ORGANIZATIONAL PERFORMANCE IN RELATION TO HUMAN, ORGANIZATIONAL AND RELATIONAL CAPITAL OF UNIVERSITIES IN NORTHERN INDIA

For the degree of Doctor of Philosophy

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DECLARATION

I hereby declare that this thesis "ORGANIZATIONAL PERFORMANCE IN RELATION TO HUMAN, ORGANIZATIONAL AND RELATIONAL CAPITAL OF UNIVERSITIES IN NORTHERN INDIA" is an original work done by me for the Degree of Doctor of Philosophy in Management. I also declare that this thesis or any other part of it has not been submitted by me for the award of any other degree, diploma, title or recognition before.

Niti Chatterji

Patiala **NITI CHATTERJI**

CERTIFICATE

Certified that the thesis entitled "*ORGANIZATIONAL PERFORMANCE IN RELATION TO HUMAN, ORGANIZATIONAL AND RELATIONAL CAPITAL OF UNIVERSITIES IN NORTHERN INDIA*" which is being submitted by Ms Niti Chatterji in fulfillment of the requirements for the award of Degree of Doctor of Philosophy in Management, Thapar University, Patiala is a record of the candidate's own work, carried out by her under our own supervision and guidance. The matter embodied in this thesis has not been submitted in part or full to any other University or Institute for the award of any other degree.

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"Arise! Awake! and stop not, until the goal is reached." – Swami Vivekananda

One of the joys of completion is to look over the past journey and remember and thank everyone who has in some way or the other motivated and facilitated me to achieve my goals.

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Niti Chatterji

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ABSTRACT

Higher education is an integral enterprise in any economy and its role in a country's success index is increasing exponentially. Increased competition and technology development has called for greater interest of Governments in the higher education sector. Today knowledge economy is synonymous with global competitiveness and for economies across the world, the critical success factor is the ability to exploit their knowledge potential. In context to higher education, universities are largely those institutions where knowledge creation, dissemination and transfer takes place, thus making them the epicenter of a knowledge based economy.

In the last two decades, India has transformed its higher education landscape tremendously by creating access to low-cost-high-quality university education. With a planned expansion and a learning-driven model, India has successfully bettered its enrolment numbers. Large scale reforms have been undertaken to improve faculty-student ratio by making teaching an attractive career option and expanding capacity for doctoral students at universities. Today India has a student population of 37 million in higher education, which is a force to reckon with. Among them are potential leaders, researchers and entrepreneurs positioned at the helm of knowledge creation, thus making the Indian higher education system worthy of emulation, especially among the developing economies.

Despite these strides of progress, Indian universities do not feature among the best in the world. According to the Times Higher Education BRICS (Brazil, Russia, India, China, South Africa) & Emerging Economies University Rankings (2016-17), only 27 Indian universities have found place in the top 300. On the other hand China is far ahead in the rankings with 52 universities in the list.

The present study has designed a structural model from the perspective of university faculty members across five selected states of North India, with an objective of enhancing performance of universities in relation to their intellectual capital. The study has highlighted the importance of intellectual capital in the performance of a university. This finding is immensely important because of the emerging knowledge economies throughout the world including India.

The final structural model indicates that having research oriented policies, employee oriented practices in terms of quality work life and perks to retain competent faculty, securing faculty commitment towards university visions, equal employment opportunities, proper decision support systems, a culture of knowledge sharing, dissemination of relevant information, interactive environment at universities and networking taken collectively, significantly contribute towards human capital, organizational capital and relational capital. A final path analysis establishes the fact that intellectual capital has a strong impact on university performance. Thus the study provides an empirically tested model for planners in the higher education sector to enable them strategize around intellectual capital in order to enhance the overall university performance.

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LIST OF ABBREVIATIONS

ESRC	Economic and Social Research Council
KBE	Knowledge Based Economy
UGC	University Grants Commission
NPE	National Policy on Education
AISHE	All India Survey on Higher Education
MOOC	Massive Open Online Course
BRICS	Brazil, Russia, India, China & South Africa
IIT	Indian Institute of Technology
IIM	Indian Institute of Management
GER	Gross Enrolment Rate
FICCI	The Federation of Indian Chambers of Commerce and Industry
E&Y	Ernst & Young
VSAT	Very Small Aperture Terminal
NKN	National Knowledge Network
NKC	National Knowledge Commission
ERASMUS	European Community Action Scheme for the Mobility of University Students
GATS	General Agreement on Trade in Services
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
EVA	Economic Value Added
IC	Intellectual Capital
VAIC	Value Added Intellectual Coefficient
ITRI	Industrial Technology Research Institute
LSD	Least Significant Difference
ANOVA	Analysis of Variance
ARDL	Autoregressive distributed lag
HKUST	Hong Kong University of Science and Technology
SEM	Structural Equation Modelling
IT	Information Technology
ITES	Information Technology Enabled Services

OC	Organizational Commitment
OCB	Organizational Citizenship Behavior
DSS	Decision Support System
ICT	Information and Communication Technology
CBIS	Computer Based Information System
KM	Knowledge Management
WLAP	Web Lecture Archive Project
CLE	Creative Learning Ecosystem
QES	Quality of education system
CFA	Confirmatory Factor Analysis
GDP	Gross Domestic Product
EFA	Exploratory Factor Analysis
PLS	Partial Least Squares
DEA	Data Envelopment Analysis
BSC	Balanced Score Card
FAHP	Fuzzy Analytical Hierarchy Process
EFQM	European Foundation for Quality Management
ISO	International Standards Organization
UT	Union Territory
NCR	National Capital Region
GLA	Ganeshi Lal Agrawal
GHRDC	Global Human Resource Development Centre
SPSS	Statistical Package for Social Sciences
AMOS	Analysis of Moment Structures
CR	Composite Reliability
AVE	Average Variance Extracted
RF	Research Facilitation
QWL	Quality of Work Life
PFER	Perks for Employee Retention
FC	Faculty Commitment
EEO	Equal Employment Opportunity

KI	Knowledge Infrastructure
KS	Knowledge Sharing
ATI	Access to Information
NLC	Network Leveraging Capacity
DOI	Degree of Interaction
PCA	Principal Component Analysis
KMO	Kaiser-Mayer-Olkin
PDA	Professional Development Allowance
TA	Teaching Assistantship

CHAPTER 1

INTRODUCTION

Capital generally refers to money or property capable of producing wealth which is owned and controlled by an organization. While physical capital was the center of all economic debates in the 20^{th} century, intellectual capital has taken a front seat today. Tangible assets which were the only ones recognized earlier in company financial statements are now accompanied by more intangible assets which have a direct bearing on the competitive advantage of a firm.

Many times it is seen that the difference between market value and book value of companies can be attributed to intangible assets that are often not recognized on the company balance sheets (Bozbura *et al*., 2006). These include assets like employee knowledge, expertize and creativity, customer confidence in the company and its products, brands and franchises, information and knowledge management systems, administrative procedures, copyrights, patents and trademarks, the efficiency of company business processes and the effectiveness of company planning, forecasting and strategy-making.

This has presented companies with a new challenge - how to measure, account for, manage and develop intellectual capital. Information, knowledge and other intangibles now drive economic prosperity and wealth creation. Intangible assets like worker skills and know-how, informal relations that feed creativity and new ideas, intellectual property and brand names are the new keys to competitive advantage. According to researchers, (Issac *et al*.,2010) physical assets like plant and machinery and financial assets like bank deposits, bonds and stocks are necessary but no longer sufficient to achieve high performance. Rather, information, knowledge sharing practices, knowledge development and networks that produce a good image, brand, trademarks and information systems that support quality decision making constitute the critical success factors of the information and service era. The mode of wealth creation has shifted from production based to an economy of knowledge, where the key drivers of growth are intangibles.

1.1 Knowledge Based Economy (KBE)

According to (DTI Competitiveness White Paper, 1998, cited in Brinkley, 2006, p.4), knowledge economy is "one in which the generation and exploitation of knowledge has come to play the predominant part in the creation of wealth. It is not simply about pushing back the frontiers of knowledge; it is also about the most effective use and exploitation of all types of knowledge in all manner of economic activity."

"Economic success is increasingly based upon the effective utilization of intangible assets such as knowledge, skills and innovative potential as the key resource for competitive advantage. The term „knowledge economy" is used to describe this emerging economic structure." (ESRC, 2005, cited in Brinkley, 2006, p. 4).Firms obtain value and competitive advantage if they have the required capability to store, disseminate, analyze and convert information into useful knowledge. Knowledge sharing can happen internally with employees and in many cases even externally with suppliers and customers. Against this backdrop, universities are largely becoming the focus of governments throughout the world since they are the seat of knowledge creation, dissemination and transfer.

This work of research tries to bring together two phenomenal shifts across the world under one roof. Shift to knowledge economy and a shift from tangibles to intangibles. By trying to explore the contribution of universities" intellectual capital towards their performance, this study tries to touch on both, the intangible as well as the knowledge aspect of an organization. Present study treats universities as organizations and the supporting literature is provided further in Chapter 2.

1.2 Universities and Knowledge economy

Powell and Snellman (2004) defined a knowledge based economy as "production and services based on knowledge intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence". They opined that a critical component of a knowledge based economy is reliance on intellectual capabilities. Among the theorized models of innovation underpinning a knowledge economy, the triple helix model in particular has emerged as significant. Tirronen and Nokkala (2009) opined that monitoring and enhancing university performance will be a key building block in crafting a knowledge based economy, since universities are those organizations which are at the heart of knowledge creation, transfer and dissemination. Particularly in the era of globalization, universities will be the key institutions for churning out workforce needed for a knowledge economy.

Bano and Taylor (2015) suggested that much of the debate on KBE and universities is confined to developed countries because they are well equipped to deal with the power of knowledge in terms of availability of human, social and intellectual capital, complemented by the political will of their governments. On the other hand developing countries are still groping in the dark with accumulating the pre requisite human and social capital needed to create, manage and disseminate knowledge. It will therefore be quite interesting to see how developing countries like India explore the role of universities in creating a KBE.

Universities around the world are dealing with many paradigm shifts like reduced state funding in the wake of increasing competition, changing ways of university governance due to the rise of neo-liberal policies in higher education, shift from a teacher driven to a student driven learning model and pressures of accountability towards the society. Moreover, extended competition with other organizations, increasing internationalization, increasing expectations of the interested groups and increasing importance of accountability is compelling universities to focus on activities like knowledge transfer, project consultancies, spin off units and skill development. This has resulted in a fundamental reform in the overall purpose and functioning of higher education and contribution of universities towards knowledge economy. Governments have also shifted their focus on improving university performance through research, innovation and developing state-of-the-art infrastructural facilities. Universities are looking for strong networking with business, industry and other universities. Human and relational capital of universities, especially in developing economies has become the primary elements of a knowledge economy (Chatterji & Kiran, 2017).

The third 'academic evolution' clearly indicates a paradigm change in the mission and functioning of universities which has resulted in a completely different dynamics of reciprocation between universities and government (Etkowitz *et al*., 2000). Universities are expected to change and adapt according to this change in the external environment. This change requires universities to reciprocate in a flexible manner by being financially more autonomous, adequate, infrastructure wise, strong and sound and research wise and maintain high standards of strategic performance. This provides a strong ground for the present study and also constitutes the major research question, that "can intellectual capital of universities effect their performance and thereby act as a catalyst in taking India towards the establishment of a knowledge based economy?"

1.3 Evolution of higher education in India

Higher education refers to the process of learning that occurs at universities and affiliated colleges beyond the level of post higher secondary education. Higher education starts after primary education and schooling is over. Higher education goes beyond teaching and comprises of research, consultancy as well as initiatives for the betterment of the society on the whole.

When talking of the ancient seats of learning in the world, India deserves a special mention. The education system in India has evolved through a long socio-historical process. The basic format of India's higher education was that of a monastic order. Students remained under the guidance of a guru for a considerable period of time. Initially higher education was attributed and confined to the nobility of the society. The kind of knowledge imparted was also customized according to the strata of society to which the student belonged to and the job allocated to a particular section. Brahmins were the educated class and were involved with teaching, learning and imparting knowledge while Kshatriyas were trained in the art of war. Vaishyas were taught the trades of business while the shudras were deprived of education and were meant to do the menial jobs of the society. From the writings of Chinese travelers like Fa-hein, Tsang and I-Tsing, it has been established that India had renowned centers of learning and education like Taxila, Nalanda, Kanchipuram, Odantapuri, Kashmira and Vikramashila (Maity & Maity, 2016). Particularly, Nalanda University had a world-wide recognition around 850 A.D. Takshashila, which is currently in Pakistan has been established as a great seat of higher education as per the Buddhist literature.

India got its first exposure of western education with the advent of British rule. Woods Despatch (1854) or education Despatch was sent by the company to Dalhousie, the then governor general, who contributed majorly towards the upsurge of higher education sector in India. The ideas and principles proposed in the Despatch influenced the field for around five decades. This Despatch cleared the way towards creation of universities in India. In the year 1857, the first three state universities in the "presidency headquarter" cities of Calcutta, Bombay and Madras came into existence (Maity & Maity, 2016).But these universities were created only as regulatory bodies and not as direct bodies of teaching. Teaching happened majorly in the privately owned colleges that prepared members of the Indian elite society for jobs in British bureaucracy. According to

Carnoy and Dossani (2013) apart from a few experiments here and there, the direct university education federal structure in India remained intact throughout the colonial period.

For the first time in 1944, an effort was made to formulate India's national system of education. The Central Advisory Board of Education issued a report on post war development of education in the country. The report was known as the Sargeant Report. The outcome of the recommendations of the report was the formation of a University Grants Committee in 1945. The committee was formed to monitor the functioning of the three Central universities: Aligarh, Banaras and Delhi. The UGC was later given the responsibility to oversee all the existing universities.

In 1945, the Sarkar Committee recommended the establishment of one higher institution in all the four zones of the country. This culminated into the formation of The All India Council of Technical Education in the year 1946, to supervise tertiary level technical education.

Post-independence, the ministry of education initiated major changes in the education system of India. The University Education Commission was set up with Dr Sarvepalli Radha krishnan as the chairman. The Commission's report assessed the current situation of university education in India and suggested improvements and extensions desirable for the betterment of the same. On the recommendation of the University Education Commission, the University Grants Committee was restructured on the patterns of University Grants Commission (UK). Consequently, the University Grants Commission (UGC) came into being in 1953.

In 1964, Kothari Commission, an adhoc commission was set up to examine all important aspects of the education system of India and to suggest policies for the development of the education sector. According to Maity and Maity (2016) the report of Kothari Commission stressed on the importance of universities as dwelling places of ideas and the high standards of integrity and conduct expected from its members.

Two decades later, the parliament adopted The National Policy on Education (NPE) in the year 1986. Acharya Ramamurti was made the chairman of a committee to go through the policy and suggest improvisations. The report submitted by the committee was considered by the Central Advisory Board of Education which suggested some changes. The National Policy of Education was a milestone in the evolution of education after independence. It emphasized on the need for a phenomenal reconstruction of the complete education structure, to improve quality and highlighted the importance of science and technology, inculcating moral values and establishing a close connect between education and practical lives of people.

For higher education, it was proposed that steps be taken to facilitate regional mobility by providing equal access to every student of requisite merit, irrespective of his origin. For the research and development and science and technology domain, it was proposed that special measures should be taken to strengthen networking between academic institutions across the country to pool their resources and work on projects of national importance (The National Policy of Education, 1968).

The period from 1980s to the 1990s was a phase of remarkable transformation in higher education. Global economy was now beginning to realize the significance of higher education. Universities started enrolling and engaging international students, becoming partners in inter university projects, exchanging staff, students and curriculum among themselves and achieving accreditation ratings.

Table 1.1 below gives the data on university level institutions and their growth in India over the years between 2002 and 2011.

University level institutions in India

Type	**2002**	**2006**	**2007**	**2009**	**2010**	**2011**
Central	18	20	25	40	41	43
State	178	217	231	234	257	285
Deemed to be	52	102	102	128	130	129
National institutions through state legislation	5	5	5	5	5	5
National institutions through central legislation	12	13	33	39	39	39
Private	0	10	21	21	61	110
Total	265	367	367	467	533	567

Source: Higher Education in India, Strategies and schemes during eleventh plan period (2007-2012)

The term "public universities" in the present study refers to state universities which are established or incorporated by a Provincial Act or by a State Act, while private universities refers to the universities established through a State/Central Act by a sponsoring body viz. a society registered under the Societies Registration Act 1860, or any other corresponding law for the time being in force in a state or a Public Trust or a company registered under section 25 of The Companies Act 1956. The present study treats deemed to be universities as universities.

The table above clearly shows the exponential growth in higher education. This was majorly because of the visionary planning of scholars, academic decision makers and policy makers of the country. The report of the 11th plan also brought out certain challenge areas which were as follows:

- Lower enrolment in higher education sector
- Inter-regional disparities in access to higher education
- Inter-religion, gender and economic discrepancies in accessing higher education.
- Quality issues in higher education
- Relevance of the education being provided
- Reforms related to academics in universities
- Mentoring of private universities

According to the UGC report, the 11th plan was successful in addressing maximum issues written down and suggested reforms accordingly. The main focus of the 11th plan was augmentation in higher education with inclusiveness, quality and relevant educational reforms.

1.4 Current scenario of higher education

Higher education is central to the country's dream of emerging as a knowledge hub in the global economy. Competitiveness of the economy and its employment generation potential rides heavily on skillful and trained personnel. Having said that, the overall state of Indian higher education was dismal even about a few decades back. Enrolments were abysmally low in almost half of the districts in the country and therefore it posed serious limitations on the availability of qualified and skillful manpower. Additionally, quality of education was a very significant drawback in context to India. But recently, calls for reforms have provoked fundamental transformation in the higher education scenario of the country. This change has occurred as a consequence of a bigger change in the overall vision of higher education and contribution of universities towards a knowledge based economy. In last twenty years, India has tremendously revolutionized the landscape of its higher education by enabling the availability of low-cost-high-quality university education. Systematic growth and a learning-driven model, has resulted in better enrolment numbers with over 37 million students in higher education. The gross enrolment ratio today stands at 25.8% (All India Survey on Higher Education, 2017-18).

Apart from the brick and mortar way, India also chose to go the information technology route through the Massive Open Online Courses (MOOCs) to achieve these numbers. The MOOC model made it possible for the higher education sector to reach the masses, despite poor faculty-student ratios. Technology has also changed the pedagogy of education. Classroom lectures are pre-recorded and uploaded on institutional portals so that students can access the material at their own comfort. This is a two pronged strategy. Firstly it has resulted in achieving inclusivity, since many students had to drop out of higher education due to inaccessibility. Secondly it has resulted in a customized form of learning. Every student can access and learn the material according to his/her own grasping power and capability. This has led to achieving equity in higher education. In short, technology has solved two of the pressing problems of the Indian higher education system- access & equity. Large scale reforms have also been undertaken to augment faculty to student ratio. This has been done by trying to make teaching an alluring career choice, increasing admissions for research scholars and disassociating qualifications from eligibility to teach.

Despite these strides of progress, Indian universities are not yet the best in the world. According to the latest release of the Times Higher Education BRICS & Emerging Economies University Rankings (2018-19), China remains the most represented nation with 72 universities in the list. India has 49 institutions that have featured in the list of 442 universities.

Yeravdekar and Tiwari (2014) brought out that the blueprint of having world class universities prepared by the Ministry of Human Resource Development was done very lackadaisically and formulated in a slapdash manner by bringing together bits and pieces from the administrative charter of celebrated institutions like IITs and IIMs which was not representative of the entire university system of the country. Thus what is required is a robust overall university system and not just a few stand-alone institutions of eminence.

The 12th plan (2012-2017) which is the last and the latest completed five year plan took over from the previous plans' objectives and focused on utilizing the expansion achieved for deepening excellence and achieving inclusivity. In the 11th five year plan there has been a considerable increase in Gross Enrolment Rates (GER) and reduction in social disparities. There have been massive systemic changes which have also started yielding results.

According to Vision 2030 FICCI and E&Y report on higher education 2013, India should deliberately move to a three tiered university structure system in future. The first tier will comprise of elite research oriented universities set up with the objective to emerge as world class in research and academics. These universities would attract handsome research funding, stellar faculty and research-oriented individuals. These universities will attract top 10% of the total enrolments and their faculty to student ratio will be around 1:10. Their curricula will comprise of integrated research activity and a multi-disciplinary course structure. For international students, Massive Open Online Courses (MOOCs) will be available through which they can access the contents and the curriculum. These universities would have state-of-the-art infrastructure, labs and other required facilities to enable cutting edge research. They shall aim at developing robust research capability in areas that are relevant to the economy like environment science, climate change, inclusive development and leadership. These universities will collaborate with global institutes with the aim of conducting research, organizing exchange programs for students as well as faculty. These institutions will be autonomous and function on the basis of academic freedom. They will enjoy a strong funding system through government, grants from the industry and alumni and live projects financed by the industry.

The second tier will consist of specialized career focused institutions which will aim at student learning outcomes and prepare students according to the industry requirements and these universities will see the greatest growth in demand and expansion over the years. These universities will be a launch pad to lucrative executive jobs in the emerging knowledge based economy. These universities will encourage development of critical thinking and problem-solving to churn out industry ready, highly employable graduates and well-rounded industry leaders. While a part of the faculty of these universities will comprise of academic scholars, they will also attract lot of industry experts and practitioners for real time learning experience of their students. These universities shall benefit the students by making them industry-ready and employable graduates and turning them into future leaders and professionals. For the government, these institutions shall act as vehicles for reducing unemployment in the economy and directly benefit the industry by providing them incumbents for the white collar jobs, particularly people with pertinent skill-sets required for knowledge based economy.

Lastly, the third tier of universities will function as foundation institutions that offer a wide spectrum of courses that will aim to provide low cost high quality education to the masses of the country. These universities shall cater to the objectives of inclusivity and equal access, which happen to be significant objectives of the 11^{th} and 12^{th} five year plans. These institutions will aim at imparting skills that are pertinent to the local industries. In this manner these universities will play a significant role in addressing the social imperatives which is one of the three important imperatives highlighted as per the Vision 2030 report. They shall attract their funding through philanthropic grants by the industry, alumni and government. The idea will be to achieve inclusivity by providing basic education to masses, to work on the social imperatives of poverty reduction and unemployment, improving health, improve the standard of living of common man and enable employability at the grass root levels.

When we talk of government reforms in higher education sector since 2013, these five salient trends deserve a special mention.

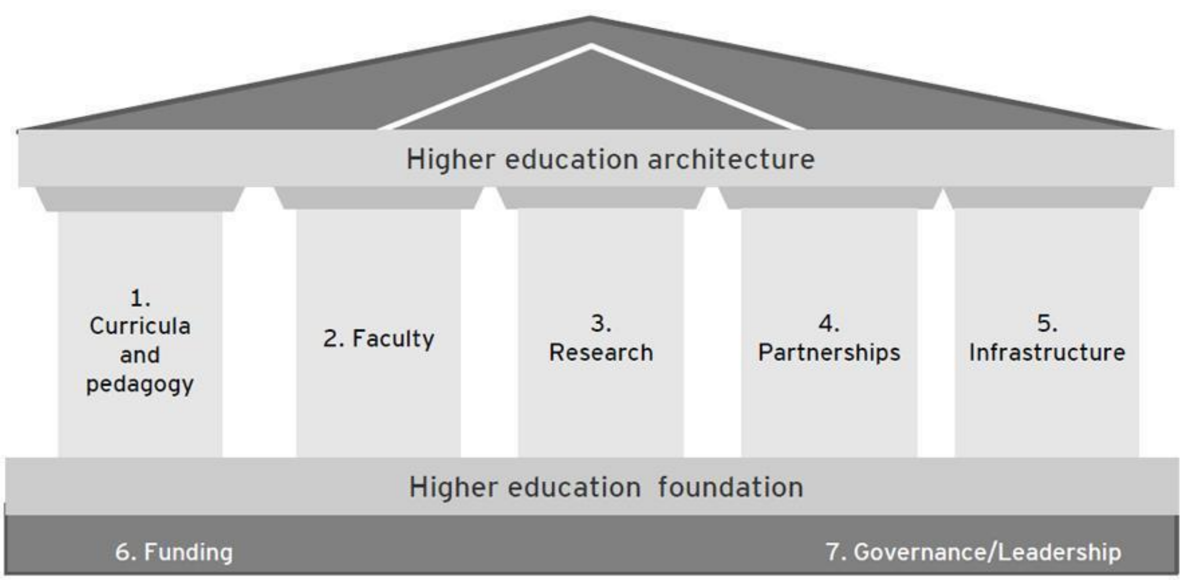
- **Diminishing role of government-** Over the years, the government has gradually reduced its stake in the direct control and management of state universities. Decentralization of authority has been done towards boards consisting of academics, industry experts and alumni. The government instead is indirectly controlling universities in the form of performance- linked funding and quality recognition. The funding structure has also shifted. Funding for organizations has shifted to funding for individuals.
- **Monitoring inputs to regulating outcomes-** In earlier times a university was judged on the basis of the inputs that it had in the form of land, building, books in the library, money invested in computers and other such assets. A conscious effort has been made to change these phenomena and shift to focusing on outputs such as student learning, placements, performance in examinations and level of employability.
- **Importance of accreditation-** The move towards regulating outcomes has been accompanied by the introduction of a more refined quality assurance system based on the establishment of accreditation agencies for higher education with a specific

focus on quality. As a result, claims to quality cannot be confined to the university's own internal judgment.

- **Enabling private and foreign participation-** Due to low obstacles to entry and a compulsory accreditation system, quality has become the sole parameter of university performance, be it a state university or a private universities. In terms of performance, the demarcation between private and state universities is getting blurred with time.
- **Focus towards internationalization-** Much of the reforms in the last two decades have been with the idea of emerging as an international benchmark of higher education. According to the Vision 2030 report issued by FICCI, the objective of the Indian higher education in the next decade is to be the best in the world and for the world. Hence internationalization has been a powerful underpinning force behind all reforms.

