovation.

Without innovation products and services do not become better. Innovation translates to *change*. The innovation effected in a product or service constitutes a change in the way the product is created (faster, cheaper, more useful) or in the manner the product is used. And change is neither dependent upon nor encouraged by a monopoly on certain information. "Patent protection may also *hamper further innovation*, especially when it limits access to essential knowledge" (OECD, 2004). Further, when protection is so broad on basic inventions, follow-on inventors are

discouraged if the holder of a patent for an essential technology refuses access to others under reasonable conditions (OECD, 2004).

2.2.1 Property Rights Justification and Controversy

Per WIPO Publication No. 450(E), policy makers have emphasized the necessity for patent protection to foster innovation, alleging that patents provide incentives to individuals by recognizing their creativity and offering the possibility of material reward for their marketable inventions. These incentives encourage innovation, which in turn enhances the quality of human life. But the WIPO statement makes a leap, as do most policy proponents, implying that innovation shall not be fostered without the government created monopoly on a particular knowledge set. This strikes at the heart of the property dilemma and the notion of scarcity (Kinsella, 2001). The allocation of property rights is a social construct rationalized by the concept of economic scarcity, the argument that property is held, constructed and managed because of the limitations (scarcity) of the physical object itself. One cannot use an automobile without the consent of the automobile's owner. The automobile itself is a singular entity. One cannot, by some supernatural force, use that same automobile without conflict; my use of the object prohibits the owner from using it at the same time. More automobiles can be manufactured and other drivers would have an opportunity to acquire those other objects, but the initial automobile in question is singular, one and only. It is owned and disposed of as the possessor sees fit. Property rights were developed to accommodate the notion of scarcity and provide a means for society to identify control of physical objects (Bastiat, ed. 2007).

To make the example automobile “better”, whether that means faster, increased durability, higher quality or enhanced capability, a change in the automobile’s design is required. The change is the result of innovation versus the initial structure and embodiment of the automobile’s capabilities. Via innovative thinking, knowledge of the physical world, breakthroughs in technology of materials, processes or physical properties result in a *change to the automobile*. Due to force of change, innovation, the physical object or capability becomes altered. Slightly or excessively, it becomes different.

2.2.2 Question on Patents and Firm value

Patents, as property rights construct, are an extended monopoly within a country’s institutional, legal, and legislated framework, and they are a salient component in this paper’s analysis. If patents are pursued by firms, then one would assume that the patent adds firm-specific value. The patents ostensibly provide an exclusive right for the “inventor” to benefit and be compensated for utilizing the inventor’s product. In return, the inventor will share in the design of the patent for the institutionally-stated purpose of providing knowledge and innovative opportunity to the public, including competing firms. But the registration of a patent is also reflective of opportunity cost. The average length of time involved in organizing data, constructing shareable artifacts, engaging in legal processes and awaiting patent approval is approximately twelve to eighteen months or more (WIPO, 2016). This does not include the strategic planning internal to the firm, nor does it include the opportunity cost for first-mover advantage.

Patents are supported by governmental institutions as well as non-governmental forces in the legal profession and policy-making realm. Institutions represent rules, norms of behavior and social conventions as well as legal frameworks. Such rules are potentially codified. Members of the relevant community share tacit or explicit knowledge of these rules. “This criterion of codifiability is important because it means that breaches of the rule can be identified explicitly. It also helps to define the community that shares and understands the rules involved” (Hodgson, 2006). The citation here is significant, implying *an enforcement requirement*, such that any evaluation of patent rules or institutional measurements must include a legal and political analysis. This, in effect, underscores the ability of the country to mandate compliance. *Patents are a macro factor as much as a micro concern for firms.*

Per the OECD (2004), the acquisition of a patent is obviously recognized as an advantage. Simultaneously, there have been numerous claims that patents offer little novelty or that excessive breadth was granted, allowing their holders to extract undue rents from other inventors and from customers. “This has been of particular concern in software, biotechnology and business methods, where patent offices and courts have had most difficulties in responding to rapid change, building up institutional expertise, evaluating prior art and determining correct standards for the breadth of granted patents.”

The evidence that firms recognize the necessity of patents is seen in the metrics. The number of patent applications filed in Europe, Japan and the United States increased by over 40% (OECD, 2004). Yet OECD submits that patent protection may also *hamper further innovation*, especially when it limits access to essential knowledge, as may be the case in emerging technological areas when innovation has a marked cumulative character and patents protect

foundational inventions. In the realm of international business strategy, one must evaluate whether energy is best expended in pursuit of patents or in optimizing the communication channels that foster creativity.

Glazer (2015) submits that patents will subsequently “translate to innovative potential.” But the term innovation is bandied about as though the only thing promoting change and creativity in the EU firm is monopoly guarantee for a potential invention, discounting knowledge transfer and innovative behaviors that occur simply in pursuit of capturing market share and delivering product at a lower cost. This research is also at odds with Isom and Jarczyk (2009) whose analysis suggest that additions in employee headcount increase innovation while growth in sales does not increase innovation. Their analysis also finds that increases in research and development (R&D) expenditures enhance small business value in certain industries, but not uniformly and not in all the industries investigated. Ultimately, Isom and Jarczyk (2009) find that the number of patents owned by a small business is not a good indicator of a firm’s value. They reference some broader studies (Griliches, 1990) that “stock market valuations using patent measures have been disappointing.” But even under a more granular focus, small business-only and within certain industries, there was little significant correlation.

As the question of firm value appears to be unsettled, just as the notion that IP rights as innovation enhancer is unsettled, there is nevertheless a firm focus on patent acquisition (OECD, 2004).

As a backdrop to patent attractiveness, there is fragmentation in the patent protocol of the European Union. Results of this misalignment have elevated uncertainty for management, increased lawsuits due to multiple or parallel litigation, and exacerbated economic and legal

inconsistencies (Glazer, 2015). This underscores the fact that country institutions vary regarding IP.

To measure the effectiveness of any intellectual property institutions, the enforcement mechanism is a required component; otherwise, a patent has no significance and there would be no compliance to the exclusivity construct. If illegal duplication or patent infringement is not prosecuted within a nation-state, then the means to measure effectivity of the patent is impossible. This aspect of intellectual property is critical in country analysis and its development progress. Per Maskus (2010), “Small domestic markets along with the relative absence of local adaptation capacities, skilled labor, and weak governance and infrastructure in the poorest countries tend to make IPRs (intellectual property rights) inconsequential with respect to both inward technology transfer and local innovation.” Although Maskus’ context was climate change regimes and policy making, the quote is remarkable.

There is an implication that absorptive capacity is critical to the country’s innovation environment. It is not an illogical step to consider that firm-specific innovation and country specific innovation both depend upon cultures that can synthesize knowledge. Absorptive capacity pertains to country environments as well as firm environment; absorptive capacity in the firm value chain complements innovation.

Providing a sensible and concise view of the term, the Oslo Manual (OECD, 2005) defines innovation as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.”

Innovation cannot be explained by a patent alone, which is often used as a proxy. This is not to say that all use of patents is inappropriate, but the quote above highlights the theoretical interplay of multiple factors; this shall be discussed concerning value chain analysis. If innovation can apply to business practices, is there no spillover of innovation approaches into other parts of the firm's value chain? It would theoretically be logical to imply that a firm, which embraces innovation as a cultural theme, would encourage an open and collaborative environment, whereby strategic practitioners would promote the innovative efforts cross-functionally.

2.2.3 Country Comparisons

In an assessment of economic advancement there are several private institutions who measure and rank, via quantitative and qualitative means, the economic freedom of each country. Two institutes that come to mind are the Heritage Foundation (2016) and the previously mentioned Fraser Institute (2016). Both assess a country's vibrancy and opportunity by way of many attributes that are said to indicate factors for economic freedom. Within these frameworks is the concept of property rights. For both institutions, property rights are measured by a mix of legal and statutory institutions and cultural attributes. The resultant measure is a hybrid of both intellectual and physical property; however, their analyses do not have the necessary granularity to determine if the removal of intellectual property as an attribute would have a bearing on their dependent variable, usually identified as FDI, GDP growth or GDP per capita. Both institutions have stressed the need for entrepreneurs to expect supernormal profits by enjoying some kind of monopolistic power over their inventions. That expectation would encourage them to devote

time and money to innovation activities. But the present research seeks to refine property rights impacts and determine impact (or not) of *intellectual property vs. physical property*.

In the absence of an objective or scientific measure for innovation, there are many proxies beyond patents, including R&D spending, R&D staff sizes, product announcements, etc. The innovation output is influenced by the innovative inputs and the innovation process (Jong, Kemp and Folkeringa, 2003).

As for patents, they are used as both an input proxy to the innovation process and an output proxy. “A survey of economic studies reveals that patents are the most preferred IP rights in relation to technological innovations. This seems to be due to the use of the terms ‘innovation’ and ‘invention’ as synonyms.” This may explain why studies on innovation have, in many cases, treated patents as proxy input for innovation (Jong, Kemp and Folkeringa, 2003). But patents are only one facet of innovation; innovation is value-chain related as well as endogenously conceived.

As an intermediate output of the innovation process, patents are metrics indicating the *result* of the creative process. The accuracy of the metric is considered high, as the data is housed in institutions that are open and transparent. The numbers refer specifically to inventions that have proceeded through the confirmation and validation process of the governmental patenting body. Yet this aspect of innovation is limited; process and service innovations are often not captured (or impossible to capture) as officially, institutionally recognized discrete outputs. An inhibitor or dissuader to patents would be the imitation cost factor. If it is more feasible to imitate a capability, then the lengthy process for patent is avoided. (Kleinknecht, 2000). Kleinknecht is

correct is observing the narrow field of patents as innovating output, but he does not state that process and service innovations are additional inputs into value chain efficiency.

Ultimately, the patent is used by firms to provide differentiation in a product. and sustain a monopoly advantage. This differentiation is acknowledged and approved by the institution or governmental body. The right of intellectual property is codified into law, and the utilitarian objective is to foster an environment of innovation. Extending this objective, countries wish to seek innovation to become more competitive, attract more FDI and foreign revenue. Countries (nation-states) seek to be the “supplier of choice” via their resident firms. Therefore, country property rights institutions are at the core of this research.

2.3 Three Major Branches Concerning Research Question

In the literature review, foundational influences and rationales have been identified for the current research, including the controversies and competing research arguments, as well as the progression from historical IB forces. Synthesizing these issues, a triad of salient, major literature streams is offered to support the theoretical outlook of this paper, as well as a tool set for the strategic practitioner. These three streams are at the heart of this research – *innovation* (whose relationship to various property rights constructs is under evaluation); *firm-specific advantage* (FSA, whose factors and behaviors shall be the fuel which promotes a country’s innovation strength); and *institutional maturity* (which marries firm innovation to country innovation performance). These streams represent foundational explanations of trends, as well as opportunities for refinement. Their constituent parts can help formulating the theoretical

concerns and rationales for the empirical model proposed later. A fourth stream is significant in the study of innovation as it relates to intellectual property and patent measurements; that is the sector. For purposes of the present study the industry or sector consideration is not being deliberately ignored. In fact, sector plays an important role in the FSA. Arora, Fosfuri and Gambardella (2001) consider the conditions that technologies resemble a tradeable asset. “What constraints limit the rise of technology transactions? Under what conditions will specialized technology suppliers arise? How does such a view alter the analysis of emergence of new goods, diffusion of technology?” They cite the fact that a handful of engineering firms are responsible for chemical plants, where licensing transactions abound. Software specialization is critical in the information industry with interfirm transfers, and in biotech small firms sign contracts for distribution and marketing, a similar pattern seen in semiconductors (Arora, Fosfuri and Gambardella, 2001). Surveys on effectiveness of patents for protecting innovations submit that pharmaceutical firms place a high value on patents for protecting intellectual property more than other industries. “Innovation costs are very high, regulatory approval substantially increases time-to-market, and few R&D projects result in marketed drugs, patents are considered an essential factor in protecting competitive advantage” (Kortum, Eaton and Lerner, 2003).

Nevertheless, the present study seeks to find a relationship, or lack thereof, for macro factors and their correlation with innovation. In a stepwise approach to compartmenting the research, the institutional drivers and firm-specific advantages are being isolated as critical to the pursuit and the fostering (or limiting) of innovation. Subsequent research shall focus on confining the research to sectors that are presently dependent on patents for their livelihood. In the next sections, several fishbone analyses have been provided as toolsets for the strategy scholar.

2.3.1 Triad Branch 1: Innovation and its Drivers

Innovation, shown in *Figure 2, Fishbone Analysis for Innovation drivers, applicable to both the macro view and micro view*, is driven and sustained in firms, via four major factors. These factors provoke constant change and competitive behaviors. They are categorized as funding resources (Capital), the consumer needs (Demand), the ability to monitor performance and address deficiencies (Feedback Metrics), and the aptitude and information that will instigate deliverable changes (Knowledge).

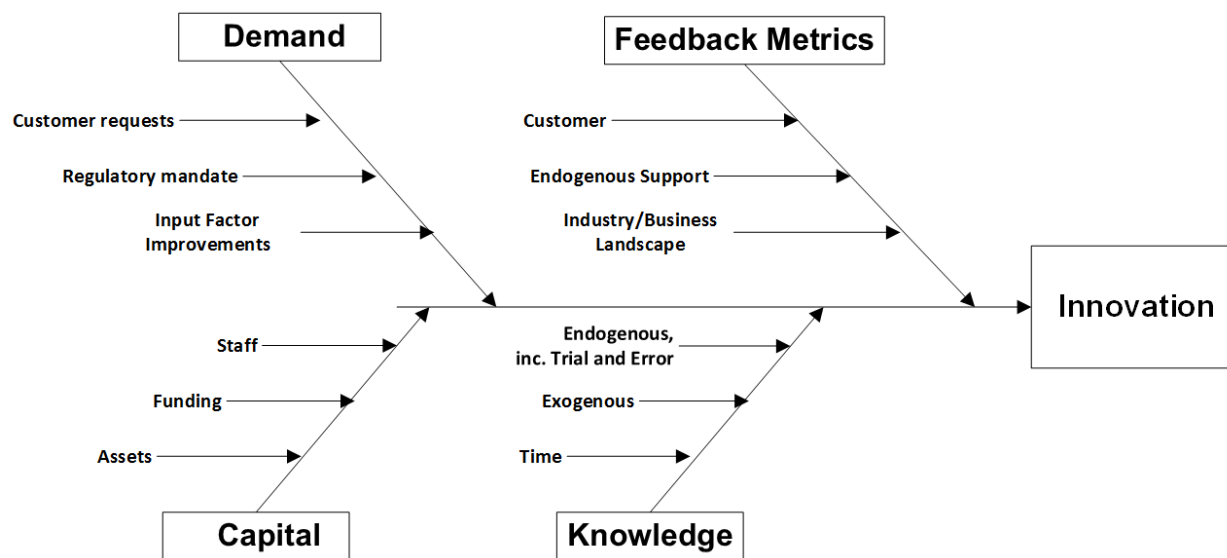


Figure 2, Fishbone Analysis for Innovation drivers, applicable to both the macro view and micro view

Aligned within this demarcation, the life cycle of development is inferred -- from initial analysis of environment; through the development of capability via firm strengths; and post-delivery, the analytics of customer satisfaction. Demand arises not only via customer requests, energized by the forces of rivalry, but also emanates from the endogenous needs of other departments in the

value chain. Inputs to the development, such as lower cost materials, better trained staff, more efficient operations are also internal motivators and expectations of the firm, fed into the delivery process as a motivator for internal innovation. These endogenous demands provoke change. Change is a necessity and a competitive advantage. The customer, the end user, will have a need but the customer is not the innovator nor even the application visionary. The subsequent innovation is the internal translation of a customer need into a product or service that can be scaled, packaged and shipped or, in the case of a service, branded, sold and delivered (Deming, 1993).

The capital input shown in the diagram signifies both financial, as well as human, capital. The asset base will include both tangible and intangible assets, whose property will be defined as physical and intellectual property. Via simple inspection, when viewing the Innovation outcome from all four major stems (Demand, Feedback Metrics, Capital and Knowledge), the research questions become magnified -- is intellectual property a necessity whose absence would diminish the entire objective of change? Or is the ability to use assets appropriately, in pursuit of customer needs an adequate impetus for competitiveness?

The Feedback Mechanisms go beyond customer satisfaction; innovation of service and product will be influenced by feedback from the delivery network itself, including those who are enmeshed into the firm's processes. Feedback is embedded into continuous improvement, and continuous improvement is fostered by innovation, whether incremental or transformative.

Overlapping into the institutional literature stream, Kshetri (2015) promotes a view that innovation, thanks to intellectual property regulations provides security in jobs, protecting firms from losing their intangible assets to competitors. This view is challenged by Douardo (2014)

who cites the dynamic nature of economic activity, and the advancement of innovation under the threat of rabid competition.

Steeped in the foundational literature is Porter (1987) who identifies the competitive forces for organizations entering new markets and economies. These threats include rivals who will compete in a field that is not necessarily equivalent to a firm's typical experience. Rozek (1988) and Long (2000) chronicle the intellectual property differences in countries, specifically emerging markets, as well as some of the means by which a company can counteract the ominous nature of IP anarchy.

Within the stream of innovation research, Gueringer (1992) suggests that innovation must be embedded into the organizational fabric of the firm. This is a critical component in recognizing innovation influences are cross-functional and not confined only to R&D. In addition, the means by which firms measure their internal R&D expenditures varies. Accordingly, researchers typically use proxies for innovation services such as R&D expenditure, counts of intellectual property rights (Jensen and Weber, 2004).

As mentioned above, a supply chain impacts the firm not only as an operational dependency but also as a spillover (Lamming, 1993).

The literature researched at the World Intellectual Property Organization (WIPO, 2016) naturally tends to suggest many advantages and positive innovation outcomes due to IP regulations and enforcement from one country to another. Trade antagonism has been provoked by piracy, blamed on the lack of IP enforcement; yet, there is some evidence (Cooper 2010) that innovation has been spurred due to the open nature of digital capabilities.

As firms wish to exploit their advantages, innovation must become a way of life, especially since the dangers of competitive imitation are more extreme in markets that do not have strong IP enforcement mechanisms. Measuring a firm's innovation capabilities, is problematic. "Why aren't more companies measuring innovation? Because innovation is nebulous. Definitions differ. Expectations vary" (Kaplan 2014).

The competitive attributes of firms (and their subsequent contribution to the country's productivity) remains virtually endless through the innovative opportunities in service or product delivery. With the goal of providing value to a separate entity (whether the entity is in-house and dependent upon other input factors, or is an exogenous body called the external customer), the objective remains to improve the condition or the satisfaction of the consumer. The objective is to provide what a customer desires for use, manipulation, enjoyment or facilitation in the consumer's domain. The consumer's choice of firm shall depend on the distinguishing capability of that firm to provide an enhanced value for a *scarce* piece of property; therefore, innovation in services or products is not dependent on the intellectual property construct.

The drivers of innovation were specified as behavioral and resource-intensive, aligned to an ownership advantage. Some firms promote an innovation center of excellence, such that all processes within a firm can be analyzed and improved by way of innovative thinking. Networks provide spillover effects that promote knowledge sharing. As knowledge acts as a key ownership advantage, this is a differentiator for the firm. The ability for firms to manage knowledge and manage innovation, especially in the absence of monopoly protections, becomes a strategic differentiator. Firms need to direct and administer a cohesive plan and initiative for

institutionalizing an innovation strategy within the firm. The efficiency and performance of these innovation programs will depend on the managerial skill of the firms (Mefford, 1986).

2.3.2 Triad Branch 2: Firm-specific Advantage

As the research focus considers whether intellectual property is a higher motivator than more traditional physical property, and since the competitiveness of a country is measured by the performance of the country's resident firms, firm-specific advantage represents a second leg in the research triad as decomposed in *Figure 3, Fishbone Analysis for Firm-specific Advantage, as related to Innovation motivations and performance*.

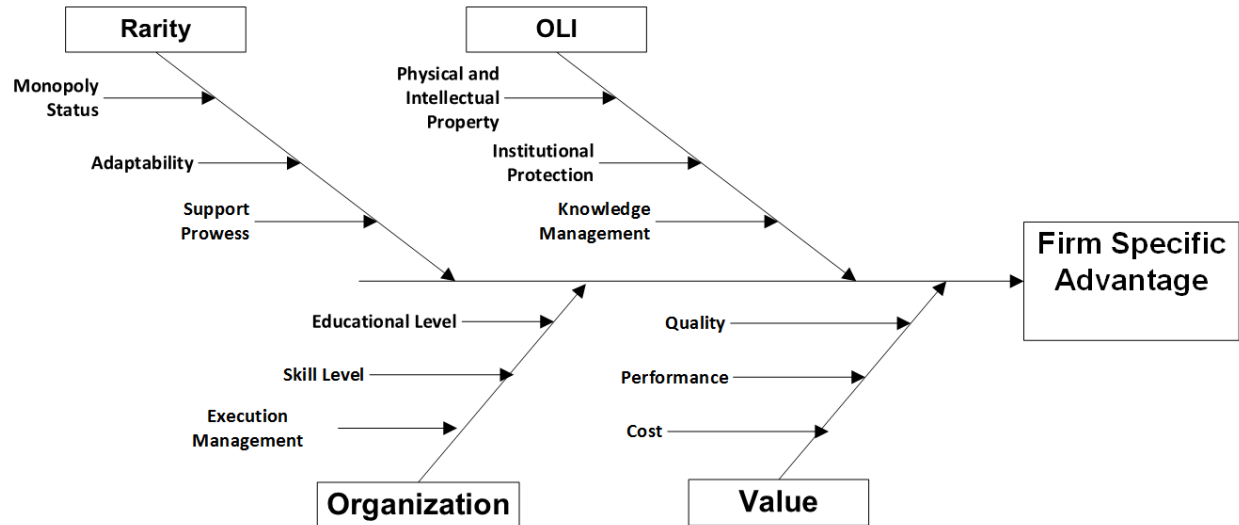


Figure 3, Fishbone Analysis for Firm-specific Advantage, as related to Innovation motivations and performance

Three of Barney's (2011) success factors for strategic competitiveness are captured in the fishbone analysis – Rarity, Organization, and Value. Imitability is omitted deliberately as intellectual property acts as an input to the Rarity stem. The intellectual property factor is a firm-specific advantage for those companies who acquire the government-approved monopoly; the concept of rarity is evermore significant in order for the firm to distinguish itself among competitors. If one considers an absence of intellectual property, then two other FSAs are elevated – *Adaptability and Support Prowess*. Unprotected inventions can be appropriated; but a first-mover (assuming the first-mover has execution/delivery capacity) shall have a market advantage. Does a competing firm have any potential for advantage if it is not first-mover? The answer is affirmative; the advantage would be in adapting the openly disclosed invention into its internal value chain and its firm-specific strengths. Adaptability allows for competing firms to improve not only the design of a competing service or product, but also its delivery to new markets.

Support prowess is an advantage for those firms who can provide an invention and can also service customers in the usage, portability and integration of that invention within the customer's environment.

These factors are ineffective if the firm is not able to mobilize its work force, supply chains and processes formidably. Thus, the Organization attribute as a firm-specific advantage represent the execution capabilities of the firm, including its managerial skill and the educational levels of its human capital. The intersection with the Organization (Barney, 2011) stem is implied as disciplined execution, and the ability for cohesive teams to synthesize the input factor of knowledge, then collate, structure and incorporate knowledge into the delivery model of the firm.

This is sometimes manifested in the “operational excellence” focus of the firm identity (Treacy and Wierseama, 1993), whereby the firms’ competitive advantage is the ability to deliver in a cost optimal, repeatable manner, with minimal defects. Operational excellence can be misconstrued as disregard for innovation; but the two are complementary in a firm that strives for current and future leadership. While operational processes are managed in a strict and standardized manner, the monitoring of such processes is critical to seek delivery gaps, input liabilities and root cause for errors and omissions. The innovation lies in the management ability to root out suboptimal causes, improving processes by way of modifying them. Innovation lies in the ability to transform or incrementally *improve all facets of the value chain*, not simply the registration of an invention.

The Value of firm deliverables is the competitive objective for enhancing the product or service and customizing it optimally for consumers. Standard performance is supplemented with cost attractiveness and quality. This is yet another opportunity where a non-first-mover can (under an innovative culture) improve upon externally sourced inventions or the competitions’ services.

For firm-specific advantages, in the innovation paradigm and the question of property rights, the Dunning (1979) eclectic model fits neatly. The ownership advantage is witnessed in the concept of property itself. Thus, the dilemma is posed: will abolition of intellectual property collapse the firm; i.e., have firms found advantages in other capabilities as discussed above? The institutional protection of property is analyzed and ranked in reporting bodies, such as WIPO, WTO, and OECD; this aligns with the Location factor of Dunning’s OLI model. Knowledge management is the internalized process that a firm employs when market imperfections fail to provide equilibrium for supply chains and input factors; the search for creative ways to overcome the

imperfections demands organized and formalized means for researching and discovering opportunities. If internalization is a firm-specific advantage, or can be a firm-specific advantage, then the endogenous, continuous improvement (innovative) processes allow for opportunity in customer delivery, speed of development, and expeditious value chain enhancements. In short, firm-specific advantage is not diminished by the removal of the alleged ownership entity called intellectual property.

2.3.3 Triad Branch 3: Institutions

As the final leg in the research triad, *Figure 4, Institutional Maturity attributes, as related to Innovation environments and rule of law*, is shown below. This illustrates four stems for identifying the maturity of country-specific institutions. They highlight the constructs that make a country institutionally mature, and will be ultimately used (in various forms) as input factors to the innovation test.

Political integrity is demonstrated by overall political transparency, a guard against corruption. This attribute implies overall fairness, by way of equal protection and treatment before the law. Oversight of the political process is key to the concept of fairness, with assurances that no advantage is provided; i.e. government is not choosing winners and losers. The Access factor indicates if sufficient avenues exist for redress requests as well as recognition that the political environment is open to criticism and improvement.

Hand in hand with Political Integrity is the Legal Framework, ensuring evenhandedness in the ability for parties to make and enforce contracts. The judiciary is at the core of the impartiality,

as is the openness of the judicial system. Institutional differences also cause strain among countries. Relative to intellectual property, U.S. companies complain that they have suffered greatly from the lack of rigorous and enforceable intellectual property laws (Long, ed. 2000). But as many firms in developing countries endeavor to catch up to the developing world's technology capabilities through technology (Kuo, Lin and Peng, 2016), there exists the rationale for lack of urgency in formalizing intellectual property laws. The enforcement consistency shall be increasingly important under international trade agreements, such as TRIPS (Ostergard, 2000).

Network, access to knowledge resources, trial and error are important components for fulfilling a strategy of innovation. Tools and assets include the endogenous processes that facilitate knowledge exchange and knowledge capture. The network is the physical and intangible infrastructure, which can include the transport systems and the human connections. Trial and error, assumed to be an R&D value, can apply to many parts of the firm, so long as it is managed and controlled. As an additional driver, strategists understand that not all failures result in waste. The failures are also an innovative knowledge asset. Access to knowledge is at the core of this research; the patent environment is a part knowledge sharer and part knowledge inhibitor.

But what of the measures of IP protection? If there is a correlation to test, then metrics must be employed for the macro levels of innovation and the country levels of IP protection.

The absence of enforcement is a byproduct of corruption whereby some violations of legal guidelines are ignored, but corruption charges cannot be leveled if a country's overall perspective and culture is not steeped in intellectual property mindsets.

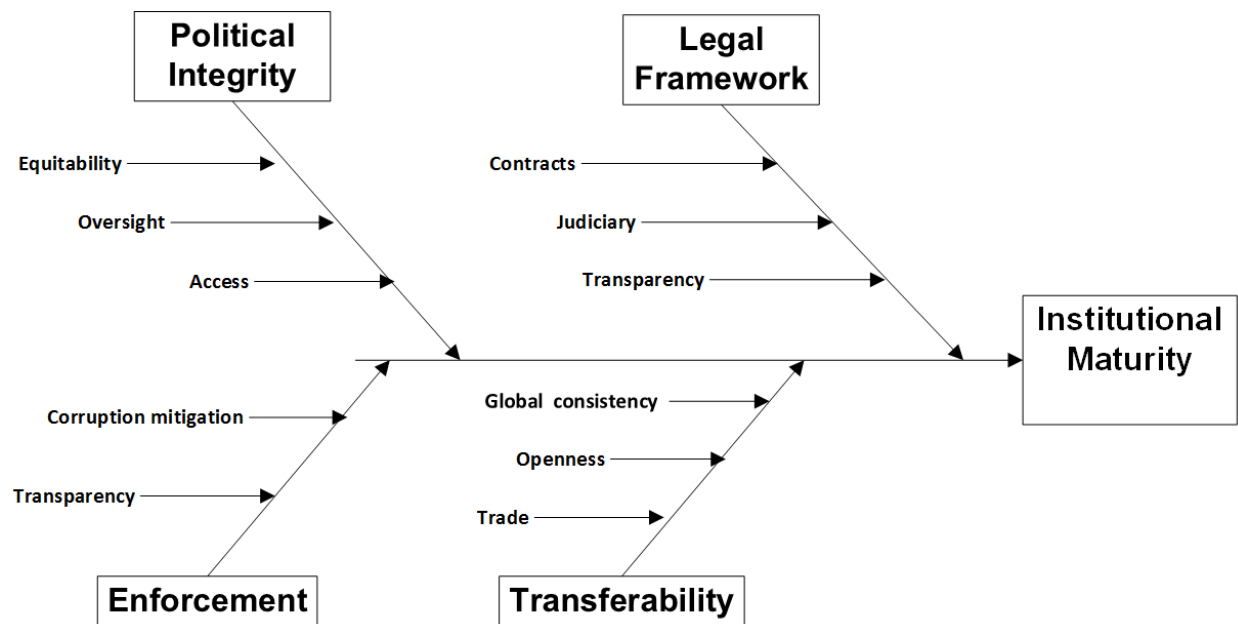


Figure 4, Institutional Maturity attributes, as related to Innovation environments and rule of law

Enforcement is a necessary measuring component for intellectual property protection; the implicit criticality is embedded in the measurements of legal framework and legal maturity. There is a different perspective between developed and developing economies regarding the criticality of intellectual property rights. These rights were codified in advanced economies whose firms have operated, prospered and adapted to this business expectation. Intellectual property is used as a lever.

According to Shinkle and Kriauciunas (2010), “Most developing countries have committed themselves, pursuant to recent treaties, to raising their standards of intellectual property protection within a grace period.’ The time frame for these intentions remains unclear, as the developing countries do not possess mature intellectual property rights tradition nor the legal frameworks for enforcement. This should not be an indictment of the developing work’s legal

structure; the culture of these countries (social and political) have not seen intellectual property as a significant concern nor an individual right under assault.

But institutions are also vehicles enhancing knowledge. They establish incentives and business practices that influence the competitive markets as well as provoke knowledge capture and information exchange (Hoekman, Maskus, & Saggi, 2005). The question that this prompts is whether the incentive is monopoly-based or competition-based. The policy making zeitgeist is the former, with full blown acceptance that the governmentally mandated IP framework is the inducement to innovation.

Taken together, institutional factors are key to determining productivity and innovation; ultimately property ownership is upheld by the institutional framework and a transparent environment. But the legal codification of intellectual property is promoted more on utilitarian grounds rather than philosophical grounds. Thus, it follows that if IP protections do not advance innovation (the utilitarian objective) then why should they continue to exist? This is a political question of course. Nevertheless, to add credence to the argument that innovation depends on IP, one must ascertain whether IP is the difference maker in the institutional framework. One must consider if IP is an extraneous variable, impacting innovation dynamic in no significant manner beyond that which is impacted by physical property rights.

2.4 Advanced Propositions

Following the extant literature, whereby intellectual property (and underlying patents) is often used in social science research as innovation proxies, the matter cannot be considered a settled

one. This argument is based both on empirical ambiguity as well as theoretical structures of firm and spillover behaviors, which clouds the historical analysis. Intellectual property includes patent protection, which is not necessarily a valid proxy for innovation, and can be better analyzed if it can be separated from physical property constructs. Moving to the methodological framework, the main propositions for empirical analysis are as follows:

- (a) The absence of country-specific intellectual property institutions does not deter nor impede country-specific innovation;
- (b) Innovation is advanced more by countries with strong physical property rights but not necessarily by strong intellectual property rights.
- (c) Firm innovation is a byproduct of exogenous and endogenous flows with dependency on legal institutions.

Institutional metrics will be employed according to a granular intellectual property framework, with separation of property rights into institutional environment, physical property and intellectual property.

3 Methodology Fundamentals

The Methodology discussion is encapsulated in an analysis of international business theory and rationales, to add robustness to the overall propositional arguments, empirical framework and appropriateness of key variables (factors) for testing.

To begin, an enhanced value chain construction is offered, which is the lynchpin for the paper's core argument; innovation is a macro phenomenon owing to knowledge management, spillover theory, FSA tendencies and, most importantly property rights. Further, the property rights that will foster innovation are not necessarily intellectual property rights whose advancement is promoted more by IP rights activist supporters and rent seeking interests.

3.1 Enhanced Value Chain Theory

If innovation applies to the entire value chain of a firm, with endogenous spillovers (as well as exogenous spillover), then the confinement of innovation activity to R&D, as discussed previously, is limiting. A view of R&D expenditures or R&D staffing diminishes the value of endogenous investments of innovation. If a firm promotes innovation as a cultural construct and promotes an expectation of innovative activity and creativity, then the R&D spend is a relatively small part of the innovative force. The validation of this paper's methodology lies in the theoretical proposition that innovation is a measure of productivity, accounting for the cost of inputs into the firm. The value chain of Porter (1985) aptly demonstrates that the firm output is comprised of, and a result of, a cohesive set of disciplines or business processes, distinguished typically in a cost center or departmental organizational structure.

By way of example, one can consider a set of corporate wide support functions, such as Infrastructure, Human Resources Management, Administration and Corporate Finance. Specific departmentally-confined disciplines would manage business processes in Research and Development, Marketing, Operations, Sales and Customer Services. The order of these business processes implies a development process, as ideation will be marketed to consumers; Operations shall ensure rigorous defect minimization; Sales forces will be mobilized; Customer Service is available for the feedback and services of the delivered product. This framework was first published by Porter (1980). The model alone, however, does not indicate the interrelationships of the firm's departmental entities (those entities delivering specific business processes and functions with the objective of margin delivery and competitive advantage.

This research paper improves upon the value chain concept by illustrating innovation influences as both external and internal to the firm, shown in *Figure 5, Enhanced Value Chain Model building upon Porter, recognizing the exogenous and endogenous innovative forces onto and throughout the firm's business processes*, with the output of the firm being a desired product or service for the marketplace. As noted in the figure's caption, the dotted lines represent the permeability of the firm, both endogenously and exogenously. Knowledge flows are not confined to a cost center or function in the chain. Knowledge flows are not confined to the firm itself. Innovation forces flow throughout the organization, inspiring the innovative capabilities and the improvement of process and product.

Formal silos contribute to knowledge confinement. "Many large organizations are divided, and then subdivided into numerous different departments, which often fail to talk to each other – let

alone collaborate” (Tett, 2015). Therefore, the elimination of these silos is the strategy toward firm wide innovation, which is then manifested in market share and product/service adoption.

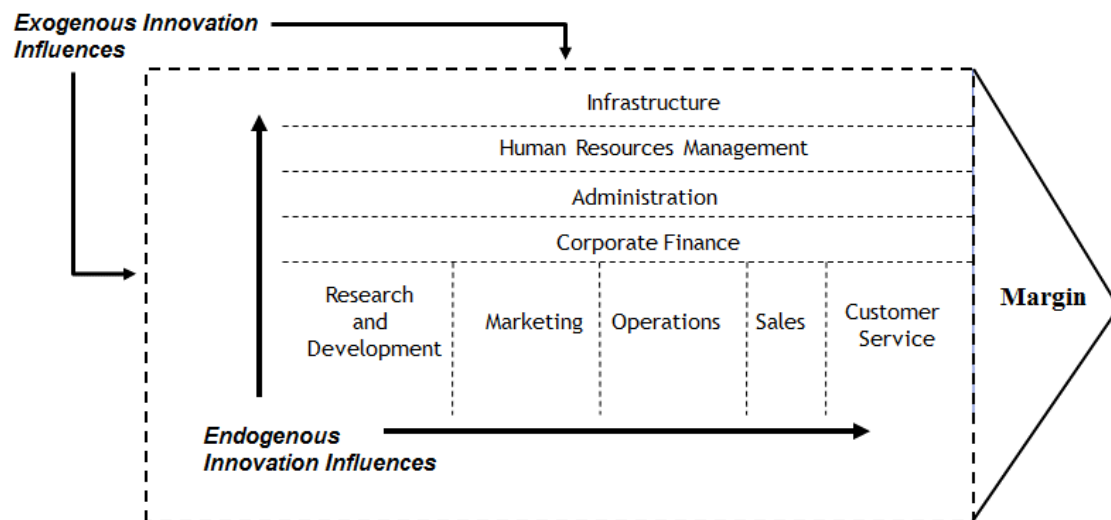


Figure 5, Enhanced Value Chain Model building upon Porter, recognizing the exogenous and endogenous innovative forces onto and throughout the firm’s business processes; dotted lines represent the knowledge spillovers from without and within.

In constructing an empirical methodology, the enhanced value chain view leads to a diminishment of patents as true representation of firm-innovation. This research effort is focused on the measurements of innovation and challenges the notion that innovation is driven by intellectual property rights as codified by patent institutions and governments. The innovation impact to the firm emanates from exogenous activities, shown in the upper left of the diagram, and endogenous activities, which are encapsulated inside the firms’ value chain construct. This represents the knowledge spillover that occurs and which adds competitive value to the firm. Spillover management is a necessity in continuous improvement and in transformation;

innovative forces are not confined to the Research and Development (R&D) department of the firm. Innovation influences are characterized by a cross-pollination of ideas and knowledge, enhancing the operational efforts of the firm as well as the creative energies. To isolate R&D spending as a level of firm innovation is to ignore the myriad of knowledge considerations that are employed to add firm value, minimize operational costs, and breed a more vibrant company culture.

The ability to manage the ebb and flow of innovation factors becomes more significant in an age of ubiquitous information. “Innovation management has been defined as a set of organizational routines and activities aimed at developing a culture for innovation” (Cortimiglia, al., 2015).

As it can be expected, these routines and activities vary enormously among industries and firms. The systematic management of innovation at firm-level is a complicated endeavor and, as represented in Figure 5, must grapple with multiple interdependencies and touchpoints among cost centers and departments. As some models are product-centric, others are related to process improvement. “As a result, there has been much confusion about what is and what constitutes an innovation management system” (Cortimiglia, al., 2015).

Value chain processes are as distinct as the firms themselves. Although some standard and well publicized means for instituting continuous improvement (Deming, 1993) has become commonplace, the specific day to day processes within firms, even those of similar size are company-idiosyncratic. There is no “meaningful aggregate” (Jensen and Weber, 2004).

However, the effectivity and significance of research advances can be accomplished in measuring macro-level variables, particularly as this paper aims to separate intellectual property

ambiguity and determine if physical property rights or other institutions are a the real driver of innovation.

All innovation efforts are fruitless without the ability of the firm to embrace and synthesize the innovation plan. Absorptive capacity is advanced when firms can instill awareness and motivation capabilities (Chen, Su and Tsai, 2007). Supporting the present thesis, absorptive capacity and the innovative management skills vary across countries, and contribute to the international variation of realized spillovers (Meyer and Sinani, 2009). “In parallel, the ‘right innovation management and the ‘best’ source of innovation will depend upon the attributes and environments of the specific firm” (Brem and Voigt, 2009). Absorptive capacity supports technology and knowledge sharing, manifested in in firms’ or regions’ ability to transform knowledge into innovation (Brant and Parthasarathy, 2015).

These references add emphasis to the enhanced value chain illustration, and support the macro analysis of country innovation and its relationship to firm capabilities and institutional environments. The impact of innovation on a country is derived knowledge and knowledge transfer with three significant determinants: the country’s absorptive capacity, socioeconomic objectives of government support, and types of public institutions. (Guellec and Van Pottelsberghe de la Potterie, 2004). The latter two intersect this paper’s research insofar as government support is manifested in the patent institution themselves. To remind, patents represent intellectual property and are not a natural monopoly. They represent a privilege and a legalized monopoly for utilitarian purposes.

As Hope (2001) affirms, corporations embrace an innovation strategy because competitive advantage is so fleeting. That innovation strategy is not one that is isolated to an R&D function.

The firm at large seeks betterment of processes and capabilities, and this innovation will impact the day to day means of doing business. “The argument for favouring more and better business R&D support is too simple.” It is based on a linear model of innovation more applicable to the past (Sulzenko, 2016). The present knowledge age has added a dimension of innovation transfer, which will invoke new competitive approaches that were not previously necessary.

“The notion ‘knowledge based society’ is a concept which attempts to grasp the multidimensional transformations which are taking place in the current society and serves also for the analysis of those alterations” (IPRI, 2016). From the 1960s to present day, many economies migrated to a service based orientation, dependent upon a skilled and technically adept workforce. The IPRI author notes that the post-industrial society promoted a shifting of resource valuation, from capital inputs, hardware and materials to knowledge. There is a subtlety in this observation, which strikes at the core of the intellectual monopoly research and legalistic motivations. Is it not logical to assume that those countries who had a comparative advantage in knowledge based resources (such as skilled and educated labor, managerial acuteness, process execution and innovative cultures) would naturally wish to exploit the advantage? If human resources are equipped with knowledge synthesis skills, and if analysis and information constitute the differentiation of a country, then it is logical to assume that country would desire to distinguish itself by way of those advantages. The firms in a knowledge-based country would promote an activist stance relative to intellectual property rights, ensuring their own monopoly advantage. In effect, these intellectual property rights are artificially constructed knowledge based rights.

“Knowledge and information are not like other kind of physical goods widely traded in markets. They possess a specific characteristic referred as ‘non-rival in use’, that is, they can be used repeatedly and concurrently by many people, without being ‘depleted’” (IPRI, 2016). The challenge in proving ownership, beyond the scope of this paper, is the result of virtually infinite foundational requirements, impetuses and inspirations that must have preceded the patented invention. These comments require additional consideration. The duplication or imitation of a specific arrangement of manufactured parts, chemical compounds or design blueprints does not infringe on the “usage” of said invention for any party, including the party who allegedly first disclosed it. Nevertheless, knowledge is diffused by way of spillovers, and spillovers for an intangible entity do not have natural boundaries. It is, therefore, logical to state that intellectual property is a spillover barrier effecting each country in distinct ways, impacted in varying degrees by their natural comparative advantages, climatological, geographical, and cultural.

The “amount of resources innovators invested in (knowledge creation)” is but a small part of the firm’s value chain and shared activities. An argument can be extended that the product offering (that which will differentiate the firm and that which will be patented) has naught to do with an efficiently operating purchasing department or an infrastructure management center that ensures email is working and that lighting is available in the hallway. Ignoring these cross-functional dynamics fully disregards the interconnectedness of the firm’s ecosystem, and ignores the interdependencies of knowledge transfer and accelerated information sharing. If innovation is a prerequisite for competitive advantage, then the accelerated delivery of goods and services to the marketplace depends (innovatively) on the entire operation and every activity of the firm.

“In a 'knowledge society,' structures and processes of material and symbolic reproduction are so immersed in knowledge operations that information processing, symbolic analysis and expert systems take precedence over other factors, like capital and labor” (IPRI, 2016). This comment underscores the importance of the value chain innovation culture, and it strengthens the argument that innovation is not isolated to an R&D function within the individual firm.

This research has submitted that creative/innovation output depends on firm-specific attributes, which blend departments and which are not isolated to R&D alone. The measurement of innovation within firm, per Kleinknecht (2000), is nearly impossible to capture due to the variation in firm configuration and the endogenous spillover. Therefore, a macro measure of innovation will be offered to initiate a new look at innovation research and its relationship to country institutions. For the IPRI (2016) evaluation, the property rights factors are core drivers in ranking and assessing country capabilities. Their focus has been economic growth, which they correlate with property rights.

This paper’s enhancement of the Value Chain construct is core to the central thesis and methodology.

3.2 Methodological Precedence and Hypotheses

The Property Rights Alliance (employing the IPRI, 2016) as well as other institutions (PERC, 2016; Fraser, 2016; Heritage, 2016), suggests that economic growth is correlated with property rights, whose institutional attributes will influence innovation. Therefore, innovation should correlate with property rights valuations, so long as those valuations are theoretically justified.

The analysis of this dissertation and its investigation concerns whether or not intellectual property is a legitimate institutional variable for advancing country innovation. As described above, innovation has become a catch-all word that has been manipulated and integrated into all manner of research endeavors. If innovation is embedded as a cultural and firm-wide attribute, then a firm should become more productive, as waste removal and efficiency leads to time availability. The additional time saved via efficiency (overall productivity) can be spent on core competencies for products and services. Productivity makes firm offerings more attractive (quality, cost, performance) and subsequently a country's competitiveness should move positively in relation to its constituent firm performances.

The attributes of economic freedom, legal integrity, openness, fairness and equitability are employed in many macro research endeavors; there is precedence for social science valuation according to underlying institutional constructs. These institutional constructs have been related to economic growth, educational levels, R&D and innumerable others. For the present research, and based on the literature study, the inclusion of intellectual property rights, as one institutional construct, is suspect. The question of whether or not "intellectual property" is evident in country performance can be analyzed empirically by investigating its impact on innovation. That necessitates a dependent variable to act as a country's innovation proxy.

The inference of Ostry (1998) is partially flawed relative to innovation measures. His research concludes that measurement of innovation should be focused on knowledge investment, including levels or R&D expenditures, the number of patents, and high technology trade, in relation to "flow measure; that is, human resource mobility; cross country publication citations." There is no doubt that an innovation measurement requires investment calculation; however, his

inference implies that the innovation-centric investment is one that falls within the research and development cost center. This paper's thesis submits that innovation inputs should apply to all facets of firm operation, which will have spillover effects. Innovation is knowledge, and knowledge has no tangible boundaries. Certainly, a knowledge investment is justified as a measurable component, but that should initially be assessed across the entire value chain; this is proposed in the empirical analysis when multifactor productivity will be employed in a proxy configuration.

When a firm mandates a cultural construct of innovation, the expectation is that innovation is embraced as a way of life. If innovation is applied to traditionally-oriented overhead functions (Facilities Management, Accounting, Supplier Management; Infrastructure, etc.) the end goal is improvement of the intra-firm service catalog for supporting various departments. As discussed in the Enhanced Value Chain Theory section, innovative enhancements are not necessarily isolated to R&D expenditures. If one considers that only the outwardly facing deliverable (service or product) is the evidence for innovation, then that assumption claims that only the constrained investment within that firm (the dollars identified as R&D) represent, as a proxy, the emphasis or level of innovation within. That might be acceptable in trying to compare "apples to apples" across like-kind firms, since the proxy would be conceivably utilized as measuring only product/service delivery investment. But this ignores the endogenous cultural expectations and cross-functional behaviors. Innovation is contagious. The inspiration for product/service improvement is not confined to the R&D cost centers of the firm but is prompted by spillovers, both exogenous and endogenous. If the firm holds innovation as a strategic imperative,

embedded and expected in day to day activities, including internal operations, then the proxy of R&D expenditures is lacking.

“In order to understand the exact role that knowledge and therefore innovation plays in the economy the measurement of knowledge inputs and knowledge outputs is critical. Our understanding of the role of knowledge in economic activity has traditionally been guided by the state of the measurement of knowledge. However, such data have always been incomplete and, at best, represented only a proxy measure reflecting some aspect of the process of technological change.” (Acs, et. al, 2002)

Returning to Ostry (1998), he then delivers an approach aligned with this thesis: the intent should be to use an [innovation] indicator that can cut across OECD countries, in order to have a normalized comparison. “Neoclassical models recognized technology as the key driver of growth, but it was exogenous to the market (manna from heaven). The growth of knowledge (which depends on a variety of economic decisions, such as investment in R&D, in human capital, in new capital goods, *or accumulated in learning by doing, etc.*) is central to the new model...” (Ostrey, 1988, emphasis mine).

Kemp (2003) referring to Katz and Shapiro (1994) recognizes that innovation activities evolve via network instigations; the resultant innovation influences are not necessarily in pursuit of the product development objective. That is, innovation is even exogenous to project goals. They are factors which assist in development but those ‘helpers’ are behavioral and brainstorming-related. They are borrowed from other experiential activities that may or may not be isolated to the project requirements and specifications. In strategic, executive branding, firms determine their reputation goals, whether they are product leadership, operational excellence, or customer

intimacy (Treacy and Wiersema, 1993). Firms must intensify innovation behaviors and values, and these behaviors are cross-functional phenomena.

As micro factors in literature are condensed for study, there is unintended disregard of innovation as an orchestrated firm-wide, strategic imperative. Innovation measures might include innovation inputs (percentage dedicated time to innovation) and innovative outputs (innovative sales); however, there are other inputs that have bearing on the innovation intensity, solidifying the proposition that innovation can be an amorphous entity. This is very challenging for measurement efforts.

The endogenous components of a firm can be summarized as its owned assets and the effectiveness and efficiency of labor. These are measurable and can be consistent across industry. These are also measurable across countries.

The avenues of research are leading to an innovation indicator that can account for varied and sometimes unrelated behaviors, influences activities and inputs. These innumerable inputs lead to the implication that innovation should be measured as a firm output. Reflecting on the original nature of innovation and its objective, research seeks to measure amount of change, amount of outputs that cannot be determined simply by an additive or multiplicative assessment of labor and assets. The resultant value to the firm is in the revenue obtained following the delivery of the good. This leads to a productivity measure that may act as a relatively unambiguous proxy for innovation, such as overall productivity after accounting for labor and capital investments. What is compelling is that the micro proxies of R&D, or number of new products, does not necessarily identify innovation. Innovation is represented as a collective capability for delivering productivity and change.

“Anecdotal evidence suggests that new technology, especially information technology over the 1990s, has substantially contributed to recent improvement in the productivity of firms” (Guellec and Van Pottelsberghe de la Potterie, 2004). While these authors cite R&D as the ultimate source of technological change and economic growth, their qualification, however, is telling: “There are different types of R&D, however, and its effect on productivity may work through various channels.” The literature is rife with identification of micro factors and acknowledgement of innovation flowing through the firm, without enough qualifications on innovation proxy measures employed.

Innovation is considered a byproduct of intellectual property whose rights are codified by institutions. Institutional measures have been employed in IB literature successfully, valuating countries and scoring them. An institutional assessment will also be applied here.

The hypothesis for testing intellectual property rights institutions vs. innovation is stated as,

H₁: Country measured innovation increases without support of intellectual property rights institutions.

Structuring of this hypothesis will require a macro level dependent variable, for innovation, as well as macro level independent variables, which will represent the institutional levels of various countries.

Since various institutional factors represent property rights advancement, and since the construct of intellectual property rights is submitted as ambiguous, the next hypothesis is stated as,

H₂: Country measured innovation is positively correlated with physical property rights institutions in the absence of intellectual property robustness.

Structuring of this hypothesis will require the same macro level dependent variable, for innovation, and will also require a distinguishing set of independent variables, such that physical property rights institutional maturity can be differentiated from intellectual property rights institutional maturity.

The final proposition, recognizing that endogenous and exogenous forces are not necessarily under the purview of intellectual property rights constraints, is a contention that innovation's prerequisite is a free flow of information. This demands an open and equitable institutional environment codified into law, excluding intellectual property rights factors. Correspondingly, the final hypothesis is,

H₃: Innovation will increase through robust legal institutions, which minimize corruption.

3.3 Methodological Refinement

The International Property Rights Index (IPRI, 2016) was developed in 2006 under the leadership of Hernando de Soto Polar. As an initiative under the Property Rights Alliance based in the United States, the aim of the IPRI is to promote the respect and acknowledgement of property rights throughout the world. Each year the IPRI conducts an analytical study and ranking of approximately 130 countries relative to their intellectual property rights progress.

A set of values was determined and attached to each country according to criteria that theoretically underpins the institutional framework for intellectual property rights. The

decomposition of the values includes not only intellectual property rights but also physical property rights.

Intellectual property is often identified as an innovation driver as was stated in much of the literature. Its ostensible existence has mostly been utilitarian in nature.

To further investigate the soundness of IPRI as valid measures and to address the limited amount of testing of property rights versus innovation, this paper will take the next step in assessing IPRI values. A correlation study will seek relationships of physical property versus innovation, intellectual property versus innovation, and a combination of both versus innovation.

The key independent variables (representing institutional property rights levels) include three major components that are subsequently detailed in sub-factors, discussed later. The three areas included Legal Framework, Physical property Rights, and Intellectual Property Rights.

The benefit of the IPRI was significant in its approach. There are a number of institutions that capture property rights, such as the Heritage Foundation (2016) and the Fraser Institute (2016). These institutions tend to promote what is termed right of center and libertarian principles, respectively, for a perspective of “economic freedom,” including property rights. Throughout their rankings and values, property rights are assessed and included in the country’s overall freedom assessment. Moreover, the property rights that are captured are a bundle, constituting both physical property rights and intellectual property rights.

With the IPRI index and research baseline, an opportunity to separate physical and intellectual property rights has been identified. Further, should theoretically sound and international business related analysis suggest these rankings have scientific validity, first assessed in literature and

prior study, then a launching pad is available. From this, the research can be extended and improved upon. As property rights are touted as a key ingredient for economic development, there is less analysis of their impact on innovation. There lies a challenge here, since the IPRI (2016) rankings of property rights embed patents into its analysis. Thus, patents should correlate to other valid proxies for innovation. In the proposed methodological testing, analysis on whether patents are multi-collinear with other property rights variables, shall indicate that patents as proxies are not necessarily an appropriate measure for innovation.

3.4 Methodological Challenges and Mitigation

Multifactor productivity was studied under Hall (2011) and recognized as a convenient, accessible and logical measure of change not accounted for by firm inputs: “Multifactor productivity is best understood and measured, because of the attention that has been paid by economists and statisticians inside and outside governments for the past 50 years.” This is not to say there haven’t been voluminous efforts in studying the measures and identifying concerns.

Measuring challenges include the difficulty in defining specific real inputs and outputs, particularly in the service sector. (Hall, 2011). Real inputs and outputs shall be gathered by a measurement of multifactor productivity discussed ahead. However, the service sector concern is theoretically justified as is the rationale for demarcating firms per their sectors. To mitigate this ambiguity, empirical analysis will be employed against both holistic views of countries’ innovation (the agglomeration of their firms’ performances).

Also, criticizing the measurement of factor productivity, Hall (2011) cites the impact of price deflators. Innovation investment may be observed by firm level prices that are due, not so much to innovation but, to shifts in market power. Conventional price indices will not reflect the phenomenon of market power dynamics. Further, benefits allocation due to innovation is effected by input and output at the sector level (Hall, 2011).

To address this, contextualizing for the case at hand, which is a macro view of intellectual property forces at the country level, there is a potential that multifactor productivity may demonstrate biases; however, to reiterate, this dissertation's research question is focused at a macro level, and concerns itself with property rights. To moderate the dependent variable of innovation, independent variables are used at the country-level, independent of firm-specific, market-power.

As additional conceptual support for this variable, assessing multifactor productivity measures as the proxy of innovation, the Bohlen and Beal (1957) diffusion process was considered. This process was later enhanced by Rogers (2003) and Moore (2006). There are several stages of product adoption aligned to various customer constituencies and customer profiled. As shown in *Figure 6, Adoption Lifecycle*.

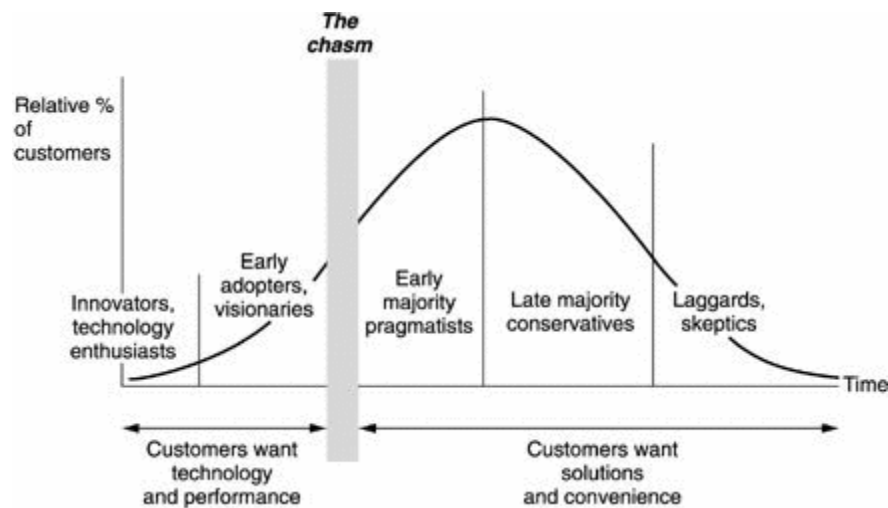


Figure 6, Adoption Lifecycle

Innovators tend to take risks, have the financial liquidity and access to sources of information. This would justify innovation impact by financial institutions, and shall be included in the testing equation, ensuring that access to funding is included. The early adopters are more educated than late adopters, having higher social status. While they are more discreet than innovators they tend to adopt as a means of maintaining central communication and connections.

The early majority will tend to wait. They adopt an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. Early Majority adopters have above average social status, contact with early adopters and seldom hold positions of opinion leadership in a system (Rogers, 2003). The Late Majority is the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change-agents. Laggards typically tend to be focused on traditions (Bohlen and Beal, 1957).

The adoption life-cycle citation here has a marked intersection for international business and the thesis at hand. In crossing the chasm (Moore, 2003), there is an expectation that not only the product innovation will have occurred but the marketing capabilities will be robust and capable. This is yet another reference to the nature of innovation as crossing value chain departmental demarcations. An innovation breakthrough in an R&D department cannot be witnessed unless it is adopted in the marketplace. Multifactor productivity is a measure of various capabilities at work within a country's firms, not simply the innovation in the laboratory or departmental silo. The importance in viewing the adoption lifecycle is the recognition that the unexplained residual (after accounting for capital and labor) is dependent on an orchestrated set of skills and FSAs, which deliver innovative products to consumers and which are visible and auspicious enough to impact the country's macro metrics.

3.5 Measuring Innovation

Per Kneip and Sickles (2010) it may be almost impossible to structurally model the role of innovation and the role of efficiency in determining total factor productivity growth. As Hall (2012) referenced Clayton Christenson, there are efficiency innovations, sustaining innovations, and empowering innovations, each having varying effects on employment and economic growth. In this paper, we are less concerned with the type of innovation, and focused on the holistic innovative forces and if they are collectively impacted by property rights. Innovation for present purposes includes efficiency improvements.

Per Mefford (1986), there is productivity variability between plants in the same industry.

Therefore, it is logical to expect variation in plants among different industries. Primary among the variables explaining the variation were management performance, worker skill, and scale and learning-by-doing effects. Mefford (1986) cites management basics as the primary determinant for productivity; managers rely on their stock of knowledge and observation. Some of the observation is simply focused on compliance of workers in relation to rote activity. But beyond working a laborer harder in order to output deliverables faster, the innovation process will ultimately elicit change and improvement.

Meyer and Sinani (2009) offer comments that underscore the policy differences among countries as prerequisite for inducing spillovers. “Both low- and high-income economies are likely to benefit from FDI spillovers, yet our theoretical discussion suggests that the underlying forces creating the spillovers may be quite different. In poor countries demonstration effects may create spillovers with little direct interfaces, compared to advanced economies spillovers. This analysis emphasizes that policy instruments to facilitate such spillovers may need to be quite different.”

The authors go on to say that spillovers related to supply chains are not necessarily vertical phenomena, within the same industry. This supports measuring innovation, (advanced by this paper as knowledge spillover influences) cross-sector.

Considering the research surrounding multifactor productivity and innovation as cross-functional and fluid, multifactor productivity is justified for use as the innovation proxy – the dependent variable.

4 Modeling for Empiricism

In its most basic form, the conceptual model wishes to compare innovation (a proxy) to institutional factors of property rights. If the purpose of this paper is to analyze the impact of property rights (sans intellectual property and patents), then what is the appropriate proxy for innovation?

4.1 Innovation and Multifactor Productivity

As an initial consideration, applying a basic Cobb Douglas (1928) approach to the determination of innovation, a dependent variable proxy must align to the propositions developed in this study. The thrust of this dissertation is that physical property rights are adequate as an institutional promoter and supporter for innovation. It is based on an analytical view of the value chain and the recognition that spillovers are major contributions to the innovation process. Firms drive value in a holistic manner; the confining of innovation to a R&D proxy or patent count proxy or, for that matter, research/staff expenditures ignores this paper's enhanced value chain model, *Figure 5, Enhanced Value Chain Model building upon Porter, recognizing the exogenous and endogenous innovative forces onto and throughout the firm's business processes; dotted lines represent the knowledge spillovers from without and within.* If the patent proxy is suspect, per this research, then innovation should not necessarily be affected by its absence. Correlating patents with a strong and accepted innovation measure shall assist in analyzing this argument. Leveraging the value chain perspective one recognizes that the inputs to all parts of the value chain are purchased as labor or other assets. The outputs of the value chain are the purchased goods or services by the consumer. The purchased good or service (adjusted for markup) is the added value. The added value is priced per its enhanced embodiment of labor and assets.

Conceptually, the whole exceeds the sum of the parts owing to the internal processes, designs and formulations of the firm. The unaccounted value (after labor and capital are considered) are sound means for identifying firm-specific innovation across its entire value chain.

A long-standing measure of innovation has been the use of Total Factor Productivity, also defined as Multifactor Productivity (MFP) which specifies the output growth not explained by accumulation of factor inputs; i.e. the residual of the production function (Danquah and Moral-Benito, 2012). MFP can be conceptualized in the Porter value chain as the visible output which, in a rational marketplace, shall exceed the value of the inputs.

MFP represents a standard production function, including its labor and capital components (by country and measured over time):

$$Y_{it} = A_{it} + F_{it} + L_{it} + K_{it}$$

where:

A_{it} is a Hicks-neutral parameter of technological efficiency;

F_{it} is a country/sector-specific production function assumed to be homogeneous of degree one and exhibits decreasing returns to the accumulation of each factor of production;

L_{it} is labor

K_{it} is capital

While multifactor productivity is nevertheless identified in the literature as a strong proxy due to its universality, the proxy is not without its drawbacks. Some of the challenges are specified below.

4.2 Challenges in Model

Kneip and Sickles (2010) cite problems in decomposing productivity change into its innovation and its efficiency components to the point that “it simply may not be possible from purely econometric models, no matter how sophisticated, to model structurally the role of innovation and the role of in determining TFP growth.” However, Hall (2001) finds MFP theoretically sound as a measure of change in the firm. Change is instituted and integrated in firm behavior as innovation. Change is incentivized as a potential return, owing to the demands of customers. The demands of customers, are observed in their spending and purchasing. The value of the output is what the consumer is willing to pay. The outputs exceed the inputs by way of innovative improvement, be it cost, performance, quality or other objective or subjective values the customer seeks.

According to OECD (2016) MFP reflects the “overall efficiency with which labour and capital inputs are used together in the production process. Changes in MFP reflect the effects of changes in management practices, brand names, organizational change, general knowledge, network effects, spillovers from production factors, adjustment costs, economies of scale, the effects of imperfect competition and measurement errors. Growth in MFP is measured as a residual, i.e. that part of GDP growth that cannot be explained by changes in labour and capital inputs.”

Note in the OECD (2016) quotation that change is represented by all manner of factors in a firm’s or country’s value chain, particularly “network effects” and “spillovers from production factors.” They do not isolate innovation output (MFP) as a confined view of R&D. These factors are perfectly aligned to activities that occur within the firm’s value chain, holistically.

The paper's supposition is that innovation is the byproduct of firm-wide value chain contributions, not a skewed count of product counts or patented inventions.

MFP is a justifiable and scientifically rational proxy for innovation, from a macro perspective and viewed as a country index. The subsequent and proposed theories will depend on the use of MFP and its relationship to physical property rights, intellectual property rights, and institutions.

Hall (2011) continues his selection of MFP as a robust innovation measure for its simplicity, wide span of coverage (country-wise), objectivity and consistency, as it is used by many institutions and official bodies of nation-states. Further it is a normalized function for comparison; can be decomposed to regions and sectors is desired; is difficult to manipulate; is well understood; is bottom-line efficient, providing a measure of the overall economy (Hall, 2011).

4.3 Formalizing the Model

In studying the byproducts of strong property rights, Mazzarol and Reboud (2007) emphasize the types of foci for a vibrant economy. So do Fraser (2016), Heritage (2016) and PRA (2016). The difference is not in factors that promote economic prosperity, but in their proposed application of such: the Mazzarol and Reboud (2007) thesis promotes a more active government policy, whereas the PRA, Fraser and Heritage promote a more market-oriented ecosystem. Regardless of which political approach, there is agreement on the types of inputs necessitating an innovative and prosperous environment, including legal protections, judicial independence, contract enforcement and property rights. In the Heritage indices, property rights are evaluated in context of government recognition of property and its protections. There is not an enumeration

and separation of intellectual vs. physical property rights. In the Fraser Institute's economic freedom rankings, property rights, including financial assets, are scaled among a continuum from property rights protection (under the oversight of a fair and impartial judiciary) and, at the other end of the spectrum, little to no recognition of provide property. The PRA's IPRI analysis considers valuation and ranking of property rights under two paradigms -- physical and intellectual. As the most relevant perspective to uncover the impact of patents, the IPRI methodology, as independent variables impacting innovation, is the preferred one for analysis and research.

Analysis via qualitative data is open to criticism and must be undertaken within a formal framework and justifiable data observations. Kraay (2006) highlighted the challenge in his paper, reviewing corruption indices and whether indices would deliver a scientifically robust analysis of institutional governance dynamics. Noting Kaufmann, et. al. (2006), assessment efforts were conducted in multiple ways: stakeholder views and surveys whereby the stakeholders included the following: leaders in their field, NGOs, international actors and public officials. Means for analysis included institutional profile analysis, such as budget management, procurement practices and the associated widows of opportunity for corruption, as well as audits of projects and deltas between expected outcomes and actual outcomes. On the surface, these approaches seem credible and rational (Francisco, 2015) but were open to calls for objective data instead of "soft perception data". "Even where objective measures are available, they provide only imperfect proxies for real conditions on the ground (of course the same is true for perception-based data which has potential problems of its own)" (Kraay, 2006).

One means to overcome the problem is via the use of aggregators, data that is sourced across multiple perception captures, surveys, and institutional databases, providing additional credibility and moderation. Aggregate indicators allow broader country coverage, a functional summary from a vast array of individual indicators; they average out, reducing measurement errors and biases of individual sources, and allow for the calculation of explicit margin of error. This can ameliorate the “perception” problems; however, the “error” problem (Francisco, 2015) is manifested in suspect confidence intervals, whereby only one source of data will result in a larger standard error. Finally, the “utility” problem is cited as the gap between measurement data and solution or implementation. This is akin to the “so what?” factor – observation data that has no actionable response. It is important that qualitative indices can be grounded in data that can help address poor performance.

The utilization of PRA alliance data (IPRI, 2016) is aimed at satisfying the concerns of perception-based metrics. The data is not only aggregated but also provides granular sub factors. The data is sourced from a variety of credible institutions. Further, the data provides strategy opportunities, to implement the granular factors into an overall enterprise plan. The data also provides policy makers strategic means to improve country property rights environments.

For the strategic practitioner, the metrics are a means to intersect country advantages with FSAs and add value to the firm via avoidance of country shortcomings or leveraging of country opportunity.,

Given the dissertation thesis and question pertaining to innovation as a significant dependency on property rights, and given the suspect usage of intellectual property and/or patents as evidence of innovation, a conceptual model is offered. *Figure 7, Conceptual Structure for Innovation*

Dependency on Property Rights Institutions shows the approach for empirically testing the innovation to property rights thesis and considered variables.

Data representing property rights has been investigated at the Fraser Institute (www.fraserinstitute.org), the Heritage Foundation (www.heritage.org), the National Center for Policy Analysis (www.ncpa.org), among others. The present challenge in data selection is to separate factors and sub factors that are associated with intellectual property. In order to conduct empirical testing for physical property rights vs. intellectual property rights and their interplay, then the data sets must be isolated and evaluated. The Property Rights Alliance pra.org sponsors the analysis of property rights with demarcation of the two in its international property rights index (IPRI). The validity of the physical property rights attributes vs. intellectual property rights attributes will be studied as a data validation measure.

Innovation Impact is captured on the left side, as a potential dependent variable, while Property Rights Institutional Factors are offered on the right.

The fundamental assumption of patents being an inordinately strong indicator of country innovation is not justifiable based on the permutations of innovative forces, the human necessity for innovation and the history of innovation in the absence of patent rights.

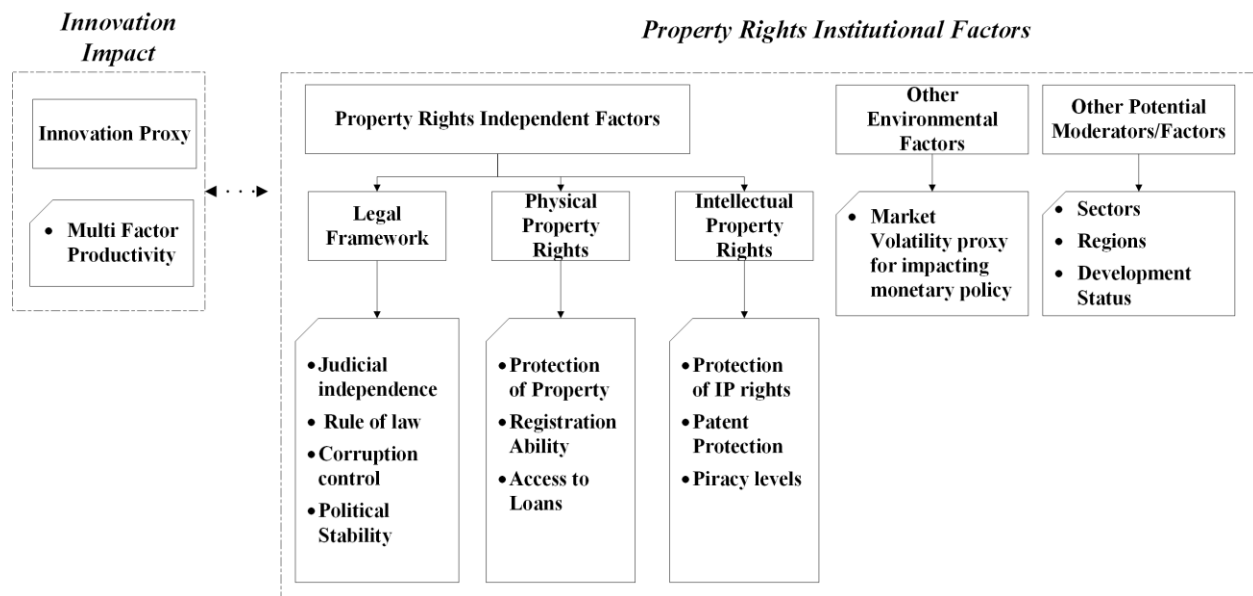


Figure 7, Conceptual Structure for Innovation Dependency on Property Rights Institutions

Per Figure 7, Conceptual Structure for Innovation Dependency on Property Rights Institutions each variable was developed from a set of official data stores, and normalized according to a 0 – 10 scale; 0 being the lowest value and 10 being the highest, as delineated below. All data is supplied in the appendices of this dissertation.

4.3.1 Innovation Impact Data

The multifactor productivity values were captured from The Conference Board 2016. The Total Economy Database™ (Original Version), November 2016, <http://www.conference-board.org/data/economydatabase/>. After removing countries that did not have adequate data across the 10 sub value, encapsulated in the three major factors of Legal Framework, Physical Property Rights, and Intellectual Property Rights, 74 countries were retained over a nine-year

period – 2006 to 2014, inclusive. The Innovation proxy (multifactor productivity) data is listed in *Appendix A, Table 5, Innovation data, represented as multifactor productivity values*. For future research, countries were associated with region -- North America (NA), Latin America (LA), Middle East and Africa (MEA), Western Europe (EU), Eastern Europe (Eastern EU), Asia Pacific (APAC). Also included is an economic classification value – Less Developed (LD) or Developed (D), which was used in the empirical testing.

4.3.2 Legal Framework Data

For Legal and Political framework, sub factors were referenced from these sources: the World Economic Forum Global Competitiveness Index (<http://gcr.weforum.org>) for Judicial Independence; and the World Bank Worldwide Governance Indicators (<http://data.worldbank.org/data-catalog/worldwide-governance-indicators>) for Political Stability, Rule of Law, and Control of Corruption.

The sub factor data is listed in *Appendix A*, followed by the rollup to the aggregate Legal Framework value. *Appendix A, Table 6, Judicial Independence values* were captured via “experts’ answers to the survey question: ‘Is the judiciary in your country independent from political influence of members of government, citizens or firms?’” (IPRI, 2016). The scaling by the World Economic Forum was on a 1 – 7 scale; this data was normalized to a 0 – 10 scale. Saudi Arabia and Senegal data is missing for 2006; Ecuador data is missing for 2014.

Appendix A, Table 7, Rule of Law values; normalized from -2.5 to +2.5 range into a 0-10 scale was derived from several indicators including the World Bank’s own judiciary assessment, respect for law in relations between citizens and the administration, property rights, confidence

in the police force, enforceability of contracts, direct financial fraud, law and order, which measure the existence of the rule of law (IPRA, 2016). Survey respondents were asked to represent the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests” (IPRI, 2016).

Appendix A, Table 8, Political Stability values are assessments of the “likelihood that the government in power will be destabilized or overthrown by possibly unconstitutional and/or violent means, including domestic violence and terrorism” (IPRI, 2016). The original ratings were between -2.5 to +2.5. The ratings were normalized by rescaling them to a 0 - 10 scale. Pakistan data was unavailable

Appendix A, Table 9, Control of Corruption values were garnered from survey data, which measure the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests” (IPRI, 2016). Note that for Denmark 2006 and 2007, as well as Finland for 2006, the original score from the World Bank Group exceeded its upper bound of +2.5, later normalized to above 10. Since the score was approximately within 1% of the upper bound, the score was retained despite it being slightly above the maximum of the range.

These four above sub factors were then averaged, resulting in *Appendix A, Table 10, Legal Framework aggregate values; average of Judicial Independence, Rule of Law, Political Stability, Control of Corruption,*

4.3.3 Physical Property Rights Data

For Physical Property Rights assessments, data sources included The World Bank Group – Doing Business database (<http://www.doingbusiness.org>) for Registering Property evaluation; and the World Economic Forum – Global Competitiveness Report (<http://gcr.weforum.org>) for both Property Rights scoring and Ease of Access to Loans scoring.

The sub factor data is listed below, which was averaged to an overall aggregate Physical Property Rights value.

The “property rights protection” sub-factor was garnered from survey data where participants were asked to comment on property rights in their country, including over financial asset protection. The data is shown in *Appendix A, Table 11, Property Rights Protection*. The scale was originally 1 – 7 (from 1 as poorly defined or protected rights, to 7 as well-defined and protected rights). The scale was then normalized to 0 – 10 scale (IPRI, 2016).

For Property Rights Protection values, data for Ecuador in 2016 was not available.

For measuring ease of Registering Property (“Registering Ability” in the conceptual framework), two considerations are factored into the index -- the number of procedures legally required to register physical property and the time spent (in days) in completing the procedures. The calculated values are shown in the *Appendix A, Table 12, Registering Property ratings*. The values were weighted 30% to the procedure counts and 70% to the number of days.

Normalization then created a 1 – 10 rating, per the methodology explained in http://internationalpropertyrightsindex.org/ipri2016_comp. Note again that this calculation process was manually duplicated for this dissertation as all years’ data from the Property Rights Alliance was not readily available. The scenario considered for “registering property” was an

entrepreneur attempting to purchase land or building in the city (IPRI, 2016). Data omissions included Canada 2006, Cyprus 2006-2008; Luxembourg 2006; Malta 2006-2011; Qatar 2006-2007; Senegal 2006.

Data listed in Access to Loans, another Physical Property Rights sub-factor, was captured via survey, questioning respondents, “How easy is it to obtain a bank loan in your country with only a good business plan and no collateral?” The data was on a 1 – 7 scale and was then normalized to a 0 – 10 scale. The scores for this factor are shown in *Appendix A, Table 13, Access to Loans values*.

The rollup of values, an average of the three Physical Property Rights sub factors, are shown in the *Appendix A, Table 14, Aggregate scores for Physical Property Rights*.

4.3.4 Intellectual Property Rights Data

Intellectual Property Rights data, included in *Appendix A*, was captured from BSA Software Piracy studies (<http://globalstudy.bsa.org>) relative to unlicensed software assessments. The World Economic Forum – Global Competitiveness Report (<http://gcr.weforum.org/>) provided values for intellectual property protection, and patent protection data was captured from Walter G. Park’s research at <http://fs2.american.edu/wgp> and downloadable, as of December 1, 2016 from <http://fs2.american.edu/wgp/www/patent%20index%201960%20-%202010.xlsx>.

The BSA Global Software Piracy Studies, which identified, on a percentage basis, compliance to software licensing rules had available data reports in 2009, 2011, 2013 and 2015. The values were then annualized for the 2006-2014 period; 2009 data was used for 2006-2008; 2011 data was used for 2009-2010; 2013 data was used for 2011-2012; 2015 data was used for 2013-2014.

As a higher % of non-compliance is perceived as a poor score, the data was normalized to a 0 – 10 scale, whereby 0 is a low compliance and 10 is a high level of compliance. The resultant scores are shown in *Appendix A, Table 15, Software License Compliance*.

For intellectual property protection, ratings were based on intellectual property protection and anti-counterfeiting measures, where a low score was 1 and a high score was 7. The values were normalized to the 0 – 10 scale. Countries with missing data included all for 2010, Ecuador 2014, Saudi Arabia 2006 and Senegal 2006, as seen in *Appendix A, Table 16, Intellectual Property Protection scores*.

Patent protection was evaluated using the Park data, which was captured every five years. 2005 data was duplicated until 2009, and 2010 data was duplicated through 2014, shown in *Appendix A, Table 17, Patent Protection scores, normalized from 0-5 range into a 0-10 scale*.

Aggregate data for Intellectual Property Rights indices is captured in *Appendix A, Table 16, Intellectual Property Protection scores*.

5 Testing and Results

The empirical testing within this thesis includes statistical analysis and regression testing of the IPRA-similar independent factors. The conceptualization fits into an empirical approach for regression testing of those indices (or their sub factors) against an innovation proxy. That is, the “data points underlying Legal Framework, Physical Property Rights and Intellectual Property Rights can be statistically compared and subjected to bi-directional influences and interplay” (IPRI, 2015).

5.1 Statistical Software and Data Normalization

The statistical analysis software used in this study was EViews v 9.5 Enterprise edition, downloaded via evIEWS.com, IHS Global, Inc. © 1996-2016. A Principal Component Analysis to determine if factors could be better employed was run using SPSS.

Data was first extracted manually, using Microsoft Excel 365. The data sources identified above were captured individually and at the precise source cited by IPRI (2016); i.e., all data formulating the major three measures (IPR, PPR, Legal Framework) was not taken from IPRI but, rather, was extracted directly from the sources they cited (e.g., World Bank, BSA, etc.).

Following the downloads, a macro-enabled methodology was employed to normalize from the diverse scales to an overall 0-10 scale, 0 implying poor performance or capability, and 10 implying optimal capability.

Also, as the intent is to determine significance of physical property rights vs. intellectual property rights within an institutional framework, the regression and thorough analysis can then

be modified by removal of variables constituting Intellectual Property, and retaining only Physical Property Rights as well as Legal Framework.

The data sample (74 countries for IPRI values and MFP values) is extensive enough to determine basic correlation and model fit for fixed effects. Countries were limited to those that had virtually all values across the property rights rankings, including sub-values. The multifactor productivity dependent variable was of course a necessity, as well.

There are three major areas that are challenging under this research: measurements of innovation (multifactor productivity) may be biased according to factor endowments of countries not fully understood. Secondly, there may be multi-collinearity concerns as firm behavior may be provoked by other ownership, location or internalization factors a la Dunning and their independent variable interplay. And thirdly, the data must be comprehensive. To address these concerns, the study will analyze iteratively-adjusted regressions and comprehensive testing.

Some challenges to the multifactor productivity measure were recognized as a sectorial difference. In a time-series analysis, change in productivity was noted in manufacturing at a higher rate than in financial and business services. This is theoretically due to the implementation of manufacturing process improvements, more readily observable than the service industry (Arnaud, et.al. 2011). Since macro level indicators for dependent and independent variables are used, sectors would not be distinguished in the iterations.

The basic regression Innovation proxy and Property Rights Independent Variables would be submitted as follows.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \varepsilon$$

where:

Y_{it} is the Multifactor Productivity measure (Innovation proxy);

$\beta_1 X_{it}$ is the Legal Framework index as calculated from granular variables cited in Figure 7;

$\beta_2 X_{it}$ is the Physical Property Rights index as calculated from granular variables cited in Figure 7;

$\beta_3 X_{it}$ is the Intellectual Property Rights index as calculated from granular variables cited in Figure 7.

More granular data is also tested; that being, the sub-factors within each of the major three categories.

5.2 Empirical Process

A stepwise methodology for the empirical testing was created to support this dissertation as well as provide a guide for follow-on research. As seen in *Figure 8, Empirical approach and rationalization for adjustments in variable testing*, there were three primary analysis stages employed to investigate the data, plus a stage listed for futures. This flowchart will be referenced throughout this section on Testing and Results. In the early stages of data gathering, there were several gaps in the researched data for the planned variables. To ensure that nearly 100% balancing was effected, although there were nevertheless some omissions, a total of 74 countries' profiles were captured.