1.5 Future of Indian higher education

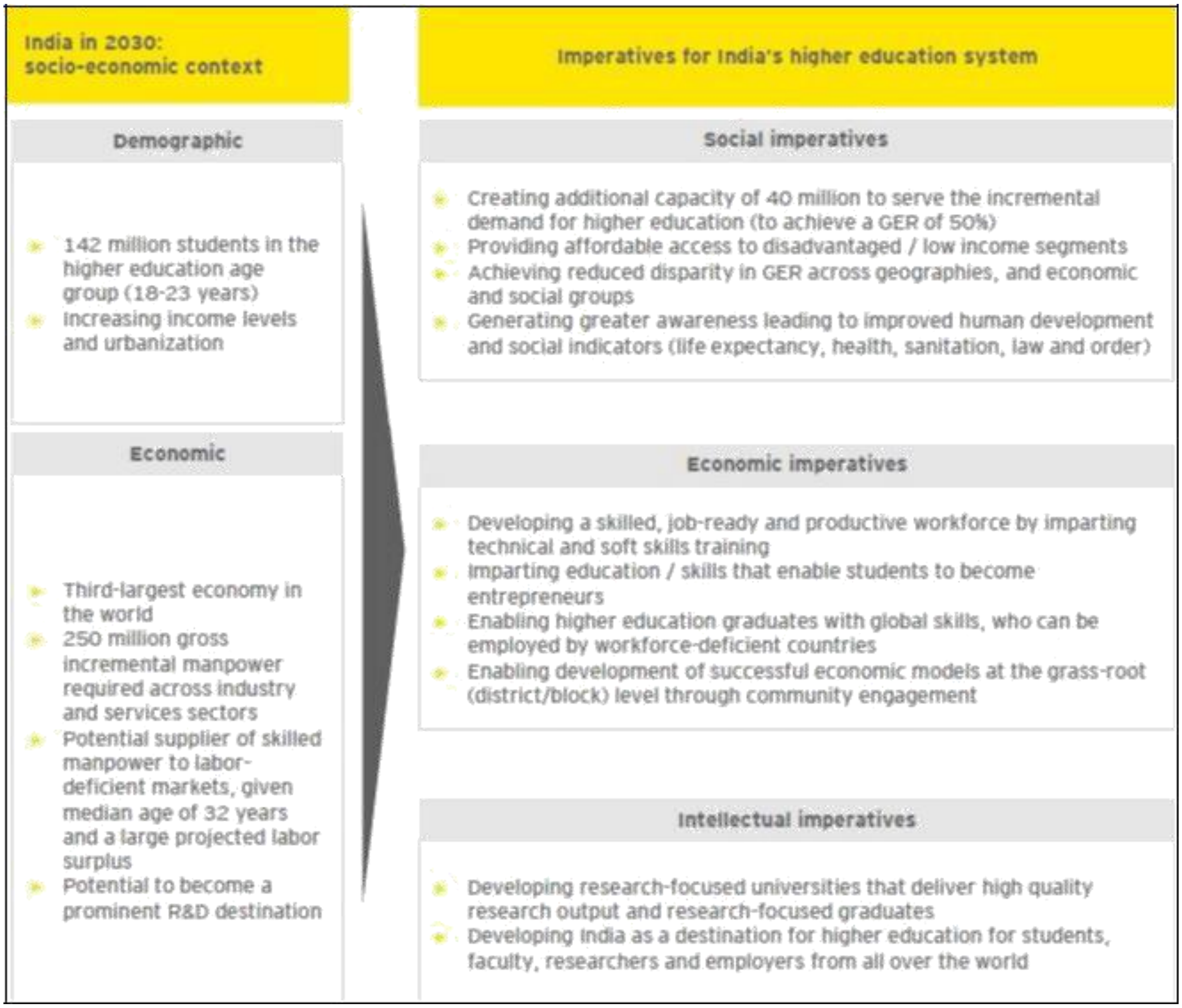
According to the Vision 2030 report in order to achieve the targeted scenario till the year 2030, innovative measures will have to be implemented across the seven levers of the higher education structure. Figure 1.1 proposes the seven important levers of higher education sector.



Source: Higher Education in India: Vision 2030 Report, FICCI Higher Education Summit, 2013

The figure above shows the major areas of focus in the coming years. The report recommended universities to have a student-centered structure of education which includes multi-disciplinary, industry oriented, entrepreneurial and skill based programs. As far as pedagogy is concerned it was proposed to have blended learning (MOOCs developed locally, combined with material provided by global universities), flipped classrooms (content delivered through face to face lectures combined with content delivered online) and experiential learning. It was suggested to attract stellar faculty and adopt a mentor model for research activity. Also faculty recruitment norms need to be eased and incentives to be offered to attract new faculty. Extra emphasis was laid on industry-academia networking, right from curriculum and faculty to infrastructure, placement and research. The concept of “lifelong education” was emphasized in the report. “Lifelong education” can be promoted by creating course contents for working professionals. These programs can either be generic or tailored to suit a particular industry, firm or job profile.
Strengthening industry- university networks and associations between universities was another focus of the report. Some important mechanisms of this is to have industry experts in the governing boards of universities, regular involvement of industry people in designing curriculum, live industry projects, hiring industry professionals as faculty for a particular course or a particular tenure and counselling by industry practitioners.

Infrastructure was yet another aspect covered in the report and highlighted as one of the levers of higher education. It has been proposed to adopt technology based systems like virtual classrooms in order to ensure a superior quality standard of teaching. Using latest technologies like 4G, VSAT and web conferencing will allow faculty to deliver in remote areas with mobility constraint. For these to happen, adequate bandwidth needs to be developed so that fast and uninterrupted connectivity can be achieved. It has to be ensured that all universities are able to leverage the advantage of projects like National Knowledge Network (NKN). Hence institutions that are under resourced, need to be equipped with requisite technology so that they can benefit from this technological initiative. Framework needs to be developed for development of electronic content apart from the current resources. Even the NKN needs to be updated and improvised for sharing of content and the process of collaboration as far as research and development across universities is concerned. Apart from these areas of focus, the report also proposed a framework of imperatives that need to be delivered upon to achieve the goals of the higher education sector. Figure 1.2 depicts the same.



Source: Higher Education in India: Vision 2030 Report, FICCI Higher Education Summit, 2013

Figure 1.2 depicts the three envisioned imperatives. The higher education system of India has to necessarily deliver on these imperatives in order to become not only best *in* the world but *for* the world. These imperatives have been framed by taking into account, the social and economic fabric of the country. While the social imperative and the economic imperative focus on affordable access to education, inclusivity, reducing disparity and empowering a productive workforce with global skills, the intellectual imperative focuses on quality research and positioning India as a one stop destination for students, researchers, faculty and employers across the globe.

1.6 Universities and Intellectual capital

Higher education is an integral enterprise in any economy and its role in a country's success index is increasing exponentially. Increased competition and technology development has called for greater interest of Governments in the higher education sector. Today knowledge economy is synonymous with global competitiveness and for economies across the world, the critical success factor is the ability to exploit their knowledge potential. In context to higher education, universities are largely those institutions where knowledge creation, dissemination and transfer takes place thus making them the epicenter of a knowledge based economy.

Powell and Snellman (2004) proposed that the salient feature of a KBE is a significant association with intellectual assets and not physical or natural resources, complemented with value addition in each stage of production. These changes will directly reflect on the firm's financial figures like profits and market capitalization etc. Taking forward the same views Ramirez *et al*., (2007) opined that knowledge and intellectual capital approaches are becoming critical for universities because their primary activity is to create and transfer knowledge. This process requires investment in human capital and research. This implies that the inputs as well as outputs are intangible in nature. Among the theorized models of innovation underpinning a KBE, the triple helix model is considered quite important and which has been mentioned in section 1.2.Different forms of triple helix have been proposed. In a laissez faire system, industry might play the leading role, in a more state controlled system, the government drives the academia and industry. However the emergence of a science-based industry and the growth of new firms stimulated by academic research have resulted in universities becoming the primary institution and even replacing industry and government in the lead role as the innovation organizer (Etkowitz, 2007).

In section 1.2 it has been explained how the external environment of universities is changing. To face these changes and increase their contribution in a knowledge economy, it will be imperative for universities to develop and focus on intellectual capital to achieve the long term objectives.

Supporting this idea, Sanchez and Elena (2006) opined that universities are important vehicles of modern societies. Higher education system needs to transform itself and become more flexible, transparent, comparable and competitive. In line with this, they suggested that intellectual capital approaches are becoming essential not only to improve governance at universities but also enable benchmark analysis. The study highlighted the importance of intellectual capital by analyzing a framework that would help universities to manage measure and report intangibles.

1.7 Rationale of the study

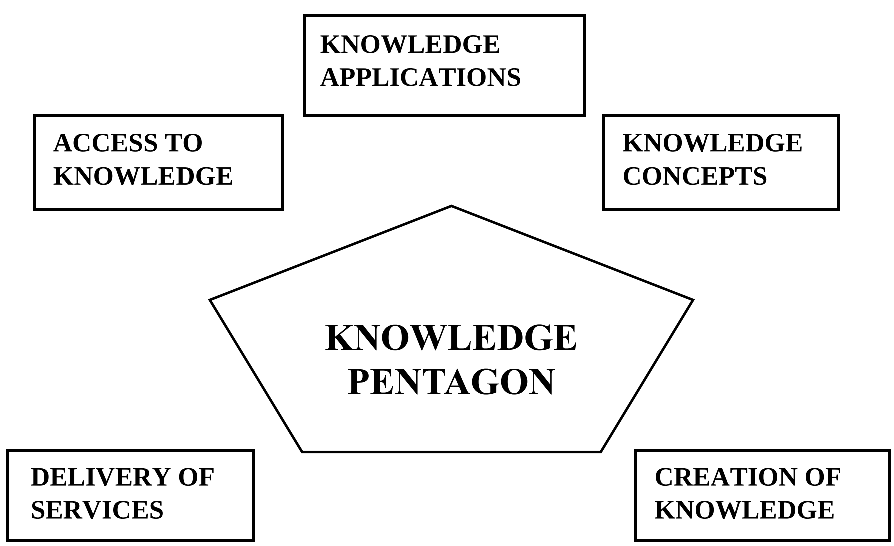
The present study has tried to touch upon two major paradigm shifts across the world. First is the shift to knowledge economy and second is the shift to intangibles. The research tries to bring together intellectual capital (intangible aspect) of universities (knowledge aspect) and explore how it affects performance. Higher education across the globe is under the radar of constantly depleting resources. This has engendered into movements like measuring performance of universities strategically, developing performance indicators and triple helix.

According to Bano and Taylor (2015) the preparedness to utilize intellectual capital and political will of governments to handle the shifts in education sector is much stronger in developed economies than the developing ones. Developed economies are well equipped with the infrastructure and the required human capital. On the contrary developing countries are groping in the dark, still accumulating the pre requisite human and social capital needed to create, manage and disseminate knowledge. Hence it is timely and relevant to investigate the role of universities in supporting a quality higher education sector in context to a developing economy.

University performance and its importance in a knowledge economy is poorly understood for developing economies. Also whatever negligible studies are available, are hardly based on empirical evidence. Universities are reciprocating to the emerging needs of a KBE by focusing on knowledge based transactions. Against the backdrop of these changes, even the governments across the world have shifted their focus on improving the performance of universities. Present research builds upon the same and explores the influence of intellectual capital on university performance.

Universities have started recognizing the importance of having a stakeholder focus, whether in the form of industry academia interface and network or focusing on students and faculty who constitute the internal customers of universities. This has resulted in a paradigm shift in the stakeholders‟ perceptions about their interests in the education sector today. This has been clearly substantiated through studies (Bontis, 1998; Ferrer & Morris, 2013; Pick *et al*., 2012) but so far this aspect has not received the kind of attention it deserves, in the Indian scenario. Present study tries to address this gap and pave the way for policy makers in the Indian higher education sector to strategize around stakeholder demands by proposing a practically applicable model.

When we talk of knowledge economy in context to India, the report issued by the National Knowledge Commission (NKC), 2009 deserves a special mention. The NKC was set up with the larger objective in mind to address the concerns of the entire knowledge spectrum and create a roadmap to reform the knowledge sector. By setting up the commission, the Indian government showcased its political will to transform India into a global knowledge hub. The 12th Five Year Plan also significantly stresses on higher education as a central mechanism for achieving expansion, excellence and equity. Recommendations given by the commission were based on the framework given below. The five major thrust areas which formed the knowledge pentagon: **Access to knowledge, Knowledge concepts, Creation of knowledge, Knowledge applications, Delivery of services** are depicted in Figure 1.3.



Source: National Knowledge Commission, Report to the Nation (2006-2009)

Present study focuses on the second pillar: "Knowledge Concepts." Knowledge concepts referred to institutions where knowledge is generated, organized and disseminated and one of the focus areas of the Commission was to revamp these institutions. It comprises 'School education', 'Vocational Education and Training', 'Higher Education', 'More students in Maths and Science', 'Professional Education', 'More Quality Ph.ds' and 'Open and Distance Education and Open Educational Resources'. Present study focuses on the "Higher Education" component. In this manner the present research is inspired from an important government policy document which aims at turning India into a global knowledge hub.

The study is inspired by another major policy document which is Higher Education scenario in India, also termed as Vision 2030. The report was issued by the higher education committee FICCI in the year 2013. The vision is futuristic and looks forward to establishing India, as a globally economic power with a high quality education sector as its underpinning. The report looks at what we can be, by the year 2030. It is in tandem with the 12^{th} five year plan and proposes an excellent roadmap to achieve the vision. The report proposes two important frameworks: the levers of higher education that are the major areas of focus and the framework of imperatives that need to be delivered upon. The current study encompasses both the frameworks and explores the effect of university intellectual capital on its performance. The first framework which is depicted by Figure 1.1 which shows the major areas where innovative and transformational interventions would be required, are ones that taken together, form the research framework of intellectual capital in the present study. While 'Faculty' and 'Research' aspects are covered under human capital, 'Infrastructure' comes under organizational capital and 'Partnerships' is covered under the third dimension of intellectual capital which is relational. The next important framework is depicted in figure 1.2 which shows the three main objectives to be achieved by the higher education sector in future. They are 'Economic', 'Social' and 'Intellectual'. The present study caters to the third imperative that is 'Intellectual'. Intellectual imperative stresses on two major areas: 'Excellence' and 'Research'. While excellence is covered majorly by the construct of performance, research emerges as a significant part of human capital. Therefore, the results of this investigation provide immensely important and practical insights to planners in the education sector. The study puts forward an empirically tested model thus bringing out the significant role played by intellectual capital of universities in delivering on the 'intellectual Imperatives' of India's higher education system envisaged in vision 2030 report. Hence it can be said that the theoretical construct of 'Intellectual imperative' put forth by the report has found practical applicability through this work of research. Thus the present study holds immense relevance and applicability in the current scenario, not only for India but also most of the developing economies throughout the world.

1.8 Objectives of the study

Following are the broad objectives of the present study:

- To study the relationship between Human Capital and Organizational Performance.
- To study the relationship between Organizational Capital and Organizational Performance.
- To study the relationship between Relational capital and Organizational Performance.
- To identify the predictors of Organizational Performance.
- To study the difference in Human, Organizational and Relational Capital and organizational performance of private, state and central universities.

1.9 Concluding remarks

Knowledge economy and global competitiveness have become synonymous to each other in the current scenario. In context to higher education, universities are largely those institutions where knowledge creation, dissemination and transfer takes place thus making them central to acknowledge based economy. The transformation in India's higher education sector is a success story worthy of emulation by developing economies around the world. Moreover the political will of the Indian government to turn India into a knowledge economy further magnifies the role and importance of the higher education sector. Against this backdrop, this is an endeavor to examine the role of university intellectual capital in enhancing performance. Thus, the study provides an empirically tested model for planners in the higher education sector to enable them strategize around intellectual capital in order to enhance university performance and become an active catalyst in creating a knowledge based economy.

CHAPTER 2

REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

It is important to examine the available literature for research as it enables the researcher to get a relevant and appropriate perspective towards the subject and also helps to remove the bottlenecks of the previous works of research. Therefore, development and execution of any research study must be backed by an exhaustive literature review. Some more reasons in favor of a comprehensive literature review are as follows:

1. Enables the researcher to get acquainted with the previous work done.
2. Abbreviates the likelihood of replication of work.
3. Provides enough information on the research techniques and methods that can be used.

Seven sections have been framed in this chapter for organizing the literature review which has been done on the basis of the earlier studies carried out:

2.1 University education: Indian and Global scenario

2.2 Intellectual capital

2.3 Human capital

2.4 Organizational capital

2.5 Relational capital

2.6 Organizational performance

2.7 Human, organizational, relational capital and performance of private, central and state universities.

2.8 Hypotheses development

2.9 Concluding remarks

Section 2.1 covers the review of literature on the Indian and global scenario of university education. Section 2.2 reports the review on intellectual capital. The next three sections, 2.3, 2.4

and 2.5 cover the previous works done on the intellectual capital dimensions. Section 2.6 focuses on the literature pertaining to organizational performance. Section 2.7 explores literature on the three aspects of intellectual capital and performance in context to the three categories of universities covered for the study. While section2.8 focuses on developing hypotheses on the basis of literature review, the last section 2.9 ends with the concluding remarks.

It is apparent from the literature review that although intellectual capital has been an area of wide interest and overwhelming research is available on the same, but studies on intellectual capital and university performance seems to be a comparatively novel domain for research. Also there are several studies which have established the relation between intellectual capital and organizational performance, but have not tested the relationship empirically. Moreover, relation of the individual dimensions with organizational performance has not received much attention. Also there are very few studies on intellectual capital and university performance pertaining to India. Hence this provides a fertile ground for further research.

2.1 University education: Global and Indian scenario

Indian economy is witnessing a huge upsurge in the knowledge sector since the last two decades. It is indispensable to seize the opportunity and make sure that India is able to leverage its huge demographic advantage. For this, it is important to continuously churn out skilled manpower at an accelerated pace (Kaul, 2006). In the study, the author touched upon the salient features of the current system of universities in India. Emphasis was given to the role of internet and communication technology which has changed the face of university education in India. From pedagogical methods to student learning, from administrative procedures to research output, every facet of university education has been affected by information technology. Another domain that was covered was the changing strategy of universities in attracting students. Universities these days are pursuing students and making use of various strategies to market their courses. This highlights a major shift in the functioning of universities. Students these days are customers/clients and universities are service providers. The study also suggested a roadmap through some mechanisms to overcome the challenges of an emerging knowledge economy. Non reliance on government for funds and resources was one of the important suggestions of the research. The author also suggested recourse to higher education by permitting foreign universities to start extension campuses in India. Another important aspect that the research focused on was the infrastructure.

Building on the lines of globalization, researchers brought out a few interesting and salient features that have emerged as the current earmarks of university education scenario across the world. They are “new managerialism”, “academic capitalism” and “entrepreneurship in universities”. The latter two exhaustively feature in many contemporary researches. Researchers (Deem, 2001; Gumport, 2000; Rhoades &Slaughter, 2004)opined that universities should reprioritize their functioning in context to the economic role that they can play in community development. They further suggested that universities should replicate the success of the private sector by subjecting themselves to increased involvement in entrepreneurial ventures and higher levels of public accountability. All the three concepts were drawn on the basis of economic versions of globalization. At the same time, Gumport (2000) also had reservations regarding these academic restructuring processes. A critical analysis of “academic capitalism” and “entrepreneurial universities” was done by Deem (2001) and it was suggested that in search for confluence in universities across countries, the local variables affecting higher education like culture and values, social factors and economic factors should not go under- emphasized. Moreover it was said that free organizational imperatives have the potential to go unfettered irrespective of their long legacy as social institutions. Hence it was proposed that universities need to make sure that pressures to respond to economic exigencies should not end up in losing the historical character of a university.

Taking forward the argument on knowledge economy and globalization, authors (Altbach, 2004; Kapur & Crowley, 2008) tried to bring out the present situation of universities due to globalization. The opined that globalization affects universities and academics differently in different countries, especially the developing countries. Many other facets of globalization and higher education were brought out in the study like the role of English as the most widely used language of higher education even in countries where English is not the main language. Another factor that got attention was the global marketplace for students and research scholars. This is in the wake of globalization and the resultant free flow of faculty, students and scholars across countries. Another important factor that emerged in the study was multi- nationalization of higher education in forms like “twinning” programs which involve linking universities in countries with counterparts in others and cross-border inter university ventures which jointly offer the degree and aid in developing new curriculum with the seal of approval of a foreign university. This also brought out significant repercussions of globalization on higher education in the form of international agreements and frameworks like the Bologna framework, European Community Action Scheme for the Mobility of University Students (ERASMUS), General Agreement on Trade in Services (GATS) and Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The author suggested that we need to understand the nuances of a modern globalized Knowledge based economy to identify the inequalities and then create an academic environment to remove them.

When it comes to a KBE and present scenario of universities, research output and research activity deserves a special mention. Altbach, (2013) shared that in developing economies; research is placed at the apex of the academic and intellectual pyramid. Good quality research is indispensable for the successful functioning of any KBE. The importance of research in the current scenario is substantiated by the fact that universities find a place in the global rankings greatly on the basis of research output. Previous works have suggested that research based universities are an immensely important vehicle for developing countries for not just joining the global knowledge society but also competing effectively. Therefore these universities ought to understand the nuances of research. Not only this, they also need to fathom the complex issues that come along, like issues of mobility, use of technology and collaboration.

A more generic study on knowledge economy with reference to the role of universities in the developing economy of Pakistan was undertaken by Bano and Taylor (2015). The study tried to capture the perceptions of decision makers and academic staff at universities and examined how the process of transformation to a KBE is viewed in the higher education sector. The study was more holistic and generic in the sense that it brought school, secondary and higher education together under one roof. The framework proposed by the study, highlighted that the ability to think critically at school and community level permeates further at the college level, which subsequently leads to knowledge transfer at university level. It emphasized the interconnection of the three: primary, secondary and tertiary and suggested that the benefits of a knowledge economy can only be reaped if such integration across the value chain is implemented.

An ongoing cause of concern in university education particularly in developed countries is the student progress towards graduation. This scenario is quite interesting and different from that of developing countries which are still grappling with the major issue of enrolment numbers. This has been highlighted in a study conducted by Heyneman (2012). The study collected secondary data across countries, compared the graduation rates and tried to identify the reasons why graduation rates differ substantially from the enrolment numbers. The study also brought out that graduation rates substantially differ across countries. On the basis of literature review, the major reasons behind different graduation rates across countries highlighted were, difference in the higher education structure: unitary, binary and diversified, difference in the flexibility to choose and change specializations, and students' intention to attend higher education. The study also gave certain recommendations like altering the examination systems, increasing the universities' autonomy to select students as per their assessment and adopting the salient features of a for-profit institution to increase accountability of performance.

Talking of the Indian scenario of higher education and universities, exhaustive study has been carried out by researchers (Altbach, 2004; Hill & Chalaux, 2011; Singh, 2011)bringing out the current challenges that India has to face, in spite of being the provider of the world's largest global talent pool. By 2030, one out of every four students who has completed graduation will be the outcome of the Indian education system. The authors opined that although good work has been done as far as capacity is concerned but "excellence" is one such area where India still needs to go a long way. It was highlighted that India has a huge demographic dividend in terms of a large population of young people who could, if properly educated lead the economic growth. Private sector was considered as an important part of higher education. "Excellence" was addressed as a very selective concept in the study to showcase that the higher education system in India is a sea of mediocrity with islands of excellence, with universities being the mediocre aspect and a selected few standalone institutions being the excellence aspects. Efforts should be made in doing away with micro managing and granting autonomy so that innovation and diversity can be induced. Increasing the number of quality assessments to which universities would be subjected to, will help achieve the objective of excellence. Moreover it was suggested that there has to be a fundamental change in the overall purpose of higher education and the contribution of universities in today's globalized world. Altbach (2004) suggested that it was high time to create a new wave of building institutions based on high quality research, state-of-the-art decision support systems and cultivating strong relationships with other universities in the country and across the world.

Yeravdekar and Tiwari (2014) highlighted that Indian higher education sector is also a contributory force towards capacity building in regions of the Asian continent and apart from that even in regions of Africa. India's golden legacy as a seat of high quality learning and inter country mobility of human resource among these regions enables India to come across as a hospitable country with a high quality education sector. This is further supported by the fact that in India the popularity of English is not just confined to communication but also extends to medium of instruction. Moreover, the low cost of living goes a long way in portraying India as the perfect destination for higher education. Increasing share of the private sector as far as higher education is concerned is an encouraging development in the wake of reduced government funding. Increasing use of technology, enhanced enrolments and fundamental policy reforms on part of the government describe the current university system of India. Researchers opined that moving on the same lines, there is ample opportunity for India to scale ahead in the value chain of the global KBE.

2.2 Intellectual capital

A path breaking study on intellectual capital was conducted by Bontis (1998) to explore and develop measures and model of the construct. The research was undertaken in the form of a pilot study and principal component analysis was undertaken to identify the items of the construct and narrow them down to latent factors. Further partial least square method was used to maximize the explanation variance and three first order variables that were identified were human, structural and customer capital. Intellectual capital was identified as the second order variable. The study was undertaken to come up with measures and models to quantify intellectual capital in organizations, because authors religiously opined that managing intellect is the cornerstone of value generation in KBEs. The study gave certain recommendations to be able to leverage and manage intellectual capital in business to their advantage. They were: conducting regular intellectual capital audits in organizations, making knowledge management practices a prerequisite for employees, clearly defining the role of knowledge in organizations, formally creating a designation in organizations to handle management of intellectual capital, making extensive utilization of information technology and tools to facilitate sharing and exchange of knowledge and coming out with an annual report which contains all the information and details about the intellectual capital assets of the organization.

Bontis *et al.*, (2000) explored the 3 dimensions which constitute intellectual capital and the relationship among them for two different Malaysian industries. The study which was based on a survey administered by a psychometric questionnaire designed in his previous studies, concluded that human capital is indispensable for every industry whether knowledge based, manufacturing based or service based, but the magnitude of its influence is bigger in non-service industries than service industries. Moreover it was suggested that the three dimensions are interrelated to each other. Finally, making use of partial least square method, the hypothesized model was proposed. It was revealed that apart from the relationship between human capital and structural capital, all other relationships came out to be significant.

A study based on literature review was undertaken as a sequel to the studies mentioned above by Bontis (2001) to assess the models related to intellectual capital proposed in the previous studies. A number of models emerged and researchers highlighted the strengths and weaknesses of all of them. Models that came up in the study were the Skandia Navigator model, the IC-Index model, the Technology Broker model, the Intangible Asset Monitor model and the EVA (Economic value added) model. The Skandia navigator model was one of the first efforts by any organization to come out with an added addendum on intangible assets along with the tangibles viz.intellectual capital. Intellectual capital was referred to as the aggregate of human capital and structural capital. Also customer capital was seen as a part of structural capital. But the model was criticized for the measures and metrics used to explain intellectual capital and critics suggested that the same measures and metrics can’t be generalized for all organizations and they need to be customized. IC-Index model was developed as a more context specific measure of intellectual capital and thus its universality could be questioned. Technology broker model proposed that intellectual capital was the sum of market assets, human assets, intellectual property assets and infrastructural assets. Proponents of the model said that the value of intellectual capital of an organization depends upon its objectives and current condition of the market and hence it differs across organizations and across time periods. Intangible asset monitor model was a conceptual framework based on three components namely external structure, internal structure and individual competence. It was further proposed that while external structure is directed towards outsiders and shareholders, the internal structure should be oriented towards the management. All in all, the author opined that the various models are using more or less the same concepts but with different nomenclatures. At the same time these models were based on perceptual measures and not empirically tested. Hence the present study focusses on the empirically tested model by Bontis (1998).

According to Value Added Intellectual Coefficient (VAIC) model, originally proposed and empirically tested by Pulic (2004), intellectual capital comprises of human and structural capital, and an appropriate measure of business success is value added. Moreover it proposed intellectual capital efficiency as the sum of human capital efficiency coefficient and structural capital efficiency coefficient. This aggregated value indicated the intellectual ability of the firm. VAIC indicated the value generated per monetary variable invested in each resource. Majority studies have used the VAIC method to study intellectual capital (Clarke *et al*., 2011; Pulic, 2004; Vishnu & Gupta, 2014). Although celebrated, the VAIC model fails to address the social reciprocation aspect of intellectual capital. The present study modifies the VAIC model and expands it to include the three dimensions of IC- human, organizational and relational.

Vishnu and Gupta (2014) adopted the original VAIC model and extended it further. Data from 22 pharmaceutical companies was collected for the investigation. The two dependent variables were return on assets and return on sales. The original VAIC model was extended with the objective of studying the relationship between intellectual capital and firm performance. Results confirmed that although intellectual capital and performance were positively related, the newly included variable, relational capital did not demonstrate any substantially significant relationship with performance. Present study refutes these findings and empirically establishes the positive association between relational capital and performance.

Firer and Stainbank (2012) also examined the relation between intellectual capital and organizational performance using the original VAIC model. The study investigated the construct of organizational performance under three dimensions of profitability, productivity and market valuation. Respondents were 65 South African publicly listed companies which were into knowledge based business sectors. It was hypothesized that intellectual capital is positively related to organizational performance. Profitability, productivity and market valuation were also the major constructs of the study. Asset turnover ratio, return on assets and market capitalization to book value of assets were taken as the three dependent variables. Hypothesis was tested using correlation and multiple regression analysis. Final dataset consisted of 130 companies. 65 out of these were eligible to be included in the high knowledge-based group. Linear multiple regression indicated explanatory power of intellectual capital with respect to productivity and profitability, while no explanatory power with respect to market valuation. The relation with respect to profitability was positive while it was negative in case of productivity.

Along with the development of models and measures of intellectual capital, research was simultaneously being undertaken on the significance of reporting and managing intellectual capital and performance, particularly in context to the emerging knowledge era. Few studies identified knowledge management as moderators (Corcoles *et al*., 2011; Ling, 2011; Mondal & Ghosh2012; Veltri & Bronzetti, 2015).

Chu *et al*., (2006) explored the relation of intellectual capital with organizational performance for Industrial Technology Research Institute (ITRI), a no-profit national research and development organization started in 1973. The study adopted the indices developed by the Austrian Research Centre and implemented the same for ITRI by proposing an intellectual capital reporting framework. The study aimed to recognize the importance of reporting intellectual capital in value generation of the organization and consequently its competitiveness. In-depth interviews were conducted in order to understand the vision, mechanism of functioning and change processes at ITRI. Secondary data was extracted from annual reports and ITRI 30 year special project. Results came out in the form of The ITRI Intellectual Capital report. Turnover rate provided inputs for human capital. Additionally, R&D personnel to total personnel indicated the degree of vitality/ sluggishness as far as research and development was concerned.

Non –Government project incomes were considered as a substitute for structural capital. Lesser value indicated dependence on the state for funds, consequently a lesser competitive power. Relational capital was measured through the number of seminars and commissioned projects. The results were expressed through four aspects of finance oriented, economic oriented, research oriented and social oriented.

On similar lines, Kamukama (2013) explored the relationship between the individual dimensions of intellectual capital and their contribution towards competitive advantage of an organization. The study was conducted in the microfinance industry of Uganda, Africa. Sample consisted of 78 registered microfinance companies. Competitive advantage was measured on the basis of the Dynamic Capabilities Theory. Hierarchical regression technique was deployed to identify in order, the importance of the three elements towards firm competitive advantage. It was found that all the elements are significant predictors of competitive advantage but in order of importance, it was structural, human and relational capital.

Isaac *et al*., (2010) proposed a model for managing intellectual capital in organizations. Structural equation modeling was used to explore the favorableness of "organic renewal environments", "interactive behaviors" and "trust" towards intellectual capital management process. The study proposed that a suitable environment has to be created within the organization to stimulate intellectual capital. The researchers opined that "organic renewal structure" within organizations results in "interactive behavior" among employees, leading to "trust" and finally resulting in an environment of intellectual capital. The inter-relations among these three variables were also studied. Organic renewal, interactive behavior and trust were the enablers. Various sample items were chosen from varied industries and different hierarchical levels. Two distinct models tested were aggregated and disaggregated intellectual capital. The study also tested the sequence of the two enabler variables of interactive behavior and trust before proposing the final model.

Management of intellectual capital was proposed as an important approach of strategic management in universities. Authors (Canibano & Sanchez, 2009; Safieddine *et al*., 2009) highlighted that the increasing importance of transparency and accountability is changing the landscape of strategies used to manage universities. They proposed the use of new age practices directed at efficiency, effectiveness and excellence, as opposed to the traditional ones that have been used till now to govern universities. These include practices like corporate governance, transparency and flexibility to respond to the challenges. These studies proposed that intellectual capital is deeply related to these new age practices and concluded that it is indeed a value driving asset today. On similar lines, a conceptual research (Elena-Perez *et al*., 2011) proposed a study of Romanian universities. Major constructs of the study included foresight for vision building, intellectual capital, strategic management and higher education. The study focused on the combined utilization of foresight and intellectual capital and proposed that this combination can provide effective response to the challenges of the rapidly changing environment. The study was a part of a project on "Quality and Leadership in higher education" funded by European Structural Funds. As part of the project, a framework was proposed in order to map and differentiate universities by making use of intellectual capital approaches.

Ahmadi *et al*., (2012) tried to investigate the influence of measuring and reporting intellectual capital in promoting competitiveness of universities. The research method used was a descriptive-survey method. The independent variable in the study was measuring and reporting intellectual capital in universities and dependent variable was competitive advantage of universities. The sample consisted of 139 education authorities. Questionnaire validity and reliability was confirmed using Cronbach alpha test. Statistical tests for estimating the community average(t-test), test of normality of errors, one way ANOVA test and LSD multiple comparison test was used. The hypothesis was accepted at five per cent level of significance.

Taking literature support from the previous studies, we can predict that intellectual capital has a substantial influence on performance of organizations. Also the previous model and measures used in the available literature suggests that intellectual capital has three dimensions: human, organizational and relational capital.

2.3 Human capital

In his breakthrough research on intellectual capital, Bontis (1998) opined that employees of every organization possess tacit knowledge which serves as an input in the process of producing tangible and informational outputs and to what extent this tacit knowledge contributes to the output is determined by its quality of human capital. Author was also of the view that out of the three, human is the most difficult to quantify and measure. Studying the association between human capital and organizational performance for the non-profit sector was a novel attempt by researchers (Carmeli, 2004). It was hypothesized that human capital has a positive association with monetary performance. The study was conducted for local government authorities in Israel. Respondents were chosen from 263 government organizations and financial ratios were used to measure performance. While human capital was measured through a four dimensional scale that included variables like education, experience, competence and value and uniqueness, three control variables of size, type and perceived environmental uncertainty were also introduced into the equation. Stepwise regression analysis was carried out and findings revealed that the hypothesis was supported. Moreover when human capital was introduced in the equation, it explained additional variance in performance of the organization after the three control variables had been accounted for. Research has also shown that human capital strongly influences organizational performance where cognitive ability of managers acts as a facilitator (Felicio *et al*., 2014).

Apart from organizational performance, human capital not only acts as a catalyst in the growth of nations but also contributes majorly in explaining cross country productivity differences (Barro, 1991; Goldin, 2001). Even in context to India, there has been empirical evidence of the importance of human capital in facilitating the process of a country's growth (Banerjee & Roy, 2014). An improved growth accounting framework was used to analyze India's technological progress and trade over time, and data was collected for a period of 60 years from 1950-2010. Human capital was measured using the Mincerian theory where average years of schooling above 25 years were taken as the measure of human capital. Further, the autoregressive distributed lag (ARDL) based tests were used to extract variables which fuel productivity. Outcomes revealed that out of human capital, trade and technological progress, human capital emerged as the strongest factor in explaining the country's long term growth.

Innovation in any organization in the given knowledge era is to a great extent determined by how successfully the available knowledge assets are being exploited. This premise inspired a study which hypothesized that human capital is that one knowledge based asset which strongly influences the ability to innovate in an organization. Other assets which emerged important were organizational learning and external network resources. Using a two group comparison technique, data from a total of 169 companies was analyzed from the hardware and software industry of Taiwan. Partial least square method was used to propose the theorized model which suggested that human capital, organizational learning and network resource are the three knowledge assets which have a positive association with organizational innovativeness and moreover they are also associated with each other (Hsu, 2008).

Research was carried on similar lines but against the backdrop of the education sector. Researchers (Ang *et al*., 2011) hypothesized that both, primary education as well as secondary education is conducive to emulation, while higher education supports innovation. The total sample consisted of 87 countries, classified as high, middle and low income. Human capital was conceptualized as a combination of the average number of years of primary, secondary and tertiary education after 15 years of age, number of years of education of skilled and unskilled population and percentage of population more than 14 years which comes under all three categories. The study collected data from a period of 1970-2004. Results showed that higher education contributes to growth, but the effects increase with proximity to technology and this was applicable only for medium and higher income countries.

Human capital was directly studied in relation to the energy consumption patterns in China. Though it seemed that improvement in human capital will increase energy consumption through the increased income levels but the results were counterintuitive in the sense that enhanced human capital led to decrease in the levels of energy consumption. The study brought out two aspects of the construct of human capital. Firstly human capital also has the capacity to contribute to economic parameters of growth and secondly enhanced human capital enables people to resort to energy efficient techniques thus reducing energy consumption while increasing energy conservation. Provincial data was collected for a period of 20 years. Major variables involved in the study were 'energy consumption per capita', 'real output per capita', 'real capital stock per capita' and 'human capital'. Data regarding all the variables were procured from secondary sources. ADRL was used to model the proposed relationship since it is the best for a single equation time-series set up (Salim *et al*., 2017).

In context to research universities and human capital, extensive study has been done by researchers. All studies conclude that a strategic approach to increase a university's research performance is having strong human capital policies in place. From providing adequate support for quality research in terms of adequate funding and granting autonomy, to recognizing institutional researchers as the knowledge base of universities; from having policies to facilitate and motivate researchers, to fostering strong leadership in order to generate inter disciplinarily research, all these studies brought out the importance of research in universities and the facilitating role of conducive human capital policies. Study on teacher's perception about themselves, carried out in Turkey and Ireland on a sample of 345 teachers highlighted, that teachers across both countries considered themselves as leaders and not just knowledge transmitters (Nayir & Cinkir, 2017; Nguyen, 2016; Teodorescu, 2006; Townsend *et al*., 2015).

Researchers explored the role played by research based universities in building a knowledge economy and driving globalization and particular emphasis has been given to developing economies. Studies (Huang, 2015; Postiglione, 2013; Postiglione, 2015; Postiglione & Arimoto, 2015) examined the journey of universities of Hong Kong in particular and Asia in general from being mediocre to highly reputed research based universities and the role played by the appropriate network arrangement, structural institutional system and brain circulation in crafting out quality human capital composition at universities. The research was substantiated with the help of a case study from Hong Kong University of Science and Technology (HKUST). The case highlighted that how from being a new research based university HKUST came in the top league within a short span of ten years. Role of quality human capital, networking, collaboration and internationalization was brought out thus supporting the initial premise that research universities drive globalization and knowledge economies. The studies highlighted how Asian universities have started finding a place for themselves in the list of world class universities since the last few decades.

With the emerging concept of academic capitalism, quality of work life at universities and new forms of governance are fast becoming ways to retain and engage talented people (Bontis, 1998). This supports the view that just like any other service sector where employee satisfaction is a prerequisite to delivering customer satisfaction, if universities want to engage their faculty, they need to focus on quality of work life and provide perks, incentives and other benefits to them. Referring in particular to Australian universities, a study was undertaken to bring out the changes that are coming about in governing and managing universities. Corporate approaches are being used in the wake of changing requirements to make universities more accountable, transparent and business like. It was brought out that while on one hand universities are cutting down on excess academic staff, re-engineering the course structure and adding more contractual positions to reduce costs, on the other hand they are also resorting to retain competent academics by giving them discretions in matters of academic planning, shared vision, focusing on work life of academics and an overall consultative and a participative model of university planning (Kenny, 2009).

Taking the same premise of academic capitalism, the idea was reverberated by Ferrer and Morris (2013) in a study which proved that work engagement also holds significance in university settings. Elite and non- elite were the two categories of universities studied. Work engagement was taken as the mediating variable between intentions to quit and commitment. This shows that employee turnover is a matter of concern not only in corporates but also in a traditionally non-profit setting like a university. A total of 664 responses were solicited. Scales used were taken from previous studies. The study made use of SEM analysis in order to confirm the hypothesized model and bring out work engagement as a mediator. Findings revealed that work engagement was partially mediating the relationship in case of non-elite universities. No such observation was made in respect to elite universities thus highlighting the point that one size fits all approach doesn't work even in an academic set up. Research has also been done in the Indian context to study the influence of industry and gender on job satisfaction, work commitment and intent to switch organization. Industry was categorized into IT and ITES while the second categorization consisted of males and females. Correlation was used to study the relation between job satisfaction, commitment and turnover intent while stepwise regression was carried out to study their relation by introducing one variable at a time. Results revealed that out of the two, the IT category was suffering from higher job dissatisfaction as well as higher turnover intent. While in the gender category, males displayed better satisfaction at job with low intentions of turnover as compared to females (Kanwar *et al*., 2012; Pandey & Kaur, 2011).

Diversity at workplace not just opens up people to different possibilities but is an extremely important source of enhancing creativity and encouraging out of the box thinking. At the heart of a diverse workforce, lies the key to enriching human capital. Studies have been made on various facets of workforce diversity. Taking the reference of the Equal Employment Opportunity Act

1986 of the Australian government, a study by Amano(1997) tried to investigate the inclusion of women into higher education in Japan. The author opined that despite a change in women aspirations as far as education is concerned, the gender track still continues. In the process, the study addressed certain aspects of inclusion of women into higher education like why women enter college, intention and motive behind women's selection of career as compared to men, employment opportunity and the extent of equality involved and women's involvement in higher education sector in a post-industrialized society.

A case study based research was conducted by Dobele *et al.*, (2014) with respect to Australian universities regarding the concept of glass ceiling which women are traditionally not able to break. The study brought out that the glass ceiling has been broken, but unfortunately in context to workload and not remuneration or status. Data was collected from secondary sources like academic and university web-sites, course files and faculty recruitment records. Variables included in the research were number of subjects coordinated by teachers, number of students enrolled, points earned on the basis of authorship for various publications and research funding. T-test and ANOVA techniques compared and interpreted group variance to enable a comparison between workload and gender. Results revealed that although gender equity as far as work load is concerned has improved, but there is a lot to be done as far as salary and status are concerned. It was highlighted that women were still not being hired for higher positions at universities. Baker (2016) had similar views from the research which was carried out for Canada and New Zealand with same results. Moreover study conducted in the informal sectors of the Indian state of Uttar Pradesh brings out the same results. This shows a lopsided utilization of human capital across the world, across industries and across sectors, both formal and informal (Geetika *et al.*, 2011; Nath, 2014).

A study based on a survey was conducted to apprehend the perceptions of academic staff on factors and activities of outreach and faculty engagement and the participation of faculty in such programs. To understand the disciplinary variation, ANOVA was conducted. 436 faculty responded and results provided useful insights on why faculty participate in a particular type of engagement program. How does discipline of the faculty affect the choice of a program? New patterns of engagement emerged in context to demographic factors like gender, race and status (Demb & Wade, 2012).

Faculty commitment is an in dispensable element when we talk of striving universities in particular. A study conducted on Esperanza University U.S.A, brought out that the desire to join tier one league of universities and in the process, securing commitment of faculty for the same, was having negative results because of the excess pressures induced by the lack of work life balance, unshared vision, lesser autonomy and a presence of constant scrutiny. Data was collected through formal and informal interviews with faculty. Moreover electronic survey was administered and 180 responses were solicited. It was found that the pressures to perform more with less resources, scarcity of work life and personal life balance and too much micro managing was producing rather unfavorable results in the form of lower organizational commitment (Gonzales *et al*., 2014). Moreover previously mentioned study (Kanwar *et al*., 2012) highlighted that delegating more responsibility goes a long way in motivating employees and securing their commitment as compared to monetary incentives.

Another survey brought out that job characteristics like responsibility, opportunity for growth and social exchanges between faculty members have a direct influence on their organizational commitment and organizational citizenship behavior. A total of 4550 responses were collected. Key constructs of the study were organizational commitment (OC) and organizational citizenship behavior (OCB). Items of job characteristics, OC and OCB were taken from previous studies. Logistic regression was applied to study relationship among the variables (Lawrence *et al*., 2012).

2.4 Organizational capital

It refers to the organization structures, systems and processes that enable it to exploit the human capital. Adapting appropriate organizational structure and processes is a gradual and a long term process but often leads to transformation and reorientation of organizations. It is the supportive infrastructure that enables human capital to function, which includes the organization's image, +information system and proprietary databases. These techniques, procedures and programs help to enhance the delivery of goods and services. They also include protected commercial rights like copyrights and trademarks. How successfully an organization manages and utilizes its information determines its performance (Prescott & Visscher, 1980).

A study was undertaken on one small aspect of organizational capital which is awareness of computer technology and it was shown to have a mediating effect on students' learning outcome in higher education setting. As proponents of information technology, Kuh and Vesper (2001) opined that awareness about information technology and computers leads to acquisition of desired skills among students like grasping capacity, thinking critically and logically, conception of ideas and working effectively in teams. In all, there were 23 such gain items. More than 125000 students across universities and colleges took the survey. Respondents were categorized in two groups: high gainers and low gainers. Two variables: ALLGAIN and LEARN were created to denote the extent of gain where ALLGAIN variable comprised of the sum of all the 23 gain items while LEARN comprised of the sum of 7 gain items which were the essential foundation items. The two groups were compared using T test and ANOVA. Later multiple regression models were used to study the influence that each gain item had on overall indicator of gains.

An exceedingly important research question related to organizational capital in higher educational settings was pursued that 'what are the driving factors behind a model of collaboration' and the process of its implementation. Through a case based study, Kezar (2005) tried to explore the establishment of a collaborative learning environment in a university. By creating learning communities and promoting community based learning, the study investigated the whole process of initiating a collaboration based learning environment in a higher educational set up. 30 universities nominated by the American Association for Higher Education participated in a survey. Apart from questionnaire survey, institutional members were contacted for in depth interview. A three stage model emerged covering commitment building in the first stage, followed by senior management's support and the final stage was developing and sustaining requisite structures, systems and processes.

In one of the studies on organizational capital, Kokhuis (2006) highlighted the importance of institutional infrastructure in the process of discussing the important elements of the process of internationalization in higher education. Kokhuis (2006) supported that institutional infrastructure has a big contribution in the process of internationalization.

Kohli and Devraj (2004) used longitudinal data from healthcare organizations to assess the role played by institutional decision support system in an organizations' performance. The study brought out some important indicators of a decision support system (DSS) in an organization. These included: ease of use, usefulness and attitude towards DSS. Very few cases of institutional decision support systems have been cited in literature. Because the impact of DSS is evident after a time lag, hence longitudinal data across 3 years was used for the study. Least square regression analysis was applied and results indicated that actual usage of decision support systems were positively associated with the reimbursement rates of services. Reimbursement rate of services had been taken as a variable representing organizational performance. Coates *et al*., (2005) carried out a similar research in a university setting to show the effect of learning management systems on teaching and learning.

Another study that combined the Indian and Spanish university system in context to structural capital was conducted to examine the benefits of e-learning, given the exponential increase in the usage of information and communication technology in Indian and Spanish universities. Many important issues were addressed like use of computer technology, cultural imperatives, implementing e-learning strategy, bottlenecks in the implementation and the impact of information and communication technology (ICT) on behavior of academic staff. Against the backdrop of organizational culture and behavior, the study established the process of implementing ICT (Suri, 2005).

Continuing with the Indian context, Doctor (2008) discussed a study based on survey and the pilot implementation of an academic repository at a business school in India. The study highlighted the significance of capturing intellectual capital in higher education institutions in India through the use of digital repositories that collect, analyze, retrieve and share intellectual capital of academicians and research scholars like their research publications and teaching material. Data was collected through questionnaire to measure the usage of digital repository by faculty members. The findings indicated that the faculty members in B-schools irrespective of their academic areas and teaching domains, made use of digital institutional repository for academic purposes. The findings also indicated that a positive culture of sharing knowledge coupled with a keen attitude towards using the digital repository also existed in the institution. Also implementation of the pilot institutional repository highlighted the increasing importance of institutional intellectual capital. It has also been brought out in the Indian context by Dharni *et al.*, (2009) that the usage of technology based information systems in the Indian manufacturing sector varies across functional disciplines and across different levels of management. IT and finance managers were found making the maximum usage of computer based information systems (CBIS) followed by production and human resource managers. Among the managerial levels, CBIS tended to be the most popular in the roles involving decision making as compared to interpersonal and informational roles.

There is rich literature covering the extent of awareness with reference to web-based information and usage of new generation web technology in libraries of Indian universities. The objective of the study by Balaji and Kumar (2011) was to assess the library websites as one stop shop for information. A weighted checklist was created on the basis of which websites were to be evaluated. The checklist was created on the basis of quality of information available on website, access to scholarly content like journals, working papers, video lectures, e-books and web tools etc. The assessment in other studies revealed that universities in India have to still work a lot as far as using web development technologies for library websites is concerned. (Harinarayanaa & Raju, 2010; Madhusudhan & Nagabhushanam, 2012).

The importance of collaboration and knowledge sharing while constructing knowledge was brought out in a study, taken up as part of a teacher education program at a university in Taiwan. Respondents of the study comprised of the participants who were selected for the program. Constant comparative process was used to collect and interpret data which was the combined result of secondary source like student journal and primary source like survey and interview. Results substantiated the view that collaborative approach and knowledge sharing improves construction of knowledge (Syh-Jong, 2007).

‘Knowledge sharing’ was also studied in context to the changing social climate of universities due to the changing demographics and increasing diversity. The objective was to explore the impact of knowledge sharing on the diversity climate of a university. 489 teachers were surveyed from Danish universities. Hierarchical multiple regression was employed to investigate the relationships. Results validated that knowledge sharing and collaboration among faculty members of universities has a positive effect on the social working climate (Lauring & Selmer, 2011).

The impact of knowledge management on firm performance was extensively examined by Chuang *et al*., (2013) with the support of IT as the moderator. Major constructs of the study were: Knowledge management (KM), information technology support and organizational performance. For a better understanding of the effects of knowledge management on performance, in the study, the researchers focused on this significant relationship, with IT as the moderator. From literature review a theoretical concept of overall knowledge management with information technology support (KMIT) was developed which referred to the degree to which IT facilitates a firm's creation, dissemination, synchronization and exploitation of knowledge. Further overall KMIT was the aggregate contribution of six KMITs which were conceptualized as first order variables: Inbound, Operations, Outbound, Marketing and sales, Service and Support KMITs. Chuang *et al*., (2013) proposed a research model which enabled an empirical backdrop for evaluating performance effects of overall KMIT in context to the organizational structure, culture and incentive. Out of all the models created and tested, the most satisfactory was the one which was proposed and tested with the help of confirmatory factor analysis. Further, data was analyzed by making use of partial least squares technique to test the model. Continuing on the same lines of knowledge management and introducing the variable of knowledge sharing culture, Goyal *et al*., (2012) highlighted the importance of both variables for company performance. Present study builds on the variable of knowledge sharing and attempts to apply the same in higher educational settings.

Studies (Brinckmann, 1998; Herrington & Summers, 2014) have proposed that conversion of willingness to innovate into innovative research and teaching, rides greatly on the operative units and it is organizational capital that will drive the quality of research output in the coming decade.