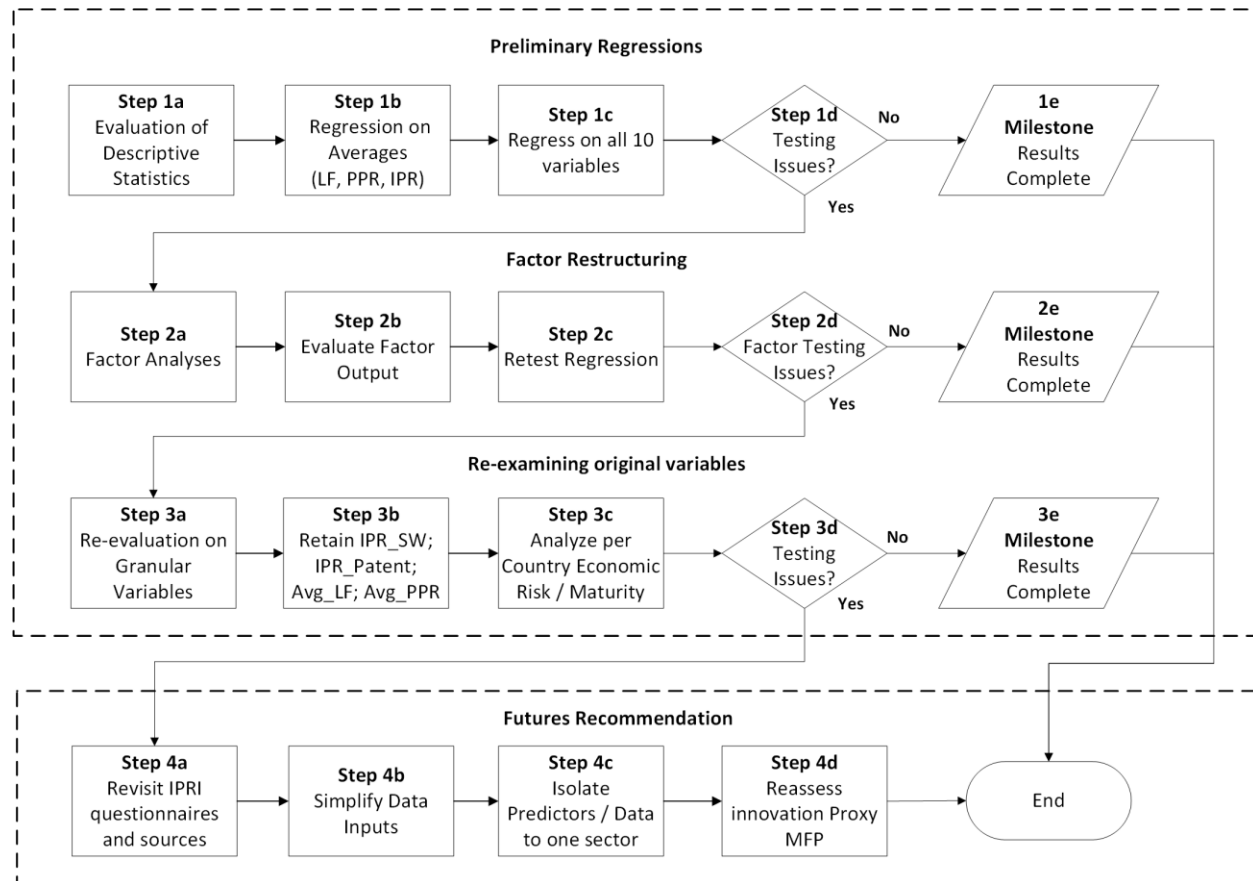


Figure 8, Empirical approach and rationalization for adjustments in variable testing

As an introductory step, basic descriptive statistic checks were undertaken for standard inspection prior to initial regression. The data distributions are shown in *Figure 9 through Figure 12*.

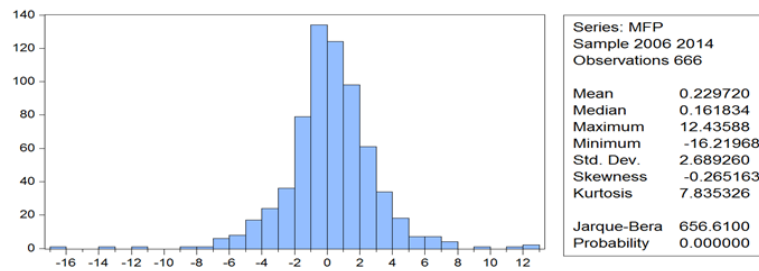


Figure 9, Distribution of Multifactor Productivity across 74 countries

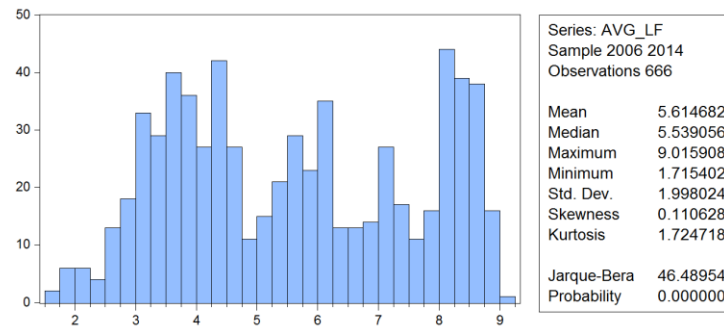


Figure 10, Legal Framework Distribution

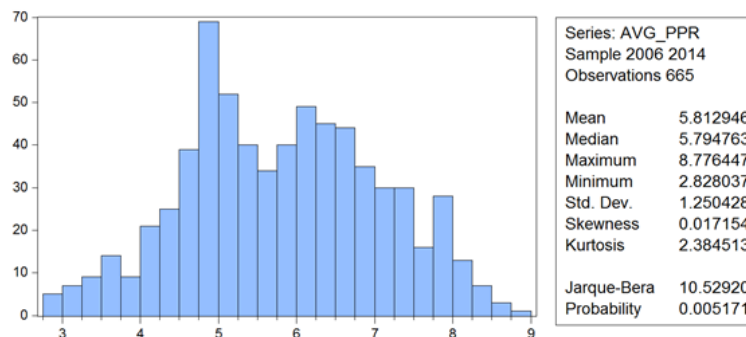


Figure 11, Physical Property Rights distribution

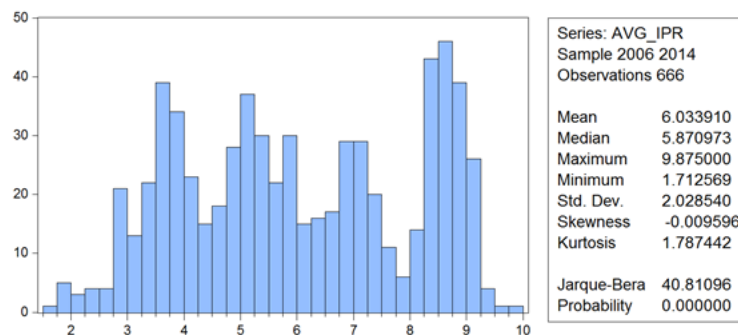


Figure 12, Intellectual Property Rights distribution

The dependent variable MFP shows a normal distribution along with Physical Property Rights, which also shows normality. Some question regarding the data for Intellectual Property and Legal Framework is elevated due to an irregular distribution showing. This is not cause for alarm but it does indicate that the country selection analysis may manifest some peculiarities as regression testing is executed, and that the qualitative questions deriving the predictors (institutional variables) have opportunity for refinement.

5.2.1 Regression Testing

In the first iteration of tests, cited as Preliminary regressions within *Figure 8, Empirical approach and rationalization for adjustments in variable testing* IPRI data was tested at the summary level, summarized into the three major categories initially discussed and proposed by the Property Rights Alliance, per *Figure 13, Regression of MFP vs. Average scores on Legal Framework, Physical Property Rights and Intellectual Property Rights*. For the average

variables, LF is the Legal Framework; PPR is the Physical Property Rights; IPR is Intellectual Property Rights.

The dependent variable was specified per the model and regressed accordingly. Results were not as significant as expected.

Dependent Variable: MFP?		JC -- Ambiguous non-robust results		
Method: Pooled Least Squares				
Included observations: 9				
Cross-sections included: 74				
Total pool (unbalanced) observations: 663				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.797207	3.105245	1.544872	0.1229
AVG_LF?	0.219222	0.22662	0.967353	0.3338
AVG_PPR?	-1.30481	0.503626	-2.590833	0.0098 **
AVG_IPR?	0.156238	0.525705	0.297198	0.7664
Fixed Effects (Cross)		All countries		
Fixed Effects (Period)				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.419617	Mean dependent var		0.241759
Adjusted R-squared	0.33527	S.D. dependent var		2.687305
S.E. of regression	2.190985	Akaike info criterion		4.525789
Sum squared resid	2774.641	Schwarz criterion		5.102298
Log likelihood	-1415.299	Hannan-Quinn criter.		4.749201
F-statistic	4.974923	Durbin-Watson stat		1.91117
Prob(F-statistic)	0.000000			
			* significance to 0.10	
			** significance to 0.05	
			*** significance to 0.01	

Figure 13, Regression of MFP vs. Average scores on Legal Framework, Physical Property Rights and Intellectual Property Rights.

The only significant variable in the output was the average level of Physical Property rights.

Further, this variable showed an unexpected sign, being negatively correlated with multifactor productivity (MFP). Not unexpected, following this output, was a correlation matrix developed

from the average variables. The levels of correlation, *Table 1, Extremely High Correlation among average score predictors of the IPRI structure, as related to regression testing* were exceedingly high, and further diminish any credence in the regression output above.

	AVG_LF	AVG_PPR	AVG_IPR
AVG_LF	NA	0.826186	0.901986
AVG_PPR	0.826186	NA	0.755326
AVG_IPR	0.901986	0.755326	NA

Table 1, Extremely High Correlation among average score predictors of the IPRI structure, as related to regression testing

Moving away from the questionable categories employed in the first regression, all individual sub-factors were tested collectively against the innovation proxy of MFP, going from three aggregate variables (the averages) to ten variables. Recall that, per the conceptual testing model, there were four, three, and three, sub-factors applied to Legal Framework, Physical Property rights and Intellectual Property Rights, respectively. Observed in *Figure 14, Regression of MFP vs. All Granular Variables per model, which are subsidiaries of the Legal Framework, Physical Property Rights, Intellectual Property Rights categories*, the ten sub-factors were analyzed. It is evident that the qualifying data chosen by Property Rights Alliance, relative to multifactor productivity (MFP) can instigate results with problematic significant levels. The overall goodness of fit is not overly compelling (.44 and with adjusted R-squared of .34 due to the excessive number of variables); however, econometrically it can be useable. More concerning is that there is no solid reason to explain the erratic behaviors of the signs. Note in the Legal Framework group (LF*), three of four sub-factors are negatively correlated, while only the political stability (LF_Stable?) and rule of law (LF_Rule?) factors show a significant impact.

Given the plethora of other variables, there is too much uncertainty to consider that this model will advance the research accurately.

Dependent Variable: MFP?		<i>JC -- Overloaded variables, no clarity in predictors</i>		
Method: Pooled Least Squares				
Sample: 2006 2014				
Included observations: 8				
Cross-sections included: 73				
Total pool (unbalanced) observations: 568				
Cross sections without valid observations dropped				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.260172	5.667785	-0.575211	0.5654
LF_STABLE?	4.095998	1.680287	2.437677	0.0151 **
LF_CORRUPT?	-0.261215	0.507961	-0.514242	0.6073
LF_RULE?	-2.367586	0.872492	-2.713592	0.0069 **
LF_JUD_IND?	-0.502171	0.502416	-0.999513	0.3181
PPR_REG?	-0.591562	0.386823	-1.529281	0.1269
PPR_LOANS?	0.678644	0.983613	0.68995	0.4906
PPR_FIN?	-0.004358	0.425525	-0.010241	0.9918
IPR_SW?	0.71741	0.60682	1.182244	0.2377
IPR_PATENT?	-2.317082	1.542946	-1.501726	0.1338
IPR_IP_PROT?	0.91686	0.796822	1.150645	0.2505
Fixed Effects (Cross)				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.440306	Mean dependent var	0.017327	
Adjusted R-squared	0.336095	S.D. dependent var	2.630202	
S.E. of regression	2.143098	Akaike info criterion	4.506773	
Sum squared resid	2195.392	Schwarz criterion	5.194785	
Log likelihood	-1189.923	Hannan-Quinn criter.	4.775256	
F-statistic	4.225147	Durbin-Watson stat	1.819495	
Prob(F-statistic)	0			
			* significance to 0.10	
			** significance to 0.05	
			*** significance to 0.01	

Figure 14, Regression of MFP vs. All Granular Variables per model, which are subsidiaries of the Legal Framework, Physical Property Rights, Intellectual Property Rights categories

The next steps in the flowchart process, again referencing *Figure 8, Empirical approach and rationalization for adjustments in variable testing*, focused on Factor Restructuring. This was rationalized due to concerns of multicollinearity-- unexpected signs and very high error terms. Further underscoring this behavior is the correlation matrix in *Table 2, All granular variables with mostly high correlations among each other*. The correlation of the ten variables was very high, outside of a handful of relationships, particularly in “property registration” and also in “access to loans”.

	LE_STABLE	LF_CORRUPT	LF_JUD_IND	LF_RULE	IPR_PATENT	IPR_SW	IPR_IP_PROT	PPR_LOANS	PPR_FIN	PPR_REGISTER
LE_STABLE	1	0.808404	0.64282	0.816927	0.620693	0.730898	0.714803	0.458195	0.686628	0.484294
LF_CORRUPT	0.808404	1	0.885035	0.962409	0.707459	0.873787	0.889274	0.62966	0.872883	0.441482
LF_JUD_IND	0.64282	0.885035	1	0.884018	0.567875	0.80015	0.896515	0.655816	0.916125	0.36618
LF_RULE	0.816927	0.962409	0.884018	1	0.745665	0.898405	0.897841	0.596042	0.892545	0.442546
IPR_PATENT	0.620693	0.707459	0.567875	0.745665	1	0.780014	0.647045	0.393611	0.599091	0.304479
IPR_SW	0.730898	0.873787	0.80015	0.898405	0.780014	1	0.868483	0.532552	0.806777	0.430092
IPR_IP_PROT	0.714803	0.889274	0.896515	0.897841	0.647045	0.868483	1	0.651084	0.9243	0.421248
PPR_LOANS	0.458195	0.62966	0.655816	0.596042	0.393611	0.532552	0.651084	1	0.701161	0.310166
PPR_FIN	0.686628	0.872883	0.916125	0.892545	0.599091	0.806777	0.9243	0.701161	1	0.372286
PPR_REGISTER	0.484294	0.441482	0.36618	0.442546	0.304479	0.430092	0.421248	0.310166	0.372286	1

Table 2, All granular variables with mostly high correlations among each other

As the Property Rights Alliance (PRA) had devised a three-pronged index architecture for analyzing property rights, with subsidiary variables, there was a basic assumption -- the three categories constitute a demarcation of property rights attributes (along with legal or institutional frameworks) in a logical and robust manner. This separation was used to first initiate the “averages” regression; meaning the averages of the four Legal Framework variables, averages for the three Physical Property Rights subsidiary variables, and averages for the three Intellectual Property Rights subsidiary variables. As the “averages” results were disappointing, and while an exhaustive list of the ten variables also showed erraticism, the next approach was to execute a

factor analysis of the variables, potentially removing the variables' impact ambiguity while reducing the number of property rights/environment predictors for MFP. The assumption going into the factor analysis suggested that the results would align to the three IPRI categories.

Employing SPSS, results are included in *Appendix B; Principal Component Analysis Output* delivered only one factor accounting for over 70% of variation. Furthermore, these factor groupings were not sustaining the taxonomy of legal framework, intellectual property and physical property.

Variables Created	FAC1_1	Component score 1	
[DataSet0]			
Communalities			
	Initial		
Judind	1		
Rulelaw	1		
ConCor	1		
PolSta	1		
PR	1		
RegProp	1		
AccessLoan	1		
SW	1		
IP	1		
PatentPro	1		
Extraction Method: Principal Component Analysis.			
Total Variance Explained			
Component	Total	Initial Eigenvalues	
		% of Variance	Cumulative %
1	7.279	72.788	72.788
2	0.837	8.37	81.158
3	0.729	7.293	88.452
4	0.406	4.062	92.514
5	0.334	3.339	95.853
6	0.134	1.345	97.198
7	0.12	1.196	98.393
8	0.068	0.677	99.07
9	0.064	0.637	99.708
10	0.029	0.292	100

Figure 15, Snapshot of initial SPSS Factor Analysis execution, showing 10-variable processing and outputting 1 factor

As a single factor would not be helpful in the current effort, particularly since the expectation was to find some differentiation according to the three-criteria grouping (LF, IPR, PPR), SPSS was then employed to develop factors specifically around these categories. The detailed output is captured in *Appendix B, 0 SPSS Factor Analysis Configuring Three Factors*, whereby each property rights category was made to output PCA values that would be regressed. The outputted values are then listed in *Appendix B, section 0 PCA Factor Output Data for LF, IPR, PPR*.

Below is a snapshot of the data table.

Year	Country	Region	Class	MFP	Factor_Legal	Factor_Phys	Factor_IPR
2006	Algeria	MEA	LD	-5.095	-1.03474	-1.90879	-1.31998
2007	Algeria	MEA	LD	2.810	-1.00222	-1.80926	-1.29492
2008	Algeria	MEA	LD	-3.205	-1.10119	-2.14324	-1.44209
2009	Algeria	MEA	LD	-2.977	-1.20085	-2.27275	-1.37528
2010	Algeria	MEA	LD	-0.653	-1.19758	-1.29778	NA
2011	Algeria	MEA	LD	1.458	-1.28574	-1.68115	-1.54584
2012	Algeria	MEA	LD	-1.783	-1.26108	-2.12603	-1.6644
2013	Algeria	MEA	LD	-2.518	-1.07271	-1.51118	-1.59249
2014	Algeria	MEA	LD	4.383	-1.07763	-1.22621	-1.38701
2006	Argentina	LA	LD	2.818	-0.89879	-1.15058	-0.74859
2007	Argentina	LA	LD	2.960	-0.88471	-1.10815	-0.80636
2008	Argentina	LA	LD	-1.188	-0.97432	-1.03884	-0.85115
2009	Argentina	LA	LD	-4.352	-0.98873	-1.423	-0.83146

Table 3, Snapshot of PCA Factor Output, which was programmed to generate factors according to the IPRI taxonomy -- Legal Framework, Physical Property Rights, Intellectual Property Rights.

The PCA factors were then applied in the original regression structure with MFP as dependent variable and factor predictors submitted as Factor_Legal, Factor_PPR, Factor_IPR.

Dependent Variable: MFP?		JC -- Factors as predictors, all countries		
Method: Pooled Least Squares				
Sample: 2006 2014				
Included observations: 8				
Cross-sections included: 73				
Total pool (unbalanced) observations: 568				
Cross sections without valid observations dropped				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.10092	0.094796	1.064598	0.2876
FACTOR_LEGAL?	3.929559	0.996936	3.941636	0.0001 ***
FACTOR_PPR?	-0.596651	0.413229	-1.443876	0.1494
FACTOR_IPR?	-1.033912	1.292005	-0.800238	0.424
Fixed Effects (Cross)				
Fixed Effects (Period)				
Effects Specification				
R-squared	0.421824	Mean dependent var		0.017333
Adjusted R-squared	0.32407	S.D. dependent var		2.630216
S.E. of regression	2.162431	Akaike info criterion		4.514624
Sum squared resid	2267.912	Schwarz criterion		5.149124
Log likelihood	-1199.153	Hannan-Quinn criter.		4.762225
F-statistic	4.315178	Durbin-Watson stat		1.821887
Prob(F-statistic)	0			
		* significance to 0.10		
		** significance to 0.05		
		*** significance to 0.01		

Figure 16, Regression following PCA Analysis and Factor construction, showing high significance for Legal Framework only

The output of the regression on factors, whose taxonomy matched the original “averages” regression per the three property rights categories, illustrated unexpected signs and very high significance in the Legal Framework area. The R-squared goodness of fit was not high and this would be seen throughout all the regressions, including the most successful test ahead.

To this point, the PRA demarcation of property rights variables is becoming more suspect relative to innovation predictors. Recall that PRA’s contention advanced theory that property rights delivered strength in economy, advances in GDP, and were core to equitability. The

taxonomy and the data collection advised by the PRA included a separation of physical property rights and intellectual property rights. Complementing their data collections are the academic, institutional and commercial rationales, suggesting that intellectual property rights (IPR) will advance innovation, discussed throughout the literature review. This suggestion is challenged by the dissertation thesis. While the empirical testing to this point, illustrated the data sources were not significantly supporting an innovation-via-IPR hypothesis, neither were results to this point showing innovation supported by physical property rights. Nevertheless, would the research have ended here, the PRA approach is still valuable as a launching point for refining tests. Moreover, additional considerations below presented some strength in the variables, constrained and filtered per a re-examination. Referencing the flowchart for the empirical approach, the next stage, seen in *Figure 8, Empirical approach and rationalization for adjustments in variable testing*, was to further assess and analyze ambiguity in the qualitative data, from a theoretical perspective. The granular variables (all ten) were deconstructed to determine if a more refined model could be devised from the observations and data points.

Under this reexamination, a tabular analysis was created, per *Table 4*, and used to effect some changes in the model, based on international business and institutional theory. The re-examination included a rigorous assessment of the attributes embedded in the PRA approach.

Summarily, the software compliance and patent protection, as well as legal framework and average physical property rights were retained as dependent variables. This is justifiable considering the redundancy noted in the various rows and the insistence on separating IP rights vs. Physical Property. Note the fact that software compliance indicates a sector-oriented attribute.

Research Group / Data Source	IPRI Grouping	Variable	Prime Attributes	Attribute Redundancy comments	Action
BSA	Intellectual Property Rights	IPR_SW	Compliance; Enforcement	Little redundancy due to sector confining	Retain as core focus
WEF-GCI	Intellectual Property Rights	IPP_IP_Prot	Anti Counterfeiting; Enforcement	Generalization over copyrights, patents, trademarks	Remove
Ginarte Park Data	Intellectual Property Rights	IPR_Patent	Patent duration and coverage; International consistency; Enforcement	Little IP redundancy but Legal Enforcement is highly focused here	Retain
WEF-GCI	Legal Framework	LF_Judic_Ind	Judiciary Political Independence	Redundant with Rule-of_Law Variable set	Retain Average_LF, as all LF attributes have excessive overlap
World Bank	Legal Framework	LF_Rule of Law	Judiciary Independence; Administrator Ethics; Confidence in Police; Financial Oversight	Redundant with Rule-of_Law Variable set; Financial attribute redundant with Property Rights attributes	per above
World Bank	Legal Framework	LF_Stable	Government stability; Rule of Law continuity	Redundant with Judicial Independence within Legal Framework IPRI Grouping	per above
World Bank	Legal Framework	LF_Corrupt	Judiciary Independence; Administration corruption	Redundant with Judicial Independence within Legal Framework IPRI Grouping	per above
World Bank	Physical Property	PPR_Reg	Entrepreneurial capability; Small Business capital acquisition	Some Financial attribute redundancy	Retain Average_PPR, as all PPR attributes have financial overlap
WEF-GCI	Physical Property	PPR_Prop	Real Property protection; Financial Asset protection	Some Financial attribute redundancy with PPR_Reg	per above
WEF-GCI	Physical Property	PPR_Loans	Financial Access to Capital	Some Financial attribute redundancy with Property Rights and Rule of Law	per above

Table 4, Focused review of variables to modify equation

The regression tests were repeated using the retained variables, whose results are shown in *Figure 17, Regression on MFP impact via SW Compliance, Patent Protection, Average Physical Property rights and Average Legal Framework scores*. The ***expected signs*** for the variables were negative for SW Compliance (as the thesis contends that the absence of IP protections will on average enhance innovation); negative for Patent Protection; positive for physical property rights (as this solidifies ownership in tangible assets); and positive for legal framework (as an equitable and consistent environment promotes industriousness and predictability).

Dependent Variable: MFP?		JC -- no significance		
Method: Pooled Least Squares				
Sample: 2006 2014				
Included observations: 8				
Cross-sections included: 74				
Total pool (unbalanced) observations: 589				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.962724	4.669526	0.848635	0.3965
IPR_SW?	-0.082928	0.611422	-0.135631	0.8922
IPR_PATENT?	0.196347	1.610377	0.121926	0.903
AVG_PPR?	-1.251967	0.767778	-1.630636	0.1036
AVG_LF?	0.303056	0.288448	1.050644	0.2939
Fixed Effects (Cross)				
Fixed Effects (Period)				
Effects Specification				
Cross-section fixed (dummy variables)		All countries		
Period fixed (dummy variables)				
R-squared	0.401513	Mean dependent var		0.035923
Adjusted R-squared	0.301765	S.D. dependent var		2.627818
S.E. of regression	2.195816	Akaike info criterion		4.54376
Sum squared resid	2430.091	Schwarz criterion		5.175621
Log likelihood	-1253.137	Hannan-Quinn criter.		4.789934
F-statistic	4.025284	Durbin-Watson stat		1.801985
Prob(F-statistic)	0			

Figure 17, Regression on MFP impact via SW Compliance, Patent Protection, Average Physical Property rights and Average Legal Framework scores.

Other than the average physical property rights attribute, which is not quite to the 0.1 significance level, none of the variables appear to have the impact expected on innovation. Considering the conceptual model again, another explanatory variable was considered; i.e. overall country risk (or country beta). Under an additional test, this had no marked improvement or explanatory power.

As various views were not showing the relationships with innovation as expected, even under theoretical reconsideration, there had not yet been a test isolating the country economic status; i.e., *developed vs. less developed*. During the literature review and methodology, and cited inside the conceptual model, the economic maturity of the country could have a justifiable impact on innovation. Firstly, developed countries will have more established, legacy IP institutions, whose mature, legal processes could temper sudden shifts in unexplained output. Technological change may not move in spikes in such environments, but rather evolve in a steady pattern. Less developed countries may experience higher multifactor productivity effects due to a less structured oversight by administrators and their correspondingly smaller institutions. Nevertheless, the exercise to minimize variables in a theoretically sound manner still had not shown the expected results until, remarkably, economic maturity was included.

Shown in *Figure 18, Regression of IPR_SW, Avg_PPR, Avg-LF in Less Developed countries*, significance is seen in software compliance (with negative sign), average property rights scores (negative sign), and legal framework (positive sign). The software compliance sign upholds the thesis that less regimented control and oversight will result in more innovation, *ceteris paribus*. The legal framework correlation makes sense in supporting a predictable institutional environment. The lack of significance for patent protection shows no effect on innovation. But what of the physical property rights score? There is significance at the 0.1 p-level, nearly at 0.05, but the negative sign is unexpected.

One possibility is that the property rights factor included an emphasis on protection of financial assets as well as access to loans. A mature institutional environment is required for high scores in this space and that would not be observed very often in less developed countries. This would

be an opportunity to modify the property rights evaluation criteria and perhaps focus more on property rights as a recognition of ownership in capital or real estate rather than debt instruments. The dilemma here is that MFP, requires a means to get product to market, and that implies access to funding, per the adoption cycle earlier. More refinement in the physical property rights factor should be undertaken.

Dependent Variable: MFP?		JC - Less Dev Countries significant effects		
Method: Pooled Least Squares				
Sample: 2006 2014				
Included observations: 9				
Cross-sections included: 39				
Total pool (unbalanced) observations: 350				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.359207	5.50556	-0.065244	0.948
IPR_SW?	-1.629009	0.710319	-2.293349	0.0225 **
IPR_PATENT?	0.265179	0.670446	0.395527	0.6927
AVG_PPR?	-0.902016	0.466195	-1.934847	0.054 *
AVG_LF?	2.095774	0.636125	3.294595	0.0011 **
Fixed Effects (Cross)				
Fixed Effects (Period)				
Effects Specification				
R-squared	0.377163	Mean dependent var		0.534436
Adjusted R-squared	0.273009	S.D. dependent var		3.030038
S.E. of regression	2.583524	Akaike info criterion		4.870125
Sum squared resid	1995.704	Schwarz criterion		5.432281
Log likelihood	-801.2718	Hannan-Quinn criter.		5.093883
F-statistic	3.621222	Durbin-Watson stat		1.888658
Prob(F-statistic)	0.00000			
		* significance to 0.10		
		** significance to 0.05		
		*** significance to 0.01		

Figure 18, Regression of IPR_SW, Avg_PPR, Avg-LF in Less Developed countries

Concluding the empirical process, both an “all-country” regression was run between MFP and patent protection alone. In *Figure 19, Regression on all countries; isolating IPR_Patent predictor to MFP with no significant correlation*, the thesis continues to be supported; the dissertation recommends a limiting of patents as proxies, if not eliminating them, and employing patents as proxy only in the most isolated cases of innovation study. A more thorough examination of innovation recognizes that value chain paradigms acknowledge the amorphous dynamics influencing the development process. Thus, patent-citation should be applied in only the most constraining of scenarios. Further, if the constraint is so isolated, then what is the value of patents as a true metric when innovation moves in such a fluid context?

Dependent Variable: MFP?		JC -- Regression on IPR_Patent only;		
Method: Pooled Least Squares		All Countries		
Date: 12/14/16 Time: 13:34				
Sample: 2006 2014				
Included observations: 9				
Cross-sections included: 74				
Total pool (balanced) observations: 666				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.94975	3.779414	0.251296	0.8017
IPR_PATENT?	-0.096472	0.506251	-0.190561	0.8489
Fixed Effects (Cross)				
Fixed Effects (Period)				
Effects Specification				
R-squared	0.411041	Mean dependent var		0.229724
Adjusted R-squared	0.328203	S.D. dependent var		2.689269
S.E. of regression	2.204212	Akaike info criterion		4.534764
Sum squared resid	2832.534	Schwarz criterion		5.095735
Log likelihood	-1427.076	Hannan-Quinn criter.		4.752109
F-statistic	4.961983	Durbin-Watson stat		1.894752
Prob(F-statistic)	0			

Figure 19, Regression on all countries; isolating IPR_Patent predictor to MFP with no significant correlation

For consistency with the findings that showed sensitivity to a Less Developed country context, a final regression showed no significant relationship in patent-regime maturity/enforcement relative to MFP -- *Figure 20, Regression on Less Developed countries; isolating IPR_Patent predictor to MFP with no significant correlation*

Dependent Variable: MFP?		JC -- Regression on IPR_Patent only;		
Method: Pooled Least Squares		Less Dev Countries		
Date: 12/14/16 Time: 14:21				
Sample: 2006 2014				
Included observations: 9				
Cross-sections included: 38				
Total pool (balanced) observations: 342				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.375963	4.370739	0.086018	0.9315
IPR_PATENT?	0.028724	0.677183	0.042417	0.9662
Fixed Effects (Cross)				
Fixed Effects (Period)				
Effects Specification				
R-squared	0.349662	Mean dependent var		0.561259
Adjusted R-squared	0.248254	S.D. dependent var		3.02452
S.E. of regression	2.622359	Akaike info criterion		4.893044
Sum squared resid	2028.646	Schwarz criterion		5.42005
Log likelihood	-789.7105	Hannan-Quinn criter.		5.102989
F-statistic	3.448052	Durbin-Watson stat		1.813506
Prob(F-statistic)	0			

Figure 20, Regression on Less Developed countries; isolating IPR_Patent predictor to MFP with no significant correlation

5.2.2 Hypotheses Results and Conclusions

The regression results using specified predictors from all three major categories of LF, PPR, IPR (*Figure 18, Regression of IPR_SW, Avg_PPR, Avg-LF in Less Developed countries*) provided a

balanced view of predictors that rationally affect multifactor productivity, this dissertation's proxy for innovation. Within that regression view, two of the three hypotheses offered in this thesis are supported with limitations, while one is not supported.

H₁: Country measured innovation increases without support of intellectual property rights institutions.

This hypothesis was supported. When countries are limited to Less Developed status, the institutional dynamics relating to innovation in the conceptual and the formally tested model show different behavior as compared to all countries including Developed countries. Developed country-only results were not illustrated in the Testing section for brevity but they exhibited no marked difference compared to the "all-country" testing. Most notably, there was no correlation between Patent Protection and Innovation for this macro scenario among Less Developed Countries.

Limited to Less Developed countries, innovation (measured by MFP proxy) increases without support of intellectual property institutions. Regression testing showed reductions in software compliance improved MFP, while patent protection was neutral.

H₂: Country measured innovation is positively correlated with physical property rights institutions in the absence of intellectual property robustness.

This hypothesis was not supported. As discussed in the testing section, the predictor variable (average property rights factors) was negatively correlated at a moderately significant level.

H₃: Innovation will increase through robust legal institutions, which minimize corruption.

Legal institutions had a highly significant correlation (positively and at the 0.01 p-level) with innovation. This was only illustrated for Less Developed countries.

Notably in this empirical test, the sector attribute was witnessed by the IPR_SW variable. This predictor was isolated to the software industry and included both copyrights and patent implications. Per the testing for Less Developed countries, innovation is effected by less oversight, at the macro level, in the space of software development and software licensing compliance. Further study should be undertaken to minimize other noise or disruptive interplay, and to confine MFP within the software domain. As software falls within the Information and Commutation Technology (ICT) sector, firms can be assessed intra-country and then internationally, in a stepwise fashion.

Finally, measures for innovation have been focused on patent proxies, R&D spending proxies, technical labor measurements, and other metrics which do not necessarily, in and of themselves, determine the innovativeness of a country. As proxies are sought for scientific and econometric analysis of innovation, the recognition of value chain dynamics and information flows may be a more robust means for measuring, at both the macro level (the focus of this current thesis) as well as the firm level (for future researchers and practitioners).

6 Summary

In a literature review by Edison, Ali and Torkar (2013) the authors cited innovation measures for the software industry and stated that a consistent perspective of innovation was absent. This is at the core of the innovation metric dilemma. When innovation's genesis can stem from a virtually infinite number of ideas, exchanges, encounters, through collaboration, study, or even accident, then how do we agree on a genuinely scientific metric?

Throughout the social sciences, the patent has been frequently used as a proxy for innovation. This implicitly encourages a policymaking influence, continued support of intellectual property institutions. Yet there are acknowledgements throughout the research, including by those who employ the patent metric, that validity of the patent as innovation-unit-of-measure is suspect, and that further research in innovation is necessary to refine measurements and their proxies. This research intended to contribute to the innovation discipline and add a baseline simplicity to the hyper granular arguments, which often overlook the holistic, value chain impact.

Theory advanced in this dissertation can be summarized as follows. Innovation is the output of multiple internal dynamics in a firm. While this is generally accepted in IB literature and research, the employment of questionable proxies (representing innovation) continues. In the case of this thesis, multifactor productivity (MFP) was the proxy of choice, rationalized by way of value chain processes. MFP is justified as a consistent and globally recognized measure, applicable to micro perspectives as well as macro perspectives, the paradigm of this research. Adoption dynamics are also key to embracing the holistic influences of innovation, and MFP is influenced by the penetration of new products and services in the marketplace. "Crossing the

chasm” is dependent on the innovative differentiators of firms as well as the acceptance of their change and value.

Intellectual Property (IP) is an institutional construct implicitly advanced for competitiveness in countries and firms. But the ubiquitous information explosion makes control of operationalized ideation extremely challenging, especially since innovation is a flowing and evolving force. Prior measures of innovation, such as patent proxies, are a flawed measure of innovation due to their outwardly facing innovation criteria, and the fact that many innovative firms find success in non-intellectual property environments. Further, as innovation is difficult to measure, often being quantified simply by means of a proxy (i.e., patent applications; R&D spend by country, new product offerings), there is little standardization on innovation as a quantifiable metric.

Throughout the literature review and the methodology sections, the intertwined drivers of innovation were examined and analyzed. To research international business (IB) innovation studies and to align them with the IB Strategy discipline, an empirical model was utilized to underscore the fluid nature of innovation and to call for more specificity in measurements.

This research contended that property rights are justifiable as an innovation promoter; *however, this is limited to physical property rights*. This was not significantly evident in this empirical analysis. However, there was empirical evidence that innovation thrived when software compliance was diminished. Also, there was no significant evidence that patent regimes had any effect in promoting innovation.

Innovation has become a buzzword, often without specificity, lacking granular delineation nor appropriate contextualization. It is bandied about by institutions (academic, governmental, commercial) who cite it as a competitive advantage, which must be embedded in a firm’s identity

and ownership. Ignoring its importance shall be destructive to a company's or country's competitive future.

For the large firm, the MNC, an enormous amount of capital is spent in protecting intellectual property under the Legal function of the organization. Investment in legal processes is undertaken to ensure the intellectual intangible property of the firm is protected and cannot be appropriated/implemented by a competitor. The institutional power of government is employed and advanced to provide patents, copyrights, trade secrets, etc., for the protection of firms. But from the firm's point of view, questions should be pondered. Is the enterprise best served by investing its resources in intellectual property pursuits, lobbying, legal challenges and the like, or is the firm wasting its resources when it could employ that energy to develop better ways of manufacturing, faster ways to reach markets, more effective ways to develop brand and credibility?

If firms are, by necessity, required to innovate to remain competitive, are they instead distracted by the resources expended in legal processes vs. processes that are focused on the core competency and offerings of the firm? Are resources better spent on being innovative and competitive? A standard assumption in technology opines that innovation will not take place without a patent, and studies are concentrated on the optimal length and breadth of patent protection (Boldrin and Levine, 2008). In many cases the assumption that patents are necessary for innovation is not intended as an empirical principle, but accepted as fact. Within this paradigm, policy makers and legislatures have been persuaded to grant exclusive rights to innovation by way of artificial extra-legal constructs -- IP.

The aim of this research is to reexamine not only the view of value chain as conduit for innovation, breaking barriers and silos, but to further advance ideas that innovation does not depend on a patent construct. Follow on research should isolate this paradigm to specific sectors, first considering whether the Legal Framework, PPR, and IPR taxonomy is still appropriate, or if PPR should be initially filtered. Further, multifactor productivity (MFP) was implemented as the innovation proxy to determine its sensitivity to property rights. As MFP was analyzed and described as a robust and rational measure of innovation, still useful after decades of economic and business research, there is nevertheless continuing opportunity to assess its measurement applicability in the fluid and dynamic concept of innovation.

Appendix A

Tables in Appendix A represent the dependent variables for 74 countries, and the independent variables, which were regressed according to the empirical process specified in *Section 5, Testing and Results*.