Fallshaw (2000) along with Minguillo and Thelwall (2015) explored the decision support systems, infrastructures and the appropriate strategic planning for an IT support needed to enable universities with research and technology output. The study particularly focused on science parks and incubators and confirmed whether science parks and incubators actually affect research output and the time required for the same. The analysis was conducted based upon the published results of universities that have such infrastructures on campus for a period of 35 years starting from 1975. Non parametric statistical techniques like Kaplan-Meier and Cox regression helped in establishing a strong link between science parks, incubators and commercial performance of universities.

On similar lines, Zhang *et al*., (2016) conducted a study to find whether there is any link between 'resource' and 'research'. The outcome variable was research output of the university and not commercial output. The study was conducted in Chinese universities since Chinese higher education has expanded rapidly over the last two decades. Data from highly research intensive 72 universities was collected over a period of ten years from 2000 to 2010. The final sample consisted of 748 observations. The main dependent variable was research production and independent variable was resource, measured by three main factors: human resources, financial resources and structural resources. The study used stochastic frontier analysis to estimate the research production frontier. It was found that research publication in science stream depended on all the three factors while research in non-science stream was determined by human resources.

Similarly, resource also positively affects learning among students. This was highlighted by Dey *et al*., (2009) through an experiment undertaken through the mechanism of a multimedia presentation in the department of Physics at a research university. The presentation was designed in adherence to the seven design principles by Mayer. The presentation was pre- recorded and administered through an open-source web-lecture archiving tool. Three conditions of pedagogy were created: personalized video group, neutral video group and control group. Personalized video was the condition where the Web Lecture Archive Project (WLAP) based presentation was administered online and included the video of the instructor apart from the audio and presentation. Neutral video was the situation where the instructor wasn't visible while only the audio and the presentation were available. Finally, the control group was administered with the presentation being given live by the lecturer.195 students were involved in the study. They were assigned to the three different groups. For the first two groups, the entire experiment was conducted online while the third group was given a live lecture. Multiple regression analysis helped in identifying differences in the outcome variables. Results indicated that there was much more transfer of information taking place in case of personalized and interactive video session as compared to the traditional lecturing method.

Crosling *et al*., (2015) tried to investigate and establish a relation between a country's creative learning ecosystem (CLE), quality of education system (QES), and innovative capacity (IC). CLE was measured by a number of factors out of which one majorly important measure was physical and digital infrastructure which were termed as infrastructure and infostructure respectively. A composite index measuring CLE of 113 highly performing countries in the higher education sector like Switzerland, Singapore and Finland was used in the study and a high correlation was brought out between these country's CLE, QES and IC. The study set a benchmark for the countries which aim at improving higher education for creativity and innovation.

2.5 Relational capital

Cinquini *et al*., (2012) in a study, defined relational capital as the external structures concerning the organization's relations with channel partners, supply chain partners and business collaborations, franchising agreements and so forth. The research was undertaken to investigate the contents of intellectual capital disclosure by Italian listed companies. Content analysis was used as methodology and findings revealed that instances of reporting intellectual capital were increasing, with highest instances of reporting human capital, followed by relational. This brings out the importance of relational capital as an Organization's performance indicator. Relational capital also finds an important place in majority studies (Bontis, 1998; Bontis *et al*.,2000; Canibano & Sanchez, 2009; Chu *et al*., 2006; Komnenic & Pokrajcic, 2012; Vishnu & Gupta, 2014).

The evolution in the role of universities has been driven by certain factors. Push factors include changes in the higher education policies that are encouraging universities across the globe to engage with their proximate regions. Also policy shifts have taken place from elite class to a more inclusivity in higher education. Lifetime education concept has been created by the changing skill sets required by the labor market. In literature and in organizations these days, managing and governing with intellectual capital based approaches are being increasingly recognized. Moreover relational capital and approaches based on development of relationships are being specially reiterated. Same applies to universities. The result is, increasing networks between universities and industry through various collaboration channels like incubators and small business development centers, spin offs, alumni associations, new start-up companies, patenting offices and academy-industry liaison offices on university campuses (Draghici *et al*.,2015; Freitas *et al*., 2012; Kitson, 2004; Nyerere & Friso, 2013; Siboni *et al*., 2013).

As part of a research by Dill (1995), a survey was conducted in the university technology transfer units on their organization and management, with the objective of reporting the management and performance effectiveness of these technology transfer units. The study defined university technology transfer as "formal efforts to capitalize upon university research by bringing research outcomes to fruition as commercial ventures." The dataset consisted of 115 institutions. Units were divided into 5 categories of: licensing and patenting offices, small business development centers, research and technology centers, incubators and endowment offices. Similarly, universities were also grouped into 4 categories based on their inclination to research and entrepreneurial activity. All these groups were compared for the incidences of technology transfers. Results majorly indicated that all five types of technology transfer incidences, particularly entrepreneurial activities like patenting and licensing, incubators and endowment are higher in research university (Type 1) as compared to other three types of universities. Type 3 universities which were doctoral granting universities, resorted to more business and consulting activities like small business development centers. Type 2 universities faired on entrepreneurial activities as expected. Institutionalization of such units has also been studied in context to Canada and Singapore and the reforms and policies of the governments of these countries has also been discussed (Fisher & Grosjean, 2002; Mok, 2015; Nyerere & Friso, 2013).

Research was conducted on mechanisms, enablers and barriers to knowledge transfer in the process of collaborative projects between university and industry. Respondents of the survey comprised of firms, students and scholars who had been involved in collaborative projects directly or indirectly. The research was undertaken to bring out the significance of trust and a feeling of equality between the two parties which are involved in such collaborations (Nielsen *et al*., 2014).Continuing on the same lines, Zavale and Macamo (2016) proposed through their research that the anatomy of the university-industry network is tangible in case of low income countries which engage with industry through tangible vehicles like internship, employment and consultancies. In this process, the disembodied knowledge gets left out which is a drawback.

Research has also propagated increasing the collaboration between academia and industries, but carefully taking into account the different value systems of both the sectors. Universities are part of the traditional education sector where traditional academic values exist unlike the industry where capitalist values prevail. Despite the shifts that are taking place, the two domains remain profoundly different. The conclusion was that unless and until both the groups recognize and respect each other's fundamental differences, no collaboration will serve the purpose it is supposed to (Tasker & Packham, 1993).

A different aspect of networking was explored in a study which aimed to establish the association of transnational mobility with the social networks of higher education students. The research question pursued was "what motivates students to move to other countries for higher education and how does networking effect this motivation." Students of a Portuguese state university and a Brazilian group of students who were attending the Portuguese university were the respondents. 81 valid responses were received. While the independent variables were identified as 'public reasons before departure', 'private reasons before departure', 'public reasons after departure' and 'private reasons after departure', social network was identified as the dependent variable. Logistic regression helped in assessing the significance of the independent variables in influencing the dependent ones. The importance of networks was brought out as being the major factor underpinning student mobility (Pedro & Franco, 2015).

Against the backdrop of increasing competition and reduced state funding, the role of alumni and alumni associations has exponentially increased and university leaders are focusing their attention on this domain. Alumni contribute both monetarily as well as non-monetarily to universities. The non-monetary contribution which doesn't receive as much attention as it deserves, was brought out by researchers (Weerts *et al*., 2010) through a study. 'Political advocacy' and 'Volunteerism' were identified as the two second order variables which were being explained by seven first order variables. CFA was used to establish the measurement and the structural model. The study brought out the variety of ways in which alumni are contributing towards the university and in the process, highlighted the significance of alumni.

Significance of alumni was emphasized in a study by Belwal *et al*., (2017) which brought out the lag on part of the universities, alumni and industry jointly to boost the employability conditions of graduates of universities in Oman. The study made use of inferential analysis and by combining focus group and survey technique, collected data from 114 students. The findings revealed that very few universities had a checklist of graduate employability and those that had were too generic. Students were of the opinion that specific employment related attributes which can be related to the industry and alumni should be a part of the university regular curriculum.

On similar lines, a study was conducted by McDearmon (2013) with an extension that how and why alumni support their alma-mater even once they have left the university campus. The study was undertaken to investigate how universities perceive their alumni's role once they pass out. This study was an extension to the previous study in the sense that the construct of support behavior was extended from political advocacy and volunteerism to many other behaviors which could be termed as support behaviors in addition to the constructs of role identity and expectations. Respondents comprised of alumni who graduated from the university between 1940 and 2009. The final sample composed of 8987 people and it was a self-administered web-based survey. A final response of 688 individuals was received. Regression analysis enabled to explore the relationships and results revealed that those alumni who completed the support behaviors included in the study, responded positively to the role identity scale. Therefore it was concluded that alumni who had better role identity were the ones who were favorably supporting their alma-mater through the varieties of support behaviors identified in the study.

For those universities which do not have a strong tradition in the area of alumni relations, a study was undertaken by Ebert *et al.*, (2015) to bring out the strategies, challenges, barriers and outcomes of building an alumni program. The case study was based in Stockholm University. This conceptual case based study aimed to provide a perspective to other universities which have a long way to go as far as alumni relations is concerned.

With the upsurge of free-market policies in the higher education system, marketization and deregulation of university sector in many countries around the world, market orientation of universities has become one of the focus areas of researchers. One such study was conducted to identify which aspect of market orientation was more favorable and were the differences among them significant or not. 'Student orientation' was identified as one of the major dimensions of market orientation, while competitor orientation and inter-functional coordination being the other two. Questionnaire based survey was used which comprised of 32 items describing the three dimensions of market orientation. A comparison of England and Israel was done in the survey. ANOVA helped in testing the difference in the average of the three dimensions and results revealed that out of the three, the most important dimension that emerged was student orientation, meeting the needs of students and having a student centered approach. No significant difference emerged in market orientation of both the countries but the t-test conducted in context to competitor orientation revealed that Israeli respondents were more positive towards competitor orientation as compared to their English counterparts (Hemsley-Brown & Oplatka, 2010).

Many studies (Koc & Celik 2015; Shefi, 2015) have been focusing on student-teacher relationship and student centric learning. Most of the studies have investigated the affect that the teacher-student relationship has on the achievement of students, their perseverance, dropout prevention, motivation and attitude related concepts. Some studies talked about student- centered learning in terms of the use of technology while teaching with the objective of understanding how the use of student centric communicative technologies contribute to the quality of training. Others spoke about the impact that student to teacher ratio has on student achievement. Relationship was established using Spearman Rho's correlation analysis.

Finney and Finney (2010) in their study, took a customer centric approach to the relationship between students and universities. 1025 students of Southern United States were surveyed.
It talked about the student-as-customer model and hypothesized that if students consider themselves as the customers of university they are more prone to have feelings of entitlement and behaviors that are not favorable to success. While if they consider themselves as participants in the process of producing knowledge, there is much more chance of students indulging in appropriate behavior. So we can conclude, that whatever be the perception of students, as a customer or as a co-producer, there is surely a relation of reciprocation between the two.

Carrying on the same lines of research, Severiens *et al.*, (2015) conducted a study to confirm whether under certain conditions, student-oriented programs lead to better academic results. It compared a traditional lecture based program to a more student based course program under conditions like positive student experience (feeling of belongingness and cultural harmony), higher levels of effort and engagement and number of hours spent studying. Students were surveyed on these three conditions while their performance data was collected from university. Structural equation modelling was conducted to study the relationships. Results showed that number of hours spent in studying, effort and feeling of belongingness influenced differently in student centered programs unlike lecture based programs.

Studies have also taken an entrepreneurial perspective to universities and opined that universities serve as channels of spillover thereby contributing to socio-economic development through their triple mission of teaching, research and entrepreneurial activities. This gave rise to the concept of triple helix. In context to triple helix, studies (Etkowitz, 1998; Etkowitz *et al.*, 2000; Etkowitz, 2003) spoke of academic entrepreneurship and suggested that adoption of an entrepreneurial characteristic is a part of the evolution process of a university to transform itself. They also suggested that after the first academic revolution, which made research, an academic function apart from teaching, now is the time for the second revolution which has added economic development as an additional function of universities. Guerrero *et al*., (2013) established that the resources and capabilities invested by an entrepreneurial university work as its inputs while the output is human, knowledge and entrepreneurship capital and taken together they affect the GDP of economies. Another study by Abramo *et al*., (2011) established an econometric model which suggested that the capacity for a university to collaborate, depends on its size, location and research quality, while it was also established that how faculty quality influences industry engagement. Yet another study investigated the relationship between scientific productivity and entrepreneurial effectiveness. The various mechanisms of transfer like contract research, patenting and spin off activities and the tradeoff among them were also examined (Looy *et al*., 2011; Perkmann *et al*., 2011).

Taking the context of the "open data" rule of the Human Genome Project, Perkmann and Schildt (2015) tried to overcome the challenges of publishing the research results of university- industry collaboration conceptualizing the idea of a boundary organization thus substantiating the importance of publishing the results of industry- university collaboration. A conceptual study based on extensive review of literature on academicians' participation in industry- university collaboration termed it as "academic engagement" (Perkmann *et al*., 2013). Differentiating and comparing the concepts of academic engagement with commercialization, they concluded that academic engagement is more closely related to traditional research. It takes forms like collaborative research, contractual research and consultancy. The study took a consequential angle to academic engagement and gave a fresh perspective to researchers to study the impact that academic engagement has on other activities of the university like teaching.

Similar research was conducted where the outcome variable was regional wealth creation, of which GDP is just a part. It tried to empirically establish the relationship between knowledge transfer through universities and regional wealth. Panel data was collected from 1998 to 2012. Constructs identified were "regional wealth", "university-industry collaboration", "regional innovativeness", "regional attractiveness", "entrepreneurial activity", "scientific orientation" and "university size". Panel regression was applied and it was concluded that it is not that university-industry connection solely leads to regional wealth, or that regional development leads to emergence of universities but that these two are interlinked, substantiating the idea that economic development and university are in conjunction of each other (Lehmann & Menter, 2015).

Studies have shown that corporate websites are becoming one of the most significant tools of communicating with stakeholders in order to create successful value proposition from the corporate sustainability perspective (Salehi *et al*., 2012; Siano *et al*., 2015). The same applies to universities. University websites have become an important source of relationship building with stakeholders.

A number of studies (Harinarayan & Raju, 2010; Pinto *et al*., 2014; Utulu & Okoye, 2010; Zhang & Halloran, 2013) support the idea. These studies talked about the visibility of teaching and learning taking place in the university to the stakeholders and suggested that websites are one great medium through which they can be made visible to the external world since there is a strong link between value, perceived worth, marketeability and visibility. Tools like UNIWEEES were used in some studies to evaluate the quality of websites and the way websites are used to disseminate information. Through their websites, universities are repositioning themselves in front of the global community from a mere education provider to a place which functions like a finishing school and where students are churned out according to the industry demands. Else & Crookes (2015) highlighted how certain universities in Australia present their teaching and learning online. Teaching and learning elements were drawn from 20 websites. Findings showed that while certain elements were visible, other aspects were not.

Effect of relational capital on performance of international joint ventures was investigated by researchers (Thuy & Quang, 2005) and findings brought out the criticality of relational capital in the success of these joint ventures. Inter-partner flexibility, conflict management and goal clarity emerged as the mediators in the process. The construct of relational capital was measured by variables like mutual trust, respect and understanding. Secondary data from the Ministry of Planning and Investment was collected for a period of 16 years from 1988 to 2003. A questionnaire was also developed to collect information on relational capital variables along with the demographic characteristics of the joint ventures. Exploratory factor analysis and regression analysis were conducted to investigate the relationships.

Like trust, another element of relational capital that is collaboration was investigated and its effect on organizational outcomes was brought out. Collaboration in this study referred to collaboration among tourism operators in the tourism industry of Malaysia. The study made use of partial least square and structural equation modelling to test the hypothesis. Mixed method of data collection was used and the final sample consisted of 90 responses. PLS based regression results revealed that communication, commitment and trust are the factors affecting collaboration and that collaboration has a positive influence on network performance (Ramayah & Lee, 2011; Watson & Papamarcos, 2002).

Carrying forward the importance of the variable of trust, an important study brought out the mediating capacity of swift trust for achieving supply chain co-ordination. The theoretical framework was adopted from commitment-trust theory and using path-analysis technique, the data collected from National Disaster Management Authority of India was tested. Respondents of the study were managers of organizations across India who were involved in disaster relief activities. Data was divided into governmental and non-governmental organization and the difference between these two groups was observed through R square and F-statistics. Later, measurement model was proposed through confirmatory factor analysis followed by structural equation modelling. Findings revealed that dissemination and sharing of information coupled with behavior uncertainty reduction acted as facilitators of swift trust which influenced commitment, which further affected co-ordination (Dubey *et al*., 2017).

2.6 Organizational Performance

Looking at it from a systems approach it can be inferred that performance is the result of the inputs that enter a system and get processed in the form of output. In context to business, output may be in the form of goods, services, new products, innovative ideas, profits, financial returns, return on assets, return on investment, market share, market price of company shares, customer satisfaction levels, employee turnover and job satisfaction. Strategic performance management has become much more consequential as compared to quantification and accounting in the present dynamics of business.

With pressures of globalization all across the world, universities are under constant pressure of accountability towards all their stakeholders. This has led to an ever increased performance pressure on universities and as a result they are resorting to corporate ways of governance, functioning and working.

In the present research, universities are being treated as organizations. Several previous studies support the view that universities are gradually turning towards being more neo-liberal, market driven and student oriented in terms of their management style (Brownlee, 2015; Ferrer & Morris, 2013; Nadolny & Ryan, 2015; Pick *et al*., 2012; Rhoades & Slaughter, 2004; Stephenson *et al*., 2016; Tadaki & Tremewan, 2013). Ferrer and Morris (2013) explored the relationship between work engagement, job commitment and intention to quit. Work engagement was brought out as a mediating factor between job resources and commitment and intentions to quit. Brownlee (2015) conducted a study based on universities of Canada and brought out that these days universities have been increasingly relying on contractual faculty for the purpose of cost cutting. Data was collected across 18 universities of Canada. Pick *et al.,* (2012) tried to explore the managerialism related reforms in Australian universities. Six stressors were found to be evident in the study: time, information, supervisor, work environment, salary and communication. These elements clearly reflect corporate principles, values and orientation of universities off late.

The evolution of neo-liberal approach in managing and governing universities, has permeated even in assessing their performance. Universities are restructuring and re-engineering themselves supported by the above mentioned neo-liberal agenda to measure performance. Moreover, the dismal financial performance of the non-profit sectors around 1980s forced the governments to embrace the philosophy of free markets and business oriented values. This was majorly the time when quality models like Total Quality Management and Balanced Score Cards started being used in the non-profit sectors (Lawrence & Sharma, 2002).

One such study, investigating the two countries of Argentina and Australia was conducted by Mollis and Marginson (2002) with the objective of identifying the performance parameters given the change in the orientation of universities. The findings revealed that the structure of autonomy in Argentina has shifted from the traditional academics oriented to a system of self-managed corporate organization, managed by professional leaders. In both the countries' assessment policies, a similarity was found that in both the cases specifically pedagogical objectives as measures of assessment were towards a weaker side and a more holistic institution based approach controlled by professional managers prevailed. Moreover Australia was found to be more culturally closer to a neo-liberal educational policy as compared to Argentina.

A popular method of estimating university efficiency has been data envelopment analysis (DEA). It has found a mention in many studies as per literature review. A study was conducted by Avkiran (2001) in Australia to investigate the technical and scale efficiencies of their universities. This particular method was used since it ensures more efficient allocation of resources and these studies consider efficiency as proxies to performance. Three performance models were developed which included overall performance, performance on service delivery and performance on fee-paying enrolments. Items for input and output variables were taken from secondary sources like Department of Employment, Education, Training and Youth Affairs for the year 1995. 36 universities constituted the sample set. Findings revealed that there was much scope in improving performance on fee-paying model. Also it revealed that most universities were operating on decreasing returns to scale.

Similarly, a quantitative study utilizing three different methods to evaluate the efficiency of Greek universities was conducted with the objective of being more consistent and reliable while evaluating the efficiency of public universities. Efficiency was considered as a proxy to good resource management. Data were collected from a sample of 20 Greek public universities, through the Greek Ministry of National Education and Religious Affairs for the year 2004. Further three different quantitative methods: performance indicators, data envelopment analysis and econometric analysis was done to compare the results of the three. Performance indicators were classified into internal, indicators of operational performance, external and research performance while DEA method involved identifying input and output variables. Findings indicated human resource management as one area that needed much focus. Financial management aspect came out to be an important contributor towards university performance. Moreover results also indicated that better planning was needed towards research income (Katharaki & Katharakis, 2010).

Lu (2012) tried to confirm whether allocation of resources in universities was capable of delivering the required outcomes. The study utilized the data envelopment analysis technique to measure cost and teaching/research efficiency of Taiwanese public universities. Further the study also explored the impact of intellectual capital on both the variables using the truncated regression analysis method. It was revealed that intellectual capital dimensions were not significantly related to the cost efficiency of institutions, whereas all the dimensions: human, relational and structural capital had a significant and a positive effect on teaching and research efficiency of institutions.

A macro level study was conducted by selecting 50 countries out of a total of 200 countries across the globe, in order to compare their performances. Four major factors were identified as performance variables which were "resources", "environment", "connectivity" and "output" which were further measured by 20 items. Individual rankings under each group were combined to form an overall ranking and the relationships between the four constructs were also explored. It was revealed that the countries that ranked high on "output" were also the ones that ranked high on "resources" and the lowest performing universities were the ones with maximum government control (Williams *et al*., 2013).

A proposed model by Rodman *et al*., (2013) identified external/ outcome quality dimension in addition to the internal quality dimension. In external dimension, stakeholder dimension was given a lot of significance as compared to dimensions of internal/institutional quality. It was concluded from the study that the outcome dimension was the most important dimension from the perspective of employers, who were also the target respondents. The holistic model which included both, internal and external dimensions was clubbed together under the common 'strategic stakeholder's perspective'. In the proposed model the internal dimensions, comprising of 'resource and inputs', 'sustainable development' and 'value chain' were clearly independent. Inter-connections between the various quality dimensions were investigated using Pearson's correlation method.

When talking about quality in higher education, a model that deserves a special mention is the Balanced Score Card (BSC) model. It has been a widely acclaimed and implemented quality model not just in organizations but also widely popular in measuring strategic performance in context to higher education (Tohidi *et al*., 2010). The concept of BSC was introduced through a path-breaking research by Kaplan and Norton (1992) to understand and measure organizational performance from a balanced perspective, in lieu of the traditional financial measures used to measure organizational performance. The BSC was the consequence of a one year old research project, with twelve firms which were at the forefront of performance measurement. The BSC allows decision makers to evaluate business performance from four different and significant perspectives: Financial, Customer, Learning and Innovation and Process. By providing information from four different perspectives, the concept helps managers to narrow down the parameters on the basis of which organizational performance can be measured. The BSC proposes focusing on those limited measures which are the most critical. While customer perspective measures how customers look at the firm, process perspective measures what should the business be good at. Learning perspective measures how to create value for customers and financial perspective measures how the firm looks at its shareholders.

Building on their previous work, Kaplan and Norton (1996) tried to link the BSC to strategy. The study proposed that unlike traditional measurement systems, which kept organizations tied to a previously established benchmark, the BSC allows executives to use the four perspectives to build around the future strategy. For the successful use of the BSC, it was suggested that these perspectives get translated into a set of critical measures, which provide total clarity on an organization's long term objectives.

This research got further extended when researchers proposed that BSC was much more than a performance measuring mechanism. It was a tool for managing performance strategically. It was based on five suggested principles: converting strategy into operational measures, bringing together organization with strategy, strategizing on a day-to-day basis, strategizing on a continuous basis and leadership creation for a constructive change. BSC was further linked with certain other and important organizational improvement initiatives like shareholder value management, activity based costing, operations, customer profitability, budgeting and hence authors concluded that BSC was much more than a performance measuring mechanism. It was a tool for managing performance strategically (Cullen *et al*., 2003; Kaplan & Norton, 2001).

Karathanos and Karathanos (2005) related BSC with education by describing how the Baldrige Education Criteria customized the concept of the Balanced Score Card to suit the education sector. Researchers also brought out the significant dissimilarities as well as similarities between BSC, meant for companies and BSC for education. The centerpiece of the Baldrige Program is the criteria for performance excellence. Also the criteria heavily emphasize the development of an exhaustive measurement system that is in consistency with the firm's strategic objectives. The spheres where the measurement system produces results are: customer-focused, product and service, financial and markets, human resources, organizational effectiveness and governance and social responsibility. These result areas are in consistency with the basic approach of BSC.

A case based study was conducted on the use of BSC for establishing an assessment structure for a private university located in central Taiwan. Study conducted by Chen *et al*., (2006) was motivated by the poor economic environment in Taiwan around the year 2006 due to which many non-profit organizations were in a financial crisis. The study proposed that immediately after mission and vision, even non-profit organizations should also place financial perspective, followed by customer, process and finally learning and growth perspective. It was concluded that to successfully create and implement BSC, there should be a well-crafted vision and mission for the organization.

An important study about implementing BSC in the higher education sector in India, was conducted by Umashankar and Dutta (2007) suggesting a framework as to how BSC can be applied to universities in India. The study was a conceptual research, based on extant literature on the BSC measures as reported by previous researchers. It was a novel effort in terms of the Indian universities and provided an opportunity to decision makers in the education sector to implement the measures and translate these measures into long term strategy of universities according to the needs and environment of India. The framework was proposed in a way that it could be used with modifications and improvisations.

Bigliardi, and Dormio (2010) developed a Balanced Score Card model as a measure of performance for organizations, having research and development as their core activity. The lack of objective measurements of research and development activities and projects is mainly because traditional financial measurements are backward looking in nature, while a performance measurement indicator needs to be forward looking specially in case of R&D activities . Delphi technique was used to identify 54 dimensions for the various perspectives of Balanced Score Card and thereafter the case study method was administered by applying the identified indicators in a company by involving the R&D personnel of the firm. Out of 54 indicators identified, 29 were retained with scores more than 4.

Zangoueinez and Moshabaki (2011) proposed a fuzzy multiple attribute based decision making technique, in order to measure performance of a university on all four knowledge-based aspects of a BSC. The knowledge-based indexes were screened with the help of fuzzy screening. Thereafter, Fuzzy Analytical Hierarchy Process (FAHP) was used to calculate the weights of the knowledge based indexes. A total of 84 indexes were compiled with respect to all the perspectives of BSC and 30 indexes were finally retained. In order of the rankings obtained, the most important predictor of performance came out to be “Learning and Growth”, followed by “Customer”, “Process” and “Finance”.

2.7 Organizational performance of private, central and state universities

In context to Australian education, Sinclair (2003) observed that a neo-liberal free-market approach to university provision results in greater access to quality higher education at lower cost as compared to the state university provision. The study started with one of the most prevalent university provision which is the social justice market. Further, it compared this format with the state capitalist mode. Then the private for-profit provision was explained. Later, all the three modes were compared in context to their cost and quality.

An important study on the quality of marketing education in business schools of Turkey was undertaken by Eser and Birkan (2005) in which students’ perception was captured. The sample set comprised of 5 private and 5 state universities in Turkey with a total of 462 respondents. Items measuring quality of marketing education were directly taken from previous research. There were also statements in the questionnaire developed by the researchers to capture a general perception of students regarding marketing education. 30 items taken directly from literature review related to instructor quality and statements prepared by researchers related to subject quality. Principal component analysis for instructor quality was done to narrow down items into factors which resulted in the narrowing down to 5 factors in case of state universities and 3 factors in case of private universities. Similarly, factor analysis was done for subject quality. Number of factors was two for both, but with different names. Differences emerged between private and state universities as a result of the analysis. While state universities were tuition free, private university students had to pay high tuition fees. Also it emerged that as far as sincerity and efforts are concerned, private university faculty were performing better than the state universities. The overall perception of subject quality at state universities was lower as compared to private universities. Another observation that emerged was that in state university’s faculty appeared to be unreachable to the students.

Study by Brunetto and Farr-Wharton (2006) was based on the comparison between state and private sector service organizations in Australia. It was conducted with the research objective of investigating and drawing the parallels and contrasts in the cultures of private and state sector employees. Some of the variables identified for the study were ‘frequency of communication’, ‘informal communication mode’, ‘indirect communication content’ and ‘uncertainty regarding customers’ while the dependent variable was ‘job satisfaction’. Regression analysis technique was applied to explore the hypothesized relationships. The results indicated that the perception that culture in private sector especially that of communication is superior as compared to the state sector, was inappropriate. Rather, ambiguity with respect to customers and promotion was prevalent in both the categories. However, the effect on job satisfaction was greater in case of the employees of the state sector.

In order to bring out the difference between private and state owned universities’ administration and students’ academic performance, Obadara (2012) conducted a study across 40 universities of Nigeria. The sample comprised of 10 state, 10 central (federal) and 20 private universities. Simple random sampling method was applied to the collected data on the basis of a developed questionnaire. Students‟ performance data were also collected for the years 2006-07 and 2008-09. The hypothesis was that there is no significant difference between the two categories of universities as far as resource availability, resource utilization, governance, student entry requirements and students’ academic performance are concerned. Chi-square test revealed that private, state and federal universities vary significantly as far as resource availability and utilization were concerned, thus rejecting the hypotheses. Similarly other hypotheses also got rejected as there were significant differences in governance and student entry requirements among the three categories of universities.

Quality management (QM) practices and their efficiency was compared for state and private universities situated in the greater-metro region of Istanbul, Turkey by researchers (Bayraktar *et al.*, 2013) using the popular Data Envelopment Analysis (DEA). Based on literature review, 9 input (QM) and 7 output (Performance Indicator) variables were identified. The nine input variables were ‘leadership’, ‘vision’, ‘measurement and evaluation’, ‘process control and improvement’, ‘program design’, ‘quality system improvement’, ‘employee involvement’, ‘recognition and reward’ and ‘education and training’. Seven outcome variables were ‘student focus’, ‘business focus’, ‘employee-focus’, ‘student’s university choice’, ‘average graduate admission test score’, ‘research performance’ and ‘student/faculty sufficiency’. A total of 59 items explained these 16 variables. Analysis revealed that private universities emphasized on ‘process control and improvement’ and ‘program design’ while state universities invest more on ‘leadership’. On the outcome variables front, it was found that private universities stress more on ‘business focus’. In contrast, state universities performed better on fronts like ‘average graduate admission test score’ and ‘student/faculty sufficiency’.

A comparative study on online disclosure of social responsibility was done between private and public universities in US. The study was undertaken to investigate whether and to what extent are state and private universities using disclosure of social responsibility (SR) as a factor that will help increase their visibility. Private universities were hypothesized to be disclosing more information regarding social responsibility as compared to their state counterparts. To identify respondents of the study, research was done on the list of those universities which address social responsibility questions through their websites. Finally the selection of 105 universities was made on the basis of the Shanghai Rankings. To make the sample representative, all the universities that appeared in the first 500 of the list were selected. An assessment model was proposed, based on the development of certain indexes which were further based on the two research questions: content and form of disclosure. A total of 6 indexes were formed. The three indexes developed in case of content of disclosure were: General social responsibility information, Specific social responsibility information and Qualitative characteristics of social responsibility information. The three indexes in case of context were: usability of websites, interaction and privacy and security of websites. Paired T-test and Mann- Whitney U test were used to test the hypotheses. Low values of General SR Information indicated lesser commitment on part of the universities with respect to SR information disclosure. But at the same time private universities had a higher mean value as compared to state universities, indicating that they disclose more information as compared to state universities. Moreover the items on which least information was disclosed was related to stakeholders for both public and private universities. Highest score was achieved on the second index of Specific SR Information. Even in the qualitative aspect, scores obtained were low with private universities again scoring slightly higher than their state counterparts. Overall results suggested that SR was not being used as a differentiating factor by the universities (Sanchez *et al*., 2013).

A study by Dattey *et al*., (2014) assessed the differential impacts of accreditation on two different public and private universities in Ghana with the objective of investigating that whether there was a difference in scores between the two sessions of assessment. Also the study aimed to investigate whether the scores of the two categories of universities were different. The study also explored that whether these differences are due to the different levels of isomorphic pressures faced by the two groups of universities. Respondents of the study were 7 state and 4 private universities. These were the oldest universities in their category. Secondary data was collected from the evaluator's reports for each university. The 5 indicators picked from the evaluator reports for the purpose of analysis were curriculum structure, student/staff ratio, library facilities, infrastructure and funding. Wilcoxon rank test was done to find any differences between the same indicators but for two different assessment cycles. T-test helped in comparing the aggregated scores of the universities. Next step was the primary data collection from the academics who were teaching in these two universities, with the purpose of recording their perception about the change in the scores between the two assessment cycles. 82 out of 142 responded. Findings revealed that statistically the two cycles of assessment for both the categories of universities were the same. Statistically, state universities demonstrated a significant improvement in the aggregate score as compared to private universities. In individual indicators also, curriculum, funding and infrastructure remained same while library and student-teacher ratio showed maximum improvements while in case of private universities two of the indicators showed decline.

2.8 Hypotheses development

2.8.1 Human capital

As far as the previous studies on human capital are concerned, exhaustive review brings out that the construct has been previously explored as one of the dimensions of intellectual capital. It has been established as an important dimension of intellectual capital in all the previous models and measures proposed (Bontis *et al*., 2000,2001; Pulic, 2004; Vishnu & Gupta, 2014). A good amount of work has been done on human capital and its impact. Some of these studies have taken organizational performance as the direct dependent variable while others have measured human capital's effect on organizational innovativeness and productivity (Barro, 1991;Hsu, 2008; Goldin, 2001) Human capital and its impact has also been studied separately for non-profit sectors and for-profit sectors (Carmeli, 2004). Even at the macro level, human capital and its influence has been investigated in context to countries‟ economic performance and growth. Growth across countries has been compared in context to human capital. Researchers have also explored the contribution of human capital towards economic parameters like energy consumption which is an important indicator of economic growth (Salim *et al*., 2017).

The next set of studies that authors came across in literature review was related to the human capital policies needed at universities in order to facilitate quality research. Moreover, literature has a lot of evidence on studies related to research based universities and their role in knowledge economies (Huang, 2015; Nayir & Cinkir, 2017; Nguyen, 2016; Postiglione, 2013, 2015; Postiglione & Arimoto, 2015 Teodorescu, 2006; Townsend *et al*., 2015).

With the concept of academic capitalism emerging strong in university settings, a good amount of literature support has been found on how universities are trying to focus on corporate like governance and management model in universities where phenomenon like quality of work life, work life and personal life balance, job satisfaction, commitment and turnover intent and workforce diversity are becoming the critical success factors (Amano, 1997; Ferrer & Morris, 2013; Kanwar *et al*., 2012; Kenny, 2009; Lawrence *et al*., 2012; Pandey & Kaur, 2011; Pick *et al*., 2012)In these studies related to academic capitalism, the above mentioned issues have been addressed, but not in context to human capital. It is clear from the previous studies that the factors: research orientation, quality of work life, diversity and pluralism are actually the dimensions of a single construct "human capital" but not tested empirically. This gap will be filled by the current work of research which will relate these ideas to the human capital of universities. Moreover previous studies have addressed the issue of human capital either directly by studying the association between human capital and performance or indirectly in the form of research facilitating human capital policies. Present study will build upon the previous studies by investigating the relationship between these concepts and exploring how they contribute to university human capital. Also the study will explore the association between human capital and organizational performance in a typical university setting, which is a less explored area in context to India. Therefore, the related hypotheses are as under:

H1 (a): Human Capital is a multidimensional construct significantly predicted by research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity.

H1 (b): There is a significant positive relation between human capital and organizational performance.

2.8.2 Organizational capital

Some studies have brought out the importance of organizational capital in context to organizational performance as a generic factor. While other studies have captured specific elements of organizational capital like awareness of computer based information technology, decision support systems, information and communication technology, institutional repository, science parks and incubators and studied their relationship to outcome variables like effect on student learning, knowledge construction of students, social climate at universities, research and commercial output etc (Balaji & Kumar, 2011; Chuang *et al*., 2013; Coates *et al*., 2005; Dharni *et al*., 2009; Kohli & Devraj, 2004; Prescott &Visscher, 1980). Knowledge sharing and collaboration are the two very important aspects of organizational capital. Studies have been conducted on these elements which have brought out the importance of knowledge sharing and collaboration, process of implementing a collaborative environment in organizations and the obstacles while implementation of communities of practice and collaborative environment (Goyal *et al*., 2012; Kezar, 2005; Lauring& Selmer, 2011; Syh-Jong, 2007) But these studies have overlooked a research question that whether a collaborative environment, communities of practice and a knowledge sharing culture contribute towards building organizational capital of universities. Studies have also been conducted on science parks and incubators and their effects on commercial and research output of a university. But so far negligible studies have brought out how these individual elements contribute towards organizational capital. Moreover if we take the Indian context, universities have been studied, but in relation to particularly library websites of business schools, healthcare industry and manufacturing industry to mention a few. Particularly in context to Indian universities, benefits of e-learning were studied which is only a resultant factor of organizational capital (Balaji & Kumar, 2011; Harinarayana & Raju, 2010; Madhusudhan & Nagabhushanam, 2012). Present study takes individual elements from the previous studies and tries to bring them together under the two main factors of organizational capital: ‘knowledge sharing’ and ‘knowledge infrastructure’. Moreover, other than investigating the contribution of knowledge infrastructure and knowledge sharing towards organizational capital, the present research also delves into the impact of organizational capital on performance of universities in context to India. Hence the associated hypotheses:

H2 (a): Organizational capital is a multidimensional construct significantly predicted by knowledge infrastructure and knowledge sharing.

H2 (b): Organizational capital has a significant positive relation with organizational performance.

2.8.3 Relational capital

Many studies talk of the disclosure of relevant information related to relational capital of universities and its significance (Salehi *et al*., 2012; Siano *et al*., 2015; Utulu & Okoye, 2010). Moreover relational capital has found an important mention in many studies and almost all studies pertaining to intellectual capital (Bontis, 1998; Bontis *et al*., 2000; Canibano & Sanchez, 2009; Chu *et al*., 2006; Komnenic & Pokrajcic, 2012; Vishnu & Gupta, 2014). In context to universities, plethora of studies have been found on university-industry collaboration and in different forms. Whether in the form of triple helix where universities are supposed to contribute to a third mission of economic development or in terms of university-industry knowledge transfer link (Draghici*et al*., 2015; Freitas *et al*., 2012; Kitson, 2004; Nyerere & Friso, 2013; Siboni *et al*., 2013). The literature in this field is quite exhaustive so much so that even the various forms of knowledge transfer links have been examined whether it is contractual research or patenting or spin off activities (Dill, 1995; Fisher & Grosjean, 2002; Mok, 2015; Nyerere & Friso, 2013). Moreover studies have covered the information dissemination aspect of universities through their websites and proposed this method as a resourceful way to make themselves visible to the external world (Utulu & Okoye, 2010). Student orientation of universities has been yet another domain of study where students have been termed as customers, and universities as service providers (Finney & Finney, 2010; Hemsley-Brown & Oplatka, 2010; Koc & Celik 2015; Shefi, 2015). Given this, negligible studies have been found on the association between the construct of relational capital and overall performance of an organization apart from a few here and there. Moreover the studies those have explored this relationship have measured relational capital from a different perspective of that of trust, communication, mutual respect and understanding (Dubey *et al*., 2017; Nielsen *et al*., 2014; Ramayah & Lee, 2011; Thuy & Quang, 2005). These are more of behavioral aspects. The current work of research, clubs together the three major streams of research: university-industry collaboration, access to relevant information and student orientation under the one common construct of relational capital and attempts to explore the association between relational capital and university performance in the Indian context. Thus the following hypotheses are being proposed to understand the construct of relational capital:

H3 (a): Relational capital is a multidimensional construct significantly predicted by access to information, network leveraging capacity and degree of interaction.

H3 (b): Relational Capital has a significant positive relation with organizational performance.

2.8.4 Organizational performance

The current research adopts 'quality' as the major parameter to evaluate university performance as has been used in studies previously. According to literature review quoted in research, (Rodman *et al*., 2013) Balanced Score Card (BSC), European Foundation for Quality Management (EFQM) excellence model and the International Standards Organization (ISO) model have been the original quality models proposed and developed for the business sector. Later on research was done to adapt these quality models to the non-profit sector as well. The global expansion and accessibility as far as higher education is concerned has exponentially increased the importance of quality in the sector. Moreover, not only internal quality assurance is needed to maintain academic standards, but external quality dimensions are becoming extremely important from the perspective of stakeholders of a university (Dill & Soo, 2005).

It has also been contended by researchers (Yeravdekar & Tiwari, 2014) that quality and reputation guides all forms of competition among higher education institutions. Researchers opined that the mainstream universities in India are majorly lacking in quality and the Indian higher education system has been referred to as "islands of excellence in a sea of mediocrity" (Altbach, 2014). Moreover the report issued by FICCI in 2013 clearly puts forward quality as a major challenge area that still infests the higher education structure in India. As per the report, the Indian higher education sector has done tremendous progress on capacity, by enhancing its Gross Enrolment Rates but it clearly lags in quality. Also ‘Vision 2030’ as an aspirational concept, focuses on India as a globally powerful economy, with a high quality and world class education system that fulfils all the requirements of a knowledge economy. Hence the authors feel that BSC could have been the best quality model suited to measure university performance in context to India. Moreover, there are negligible studies apart from a few (Umashankar & Dutta, 2007) trying to implement BSC in context to Indian universities. Even the above mentioned study did not empirically test the model. So the current research can be considered as an empirical extension of the previous conceptual attempt to implement BSC to Indian universities. In this sense, the research is completely novel in nature. Moreover, using the BSC model also confirms to the changing orientation of universities and the shift towards neo-liberal and the free market policy. It allowed the researchers to compare which perspective was coming out to be the most important in the Indian scenario. Thus the following hypotheses are proposed:

H4 (a): Organizational performance at universities is predicted by financial, customer, learning and process aspects.

H4 (b): Intellectual capital has a significant positive association with organizational performance.

2.8.5 Organizational performance of private, central and state universities

Though not much literature is available on the overall comparison between human, organizational relational capital and organizational performance of private, central and state universities but there are many specific aspects on which state and private universities have been compared. In one study, comparison was made between the private and state university provision structure where researchers claimed that private universities provide a better option for a low cost quality education as compared to their state counterparts (Sinclair, 2003). Another study took the backdrop of business schools in universities and compared the quality of instructor and quality of marketing as a subject (Eser & Birkan, 2005). Significant differences emerged between the universities. A general myth about the superiority of work cultures especially communication, in private sector universities was busted in a study, which compared private and state universities. Again, the study provided certain counterintuitive insights. Comparison was also done on administrative fronts and student performance in previous studies (Brunetto & Farr-

Wharton, 2006). Similarly, important organizational aspects like quality management practices, online disclosure of social responsibility and the differential impact of accreditation on different categories of universities was studied (Sanchez *et al*., 2013). As mentioned earlier, though no direct comparison between the human, organizational, relational capital and organizational performance has been made, but there are many aspects that have been covered which can be brought under the purview of human capital, organizational capital, relational capital and organizational performance. For eg in one of the studies importance of accreditation was studied for two private and state universities (Dattey *et al*., 2014). Accreditation forms an important measurement parameter of organizational performance. Similarly, online disclosure of information related to social responsibility can be brought under the construct of relational capital. Also comparative research on quality management practices can be taken as a support for organizational performance, in the wake of quality models being hugely popular in studying performance. Resource availability and resource utilization which formed an important part of a comparative research by Obadara (2012) can be analyzed as a subset of organizational capital. The current research will be a novel attempt in context to India where no such research as per the knowledge of the authors has taken place where the state, private and central universities have been compared with regards to this important variable of intellectual capital. Hence the hypothesis:

H5: There is a significant difference in human, organizational, relational capital and organizational performance of private, public (state) and central universities.

2.9 Concluding remarks

This chapter has investigated the existing literature on human capital, organizational capital, relational capital, organizational performance and comparative literature on private, state and central universities. Studies have been conducted on the relationships between human capital and organizational performance. Similarly there is literature available on organizational capital and performance. Also, studies have explored relational capital and performance. The major factors identified in the present study: research facilitation, quality of work life, faculty commitment, equal employment opportunity, knowledge infrastructure, knowledge sharing, networking capacity, university-industry linkage have been explored in previous studies under different nomenclatures and in different forms. But their relationship with the three constructs of human, organizational and relational capital has not been explicitly investigated earlier. Moreover there is negligible literature available in context to Indian higher education on these lines. The study will enable the planners and decision makers in the Indian higher education sector to take cognizance of university intellectual capital by strategizing around its three pillars of human, organizational and relational capital.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

The present chapter discusses the phases of research and explains the complete process adopted and followed to fulfill the objectives of the study. The chapter covers defining the objectives of the study, research design, sampling details including the selection of sample and marking the survey area, methods undertaken for data collection and explanation of the selection of appropriate statistical methods or data analysis and its further interpretation.

Section 3.1 explains the need and relevance of the study, followed by the next section that highlights the scope of the study. Section 3.3 brings out the objectives of the research based on literature review and hypotheses developed in the previous chapter. Section 3.4 provides a snapshot of the instrument of research and methods used to fulfill the objectives. Section 3.5 covers data collection and pilot study while the next section presents table on validity and reliability of the survey instrument. Section 3.7 discusses the statistical methods used for data analysis while section 3.8 provides a pictorial representation of the complete framework of the study. Section 3.9 explains the proposed conceptual model followed with the closing remarks in section 3.10.

3.1 Need and relevance of the study

All the literature review so far has majorly focused on establishing human, organizational and relational capital as dimensions of intellectual capital (Bontis, 1998; Bontis *et al*., 2000; Pulic, 2004; Vishnu & Gupta, 2014). There are plethora of studies on intellectual capital and performance of organizations both for-profit and not-for-profit, whether it is the banking industry or pharmaceuticals (Cheng *et al*., 2010; Kong, 2010; Mavridis, 2004; Mehralian *et al*., 2012; Wang *et al*., 2013). Research on intellectual capital has also been popular in India (Mondal & Ghosh, 2012; Vishnu & Gupta, 2014). Moreover the dimensions of intellectual capital have been explored in the Indian context. Relational capital has been studied in context to disaster recovery and outsourcing of services (Datta & Saad, 2008; Joshi & Aoki, 2014). While Kohli and Devraj (2004) studied the contribution of organizational capital towards organizational performance, a study was conducted to explore the contribution of human capital in explaining India's long run growth (Banerjee & Roy, 2014). Most of the research was conducted either on specific aspects of human, organizational and relational capital or their relation with performance (Balaji & Kumar, 2011; Dharni *et al*., 2009; Doctor, 2008; Harinarayana & Raju, 2009; Madhusudhan & Nagabhushanam, 2012).

Similar observation has been made in international literature. Good amount of work has been done on human capital and its impact. Some of these studies have taken organizational performance as the direct dependent variable while others have measured the effect of human capital on organizational innovativeness and productivity (Carmeli, 2004; Felicio *et al*., 2014; Goldin, 2001; Hsu, 2008). Similarly organizational capital and relational capital have been extensively studied and various aspects of these concepts have been explored successfully (Fisher, 2013; Fisher & Grosjean, 2002; Petrou & Daskalopoulou, 2013). Many of the studies have also included universities due to the rising importance of knowledge economy throughout the world.

Most of the studies pertaining to knowledge economy and intellectual capital of universities have taken place, not in context to the Indian economy (Altbach, 2004; Bano & Taylor, 2015; Kapoor & Crowley, 2008; Tirronen & Nokkala, 2009). This necessitates a research to empirically analyze the role that intellectual capital of universities plays in enhancing performance in a developing economy like India. Moreover, as per the author's knowledge the only conceptual study on balanced score card in terms of Indian universities has been a conceptual study by Umashankar and Dutta (2007). Even in this sense the study is absolutely relevant which is an extension to the above mentioned study.

Moreover, the Indian government's political will to revamp India into a knowledge economy driven by high performing universities makes the study further relevant. This can be substantiated with the report issued by the National Knowledge Commission in the year 2009 and the report issued by FICCI in the year 2013. These have been described in detail in Chapter 1 of the study.

3.2 Scope of the study

Present research provides an empirically tested model to the planners and practitioners in the higher education sector enabling them to take necessary steps to convert Vision 2030 into a reality. Achieving this vision will open up avenues for universities to get involved in the developmental process because the last decade has seen a clear dominance of the education sector in economic and social planning. Moreover the implications of this study will help government in focusing on the important areas of a university performance and thus contribute in transforming Indian economy into a knowledge based economy.

The study has tried to bring together many issues addressed individually in literature like research facilitation, quality of work life, workforce diversity, infrastructure, knowledge sharing, networking and student orientation under the common roof of intellectual capital, by empirically testing them to be the dimensions of human, organizational and relational capital respectively.

Results of this study imply that in addition to relying on the conventional areas, that are faculty expertise, teaching pedagogy and research quality, planners in the education sector need to focus equally if not more on the infrastructural and knowledge sharing aspects and keep themselves abreast of the technological changes which influence the way of teaching and learning.

As the free market logic extends to higher education, students have become customers and institutions, the service providers. The paradigm shift from a teacher driven to a student driven education model is because of the increasing service orientation of education sector. This customer oriented philosophy that has been validated through the construct of relational capital will help promote India as a symbol of international excellence in education.

3.3 Objectives of the study

O1.To study the relationship between human capital and organizational performance.

O2. To study the relationship between organizational capital and organizational performance.

O3. To study the relationship between relational capital and organizational performance.

O4. To identify the predictors of organizational performance.

O5. To study the difference in human, organizational, relational capital and organizational performance of private, state and central universities.

3.4 Research design and Research methods

Research design, sampling design, sources and procedures of data collection and methods used to analyze data are instrumental in achieving the objectives of any study. The section below covers these details. It also includes the details of the survey instrument used for collecting data, supported with its validity and reliability.

3.4.1 Research design

The study amalgamates both, exploratory and descriptive research design to propose the conceptual framework. The factors of ‘research facilitation’, quality of work life’, ‘perks for employee retention’ ‘faculty commitment’ and ‘equal employment opportunity’ were a combination of exploratory and descriptive research design. The factor of ‘access to information’ was more of a descriptive design. To analyze the factor of ‘network leveraging capacity’ literature support was used for the scale. In that sense the factor is again a combination of exploratory and descriptive research design. For measuring the construct of organizational performance, the study has used descriptive research design. ‘Quality of work life’, ‘perks for employee retention’, ‘equal employment opportunity’ and ‘degree of interaction’ and many items of these factors and others have never been studied and validated under the same names. Hence the study can be said to be a blend of both exploratory and descriptive design.

3.4.2 Survey Instrument

The respondents of the study comprised of the faculty of universities of the five North Indian states of Punjab, Haryana, UT of Chandigarh, Uttar Pradesh and Delhi NCR. Population of the study comprises of all faculty members of these universities. Most items of research facilitation scale have been adopted (Ramirez *et al*., 2007) and modified while others like ‘encouragement to be a part of research committees’ are self-designed. Literature support for ‘interdisciplinary research’ has been taken from Townsend *et al*., (2015). While ‘collaboration for research’ was adopted from Postiglione, (2013, 2015) and Kezar (2005), Ahmadi *et al*., (2012) provided the item of ‘research grant’. For the construct of quality of work life, items were adopted and modified from previous studies (Farid *et al*., 2008; Pick *et al*., 2012) while two items of ‘hiring faculty with experience’ and ‘mentoring new faculty’ were self- designed. Items of perks for employee retention and network leveraging capacity were modified from the scales provided in the study by Noaman *et al*., (2015). Two new scale items, 'individual academic responsibility' and 'individual administrative responsibility' were added in faculty commitment which have earlier neither been studied nor validated, while literature support for 'good relationships' was provided by Masron *et al*.,(2012). Two new items 'minorities' and 'different ability' were also added to the factor of equal employment opportunity while literature support was available from Bontis (1998), Amano (1997), Alleman and Haviland (2017) and Dobele *et al*., (2014).