Innovation Data (MFP) Dependent Variable

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	-5.095	2.810	-3.205	-2.977	-0.653	1.458	-1.783	-2.518	4.383
Argentina	LA	LD	2.818	2.960	-1.188	-4.352	5.030	0.401	-3.699	-0.065	-1.875
Australia	APAC	D	-1.459	-0.347	-1.273	-1.077	-0.932	-1.244	0.336	-0.591	0.229
Austria	EU	D	1.949	1.781	-0.344	-2.364	1.046	0.721	0.149	-0.129	-0.552
Bangladesh	APAC	LD	-0.388	-0.822	-0.696	-0.294	0.235	0.512	0.113	0.035	0.814
Belgium	EU	D	0.227	0.719	-1.436	-2.026	1.614	-0.521	-0.816	-0.293	0.126
Bolivia	LA	LD	2.093	1.339	1.806	0.028	-0.505	0.140	-0.073	1.567	-0.001
Brazil	LA	LD	1.249	3.156	1.576	-0.719	2.978	0.237	-0.679	0.311	-2.153
Bulgaria	Eastern EU	LD	0.701	0.779	-1.749	-4.849	0.500	1.266	-0.013	0.111	-0.158
Cameroon	MEA	LD	-0.743	-1.149	-1.527	-2.196	-1.350	-0.058	0.580	1.513	1.836
Canada	NA	D	-0.735	-1.434	-1.566	-1.946	0.721	0.515	-0.670	0.066	0.562
Chile	LA	D	-0.534	-0.964	-3.576	-4.449	-1.283	-0.437	0.716	-0.648	-1.124
China (Official)	APAC	LD	4.672	6.078	2.461	0.901	1.853	1.730	0.585	0.813	0.777
Colombia	LA	LD	1.867	1.175	-1.141	-1.398	-0.205	0.889	-0.473	1.086	0.280
Costa Rica	LA	LD	3.595	0.345	-2.856	-1.513	0.919	-0.257	-0.650	1.040	-1.280
Cyprus	EU	D	1.447	-0.622	-1.221	-3.585	-0.517	-0.462	-0.848	-2.135	-0.553
Czech Republic	Eastern EU	D	4.644	2.389	-0.799	-4.873	1.107	0.741	-1.139	-1.032	0.742
Denmark	EU	D	0.338	-1.235	-2.503	-3.893	2.944	0.006	0.432	-1.654	0.125
Dominican Republic	LA	LD	4.634	2.467	-2.351	-1.188	2.491	-1.779	-0.921	1.865	2.673
Ecuador	LA	LD	1.134	1.061	4.276	-0.013	2.583	4.277	2.111	1.351	-0.404
Egypt	MEA	LD	0.565	-3.337	-1.219	-1.131	-0.087	-3.841	-1.180	-1.345	1.126
Finland	EU	D	1.813	2.328	-1.750	-7.216	2.319	1.121	-2.293	-0.504	-0.783
France	EU	D	1.448	-0.423	-1.645	-2.328	0.860	0.626	-0.631	0.550	-0.702
Germany	EU	D	1.494	0.959	-0.623	-4.347	2.421	1.850	-0.206	-0.055	0.203
Greece	EU	D	2.696	0.128	-2.879	-4.551	-2.994	-5.928	-3.617	-0.606	2.179
Guatemala	LA	LD	0.198	3.500	1.350	-0.440	2.903	1.578	-3.719	3.783	1.305
Hong Kong	APAC	D	3.530	2.045	0.333	-3.302	3.195	2.106	-1.189	-0.432	0.309
Hungary	Eastern EU	D	1.726	-1.663	-0.136	-6.199	0.196	0.493	-0.139	0.841	0.646
Iceland	EU	D	-1.561	3.608	-1.701	1.428	-2.169	1.048	1.393	2.604	-0.151
India	APAC	LD	1.701	1.266	0.500	-0.333	3.003	0.899	0.722	1.326	1.969
Indonesia	APAC	LD	1.969	-0.453	1.534	0.438	1.842	1.851	1.458	1.254	0.896
Ireland	EU	D	-0.268	0.004	-3.607	-1.637	2.258	2.570	-0.955	-0.646	2.745
Israel	MEA	D	2.646	1.140	-0.846	-1.119	2.094	1.315	-0.366	0.144	-0.055
Italy	EU	D	-0.198	-0.471	-1.669	-3.983	1.633	0.186	-1.423	-0.126	-0.270
Japan	APAC	D	0.096	0.926	-1.129	-3.161	3.933	-0.510	0.735	0.942	-0.687
Jordan	MEA	LD	2.017	0.046	2.142	0.709	0.212	0.489	0.439	-2.141	-4.201
Kenya	MEA	LD	1.079	2.064	-4.191	-0.224	3.911	2.002	-0.152	1.410	0.570
Lithuania	Eastern EU	D	3.044	3.545	-1.316	-11.074	2.505	4.260	1.246	1.265	0.249
Luxembourg	EU	D	1.151	2.774	-6.009	-5.688	2.940	-1.226	-4.034	2.289	0.678
Malaysia	APAC	LD	1.700	2.039	1.564	-4.729	0.895	1.099	0.538	-0.684	1.025
Malta	EU	D	-1.049	0.826	0.482	-3.083	1.628	1.340	1.497	1.879	1.385
Mexico	LA	LD	1.365	-0.282	-3.111	-5.386	-0.177	0.966	0.348	-1.439	-0.036
Morocco	MEA	LD	-0.727	1.276	-2.462	-4.402	0.344	-0.417	0.142	1.634	-0.041
Netherlands	EU	D	1.050	0.551	-0.695	-3.801	1.201	0.207	-1.159	-0.420	0.377
New Zealand	APAC	D	-0.970	0.934	-3.050	-0.436	0.202	-0.168	1.257	-1.303	-0.979
Nigeria	MEA	LD	3.330	5.108	4.215	3.989	3.932	0.754	2.097	-0.084	0.777
Norway	EU	D	-1.857	-2.183	-4.034	-2.688	-1.005	-1.563	0.082	-1.040	-0.073
Pakistan	APAC	LD	-0.554	0.369	-1.318	-0.587	-0.463	0.733	2.284	2.865	3.122
Peru	LA	LD	3.090	3.135	2.142	-2.875	1.986	-0.274	-0.133	-0.240	-2.471
Philippines	APAC	LD	2.737	3.689	0.009	-1.705	3.107	-1.111	4.221	2.602	2.418
Poland	Eastern EU	LD	2.020	1.641	-1.135	0.249	2.881	2.306	-0.462	-0.535	0.026
Portugal	EU	D	0.124	0.262	-1.336	-2.669	1.421	-0.746	-1.624	-0.187	-0.394
Qatar	MEA	LD	6.561	-5.338	-1.836	-2.995	5.262	1.848	-3.350	-3.390	-2.251
Russian Federation	Eastern EU	LD	6.639	6.125	4.161	-6.007	3.941	3.244	2.381	1.357	0.558
Saudi Arabia	MEA	LD	-4.206	-6.365	-2.255	-8.265	-2.056	2.210	-1.782	-3.780	-1.825
Senegal	MEA	LD	-2.682	-0.772	-1.559	-2.179	-0.578	-3.052	-0.164	-1.645	-1.118
Singapore	APAC	D	1.124	2.329	-5.093	-4.395	7.452	1.298	-2.080	0.007	-0.101
Slovak Republic	Eastern EU	D	5.819	7.133	2.382	-4.714	3.919	1.017	0.921	1.574	1.404
South Africa	MEA	LD	1.382	2.260	-1.198	-2.269	1.984	-1.229	-0.591	-1.331	-1.229
South Korea	APAC	D	2.314	3.514	2.247	-0.286	4.806	3.349	-2.651	2.728	-1.003
Spain	EU	D	-0.588	-0.392	-1.509	-1.254	0.236	-0.574	-0.536	-0.591	-0.109
Sri Lanka	APAC	LD	3.472	3.553	5.610	1.809	3.634	4.000	2.374	3.140	4.977
Sweden	EU	D	2.059	-0.244	-3.022	-4.612	3.500	0.254	-1.398	-0.014	0.249
Switzerland	EU	D	1.727	1.465	-0.079	-2.827	2.021	-0.368	-0.203	0.727	0.236
Taiwan	APAC	D	2.174	3.632	-0.128	-1.034	7.622	1.338	0.142	0.343	1.614
Thailand	APAC	LD	1.694	2.119	-0.841	-3.779	4.781	-2.378	4.403	1.838	0.071
Turkey	MEA	LD	0.645	-0.057	-3.404	-6.451	3.347	1.898	-2.287	0.174	-0.646
Ukraine	Eastern EU	LD	6.783	6.718	1.523	-13.525	7.687	5.590	0.318	0.414	-5.856
United Kingdom	EU	D	0.981	0.649	-1.877	-2.959	0.561	1.044	-0.672	0.331	0.308
United States	NA	D	-0.345	-0.334	-0.929	-0.068	1.768	-0.196	0.150	-0.255	0.237
Venezuela	LA	LD	4.133	2.401	-0.215	-5.463	-4.212	0.889	2.549	-1.221	-6.524
Vietnam	APAC	LD	-0.316	-1.603	-2.886	-0.647	-0.342	1.996	0.401	1.112	1.619
Zambia	MEA	LD	4.456	4.458	3.639	5.797	6.714	-0.260	0.657	-0.031	1.219
Zimbabwe	MEA	LD	-1.695	-1.801	-16.220	9.217	11.576	12.007	12.436	3.372	0.874

Table 5, Innovation data, represented as multifactor productivity values

Legal Framework Data (LF)

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.888	4.423	3.527	3.017	3.004	2.536	2.535	3.690	4.102
Argentina	LA	LD	1.999	1.956	2.019	2.349	2.604	2.633	2.123	2.294	2.155
Australia	APAC	D	8.632	8.998	9.083	9.074	8.792	8.531	8.340	7.902	8.147
Austria	EU	D	8.082	8.436	8.515	8.462	7.957	7.569	6.986	6.838	6.957
Bangladesh	APAC	LD	2.637	2.597	3.622	4.133	3.980	3.702	3.074	2.392	2.050
Belgium	EU	D	6.952	7.275	7.901	7.274	7.008	7.114	7.057	7.377	7.784
Bolivia	LA	LD	2.289	2.394	2.034	1.772	2.191	3.366	3.573	3.507	3.823
Brazil	LA	LD	3.174	3.572	4.690	4.314	4.202	4.561	4.584	4.779	4.255
Bulgaria	Eastern EU	LD	2.540	2.919	3.180	3.161	3.263	3.227	3.138	2.668	2.215
Cameroon	MEA	LD	2.026	1.994	1.989	2.357	2.747	2.865	2.435	2.135	3.049
Canada	NA	D	7.745	8.356	8.789	8.678	8.739	8.883	8.840	8.584	8.588
Chile	LA	D	4.987	5.412	5.832	6.182	7.272	7.446	7.197	7.148	7.021
China	APAC	LD	3.924	4.050	4.684	4.914	4.951	4.889	4.791	5.013	4.977
Colombia	LA	LD	4.216	4.685	5.135	4.397	4.138	4.173	3.610	3.406	3.068
Costa Rica	LA	LD	6.775	6.795	7.032	7.194	7.129	6.459	6.110	6.364	6.733
Cyprus	EU	D	7.169	6.947	7.329	7.361	7.490	7.148	6.284	5.791	5.774
Czech Republic	Eastern EU	D	5.122	5.165	5.292	5.011	4.957	4.508	4.461	4.649	4.780
Denmark	EU	D	8.757	9.073	9.205	9.171	9.003	9.255	8.360	8.595	9.190
Dominican Republic	LA	LD	3.317	3.775	3.390	3.825	3.442	2.821	2.641	2.299	2.477
Ecuador	LA	LD	1.221	1.738	1.650	1.625	1.657	2.174	2.418	3.598	
Egypt	MEA	LD	6.372	6.434	6.587	4.798	4.855	6.277	5.239	4.093	5.010
Finland	EU	D	8.394	9.044	9.376	9.130	8.879	9.021	9.157	9.323	9.282
France	EU	D	6.818	7.097	7.103	6.262	6.318	6.499	6.510	6.763	6.614
Germany	EU	D	8.985	9.211	9.231	9.010	8.944	8.890	8.736	8.381	8.140
Greece	EU	D	5.451	5.691	5.138	4.468	4.239	3.888	3.426	4.023	4.432
Guatemala	LA	LD	3.027	3.817	3.789	3.338	2.873	2.745	3.097	3.378	3.324
Hong Kong SAR	APAC	D	7.679	8.228	8.372	8.391	8.576	8.468	8.406	8.809	8.874
Hungary	Eastern EU	D	5.460	5.680	5.566	5.197	5.063	4.868	4.495	4.764	5.066
Iceland	EU	D	8.264	8.422	8.232	8.064	8.177	8.047	7.907	7.598	7.520
India	APAC	LD	7.698	7.159	6.519	6.602	6.276	5.573	5.868	6.239	5.351
Indonesia	APAC	LD	3.290	3.279	4.278	4.721	4.662	4.332	4.282	4.429	4.771
Ireland	EU	D	8.502	8.344	8.712	8.905	8.748	8.777	8.883	8.919	8.791
Israel	MEA	D	8.417	8.379	7.875	8.379	8.680	8.635	8.093	7.943	7.952
Italy	EU	D	4.237	4.657	4.326	3.562	4.132	4.987	4.617	4.525	4.232
Japan	APAC	D	7.418	7.520	7.303	7.486	7.831	8.048	8.042	8.270	8.604
Jordan	MEA	LD	6.346	6.465	6.608	6.611	6.023	5.590	5.646	5.723	5.768
Kenya	MEA	LD	3.263	3.308	3.349	2.895	2.631	3.237	4.008	4.951	5.216
Lithuania	Eastern EU	D	3.571	4.337	4.700	4.564	4.320	3.990	4.140	4.516	4.410
Luxembourg	EU	D	7.749	7.586	8.101	8.313	8.112	8.485	8.075	7.771	8.328
Malaysia	APAC	LD	7.259	7.061	6.094	5.343	5.564	6.130	6.041	5.913	6.450
Malta	EU	D	7.001	7.179	7.204	6.775	6.734	6.891	6.696	6.304	6.015
Mexico	LA	LD	4.283	4.302	4.020	3.730	3.693	3.738	3.941	3.913	3.663
Morocco	MEA	LD	3.819	4.727	4.833	4.196	4.138	4.285	4.169	3.984	4.200
Netherlands	EU	D	8.758	9.011	9.183	8.944	8.709	8.911	9.065	8.629	8.482
New Zealand	APAC	D	8.640	9.150	9.386	9.564	9.597	9.553	9.485	9.464	9.583
Nigeria	MEA	LD	4.097	4.203	5.434	5.127	4.137	4.517	4.477	3.683	3.452
Norway	EU	D	8.625	8.477	8.480	8.611	8.705	8.802	8.734	8.758	8.908
Pakistan	APAC	LD	3.326	4.182	3.705	3.525	4.256	4.889	5.165	5.103	4.698
Peru	LA	LD	1.647	1.989	2.879	3.093	2.689	2.696	2.472	2.564	2.451
Philippines	APAC	LD	3.459	3.856	4.120	3.561	3.073	3.248	3.360	3.610	4.255
Poland	Eastern EU	LD	4.091	4.229	4.529	5.240	5.557	5.554	5.412	5.151	5.181
Portugal	EU	D	7.713	7.797	7.024	6.160	5.476	4.890	4.782	5.296	5.818
Qatar	MEA	LD	7.505	7.508	7.771	8.821	8.859	8.373	8.660	8.467	8.291
Russian Federation	Eastern EU	LD	2.157	2.827	3.185	2.824	2.872	2.662	2.594	2.795	3.175
Saudi Arabia	MEA	LD		5.652	6.633	6.667	7.001	7.630	7.171	7.142	7.023
Senegal	MEA	LD		2.532	2.715	2.902	3.489	2.924	2.702	3.443	4.206
Singapore	APAC	D	7.157	7.663	8.182	7.990	7.730	7.734	7.821	7.795	7.780
Slovak Republic	Eastern EU	D	4.119	4.344	4.424	4.177	3.175	2.768	2.783	2.227	2.099
South Africa	MEA	LD	7.080	7.419	7.078	6.600	6.165	6.622	7.145	7.469	7.399
South Korea	APAC	D	5.265	6.889	6.288	5.132	4.983	4.593	4.472	4.236	4.176
Spain	EU	D	4.567	4.592	5.440	5.109	4.697	4.861	5.011	4.464	3.672
Sri Lanka	APAC	LD	3.772	4.930	5.405	5.870	6.088	5.508	5.174	4.890	4.392
Sweden	EU	D	7.344	8.596	9.329	9.345	9.259	9.119	8.681	8.588	7.844
Switzerland	EU	D	8.536	8.828	9.182	8.952	8.977	9.008	8.794	8.470	8.450
Taiwan, China	APAC	D	5.260	5.494	5.956	6.020	5.997	6.094	6.064	5.903	5.400
Thailand	APAC	LD	5.685	6.201	5.718	5.332	5.533	5.339	5.020	4.665	4.671
Turkey	MEA	LD	4.826	5.659	5.002	4.509	4.007	3.773	4.094	4.010	3.453
Ukraine	Eastern EU	LD	2.386	2.540	2.600	2.088	1.663	1.801	2.522	2.031	1.694
United Kingdom	EU	D	8.524	8.405	7.983	8.366	8.808	8.664	8.657	8.723	8.669
United States	NA	D	6.950	6.761	7.458	7.238	6.616	6.572	6.500	6.737	6.837
Venezuela	LA	LD	0.388	0.314	0.628	0.744	1.154	1.082	0.454	0.189	0.192
Vietnam	APAC	LD	4.057	4.343	4.452	4.642	4.781	4.326	3.943	3.935	4.005
Zambia	MEA	LD	2.860	3.483	4.148	4.565	4.646	4.115	4.182	4.578	4.522
Zimbabwe	MEA	LD	1.409	1.359	1.732	1.736	2.098	2.733	2.887	2.860	2.508

Table 6, Judicial Independence values, normalized from a 1-7 range into a 0-10 scale

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.685	3.549	3.587	3.485	3.502	3.449	3.507	3.683	3.533
Argentina	LA	LD	3.811	3.745	3.597	3.590	3.761	3.823	3.584	3.535	3.190
Australia	APAC	D	8.500	8.476	8.508	8.464	8.526	8.483	8.514	8.530	8.855
Austria	EU	D	8.824	8.924	8.854	8.574	8.612	8.622	8.706	8.680	8.914
Bangladesh	APAC	LD	3.228	3.327	3.490	3.453	3.427	3.577	3.201	3.355	3.559
Belgium	EU	D	7.403	7.616	7.655	7.711	7.740	7.808	7.811	7.828	8.022
Bolivia	LA	LD	3.278	3.315	3.005	2.715	2.884	2.970	2.919	2.855	2.844
Brazil	LA	LD	4.165	4.129	4.271	4.566	4.998	4.994	4.806	4.779	4.832
Bulgaria	Eastern EU	LD	4.721	4.789	4.681	4.853	4.792	4.726	4.769	4.742	4.845
Cameroon	MEA	LD	2.734	2.659	2.813	2.771	2.895	2.873	2.934	2.913	3.246
Canada	NA	D	8.585	8.583	8.598	8.612	8.620	8.487	8.528	8.502	8.788
Chile	LA	D	7.460	7.467	7.542	7.548	7.645	7.712	7.749	7.687	7.837
China (Official)	APAC	LD	3.895	4.098	4.334	4.357	4.343	4.215	4.036	4.097	4.331
Colombia	LA	LD	3.947	4.062	4.136	4.120	4.299	4.420	4.227	4.118	4.311
Costa Rica	LA	LD	5.826	5.657	5.829	6.049	5.956	5.839	5.954	6.022	6.028
Cyprus	EU	D	7.149	7.164	7.379	7.382	7.392	7.106	7.157	7.017	7.117
Czech Republic	Eastern EU	D	6.675	6.724	6.776	6.871	6.851	7.045	7.032	7.024	7.272
Denmark	EU	D	8.974	9.005	8.901	8.842	8.793	8.858	8.724	8.769	9.187
Dominican Republic	LA	LD	3.859	3.766	3.668	3.463	3.392	3.483	3.625	3.977	4.242
Ecuador	LA	LD	2.858	2.862	2.645	2.495	2.594	2.590	2.712	3.082	2.889
Egypt	MEA	LD	4.587	4.618	4.832	4.884	4.770	4.187	4.089	3.805	3.796
Finland	EU	D	8.926	8.792	8.809	8.948	8.954	8.912	8.909	8.874	9.241
France	EU	D	7.896	7.863	7.957	7.855	8.023	7.880	7.883	7.818	7.933
Germany	EU	D	8.516	8.499	8.441	8.279	8.232	8.215	8.297	8.253	8.704
Greece	EU	D	6.720	6.681	6.673	6.239	6.210	6.096	5.804	5.894	5.690
Guatemala	LA	LD	2.764	2.690	2.695	2.861	2.988	2.864	2.800	2.771	3.024
Hong Kong	APAC	D	8.056	8.019	7.951	7.966	8.078	8.101	8.134	8.109	8.708
Hungary	Eastern EU	D	6.925	6.841	6.784	6.518	6.495	6.490	6.209	6.145	5.994
Iceland	EU	D	8.807	8.698	8.773	8.411	8.395	8.354	8.366	8.312	8.443
India	APAC	LD	5.370	5.213	5.181	5.046	4.918	4.779	4.817	4.839	4.822
Indonesia	APAC	LD	3.541	3.648	3.685	3.810	3.720	3.784	3.825	3.912	4.308
Ireland	EU	D	8.395	8.424	8.383	8.484	8.537	8.531	8.481	8.464	8.602
Israel	MEA	D	6.776	6.623	6.655	6.646	6.797	6.998	6.853	6.925	7.210
Italy	EU	D	5.703	5.871	5.835	5.702	5.757	5.841	5.739	5.732	5.674
Japan	APAC	D	7.706	7.655	7.639	7.594	7.652	7.591	7.667	7.840	8.197
Jordan	MEA	LD	5.760	5.905	5.922	5.595	5.449	5.519	5.770	5.807	5.963
Kenya	MEA	LD	3.216	3.049	2.967	2.901	3.013	3.088	3.279	3.506	4.120
Lithuania	Eastern EU	D	6.329	6.345	6.359	6.394	6.509	6.513	6.633	6.601	6.813
Luxembourg	EU	D	8.370	8.506	8.601	8.635	8.663	8.604	8.569	8.598	8.791
Malaysia	APAC	LD	6.064	5.992	5.758	5.974	6.053	6.046	6.008	5.942	6.281
Malta	EU	D	8.080	8.173	8.193	7.964	7.873	7.601	7.691	7.665	7.412
Mexico	LA	LD	4.078	3.921	3.569	3.786	3.836	3.880	3.885	3.862	4.107
Morocco	MEA	LD	4.491	4.468	4.428	4.616	4.687	4.553	4.593	4.516	4.895
Netherlands	EU	D	8.533	8.530	8.491	8.610	8.621	8.628	8.705	8.640	8.964
New Zealand	APAC	D	8.580	8.656	8.705	8.873	8.737	8.815	8.777	8.743	9.034
Nigeria	MEA	LD	2.840	2.870	2.886	2.673	2.653	2.566	2.650	2.692	2.828
Norway	EU	D	8.921	8.837	8.915	8.780	8.834	8.787	8.920	8.959	9.091
Pakistan	APAC	LD	3.324	3.245	3.051	3.317	3.522	3.181	3.198	3.260	3.440
Peru	LA	LD	3.507	3.448	3.510	3.686	3.790	3.766	3.775	3.791	3.894
Philippines	APAC	LD	4.173	4.046	3.872	3.803	3.832	3.922	3.925	4.162	4.344
Poland	Eastern EU	LD	5.708	5.736	6.019	6.194	6.316	6.502	6.509	6.590	6.635
Portugal	EU	D	6.908	6.959	6.987	7.093	7.086	7.052	7.097	7.086	7.261
Qatar	MEA	LD	6.446	6.270	6.576	7.023	6.891	6.684	7.084	7.107	6.972
Russian Federation	Eastern EU	LD	3.135	3.096	3.133	3.463	3.464	3.528	3.373	3.447	3.577
Saudi Arabia	MEA	LD	5.218	5.374	5.378	5.320	5.519	5.271	5.502	5.547	5.538
Senegal	MEA	LD	4.513	4.496	4.427	4.259	4.195	4.033	4.382	4.460	4.785
Singapore	APAC	D	8.255	8.291	8.286	8.208	8.367	8.452	8.567	8.509	8.788
Slovak Republic	Eastern EU	D	6.038	5.904	6.138	5.998	6.050	6.144	5.931	5.911	5.945
South Africa	MEA	LD	5.452	5.126	5.068	5.186	5.216	5.244	5.176	5.283	5.335
South Korea	APAC	D	6.679	7.039	6.705	6.956	6.980	7.046	6.957	6.894	6.960
Spain	EU	D	7.194	7.259	7.333	7.266	7.317	7.353	7.106	7.013	6.874
Sri Lanka	APAC	LD	5.383	5.303	5.001	4.863	4.849	4.865	4.816	4.500	4.700
Sweden	EU	D	8.678	8.757	8.826	8.931	8.925	8.897	8.891	8.931	8.985
Switzerland	EU	D	8.604	8.672	8.616	8.511	8.533	8.476	8.646	8.604	9.031
Taiwan	APAC	D	6.522	6.500	6.519	6.851	7.031	7.092	7.104	7.109	7.393
Thailand	APAC	LD	4.946	4.829	4.720	4.555	4.606	4.579	4.672	4.748	4.699
Turkey	MEA	LD	5.085	5.036	5.166	5.205	5.236	5.157	5.086	5.168	5.074
Ukraine	Eastern EU	LD	3.375	3.508	3.613	3.453	3.374	3.342	3.426	3.363	3.426
United Kingdom	EU	D	8.514	8.369	8.328	8.452	8.523	8.290	8.401	8.369	8.774
United States	NA	D	8.150	8.158	8.225	8.151	8.260	8.210	8.231	8.093	8.229
Venezuela	LA	LD	2.202	1.901	1.792	1.803	1.708	1.659	1.636	1.375	1.212
Vietnam	APAC	LD	4.122	4.171	4.204	4.054	3.946	4.032	4.008	4.038	4.378
Zambia	MEA	LD	3.819	3.852	4.127	4.030	4.005	4.067	4.219	4.426	4.487
Zimbabwe	MEA	LD	1.556	1.432	1.472	1.316	1.373	1.445	1.726	1.822	2.134

Table 7, Rule of Law values; normalized from -2.5 to +2.5 range into a 0-10 scale

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	2.764	2.753	2.818	2.570	2.479	2.275	2.363	2.632	2.668
Argentina	LA	LD	5.033	5.243	4.852	4.530	4.824	5.276	5.168	5.091	4.972
Australia	APAC	D	6.830	6.849	6.894	6.654	6.737	6.853	6.990	7.034	7.044
Austria	EU	D	7.151	7.549	7.671	7.332	7.240	7.350	7.647	7.684	7.529
Bangladesh	APAC	LD	2.053	2.009	2.040	1.918	2.207	2.219	2.291	1.743	3.161
Belgium	EU	D	6.690	6.530	6.237	6.584	6.558	6.863	6.802	6.835	6.418
Bolivia	LA	LD	3.354	3.329	3.590	3.940	4.111	4.113	3.999	4.304	4.308
Brazil	LA	LD	4.444	4.244	4.414	5.329	5.010	4.726	5.090	4.435	4.805
Bulgaria	Eastern EU	LD	5.779	5.701	5.696	5.637	5.652	5.555	5.702	5.295	5.143
Cameroon	MEA	LD	4.472	4.325	3.899	4.036	3.548	3.679	3.847	3.940	2.942
Canada	NA	D	6.981	6.925	7.005	7.193	6.802	7.115	7.179	7.060	7.311
Chile	LA	D	6.161	5.797	5.824	6.185	6.345	5.914	5.685	5.752	5.913
China (Official)	APAC	LD	3.914	4.014	4.039	4.144	3.687	3.788	3.895	3.908	3.931
Colombia	LA	LD	1.297	1.430	1.323	1.338	1.941	2.473	2.205	2.432	2.763
Costa Rica	LA	LD	6.494	6.220	5.741	6.144	6.365	6.007	6.253	6.326	6.172
Cyprus	EU	D	6.031	6.069	6.282	5.759	5.886	6.192	6.236	6.099	6.112
Czech Republic	Eastern EU	D	7.016	6.957	7.022	6.757	6.914	7.186	7.082	7.104	6.925
Denmark	EU	D	7.053	7.215	7.093	6.946	7.055	7.194	6.810	6.898	6.867
Dominican Republic	LA	LD	4.808	4.827	4.935	4.979	4.861	4.972	5.476	5.364	5.256
Ecuador	LA	LD	3.290	3.415	3.544	3.633	3.758	3.573	3.790	4.635	4.964
Egypt	MEA	LD	3.271	3.816	3.958	3.761	3.185	2.111	2.071	1.703	1.784
Finland	EU	D	7.984	7.981	7.884	7.850	7.777	7.740	7.762	7.715	7.520
France	EU	D	6.132	6.104	6.051	5.950	6.337	6.182	6.101	5.882	5.611
Germany	EU	D	6.992	6.967	6.849	6.669	6.564	6.670	6.550	6.856	6.842
Greece	EU	D	6.272	6.063	5.551	4.552	4.735	4.799	4.563	4.659	4.749
Guatemala	LA	LD	3.522	3.470	3.546	3.111	3.256	3.471	3.688	3.632	3.695
Hong Kong	APAC	D	7.207	7.073	7.146	6.854	6.764	6.832	6.955	6.768	7.229
Hungary	Eastern EU	D	6.910	6.442	6.431	6.034	6.336	6.464	6.331	6.559	6.352
Iceland	EU	D	7.876	7.972	7.425	7.352	7.013	7.454	7.435	7.517	7.448
India	APAC	LD	2.886	2.710	2.801	2.343	2.537	2.412	2.496	2.635	3.045
Indonesia	APAC	LD	2.201	2.600	2.833	3.483	3.294	3.471	3.850	4.006	4.186
Ireland	EU	D	7.265	7.305	7.287	7.045	6.952	6.857	6.844	6.754	7.094
Israel	MEA	D	2.451	2.473	2.333	1.754	2.360	2.619	2.862	2.821	2.910
Italy	EU	D	6.001	5.869	6.054	5.681	5.944	6.007	6.027	5.999	5.924
Japan	APAC	D	7.164	6.905	6.667	6.873	6.703	6.962	6.847	6.986	6.898
Jordan	MEA	LD	3.463	4.375	4.271	4.288	4.379	3.968	3.958	3.768	3.905
Kenya	MEA	LD	2.762	2.460	2.235	2.140	2.664	2.519	2.368	2.703	2.417
Lithuania	Eastern EU	D	6.669	6.555	6.450	6.195	6.330	6.270	6.491	6.871	6.445
Luxembourg	EU	D	7.796	7.960	8.019	7.847	7.875	7.621	7.674	7.663	7.722
Malaysia	APAC	LD	5.512	5.344	5.154	4.860	5.243	5.160	4.986	5.101	5.487
Malta	EU	D	7.404	7.501	7.534	7.419	7.416	7.070	7.078	7.010	7.199
Mexico	LA	LD	3.714	3.536	3.402	3.603	3.524	3.636	3.635	3.542	3.295
Morocco	MEA	LD	4.051	3.978	3.801	4.179	4.234	4.211	4.075	4.030	4.137
Netherlands	EU	D	6.745	6.552	6.721	6.817	6.822	7.185	7.339	7.234	7.057
New Zealand	APAC	D	7.395	7.408	7.240	7.067	7.439	7.740	7.725	7.908	7.907
Nigeria	MEA	LD	0.935	0.982	1.284	1.095	0.621	1.114	0.885	0.843	0.735
Norway	EU	D	7.407	7.248	7.486	7.487	7.608	7.647	7.615	7.660	7.222
Pakistan	APAC	LD									
Peru	LA	LD	3.301	3.481	3.208	2.638	3.049	3.526	3.256	3.465	3.902
Philippines	APAC	LD	1.700	1.737	1.461	1.574	1.742	2.235	2.671	2.886	3.554
Poland	Eastern EU	LD	5.652	6.275	6.718	6.809	6.969	7.107	7.057	6.922	6.700
Portugal	EU	D	6.840	6.549	6.929	6.527	6.399	6.438	6.516	6.458	6.604
Qatar	MEA	LD	6.804	6.882	7.195	7.417	7.230	7.327	7.421	7.379	6.952
Russian Federation	Eastern EU	LD	3.192	3.284	3.473	3.098	3.177	3.025	3.343	3.528	3.117
Saudi Arabia	MEA	LD	3.924	3.994	4.254	3.985	4.551	4.079	4.098	4.183	4.437
Senegal	MEA	LD	4.431	4.495	4.704	4.606	4.146	4.407	4.768	4.881	4.615
Singapore	APAC	D	7.412	7.297	7.615	7.285	7.271	7.352	7.683	7.687	7.328
Slovak Republic	Eastern EU	D	6.520	7.019	7.124	6.760	7.040	6.920	7.142	7.199	7.024
South Africa	MEA	LD	5.106	5.394	5.086	4.774	4.960	5.061	4.958	4.910	4.739
South Korea	APAC	D	5.749	6.052	5.787	5.759	5.569	5.775	5.476	5.498	5.184
Spain	EU	D	4.621	4.389	4.202	4.069	4.421	5.076	4.975	5.065	5.528
Sri Lanka	APAC	LD	2.152	1.532	1.405	2.305	3.156	3.603	3.593	3.819	4.337
Sweden	EU	D	7.517	7.489	7.203	7.123	7.171	7.445	7.321	7.255	7.112
Switzerland	EU	D	7.531	7.486	7.449	7.554	7.449	7.560	7.797	7.740	7.760
Taiwan	APAC	D	6.243	6.040	6.597	6.066	6.666	6.871	6.774	6.732	6.490
Thailand	APAC	LD	2.719	2.698	2.435	2.169	2.147	2.755	2.582	2.379	3.174
Turkey	MEA	LD	3.795	3.364	3.312	2.936	3.161	3.091	2.612	2.598	2.863
Ukraine	Eastern EU	LD	4.932	5.297	5.062	4.379	4.950	4.838	4.796	3.483	1.025
United Kingdom	EU	D	6.276	6.114	5.908	5.213	5.799	5.701	5.822	5.975	5.869
United States	NA	D	5.973	5.743	6.116	5.855	5.867	6.190	6.264	6.270	6.151
Venezuela	LA	LD	2.544	2.580	2.411	2.453	2.518	2.833	2.992	2.870	3.263
Vietnam	APAC	LD	5.734	5.424	5.270	5.478	5.211	5.331	5.470	5.440	4.902
Zambia	MEA	LD	5.721	5.685	5.922	6.069	5.919	5.937	6.212	5.769	5.295
Zimbabwe	MEA	LD	3.187	2.782	2.603	2.676	2.761	3.092	3.419	3.641	3.639

Table 8, Political Stability values, normalized from -2.5 to +2.5 range into a 0-10 scale

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	4.041	3.979	3.877	3.907	4.024	4.010	4.053	4.057	3.770
Argentina	LA	LD	4.255	4.251	4.052	3.994	4.175	4.196	4.016	4.074	3.839
Australia	APAC	D	8.990	9.092	9.146	9.157	9.088	9.160	9.016	8.546	8.740
Austria	EU	D	8.989	9.214	8.838	8.528	8.253	7.890	7.715	8.033	7.875
Bangladesh	APAC	LD	2.148	2.901	2.969	2.945	2.953	2.907	3.274	3.219	3.179
Belgium	EU	D	7.504	7.599	7.639	7.856	7.988	8.120	8.126	8.284	8.105
Bolivia	LA	LD	4.206	4.281	4.017	3.743	4.116	3.931	3.581	3.823	3.721
Brazil	LA	LD	4.728	4.762	4.950	4.756	5.000	5.299	4.865	4.766	4.241
Bulgaria	Eastern EU	LD	4.798	4.531	4.394	4.506	4.586	4.551	4.529	4.416	4.432
Cameroon	MEA	LD	2.947	3.099	3.113	3.155	3.026	2.845	2.485	2.613	2.698
Canada	NA	D	8.919	8.974	8.982	9.167	9.193	8.999	8.873	8.776	8.636
Chile	LA	D	7.860	7.687	7.655	7.703	7.971	8.046	8.146	8.064	7.958
China (Official)	APAC	LD	3.963	3.792	3.918	3.914	3.810	3.891	4.041	4.297	4.339
Colombia	LA	LD	4.801	4.617	4.562	4.392	4.179	4.397	4.150	4.139	4.211
Costa Rica	LA	LD	5.680	5.813	5.888	6.357	6.282	6.176	6.184	6.202	6.460
Cyprus	EU	D	7.187	7.155	7.484	6.866	7.009	6.775	7.507	7.497	7.133
Czech Republic	Eastern EU	D	5.611	5.469	5.541	5.656	5.518	5.594	5.466	5.388	5.634
Denmark	EU	D	10.106	10.061	9.943	10.039	9.827	9.905	9.809	9.851	9.523
Dominican Republic	LA	LD	3.728	3.623	3.661	3.547	3.385	3.478	3.393	3.344	3.420
Ecuador	LA	LD	3.344	3.214	3.426	3.226	3.282	3.414	3.671	3.775	3.367
Egypt	MEA	LD	3.674	3.643	3.587	4.164	3.902	3.686	3.824	3.793	3.815
Finland	EU	D	10.114	9.952	9.825	9.606	9.364	9.438	9.468	9.413	9.359
France	EU	D	7.916	7.890	7.759	7.835	7.872	8.044	7.863	7.624	7.548
Germany	EU	D	8.576	8.402	8.467	8.446	8.474	8.419	8.587	8.580	8.659
Greece	EU	D	5.705	5.506	5.199	5.015	4.684	4.631	4.496	4.794	4.600
Guatemala	LA	LD	3.489	3.604	3.774	4.050	4.039	4.059	3.766	3.843	3.598
Hong Kong	APAC	D	8.753	8.820	8.795	8.793	8.948	8.722	8.446	8.286	8.285
Hungary	Eastern EU	D	6.219	6.119	5.770	5.682	5.505	5.639	5.566	5.584	5.262
Iceland	EU	D	9.503	9.552	9.884	9.114	8.875	8.892	8.755	8.828	8.641
India	APAC	LD	4.430	4.162	4.283	4.046	3.975	3.856	3.875	3.886	4.072
Indonesia	APAC	LD	3.374	3.832	3.878	3.368	3.511	3.641	3.689	3.758	3.846
Ireland	EU	D	8.433	8.508	8.518	8.537	8.397	8.082	7.913	8.099	8.239
Israel	MEA	D	7.005	6.628	6.678	6.499	6.336	6.425	6.674	6.700	6.649
Italy	EU	D	5.920	5.612	5.501	5.250	4.990	5.164	4.952	4.928	4.780
Japan	APAC	D	7.639	7.418	7.619	7.744	8.146	8.136	8.248	8.318	8.461
Jordan	MEA	LD	5.623	5.634	5.826	5.366	5.085	5.192	5.161	5.193	5.310
Kenya	MEA	LD	3.230	3.159	2.946	2.835	3.131	3.108	2.797	2.875	3.115
Lithuania	Eastern EU	D	5.150	5.069	5.073	5.242	5.541	5.480	5.635	5.740	5.958
Luxembourg	EU	D	8.814	9.021	9.034	8.971	9.126	9.336	9.270	9.260	9.179
Malaysia	APAC	LD	5.577	5.492	4.942	4.939	5.267	5.102	5.548	5.772	5.954
Malta	EU	D	7.096	7.128	7.090	6.669	6.710	6.669	6.944	6.998	6.727
Mexico	LA	LD	4.495	4.469	4.514	4.397	4.261	4.200	4.185	4.055	3.537
Morocco	MEA	LD	4.196	4.346	4.246	4.383	4.650	4.201	4.129	4.274	4.480
Netherlands	EU	D	9.163	9.442	9.327	9.333	9.358	9.313	9.282	9.119	8.997
New Zealand	APAC	D	9.728	9.698	9.668	9.924	9.792	9.675	9.668	9.727	9.540
Nigeria	MEA	LD	2.854	3.037	3.381	3.047	3.006	2.733	2.696	2.585	2.454
Norway	EU	D	9.268	8.932	8.754	8.992	9.204	9.348	9.513	9.601	9.455
Pakistan	APAC	LD	3.479	3.506	3.396	2.911	2.859	2.896	2.874	3.131	3.373
Peru	LA	LD	4.575	4.468	4.596	4.318	4.500	4.503	4.213	4.128	3.816
Philippines	APAC	LD	3.362	3.590	3.507	3.456	3.394	3.607	3.839	4.208	4.116
Poland	Eastern EU	LD	5.350	5.386	5.694	5.740	5.826	5.971	6.182	6.107	6.185
Portugal	EU	D	6.935	6.916	7.001	7.077	7.061	7.169	6.865	6.846	6.769
Qatar	MEA	LD	7.184	6.620	7.224	8.446	8.137	7.165	7.395	7.492	7.185
Russian Federation	Eastern EU	LD	3.301	3.095	2.901	2.825	2.883	2.928	2.965	3.006	3.256
Saudi Arabia	MEA	LD	4.509	4.641	4.944	4.978	5.113	4.251	4.882	4.991	5.195
Senegal	MEA	LD	4.167	3.913	3.933	3.945	3.613	3.945	4.437	4.492	5.035
Singapore	APAC	D	9.395	9.505	9.508	9.505	9.426	9.246	9.334	9.188	9.234
Slovak Republic	Eastern EU	D	5.792	5.608	5.608	5.456	5.471	5.487	5.142	5.123	5.234
South Africa	MEA	LD	5.845	5.426	5.325	5.289	5.186	5.055	4.684	4.773	4.774
South Korea	APAC	D	5.551	6.047	5.747	5.966	5.803	5.923	5.938	6.105	5.982
Spain	EU	D	7.239	6.986	7.212	6.991	7.026	7.109	7.112	6.642	6.052
Sri Lanka	APAC	LD	4.520	4.569	4.657	4.611	4.666	4.411	4.283	4.329	4.285
Sweden	EU	D	9.410	9.497	9.456	9.582	9.638	9.444	9.642	9.601	9.284
Switzerland	EU	D	9.256	9.385	9.335	9.187	9.197	9.103	9.335	9.291	9.378
Taiwan	APAC	D	6.055	6.008	5.959	6.198	6.434	6.730	6.460	6.377	6.689
Thailand	APAC	LD	4.290	4.316	4.207	4.440	4.372	4.420	4.325	4.347	4.190
Turkey	MEA	LD	5.022	5.184	5.172	5.150	5.060	5.111	5.345	5.233	4.757
Ukraine	Eastern EU	LD	3.640	3.515	3.425	2.986	3.050	3.008	2.941	2.812	3.010
United Kingdom	EU	D	8.579	8.447	8.323	8.204	8.121	8.169	8.300	8.388	8.455
United States	NA	D	7.635	7.684	7.821	7.525	7.519	7.530	7.774	7.586	7.646
Venezuela	LA	LD	3.044	2.938	2.801	2.684	2.593	2.685	2.490	2.427	2.239
Vietnam	APAC	LD	3.474	3.700	3.548	3.931	3.746	3.771	3.884	3.931	4.002
Zambia	MEA	LD	3.568	3.884	4.059	3.974	3.869	4.062	4.294	4.248	4.171
Zimbabwe	MEA	LD	2.353	2.293	2.391	2.366	2.383	2.242	2.319	2.177	2.222

Table 9, Control of Corruption values, normalized from -2.5 to +2.5 range into a 0-10 scale