Items of knowledge infrastructure, knowledge sharing and degree of interaction were adopted from previous study (Corcoles *et al*., 2011). All items of access to information were taken straight from an already validated study (Utulu & Okoye, 2010) and modified. Studies (Mc Dearmon, 2013; Weerts *et al*., 2010) provided literature support for the items related to alumni. Almost all items of the construct of organizational performance were adopted and modified from a few important studies on the application of balanced score card in universities by (Bontis, 1998; Cullen *et al*., 2003; Karathanos & Karathanos, 2005; Leitner, 2004; Tohidi *et al*., 2010; Umashankar & Dutta 2007) while some were self –designed. The scale adopted for the constructs were Likert scales ranging from 'Strongly Agree' to 'Strongly Disagree'.

3.4.3 Sample selection and sample size determination

The sample consisted of 13 universities out of the total 93 universities in five North Indian states of Punjab, Haryana, Uttar Pradesh, UT of Chandigarh and Delhi NCR.6 out of the 13 universities covered, featured in the top 100 state universities list according to the National Institutional Ranking Framework by the Ministry of Human Resource Development (2015). The Central Universities of Punjab and Haryana respectively are the only two central universities in these two states and thus have been considered for the purpose of this research. Thapar University, another private deemed university in Punjab has been ranked at 137th among 300 universities from 5 countries and 26thamong 65 Indian universities in the recently released QS BRICS university rankings 2018. GLA University, was ranked as the best emerging private university in the state of Uttar Pradesh. The other Universities, viz. Galgotias University, Greater

Noida, and Maharishi Markandeshwar University, Haryana featured in the list of top 100 engineering colleges by India today and Global Human Resource Development Centre (GHRDC) and are thus included in the study. Therefore, effort has been made to cover the universities that have good ratings and rankings. Because universities are largely knowledge intensive organizations, respondents were supposed to be the people who are at the helm of knowledge creation, dissemination and transfer, and hence faculty members were chosen to be the respondents. Regular faculty members and not research scholars were chosen so that clear insight could be gathered on questions relating to university policies. Administrative staff was omitted from the survey as they were not directly a part of the knowledge creation and dissemination process. To fill in for their perception on administrative issues, researchers included senior faculty/Deans who are equally a part of the policy making procedures. The basic assumption of the model is that all universities included in the study are at par, inspite of their year of establishment. All universities included, have good ratings and rankings. The two youngest central universities in the list: Central universities of Punjab and Haryana are both NAAC accredited ‘A’ grade universities. Moreover central university of Punjab has the highest h-index score among the 15 new central universities established, which makes it an upcoming research oriented university. Hence basic premise remains the same

To arrive at an appropriate sample size, the study used the following formula:

$n = z^2 * \ {}^2/M.E^2$ where

n= sample size

z= standard normal random variable (z score)

σ= variance

M.E= margin of error

So, the calculations at 95% level of confidence works out as under:

$$n = [(1.96)^2 * (0.24)^2]/(0.03)^2$$

$$n = [(3.8416) * (0.0576)]/(0.0009)$$

$$n = (0.2213)/(0.0009)$$

$$n = 245.89$$

Hence it can be said that the study has used a fairly representative size of sample.

3.4.4 Sources of data

Primary Source

Primary source of data includes the questionnaire survey which was administered directly to the faculty of all the universities covered. All the major constructs of the study: human capital, organizational capital, relational capital and organizational performance were a part of the questionnaire. Researchers visited all the universities personally and administered the questionnaires to the respondents.

Secondary source

The study also used secondary source of data apart from the questionnaire survey. In fact secondary data makes up for a very important part of the present study. Apart from the report of the All India Survey on Higher Education (2016-17) and the Inclusive and Qualitative Expansion of Higher Education (12th Five-Year Plan, 2012-17), the present research has studied two very important policy documents/reports. One was issued by FICCI (Federation of Indian Chambers of Commerce and Industry) higher education committee and Ernst and Young titled Higher Education in India: Vision 2030. The other report was issued by the National Knowledge Commission (2006-09) constituted by the government in the year 2005.

The All India Survey on Higher Education (2016-17) issued by the Ministry of Human Resource Development and the Inclusive and Qualitative Expansion of Higher Education (12th Five-Year Plan, 2012-17) issued by the University Gants Commission gave the researchers a credible and a complete snapshot of the higher education scenario which paved the way for further research. The report by the National Knowledge Commission and the Vision 2030 report by FICCI enabled the researchers to identify the gaps in the higher education scenario that can be worked upon in order to make the present study relevant and worthy of practical implementation.

3.5 Data collection procedure and pilot study

To make sure that the research instrument provides accurate responses and reduces uncertainty, a preliminary questionnaire was administered to a group of 70 people. Purpose of choosing convenience sampling was to test the questions on different constructs (human capital, organizational capital, relational capital, organizational performance). Academicians, teachers and faculty were the respondents of this survey. Apart from answering the questions, they also recommended certain changes in the structure and relevance of the questions. Some questions were totally eliminated while the phrasing of some of them was changed. Recommendations were incorporated so as to get an improvised questionnaire. Their suggestions were incorporated to refine the final questionnaire which had close-ended questions on a 5-point Likert scale.

Data were collected through the process of a field survey after taking prior approval of the concerned academic authority for every university. Stratified random sampling was used since the population comprised of sub groups like lecturers, assistant professors, associate professors, professors and visiting professors. Data from each stratum was collected in proportion to the population in each stratum. Initially data was collected for the states of Punjab, Haryana and UT of Chandigarh and thereafter the two states of Delhi NCR and Uttar Pradesh were covered.

Out of the 590 respondents surveyed, 390 (66.1%) were males and 200 (33.9%) were females. Among the respondents, 20% were in the age bracket of 25 to 30 years, followed by 34.4% in the age bracket of 30 to 35 years. 19.5% faculty came under the age bracket of 35 to 40 years and 26.1% were above 40 years. 54% of the faculty had Ph. D degree and 43.9% were post graduates. Data was collected from faculty belonging to different streams of university teaching like engineering, applied science, management, humanities and social science and others. Maximum response was received from engineering (28.8%) followed by applied science (23.4%), management (20.8%) and humanities and social science (20.7%). In terms of designation, maximum response was received from assistant professors, followed by associate professors, professors, lecturers and others.

3.6 Validity and Reliability

Validity is the phenomena because of which a survey instrument determines what it should determine and measures what it should. Questionnaire used for the survey was validated by academicians and faculty members before the final survey was conducted. Reliability is the feature of the survey instrument which ensures that if it is administered over and across different time frames, the results will be similar.

To determine the reliability of the scales, Cronbach's alpha was used. The standard threshold value of Cronbach alpha is 0.7 (Nunnally, 1978). But higher the coefficients, higher are the measuring instrument's reliability (Ghauri *et al*., 1995). Assessment of validity and reliability was done to make sure that the findings are meaningful. The reliability score of the questionnaire, construct wise has been presented in table 3.1.

Table 3.1: Reliability Statistics

S.No	Items	Construct	Cronbach Alpha
1	22	Human capital	0.908
2	9	Organizational capital	0.91
3	18	Relational capital	0.919
4	26	Organizational performance	0.951

The table above clearly shows that every construct individually is way above the threshold of 0.7 which is an indication that the instrument used for the study is completely reliable. Moreover the overall reliability of all the 75 items is 0.973. Hence the questionnaire is totally valid and reliable for the present study.

3.7 Tools and Techniques

The study has used Statistical Package for Social Sciences (SPSS) for data analysis. SPSS was used mainly for its reliability and correlation among the constructs. Also AMOS (Analysis of Moment Structures) which is an added SPSS module was used for regression analysis in order to study the relationships. Moreover SEM is a further improvisation of regression and a second generation multivariate method which is used to assess the validity and reliability of a hypothesized model. Correlation and factor analysis have been applied to test the hypotheses. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) was carried out using AMOS20.

3.7.1 Correlation

In order to assess, how strong the linear relationship between two or more variables is, correlation technique is used. It is also used to assess the direction of relationship. The present study has used correlation to establish discriminant validity of the scales used. Discriminant validity has been established by exploring the correlation between the various constructs of the study like research facilitation, quality of work life, perks for employee retention, faculty commitment, equal employment opportunity, knowledge infrastructure, knowledge sharing, access to information, network leveraging capacity and degree of interaction, financial, customer, learning and process. Using correlation matrix, it was established that the constructs are distinct from each other.

3.7.2 Factor analysis

Factor analysis is used to reduce the number of dimensions and identify the latent factor that underlies the variables. The present study has used exploratory factor analysis to reduce the number of items of the factors ‘research facilitation’, ‘quality of work life’, ‘perks for employee retention’, ‘faculty commitment’, ‘equal employment opportunity’, ‘knowledge infrastructure’, ‘knowledge sharing’, ‘access to information’, ‘network leveraging capacity’ and ‘degree of interaction’. Further, items of the factors were eliminated and their factor structure was confirmed using 1^{st} order and 2^{nd} order confirmatory factor analysis.

3.7.3 Structural Equation Modeling (SEM)

SEM is essentially a multivariate analysis technique to analyze relationships. It comprises of specified versions of a number of analysis methods as unique cases and is used to portray relations to test a conceptual or a theoretical model. SEM has been applied in the present study to investigate the impact of intellectual capital of universities on their performance with the help of AMOS 20. Goodness of fit indices for every construct have been calculated to confirm whether they are above the given threshold levels.

3.8 Research Framework

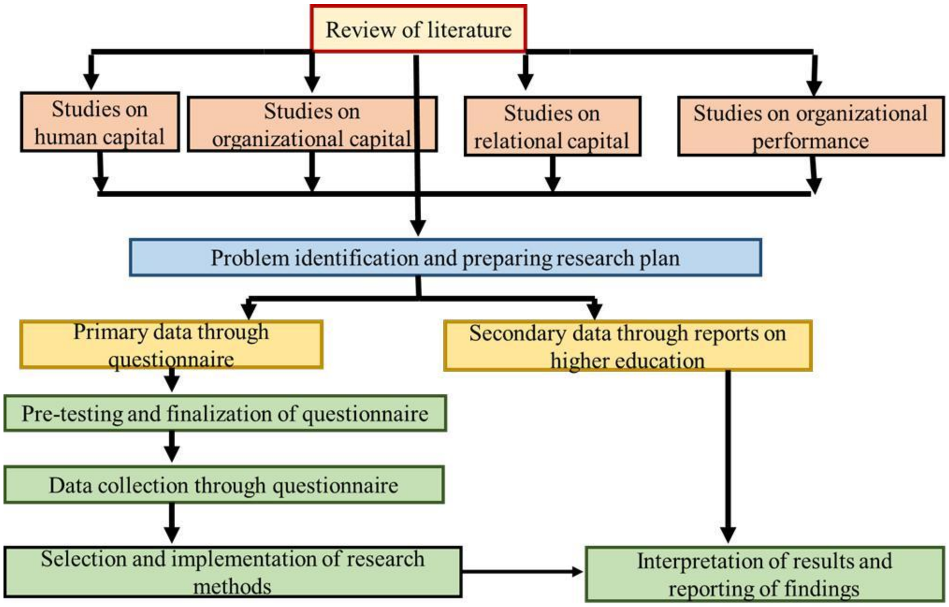


Figure 3.1 Research Framework

3.9 Conceptual Research Model

The present study has designed a structural model from the perspective of university faculty members across five selected states of North India, with an objective of enhancing performance of universities in relation to their intellectual capital. The study has highlighted the role played by intellectual capital in enhancing university performance. This finding is immensely important because of the emerging knowledge economies throughout the world including India.

Different forms of triple helix have been proposed. In a laissez faire system, industry might play the leading role, in a more state controlled system; the government might drive academia and industry. However the emergence of a science-based industry and the growth of new firms stimulated by academic research have resulted in the university becoming a primary institution and even replacing industry and government in the lead role as innovation organizer (Etkowitz, 2007).

Bano and Taylor (2015) highlighted in their study that much of the debate on KBE and universities is focused on developed countries since they are well capacitated to deal with the power of knowledge in terms of availability of human, social and intellectual capital, complemented by the political will of the governments of these countries. On the other hand developing countries are still struggling with accumulating the required human and social capital needed to create, manage and disseminate knowledge. It will therefore be quite interesting to see how developing countries like India explore the role of universities in creating a knowledge based economy. Thus the suggested model provides an appropriate direction to the planners and policymakers at universities to leverage intellectual capital in achieving a high performance education sector.

To validate the construct of human capital, EFA followed by CFA was performed on the items of research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity. Importance of a research facilitation coincides with previous studies (Altbach, 2013; Huang, 2015; Postiglione, 2013; Shin & Lee,2015). This highlights that research/publication output complemented with collaboration is outlined as a critical success factor whether it is between university faculty, between universities or with industry.

Researchers opine that the role of the state is to provide an institutional structure which promotes individual entrepreneurial freedom, free markets and free trade (Upadhyay, 2011). With increasing neo liberal policies in higher education, changes in forms of governance and emphasis on academic capitalism, quality of work life and perks provided to the faculty is fast becoming a way to retain and engage talented people at universities. The importance of these factors and practices in universities has been clearly substantiated through previous studies (Ferrer & Morris, 2013; Pick *et al*., 2012; Taylor, 2013). This supports the conclusion of the study that if universities want to engage their academicians, they need to share governance, focus on job satisfaction, workplace environment and career benefits.

The present study has extended the thoughts previously brought out on the centrality of organizational capital (Minguillo & Thelwall, 2015, Zhang *et al*., 2016, Brinckmann, 1998, Herrington & Summers, 2014) from the infrastructural aspect. This study has adopted a culture of knowledge sharing in addition to infrastructure as a factor and established that having the right kind of technology and infrastructure together with a knowledge sharing environment contribute to organizational capital. This finding will be particularly useful for planners at the Indian universities where the concept of knowledge sharing still hasn't got much attention.

Access to information, network leveraging capacity and degree of interaction emerged as significant predictors of relational capital. Previous studies conducted on reporting of information in the university accounting system and through websites with the objective of making universities more flexible, transparent, competitive, comparable and accountable reiterate this thought (Corcoles *et al*., 2011; Leitner, 2004; Sanchez *et al*., 2013; Sanchez & Elena, 2006; Utulu & Okoye, 2010; Zhang & Halloran, 2013). Also network leveraging capacity and degree of interaction have been studied extensively (Caruana, 2014; Fisher & Grosjean, 2002; Gibbs & Dean, 2014; Koenig-Lewis *et al*., 2016; McDearmon, 2013; Nielsen & Cappelen, 2014 ; Severiens *et al*., 2015; Tasker & Packham, 1993; Temple, 2006; Tulsi & Poonia, 2015; Weerts *et al*., 2010)

Thus the final structural model indicates that having research oriented policies, employee oriented practices in terms of quality work life and perks to retain competent faculty, securing faculty commitment towards university visions and equal employment opportunities, proper decision support systems, a culture of knowledge sharing, dissemination of relevant information, interactive environment at universities and networking taken together significantly contribute towards human capital, organizational capital and relational capital. A final path analysis establishes the fact that university performance is strongly influenced by intellectual capital. Thus the study provides an empirically tested model for planners in the higher education sector to enable them strategize around intellectual capital in order to enhance the overall university performance.

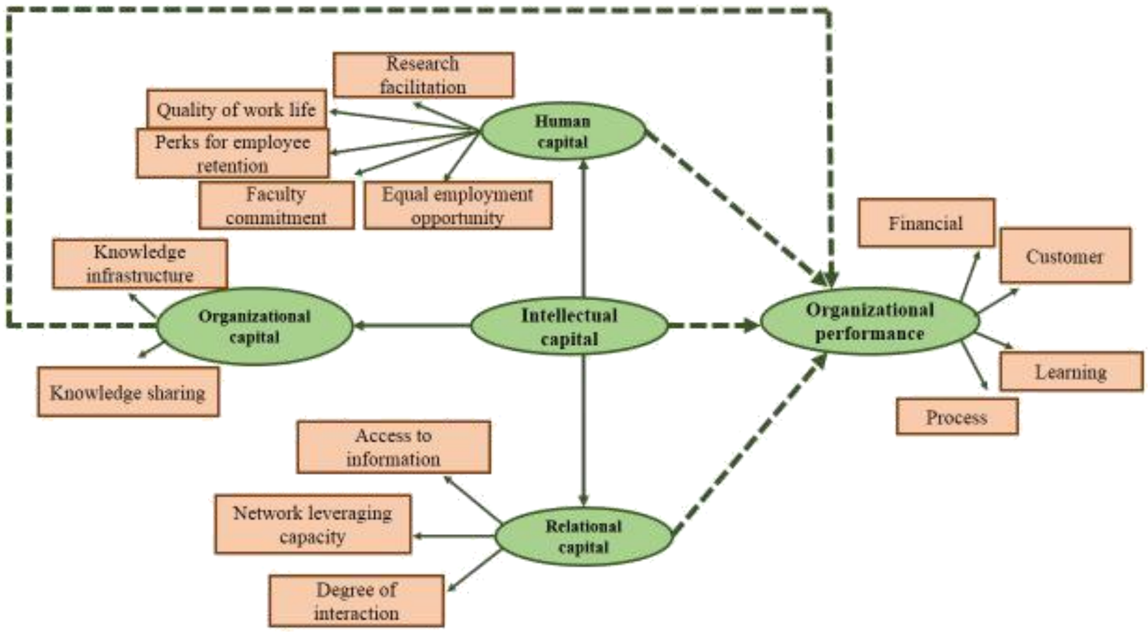


Figure 3.2 Proposed research model for examining the impact of university intellectual capital on performance

3.10 Concluding remarks

The chapter explains the details of data collection from faculty of the universities covered in the five states of Punjab, Haryana, Uttar Pradesh, UT of Chandigarh and Delhi NCR. The chapter also presents in detail the research design adopted for the present study. It explains the sample frame, questionnaire designing, sources of data collections, pilot study and the validity and reliability of the data collected. Further, the chapter provides information on the research methods and tools used for testing the hypotheses and designing the research model.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis of the collected data and further interpreting the same for the research study. Findings focus on the influence of university intellectual capital on university performance. The study explored the dimensions of intellectual capital viz. human, organizational and relational capital. Further, the factors of human, organizational and relational capital were examined. Also performance was measured in terms of BSC (Balanced Score Card).

Section 4.1 provides the details of the respondents‟ demographic profile so that the nature and feature of the sample can be understood. Section 4.2 discusses the factors of human, organizational and relational capital and their impact on performance of organizations along with the comparative analysis among private, state and central universities. Finally section 4.3 ends with the concluding remarks.

4.1 Demographic profile of the respondents

The section below is covering the profile and demographic characteristics of the respondents of the present study:

4.1.1 Gender of respondents-As shown through Figure 4.1.1, the sample set was dominated by male faculty. They comprised 66.1% of the total sample size while female faculty comprised of 33.9%. The data is presented pictorially below:

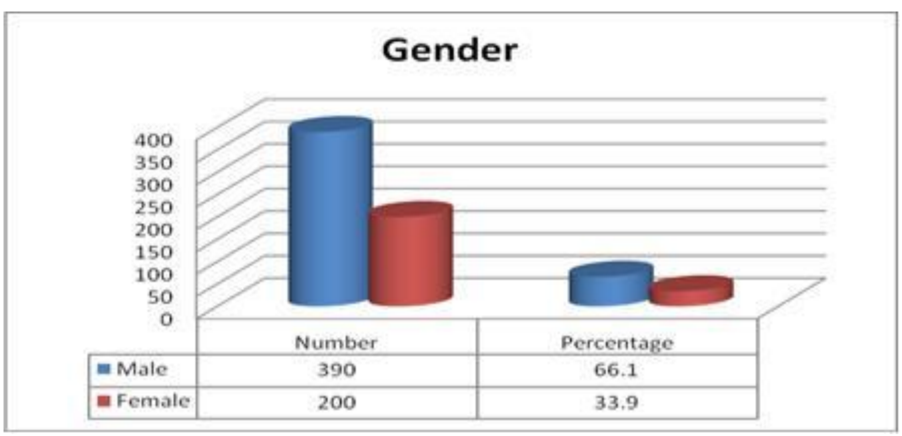


Figure 4.1.1: Gender of respondents

4.1.2 Age break-up of respondents- As represented through figure 4.1.2, the maximum response was received from the age bracket of 30 to 35 years (34.4%) followed by the age bracket of above 40 years (26.1%) indicating that maximum opinions on the survey have been received by academicians who are moderately established in their teaching career and seasoned academicians who are well established. The next category which received responses was from the age bracket of 25 to 30 years (20%) and the minimum response was received from the age bracket of 35 to 40 years (19.5%). This data has been shown pictorially below:

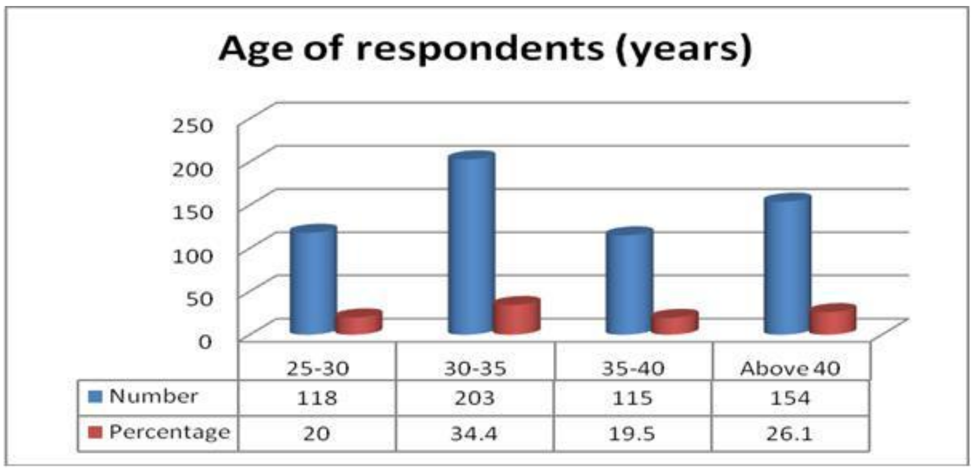


Figure 4.1.2: Age of respondents

4.1.3 Educational qualification of respondents

Three levels of education were chosen for the survey. They were: post-graduation, doctorate and others. Since the respondents of the survey were strictly faculty of universities, the classification started with post- graduation. 43.9% of respondents were post-graduates, while 54.4% were having a doctorate degree. Figure 4.1.3 indicates that majority are Phd holders.

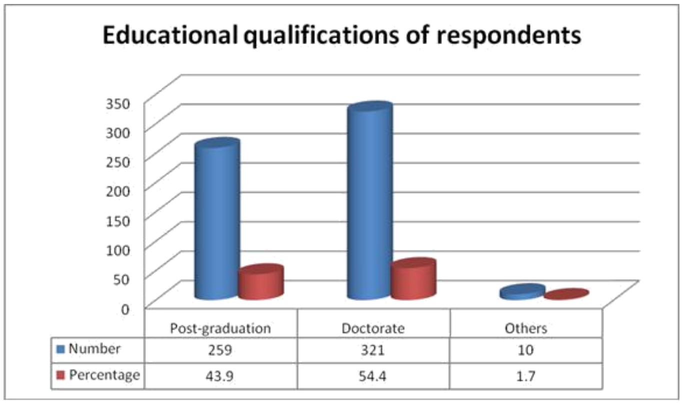


Figure 4.1.3: Educational qualification of respondents

4.1.4 Designation of the respondents

The study also provides the designation wise break-up of the respondents. Figure 4.1.4 indicates that 62.2% respondents were assistant professors, 17.8% were associate professors, followed by professors (11.7%), lecturers and others at 7.6% and 0.7% respectively.

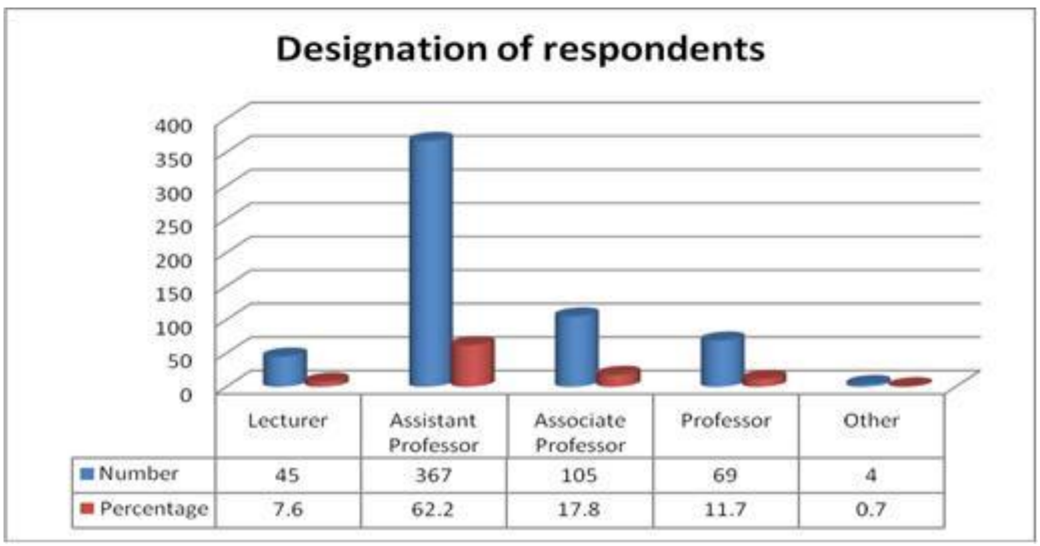


Figure 4.1.4: Designation of the respondents

4.1.5 Stream of teaching/research of respondents

Data was collected from various departments of the universities covered, so as to get a comprehensive view of universities and their intellectual capital. Departments covered comprised of engineering, applied science, management, humanities and social science and others (arts & commerce). Figure 4.1.5 depicts the break-up of departments covered. It is shown that maximum respondents were from engineering stream, (28.8%) followed by applied science (23.4%). Response received from management and humanities was almost the same at 20.8% and 20.7% respectively, while others constituted 6.3%.

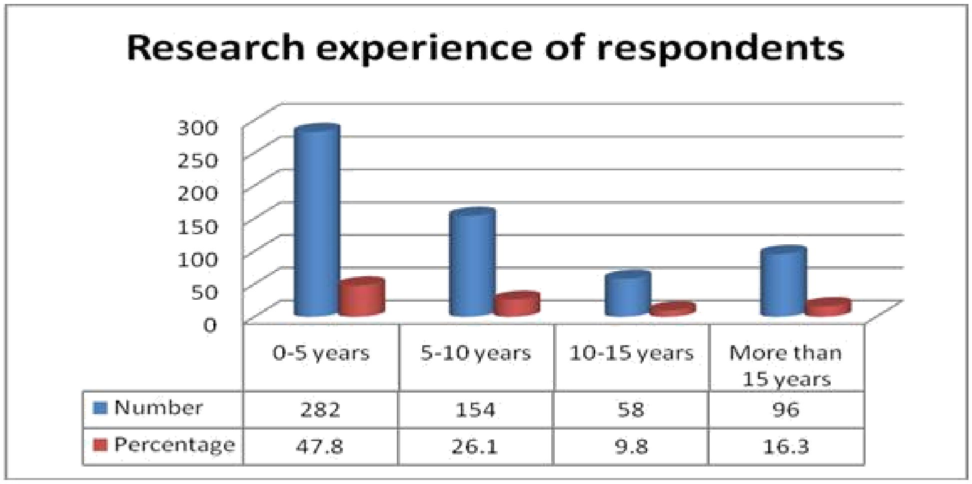


Figure 4.1.5: Stream of teaching/research of respondents

4.1.6 Research experience of respondents

The data collected on research experience indicates that maximum respondents were in their initial years of research with a percentage of 47.8 in 0 to 5 years. 26.1% respondents had a research experience of 5 to 10 years. 16.3% of the respondents were in the bracket of more than 15 years of research while 9.8% respondents were in the 10 to 15 years category. Table and figure 4.1.6 represents the same.

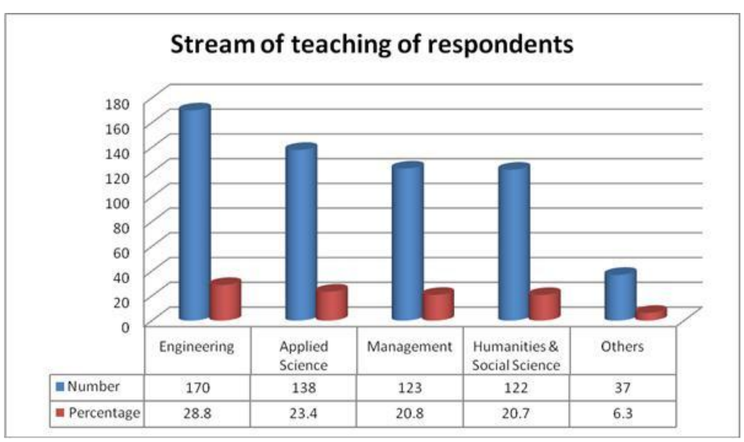


Figure 4.1.6: Research experience of the respondents

4.2 SEM Analysis of human capital, organizational capital, relational capital and organizational performance and their relationships.

This section reports the analysis of data using SPSS 20 and AMOS 20. This part of the study reports the factors identified which are basic to the main constructs. Exploratory factor analysis was carried out followed by confirmatory factor analysis to test the hypothesized relationships.

Exploratory Factor Analysis (EFA)

Exploratory factor analysis brings related variables together under more generic factors. More specifically, factor analysis is conducted with the objective of reducing "the dimensionality of the original space and to give an interpretation to the new space, spanned by a reduced number of new dimensions which are supposed to underlie the old ones." (Rietveld& Van Hout, 1993) Also it is used to explain the variance in the observed variables in terms of the underlying latent factors (Habing, 2003). Hence factor analysis gives not only a clear view of the data, but also the opportunity of utilizing the output in further analyses (Field, 2000; Rietveld & Van Hout, 1993).

Confirmatory factor analysis-measurement model

Confirmatory factor analysis (CFA) is a statistical technique for verifying the factor structure of a set of variables. CFA allows the researcher to test the hypothesis that a relationship between observed variables and their underlying latent structure exists (Suhr, 2006). The measurement model is estimated to determine to what extent exogenous variables explain the latent variable constructs.

Structural equation modeling (SEM) is used to describe the relationship between latent and observed/measured variables. Observed variables can be measured by the researcher. The latent variables can't be measured directly but are of immense importance for the researcher. Hence, to measure latent variables, a conceptual model has to be designed in order to be able to express latent variables in terms of observed variables. For developing SEM framework, this research has used AMOS 20 and covered both, measurement and structural model. The structural component, models the relationship between the latent variable constructs.

The measurement model and the structural model combined together make up a holistic model that comprehensively describes the relationship between all the variables involved in the study. The estimation of the structural model is carried out after the estimation of the measurement model.

The measurement model represents CFA that depicts the pattern how each item indicator loads on the respective latent factor. It defines the relationship between the observed and unobserved variables. Measurement model only deals with validating the model. The model was specified and tested on the basis of the dataset.

Validation of measurement model

To estimate the measurement model evaluation, convergent and discriminant validity of each of the measurement scale is done. It is imperative to establish validity and reliability checks of the instrument. The following checks were carried out:

- Content validity
- Composite reliability
- Convergent validity
- Discriminant validity

Content validity- Content validity refers to the degree to which the measure represents the elements of the given construct. Content validity has been mentioned in section 3.4 of the research design chapter.

Composite reliability- Composite reliability (CR) is the degree to which measurements are error free and yield consistent results. The standardized threshold value used for CR is 0.7. Values above 0.7 are considered to be acceptable. Higher the value, higher is the reliability.

CR= (square of summed standardized loadings)/ (square of summed standardized loadings+ sum of measurement error variances)

$$CR = \frac{\left(\sum \lambda_i\right)^2}{\left(\sum \lambda_i\right)^2 + \sum Var\left(\varepsilon_i\right)}$$

Here λ is the standardized factor loading and ε is the indicator measurement error.

Convergent validity- This type of validity is established when the item indicators measuring a proposed construct correlate very strongly to it. It means that the items which indicate and measure a construct should share a high variance in common. For this to happen, the standardized factor loadings need to be more than 0.5. Higher the value of factor loadings, higher is the convergent validity. Also, the average variance extracted (AVE) for all the factors should be greater than 0.5. The formula for calculating AVE using the formula suggested by Hair *et al*., (2010) is given below:

AVE= (sum of squared standardized loadings)/(sum of squared standardized loadings+ sum of measurement error variances)

$$AVE= \frac{\Sigma \lambda i^2}{\Sigma \lambda i^2 + \Sigma \varepsilon i}$$

Here λ is the standardized factor loading and ε is the indicator measurement error.

Discriminant validity- It is the degree to which a construct is distinct from the other constructs. Discriminant validity is said to be established when the square-root of AVE of each individual constructs is more than the inter-construct correlations.

4.2.1 Analysis of human capital and organizational performance

Objective 1 (O1): To study the relationship between human capital and organizational performance

The following hypotheses as formulated in chapter 2 of review of literature were tested and the results have been provided in the section below:

H1 (a): Human Capital is a multidimensional construct significantly predicted by research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity.

H1 (b): There is a significant positive relation between human capital and organizational performance.

To identify factors underlying human capital, factor analysis on the 40 items of human capital was carried out. These item indicators were identified through literature review to represent the construct. SPSS version 20 was used to condense the large number of original items into a smaller set of new variables with a minimum loss of information (Hair *et al.,* 2010). Thus to reduce the number of variables through deletions by looking at whether underlying assumptions are met in Eigen values (>1), communalities (>0.5) and factor loadings (>0.5), Principal Component Analysis along with Varimax rotation was performed. Items with loadings less than 0.5 were eliminated so that all factors can explain variance.

Identification of the factors using EFA allowed the researchers to go ahead and confirm the factor structure with the help of CFA. Later, the path model was used which delved into more meaningful relationships among observed variables. Thus in the present study, reliability and validity of measurement models for all constructs is measured using CFA.

(i)Measurement model, reliability and validity

To estimate the reliability and validity of the hypothesized measurement model, 1st order CFA was carried out on the indicators of human capital. 22 out of 35 items were sustained and carried forward for further analysis. 2 items of quality of work life (QWL), 4 items of perks for employee retention (PFER), 2 items of faculty commitment (FC) and the factor of teaching effectiveness were eliminated because of unclear factor structure and poor factor loadings. Table 4.2.1 shows the results of CFA. The standardized loadings of all items included are significant. Convergent validity of the instrument is established as AVE (Average variance extracted) of the 5 factors of the construct is more than 0.50. The results also confirm composite reliability of the constructs since the values on all occasions is greater than 0.70. To establish discriminant validity, square root of the average variance extracted (AVE) of each factor of the construct was calculated. The instrument illustrated strong discriminant validity as the square root of AVE estimate of each factor was larger than the inter-factor correlations. Table 4.2.2 depicts discriminant validity.

Table 4.2.1 Measurement model, human capital

Variables	Items	S. estimates	S.E	C.R	Composite Reliability	AVE
Research facilitation	RF1	0.568			0.902	0.538
	RF2	0.767	0.077	13.697		
	RF3	0.635	0.056	12.232		
	RF4	0.742	0.082	13.51		
	RF5	0.677	0.066	12.768		
	RF6	0.777	0.088	13.813		
	RF7	0.803	0.086	14.177		
	RF8	0.856	0.079	14.694		
Quality of work life	QWL1	0.844			0.838	0.514
	QWL2	0.832	0.048	21.348		
	QWL3	0.581	0.048	14.222		
	QWL4	0.642	0.053	16.009		
	QWL5	0.644	0.049	16.068		
Perks for employee retention	PFER1	0.679			0.767	0.525
	PFER2	0.696	0.089	12.874		
	PFER3	0.793	0.089	12.729		
Faculty commitment	FC1	0.602			0.769	0.53
	FC2	0.781	0.117	12.31		
	FC3	0.785	0.128	12.287		
Equal Employment opportunities	EEO1	0.542			0.762	0.53
	EEO2	0.643	0.121	11.668		
	EEO3	0.94	0.205	9.796		

Table 4.2.2 Correlation Matrix

	RF	QWL	PFER	FC	EEO
RF	*0.733*				
QWL	0.604**	*0.716*			
PFER	0.392**	0.351**	*0.724*		
FC	0.343**	0.248**	0.183**	*0.728*	
EEO	0.506**	0.451**	0.465**	0.195**	*0.728*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Structural Model of Human capital

The hypothesized second order model was estimated separately on human capital. Table 4.2.3 depicts the results. Results indicate that human capital is significantly explained by research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity thus supporting **H1(a)**. Research facilitation had the highest value indicating that research is still at the apex of the academic hierarchy. This was followed by quality of work life, equal employment opportunity and perks for employee retention. This provides an important insight on the changed functioning of universities and their increasing inclination towards neo-liberal policies as far as governance and management is concerned. Significant emphasis is being given to the work environment being provided at universities. Though faculty commitment emerged significant but had the lowest loading indicating that in spite of its significance, faculty commitment is not something which is being focused on.

Table 4.2.3 Structural model of human capital

Factors		Construct	Standardized estimates	Estimate	S.E.	C.R.	P
Research facilitation	<---	Human capital	0.817	1			
Quality of work life	<---	Human capital	0.726	0.951	0.055	17.228	0.000***
Perks for							

employee retention	<---	Human capital	0.512	0.908	0.077	11.761	0.000***
Faculty commitment	<---	Human capital	0.400	0.376	0.041	9.08	0.000***
Equal employment opportunity	<---	Human capital	0.595	0.858	0.062	13.936	0.000***

(iii) Path analysis of human capital and organizational performance

In the next phase the structural model and the corresponding theoretical relationship with organizational performance was tested. Human capital had a positive influence on organizational performance (standardized factor loading= 0.827, p< 0.001). This result supported **H1(b)** that there is a significant positive association between human capital and organizational performance. Table 4.2.4 shows the results of path analysis. Acceptable goodness of fit indices used in the study are the standard ones that are used in most of the studies. AGFI, GFI, CFI, TLI should be close to1. CMIN/df <5 and RMSEA≤ 0.07.

Table 4.2.4 Path analysis of human capital and organizational performance

Construct	Path	Construct	Standardized estimate	Estimate	S.E.	C.R.	P
Organizational performance	<---	Human capital	0.827	1.245	0.111	11.259	0.000***
Goodness of fit CMIN/df= 4.417, GFI=0.969, NFI= 0.963, TLI=0.948, CFI= 0.971, RMSEA= 0.07							

4.2.2 Analysis of organizational capital and organizational performance

Objective 2 (O2): To study the relationship between organizational capital and organizational performance

The following hypotheses as formulated in chapter 2 of review of literature were tested and the results have been provided in the section below:

H2 (a): Organizational capital is a multidimensional construct significantly predicted by knowledge infrastructure and knowledge sharing.

H2 (b): Organizational capital has a significant positive relation with organizational performance.

To identify the factors underlying organizational capital, factor analysis was carried out on the nine items identified through literature review to represent the construct. SPSS version 20 was used to condense the information from the large number of original items into a smaller set of new variables (Hair *et al.,* 2010). Thus to reduce the number of variables through deletions by looking at whether underlying assumptions are met in Eigen values (>1), communalities (>0.5) and factor loadings (>0.5), Principal Component Analysis (PCA) along with Varimax rotation was performed. Factor loadings of all the 9 items was more than 0.5 and hence all the items were carried forward for the analysis.

(i) Measurement model, reliability and validity

Identification of the factors using EFA allowed the researchers to go ahead and confirm the factor structure with the help of CFA. Later, path analysis was carried out to allow more meaningful relationships among observed variables. None of the nine items were eliminated during exploratory factor analysis. Table 4.2.5 depicts the results of 1st order CFA conducted on the items of organizational capital. Results indicate evidence of convergent validity. All the nine items significantly converge into the two factors of „knowledge infrastructure" and „knowledge sharing" with factor loadings more than 0.5. Also average variance extracted for both the factors of the construct exceeds 0.5. Finally, the composite reliability of the instrument is also established since values on all occasions exceeds 0.7. Discriminant validity is also established through the correlation matrix indicated in table 4.2.6 which clearly shows that the square root of the AVEs of both factors of the construct are greater than the respective correlations among them.

Table 4.2.5Measurement model, organizational capital

Variables	Items	S. estimates	S.E	C.R	Composite reliability	AVE
Knowledge infrastructure	KI1	0.625			0.85	0.534
	KI2	0.708	0.057	19.417		
	KI3	0.686	0.064	12.996		
	KI4	0.811	0.072	16.139		
	KI5	0.805	0.079	14.294		
Knowledge sharing	KS1	0.614			0.888	0.668
	KS2	0.854	0.096	16.142		
	KS3	0.862	0.098	16.23		
	KS4	0.908	0.096	16.671		

Table 4.2.6 Correlation Matrix

	KI	KS
KI	*0.73*	
KS	0.689**	*0.817*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Structural model of organizational capital

In this phase the hypothesized second order model was tested. Results are shown in table 4.2.7. Results indicate that knowledge infrastructure and knowledge sharing have a significant explanation power as far as organizational capital is concerned. Therefore it can be said that **H2(a)** is accepted which states that organizational capital is a multidimensional construct significantly predicted by knowledge infrastructure and knowledge sharing. The structural model indicates that both the factors significantly predict organizational capital but out of the two, knowledge sharing emerged as the stronger predictor of organizational capital. This is an indicator that having decision support systems in organizations may not be enough, unless it is supported by a strong culture of knowledge sharing and communities of practice.

Table 4.2.7 Structural model of organizational capital

Factors		Construct	Estimate	Standardized estimate	S.E.	C.R.	P
Knowledge Infrastructure	<---	Organizational capital	1	0.804			
Knowledge Sharing	<---	Organizational capital	1.361	0.851	0.063	21.56	0.000***

(iii) Path analysis of organizational capital and organizational performance

Path analysis was conducted in this phase to test the structural model and corresponding theoretical relationship between organizational capital and organizational performance of universities. Organizational capital had a positive impact on organizational performance (standardized factor loading= 0.815, $p < 0.001$) thus supporting **H2(b)** that there is a significant positive association between organizational capital and organizational performance. Table 4.2.8 shows the results of path analysis.

Table 4.2.8Path analysis of organizational capital and organizational performance

Construct	Path	Construct	Standardized estimate	Estimate	S.E.	C.R.	P
Organizational performance	<---	Organizational capital	0.815	0.764	0.057	13.338	0.000***

Goodness of fit CMIN/df= 3.758, GFI=0.983, NFI=0.985, TLI= 0.979, CFI=0.989, RMSEA= 0.068

4.2.3 Analysis of relational capital and organizational performance

Objective 3 (O3): To study the relationship between relational capital and organizational performance

The following hypotheses as formulated in chapter 2 of review of literature were tested and the results have been provided in the section below:

H3 (a): Relational capital is a multidimensional construct significantly predicted by access to information, network leveraging capacity and degree of interaction.

H3 (b): Relational Capital has a significant positive relation with organizational performance.

To fulfill objective 3 and study the relation between relational capital and organizational performance, exploratory factor analysis was performed to narrow down the variables into latent factors. Thus the number of variables were reduced through deletions by looking at whether underlying assumptions are met in Eigen values (>1), communalities (>0.5) and factor loadings (>0.5).

(i)Measurement model, reliability and validity

After the EFA, 1st order CFA was carried out where 3 items were removed due to unclear factor structure and low factor loading. Remaining 18 items were carried on for further analysis. The results of reliability and validity testing are depicted in table 4.2.9. Results reinforce that the scales used were valid and reliable. All the eighteen items of access to information, network leveraging capacity and degree of interaction had a standardized loading (>0.5) and merge into these three factors thus demonstrating convergent validity of the instrument. Moreover, the AVE of all the three factors is more than 0.5, thus satisfying the criterion. Composite reliability of all the three factors is well beyond the threshold limit (>0.7). Discriminant validity was established by confirming that the square root of AVE values of all factors was larger than all the inter-construct correlations.

4.2.9Measurement model, relational capital

Variables	Items	Standardized estimates	S.E	C.R	Composite Reliability	AVE
Access to information	ATI1	0.776			0.914	0.517
	ATI2	0.803	0.054	20.722		
	ATI3	0.723	0.055	18.268		
	ATI4	0.734	0.047	18.6		
	ATI5	0.716	0.056	18.066		
	ATI6	0.695	0.051	17.453		
	ATI7	0.719	0.049	18.169		
	ATI8	0.697	0.047	17.495		
	ATI9	0.704	0.042	17.713		

	ATI10	0.606	0.039	14.89		
Network leveraging capacity	NLC1	0.584			0.841	0.52
	NLC2	0.604	0.108	11.654		
	NLC3	0.75	0.099	13.47		
	NLC4	0.856	0.104	14.369		
	NLC5	0.773	0.093	13.704		
Degree of interaction	DOI1	0.642			0.772	0.532
	DOI2	0.774	0.102	12.802		
	DOI3	0.764	0.121	12.835		

4.2.10 Correlation Matrix

	ATI	**NLC**	**DOI**
ATI	*0.719*		
NLC	0.484**	*0.721*	
DOI	0.507**	0.608**	*0.729*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Structural model of relational capital

The hypothesized second order model was estimated separately on relational capital. Table 4.2.11 summarizes the results. Results indicate that access to information, network leveraging capacity and degree of interaction significantly explain relational capital. Out of the three, the strongest factor that emerged was access to information followed by network leveraging capacity and degree of interaction. The results clearly support **H3(a).** This indicates that in this information age universities are making an extra effort towards being more flexible, transparent, competitive, comparable and accountable by dissemination of relevant information through university websites.

4.2.11 Structural model of relational capital

Factors		Construct	Estimate	Standardized estimate	S.E.	C.R.	P
Access to information	<---	Relational capital	1	0.774			
Network leveraging capacity	<---	Relational capital	0.943	0.641	0.061	15.453	0.000***
Degree of interaction	<---	Relational capital	0.899	0.622	0.061	14.775	0.000**

(iii) Path analysis of relational capital and organizational performance

Moving further, path analysis was carried out so that the association between relational capital and organizational performance can be established. Results in table 4.2.12 indicate that relational capital has a significant positive association with organizational performance (standardized factor loading= 0.854, p<0.001) thus supporting **H3 (b)** which states that relational capital has a significant positive relation with organizational performance. Moreover all fit indices have good values indicating the credibility of the hypothesized relationship.

4.2.12 Path analysis of relational capital and organizational performance

Construct	Path	Construct	Standardized estimate	Estimate	S.E.	C.R.	P
Organizational performance	<---	Relational capital	0.854	0.862	0.063	13.725	0.000***

Goodness of fit CMIN/df= 2.638, GFI=0.987, NFI=0.989, TLI=0.986, CFI=0.993, RMSEA=0.053

4.2.13 Combined structural model of human, organizational and relational capital

Factor		Construct	S. Estimate	S.E.	C.R.	P
Research facilitation	<---	Human capital	0.817			
Quality of work life	<---	Human capital	0.726	0.055	17.228	0.000***
Perks for employee retention	<---	Human capital	0.512	0.077	11.761	0.000***
Faculty Commitment	<---	Human capital	0.400	0.041	9.08	0.000***
Equal employment opportunity	<---	Human capital	0.595	0.062	13.936	0.000***
Knowledge Infrastructure	<---	Organizational capital	0.804			
Knowledge sharing	<---	Organizational capital	0.851	0.063	21.565	0.000***
Access to information	<---	Relational capital	0.774			
Network leveraging capacity	<---	Relational capital	0.641	0.061	15.453	0.000***
Degree of interaction	<---	Relational capital	0.622	0.061	14.775	0.000***

Goodness of fit CMIN/df= 3.12, GFI=0.974, NFI=0.969, TLI=0.962, CFI=0.979, RMSEA= 0.06

4.2.4 Organizational performance (reliability, validity and structural model)

To fulfill objective 4 (**O4**): To identify the predictors of organizational performance, the following two hypotheses were proposed.

H4 (a): Organizational performance at universities is predicted by financial, customer, learning and process aspects.

H4 (b): Intellectual capital has a significant positive association with performance at universities.

For the present study the Balanced Score card model has been used to measure organizational performance. The model is an empirically established model proposed by Kaplan and Norton (1992), with its four sub dimensions viz. Financial, Customer, Learning and Process. Moreover great amount of work has been done building up on the model which have all been discussed in literature review. Hence exploratory factor analysis was not required in case of this construct and this step was omitted and confirmatory factor analysis was carried out for testing the proposed measurement and structural model.

(i)Measurement model, reliability and validity of organizational performance

1st order confirmatory factor analysis was conducted to test the hypothesized measurement model and confirm the factorial structure and establish whether the indicators selected, measure the four dimensions of the model: financial, customer, process and learning. 33 items were selected on the basis of literature review. 1st order confirmatory factor analysis led to the elimination of 4 items from financial, 2 items from customer and 1 item from learning and finally 26 items went ahead for further analysis. Tables 4.2.14 and 4.2.15 summarize the results. The results depict that the scale adopted demonstrates convergent validity. All the indicators merged into the four respective factors with standardized loadings greater than 0.5. Also the values of AVE for all the four factors exceeded 0.5. Composite reliability values on all occasions were comfortably beyond the threshold value of 0.7. Finally, discriminant validity was also established since the square root of the AVE values of all four factors were more than the inter-factor correlations.

4.2.14 Measurement model, organizational performance

Variables	**Items**	**S. estimates**	**S.E**	**C.R**	**Composite Reliability**	**AVE**
Financial	Fin 1	0.761			0.811	0.519
	Fin 2	0.696	0.073	12.562		
	Fin 3	0.757	0.082	13.322		
	Fin 4	0.663	0.074	12.292		
Customer	Cust1	0.72	0.077	14.587	0.896	0.554
	Cust2	0.855	0.077	16.493		
	Cust3	0.828	0.077	16.151		
	Cust4	0.804	0.077	15.829		
	Cust5	0.681	0.068	15.319		
	Cust6	0.633				
	Cust7	0.656	0.053	19.479		
Learning	Learn1	0.706			0.853	0.502

	Learn2	0.646	0.061	14.1		
	Learn3	0.679	0.061	14.767		
	Learn4	0.652	0.069	14.24		
	Learn5	0.761	0.071	16.339		
	Learn6	0.757	0.07	16.259		
Process	Pro1	0.746			0.911	0.533
	Pro2	0.719	0.053	17.478		
	Pro3	0.673	0.049	16.277		
	Pro4	0.745	0.062	18.187		
	Pro5	0.753	0.067	18.368		
	Pro6	0.797	0.066	19.582		
	Pro7	0.837	0.059	20.642		
	Pro8	0.636	0.073	15.305		
	Pro9	0.638	0.063	15.368		

4.2.15 Correlation Matrix

	Financial	**Customer**	**Learning**	**Process**
Financial	*0.72*			
Customer	0.533**	*0.744*		
Learning	0.570**	0.674	*0.708*	
Process	0.544**	0.705**	0.70**	*0.73*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Structural model of organizational performance

Next, the hypothesized second order model was established by conducting 2^{nd} order confirmatory factor analysis. Results indicate that financial, customer, learning and process aspects significantly predict performance of a university and the data fits the hypothesized 2^{nd} order model, thus supporting **H4 (a)** which states that organizational performance at universities is predicted by financial, customer, learning and process aspects.

Table 4.2.16 shows the outcomes along with the fit indices. Results provide some interesting insights on university performance. Though all four emerged as predictors, the maximum impact was exerted by learning (standardized loading= 0.927, $p<0.001$), followed by process (standardized loading= 0.854, $p<0.001$), customer (standardized loading= 0.825, $p<0.001$) and financial (standardized loading= 0.666, $p<0.001$). These are pointers towards the significance of universities as learning organizations. Being at the epicenter of knowledge creation and dissemination, universities need to constantly work on and move ahead on their learning curve. Innovative and entrepreneurial universities are becoming in conjunction with world class universities. Customer aspect emerged as a very strong factor indicating that universities are gradually changing from a teacher oriented to a student oriented model of education where students, their parents and industry are treated as customer and universities as service providers.