Country/Territory	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.595	3.676	3.452	3.244	3.252	3.067	3.114	3.516	3.518
Argentina	LA	LD	3.774	3.799	3.630	3.616	3.841	3.982	3.723	3.748	3.539
Australia	APAC	D	8.238	8.354	8.408	8.337	8.286	8.257	8.215	8.003	8.196
Austria	EU	D	8.262	8.531	8.470	8.224	8.016	7.858	7.763	7.809	7.819
Bangladesh	APAC	LD	2.516	2.708	3.030	3.112	3.142	3.101	2.960	2.677	2.987
Belgium	EU	D	7.138	7.255	7.358	7.356	7.323	7.476	7.449	7.581	7.582
Bolivia	LA	LD	3.282	3.330	3.161	3.043	3.326	3.595	3.518	3.622	3.674
Brazil	LA	LD	4.128	4.177	4.581	4.741	4.802	4.895	4.836	4.690	4.533
Bulgaria	Eastern EU	LD	4.460	4.485	4.488	4.539	4.573	4.515	4.535	4.280	4.159
Cameroon	MEA	LD	3.045	3.019	2.954	3.080	3.054	3.065	2.925	2.900	2.984
Canada	NA	D	8.058	8.209	8.343	8.412	8.338	8.371	8.355	8.230	8.330
Chile	LA	D	6.617	6.591	6.713	6.905	7.308	7.279	7.194	7.163	7.182
China (Official)	APAC	LD	3.924	3.988	4.244	4.332	4.197	4.196	4.191	4.329	4.395
Colombia	LA	LD	3.565	3.699	3.789	3.562	3.639	3.866	3.548	3.524	3.589
Costa Rica	LA	LD	6.194	6.121	6.122	6.436	6.433	6.120	6.125	6.228	6.348
Cyprus	EU	D	6.884	6.834	7.119	6.842	6.944	6.805	6.796	6.601	6.534
Czech Republic	Eastern EU	D	6.106	6.079	6.158	6.074	6.060	6.083	6.010	6.041	6.153
Denmark	EU	D	8.723	8.838	8.786	8.750	8.669	8.803	8.426	8.528	8.692
Dominican Republic	LA	LD	3.928	3.998	3.914	3.953	3.770	3.688	3.784	3.746	3.849
Ecuador	LA	LD	2.678	2.807	2.816	2.745	2.823	2.938	3.148	3.773	3.740
Egypt	MEA	LD	4.476	4.628	4.741	4.402	4.178	4.065	3.806	3.349	3.601
Finland	EU	D	8.854	8.942	8.973	8.884	8.743	8.778	8.824	8.831	8.851
France	EU	D	7.191	7.238	7.218	6.975	7.137	7.151	7.089	7.022	6.927
Germany	EU	D	8.267	8.270	8.247	8.101	8.053	8.048	8.042	8.017	8.086
Greece	EU	D	6.037	5.985	5.640	5.069	4.967	4.854	4.573	4.442	4.868
Guatemala	LA	LD	3.201	3.395	3.451	3.340	3.289	3.285	3.338	3.406	3.410
Hong Kong	APAC	D	7.924	8.035	8.066	8.001	8.092	8.031	7.985	7.993	8.274
Hungary	Eastern EU	D	6.379	6.271	6.138	5.858	5.850	5.865	5.650	5.763	5.668
Iceland	EU	D	8.612	8.661	8.579	8.235	8.115	8.187	8.116	8.064	8.013
India	APAC	LD	5.096	4.811	4.696	4.509	4.426	4.155	4.264	4.400	4.323
Indonesia	APAC	LD	3.102	3.340	3.668	3.845	3.797	3.807	3.911	4.026	4.278
Ireland	EU	D	8.149	8.145	8.225	8.243	8.158	8.062	8.030	8.059	8.182
Israel	MEA	D	6.163	6.025	5.885	5.819	6.043	6.169	6.121	6.097	6.180
Italy	EU	D	5.465	5.502	5.429	5.049	5.206	5.500	5.334	5.296	5.152
Japan	APAC	D	7.482	7.374	7.307	7.424	7.583	7.684	7.701	7.853	8.040
Jordan	MEA	LD	5.298	5.595	5.657	5.465	5.234	5.067	5.134	5.123	5.237
Kenya	MEA	LD	3.118	2.994	2.874	2.693	2.860	2.988	3.113	3.509	3.717
Lithuania	Eastern EU	D	5.430	5.576	5.645	5.599	5.675	5.563	5.725	5.932	5.907
Luxembourg	EU	D	8.182	8.268	8.439	8.442	8.444	8.511	8.397	8.323	8.505
Malaysia	APAC	LD	6.103	5.972	5.487	5.279	5.532	5.609	5.646	5.682	6.043
Malta	EU	D	7.395	7.495	7.505	7.207	7.183	7.058	7.102	6.994	6.838
Mexico	LA	LD	4.142	4.057	3.876	3.879	3.829	3.863	3.912	3.843	3.651
Morocco	MEA	LD	4.139	4.380	4.327	4.344	4.427	4.312	4.242	4.201	4.428
Netherlands	EU	D	8.300	8.384	8.430	8.426	8.377	8.509	8.598	8.406	8.375
New Zealand	APAC	D	8.586	8.728	8.750	8.857	8.891	8.946	8.914	8.961	9.016
Nigeria	MEA	LD	2.682	2.773	3.246	2.985	2.604	2.732	2.677	2.451	2.367
Norway	EU	D	8.555	8.374	8.409	8.467	8.588	8.646	8.696	8.744	8.669
Pakistan	APAC	LD	3.376	3.644	3.384	3.251	3.546	3.655	3.746	3.831	3.837
Peru	LA	LD	3.258	3.346	3.548	3.434	3.507	3.623	3.429	3.487	3.516
Philippines	APAC	LD	3.173	3.307	3.240	3.099	3.010	3.253	3.449	3.717	4.067
Poland	Eastern EU	LD	5.200	5.406	5.740	5.996	6.167	6.284	6.290	6.192	6.175
Portugal	EU	D	7.099	7.055	6.985	6.714	6.506	6.387	6.315	6.422	6.613
Qatar	MEA	LD	6.985	6.820	7.192	7.927	7.780	7.387	7.640	7.611	7.350
Russian Federation	Eastern EU	LD	2.946	3.076	3.173	3.052	3.099	3.035	3.069	3.194	3.281
Saudi Arabia	MEA	LD	4.550	4.915	5.302	5.238	5.546	5.308	5.413	5.466	5.548
Senegal	MEA	LD	4.370	3.859	3.945	3.928	3.861	3.827	4.072	4.319	4.660
Singapore	APAC	D	8.055	8.189	8.398	8.247	8.199	8.196	8.351	8.295	8.283
Slovak Republic	Eastern EU	D	5.617	5.719	5.824	5.598	5.434	5.330	5.249	5.115	5.076
South Africa	MEA	LD	5.871	5.841	5.639	5.462	5.382	5.496	5.491	5.609	5.562
South Korea	APAC	D	5.811	6.507	6.132	5.953	5.834	5.834	5.711	5.683	5.575
Spain	EU	D	5.905	5.806	6.047	5.859	5.865	6.100	6.051	5.796	5.531
Sri Lanka	APAC	LD	3.957	4.084	4.117	4.413	4.690	4.597	4.467	4.384	4.428
Sweden	EU	D	8.237	8.585	8.704	8.745	8.748	8.726	8.634	8.594	8.306
Switzerland	EU	D	8.482	8.593	8.646	8.551	8.539	8.537	8.643	8.526	8.655
Taiwan	APAC	D	6.020	6.011	6.258	6.284	6.532	6.697	6.600	6.530	6.493
Thailand	APAC	LD	4.410	4.511	4.270	4.124	4.164	4.273	4.150	4.035	4.183
Turkey	MEA	LD	4.682	4.811	4.663	4.450	4.366	4.283	4.284	4.252	4.037
Ukraine	Eastern EU	LD	3.583	3.715	3.675	3.226	3.259	3.247	3.421	2.922	2.289
United Kingdom	EU	D	7.973	7.834	7.635	7.559	7.813	7.706	7.795	7.864	7.942
United States	NA	D	7.177	7.087	7.405	7.192	7.065	7.126	7.192	7.171	7.216
Venezuela	LA	LD	2.044	1.933	1.908	1.921	1.993	2.065	1.893	1.715	1.727
Vietnam	APAC	LD	4.347	4.410	4.368	4.526	4.421	4.365	4.326	4.336	4.322
Zambia	MEA	LD	3.992	4.226	4.564	4.660	4.610	4.545	4.727	4.755	4.619
Zimbabwe	MEA	LD	2.126	1.967	2.049	2.024	2.154	2.378	2.588	2.625	2.626

Table 10, Legal Framework aggregate values; average of Judicial Independence, Rule of Law, Political Stability, Control of Corruption,

Physical Property Rights Data (PPR)

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	5.186	5.577	4.253	3.537	4.291	3.470	2.564	3.707	4.538
Argentina	LA	LD	3.327	3.281	3.628	3.194	2.754	2.922	2.746	2.452	2.705
Australia	APAC	D	8.893	8.914	8.886	8.617	8.111	7.588	7.424	7.059	7.513
Austria	EU	D	9.002	9.226	9.364	8.952	8.590	8.232	8.082	8.147	8.074
Bangladesh	APAC	LD	4.546	4.483	4.280	4.130	4.071	4.442	4.382	3.925	3.755
Belgium	EU	D	7.989	8.406	8.409	7.929	7.410	7.278	7.100	7.351	7.414
Bolivia	LA	LD	3.510	3.475	2.671	1.983	1.991	2.802	3.632	3.689	4.085
Brazil	LA	LD	5.794	5.766	5.975	5.626	5.446	5.687	6.109	5.997	4.989
Bulgaria	Eastern EU	LD	4.555	4.694	4.864	4.072	3.722	3.823	4.170	4.230	4.113
Cameroon	MEA	LD	4.381	4.600	4.569	4.152	4.481	4.380	4.663	4.750	4.393
Canada	NA	D	8.197	8.473	9.044	8.684	8.434	8.324	8.393	8.391	8.315
Chile	LA	D	7.361	7.353	7.378	7.511	7.024	6.728	6.932	6.841	6.636
China	APAC	LD	5.035	5.524	6.638	7.078	6.854	6.736	6.428	6.037	5.813
Colombia	LA	LD	6.135	5.886	5.741	4.942	4.739	4.855	4.675	4.726	4.771
Costa Rica	LA	LD	5.970	5.998	5.974	5.812	5.585	5.507	5.765	5.957	5.967
Cyprus	EU	D	7.636	7.411	7.838	7.569	7.390	7.359	7.073	6.236	5.548
Czech Republic	Eastern EU	D	5.729	5.970	6.167	6.195	5.652	5.144	5.133	4.812	5.006
Denmark	EU	D	9.197	9.321	9.397	9.136	8.384	8.416	7.513	7.395	7.830
Dominican Republic	LA	LD	4.794	5.334	5.122	4.894	4.966	4.793	4.819	4.714	4.710
Ecuador	LA	LD	3.818	3.911	3.711	3.863	3.631	3.681	3.924	4.643	bl
Egypt	MEA	LD	5.943	6.753	6.097	5.709	6.057	5.210	5.033	4.531	4.261
Finland	EU	D	8.826	9.001	9.184	9.094	9.020	9.077	9.086	8.965	8.978
France	EU	D	8.398	8.431	8.458	8.005	8.055	8.246	7.883	7.784	7.571
Germany	EU	D	9.413	9.449	9.176	8.784	8.539	7.876	8.054	8.067	7.732
Greece	EU	D	7.039	6.964	6.841	6.629	6.193	5.771	5.287	4.820	4.844
Guatemala	LA	LD	4.294	5.176	5.255	4.797	4.429	4.308	4.542	4.719	4.743
Hong Kong SAR	APAC	D	8.590	8.789	8.906	8.806	8.818	8.541	8.502	8.500	8.444
Hungary	Eastern EU	D	7.460	7.402	7.070	6.038	5.593	5.542	4.698	4.502	4.558
Iceland	EU	D	9.269	8.888	8.950	8.279	7.303	6.962	6.864	6.967	7.144
India	APAC	LD	7.549	7.139	6.700	6.305	5.896	5.488	5.636	5.628	5.108
Indonesia	APAC	LD	4.520	3.961	4.183	5.184	5.073	4.942	5.093	5.110	5.478
Ireland	EU	D	8.880	8.874	8.945	8.437	8.153	8.313	7.974	7.872	8.125
Israel	MEA	D	7.835	7.758	6.921	5.752	6.246	7.145	7.138	6.639	6.346
Italy	EU	D	6.722	6.710	6.328	5.686	5.497	5.416	5.475	5.438	5.017
Japan	APAC	D	8.497	8.647	8.762	8.162	7.636	7.814	7.983	8.024	8.240
Jordan	MEA	LD	6.819	7.613	8.116	7.922	7.327	6.978	7.134	7.212	6.817
Kenya	MEA	LD	5.051	5.154	5.370	4.653	4.423	4.419	4.291	4.853	5.346
Lithuania	Eastern EU	D	6.483	6.885	6.870	5.877	5.559	5.580	5.490	5.406	5.414
Luxembourg	EU	D	8.482	8.328	8.488	8.860	8.730	8.822	8.742	8.375	8.517
Malaysia	APAC	LD	7.855	7.852	7.432	7.016	6.821	7.190	7.287	7.000	7.160
Malta	EU	D	7.091	7.227	7.640	7.457	7.188	7.086	7.600	7.553	6.738
Mexico	LA	LD	5.685	5.505	5.153	4.923	4.877	5.054	5.359	5.320	4.941
Morocco	MEA	LD	5.795	6.122	6.108	5.969	5.701	5.621	6.014	6.350	6.423
Netherlands	EU	D	8.943	9.007	8.862	8.514	8.067	8.056	8.390	8.277	8.074
New Zealand	APAC	D	8.672	8.455	8.627	8.745	7.879	8.074	8.526	8.232	8.262
Nigeria	MEA	LD	4.790	4.678	5.263	4.817	3.883	3.688	3.952	4.067	3.993
Norway	EU	D	8.669	8.851	8.953	8.778	8.442	8.223	8.218	8.272	8.320
Pakistan	APAC	LD	4.496	4.960	5.057	4.625	4.279	4.077	4.115	3.906	3.794
Peru	LA	LD	4.067	4.315	4.658	4.918	4.711	4.783	4.623	4.502	4.229
Philippines	APAC	LD	5.567	5.576	5.074	4.687	4.448	4.350	5.169	5.575	5.467
Poland	Eastern EU	LD	5.034	5.012	4.934	5.417	5.979	5.895	5.607	5.486	5.540
Portugal	EU	D	7.555	7.630	7.590	6.992	6.731	6.310	6.355	6.410	6.410
Qatar	MEA	LD	7.098	7.382	7.658	8.366	7.488	6.322	7.558	8.299	8.327
Russian Federation	Eastern EU	LD	3.588	3.597	3.788	3.451	3.231	3.018	2.987	3.388	3.890
Saudi Arabia	MEA	LD	-1.667	6.944	7.243	7.188	7.368	7.654	7.624	7.229	6.868
Senegal	MEA	LD	-1.667	4.784	5.617	5.397	5.070	5.166	5.123	5.011	4.910
Singapore	APAC	D	8.922	9.018	9.204	9.023	8.902	8.974	8.963	8.891	8.729
Slovak Republic	Eastern EU	D	6.619	6.749	6.512	5.917	5.412	5.091	5.141	4.895	4.737
South Africa	MEA	LD	8.001	7.963	8.368	8.110	7.340	7.151	7.336	7.708	7.666
Korea, Rep.	APAC	D	7.205	7.849	7.406	6.609	6.181	5.921	6.106	5.912	5.355
Spain	EU	D	7.399	7.568	7.290	6.905	6.541	6.489	6.414	6.179	5.537
Sri Lanka	APAC	LD	5.498	6.208	6.315	5.703	5.696	5.773	5.527	5.619	5.506
Sweden	EU	D	8.347	8.903	9.173	9.014	8.804	8.705	8.173	8.100	7.820
Switzerland	EU	D	9.149	9.296	9.436	9.249	9.024	9.071	9.065	8.736	8.727
Taiwan, China	APAC	D	7.305	7.365	7.599	7.395	7.750	8.082	8.088	7.994	7.882
Thailand	APAC	LD	6.828	6.840	6.185	5.458	4.852	4.289	4.536	5.130	5.154
Turkey	MEA	LD	5.989	6.326	5.338	4.832	5.079	5.347	5.908	6.125	5.936
Ukraine	Eastern EU	LD	3.868	3.825	3.782	3.086	2.661	2.777	2.885	2.518	2.830
United Kingdom	EU	D	9.019	8.425	7.487	7.654	7.922	8.344	8.674	8.599	8.698
United States	NA	D	8.468	7.579	7.983	7.545	6.831	6.761	6.634	6.951	7.249
Venezuela	LA	LD	2.438	2.149	2.080	1.801	1.256	1.245	1.320	1.017	0.870
Vietnam	APAC	LD	5.608	5.387	5.651	5.711	5.136	4.522	4.201	4.177	4.342
Zambia	MEA	LD	6.048	5.921	6.139	5.775	5.238	5.230	5.782	6.092	6.023
Zimbabwe	MEA	LD	2.330	1.894	1.834	1.703	1.951	2.243	2.671	2.744	2.284

Table 11, Property Rights Protection, normalized from a 1-7 range to a 0-10 scale

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	2.771	2.771	2.771	2.771	4.984	4.984	4.984	4.984	4.984
Argentina	LA	LD	7.689	7.689	7.689	7.151	7.151	6.611	6.611	6.611	6.611
Australia	APAC	D	7.835	7.835	7.835	7.835	7.835	7.835	7.835	7.835	7.835
Austria	EU	D	8.827	8.827	8.827	8.827	8.827	8.862	8.862	8.862	8.862
Bangladesh	APAC	LD	6.164	6.164	6.162	6.603	6.603	6.603	6.603	6.605	5.467
Belgium	EU	D	6.358	6.358	6.358	6.358	6.524	5.986	6.033	6.033	6.033
Bolivia	LA	LD	6.487	6.487	6.487	6.487	6.487	6.487	6.487	6.487	6.487
Brazil	LA	LD	5.909	6.232	6.232	6.239	6.239	6.239	6.239	5.916	3.119
Bulgaria	Eastern EU	LD	6.174	6.174	6.174	6.174	6.199	6.199	6.199	6.199	6.199
Cameroon	MEA	LD	7.557	7.557	7.557	7.557	7.557	7.557	7.557	7.557	7.579
Canada	NA	D		7.259	7.259	7.259	7.259	7.259	7.259	7.259	7.259
Chile	LA	D	7.213	7.213	7.213	7.213	7.213	7.213	7.213	7.213	7.221
China	APAC	LD	9.309	9.309	9.309	9.309	9.309	9.309	9.309	9.309	8.327
Colombia	LA	LD	5.611	5.611	5.611	5.611	6.697	6.697	6.713	6.719	6.722
Costa Rica	LA	LD	7.245	7.245	7.245	7.245	7.245	7.246	7.790	7.790	7.790
Cyprus	EU	D				6.637	6.637	6.637	6.637	6.706	6.706
Czech Republic	Eastern EU	D		7.460	7.460	7.460	7.601	7.711	7.768	8.309	8.309
Denmark	EU	D	7.179	7.179	7.179	7.179	7.179	8.797	8.879	8.898	8.914
Dominican Republic	LA	LD	7.022	7.022	7.169	7.169	7.169	7.169	7.169	7.169	7.169
Ecuador	LA	LD	6.716	6.716	6.725	6.725	6.725	6.725	6.725	6.653	6.653
Egypt, Arab Rep	MEA	LD	5.624	5.624	5.624	6.005	6.005	6.005	6.005	6.005	6.036
Finland	EU	D	8.882	8.882	8.882	8.882	8.882	8.882	8.882	8.882	8.882
France	EU	D	5.124	5.124	5.312	5.340	5.879	6.001	6.001	6.001	6.001
Germany	EU	D	7.147	7.147	7.147	7.147	7.147	7.147	7.147	7.147	7.147
Greece	EU	D	4.543	4.543	4.543	4.543	4.543	4.556	4.556	4.556	4.556
Guatemala	LA	LD	6.556	6.653	6.675	6.675	7.223	7.235	7.235	7.235	7.235
Hong Kong SAR, China	APAC	D	7.763	7.763	7.763	7.763	7.763	7.763	7.763	7.763	7.763
Hungary	Eastern EU	D	8.144	8.144	8.191	8.336	8.336	8.336	8.336	8.336	8.336
Iceland	EU	D	8.914	8.914	8.914	8.914	8.914	8.914	8.914	8.915	8.915
India	APAC	LD	8.670	8.670	8.670	8.695	8.695	8.695	8.695	8.695	6.625
Indonesia	APAC	LD	8.344	8.344	8.344	8.344	8.380	8.380	8.380	8.380	7.763
Ireland	EU	D	7.735	7.735	7.735	7.735	7.735	7.735	7.733	7.735	7.735
Israel	MEA	D	6.858	6.858	6.858	6.858	6.858	6.858	6.858	7.056	7.056
Italy	EU	D	7.771	7.771	7.771	7.771	7.771	7.771	7.771	7.771	8.337
Japan	APAC	D	8.415	8.415	8.415	8.415	8.415	8.415	8.415	8.415	7.270
Jordan	MEA	LD	6.706	6.706	6.706	6.706	6.706	6.706	6.706	6.706	6.706
Kenya	MEA	LD	5.469	5.469	5.469	5.469	5.469	5.469	5.469	5.469	5.469
Lithuania	Eastern EU	D	8.914	8.914	8.914	8.914	8.914	8.914	8.915	8.915	8.915
Luxembourg	EU	D		6.689	6.689	6.689	6.689	6.689	6.689	6.689	6.689
Malaysia	APAC	LD	5.775	5.775	5.775	5.775	5.775	6.077	6.077	6.184	6.193
Malta	EU	D							6.725	6.725	6.725
Mexico	LA	LD	6.792	6.792	6.792	6.792	6.792	6.792	6.792	6.792	6.187
Morocco	MEA	LD	7.066	7.066	5.454	5.454	5.454	5.454	5.454	5.454	5.501
Netherlands	EU	D	7.832	7.832	7.832	7.832	7.832	7.832	7.832	7.832	7.841
New Zealand	APAC	D	9.462	9.462	9.462	9.462	9.462	9.462	9.462	9.462	9.462
Nigeria	MEA	LD	4.480	4.963	4.966	4.966	4.980	4.980	4.980	4.971	3.808
Norway	EU	D	10.000	10.000	9.994	9.994	9.994	9.994	9.994	9.994	9.994
Pakistan	APAC	LD	7.588	7.588	7.588	7.588	7.317	7.317	7.317	7.317	5.909
Peru	LA	LD	7.746	7.746	7.746	7.747	8.344	8.367	8.367	8.367	8.367
Philippines	APAC	LD	5.586	5.586	5.586	5.586	5.586	5.586	5.586	5.586	5.586
Poland	Eastern EU	LD	6.698	6.698	6.698	6.698	6.698	6.840	6.840	7.147	7.207
Portugal	EU	D	7.589	7.595	7.717	7.717	7.812	10.000	10.000	10.000	10.000
Qatar	MEA	LD			6.732	6.732	6.732	6.732	6.732	6.732	6.732
Russian Federation	Eastern EU	LD	8.166	8.166	8.166	8.166	8.186	8.186	8.562	8.560	8.319
Saudi Arabia	MEA	LD	7.824	7.824	7.824	7.824	7.824	7.824	7.824	7.824	7.824
Senegal	MEA	LD		6.855	6.855	6.921	6.921	6.928	6.928	6.928	6.928
Singapore	APAC	D	8.325	8.325	7.248	7.251	7.251	7.251	7.251	7.251	7.297
Slovak Republic	Eastern EU	D	8.873	8.873	8.874	8.874	8.874	8.874	8.874	8.874	8.874
South Africa	MEA	LD	6.700	6.700	6.700	6.700	6.700	6.700	6.700	6.700	6.700
Korea, Rep	APAC	D	6.741	6.743	6.743	6.743	6.744	6.744	6.744	6.744	6.744
Spain	EU	D	8.325	8.347	8.347	8.347	8.347	8.347	7.808	7.808	7.808
Sri Lanka	APAC	LD	6.011	6.011	6.011	6.011	6.011	6.011	6.011	6.077	5.535
Sweden	EU	D	9.418	9.418	9.418	9.418	9.418	9.981	9.981	9.909	9.915
Switzerland	EU	D	8.337	8.337	8.337	8.337	8.337	8.337	8.337	8.337	8.337
Taiwan, China	APAC	D	8.911	8.911	8.912	8.912	8.914	8.914	8.914	8.914	8.914
Thailand	APAC	LD	8.369	8.369	8.369	8.369	8.369	8.369	8.369	8.369	8.369
Turkey	MEA	LD	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
Ukraine	Eastern EU	LD	4.802	4.802	4.802	4.802	4.802	4.789	4.789	4.940	6.093
United Kingdom	EU	D	7.180	7.180	7.180	7.180	7.221	7.221	7.221	7.221	7.243
United States	NA	D	9.227	9.227	9.227	9.227	9.227	9.227	9.227	9.227	8.125
Venezuela, RB	LA	LD	6.625	6.086	6.111	6.111	6.111	5.529	5.529	5.532	5.532
Vietnam	APAC	LD	7.637	7.637	7.637	7.669	7.669	7.669	7.669	7.669	7.669
Zambia	MEA	LD	7.082	7.082	7.082	7.179	7.179	7.708	7.708	7.708	7.708
Zimbabwe	MEA	LD	8.294	8.294	8.294	8.294	7.755	7.755	7.752	7.736	7.736

Table 12, Registering Property ratings

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	2.059	2.075	2.031	2.177	2.991	2.378	1.629	2.752	3.030
Argentina	LA	LD	2.033	2.211	2.162	1.677	1.198	1.343	1.144	1.121	1.215
Australia	APAC	D	6.384	6.472	6.575	5.675	4.859	4.461	4.470	4.183	3.866
Austria	EU	D	5.450	5.421	5.106	4.179	3.666	3.644	3.683	3.384	3.097
Bangladesh	APAC	LD	2.441	2.450	2.435	2.285	2.588	2.684	2.333	2.201	2.408
Belgium	EU	D	5.751	5.514	5.648	4.910	4.831	4.918	4.635	4.141	3.881
Bolivia	LA	LD	1.792	2.202	2.077	1.872	2.102	3.094	4.286	4.595	4.336
Brazil	LA	LD	3.132	2.978	3.660	3.401	3.041	3.488	3.524	3.135	2.781
Bulgaria	Eastern EU	LD	3.934	4.393	4.927	3.812	3.073	3.432	3.842	3.791	3.323
Cameroon	MEA	LD	1.409	1.373	1.849	1.810	1.488	1.790	2.346	2.413	2.554
Canada	NA	D	5.232	5.466	5.609	4.864	4.400	4.480	4.641	4.337	4.620
Chile	LA	D	5.199	5.464	5.343	4.787	4.424	4.319	4.574	4.407	4.443
China	APAC	LD	2.412	2.623	2.778	2.787	3.295	3.559	3.557	3.997	4.434
Colombia	LA	LD	3.064	3.617	4.079	3.471	3.098	3.682	3.481	2.982	2.944
Costa Rica	LA	LD	2.981	3.281	3.805	3.381	2.270	1.861	2.130	2.296	2.024
Cyprus	EU	D	5.303	5.534	5.699	5.368	4.740	4.791	4.028	2.838	2.305
Czech Republic	Eastern EU	D	3.577	3.941	4.508	4.242	3.460	3.138	3.135	3.283	3.879
Denmark	EU	D	7.524	7.520	7.386	5.564	4.244	4.256	3.478	3.131	3.189
Dominican Republic	LA	LD	2.714	2.631	2.649	2.389	2.564	2.327	2.570	3.327	2.980
Ecuador	LA	LD	2.336	2.405	1.797	2.252	2.127	2.419	3.005	4.010	-1.667
Egypt	MEA	LD	3.004	2.810	3.462	3.919	3.389	2.822	2.709	2.416	1.428
Finland	EU	D	7.251	7.329	7.385	6.221	5.757	5.841	5.681	5.301	4.967
France	EU	D	5.077	4.606	4.459	4.111	3.921	3.598	3.280	3.748	4.632
Germany	EU	D	5.444	5.677	4.743	3.318	2.973	3.291	3.610	3.676	3.914
Greece	EU	D	4.684	4.340	4.296	3.512	2.712	2.059	1.189	0.950	1.125
Guatemala	LA	LD	2.745	3.310	3.380	3.045	3.073	3.419	3.489	3.445	3.434
Hong Kong SAR	APAC	D	6.584	6.470	6.339	5.745	5.415	5.377	5.728	6.146	5.822
Hungary	Eastern EU	D	4.462	4.443	3.797	2.955	2.505	2.406	2.090	1.762	1.671
Iceland	EU	D	7.425	7.408	6.005	3.034	2.162	2.609	2.812	2.954	2.993
India	APAC	LD	5.585	5.294	4.869	4.328	3.819	3.930	3.879	3.839	4.298
Indonesia	APAC	LD	5.633	5.038	4.014	4.990	4.975	4.844	4.858	4.799	4.873
Ireland	EU	D	6.801	6.742	5.962	3.325	1.857	1.489	1.391	1.557	2.035
Israel	MEA	D	5.749	5.889	5.239	3.554	3.209	4.166	4.024	3.126	3.325
Italy	EU	D	3.176	3.129	2.566	2.080	1.981	2.043	1.636	0.967	1.018
Japan	APAC	D	4.443	4.423	3.978	3.630	3.488	3.514	3.425	3.936	4.562
Jordan	MEA	LD	3.697	4.096	4.339	3.918	3.279	3.151	3.596	3.887	4.333
Kenya	MEA	LD	3.806	4.536	5.169	4.766	4.441	4.914	4.411	3.689	3.986
Lithuania	Eastern EU	D	5.381	4.642	4.365	3.068	2.025	2.015	2.222	2.271	2.586
Luxembourg	EU	D	6.531	6.864	6.908	6.632	6.228	5.708	5.178	5.288	5.607
Malaysia	APAC	LD	5.771	5.920	6.080	5.563	5.351	5.778	5.691	5.702	6.295
Malta	EU	D	5.111	5.306	5.182	5.025	5.268	5.109	4.806	4.818	4.689
Mexico	LA	LD	2.901	2.979	2.927	2.829	2.259	2.406	2.721	2.538	2.362
Morocco	MEA	LD	2.650	3.619	3.917	3.491	3.549	3.725	3.306	3.046	3.499
Netherlands	EU	D	6.907	7.166	6.970	5.391	4.490	4.760	4.568	3.590	3.427
New Zealand	APAC	D	6.264	6.818	6.317	5.078	4.308	4.648	5.343	5.411	5.073
Nigeria	MEA	LD	2.297	2.494	2.185	1.830	1.669	1.758	1.901	1.452	1.069
Norway	EU	D	6.957	7.478	7.195	5.993	5.649	6.019	5.748	5.361	5.521
Pakistan	APAC	LD	4.764	5.071	4.401	3.639	3.765	3.678	3.141	2.955	2.634
Peru	LA	LD	3.964	4.055	4.368	4.005	3.882	4.417	4.394	4.139	3.698
Philippines	APAC	LD	3.084	3.195	3.234	2.790	3.192	3.386	3.580	3.845	4.209
Poland	Eastern EU	LD	4.223	4.057	3.974	3.440	3.117	2.870	2.575	2.498	2.654
Portugal	EU	D	6.011	5.792	4.794	3.668	3.272	2.882	2.172	1.846	2.334
Qatar	MEA	LD	6.058	6.268	6.278	6.302	6.626	7.118	6.516	6.458	6.794
Russian Federation	Eastern EU	LD	2.647	3.017	3.277	2.607	2.131	2.408	2.675	3.087	3.283
Saudi Arabia	MEA	LD		4.386	4.994	5.308	5.651	5.945	5.110	4.354	4.305
Senegal	MEA	LD		1.392	1.314	1.427	2.241	2.254	1.967	2.262	3.189
Singapore	APAC	D	6.196	6.358	6.331	6.040	5.832	6.032	6.129	5.882	5.865
Slovak Republic	Eastern EU	D	5.090	5.653	5.767	4.950	3.650	3.268	3.306	3.516	3.822
South Africa	MEA	LD	4.758	4.874	5.276	4.558	3.714	3.773	4.170	4.391	4.141
Korea, Rep.	APAC	D	3.600	5.584	5.593	2.953	1.850	1.719	2.053	2.023	1.962
Spain	EU	D	4.863	5.007	4.512	3.157	2.507	2.320	1.752	1.325	1.236
Sri Lanka	APAC	LD	3.932	4.857	4.483	3.720	3.821	3.172	2.584	2.666	3.108
Sweden	EU	D	6.820	7.044	6.545	5.615	5.329	5.907	5.925	5.380	5.147
Switzerland	EU	D	5.638	5.700	5.243	4.475	4.437	4.493	4.454	4.423	4.305
Taiwan, China	APAC	D	5.756	5.171	5.081	4.945	4.505	4.414	4.872	4.947	4.325
Thailand	APAC	LD	4.494	4.657	4.809	4.320	4.074	4.138	4.251	4.364	4.345
Turkey	MEA	LD	2.942	3.581	3.773	3.037	2.613	2.835	3.278	3.438	3.117
Ukraine	Eastern EU	LD	3.352	3.633	4.012	2.800	1.567	1.706	2.186	2.084	2.696
United Kingdom	EU	D	7.259	7.213	6.379	3.745	2.802	3.413	3.565	2.828	2.817
United States	NA	D	6.725	6.758	6.321	4.433	3.989	4.419	4.592	4.765	4.882
Venezuela	LA	LD	3.095	3.812	3.276	2.282	1.880	2.129	2.517	2.229	2.177
Vietnam	APAC	LD	2.899	3.026	3.129	3.216	2.838	2.417	2.269	2.217	2.675
Zambia	MEA	LD	0.842	1.656	3.136	2.904	2.145	2.223	2.739	2.914	2.462
Zimbabwe	MEA	LD	2.531	3.040	3.395	2.026	1.647	2.076	1.932	1.764	1.209

Table 13, Access to Loans values, normalized from a 1-7 range to a 0-10 scale

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.339	3.474	3.018	2.828	4.089	3.611	3.059	3.814	4.184
Argentina	LA	LD	4.350	4.394	4.493	4.007	3.701	3.625	3.500	3.395	3.510
Australia	APAC	D	7.704	7.740	7.765	7.376	6.935	6.628	6.576	6.359	6.405
Austria	EU	D	7.760	7.825	7.766	7.319	7.028	6.913	6.876	6.798	6.678
Bangladesh	APAC	LD	4.384	4.366	4.292	4.339	4.421	4.576	4.439	4.244	3.877
Belgium	EU	D	6.699	6.759	6.805	6.399	6.255	6.061	5.923	5.842	5.776
Bolivia	LA	LD	3.930	4.055	3.745	3.447	3.526	4.128	4.802	4.924	4.969
Brazil	LA	LD	4.945	4.992	5.289	5.089	4.909	5.138	5.290	5.016	3.630
Bulgaria	Eastern EU	LD	4.888	5.087	5.322	4.686	4.332	4.485	4.737	4.740	4.545
Cameroon	MEA	LD	4.449	4.510	4.658	4.506	4.509	4.576	4.855	4.906	4.842
Canada	NA	D	6.715	7.066	7.304	6.936	6.698	6.688	6.764	6.662	6.731
Chile	LA	D	6.591	6.677	6.645	6.504	6.220	6.087	6.240	6.154	6.100
China	APAC	LD	5.585	5.819	6.242	6.391	6.486	6.534	6.431	6.448	6.191
Colombia	LA	LD	4.936	5.038	5.144	4.675	4.845	5.078	4.956	4.809	4.812
Costa Rica	LA	LD	5.399	5.508	5.675	5.479	5.033	4.871	5.228	5.348	5.260
Cyprus	EU	D	6.470	6.472	6.769	6.525	6.256	6.262	5.913	5.260	4.853
Czech Republic	Eastern EU	D	4.653	5.790	6.045	5.965	5.571	5.331	5.345	5.468	5.731
Denmark	EU	D	7.967	8.006	7.987	7.293	6.602	7.157	6.623	6.475	6.644
Dominican Republic	LA	LD	4.843	4.996	4.980	4.818	4.900	4.763	4.853	5.070	4.953
Ecuador	LA	LD	4.290	4.344	4.078	4.280	4.161	4.275	4.552	5.102	2.493
Egypt	MEA	LD	4.857	5.062	5.061	5.211	5.150	4.679	4.582	4.317	3.908
Finland	EU	D	8.320	8.404	8.484	8.066	7.886	7.933	7.883	7.716	7.609
France	EU	D	6.200	6.054	6.076	5.819	5.952	5.948	5.722	5.844	6.068
Germany	EU	D	7.335	7.424	7.022	6.416	6.220	6.105	6.270	6.297	6.265
Greece	EU	D	5.422	5.282	5.227	4.895	4.483	4.128	3.677	3.442	3.509
Guatemala	LA	LD	4.532	5.046	5.103	4.839	4.908	4.988	5.089	5.133	5.137
Hong Kong SAR	APAC	D	7.645	7.674	7.670	7.438	7.332	7.227	7.331	7.470	7.343
Hungary	Eastern EU	D	6.689	6.663	6.353	5.776	5.478	5.428	5.042	4.867	4.855
Iceland	EU	D	8.536	8.403	7.956	6.742	6.126	6.162	6.196	6.279	6.351
India	APAC	LD	7.268	7.034	6.746	6.443	6.137	6.038	6.070	6.054	5.343
Indonesia	APAC	LD	6.166	5.781	5.513	6.172	6.143	6.055	6.111	6.097	6.038
Ireland	EU	D	7.805	7.784	7.547	6.499	5.915	5.846	5.700	5.721	5.965
Israel	MEA	D	6.814	6.835	6.339	5.388	5.438	6.056	6.007	5.607	5.576
Italy	EU	D	5.889	5.870	5.555	5.179	5.083	5.077	4.961	4.725	4.791
Japan	APAC	D	7.119	7.162	7.051	6.736	6.513	6.581	6.608	6.792	6.691
Jordan	MEA	LD	5.741	6.138	6.387	6.182	5.771	5.612	5.812	5.935	5.952
Kenya	MEA	LD	4.776	5.053	5.336	4.963	4.778	4.934	4.724	4.670	4.934
Lithuania	Eastern EU	D	6.926	6.814	6.716	5.953	5.499	5.503	5.542	5.531	5.638
Luxembourg	EU	D	7.507	7.294	7.362	7.394	7.216	7.073	6.870	6.784	6.938
Malaysia	APAC	LD	6.467	6.516	6.429	6.118	5.983	6.348	6.352	6.295	6.549
Malta	EU	D	6.101	6.267	6.411	6.241	6.228	6.097	6.377	6.365	6.051
Mexico	LA	D	5.126	5.092	4.957	4.848	4.643	4.751	4.957	4.883	4.497
Morocco	MEA	LD	5.170	5.602	5.159	4.971	4.901	4.933	4.924	4.950	5.141
Netherlands	EU	D	7.894	8.002	7.888	7.246	6.796	6.883	6.930	6.566	6.448
New Zealand	APAC	D	8.133	8.245	8.135	7.762	7.216	7.395	7.777	7.702	7.599
Nigeria	MEA	LD	3.856	4.045	4.138	3.871	3.511	3.475	3.611	3.497	2.957
Norway	EU	D	8.542	8.776	8.714	8.255	8.028	8.079	7.986	7.875	7.945
Pakistan	APAC	LD	5.616	5.873	5.682	5.284	5.120	5.024	4.857	4.726	4.113
Peru	LA	LD	5.259	5.372	5.591	5.557	5.645	5.855	5.795	5.670	5.431
Philippines	APAC	LD	4.745	4.786	4.631	4.354	4.408	4.441	4.778	5.002	5.087
Poland	Eastern EU	LD	5.319	5.256	5.202	5.185	5.265	5.202	5.007	5.044	5.134
Portugal	EU	D	7.052	7.006	6.700	6.126	5.938	6.397	6.176	6.085	6.248
Qatar	MEA	LD	6.578	6.825	6.889	7.133	6.949	6.724	6.935	7.163	7.284
Russian Federation	Eastern EU	LD	4.800	4.926	5.077	4.741	4.516	4.537	4.742	5.012	5.164
Saudi Arabia	MEA	LD	1.497	6.385	6.687	6.773	6.948	7.141	6.852	6.469	6.333
Senegal	MEA	LD		4.344	4.596	4.582	4.744	4.783	4.673	4.733	5.009
Singapore	APAC	D	7.814	7.900	7.594	7.438	7.329	7.419	7.448	7.342	7.297
Slovak Republic	Eastern EU	D	6.861	7.091	7.051	6.580	5.979	5.744	5.774	5.762	5.811
South Africa	MEA	LD	6.486	6.512	6.781	6.456	5.918	5.875	6.069	6.266	6.169
Korea, Rep.	APAC	D	5.849	6.725	6.580	5.435	4.925	4.794	4.968	4.893	4.687
Spain	EU	D	6.862	6.974	6.716	6.136	5.798	5.719	5.325	5.104	4.860
Sri Lanka	APAC	LD	5.147	5.692	5.603	5.145	5.176	4.985	4.707	4.787	4.716
Sweden	EU	D	8.195	8.455	8.379	8.015	7.850	8.198	8.026	7.796	7.627
Switzerland	EU	D	7.708	7.778	7.672	7.354	7.266	7.301	7.286	7.166	7.123
Taiwan, China	APAC	D	7.324	7.149	7.197	7.084	7.056	7.137	7.291	7.285	7.040
Thailand	APAC	LD	6.564	6.622	6.454	6.049	5.765	5.599	5.719	5.954	5.956
Turkey	MEA	LD	5.227	5.553	5.287	4.873	4.814	4.977	5.312	5.438	5.268
Ukraine	Eastern EU	LD	4.007	4.086	4.199	3.563	3.010	3.091	3.287	3.181	3.873
United Kingdom	EU	D	7.819	7.606	7.016	6.193	5.982	6.326	6.487	6.216	6.253
United States	NA	D	8.140	7.855	7.844	7.068	6.682	6.802	6.817	6.981	6.752
Venezuela	LA	LD	4.053	4.016	3.822	3.398	3.082	2.968	3.122	2.926	2.860
Vietnam	APAC	LD	5.382	5.350	5.472	5.532	5.214	4.869	4.713	4.687	4.895
Zambia	MEA	LD	4.657	4.886	5.452	5.286	4.854	5.054	5.410	5.571	5.398
Zimbabwe	MEA	LD	4.385	4.409	4.508	4.007	3.784	4.025	4.118	4.082	3.743

Table 14, Aggregate scores for Physical Property Rights; average of Property Rights, Registering Property, and Access to Loans

Intellectual Property Rights Data (IPR)

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	1.233	1.233	1.233	1.467	1.467	1.096	1.096	0.822	0.822
Argentina	LA	LD	2.603	2.603	2.603	3.200	3.200	3.151	3.151	3.014	3.014
Australia	APAC	D	8.904	8.904	8.904	9.333	9.333	9.452	9.452	9.589	9.589
Austria	EU	D	9.315	9.315	9.315	9.333	9.333	9.452	9.452	9.452	9.452
Bangladesh	APAC	LD	0.137	0.137	0.137	0.533	0.533	0.274	0.274	0.548	0.548
Belgium	EU	D	9.315	9.315	9.315	9.333	9.333	9.315	9.315	9.178	9.178
Bolivia	LA	LD	1.507	1.507	1.507	2.000	2.000	1.781	1.781	1.644	1.644
Brazil	LA	LD	4.658	4.658	4.658	5.200	5.200	5.342	5.342	5.616	5.616
Bulgaria	Eastern EU	LD	3.425	3.425	3.425	3.733	3.733	3.836	3.836	3.836	3.836
Cameroon	MEA	LD	1.233	1.233	1.233	1.600	1.600	1.233	1.233	1.233	1.233
Canada	NA	D	8.219	8.219	8.219	8.800	8.800	8.904	8.904	9.041	9.041
Chile	LA	D	3.699	3.699	3.699	4.133	4.133	4.247	4.247	4.384	4.384
China	APAC	LD	1.507	1.507	1.507	2.133	2.133	2.055	2.055	2.329	2.329
Colombia	LA	LD	4.795	4.795	4.795	5.333	5.333	5.342	5.342	5.342	5.342
Costa Rica	LA	LD	4.384	4.384	4.384	4.800	4.800	4.658	4.658	4.384	4.384
Cyprus	EU	D	5.890	5.890	5.890	6.267	6.267	6.027	6.027	6.027	6.027
Czech Republic	Eastern EU	D	7.397	7.397	7.397	7.733	7.733	7.808	7.808	7.808	7.808
Denmark	EU	D	9.315	9.315	9.315	9.200	9.200	9.315	9.315	9.315	9.315
Dominican Rep	LA	LD	1.918	1.918	1.918	2.400	2.400	2.192	2.192	2.192	2.192
Ecuador	LA	LD	3.699	3.699	3.699	3.733	3.733	3.288	3.288	3.151	3.151
Egypt	MEA	LD	4.521	4.521	4.521	4.800	4.800	4.247	4.247	3.973	3.973
Finland	EU	D	9.315	9.315	9.315	9.333	9.333	9.178	9.178	9.178	9.178
France	EU	D	6.986	6.986	6.986	7.333	7.333	7.534	7.534	7.534	7.534
Germany	EU	D	9.041	9.041	9.041	8.933	8.933	9.041	9.041	9.178	9.178
Greece	EU	D	4.795	4.795	4.795	4.933	4.933	4.247	4.247	3.973	3.973
Guatemala	LA	LD	1.781	1.781	1.781	2.000	2.000	1.781	1.781	1.644	1.644
Hong Kong	APAC	D	5.753	5.753	5.753	6.400	6.400	6.712	6.712	6.575	6.575
Hungary	Eastern EU	D	6.986	6.986	6.986	7.200	7.200	6.986	6.986	7.123	7.123
Iceland	EU	D	6.164	6.164	6.164	6.133	6.133	6.027	6.027	5.890	5.890
India	APAC	LD	3.288	3.288	3.288	4.000	4.000	3.973	3.973	4.247	4.247
Indonesia	APAC	LD	1.233	1.233	1.233	1.200	1.200	0.822	0.822	0.959	0.959
Ireland	EU	D	8.082	8.082	8.082	8.000	8.000	7.945	7.945	7.945	7.945
Israel	MEA	D	8.356	8.356	8.356	8.267	8.267	8.356	8.356	8.356	8.356
Italy	EU	D	6.027	6.027	6.027	6.133	6.133	6.027	6.027	6.027	6.027
Japan	APAC	D	9.589	9.589	9.589	9.867	9.867	9.726	9.726	9.863	9.863
Jordan	MEA	LD	4.521	4.521	4.521	5.067	5.067	4.658	4.658	4.658	4.658
Kenya	MEA	LD	1.644	1.644	1.644	2.133	2.133	1.918	1.918	1.781	1.781
Lithuania	Eastern EU	D	5.068	5.068	5.068	5.467	5.467	5.205	5.205	5.205	5.205
Luxembourg	EU	D	9.863	9.863	9.863	9.867	9.867	9.863	9.863	9.726	9.726
Malaysia	APAC	LD	4.658	4.658	4.658	4.933	4.933	5.068	5.068	5.068	5.068
Malta	EU	D	6.438	6.438	6.438	6.667	6.667	6.712	6.712	6.438	6.438
Mexico	LA	LD	4.384	4.384	4.384	4.667	4.667	4.795	4.795	5.068	5.068
Morocco	MEA	LD	3.562	3.562	3.562	3.867	3.867	3.562	3.562	3.425	3.425
Netherlands	EU	D	8.904	8.904	8.904	8.933	8.933	8.904	8.904	9.041	9.041
New Zealand	APAC	D	9.726	9.726	9.726	9.733	9.733	9.589	9.589	9.726	9.726
Nigeria	MEA	LD	1.507	1.507	1.507	1.600	1.600	1.370	1.370	1.370	1.370
Norway	EU	D	8.767	8.767	8.767	8.800	8.800	8.904	8.904	9.041	9.041
Pakistan	APAC	LD	1.233	1.233	1.233	1.467	1.467	0.822	0.822	0.822	0.822
Peru	LA	LD	3.014	3.014	3.014	3.333	3.333	3.425	3.425	3.562	3.562
Philippines	APAC	LD	3.288	3.288	3.288	3.467	3.467	3.014	3.014	3.014	3.014
Poland	Eastern EU	D	4.932	4.932	4.932	5.467	5.467	5.342	5.342	5.479	5.479
Portugal	EU	D	6.849	6.849	6.849	7.333	7.333	7.123	7.123	6.986	6.986
Romania	MEA	LD	3.425	3.425	3.425	4.000	4.000	3.973	3.973	3.973	3.973
Russia	Eastern EU	LD	2.740	2.740	2.740	3.733	3.733	3.973	3.973	3.973	3.973
Saudi Arabia	MEA	LD	5.753	5.753	5.753	5.867	5.867	5.616	5.616	5.616	5.616
Senegal	MEA	LD	1.781	1.781	1.781	2.267	2.267	1.918	1.918	1.918	1.918
Singapore	APAC	D	7.671	7.671	7.671	8.000	8.000	8.082	8.082	8.082	8.082
Slovakia	Eastern EU	D	6.575	6.575	6.575	6.933	6.933	7.123	7.123	7.397	7.397
South Africa	MEA	LD	8.082	8.082	8.082	8.000	8.000	7.808	7.808	7.808	7.808
South Korea	APAC	D	6.849	6.849	6.849	7.200	7.200	7.123	7.123	7.260	7.260
Spain	EU	D	6.849	6.849	6.849	7.067	7.067	6.575	6.575	6.301	6.301
Sri Lanka	APAC	LD	0.411	0.411	0.411	0.800	0.800	1.096	1.096	1.096	1.096
Sweden	EU	D	9.315	9.315	9.315	9.333	9.333	9.315	9.315	9.315	9.315
Switzerland	EU	D	9.315	9.315	9.315	9.333	9.333	9.178	9.178	9.178	9.178
Taiwan	APAC	D	7.260	7.260	7.260	7.600	7.600	7.534	7.534	7.260	7.260
Thailand	APAC	LD	2.055	2.055	2.055	2.667	2.667	2.740	2.740	2.740	2.740
Turkey	MEA	LD	3.836	3.836	3.836	4.267	4.267	4.110	4.110	4.247	4.247
Ukraine	Eastern EU	LD	1.370	1.370	1.370	1.333	1.333	1.096	1.096	1.096	1.096
United Kingdom	EU	D	9.178	9.178	9.178	9.067	9.067	9.041	9.041	9.178	9.178
United States	NA	D	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
Venezuela	LA	LD	0.822	0.822	0.822	1.067	1.067	0.548	0.548	0.411	0.411
Vietnam	APAC	LD	1.096	1.096	1.096	1.333	1.333	1.507	1.507	1.370	1.370
Zambia	MEA	LD	1.507	1.507	1.507	1.733	1.733	1.370	1.370	1.370	1.370
Zimbabwe	MEA	LD	0.274	0.274	0.274	0.400	0.400	0.000	0.000	0.000	0.000

Table 15, Software License Compliance, normalized and inverted from % to 0-10 scale

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.199	3.340	2.512	2.721		2.026	1.359	1.959	3.115
Argentina	LA	LD	3.377	3.052	2.800	2.485		2.424	2.303	2.224	2.374
Australia	APAC	D	8.016	8.165	8.205	7.988		7.201	7.228	7.208	7.490
Austria	EU	D	7.629	8.122	8.643	8.453		7.456	7.473	7.473	7.515
Bangladesh	APAC	LD	1.865	1.601	1.748	2.284		2.315	2.384	2.680	2.547
Belgium	EU	D	7.227	7.837	7.541	7.111		6.764	7.035	7.072	7.146
Bolivia	LA	LD	1.571	1.735	1.485	1.162		2.665	3.730	3.624	3.842
Brazil	LA	LD	3.950	3.878	3.779	3.404		3.704	4.159	4.233	3.751
Bulgaria	Eastern EU	LD	2.738	2.972	3.094	2.723		3.160	3.314	3.405	3.368
Cameroon	MEA	LD	4.034	4.151	3.552	2.619		3.347	3.464	3.595	3.996
Canada	NA	D	7.650	7.764	7.584	7.456		7.404	7.402	7.614	7.750
Chile	LA	D	4.935	4.935	4.256	4.284		4.379	4.511	4.726	4.869
China	APAC	LD	3.736	4.034	4.804	5.039		5.023	4.902	4.907	4.921
Colombia	LA	LD	4.328	4.218	4.005	3.341		3.641	3.715	3.710	3.644
Costa Rica	LA	LD	4.723	4.546	4.187	4.241		4.166	4.366	4.745	5.046
Cyprus	EU	D	5.533	5.625	6.152	6.245		5.668	5.385	5.636	5.583
Czech Republic	Eastern EU	D	4.703	4.801	4.891	5.036		4.540	4.704	4.699	4.874
Denmark	EU	D	8.600	8.846	8.706	8.323		8.086	7.138	6.685	7.131
Dominican Republic	LA	LD	3.531	3.802	4.050	3.740		2.512	2.893	3.258	3.654
Ecuador	LA	LD	2.609	2.799	2.412	2.120		2.909	3.066	4.253	
Egypt	MEA	LD	4.128	4.191	4.404	4.457		3.838	3.878	3.716	3.245
Finland	EU	D	8.624	8.886	8.673	8.482		8.750	8.798	8.735	8.656
France	EU	D	8.051	8.187	8.353	8.016		8.074	7.722	7.798	7.674
Germany	EU	D	9.053	9.132	8.398	7.869		7.584	7.643	7.592	7.348
Greece	EU	D	5.339	5.210	5.204	5.229		4.718	4.450	4.500	4.762
Guatemala	LA	LD	2.895	3.443	2.906	2.568		2.535	2.743	3.157	3.440
Hong Kong SAR	APAC	D	7.118	7.417	7.313	7.108		7.496	7.635	7.905	8.001
Hungary	Eastern EU	D	5.607	5.737	5.155	4.801		5.133	5.043	4.752	4.477
Iceland	EU	D	8.251	8.105	8.258	7.524		6.926	6.920	6.376	6.281
India	APAC	LD	5.369	4.990	4.504	4.414		4.207	4.458	4.464	4.531
Indonesia	APAC	LD	3.985	3.523	3.164	4.236		4.381	4.548	4.839	5.201
Ireland	EU	D	7.447	7.519	7.720	7.614		7.864	7.501	7.412	7.664
Israel	MEA	D	7.191	6.795	5.760	5.043		6.014	6.275	6.083	5.952
Italy	EU	D	5.385	5.508	5.544	4.851		4.531	4.505	4.541	4.482
Japan	APAC	D	7.690	7.711	7.754	7.384		7.107	7.306	7.889	8.255
Jordan	MEA	LD	5.538	5.620	6.077	6.227		5.410	5.752	5.936	5.951
Kenya	MEA	LD	3.266	3.356	3.471	3.475		3.208	3.541	4.079	4.488
Lithuania	Eastern EU	D	3.710	4.432	5.061	4.670		4.142	4.436	4.572	4.724
Luxembourg	EU	D	7.486	7.672	7.746	8.209		8.221	8.092	8.240	8.466
Malaysia	APAC	LD	6.878	6.846	6.261	5.845		6.581	6.428	6.357	7.000
Malta	EU	D	5.099	5.541	5.522	5.647		6.001	6.155	6.461	5.873
Mexico	LA	LD	4.210	4.185	3.742	3.651		3.668	4.130	4.320	4.116
Morocco	MEA	LD	4.207	4.742	3.881	3.506		4.158	4.012	3.817	4.550
Netherlands	EU	D	8.516	8.384	8.170	8.074		7.950	8.181	7.913	7.839
New Zealand	APAC	D	7.894	7.918	7.926	8.300		8.022	8.455	8.395	8.271
Nigeria	MEA	LD	3.264	3.235	3.231	3.474		2.963	3.142	2.983	2.811
Norway	EU	D	7.660	7.732	8.017	7.765		7.640	7.538	7.540	7.621
Pakistan	APAC	LD	3.280	4.352	3.677	3.260		3.443	3.278	3.167	3.089
Peru	LA	LD	2.839	2.776	2.476	2.521		2.570	2.634	3.000	3.013
Philippines	APAC	LD	3.200	3.466	3.534	3.199		3.008	3.741	4.318	4.514
Poland	Eastern EU	LD	4.343	4.127	3.954	4.302		4.459	4.388	4.422	4.578
Portugal	EU	D	6.778	6.532	6.503	6.019		5.268	5.518	5.829	5.950
Romania	MEA	LD	3.446	3.825	4.214	3.972		3.298	3.099	3.165	3.924
Russian Federation	Eastern EU	LD	2.337	2.628	3.192	2.912		2.459	2.661	3.143	3.374
Saudi Arabia	MEA	LD		4.767	5.856	6.070		6.846	6.840	6.663	6.474
Senegal	MEA	LD		3.658	4.211	3.833		3.778	3.542	3.697	4.014
Singapore	APAC	D	8.387	8.620	8.796	8.681		8.494	8.478	8.535	8.586
Slovak Republic	Eastern EU	D	4.834	4.716	4.439	4.542		4.696	4.672	4.574	4.636
South Africa	MEA	LD	6.770	7.006	7.226	7.038		6.621	7.181	7.430	7.167
South Korea	APAC	D	5.874	7.281	6.628	5.329		5.120	5.552	5.042	4.509
Spain	EU	D	6.004	6.534	6.174	5.523		5.190	4.977	4.960	4.298
Sri Lanka	APAC	LD	3.799	4.600	4.516	4.340		5.144	4.713	4.646	4.900
Sweden	EU	D	8.142	8.351	8.253	8.510		8.383	7.633	7.540	7.429
Switzerland	EU	D	8.743	8.847	8.806	8.469		8.469	8.406	8.298	8.398
Taiwan, China	APAC	D	6.445	6.437	6.508	6.597		6.701	7.082	7.018	6.913
Thailand	APAC	LD	5.310	5.210	4.595	3.786		3.479	3.429	3.554	3.429
Turkey	MEA	LD	3.631	4.082	3.409	2.801		2.873	3.809	4.353	4.439
Ukraine	Eastern EU	LD	2.747	2.809	2.831	2.747		2.687	2.828	2.498	2.760
United Kingdom	EU	D	8.582	8.262	7.268	7.224		7.805	8.139	8.080	8.229
United States	NA	D	8.244	7.360	7.632	7.393		6.715	6.617	6.972	7.357
Venezuela	LA	LD	2.056	1.773	1.605	1.661		1.322	1.164	1.066	1.048
Vietnam	APAC	LD	2.685	3.033	3.392	3.362		2.434	2.721	3.106	3.418
Zambia	MEA	LD	2.354	2.872	4.078	4.344		4.337	4.657	4.795	5.041
Zimbabwe	MEA	LD	3.554	3.215	3.178	3.193		3.546	3.580	3.334	3.108

Table 16, Intellectual Property Protection scores, normalized from a 1-7 range into a 0-10 scale

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	5.550	5.550	5.550	5.550	5.550	5.550	5.550	5.550	5.550
Argentina	LA	LD	7.117	7.117	7.117	7.117	7.117	7.117	7.117	7.117	7.117
Australia	APAC	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Austria	EU	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Banglad.	APAC	LD	3.400	3.400	3.400	3.400	3.150	3.150	3.150	3.150	3.150
Belgium	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Bolivia	LA	LD	5.950	5.950	5.950	5.950	5.700	5.700	5.700	5.700	5.700
Brazil	LA	LD	6.850	6.850	6.850	6.850	6.850	6.850	6.850	6.850	6.850
Bulgaria	Eastern EU	LD	7.750	7.750	7.750	7.750	7.750	7.750	7.750	7.750	7.750
Cameroon	MEA	LD	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783
Canada	NA	D	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083
Chile	LA	D	8.950	8.950	8.950	8.950	9.350	9.350	9.350	9.350	9.350
China	APAC	LD	8.167	8.167	8.167	8.167	8.417	8.417	8.417	8.417	8.417
Colombia	LA	LD	6.850	6.850	6.850	6.850	6.850	6.850	6.850	6.850	6.850
Cost. Rica	LA	LD	5.783	5.783	5.783	5.783	6.183	6.183	6.183	6.183	6.183
Cyprus	EU	D	6.950	6.950	6.950	6.950	6.280	6.280	6.280	6.280	6.280
Czech Republic	Eastern EU	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Denmark	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Dom. Rep.	LA	LD	4.967	4.967	4.967	4.967	5.767	5.767	5.767	5.767	5.767
Ecuador	LA	LD	7.117	7.117	7.117	7.117	7.517	7.517	7.517	7.517	7.517
Egypt	MEA	LD	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783
Finland	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
France	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Germany	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Greece	EU	D	8.933	8.933	8.933	8.933	8.933	8.933	8.933	8.933	8.933
Guatemala	LA	LD	6.300	6.300	6.300	6.300	7.100	7.100	7.100	7.100	7.100
Hong Kong	APAC	D	7.617	7.617	7.617	7.617	7.617	7.617	7.617	7.617	7.617
Hungary	Eastern EU	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Iceland	EU	D	7.350	7.350	7.350	7.350	7.750	7.750	7.750	7.750	7.750
India	APAC	LD	7.517	7.517	7.517	7.517	7.517	7.517	7.517	7.517	7.517
Indonesia	APAC	LD	5.533	5.533	5.533	5.533	5.533	5.533	5.533	5.533	5.533
Ireland	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Israel	MEA	D	7.917	7.917	7.917	7.917	7.917	7.917	7.917	7.917	7.917
Italy	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Japan	APAC	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
Jordan	MEA	LD	6.200	6.200	6.200	6.200	6.600	6.600	6.600	6.600	6.600
Kenya	MEA	LD	6.433	6.433	6.433	6.433	6.433	6.433	6.433	6.433	6.433
Lithuania	Eastern EU	D	7.750	7.750	7.750	7.750	7.750	7.750	7.750	7.750	7.750
Luxembg.	EU	D	8.283	8.283	8.283	8.283	8.283	8.283	8.283	8.283	8.283
Malaysia	APAC	LD	6.967	6.967	6.967	6.967	7.367	7.367	7.367	7.367	7.367
Malta	EU	D	6.967	6.967	6.967	6.967	7.367	7.367	7.367	7.367	7.367
Mexico	LA	LD	6.833	6.833	6.833	6.833	7.500	7.500	7.500	7.500	7.500
Morocco	MEA	LD	6.700	6.700	6.700	6.700	7.100	7.100	7.100	7.100	7.100
Netherlands	EU	D	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333	9.333
New Zealand	APAC	D	7.350	7.350	7.350	7.350	7.350	7.350	7.350	7.350	7.350
Nigeria	MEA	LD	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783
Norway	EU	D	8.583	8.583	8.583	8.583	8.833	8.833	8.833	8.833	8.833
Pakistan	APAC	LD	4.067	4.067	4.067	4.067	4.467	4.467	4.467	4.467	4.467
Peru	LA	LD	6.050	6.050	6.050	6.050	6.850	6.850	6.850	6.850	6.850
Philipp.	APAC	LD	7.767	7.767	7.767	7.767	7.767	7.767	7.767	7.767	7.767
Poland	Eastern EU	LD	7.750	7.750	7.750	7.750	8.000	8.000	8.000	8.000	8.000
Portugal	EU	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Romania	MEA	LD	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
Russia	Eastern EU	LD	7.350	7.350	7.350	7.350	7.350	7.350	7.350	7.350	7.350
Saudi Ar.	MEA	LD	5.133	5.133	5.133	5.133	5.133	5.133	5.133	5.133	5.133
Senegal	MEA	LD	5.533	5.533	5.533	5.533	5.533	5.533	5.533	5.533	5.533
Singapore	APAC	D	8.417	8.417	8.417	8.417	8.417	8.417	8.417	8.417	8.417
Slovak Republic	Eastern EU	D	8.417	8.417	8.417	8.417	8.667	8.667	8.667	8.667	8.667
South Africa	MEA	LD	7.500	7.500	7.500	7.500	7.750	7.750	7.750	7.750	7.750
South Korea	APAC	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Spain	EU	D	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667	8.667
Sri. Lanka	APAC	LD	6.210	6.210	6.210	6.210	6.450	6.450	6.450	6.450	6.450
Sweden	EU	D	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083
Switzerl.	EU	D	8.417	8.417	8.417	8.417	8.417	8.417	8.417	8.417	8.417
Taiwan	APAC	D	7.483	7.483	7.483	7.483	7.483	7.483	7.483	7.483	7.483
Thailand	APAC	LD	4.983	4.983	4.983	4.983	6.450	6.450	6.450	6.450	6.450
Turkey	MEA	LD	8.017	8.017	8.017	8.017	7.750	7.750	7.750	7.750	7.750
Ukraine	Eastern EU	LD	7.350	7.350	7.350	7.350	7.750	7.750	7.750	7.750	7.750
U.K.	EU	D	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083	9.083
U.S.A.	NA	D	9.750	9.750	9.750	9.750	9.750	9.750	9.750	9.750	9.750
Venezuela	LA	LD	6.300	6.300	6.300	6.300	5.550	5.550	5.550	5.550	5.550
Vietnam	APAC	LD	5.550	5.550	5.550	5.550	6.850	6.850	6.850	6.850	6.850
Zambia	MEA	LD	3.800	3.800	3.800	3.800	4.467	4.467	4.467	4.467	4.467
Zimbabwe	MEA	LD	5.117	5.117	5.117	5.117	5.117	5.117	5.117	5.117	5.117

Table 17, Patent Protection scores, normalized from 0-5 range into a 0-10 scale

Country	Region	Class	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	MEA	LD	3.327	3.374	3.098	3.246	3.508	2.891	2.668	2.777	3.162
Argentina	LA	LD	4.365	4.257	4.173	4.267	5.158	4.231	4.190	4.118	4.168
Australia	APAC	D	8.529	8.578	8.592	8.663	9.000	8.440	8.449	8.488	8.582
Austria	EU	D	8.537	8.701	8.875	8.818	9.000	8.525	8.531	8.531	8.545
Banglad.	APAC	LD	1.801	1.713	1.762	2.072	1.842	1.913	1.936	2.126	2.082
Belgium	EU	D	8.625	8.829	8.730	8.592	9.333	8.471	8.561	8.528	8.552
Bolivia	LA	LD	3.009	3.064	2.981	3.037	3.850	3.382	3.737	3.656	3.729
Brazil	LA	LD	5.152	5.128	5.096	5.151	6.025	5.299	5.451	5.567	5.406
Bulgaria	Eastern EU	LD	4.638	4.716	4.756	4.735	5.742	4.915	4.966	4.997	4.985
Cameroon	MEA	LD	3.684	3.723	3.523	3.334	3.692	3.454	3.493	3.537	3.671
Canada	NA	D	8.317	8.356	8.295	8.446	8.942	8.464	8.463	8.579	8.625
Chile	LA	D	5.861	5.861	5.635	5.789	6.742	5.992	6.036	6.153	6.201
China	APAC	LD	4.470	4.569	4.826	5.113	5.275	5.165	5.124	5.217	5.222
Colombia	LA	LD	5.324	5.287	5.217	5.175	6.092	5.278	5.302	5.301	5.279
Cost. Rica	LA	LD	4.963	4.904	4.785	4.941	5.492	5.002	5.069	5.104	5.204
Cyprus	EU	D	6.124	6.155	6.331	6.487	6.273	5.992	5.898	5.981	5.964
Czech Republic	Eastern EU	D	6.922	6.955	6.985	7.145	8.200	7.005	7.060	7.058	7.116
Denmark	EU	D	9.083	9.165	9.118	8.952	9.267	8.912	8.596	8.445	8.593
Dom. Rep.	LA	LD	3.472	3.562	3.645	3.702	4.083	3.490	3.617	3.739	3.871
Ecuador	LA	LD	4.475	4.538	4.409	4.323	5.625	4.571	4.623	4.974	5.334
Egypt	MEA	LD	4.811	4.832	4.903	5.013	5.292	4.622	4.636	4.491	4.334
Finland	EU	D	9.091	9.178	9.107	9.050	9.333	9.087	9.103	9.082	9.056
France	EU	D	8.124	8.169	8.224	8.228	8.333	8.314	8.196	8.222	8.181
Germany	EU	D	9.142	9.169	8.924	8.712	9.133	8.653	8.672	8.701	8.620
Greece	EU	D	6.355	6.313	6.311	6.365	6.933	5.966	5.877	5.802	5.889
Guatemala	LA	LD	3.659	3.841	3.662	3.623	4.550	3.805	3.874	3.967	4.061
Hong Kong	APAC	D	6.829	6.929	6.894	7.042	7.008	7.275	7.321	7.366	7.398
Hungary	Eastern EU	D	7.087	7.130	6.936	6.889	7.933	6.929	6.899	6.847	6.756
Iceland	EU	D	7.255	7.207	7.258	7.003	6.942	6.901	6.899	6.672	6.641
India	APAC	LD	5.391	5.265	5.103	5.310	5.758	5.232	5.316	5.409	5.431
Indonesia	APAC	LD	3.584	3.430	3.310	3.656	3.367	3.579	3.635	3.777	3.898
Ireland	EU	D	8.287	8.312	8.378	8.316	8.667	8.381	8.260	8.230	8.314
Israel	MEA	D	7.821	7.689	7.344	7.075	8.092	7.429	7.516	7.452	7.408
Italy	EU	D	6.915	6.956	6.968	6.772	7.733	6.631	6.622	6.634	6.614
Japan	APAC	D	8.871	8.878	8.892	8.861	9.600	8.722	8.789	9.028	9.150
Jordan	MEA	LD	5.419	5.447	5.599	5.831	5.833	5.556	5.670	5.731	5.736
Kenya	MEA	LD	3.781	3.811	3.849	4.014	4.283	3.853	3.964	4.098	4.234
Lithuania	Eastern EU	D	5.509	5.750	5.960	5.962	6.608	5.699	5.797	5.842	5.893
Luxembg.	EU	D	8.544	8.606	8.631	8.786	9.075	8.789	8.746	8.750	8.825
Malaysia	APAC	LD	6.167	6.157	5.962	5.915	6.150	6.339	6.288	6.264	6.478
Malta	EU	D	6.168	6.315	6.309	6.427	7.017	6.693	6.745	6.755	6.559
Mexico	LA	LD	5.142	5.134	4.986	5.050	6.083	5.321	5.475	5.630	5.562
Morocco	MEA	LD	4.823	5.001	4.714	4.691	5.483	4.940	4.891	4.780	5.025
Netherlands	EU	D	8.918	8.874	8.803	8.780	9.133	8.729	8.806	8.762	8.738
New Zealand	APAC	D	8.323	8.331	8.334	8.461	8.542	8.320	8.465	8.490	8.449
Nigeria	MEA	LD	3.518	3.508	3.507	3.619	3.692	3.372	3.432	3.379	3.322
Norway	EU	D	8.337	8.361	8.456	8.383	8.817	8.459	8.425	8.472	8.499
Pakistan	APAC	LD	2.860	3.217	2.992	2.931	2.967	2.911	2.856	2.819	2.792
Peru	LA	LD	3.967	3.947	3.847	3.968	5.092	4.281	4.303	4.471	4.475
Philipp.	APAC	LD	4.751	4.840	4.863	4.811	5.617	4.596	4.840	5.033	5.098
Poland	Eastern EU	LD	5.675	5.603	5.545	5.840	6.733	5.934	5.910	5.967	6.019
Portugal	EU	D	7.431	7.349	7.340	7.340	8.000	7.019	7.103	7.161	7.201
Romania	MEA	LD	4.957	5.083	5.213	5.324	6.000	5.090	5.024	5.046	5.299
Russia	Eastern EU	LD	4.142	4.239	4.427	4.665	5.542	4.594	4.661	4.822	4.899
Saudi Ar.	MEA	LD	5.443	5.218	5.581	5.690	5.500	5.865	5.863	5.804	5.741
Senegal	MEA	LD	3.657	3.657	3.842	3.878	3.900	3.743	3.665	3.716	3.822
Singapore	APAC	D	8.158	8.236	8.295	8.366	8.208	8.331	8.326	8.345	8.362
Slovak Republic	Eastern EU	D	6.609	6.569	6.477	6.631	7.800	6.829	6.821	6.879	6.900
South Africa	MEA	LD	7.451	7.529	7.603	7.513	7.875	7.393	7.580	7.663	7.575
South Korea	APAC	D	7.130	7.599	7.381	7.065	7.933	6.970	7.114	6.990	6.812
Spain	EU	D	7.173	7.350	7.230	7.086	7.867	6.811	6.740	6.643	6.422
Sri. Lanka	APAC	LD	3.473	3.740	3.712	3.783	3.625	4.230	4.086	4.064	4.148
Sweden	EU	D	8.847	8.917	8.884	8.976	9.208	8.927	8.677	8.646	8.609
Switzerl.	EU	D	8.825	8.860	8.846	8.740	8.875	8.688	8.667	8.631	8.664
Taiwan	APAC	D	7.063	7.060	7.084	7.227	7.542	7.240	7.366	7.254	7.219
Thailand	APAC	LD	4.116	4.083	3.878	3.812	4.558	4.223	4.206	4.248	4.206
Turkey	MEA	LD	5.161	5.311	5.087	5.028	6.008	4.911	5.223	5.450	5.478
Ukraine	Eastern EU	LD	3.822	3.843	3.850	3.810	4.542	3.844	3.891	3.781	3.869
U.K.	EU	D	8.948	8.841	8.510	8.458	9.075	8.643	8.755	8.781	8.830
U.S.A.	NA	D	9.331	9.037	9.127	9.048	9.875	8.822	8.789	8.907	9.036
Venezuela	LA	LD	3.059	2.965	2.909	3.009	3.308	2.473	2.421	2.342	2.336
Vietnam	APAC	LD	3.110	3.226	3.346	3.415	4.092	3.597	3.693	3.775	3.879
Zambia	MEA	LD	2.554	2.726	3.128	3.292	3.100	3.391	3.498	3.544	3.626
Zimbabwe	MEA	LD	2.981	2.869	2.856	2.903	2.758	2.888	2.899	2.817	2.741

Table 18, Aggregate Intellectual Property Rights score; average of Software License Compliance, Intellectual Property Protection, and Patent Protection

Appendix B

Following a Principal, Component Analysis, SPSS delivered one factor only, not distinguishing the 10 scores into the associations of Legal Framework , IP Rights, and Property Rights, nor any other significant grouping.

Following the initial process, and considering the IPRI taxonomy of the three major property rights areas (LF, IPR, PPR), three factors were manually created and grouped. The results of the second PCA is shown in 0, including outputted PCA values, for use in regression.

Principal Component Analysis Output

Factor Analysis SPSS output

Notes		
Output Created	12/3/2016	
	0:46	
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	666
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.

Syntax

FACTOR

```

/VARIABLES Judind Rulelaw ConCor PolSta PR RegProp AccessLoan SW
IP PatentPro
/MISSING LISTWISE

/ANALYSIS Judind Rulelaw ConCor PolSta PR RegProp AccessLoan SW IP
PatentPro

```

```
/PRINT INITIAL ROTATION FSCORE
/PLOT EIGEN
/CRITERIA MINEIGEN(1) ITERATE(25)
/EXTRACTION PC
/CRITERIA ITERATE(25)
/ROTATION QUARTIMAX
/SAVE REG(ALL)
/METHOD=CORRELATION.
```

Resources	Processor Time	00 00:00:00.829
	Elapsed Time	00 00:00:00.607
	Maximum	14376 (14.039K) bytes
	Memory	
	Required	

Variables	FAC1_1	Component score 1
Created		

[DataSet0]
Communalities

	Initial
Judind	1
Rulelaw	1
ConCor	1
PolSta	1
PR	1
RegProp	1
AccessLoan	1
SW	1
IP	1
PatentPro	1

Extraction Method: Principal Component Analysis.

Total Variance Explained			
Component	Total	Initial Eigenvalues	
		% of Variance	Cumulative %
1	7.279	72.788	72.788
2	0.837	8.37	81.158
3	0.729	7.293	88.452
4	0.406	4.062	92.514
5	0.334	3.339	95.853
6	0.134	1.345	97.198
7	0.12	1.196	98.393
8	0.068	0.677	99.07
9	0.064	0.637	99.708
10	0.029	0.292	100

Extraction Method: Principal Component Analysis.

Component Matrix(a)

a. 1 components extracted.

Rotated Component Matrix(a)

a. Only one component was extracted. The solution cannot be rotated.

Component Score Coefficient Matrix
Component

	1
Judind	0.125
Rulelaw	0.133
ConCor	0.132
PolSta	0.113
PR	0.128
RegProp	0.069
AccessLoan	0.095
SW	0.126
IP	0.13
PatentPro	0.103

Extraction Method: Principal Component Analysis.

Rotation Method: Quartimax with Kaiser Normalization.

Component Scores.

Component Score Covariance Matrix

Component	1
1	1

Extraction Method: Principal Component Analysis.

Rotation Method: Quartimax with Kaiser Normalization.

Component Scores.

SPSS Factor Analysis Configuring Three Factors

Factor Analysis – Legal Framework Factor

Notes		
Output Created		06-DEC-2016 14:48:39
Comments		
Input	Data	C:\Users\botao.an\AppData\Local\Microsoft Windows\Temporary Internet Files\Content.IE5\Q79L49GN\Untitled1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	666
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.
Syntax		FACTOR /VARIABLES Judind Rulelaw ConCor PolSta /MISSING LISTWISE /ANALYSIS Judind Rulelaw ConCor PolSta /PRINT INITIAL ROTATION FSCORE /PLOT EIGEN ROTATION /CRITERIA MINEIGEN(1) ITERATE(25) /EXTRACTION PC /CRITERIA ITERATE(25) /ROTATION VARIMAX /METHOD=CORRELATION.
Resources	Processor Time	00:00:00.13
	Elapsed Time	00:00:00.12
	Maximum Memory Required	3008 (2.938K) bytes

Warnings

Only one component was extracted. Component plots cannot be produced.

Communalities

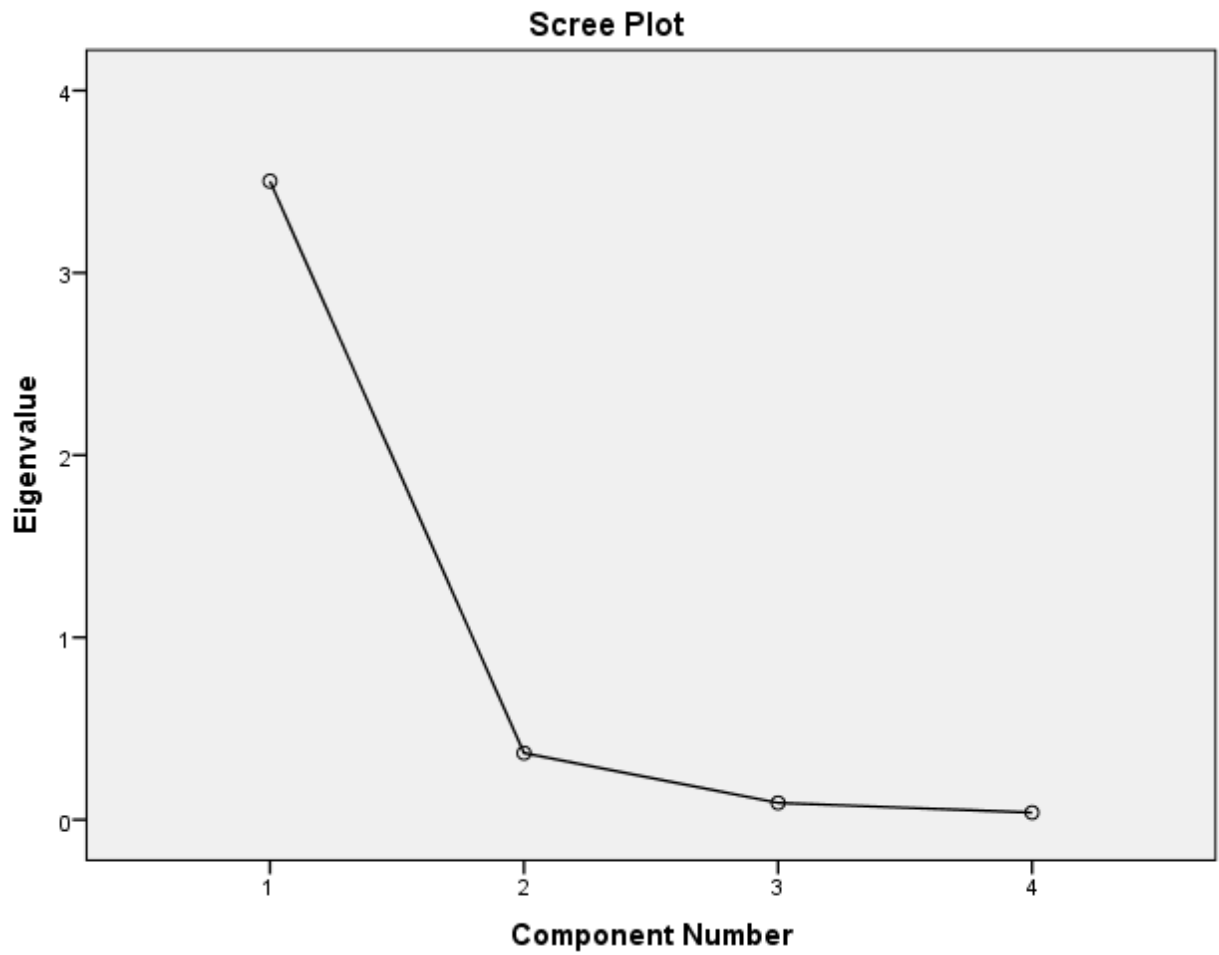
	Initial
Judind	1.000
Rulelaw	1.000
ConCor	1.000
PolSta	1.000

Extraction Method:
Principal Component
Analysis.

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.503	87.575	87.575
2	.366	9.139	96.714
3	.092	2.309	99.023
4	.039	.977	100.000

Extraction Method: Principal Component Analysis.



Component

Matrix^a



a. 1
components
extracted.

Rotated

Component

Matrix^a



a. Only one
component
was
extracted.
The solution
cannot be
rotated.

Component Score

Coefficient Matrix

	Component
	1
Judind	.260
Rulelaw	.280
ConCor	.279
PolSta	.248

Extraction Method: Principal
Component Analysis.
Rotation Method: Varimax
with Kaiser Normalization.

Component Score

Covariance Matrix

Component	1
1	1.000

Extraction Method: Principal
Component Analysis.
Rotation Method: Varimax
with Kaiser Normalization.

Factor Analysis Physical Property Rights (PPR) Factor

Notes		
Output Created		06-DEC-2016 14:56:11
Comments		
Input	Data	C:\Users\botao.an\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\Q79L49GN\Untitled1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	666
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.
Syntax		FACTOR /VARIABLES PR RegProp AccessLoan /MISSING LISTWISE /ANALYSIS PR RegProp AccessLoan /PRINT INITIAL ROTATION FSCORE /PLOT EIGEN ROTATION /CRITERIA MINEIGEN(1) ITERATE(25) /EXTRACTION PC /CRITERIA ITERATE(25) /ROTATION VARIMAX /SAVE REG(ALL) /METHOD=CORRELATION.
Resources	Processor Time	00:00:00.14
	Elapsed Time	00:00:00.09
	Maximum Memory Required	2184 (2.133K) bytes

Variables Created	FAC1_2	Component score 1
-------------------	--------	-------------------

Warnings

Only one component was extracted. Component plots cannot be produced.

Communalities

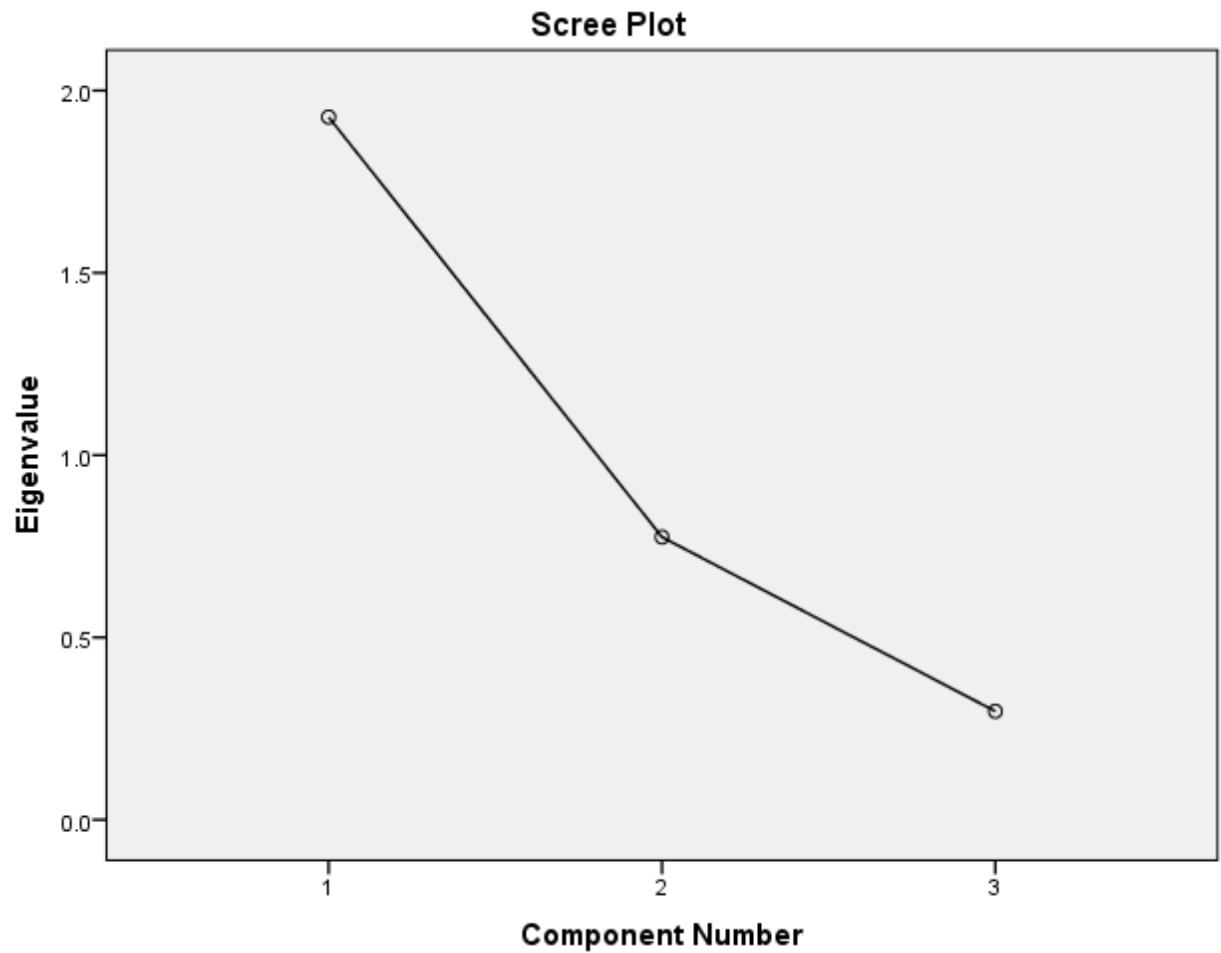
	Initial
PR	1.000
RegProp	1.000
AccessLoan	1.000

Extraction Method:
Principal Component
Analysis.

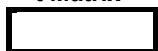
Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1.927	64.244	64.244
2	.775	25.841	90.085
3	.297	9.915	100.000

Extraction Method: Principal Component Analysis.

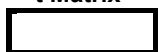


**Component
t Matrix^a**



a. 1
components
extracted.

**Rotated
Component
t Matrix^a**



a. Only one
component
was
extracted.
The solution
cannot be
rotated.

Component Score

Coefficient Matrix

	Component
	1
PR	.463
RegProp	.321
AccessLoan	.449

Extraction Method: Principal
Component Analysis.
Rotation Method: Varimax
with Kaiser Normalization.
Component Scores.

Component Score

Covariance Matrix

Component	1
1	1.000

Extraction Method:
Principal Component
Analysis.
Rotation Method: Varimax
with Kaiser Normalization.
Component Scores.

Factor Analysis Intellectual Property Rights (IPR) Factor

Notes		
Output Created		06-DEC-2016 14:56:58
Comments		
Input	Data	C:\Users\botao.an\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\Q79L49GN\Untitled1.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	666
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.
Syntax		FACTOR /VARIABLES SW IP PatentPro /MISSING LISTWISE /ANALYSIS SW IP PatentPro /PRINT INITIAL ROTATION FSCORE /PLOT EIGEN ROTATION /CRITERIA MINEIGEN(1) ITERATE(25) /EXTRACTION PC /CRITERIA ITERATE(25) /ROTATION VARIMAX /SAVE REG(ALL) /METHOD=CORRELATION.
Resources	Processor Time	00:00:00.14
	Elapsed Time	00:00:00.11
	Maximum Memory Required	2184 (2.133K) bytes
Variables Created	FAC1_2	Component score 1

Warnings

Only one component was extracted. Component plots cannot be produced.

Communalities

	Initial
SW	1.000
IP	1.000
PatentPro	1.000

Extraction Method:

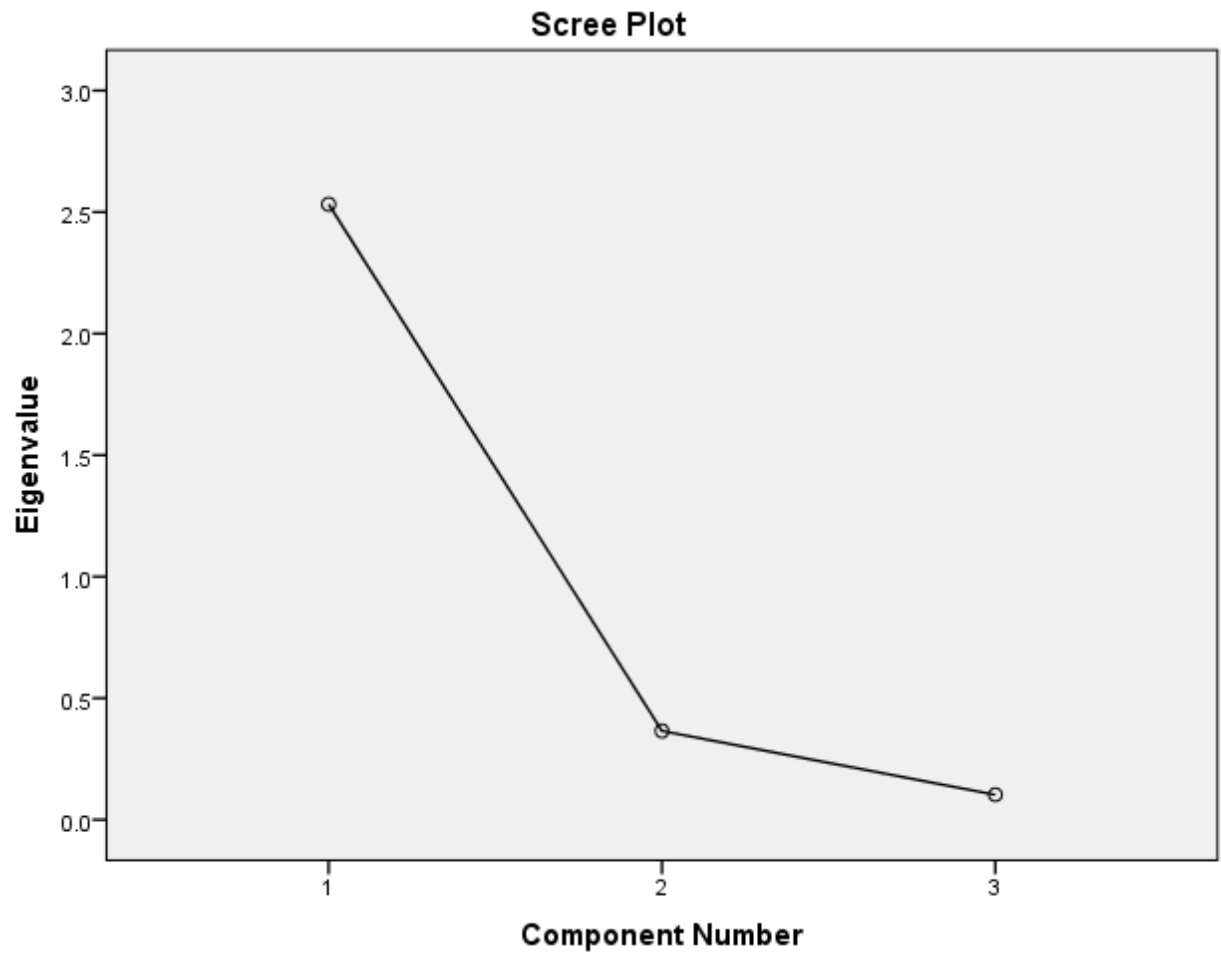
Principal Component

Analysis.

Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.532	84.400	84.400
2	.365	12.173	96.573
3	.103	3.427	100.000

Extraction Method: Principal Component Analysis.



Component

t Matrix^a



a. 1

components
extracted.

Rotated

Component

t Matrix^a



a. Only one
component
was
extracted.
The solution
cannot be
rotated.

Component Score

Coefficient Matrix

	Component
	1
SW	.381
IP	.361
PatentPro	.346

Extraction Method: Principal
Component Analysis.
Rotation Method: Varimax
with Kaiser Normalization.
Component Scores.

Component Score

Covariance Matrix

Component	1
1	1.000

Extraction Method:
Principal Component
Analysis.
Rotation Method: Varimax
with Kaiser Normalization.
Component Scores.

PCA Factor Output Data for LF, IPR, PPR

Year	Country	Region	Class	MFP	Factor_Legal	Factor_Phys	Factor_IPR
2006	Algeria	MEA	LD	-5.095	-1.03474	-1.90879	-1.31998
2007	Algeria	MEA	LD	2.810	-1.00222	-1.80926	-1.29492
2008	Algeria	MEA	LD	-3.205	-1.10119	-2.14324	-1.44209
2009	Algeria	MEA	LD	-2.977	-1.20085	-2.27275	-1.37528
2010	Algeria	MEA	LD	-0.653	-1.19758	-1.29778	NA
2011	Algeria	MEA	LD	1.458	-1.28574	-1.68115	-1.54584
2012	Algeria	MEA	LD	-1.783	-1.26108	-2.12603	-1.6644
2013	Algeria	MEA	LD	-2.518	-1.07271	-1.51118	-1.59249
2014	Algeria	MEA	LD	4.383	-1.07763	-1.22621	-1.38701
2006	Argentina	LA	LD	2.818	-0.89879	-1.15058	-0.74859
2007	Argentina	LA	LD	2.960	-0.88471	-1.10815	-0.80636
2008	Argentina	LA	LD	-1.188	-0.97432	-1.03884	-0.85115
2009	Argentina	LA	LD	-4.352	-0.98873	-1.423	-0.83146
2010	Argentina	LA	LD	5.030	-0.87586	-1.67374	NA
2011	Argentina	LA	LD	0.401	-0.80145	-1.72296	-0.84852
2012	Argentina	LA	LD	-3.699	-0.92672	-1.82549	-0.87002
2013	Argentina	LA	LD	-0.065	-0.91713	-1.90363	-0.90143
2014	Argentina	LA	LD	-1.875	-1.02335	-1.81405	-0.87477
2006	Australia	APAC	D	-1.459	1.29057	1.5433	1.23684
2007	Australia	APAC	D	-0.347	1.34353	1.57487	1.26332
2008	Australia	APAC	D	-1.273	1.36999	1.59908	1.27043
2009	Australia	APAC	D	-1.077	1.3325	1.26307	1.28624
2010	Australia	APAC	D	-0.932	1.31167	0.89492	NA
2011	Australia	APAC	D	-1.244	1.30143	0.64845	1.16144
2012	Australia	APAC	D	0.336	1.2845	0.61143	1.16624
2013	Australia	APAC	D	-0.591	1.18482	0.43664	1.18005
2014	Australia	APAC	D	0.229	1.28052	0.45122	1.23018
2006	Austria	EU	D	1.949	1.31466	1.53398	1.22015
2007	Austria	EU	D	1.781	1.44863	1.57952	1.30778
2008	Austria	EU	D	-0.344	1.41746	1.51815	1.40039
2009	Austria	EU	D	-2.364	1.2906	1.13937	1.3689
2010	Austria	EU	D	1.046	1.19259	0.89729	NA
2011	Austria	EU	D	0.721	1.11991	0.8126	1.20677
2012	Austria	EU	D	0.149	1.08374	0.788	1.20979
2013	Austria	EU	D	-0.129	1.10857	0.71376	1.20979
2014	Austria	EU	D	-0.552	1.11214	0.60971	1.21725
2006	Bangladesh	APAC	LD	-0.388	-1.5663	-1.10967	-2.19831
2007	Bangladesh	APAC	LD	-0.822	-1.46936	-1.12223	-2.24523
2008	Bangladesh	APAC	LD	-0.696	-1.32098	-1.17641	-2.2191
2009	Bangladesh	APAC	LD	-0.294	-1.28818	-1.14882	-2.07363
2010	Bangladesh	APAC	LD	0.235	-1.26905	-1.07192	NA
2011	Bangladesh	APAC	LD	0.512	-1.28445	-0.95316	-2.15936
2012	Bangladesh	APAC	LD	0.113	-1.34839	-1.07332	-2.14709
2013	Bangladesh	APAC	LD	0.035	-1.48426	-1.22326	-2.05975

2014	Bangladesh	APAC	LD	0.814	-1.31108	-1.48361	-2.08339
2006	Belgium	EU	D	0.227	0.7542	0.7685	1.30429
2007	Belgium	EU	D	0.719	0.80875	0.79819	1.41271
2008	Belgium	EU	D	-1.436	0.84953	0.83925	1.3601
2009	Belgium	EU	D	-2.026	0.86053	0.50087	1.28595
2010	Belgium	EU	D	1.614	0.84774	0.39243	NA
2011	Belgium	EU	D	-0.521	0.92578	0.25357	1.22199
2012	Belgium	EU	D	-0.816	0.91242	0.1369	1.27016
2013	Belgium	EU	D	-0.293	0.97452	0.04904	1.25937
2014	Belgium	EU	D	0.126	0.9673	-0.01394	1.27252
2006	Bolivia	LA	LD	2.093	-1.16708	-1.47607	-1.48117
2007	Bolivia	LA	LD	1.339	-1.14445	-1.36116	-1.45202
2008	Bolivia	LA	LD	1.806	-1.22356	-1.59355	-1.49646
2009	Bolivia	LA	LD	0.028	-1.27846	-1.82191	-1.49137
2010	Bolivia	LA	LD	-0.505	-1.13997	-1.75075	NA
2011	Bolivia	LA	LD	0.140	-1.02055	-1.25575	-1.31038
2012	Bolivia	LA	LD	-0.073	-1.06323	-0.69596	-1.12108
2013	Bolivia	LA	LD	1.567	-1.00796	-0.58916	-1.15729
2014	Bolivia	LA	LD	-0.001	-0.98641	-0.57117	-1.11854
2006	Brazil	LA	LD	1.249	-0.7407	-0.66246	-0.44861
2007	Brazil	LA	LD	3.156	-0.72353	-0.6357	-0.46141
2008	Brazil	LA	LD	1.576	-0.53396	-0.37983	-0.47901
2009	Brazil	LA	LD	-0.719	-0.43908	-0.54059	-0.47696
2010	Brazil	LA	LD	2.978	-0.4068	-0.69253	NA
2011	Brazil	LA	LD	0.237	-0.36782	-0.49963	-0.40563
2012	Brazil	LA	LD	-0.679	-0.39569	-0.38656	-0.32476
2013	Brazil	LA	LD	0.311	-0.47741	-0.61065	-0.27687
2014	Brazil	LA	LD	-2.153	-0.54513	-1.65316	-0.36254
2006	Bulgaria	EU	LD	0.701	-0.55108	-0.65571	-0.61009
2007	Bulgaria	EU	LD	0.779	-0.54372	-0.48391	-0.5685
2008	Bulgaria	EU	LD	-1.749	-0.54665	-0.28202	-0.54681
2009	Bulgaria	EU	LD	-4.849	-0.52	-0.80943	-0.57371
2010	Bulgaria	EU	LD	0.500	-0.50463	-1.11043	NA
2011	Bulgaria	EU	LD	1.266	-0.53468	-0.97793	-0.48298
2012	Bulgaria	EU	LD	-0.013	-0.52205	-0.77048	-0.45561
2013	Bulgaria	EU	LD	0.111	-0.64653	-0.77129	-0.43943
2014	Bulgaria	EU	LD	-0.158	-0.70178	-0.94048	-0.44601
2006	Cameroon	MEA	LD	-0.743	-1.2762	-1.11568	-1.11713
2007	Cameroon	MEA	LD	-1.149	-1.29025	-1.07346	-1.09633
2008	Cameroon	MEA	LD	-1.527	-1.32571	-0.93772	-1.2028
2009	Cameroon	MEA	LD	-2.196	-1.26665	-1.05048	-1.32212
2010	Cameroon	MEA	LD	-1.350	-1.2882	-1.06768	NA
2011	Cameroon	MEA	LD	-0.058	-1.2831	-1.00126	-1.23924
2012	Cameroon	MEA	LD	0.580	-1.34562	-0.76538	-1.21844
2013	Cameroon	MEA	LD	1.513	-1.35339	-0.72414	-1.19516
2014	Cameroon	MEA	LD	1.836	-1.33037	-0.76275	-1.12388
2006	Canada	NA	D	-0.735	1.21416	NA	1.18213
2007	Canada	NA	D	-1.434	1.28142	1.02283	1.2024
2008	Canada	NA	D	-1.566	1.34336	1.20419	1.1704

2009	Canada	NA	D	-1.946	1.3811	0.89277	1.2213
2010	Canada	NA	D	0.721	1.33996	0.69257	NA
2011	Canada	NA	D	0.515	1.35605	0.69	1.22524
2012	Canada	NA	D	-0.670	1.34943	0.75517	1.22489
2013	Canada	NA	D	0.066	1.28943	0.6632	1.27994
2014	Canada	NA	D	0.562	1.34353	0.72995	1.30411
2006	Chile	LA	D	-0.534	0.51651	0.66171	0.0955
2007	Chile	LA	D	-0.964	0.49452	0.73953	0.0955
2008	Chile	LA	D	-3.576	0.55082	0.70917	-0.02519
2009	Chile	LA	D	-4.449	0.64487	0.57406	0.0348
2010	Chile	LA	D	-1.283	0.83408	0.34685	NA
2011	Chile	LA	D	-0.437	0.8141	0.24354	0.15959
2012	Chile	LA	D	0.716	0.77312	0.3697	0.18305
2013	Chile	LA	D	-0.648	0.75819	0.2974	0.23863
2014	Chile	LA	D	-1.124	0.77201	0.26055	0.26405
2006	China	APAC	LD	4.672	-0.85919	-0.22208	-0.57841
2007	China	APAC	LD	6.078	-0.82648	-0.04012	-0.52545
2008	China	APAC	LD	2.461	-0.70562	0.2764	-0.38858
2009	China	APAC	LD	0.901	-0.66343	0.38569	-0.26745
2010	China	APAC	LD	1.853	-0.73522	0.48431	NA
2011	China	APAC	LD	1.730	-0.73535	0.53517	-0.22178
2012	China	APAC	LD	0.585	-0.73675	0.45996	-0.24329
2013	China	APAC	LD	0.813	-0.6702	0.49765	-0.20767
2014	China	APAC	LD	0.777	-0.63508	0.33202	-0.20518
2006	Colombia	LA	LD	1.867	-1.06457	-0.67402	-0.36406
2007	Colombia	LA	LD	1.175	-1.00241	-0.56792	-0.38361
2008	Colombia	LA	LD	-1.141	-0.96368	-0.46401	-0.42147
2009	Colombia	LA	LD	-1.398	-1.06734	-0.84054	-0.47129
2010	Colombia	LA	LD	-0.205	-1.01875	-0.73337	NA
2011	Colombia	LA	LD	0.889	-0.90056	-0.52952	-0.41683
2012	Colombia	LA	LD	-0.473	-1.05545	-0.62966	-0.40368
2013	Colombia	LA	LD	1.086	-1.06358	-0.76599	-0.40457
2014	Colombia	LA	LD	0.280	-1.02263	-0.76578	-0.4163
2006	CostaRica	LA	LD	3.595	0.27242	-0.33483	-0.59522
2007	CostaRica	LA	LD	0.345	0.23245	-0.23777	-0.62668
2008	CostaRica	LA	LD	-2.856	0.22689	-0.08589	-0.69049
2009	CostaRica	LA	LD	-1.513	0.38646	-0.25273	-0.62816
2010	CostaRica	LA	LD	0.919	0.38712	-0.64207	NA
2011	CostaRica	LA	LD	-0.257	0.23592	-0.7838	-0.56604
2012	CostaRica	LA	LD	-0.650	0.24602	-0.5058	-0.53049
2013	CostaRica	LA	LD	1.040	0.29529	-0.40933	-0.49786
2014	CostaRica	LA	LD	-1.280	0.34894	-0.48876	-0.44436
2006	Cyprus	EU	D	1.447	0.61723	NA	0.0123
2007	Cyprus	EU	D	-0.622	0.59553	NA	0.02865
2008	Cyprus	EU	D	-1.221	0.73605	NA	0.12232
2009	Cyprus	EU	D	-3.585	0.59277	0.6205	0.18664
2010	Cyprus	EU	D	-0.517	0.64334	0.38814	NA
2011	Cyprus	EU	D	-0.462	0.57917	0.39598	-0.10286
2012	Cyprus	EU	D	-0.848	0.58707	0.09708	-0.15317

2013	Cyprus	EU	D	-2.135	0.49412	-0.44674	-0.10855
2014	Cyprus	EU	D	-0.553	0.46156	-0.77381	-0.11797
2006	CzechRepublic	Eastern EU	D	4.644	0.26097	NA	0.45693
2007	CzechRepublic	Eastern EU	D	2.389	0.24656	0.00725	0.47435
2008	Czech	Eastern EU	D	-0.799	0.28526	0.22561	0.49034
2009	CzechRepublic	Eastern EU	D	-4.873	0.24542	0.15234	0.55871
2010	CzechRepublic	Eastern EU	D	1.107	0.24047	-0.17967	NA
2011	CzechRepublic	Eastern EU	D	0.741	0.2618	-0.37243	0.48005
2012	CzechRepublic	Eastern EU	D	-1.139	0.22493	-0.36189	0.5092
2013	CzechRepublic	Eastern EU	D	-1.032	0.23801	-0.26131	0.50832
2014	CzechRepublic	Eastern EU	D	0.742	0.29213	-0.03495	0.53942
2006	Denmark	EU	D	0.338	1.53638	1.79777	1.54833
2007	Denmark	EU	D	-1.235	1.5917	1.8266	1.59206
2008	Denmark	EU	D	-2.503	1.56166	1.80469	1.56718
2009	Denmark	EU	D	-3.893	1.54248	1.19314	1.48452
2010	Denmark	EU	D	2.944	1.50533	0.61373	NA
2011	Denmark	EU	D	0.006	1.57031	1.02528	1.45697
2012	Denmark	EU	D	0.432	1.38957	0.59267	1.28847
2013	Denmark	EU	D	-1.654	1.43871	0.46436	1.20795
2014	Denmark	EU	D	0.125	1.51485	0.59115	1.28722
2006	Dominican	LA	LD	4.634	-0.84157	-0.75522	-1.31033
2007	Dominican	LA	LD	2.467	-0.81335	-0.64939	-1.26216
2008	Dominican	LA	LD	-2.351	-0.84998	-0.65897	-1.21808
2009	Dominican	LA	LD	-1.188	-0.83685	-0.79245	-1.21208
2010	Dominican	LA	LD	2.491	-0.92494	-0.72234	NA
2011	Dominican	LA	LD	-1.779	-0.95573	-0.83557	-1.26983
2012	Dominican	LA	LD	-0.921	-0.90041	-0.75615	-1.20211
2013	Dominican	LA	LD	1.865	-0.91331	-0.55377	-1.13723
2014	Dominican	LA	LD	2.673	-0.86351	-0.65917	-1.06684
2006	Ecuador	LA	LD	1.134	-1.45787	-1.1811	-0.74616
2007	Ecuador	LA	LD	1.061	-1.39927	-1.13781	-0.71239
2008	Ecuador	LA	LD	4.276	-1.39387	-1.367	-0.78118
2009	Ecuador	LA	LD	-0.013	-1.42954	-1.19325	-0.82877
2010	Ecuador	LA	LD	2.583	-1.38923	-1.28707	NA
2011	Ecuador	LA	LD	4.277	-1.34031	-1.18709	-0.65149
2012	Ecuador	LA	LD	2.111	-1.23589	-0.95187	-0.62359
2013	Ecuador	LA	LD	1.351	-0.92972	-0.49305	-0.42997
2014	Ecuador	LA	LD	-0.404	-1.36336	NA	NA
2006	Egypt	MEA	LD	0.565	-0.6173	-0.73538	-0.68361
2007	Egypt	MEA	LD	-3.337	-0.53737	-0.59754	-0.67241
2008	Egypt	MEA	LD	-1.219	-0.48019	-0.56024	-0.63455
2009	Egypt	MEA	LD	-1.131	-0.62689	-0.42247	-0.58977
2010	Egypt	MEA	LD	-0.087	-0.74529	-0.49766	NA
2011	Egypt	MEA	LD	-3.841	-0.83402	-0.87348	-0.76989
2012	Egypt	MEA	LD	-1.180	-0.95071	-0.95037	-0.76278
2013	Egypt	MEA	LD	-1.345	-1.1689	-1.16016	-0.82631
2014	Egypt	MEA	LD	1.126	-1.05427	-1.51523	-0.91003
2006	Finland	EU	D	1.813	1.61499	2.04694	1.5526
2007	Finland	EU	D	2.328	1.64914	2.11281	1.59917

2008	Finland	EU	D	-1.750	1.65954	2.174	1.56131
2009	Finland	EU	D	-7.216	1.61845	1.8019	1.52964
2010	Finland	EU	D	2.319	1.55121	1.64433	NA
2011	Finland	EU	D	1.121	1.56583	1.68342	1.55763
2012	Finland	EU	D	-2.293	1.58729	1.63745	1.56616
2013	Finland	EU	D	-0.504	1.58803	1.49378	1.55496
2014	Finland	EU	D	-0.783	1.59894	1.39641	1.54092
2006	France	EU	D	1.448	0.78115	0.35953	1.15551
2007	France	EU	D	-0.423	0.80092	0.22578	1.17969
2008	France	EU	D	-1.645	0.79048	0.23459	1.20919
2009	France	EU	D	-2.328	0.67931	0.02704	1.19328
2010	France	EU	D	0.860	0.764	0.11529	NA
2011	France	EU	D	0.626	0.76619	0.09453	1.22907
2012	France	EU	D	-0.631	0.73433	-0.08911	1.1665
2013	France	EU	D	0.550	0.6948	0.02775	1.18001
2014	France	EU	D	-0.702	0.6476	0.24219	1.15797
2006	Germany	EU	D	1.494	1.30186	1.21622	1.59412
2007	Germany	EU	D	0.959	1.29969	1.29506	1.60816
2008	Germany	EU	D	-0.623	1.28666	0.94784	1.4777
2009	Germany	EU	D	-4.347	1.21402	0.42404	1.36998
2010	Germany	EU	D	2.421	1.18996	0.26086	NA
2011	Germany	EU	D	1.850	1.18898	0.19595	1.33301
2012	Germany	EU	D	-0.206	1.1876	0.33507	1.3435
2013	Germany	EU	D	-0.055	1.18224	0.35808	1.3518
2014	Germany	EU	D	0.203	1.22274	0.34855	1.30843
2006	Greece	EU	D	2.696	0.21593	-0.23165	0.30227
2007	Greece	EU	D	0.128	0.18472	-0.35335	0.27934
2008	Greece	EU	D	-2.879	0.01518	-0.39639	0.27828
2009	Greece	EU	D	-4.551	-0.27315	-0.68368	0.30021
2010	Greece	EU	D	-2.994	-0.31947	-1.03006	NA
2011	Greece	EU	D	-5.928	-0.37169	-1.32559	0.12242
2012	Greece	EU	D	-3.617	-0.51006	-1.70466	0.07479
2013	Greece	EU	D	-0.606	-0.38153	-1.88971	0.04894
2014	Greece	EU	D	2.179	-0.37503	-1.83123	0.09551
2006	Guatemala	LA	LD	0.198	-1.21975	-0.98228	-1.12933
2007	Guatemala	LA	LD	3.500	-1.13396	-0.57459	-1.03193
2008	Guatemala	LA	LD	1.350	-1.10499	-0.52894	-1.12738
2009	Guatemala	LA	LD	-0.440	-1.157	-0.74071	-1.15969
2010	Guatemala	LA	LD	2.903	-1.17413	-0.68589	NA
2011	Guatemala	LA	LD	1.578	-1.17349	-0.60811	-1.00643
2012	Guatemala	LA	LD	-3.719	-1.15035	-0.53036	-0.96945
2013	Guatemala	LA	LD	3.783	-1.12068	-0.50072	-0.91323
2014	Guatemala	LA	LD	1.305	-1.11566	-0.49822	-0.86293
2006	HongKong	APAC	D	3.530	1.1466	1.51228	0.43248
2007	HongKong	APAC	D	2.045	1.19342	1.52618	0.48563
2008	HongKong	APAC	D	0.333	1.20715	1.5151	0.46714
2009	HongKong	APAC	D	-3.302	1.17198	1.31211	0.51272
2010	HongKong	APAC	D	3.195	1.21472	1.21571	NA
2011	HongKong	APAC	D	2.106	1.1865	1.13717	0.62124

2012	HongKong	APAC	D	-1.189	1.16582	1.23335	0.64595
2013	HongKong	APAC	D	-0.432	1.16244	1.35866	0.67657
2014	HongKong	APAC	D	0.309	1.30999	1.24759	0.69364
2006	Hungary	Eastern EU	D	1.726	0.3935	0.69417	0.56551
2007	Hungary	Eastern EU	D	-1.663	0.33192	0.6744	0.58862
2008	Hungary	Eastern EU	D	-0.136	0.26656	0.41119	0.48517
2009	Hungary	Eastern EU	D	-6.199	0.12635	-0.05634	0.44937
2010	Hungary	Eastern EU	D	0.196	0.12658	-0.29957	NA
2011	Hungary	Eastern EU	D	0.493	0.13806	-0.34172	0.48126
2012	Hungary	Eastern EU	D	-0.139	0.03259	-0.64127	0.46526
2013	Hungary	Eastern EU	D	0.841	0.08687	-0.78746	0.4309
2014	Hungary	Eastern EU	D	0.646	0.03271	-0.80128	0.38202
2006	Iceland	EU	D	-1.561	1.49392	2.21454	0.6236
2007	Iceland	EU	D	3.608	1.51616	2.11713	0.59765
2008	Iceland	EU	D	-1.701	1.47331	1.70992	0.62484
2009	Iceland	EU	D	1.428	1.30081	0.65327	0.49044
2010	Iceland	EU	D	-2.169	1.23609	0.15441	NA
2011	Iceland	EU	D	1.048	1.27725	0.20633	0.46416
2012	Iceland	EU	D	1.393	1.24353	0.24368	0.46309
2013	Iceland	EU	D	2.604	1.22207	0.31161	0.34903
2014	Iceland	EU	D	-0.151	1.19799	0.36623	0.33215
2006	India	APAC	LD	1.701	-0.32324	1.18379	-0.21424
2007	India	APAC	LD	1.266	-0.46105	0.99689	-0.2816
2008	India	APAC	LD	0.500	-0.50931	0.76264	-0.36799
2009	India	APAC	LD	-0.333	-0.60868	0.51033	-0.29373
2010	India	APAC	LD	3.003	-0.64484	0.25806	NA
2011	India	APAC	LD	0.899	-0.7731	0.19263	-0.33394
2012	India	APAC	LD	0.722	-0.72161	0.21314	-0.28933
2013	India	APAC	LD	1.326	-0.65741	0.19916	-0.25353
2014	India	APAC	LD	1.969	-0.68058	-0.30066	-0.24162
2006	Indonesia	APAC	LD	1.969	-1.27907	0.38383	-1.18424
2007	Indonesia	APAC	LD	-0.453	-1.15557	0.06935	-1.26636
2008	Indonesia	APAC	LD	1.534	-1.00244	-0.18504	-1.33017
2009	Indonesia	APAC	LD	0.438	-0.91359	0.35117	-1.14381
2010	Indonesia	APAC	LD	1.842	-0.93937	0.32867	NA
2011	Indonesia	APAC	LD	1.851	-0.92781	0.25751	-1.16595
2012	Indonesia	APAC	LD	1.458	-0.87134	0.29831	-1.13627
2013	Indonesia	APAC	LD	1.254	-0.81402	0.28467	-1.06718
2014	Indonesia	APAC	LD	0.896	-0.68872	0.24348	-1.00283
2006	Ireland	EU	D	-0.268	1.25066	1.64091	1.18709
2007	Ireland	EU	D	0.004	1.2516	1.6217	1.19989
2008	Ireland	EU	D	-3.607	1.28607	1.40417	1.23561
2009	Ireland	EU	D	-1.637	1.29093	0.48752	1.20638
2010	Ireland	EU	D	2.258	1.25045	-0.02307	NA
2011	Ireland	EU	D	2.570	1.20077	-0.09505	1.24384
2012	Ireland	EU	D	-0.955	1.18311	-0.20716	1.17932
2013	Ireland	EU	D	-0.646	1.19615	-0.18142	1.1635
2014	Ireland	EU	D	2.745	1.26299	0.02372	1.20829
2006	Israel	MEA	D	2.646	0.20616	0.85426	0.84552

2007	Israel	MEA	D	1.140	0.13753	0.87774	0.77513
2008	Israel	MEA	D	-0.846	0.07311	0.47936	0.59116
2009	Israel	MEA	D	-1.119	0.02834	-0.31092	0.45243
2010	Israel	MEA	D	2.094	0.14234	-0.29507	NA
2011	Israel	MEA	D	1.315	0.20952	0.21071	0.63631
2012	Israel	MEA	D	-0.366	0.19365	0.16628	0.6827
2013	Israel	MEA	D	0.144	0.18418	-0.17588	0.64857
2014	Israel	MEA	D	-0.055	0.2282	-0.18697	0.62529
2006	Italy	EU	D	-0.198	-0.06254	0.03612	0.56007
2007	Italy	EU	D	-0.471	-0.0498	0.01907	0.58193
2008	Italy	EU	D	-1.669	-0.08062	-0.2429	0.58833
2009	Italy	EU	D	-3.983	-0.26455	-0.54468	0.47859
2010	Italy	EU	D	1.633	-0.19117	-0.62026	NA
2011	Italy	EU	D	0.186	-0.0546	-0.62123	0.40827
2012	Italy	EU	D	-1.423	-0.13314	-0.72942	0.40365
2013	Italy	EU	D	-0.126	-0.15106	-0.93971	0.41005
2014	Italy	EU	D	-0.270	-0.21991	-0.88636	0.39956
2006	Japan	APAC	D	0.096	0.92626	1.00669	1.42132
2007	Japan	APAC	D	0.926	0.86865	1.03701	1.42505
2008	Japan	APAC	D	-1.129	0.83571	0.93095	1.43269
2009	Japan	APAC	D	-3.161	0.89336	0.68087	1.40217
2010	Japan	APAC	D	3.933	0.96706	0.51071	NA
2011	Japan	APAC	D	-0.510	1.01658	0.56166	1.33506
2012	Japan	APAC	D	0.735	1.02457	0.57582	1.37043
2013	Japan	APAC	D	0.942	1.10009	0.73953	1.49142
2014	Japan	APAC	D	-0.687	1.19045	0.69705	1.55648
2006	Jordan	MEA	LD	2.017	-0.19621	-0.047	-0.33557
2007	Jordan	MEA	LD	0.046	-0.04063	0.26542	-0.32099
2008	Jordan	MEA	LD	2.142	-0.01231	0.4604	-0.23976
2009	Jordan	MEA	LD	0.709	-0.11032	0.28671	-0.14389
2010	Jordan	MEA	LD	0.212	-0.2181	-0.04973	NA
2011	Jordan	MEA	LD	0.489	-0.29869	-0.1728	-0.24751
2012	Jordan	MEA	LD	0.439	-0.26463	-0.00109	-0.18672
2013	Jordan	MEA	LD	-2.141	-0.27255	0.10538	-0.15401
2014	Jordan	MEA	LD	-4.201	-0.21406	0.14392	-0.15135
2006	Kenya	MEA	LD	1.079	-1.26792	-0.74845	-1.04968
2007	Kenya	MEA	LD	2.064	-1.33412	-0.50381	-1.03369
2008	Kenya	MEA	LD	-4.191	-1.39706	-0.26098	-1.01324
2009	Kenya	MEA	LD	-0.224	-1.48295	-0.55596	-0.95055
2010	Kenya	MEA	LD	3.911	-1.39058	-0.70948	NA
2011	Kenya	MEA	LD	2.002	-1.3354	-0.5681	-1.02526
2012	Kenya	MEA	LD	-0.152	-1.28342	-0.75048	-0.96607
2013	Kenya	MEA	LD	1.410	-1.09389	-0.83162	-0.88781
2014	Kenya	MEA	LD	0.570	-0.99171	-0.62281	-0.81511
2006	Lithuania	Eastern EU	D	3.044	-0.06154	0.9245	-0.22904
2007	Lithuania	Eastern EU	D	3.545	0.00059	0.79949	-0.10071
2008	Lithuania	Eastern EU	D	-1.316	0.02937	0.7125	0.01109
2009	Lithuania	Eastern EU	D	-11.074	0.0059	0.08162	-0.00783
2010	Lithuania	Eastern EU	D	2.505	0.0493	-0.3093	NA

2011	Lithuania	Eastern EU	D	4.260	-0.00262	-0.30722	-0.13489
2012	Lithuania	Eastern EU	D	1.246	0.07882	-0.26648	-0.08263
2013	Lithuania	Eastern EU	D	1.265	0.18045	-0.27208	-0.05846
2014	Lithuania	Eastern EU	D	0.249	0.1669	-0.17535	-0.03144
2006	Luxembourg	EU	D	1.151	1.28207	NA	1.17449
2007	Luxembourg	EU	D	2.774	1.32961	1.26744	1.20755
2008	Luxembourg	EU	D	-6.009	1.40904	1.31944	1.22071
2009	Luxembourg	EU	D	-5.688	1.40628	1.3265	1.30351
2010	Luxembourg	EU	D	2.940	1.4107	1.17342	NA
2011	Luxembourg	EU	D	-1.226	1.43687	1.03922	1.30514
2012	Luxembourg	EU	D	-4.034	1.38538	0.86034	1.28221
2013	Luxembourg	EU	D	2.289	1.35258	0.80454	1.29115
2014	Luxembourg	EU	D	0.678	1.43782	0.93494	1.33132
2006	Malaysia	APAC	LD	1.700	0.2136	0.59786	0.09916
2007	Malaysia	APAC	LD	2.039	0.14896	0.64197	0.09348
2008	Malaysia	APAC	LD	1.564	-0.08387	0.58838	-0.01051
2009	Malaysia	APAC	LD	-4.729	-0.17883	0.33202	-0.04959
2010	Malaysia	APAC	LD	0.895	-0.05156	0.22098	NA
2011	Malaysia	APAC	LD	1.099	-0.02113	0.51357	0.19179
2012	Malaysia	APAC	LD	0.538	-0.00347	0.51088	0.1646
2013	Malaysia	APAC	LD	-0.684	0.01698	0.47113	0.15198
2014	Malaysia	APAC	LD	1.025	0.19582	0.69058	0.26627
2006	Malta	EU	D	-1.049	0.89308	NA	0.00859
2007	Malta	EU	D	0.826	0.94213	NA	0.08716
2008	Malta	EU	D	0.482	0.9472	NA	0.08378
2009	Malta	EU	D	-3.083	0.80117	NA	0.13503
2010	Malta	EU	D	1.628	0.78936	NA	NA
2011	Malta	EU	D	1.340	0.7197	NA	0.2971
2012	Malta	EU	D	1.497	0.7453	0.48064	0.32448
2013	Malta	EU	D	1.879	0.69585	0.47287	0.34413
2014	Malta	EU	D	1.385	0.62167	0.23661	0.23962
2006	Mexico	LA	LD	1.365	-0.75522	-0.53999	-0.4411
2007	Mexico	LA	LD	-0.282	-0.8008	-0.56012	-0.44555
2008	Mexico	LA	LD	-3.111	-0.89083	-0.66104	-0.52429
2009	Mexico	LA	LD	-5.386	-0.88239	-0.74625	-0.50459
2010	Mexico	LA	LD	-0.177	-0.90752	-0.92893	NA
2011	Mexico	LA	LD	0.966	-0.88938	-0.84182	-0.32952
2012	Mexico	LA	LD	0.348	-0.8681	-0.67313	-0.2474
2013	Mexico	LA	LD	-1.439	-0.90295	-0.73765	-0.17902
2014	Mexico	LA	LD	-0.036	-0.99642	-1.03207	-0.21528
2006	Morocco	MEA	LD	-0.727	-0.745	-0.52111	-0.57691
2007	Morocco	MEA	LD	1.276	-0.63777	-0.15028	-0.48182
2008	Morocco	MEA	LD	-2.462	-0.66738	-0.46269	-0.63486
2009	Morocco	MEA	LD	-4.402	-0.646	-0.62457	-0.66285
2010	Morocco	MEA	LD	0.344	-0.60236	-0.67203	NA
2011	Morocco	MEA	LD	-0.417	-0.66288	-0.63845	-0.49217
2012	Morocco	MEA	LD	0.142	-0.69773	-0.66934	-0.51812
2013	Morocco	MEA	LD	1.634	-0.71635	-0.66619	-0.57015
2014	Morocco	MEA	LD	-0.041	-0.60231	-0.50055	-0.43986

2006	Netherlands	EU	D	1.050	1.31926	1.71206	1.4813
2007	Netherlands	EU	D	0.551	1.35621	1.80551	1.45784
2008	Netherlands	EU	D	-0.695	1.37844	1.7114	1.4198
2009	Netherlands	EU	D	-3.801	1.38103	1.15191	1.40641
2010	Netherlands	EU	D	1.201	1.36008	0.77247	NA
2011	Netherlands	EU	D	0.207	1.42639	0.85106	1.3807
2012	Netherlands	EU	D	-1.159	1.47039	0.87419	1.42176
2013	Netherlands	EU	D	-0.420	1.37879	0.5525	1.39149
2014	Netherlands	EU	D	0.377	1.36612	0.45649	1.37833
2006	NewZealand	APAC	D	-0.970	1.46987	1.85606	1.01168
2007	NewZealand	APAC	D	0.934	1.53471	1.97021	1.01595
2008	NewZealand	APAC	D	-3.050	1.54126	1.86111	1.01737
2009	NewZealand	APAC	D	-0.436	1.59215	1.51683	1.08473
2010	NewZealand	APAC	D	0.202	1.61111	1.07531	NA
2011	NewZealand	APAC	D	-0.168	1.64204	1.22487	1.01706
2012	NewZealand	APAC	D	1.257	1.62658	1.54352	1.09403
2013	NewZealand	APAC	D	-1.303	1.6516	1.49277	1.10073
2014	NewZealand	APAC	D	-0.979	1.67962	1.39832	1.07869
2006	Nigeria	MEA	LD	3.330	-1.5156	-1.51041	-1.21926
2007	Nigeria	MEA	LD	5.108	-1.47065	-1.35879	-1.22441
2008	Nigeria	MEA	LD	4.215	-1.24789	-1.30932	-1.22512
2009	Nigeria	MEA	LD	3.989	-1.37721	-1.5242	-1.17014
2010	Nigeria	MEA	LD	3.932	-1.55868	-1.79545	NA
2011	Nigeria	MEA	LD	0.754	-1.49607	-1.81591	-1.29013
2012	Nigeria	MEA	LD	2.097	-1.5247	-1.70892	-1.25831
2013	Nigeria	MEA	LD	-0.084	-1.6272	-1.81841	-1.28657
2014	Nigeria	MEA	LD	0.777	-1.66588	-2.23925	-1.31714
2006	Norway	EU	D	-1.857	1.45709	2.19695	1.13657
2007	Norway	EU	D	-2.183	1.36623	2.39783	1.14937
2008	Norway	EU	D	-4.034	1.38635	2.33589	1.20003
2009	Norway	EU	D	-2.688	1.41312	1.93176	1.15942
2010	Norway	EU	D	-1.005	1.47341	1.74684	NA
2011	Norway	EU	D	-1.563	1.50127	1.80514	1.20879
2012	Norway	EU	D	0.082	1.52757	1.72237	1.19066
2013	Norway	EU	D	-1.040	1.55241	1.61899	1.20838
2014	Norway	EU	D	-0.073	1.5097	1.67877	1.22278
2006	Pakistan	APAC	LD	-0.554	NA	-0.07049	-1.65204
2007	Pakistan	APAC	LD	0.369	NA	0.1343	-1.46149
2008	Pakistan	APAC	LD	-1.318	NA	-0.04383	-1.58147
2009	Pakistan	APAC	LD	-0.587	NA	-0.3778	-1.62593
2010	Pakistan	APAC	LD	-0.463	NA	-0.49073	NA
2011	Pakistan	APAC	LD	0.733	NA	-0.56585	-1.58172
2012	Pakistan	APAC	LD	2.284	NA	-0.71825	-1.61105
2013	Pakistan	APAC	LD	2.865	NA	-0.82485	-1.63078
2014	Pakistan	APAC	LD	3.122	NA	-1.29683	-1.64464
2006	Peru	LA	LD	3.090	-1.16941	-0.37609	-1.04139
2007	Peru	LA	LD	3.135	-1.12838	-0.28863	-1.05259
2008	Peru	LA	LD	2.142	-1.04146	-0.11134	-1.10591
2009	Peru	LA	LD	-2.875	-1.1054	-0.15735	-1.05747

2010	Peru	LA	LD	1.986	-1.05905	-0.09686	NA
2011	Peru	LA	LD	-0.274	-0.99732	0.08728	-0.85021
2012	Peru	LA	LD	-0.133	-1.09349	0.0416	-0.83883
2013	Peru	LA	LD	-0.240	-1.06384	-0.06446	-0.75641
2014	Peru	LA	LD	-2.471	-1.04355	-0.26331	-0.7541
2006	Philippines	APAC	LD	2.737	-1.2455	-0.81179	-0.54136
2007	Philippines	APAC	LD	3.689	-1.18447	-0.7762	-0.49408
2008	Philippines	APAC	LD	0.009	-1.22521	-0.88607	-0.482
2009	Philippines	APAC	LD	-1.705	-1.28789	-1.11344	-0.51885
2010	Philippines	APAC	LD	3.107	-1.32379	-1.05036	NA
2011	Philippines	APAC	LD	-1.111	-1.19991	-1.01572	-0.61023
2012	Philippines	APAC	LD	4.221	-1.09973	-0.75893	-0.47994
2013	Philippines	APAC	LD	2.602	-0.96575	-0.58083	-0.37738
2014	Philippines	APAC	LD	2.418	-0.79215	-0.49745	-0.34254
2006	Poland	Eastern EU	LD	2.020	-0.19615	-0.3231	-0.13377
2007	Poland	Eastern EU	LD	1.641	-0.08933	-0.37838	-0.17216
2008	Poland	Eastern EU	LD	-1.135	0.07911	-0.42226	-0.20291
2009	Poland	Eastern EU	LD	0.249	0.19932	-0.46595	-0.07324
2010	Poland	Eastern EU	LD	2.881	0.28286	-0.42701	NA
2011	Poland	Eastern EU	LD	2.306	0.34359	-0.48657	-0.00277
2012	Poland	Eastern EU	LD	-0.462	0.34841	-0.64512	-0.01539
2013	Poland	Eastern EU	LD	-0.535	0.30255	-0.62167	0.00802
2014	Poland	Eastern EU	LD	0.026	0.29192	-0.54681	0.03575
2006	Portugal	EU	D	0.124	0.72271	1.04607	0.75628
2007	Portugal	EU	D	0.262	0.69753	0.99982	0.71256
2008	Portugal	EU	D	-1.336	0.67645	0.71996	0.7074
2009	Portugal	EU	D	-2.669	0.54988	0.23624	0.68273
2010	Portugal	EU	D	1.421	0.45359	0.07733	NA
2011	Portugal	EU	D	-0.746	0.40252	0.39914	0.52262
2012	Portugal	EU	D	-1.624	0.36877	0.19637	0.56706
2013	Portugal	EU	D	-0.187	0.4145	0.11159	0.60497
2014	Portugal	EU	D	-0.394	0.50559	0.25845	0.62648
2006	Qatar	MEA	LD	6.561	0.66508	NA	-0.42584
2007	Qatar	MEA	LD	-5.338	0.58208	NA	-0.35847
2008	Qatar	MEA	LD	-1.836	0.7691	0.93941	-0.28933
2009	Qatar	MEA	LD	-2.995	1.12761	1.11815	-0.25945
2010	Qatar	MEA	LD	5.262	1.05081	1.00296	NA
2011	Qatar	MEA	LD	1.848	0.86068	0.86856	-0.38268
2012	Qatar	MEA	LD	-3.350	0.98666	0.98681	-0.41805
2013	Qatar	MEA	LD	-3.390	0.9747	1.14887	-0.40632
2014	Qatar	MEA	LD	-2.251	0.84183	1.25677	-0.27141
2006	Russia	Eastern EU	LD	6.639	-1.33554	-0.78459	-0.86165
2007	Russia	Eastern EU	LD	6.125	-1.27947	-0.67106	-0.80992
2008	Russia	Eastern EU	LD	4.161	-1.23372	-0.54655	-0.70967
2009	Russia	Eastern EU	LD	-6.007	-1.29016	-0.82982	-0.63356
2010	Russia	Eastern EU	LD	3.941	-1.26686	-1.02142	NA
2011	Russia	Eastern EU	LD	3.244	-1.29653	-0.98965	-0.68366
2012	Russia	Eastern EU	LD	2.381	-1.27738	-0.82381	-0.64776
2013	Russia	Eastern EU	LD	1.357	-1.21539	-0.60318	-0.56208

2014	Russia	Eastern EU	LD	0.558	-1.17954	-0.48219	-0.52102
2006	SaudiArabia	MEA	LD	-4.206	-1.05288	-3.44047	NA
2007	SaudiArabia	MEA	LD	-6.365	-0.37635	0.46715	-0.56571
2008	SaudiArabia	MEA	LD	-2.255	-0.19379	0.72256	-0.37214
2009	SaudiArabia	MEA	LD	-8.265	-0.22932	0.80373	-0.31965
2010	SaudiArabia	MEA	LD	-2.056	-0.07337	0.95056	NA
2011	SaudiArabia	MEA	LD	2.210	-0.20685	1.10832	-0.21354
2012	SaudiArabia	MEA	LD	-1.782	-0.1461	0.84976	-0.21461
2013	SaudiArabia	MEA	LD	-3.780	-0.11841	0.52656	-0.24607
2014	SaudiArabia	MEA	LD	-1.825	-0.07338	0.42436	-0.27966
2006	Senegal	MEA	LD	-2.682	-1.12072	NA	NA
2007	Senegal	MEA	LD	-0.772	-0.86392	-1.1968	-1.1729
2008	Senegal	MEA	LD	-1.559	-0.82217	-1.01848	-1.0746
2009	Senegal	MEA	LD	-2.179	-0.83502	-1.02144	-1.08018
2010	Senegal	MEA	LD	-0.578	-0.88102	-0.85569	NA
2011	Senegal	MEA	LD	-3.052	-0.8889	-0.82679	-1.1342
2012	Senegal	MEA	LD	-0.164	-0.7579	-0.92358	-1.17615
2013	Senegal	MEA	LD	-1.645	-0.64304	-0.86193	-1.1486
2014	Senegal	MEA	LD	-1.118	-0.48278	-0.60743	-1.09225
2006	Singapore	APAC	D	1.124	1.22235	1.61494	1.08808
2007	Singapore	APAC	D	2.329	1.2819	1.68695	1.12949
2008	Singapore	APAC	D	-5.093	1.38197	1.45751	1.16078
2009	Singapore	APAC	D	-4.395	1.30583	1.32683	1.18204
2010	Singapore	APAC	D	7.452	1.28601	1.23492	NA
2011	Singapore	APAC	D	1.298	1.28594	1.31255	1.1592
2012	Singapore	APAC	D	-2.080	1.36601	1.33908	1.15635
2013	Singapore	APAC	D	0.007	1.33774	1.2473	1.16648
2014	Singapore	APAC	D	-0.101	1.33057	1.21432	1.17555
2006	Slovakia	Eastern EU	D	5.819	0.02171	0.85974	0.3176
2007	Slovakia	Eastern EU	D	7.133	0.0728	1.06066	0.29663
2008	Slovakia	Eastern EU	D	2.382	0.12654	1.0378	0.24739
2009	Slovakia	Eastern EU	D	-4.714	0.01292	0.64779	0.31108
2010	Slovakia	Eastern EU	D	3.919	-0.05266	0.13423	NA
2011	Slovakia	Eastern EU	D	1.017	-0.09969	-0.05849	0.42095
2012	Slovakia	Eastern EU	D	0.921	-0.13957	-0.03495	0.41668
2013	Slovakia	Eastern EU	D	1.574	-0.19895	-0.03134	0.434
2014	Slovakia	Eastern EU	D	1.404	-0.21824	0.02247	0.44502
2006	SouthAfrica	MEA	LD	1.382	0.0924	0.55716	0.63853
2007	SouthAfrica	MEA	LD	2.260	0.07333	0.58286	0.68048
2008	SouthAfrica	MEA	LD	-1.198	-0.02612	0.80195	0.71958
2009	SouthAfrica	MEA	LD	-2.269	-0.11007	0.52337	0.67577
2010	SouthAfrica	MEA	LD	1.984	-0.14266	0.08285	NA
2011	SouthAfrica	MEA	LD	-1.229	-0.09093	0.05482	0.63572
2012	SouthAfrica	MEA	LD	-0.591	-0.10177	0.21911	0.73526
2013	SouthAfrica	MEA	LD	-1.331	-0.04684	0.37573	0.77952
2014	SouthAfrica	MEA	LD	-1.229	-0.07053	0.29032	0.73277
2006	SouthKorea	APAC	D	2.314	0.10064	0.02598	0.5956
2007	SouthKorea	APAC	D	3.514	0.43164	0.77955	0.84569
2008	SouthKorea	APAC	D	2.247	0.24773	0.67494	0.72962

2009	SouthKorea	APAC	D	-0.286	0.17555	-0.31262	0.54322
2010	SouthKorea	APAC	D	4.806	0.11631	-0.748	NA
2011	SouthKorea	APAC	D	3.349	0.12406	-0.85041	0.49631
2012	SouthKorea	APAC	D	-2.651	0.06079	-0.70507	0.5731
2013	SouthKorea	APAC	D	2.728	0.05003	-0.7611	0.49982
2014	SouthKorea	APAC	D	-1.003	-0.00533	-0.91439	0.40508
2006	Spain	EU	D	-0.588	0.15118	0.84484	0.61871
2007	Spain	EU	D	-0.392	0.09985	0.93456	0.71291
2008	Spain	EU	D	-1.509	0.20743	0.71824	0.64892
2009	Spain	EU	D	-1.254	0.11628	0.2172	0.56085
2010	Spain	EU	D	0.236	0.12847	-0.06659	NA
2011	Spain	EU	D	-0.574	0.2494	-0.13547	0.43929
2012	Spain	EU	D	-0.536	0.2205	-0.45788	0.40143
2013	Spain	EU	D	-0.591	0.10047	-0.64331	0.36367
2014	Spain	EU	D	-0.109	-0.01811	-0.82562	0.246
2006	SriLanka	APAC	LD	3.472	-0.84603	-0.46819	-1.16334
2007	SriLanka	APAC	LD	3.553	-0.80416	-0.01782	-1.02097
2008	SriLanka	APAC	LD	5.610	-0.7969	-0.10445	-1.0359
2009	SriLanka	APAC	LD	1.809	-0.64873	-0.48232	-1.01787
2010	SriLanka	APAC	LD	3.634	-0.50567	-0.45363	NA
2011	SriLanka	APAC	LD	4.000	-0.54042	-0.63028	-0.78137
2012	SriLanka	APAC	LD	2.374	-0.60147	-0.86683	-0.85798
2013	SriLanka	APAC	LD	3.140	-0.63876	-0.80354	-0.86989
2014	SriLanka	APAC	LD	4.977	-0.60426	-0.83196	-0.82474
2006	Sweden	EU	D	2.059	1.31477	1.93377	1.40852
2007	Sweden	EU	D	-0.244	1.4719	2.13587	1.44567
2008	Sweden	EU	D	-3.022	1.51935	2.05111	1.42825
2009	Sweden	EU	D	-4.612	1.54004	1.73272	1.47621
2010	Sweden	EU	D	3.500	1.54308	1.59577	NA
2011	Sweden	EU	D	0.254	1.53612	1.88498	1.45136
2012	Sweden	EU	D	-1.398	1.49471	1.76152	1.31805
2013	Sweden	EU	D	-0.014	1.47566	1.56202	1.30152
2014	Sweden	EU	D	0.249	1.34103	1.42555	1.28179
2006	Switzerland	EU	D	1.727	1.42052	1.50497	1.35976
2007	Switzerland	EU	D	1.465	1.47216	1.55924	1.37824
2008	Switzerland	EU	D	-0.079	1.49305	1.45563	1.37096
2009	Switzerland	EU	D	-2.827	1.44909	1.1792	1.31334
2010	Switzerland	EU	D	2.021	1.442	1.11326	NA
2011	Switzerland	EU	D	-0.368	1.44102	1.1415	1.29369
2012	Switzerland	EU	D	-0.203	1.50024	1.12831	1.28249
2013	Switzerland	EU	D	0.727	1.44547	1.03928	1.26329
2014	Switzerland	EU	D	0.236	1.51299	1.00159	1.28107
2006	Taiwan	APAC	D	2.174	0.20852	1.23575	0.47259
2007	Taiwan	APAC	D	3.632	0.1987	1.07423	0.47117
2008	Taiwan	APAC	D	-0.128	0.321	1.10408	0.48379
2009	Taiwan	APAC	D	-1.034	0.33079	1.01373	0.54271
2010	Taiwan	APAC	D	7.622	0.46163	0.96781	NA
2011	Taiwan	APAC	D	1.338	0.54491	1.02085	0.55283
2012	Taiwan	APAC	D	0.142	0.49639	1.16014	0.62055

2013	Taiwan	APAC	D	0.343	0.4631	1.15994	0.57444
2014	Taiwan	APAC	D	1.614	0.45111	0.94562	0.55578
2006	Thailand	APAC	LD	1.694	-0.64329	0.60635	-0.97301
2007	Thailand	APAC	LD	2.119	-0.60072	0.65831	-0.99079
2008	Thailand	APAC	LD	-0.841	-0.71769	0.54538	-1.1001
2009	Thailand	APAC	LD	-3.779	-0.78881	0.2221	-1.16632
2010	Thailand	APAC	LD	4.781	-0.77115	0.00127	NA
2011	Thailand	APAC	LD	-2.378	-0.70908	-0.11586	-0.86892
2012	Thailand	APAC	LD	4.403	-0.76741	-0.02202	-0.8778
2013	Thailand	APAC	LD	1.838	-0.82136	0.15588	-0.85559
2014	Thailand	APAC	LD	0.071	-0.74057	0.15598	-0.8778
2006	Turkey	MEA	LD	0.645	-0.48537	-0.4644	-0.33688
2007	Turkey	MEA	LD	-0.057	-0.43626	-0.19045	-0.25672
2008	Turkey	MEA	LD	-3.404	-0.50085	-0.37202	-0.37634
2009	Turkey	MEA	LD	-6.451	-0.60367	-0.71609	-0.42978
2010	Turkey	MEA	LD	3.347	-0.63676	-0.78385	NA
2011	Turkey	MEA	LD	1.898	-0.67621	-0.65212	-0.49926
2012	Turkey	MEA	LD	-2.287	-0.68448	-0.3829	-0.33289
2013	Turkey	MEA	LD	0.174	-0.69894	-0.28218	-0.21883
2014	Turkey	MEA	LD	-0.646	-0.79759	-0.42457	-0.20354
2006	Ukraine	Eastern EU	LD	6.783	-1.0035	-1.33663	-0.96244
2007	Ukraine	Eastern EU	LD	6.718	-0.93571	-1.26248	-0.95142
2008	Ukraine	Eastern EU	LD	1.523	-0.95787	-1.15884	-0.94751
2009	Ukraine	Eastern EU	LD	-13.525	-1.18221	-1.69219	-0.96713
2010	Ukraine	Eastern EU	LD	7.687	-1.15569	-2.16621	NA
2011	Ukraine	Eastern EU	LD	5.590	-1.16474	-2.09949	-0.91439
2012	Ukraine	Eastern EU	LD	0.318	-1.0873	-1.92887	-0.88933
2013	Ukraine	Eastern EU	LD	0.414	-1.34191	-2.01113	-0.94798
2014	Ukraine	Eastern EU	LD	-5.856	-1.67483	-1.46619	-0.90142
2006	UK	EU	D	0.981	1.15491	1.67515	1.46936
2007	UK	EU	D	0.649	1.08439	1.51741	1.41248
2008	UK	EU	D	-1.877	0.9889	1.03919	1.2358
2009	UK	EU	D	-2.959	0.94016	0.28696	1.21391
2010	UK	EU	D	0.561	1.06669	0.07824	NA
2011	UK	EU	D	1.044	1.01289	0.36434	1.31389
2012	UK	EU	D	-0.672	1.05928	0.49003	1.37325
2013	UK	EU	D	0.331	1.09388	0.25006	1.38013
2014	UK	EU	D	0.308	1.13538	0.27618	1.40662
2006	USA	NA	D	-0.345	0.77287	1.88725	1.66931
2007	USA	NA	D	-0.334	0.72826	1.68182	1.51218
2008	USA	NA	D	-0.929	0.88177	1.64818	1.56053
2009	USA	NA	D	-0.068	0.77558	0.9739	1.51805
2010	USA	NA	D	1.768	0.72143	0.66731	NA
2011	USA	NA	D	-0.196	0.75448	0.77976	1.39753
2012	USA	NA	D	0.150	0.78965	0.80106	1.38011
2013	USA	NA	D	-0.255	0.77518	0.92991	1.44321
2014	USA	NA	D	0.237	0.79583	0.76475	1.51165
2006	Venezuela	LA	LD	4.133	-1.77429	-1.3095	-1.40003
2007	Venezuela	LA	LD	2.401	-1.83061	-1.29704	-1.45033

2008	Venezuela	LA	LD	-0.215	-1.84968	-1.46888	-1.48019
2009	Venezuela	LA	LD	-5.463	-1.84433	-1.83561	-1.43918
2010	Venezuela	LA	LD	-4.212	-1.81383	-2.08861	NA
2011	Venezuela	LA	LD	0.889	-1.7747	-2.16029	-1.74044
2012	Venezuela	LA	LD	2.549	-1.85091	-2.02536	-1.76853
2013	Venezuela	LA	LD	-1.221	-1.93899	-2.18469	-1.80331
2014	Venezuela	LA	LD	-6.524	-1.93113	-2.23595	-1.80651
2006	Vietnam	APAC	LD	-0.316	-0.63253	-0.35025	-1.42871
2007	Vietnam	APAC	LD	-1.603	-0.60732	-0.36557	-1.36685
2008	Vietnam	APAC	LD	-2.886	-0.63043	-0.27062	-1.30304
2009	Vietnam	APAC	LD	-0.647	-0.55325	-0.22198	-1.27833
2010	Vietnam	APAC	LD	-0.342	-0.6108	-0.47503	NA
2011	Vietnam	APAC	LD	1.996	-0.63105	-0.75047	-1.11752
2012	Vietnam	APAC	LD	0.401	-0.64419	-0.87277	-1.0665
2013	Vietnam	APAC	LD	1.112	-0.63926	-0.89424	-1.01544
2014	Vietnam	APAC	LD	1.619	-0.64971	-0.71643	-0.95998
2006	Zambia	MEA	LD	4.456	-0.79582	-0.99997	-1.84427
2007	Zambia	MEA	LD	4.458	-0.68727	-0.78577	-1.7522
2008	Zambia	MEA	LD	3.639	-0.52337	-0.28756	-1.53784
2009	Zambia	MEA	LD	5.797	-0.48065	-0.42157	-1.46191
2010	Zambia	MEA	LD	6.714	-0.50809	-0.78007	NA
2011	Zambia	MEA	LD	-0.260	-0.53257	-0.6277	-1.35334
2012	Zambia	MEA	LD	0.657	-0.43931	-0.33869	-1.29646
2013	Zambia	MEA	LD	-0.031	-0.43287	-0.21093	-1.27194
2014	Zambia	MEA	LD	1.219	-0.50406	-0.36367	-1.22821
2006	Zimbabwe	MEA	LD	-1.695	-1.74606	-1.09259	-1.4796
2007	Zimbabwe	MEA	LD	-1.801	-1.82958	-1.04504	-1.53986
2008	Zimbabwe	MEA	LD	-16.220	-1.79438	-0.95274	-1.54644
2009	Zimbabwe	MEA	LD	9.217	-1.80784	-1.39646	-1.5278
2010	Zimbabwe	MEA	LD	11.576	-1.74649	-1.58375	NA
2011	Zimbabwe	MEA	LD	12.007	-1.63965	-1.38391	-1.51576
2012	Zimbabwe	MEA	LD	12.436	-1.53217	-1.32431	-1.50971
2013	Zimbabwe	MEA	LD	3.372	-1.51066	-1.36114	-1.55344
2014	Zimbabwe	MEA	LD	0.874	-1.50348	-1.6396	-1.59361

7 **References**

Acs, Z.J., Anselin, L., Varga, A., (2002). Patents and innovation counts as measures of regional production of new knowledge. *Research Policy* 31 (7), 1069–1085.

Arnaud, Benoit, ArnaDupont, Julien, Koh, Seung-Hee and Schreyer, Paul (2011). Measuring Multifactor productivity by Industry: Methodology and First Results from the OECD Productivity Database, *The Statistics Newsletter*, Issue No. 54, December 2011, www.oecd.org/std/statisticsnewsletter.

Arora, A., A. Fosfuri and A. Gambardella (2001), *Markets for Technology: the Economics of Innovation and Corporate Strategy*. MIT Press, Cambridge, Massachusetts.

Arrow, K. (1962). *Economic Welfare and the Allocation of Resources for Invention*, National Bureau of Economic Research, *The Rate and Direction of Inventive Activity*, New York.

Barney, Jay B. (2011). *Gaining and Sustaining Competitive Advantage*, Pearson Education, Prentiss Hall, Saddle River, NJ.

Bastiat Collection (2007). Frédéric Bastiat Published August 22nd 2007 by Ludwig von Mises Institute.

Boddewyn, Jean J. (2016). aib.msu.edu/publications/insights/volume/16/issue/2.

Bohlen, Joe M.; Beal, George M. (May 1957). *The Diffusion Process*, Special Report No. 18. Agriculture Extension Service, Iowa State College, 1: 56–77.

Boldrin, M., & Levine, D. K. (2008). *Against Intellectual Monopoly* (1. publ. ed.), Cambridge Univ. Press.

Boldrin, M., & Levine, D. K. (2013). The case against patents. *The Journal of Economic Perspectives*, 27(1), 3-22. Retrieved from <http://www.econis.eu/PPNSET?PPN=741370085>.

Bonthius, Andrew (2016). Seen on June 12, 2016, Deep Layered Change, <https://www.coursehero.com/file/14544141/DPLchgfrationalefinaldoc/> first published February 2013.

Brant, Jennifer and Parthasarathy, Balaji (2015). The dynamics of global technology and knowledge flows. Retrieved from [ttp://dx.doi.org.ezproxy.snhu.edu/10.13140/RG.2.1.2511.0567](http://dx.doi.org.ezproxy.snhu.edu/10.13140/RG.2.1.2511.0567).

Brem, A., & Voigt, K. (2009). Integration of market pull and technology push in the corporate front end and innovation management—Insights from the german software industry. *Technovation*, 29(5), 351-367. doi:10.1016/j.technovation.2008.06.003.

BSA Global Software Survey; The Compliance Gap (2016), <http://globalstudy.bsa.org/2016/>.

Caragliu, Andrea and Nijkamp (2008). The Impact of Regional Absorptive Capacity on Spatial Knowledge Spillovers, Tinbergen Institute Discussion Papers 08-119/3, Tinbergen Institute.

Chen, M.-J., Su, K., and Tsai, W. (2007). Competitive tension: The awareness-motivation-capability perspective. *Academy of Management Journal*, 50, 101-118

Coase, Ronald H. (1988). The Nature of the Firm: Influence, *Journal of Law, Economics, & Organization*, 4(1), pp. 33-47. Reprinted in *The Nature of the Firm: Origins, Evolution, and Development* (1993), Oliver E. Williamson and S. G. Winter, ed., pp. 61-74.

Cobb, Charles s. and Douglas, Paul H (1928). A Theory of Production. *The American Economic Review*, Vol. 18, No. 1, Supplement, Papers and Proceedings of the Fortieth Annual Meeting of the American Economic Association (Mar., 1928), pp. 139- 165 Published by: American Economic Association.

Comin, Diego (2006). Total Factor Productivity, New York University and NBER August 2006

Cooper, R. N. (2010). Piracy: The intellectual property wars from Gutenberg to Gates/Against intellectual monopoly. *Foreign Affairs*, 89(5), 154-155. Retrieved from <http://ezproxy.snhu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=cookie,ip,url,cpid&custid=shapiro&db=a9h&AN=52957907&site=ehost-live>

Cortimiglia, Marcelo Nogueira, Maxime, Charlotte Isabelle Maxime, Oliviera, Dnaiel Thome de, Correa, Christian Hans, Danilievicz (2015). A Systematic Literature Review on Firm-Level Innovation, *International Association for Management of Technology IAMOT 2015 Conference Proceedings*.

Danquah, Michael and Moral-Benito, Enrique (2012). TFP Growth and its Determinants: Nonparametrics and Model Averaging, *Documentos de Trabajo N.º 1104 Banco de Espana*.

Deming, W. Edwards (1993). *The New Economics for Industry, Government, and Education*. Boston, MA, MIT Press.

Douardo, E., & Robinson, I. (2014). How many jobs does intellectual property create. Unpublished George Mason University, Mercatus Center

Dunning, John (1979). Toward an Eclectic Theory of International Production: Some Empirical Tests. *Journal of International Business Studies*. 11 (1): 9-31. Retrieved 3 November 2015

Edison, H., bin Ali, N., & Torkar, R. (2013). Towards innovation measurement in the software industry. *Journal of Systems and Software*, 86(5), 1390. Retrieved from <http://gup.ub.gu.se/ezproxy.snhu.edu/publication/176489-towards-innovation-measurement-in-the-software-industry>

Francisco, Javier Urrea (2015). Assessing Corruption An analytical review of Corruption measurement and its problems: Perception, Error and Utility, Georgetown University

Fraser Institute (2015). Economic Freedom of the world 2015, www.fraserinstitute.org.

Freyfogle, Eric (2009), *On Private Property: Finding Common Ground on the Ownership of Land* Paperback, Beacon Press.

Ginarte, Juan C. and Park, Walter G. (1997). Determinants of patent rights: A cross-national study. *Research Policy*, 26, 3. pp. 283–301.

Glazer, Klara. (2015). Advantages and disadvantages of the single european patent / prednosti in slabosti enotnega evropskega patenta. *Naše Gospodarstvo/our Economy*, 61(2), 24-34. doi:10.1515/ngoe-2015-0007.

Global Competitiveness Index of the World Economic Forum (2016)
<http://reports.weforum.org/global-competitiveness-report-2015-2016/>.

GII, Global Innovation Index from Cornell University, INSEAD, and WIPO (2014): *The Global Innovation Index 2014: The Human Factor In innovation*, Fontainebleau, Ithaca, and Geneva, http://www.wipo.int/export/sites/www/econ_stat/en/economics/gii/pdf/2014/.

Griliches, Z. (1990). Patent statistics as economic indicators. *Journal of Economic Literature*, 28(4), 1661.

Guellec, D. and Van Pottelsberghe de la Potterie, B. (2004), *From R&D to Productivity Growth: Do the Institutional Settings and the Source of Funds of R&D Matter?*. *Oxford Bulletin of Economics and Statistics*, 66: 353–378.

Hall, B. H. (2010). Open innovation & intellectual property rights: The two-edged sword. *Japan Spotlight*, jan/feb, 18-19. Retrieved from <http://www.narcis.nl/publication/RecordID/oai:publications.maastrichtuniversity.nl:27-M250355>.

Hall, Bronwyn H. (2011). *Using productivity growth as an innovation indicator*, University of Maastricht and UC Berkeley, Report for the High Level Panel on Measuring Innovation, DG Research, October 2011.

Hall, Alan (2012). Clayton Christensen, *On The Entrepreneurial Innovations Our Economy Needs*, DEC 11, 2012, <http://www.forbes.com/sites/alanhall/2012/12/11/clayton-christensen-on-the-entrepreneurial-solutions-our-economy-needs/#5859471f128a>.

Hassan, E., Yaqub, O., & Diepeveen, S. (2010). Intellectual property and developing countries: A review of the literature. ().RAND Corporation. Retrieved from http://gateway.proquest.com.ezproxy.snhu.edu/openurl?url_ver=Z39.88-2004&res_dat=xri:policyfile&rft_dat=xri:policyfile:article:00124149.

Heckscher, Eli T. and Ohline, Bertil (ref. 1991)., *Heckscher-Ohlin Trade Theory*, translated, edited, and introduced by Harry Flam and M. June Flanders, Cambridge, MA, MIT Press, 1991.

Heritage (2016). Index of Economic Freedom, <http://www.heritage.org/index/>, cited on August 15, 2016.

Hodgson, Geoffrey (2006), What Are Institutions? JOURNAL OF ECONOMIC ISSUES Vol. XL No. 1 March.

Hoekman, Bernard and Maskus, Keith, and Saggi, Kamal, Transfer of technology to developing countries: Unilateral and multilateral policy options, World Development, 2005, vol. 33, issue 10, pages 1587-1602

Hope, Hailey, V., 2001. Breaking the mold? Innovation as a strategy for corporate renewal. International Journal of Human Resource Management 12 (7), 1126–1140.

Hymer, Stephen (1960). The International Operations of National Firms, Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA

International Property Rights Index (IPRI, 2016). www.internationalpropertyrightsindex.org

Isom, C.J. and Jarczyk, David R. (2009) Innovation in Small Businesses: Drivers of Change and Value, Ceteris, Inc. for SBAHQ07-Q-0012 Release Date: March 2009

Katz, Michael L. and Shapiro, Carl. 1994. Systems competition and network effects. Journal of Economic Perspectives, 8(2): 93-115.

Kaplan, Soren (2014), “How to Measure Innovation to Get Real Results”, <http://www.fastcodesign.com/3031788/how-to-measure-innovation-to-get-real-results>, June 2014.

Kinsella, N. Stephan (2001) “Against Intellectual Property, Journal of Libertarian Studies 15, no. 2.

Kleinknecht, A. (2000), Indicators of manufacturing and service innovation: their strengths and weaknesses, in Metcalf, J.S., & I. Miles (eds), Innovation system and the service economy, Boston: Kluwer AP, pp. 169-186).

Kneip, Alois and Sickles, Robin (2012). Panel Data, Factor Models, and the Solow Residual, In: Exploring Research Frontiers in Contemporary Statistics and Econometrics, a festschrift in honor of Leopold Simar, Van Keilegom, I and Wilson P, ed. Springer, New York.

Kortum, S., J. Eaton and J. Lerner (2003), International Patenting and the European Patent Office: A Quantitative Assessment, in Patents Innovation and Economic Performance, proceedings of the OECD conference on IPR, Innovation and Economic Performance, 28-29 August 2003

Kraay, A. (2006). What is Governance and How do we measure it? Presentation at Workshop on Governance and Development, Dhaka, November 11-12, 2006.

- Kshetri, N. (2015). Success of crowd-based online technology in fundraising: An institutional perspective, *Journal of International Management*, 21(2), 100-116.
- Kuo, P., Lin, Y., & Peng, C. (2016). International technology transfer and welfare. *Review of Development Economics*, 20(1), 214-227. doi:10.1111/rode.12212.
- Jaffe, A. B. 2000. The US Patent System in Transition: Policy Innovation and the Innovation Process. *Research Policy*, 29(4-5): 531-557.
- Jensen, P. H., & Webster, E. (2004). Examining biases in measures of firm innovation.(10) Retrieved from <http://www.econis.eu/PPNSET?PPN=389693278>.
- Jong, Jeroen de, Kemp, Ron, Folkeringa, Mickey and Wubben, 2003, Innovation and firm performance, Scales Research Reports H200207, EIM Business and Policy Research.
- Lamming, R. (1993). *Beyond Partnership: Strategies for Innovation and Lean Supply*. Prentice-Hall, Englewood Cliffs, NJ.
- Lieberman, Marvin B. and Montgomery, David B. (1988), First-Mover Advantages, *Strategic Management Journal*, Volume 9, Summer 1988, 41-58.
- Long, C. (Ed.). (2000). *Intellectual property rights in emerging markets*. Washington, DC: American Enterprise Institute.
- Mansfield, Edwin, Schwartz, Mark and Wagner, Samuel (1981). Imitation Costs and Patents; An Empirical Study, *Economic Journal*, 91 [December 1981], 907-918.
- Mazzarol, T.W., Reboud, S. (2007) "Innovation management in small firms: A comparison of French and Australian companies", 37th Entrepreneurship, Innovation and Small Business (EISB) Annual Conference, Ljubljana, Slovenia.
- Maskus, K. (2010), "Differentiated Intellectual Property Regimes for Environmental and Climate Technologies", OECD Environment Working Papers, No. 17, OECD Publishing.
- Mefford, Robert N. (1986), Determinants of Productivity Differences in International Manufacturing. *Journal of International Business Studies*, 17, 1, pages 63-82.
- Meyer, K. E., & Sinani, E. (2009). When and where does foreign direct investment generate positive spillovers? A meta-analysis. Retrieved from <http://opus.bath.ac.uk/15932>.
- Moore, Geoffrey A. (2006), *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*, HarperBusiness; Revised edition.
- Moral-Benito, Enrique (2012). Determinants of Economic Growth: A Bayesian Panel Data Approach, *The Review of Economics and Statistics*, 2012, vol. 94, issue 2, pages 566-579.

OECD, 2004. www.oecd.org.

OECD, 2005, Oslo Manual, third edition, <https://www.oecd.org/sti/inno/2367580.pdf> cited September 1, 2016.

OECD, 2016, <https://data.oecd.org/lprdt/multifactor-productivity.htm>.

Ostergard, R. L., Jr. (2000). The measurement of intellectual property rights protection . *Journal of International Business Studies*, 31, 2, 31(2), 349-360.

Ostry, S. (1998). Technology, productivity and the MNE. *Journal of International Business*, 29(1).

PERC, 2016. The Property and Environment Research Center, <http://www.perc.org/>.

Petrosyan, A. E. (2006). A straight-jacket for conceptual breakthroughs: *International Journal of Innovation, Creativity and Change*, 2(3).

Porter, Michael E. (1987), *From Competitive Advantage to Corporate Strategy*, Harvard Business Review, May 1987.

Porter, Michael E. (1980), *Competitive Strategy*. Free Press.

Porter, Michael E., (1985), *Competitive Advantage*, Free Press.

PRA, Property Rights Alliance, 2016. www.propertyrightalliance.org.

Rozek, R. (1988). Protection of intellectual property through licensing: Efficiency considerations. *Journal of World Trade*, 22(5), 27-34.

Ricardo, David (1815), *An Essay on the Influence of a Low Price of Corn on the Profits of Stock*, reprinted by, among others, Kessinger Publishing, 22 May 2010.

Rogers, Everett (2003). *Diffusion of Innovations*, 5th Edition. Simon and Schuster, August 16, 2003.

Serrat, O. (2010). *The five ways technique*. Washington, DC: Asian Development Bank.

Schumpeter, Joseph A. (1934), *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle*, Harvard University Press, Cambridge: MA.

Shinkle, George A. and Kriauciunas, Aldas P. (2010). Institutions, size and age in transition economies: Implications for export growth. *Journal of International Business Studies*, 41(2), 267-286. doi:10.1057/jibs.2009.9.

Smith, Adam (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. 1 (1 ed.). London: W. Strahan.

Squicciarini, M., Dernis, H. and Criscuolo C. (2013). Measuring patent quality: Indicators of technological and economic value. OECD Science, Technology and Industry Working Papers, 25.

Sulzeko, Andrei (2016). Canada's Innovation Conundrum: Five Years After the Jenkins Report, <http://irpp.org/research-studies/report-2016-06-09/>, retrieved on November 2, 2016.

Tett, Gillian (2015), The Silo Effect: The Peril of Expertise and the Promise of Breaking Down Barriers, Simon and Schuster, September 1, 2015.

Treacy, Michael and Wiersema, Fred (1993), Customer Intimacy and Other Value Disciplines. Harvard Business Review, January – February, 1993.

Vernon, Raymond (1966), International Investment and International Trade in the Product Cycle, The Quarterly Journal of Economics, Vol. 80, No. 2 (May, 1966), pp. 190-207.

WIPO Publication No. 450(E) ISBN 978-92-805-1555-0,
http://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf.

WIPO, 2009, The Economics of Intellectual Property: suggestions for further research in developing countries and countries with economies in transition (2009). Geneva, Switzerland: World Intellectual Property Organization.

World Bank Group's Doing Business Report (2016) <http://www.doingbusiness.org/>.

World Intellectual Property Organization (WIPO, 2016), as cited on September 10, 2016, http://www.wipo.int/sme/en/faq/pat_faqs_q4.html.

This page deliberately left blank