4.2.16 Structural model of organizational performance

Factors		Construct	S. Estimates	Estimate	S.E.	C.R.	P
Financial	<---	OP	0.666	1			
Customer	<---	OP	0.825	1.047	0.051	20.585	0.000***
Learning	<---	OP	0.927	1.205	0.05	24.282	0.000***
Process	<---	OP	0.854	1			

Goodness of fit CMIN/df= 3.598, GFI=0.994, NFI=0.995, TLI=0.988, CFI=0.996, RMSEA= 0.066

(iii) Structural model of Intellectual capital

Proposed structural model was tested for the given dataset in order to establish in order to establish human capital, organizational capital and relational capital as the elements of intellectual capital. Table 4.2.17 depicts the results of structural model. The table shows that relational capital emerged as the strongest predictor of intellectual capital (standardized loading= 0.856, p<0.001), closely followed by organizational capital (standardized loading= 0.834, p<0.001) and human capital (standardized loading= 0.724, p<0.001). This clearly indicates that relational capital is the strongest determinant of a university’s intellectual capital, which was quite a counterintuitive result of the present study.

4.2.17 Structural model of intellectual capital

Factors		Construct	S. Estimate	S.E.	C.R.	P
Human capital	<---	Intellectual capital	0.724			
Organizational capital	<---	Intellectual capital	0.834	0.086	19.361	0.000***
Relational cap	<---	Intellectual capital	0.856	0.069	19.825	0.000***

Goodness of fit CMIN/df= 2.33, GFI=0.985, NFI=0.990, TLI=0.988, CFI=0.995, RMSEA= 0.04

(iv) Path analysis of intellectual capital and organizational performance

Path analysis helped in establishing the impact of intellectual capital over organizational performance. Table 4.2.18 summarizes the results of the path analysis. Results indicate that intellectual capital has a very strong effect on performance of universities (standardized factor loading= 0.89, $p<0.001$) thus supporting **H4 (b)** which states that intellectual capital has a significant positive association with performance at universities. All the fit indices were better than acceptable and show that the data fits the proposed model. Figure 4.2.1 below depicts the hypothesized model along with the relationships among the variables. Dotted lines represent the paths.

4.2.18Path analysis of intellectual capital and organizational performance

Construct	Path	Construct	S. estimate	Estimate	S.E.	C.R.	P
OP	<---	IC	0.89	1.339	0.079	16.909	0.000***

Goodness of fit CMIN/df= 2.33, GFI=0.989, NFI=0.992, TLI=0.99, CFI=0.995, RMSEA= 0.048

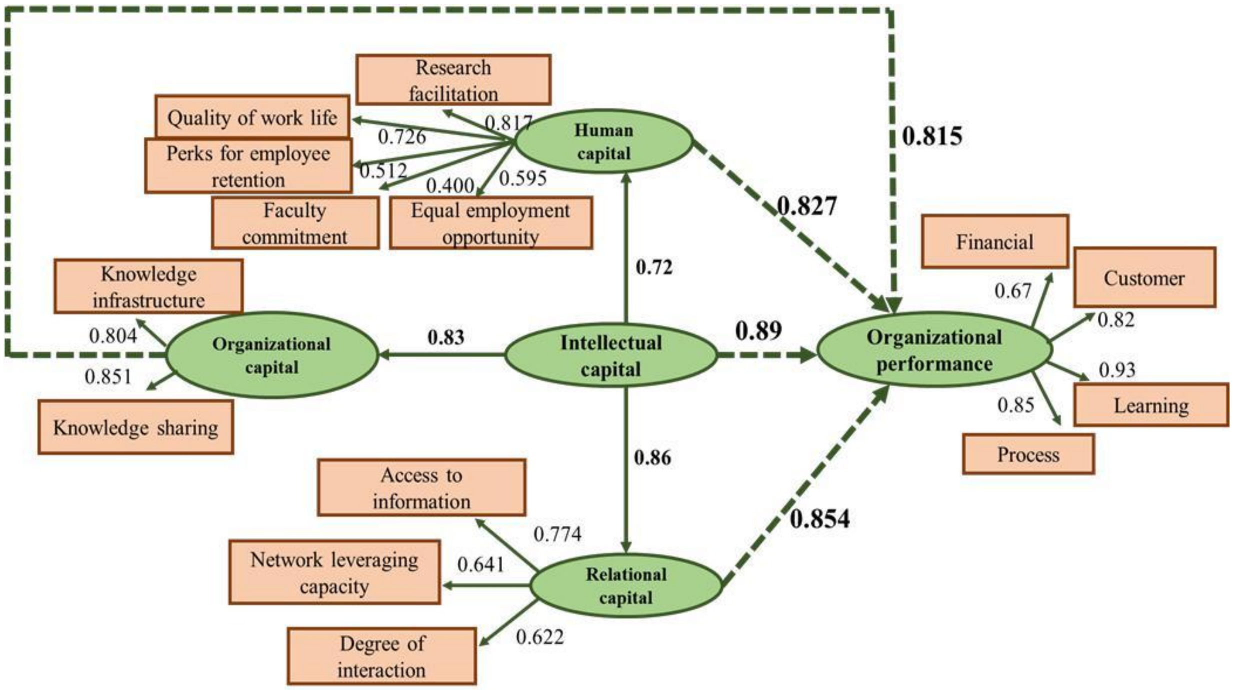


Fig 4.2.1 Research model depicting the hypothesized relationships

4.2.5 Analysis of the difference in human, organizational, relational capital and organizational performance of private, state and central universities.

The last objective **(O5)** of this research was to study the difference in human, organizational, relational capital and performance of private, state and central universities. The following hypothesis was proposed:

H5: There is a significant difference in human, organizational, relational capital and organizational performance of private, state and central universities.

To compare intellectual capital and performance of private, state and central universities, the first step was dividing the data of the three categories of universities from the complete dataset. Three separate datasets were created for private, state and central universities respectively. Exploratory factor analysis (EFA) had already been conducted to fulfill the previous objectives hence this step was omitted. 1st order confirmatory factor analysis followed by 2nd order CFA and finally path analysis was conducted for each dataset separately in order to study the differences in human, organizational, relational capital and organizational performance of the three categories of universities. Results of the analysis are depicted in the section below.

4.2.5.1 Private

(i) Measurement model, reliability and validity of human capital

To study the hypothesized measurement model and confirm the reliability and validity of the scales, 1st order CFA was conducted on the total 30 items of human capital. After the CFA was conducted, 3 items of quality of work life (QWL) and all the 3 items of equal employment opportunity (EEO) were removed due to unclear factor structure. Remaining 24 items were carried forward for further analysis. Results depicted in tables 4.2.19 and 4.2.20 show that the scale adopted demonstrates convergent validity and discriminant validity. All the indicators merged into the four respective factors with standardized loadings greater than 0.5. AVE of all four factors exceeded 0.5. Composite reliability values on all occasions was more than 0.7. Finally, discriminant validity was also established since the square root of the AVE of all four factors was more than the inter-construct correlations.

4.2.19 Measurement model, human capital

Variables	Items	S. estimates	S.E.	C.R.	Composite reliability	AVE
Research facilitation	RF1	0.796			0.913	0.572
	RF2	0.838	0.075	14.304		
	RF3	0.87	0.089	15.022		
	RF4	0.715	0.075	11.644		
	RF5	0.792	0.089	13.264		
	RF6	0.691	0.106	11.151		
	RF7	0.716	0.087	11.659		
	RF8	0.593	0.07	9.307		
Quality of work life	QWL1	0.807			0.812	0.522
	QWL2	0.745	0.095	10.266		
	QWL3	0.681	0.097	9.536		
	QWL4	0.645	0.107	9.057		
Perks for						

employee retention	PFER1	0.668			0.894	0.549
	PFER2	0.786	0.11	10.377		
	PFER3	0.718	0.097	9.611		
	PFER4	0.798	0.114	10.502		
	PFER5	0.819	0.116	10.729		
	PFER6	0.667	0.131	9.015		
	PFER7	0.714	0.132	9.571		
Faculty commitment	FC1	0.752			0.848	0.53
	FC2	0.708	0.09	10.157		
	FC3	0.62	0.119	8.871		
	FC4	0.825	0.091	11.663		
	FC5	0.72	0.099	10.324		

4.2.20 Correlation Matrix

	RF	**QWL**	**PFER**	**FC**
RF	*0.756*			
QWL	0.632**	*0.722*		
PFER	0.348**	0.293**	*0.74*	
FC	0.470**	0.405**	0.413**	*0.728*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii)Measurement model, reliability and validity of organizational capital

To study the hypothesized measurement model and confirm the reliability and validity of the scales, 1st order CFA was conducted on the 9 items of organizational capital. None of the items were removed due to unclear factor structure and hence all were carried forward for further analysis. Results depicted in table 4.2.21 show that the scale adopted demonstrates convergent validity. All the nine indicators merged into the two respective factors of knowledge infrastructure and knowledge sharing, with standardized loadings greater than 0.5. Also the values of average variance extracted (AVE) for both the factors was greater than 0.5. Composite reliability on all occasions was comfortably beyond the threshold value of 0.7. Finally, discriminant validity was also established through the correlation matrix in table 4.2.22which depicts that square root of the AVE values of factors were greater than the inter-construct correlations.

4.2.21 Measurement model, organizational capital

Factor	Items	S. Estimates	S.E.	C.R.	Composite reliability	AVE
Knowledge infrastructure	KI1	0.68			0.863	0.558
	KI2	0.757	0.122	9.877		
	KI3	0.775	0.125	10.065		
	KI4	0.727	0.136	9.552		
	KI5	0.791	0.122	10.216		
Knowledge sharing	KS1	0.63			0.895	0.684
	KS2	0.879	0.144	10.623		
	KS3	0.883	0.152	10.653		
	KS4	0.888	0.143	10.69		

4.2.22 Correlation Matrix

	KI	KS
KI	*0.746*	
KS	0.738**	*0.827*

**. Correlation is significant at the 0.01 level (2-tailed).

(iii) Measurement model, reliability and validity of relational capital

In order to test the hypothesized measurement model on the 18 item indicators, 1st order confirmatory factor analysis (CFA) was carried out. According to the findings all 18 items successfully measured the construct of relational capital and the standardized loadings of all items were much more than 0.5, thus confirming that the indicators merged into the three factors of access to information, network leveraging capacity and degree of interaction. Composite reliability on all occasions was more than 0.7, thus establishing the reliability of the instrument. Discriminant validity was also established because correlation matrix depicts that square root of the AVE values of all three factors were greater than the inter-factor correlations. Results are summarized in tables 4.2.23 and 4.2.24.

4.2.23 Measurement model, relational capital

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Access to information	ATI1	0.812			0.928	0.563
	ATI2	0.792	0.064	13.699		
	ATI3	0.806	0.07	14.036		
	ATI4	0.718	0.076	12.005		
	ATI5	0.692	0.081	11.434		
	ATI6	0.724	0.071	12.121		
	ATI7	0.809	0.072	14.098		
	ATI8	0.678	0.055	11.15		
	ATI9	0.704	0.068	11.694		
	ATI10	0.751	0.055	12.734		
Network leveraging capacity	NLC1	0.845			0.848	0.54
	NLC2	0.941	0.067	17.041		
	NLC3	0.736	0.071	12.818		
	NLC4	0.546	0.091	8.699		
	NLC5	0.513	0.076	8.085		
Degree of interaction	DOI1	0.742			0.829	0.619
	DOI2	0.792	0.128	10.495		
	DOI3	0.824	0.127	10.552		

4.2.24 Correlation matrix

	ATI	NLC	DOI
ATI	*0.75*		
NLC	0.616**	*0.734*	
DOI	0.551**	0.619**	*0.786*

**. Correlation is significant at the 0.01 level (2-tailed).

(iv)Structural model of human, organizational and relational capital

The hypothesized second order model was tested to establish the factor structure of the three constructs of human, organizational and relational capital. Table 4.2.25 summarizes the outcomes of the structural model. It was found that out of the five factors of human capital, equal employment opportunity was removed from the analysis. This indicates that private universities in North India are still not implementing policies related to a diverse workforce in terms of gender, ability and minorities. Out of all factors of intellectual capital, knowledge sharing had the maximum impact (standardized factor loading= 0.907, p<0.000) followed by access to information, knowledge infrastructure and network leveraging capacity. This substantiates that private universities are functioning on neo liberal policies and academic capitalism.

4.2.25 Structural model of human capital, organizational capital and relational capital

Factor		Construct	S. estimate	S.E.	C.R.	P
Research facilitation	<---	Human capital	0.693			
Quality of work life	<---	Human capital	0.649	0.092	10.891	0.000***
Perks for employee retention	<---	Human capital	0.412	0.131	5.652	0.000***
Faculty commitment	<---	Human capital	0.687	0.086	9.079	0.000***
Knowledge infrastructure	<---	Organizational capital	0.81			
Knowledge sharing	<---	Organizational capital	0.907	0.098	14.477	0.000***
Access to information	<---	Relational capital	0.82			
Network leveraging capacity	<---	Relational capital	0.741	0.074	12.055	0.000***
Degree of interaction	<---	Relational capital	0.687	0.074	10.921	0.000***

Goodness of fit CMIN/df= 1.39, GFI=0.978, NFI=0.978, TLI=0.987, CFI=0.994, RMSEA= 0.041

(v) Structural model of intellectual capital

To establish human, organizational and relational capital as sub dimensions of intellectual capital, 2nd order confirmatory factor analysis was carried out. Table 4.2.26 summarizes the results. Results show that in case of private universities, relational capital has the maximum explanation power (standardized factor loading= 0.866, $p < 0.001$), followed by organizational capital (standardized factor loading= 0.816, $p < 0.001$) and very closely human capital (standardized factor loading= 0.815, $p < 0.001$). Fit indices clearly show that the data completely fits the hypothesized model.

4.2.26 Structural model of intellectual capital

Factor		Construct	S.Estimate	S.E.	C.R.	P
Human capital	<---	Intellectual capital	0.815			
Organizational capital	<---	Intellectual capital	0.816	0.097	14.339	0.000***
Relational	<---	Intellectual capital	0.866	0.076	15.64	0.000***

Goodness of fit CMIN/df= 1.26, GFI=0.983, NFI=0.991, TLI=0.996, CFI=0.998, RMSEA= 0.034

(vi) Measurement model of organizational performance

The hypothesized measurement model was tested on the data of organizational performance for private universities through 1st order confirmatory factor analysis. All 33 items were carried forward for further analysis and none was eliminated. Results are depicted in table 4.2.27 below. All the 33 items converge into the 4 factors of financial, customer, learning and process. The condition of convergent validity was satisfied since standardized loadings of all items were more than 0.5. Average variance extracted (AVE) values on all occasions exceeded 0.5. Correlation matrix depicted in 4.2.28 establishes the evidence of discriminant validity where it is shown that the square-root values of AVE of all the factors is greater than the inter-factor correlations.

4.2.27 Measurement model, organizational performance

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Financial	Fin1	0.537			0.896	0.52
	Fin2	0.674	0.177	7.466		
	Fin3	0.744	0.191	7.893		
	Fin4	0.698	0.198	7.616		
	Fin5	0.802	0.202	8.204		
	Fin6	0.717	0.211	7.731		
	Fin7	0.786	0.227	8.122		
	Fin8	0.778	0.215	8.079		
Customer	Cust1	0.611			0.913	0.541
	Cust2	0.596	0.122	7.744		
	Cust3	0.673	0.103	8.513		
	Cust4	0.799	0.103	9.635		
	Cust5	0.771	0.102	9.403		
	Cust6	0.829	0.11	9.878		
	Cust7	0.837	0.104	9.939		
	Cust8	0.729	0.104	9.035		
	Cust9	0.729	0.094	9.032		
Learning	Learn1	0.658			0.882	0.519
	Learn2	0.727	0.134	9.449		
	Learn3	0.737	0.143	9.553		
	Learn4	0.626	0.143	8.328		
	Learn5	0.756	0.126	9.756		
	Learn6	0.739	0.119	9.58		
	Learn7	0.786	0.127	10.057		
Process	Pro1	0.791			0.921	0.564
	Pro2	0.741	0.082	12.065		
	Pro3	0.734	0.07	11.935		
	Pro4	0.779	0.088	12.848		
	Pro5	0.764	0.104	12.549		
	Pro6	0.773	0.106	12.737		
	Pro7	0.801	0.088	13.331		
	Pro8	0.681	0.113	10.889		
	Pro9	0.683	0.085	10.931		

4.2.28 Correlation matrix of organizational performance

	Financial	Customer	Learning	Process
Financial	*0.721*			
Customer	0.714**	*0.735*		
Learning	0.748**	0.704**	*0.75*	
Process	0.680**	0.718**	0.738**	*0.75*

**. Correlation is significant at the 0.01 level (2-tailed).

Next phase was conducting 2nd order confirmatory analysis to establish the factor structure of organizational performance and establish financial, customer, process and learning as the sub dimensions of organizational performance. To test the hypothesized model CFA was carried out and outcomes are provided in table 4.2.29.

(vii) Structural model of organizational performance

2nd order CFA was carried out to confirm the hypothesized structural model. Results are depicted in table 4.2.29. Results show that all the four factors are significant in explaining performance of private universities but the strongest determinant is process (standardized loading= 0.924) closely followed by learning (standardized loading= 0.905). While customer aspect had the third highest loading, financial had the lowest loading out of all.

4.2.29 Structural model of organizational performance

Factor		Construct	Standardized Estimate	Estimate	S.E.	C.R.	P
Financial	<---	OP	0.778	1			
Customer	<---	OP	0.893	1			
Learning	<---	OP	0.905	1.101	0.047	23.328	0.000***
Process	<---	OP	0.924	1.049	0.047	22.241	0.000***

Goodness of fit CMIN/df= 1.425, GFI=0.997, NFI=0.998, TLI=0.997, CFI=0.999, RMSEA=0.043

(viii) Path analysis of intellectual capital and organizational performance

Table 4.2.30 summarizes the impact that intellectual capital has over performance in private universities and it indicates that intellectual capital has a very strong influence (standardized factor loading= 0.95, p<0.001) on performance in universities.

4.2.30 Path analysis of intellectual capital and organizational performance

Construct	Path	Construct	Standardized Estimate	S.E.	C.R.	P
OP	<---	IC	0.954	0.097	14.027	0.000***

Goodness of fit CMIN/df= 1.726, GFI=0.977, NFI=0.987, TLI=0.989, CFI=0.994, RMSEA=0.056

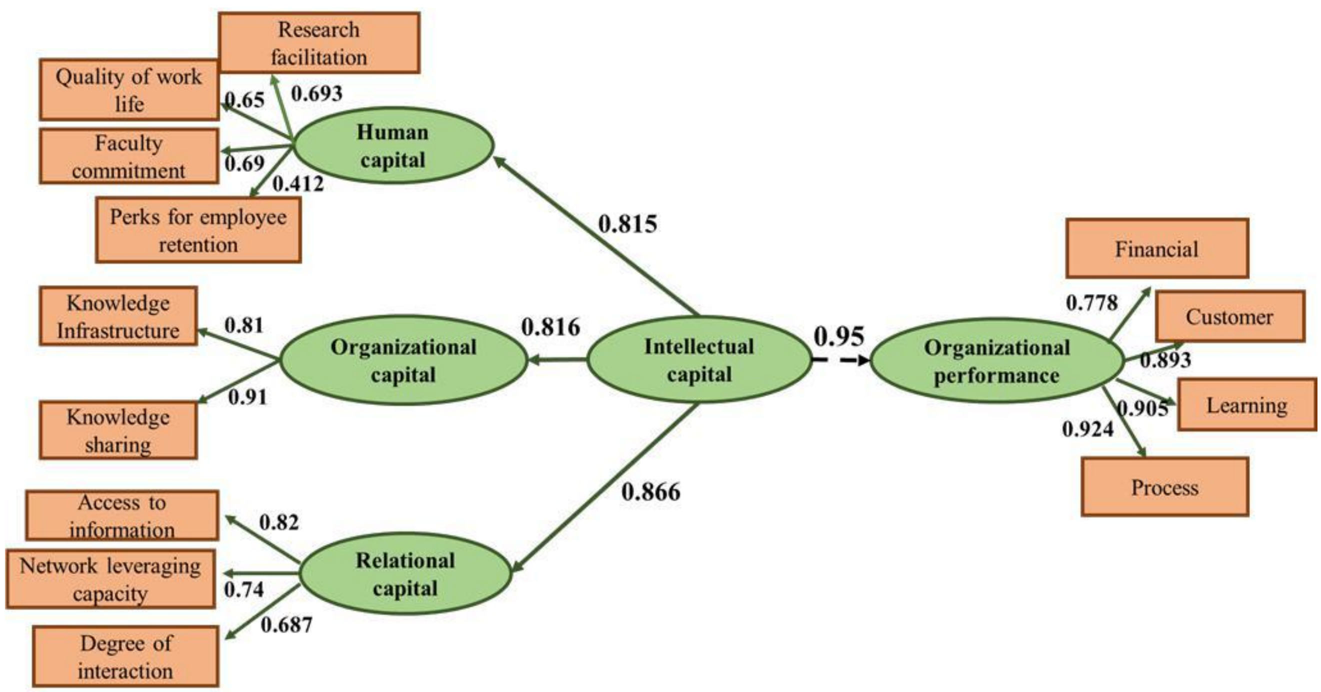


Figure 4.2.2: Intellectual capital and Organizational performance (Private)

4.2.5.2 State

(i) Measurement model, reliability and validity of human capital

1st order CFA was carried out to test the measurement model and its reliability and validity. Out of 30 items, 1 item from quality of work life (QWL) and1 item of perks for employee retention (PFER) were removed while the factor of faculty commitment was totally eliminated, thus indicating that in state governed universities, least importance is given to the extent to which faculty are engaged in activities where they need to take ownership of academic and administrative outcomes. Remaining 23 items were carried forward for further analysis. Table 4.2.31 and 4.2.32summarize the outcomes. Results indicate that convergent and discriminant validity were established, thus indicating the data fit of the hypothesized measurement model.

4.2.31Measurement model, human capital

Factor		S. Estimates	S.E.	C.R.	Composite reliability	AVE
Research facilitation	RF1	0.88			0.911	0.569
	RF2	0.839	0.075	15.998		
	RF3	0.797	0.065	14.579		
	RF4	0.699	0.05	11.837		
	RF5	0.801	0.056	14.718		
	RF6	0.768	0.066	13.704		
	RF7	0.48	0.084	7.239		
	RF8	0.696	0.06	11.757		
Quality of work life	QWL1	0.87			0.876	0.549
	QWL2	0.9	0.063	16.913		
	QWL3	0.65	0.067	10.431		
	QWL4	0.501	0.096	7.513		
	QWL5	0.732	0.064	12.328		
	QWL6	0.718	0.068	11.994		
Perks for employee retention	PFER1	0.806	0.122	9.574	0.868	0.526
	PFER2	0.749	0.122	9.064		
	PFER3	0.613	0.075	7.683		
	PFER4	0.831	0.115	9.779		
	PFER5	0.676	0.126	8.352		
	PFER6	0.651				

Equal employment opportunity	EEO1	0.535			0.775	0.546
	EEO2	0.914	0.329	6.3		
	EEO3	0.718	0.254	7.102		

4.2.32 Correlation Matrix

	RF	QWL	PFER	EEO
RF	*0.754*			
QWL	0.466**	*0.74*		
PFER	0.492**	0.384**	*0.725*	
EEO	0.564**	0.313**	0.636**	*0.739*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Measurement model, reliability and validity of organizational capital

Tables 4.2.33 and 4.2.34 depict the results of 1st order CFA conducted on the items of organizational capital. Results indicated evidence of convergent validity since all the three pre conditions were satisfied. All the items significantly converged into the two factors of „knowledge infrastructure‟ and „knowledge sharing‟ with factor loadings more than 0.5. Also average variance extracted for both the factors of the construct exceeds 0.5. Finally, the composite reliability of the instrument was also established since values on all occasions exceeded 0.7. Discriminant validity was established through the correlation matrix which showed that the square root of AVE values on all occasions was more than the inter-factor correlations.

4.2.33 Measurement model, organizational capital

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Knowledge Infrastructure	KI1	0.405			0.863	0.573
	KI2	0.664	0.367	5.472		
	KI3	0.915	0.579	5.979		
	KI4	0.91	0.546	5.974		
	KI5	0.772	0.46	5.74		
Knowledge sharing	KS1	0.573			0.88	0.653
	KS2	0.841	0.189	8.743		
	KS3	0.843	0.187	8.751		
	KS4	0.93	0.194	9.111		

4.2.34 Correlation matrix

	KI	KS
KI	*0.756*	
KS	0.727**	*0.808*

**. Correlation is significant at the 0.01 level (2-tailed).

(iii)Measurement model, reliability and validity of relational capital

Tables 4.2.35 and 4.2.36 summarize the results tested on the dataset of state universities. Reliability and validity of instrument was also confirmed by the measurement model. All the 18 items were carried forward for further analysis. Table 4.2.35 depicts that standardized factor loadings of all the 18 item exceeds 0.5 thus satisfying the condition. This also indicates that all the items converge successfully into the 3 factors of access to information, network leveraging capacity and degree of interaction respectively. Further, the average variance extracted (AVE) values on all occasions exceeds 0.5, thus confirming convergent validity. Moreover composite reliability on all occasions exceeded 0.7. Finally discriminant validity was established with the help of the correlation matrix which clearly indicated that the square root of the AVE values of all the 3 factors exceeded the individual correlation among the factors themselves. Discriminant validity is established in table 4.2.36.

Table 4.2.35Measurement model, relational capital

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Access to information	ATI1	0.713			0.911	0.51
	ATI2	0.75	0.093	10.362		
	ATI3	0.851	0.12	11.731		
	ATI4	0.78	0.116	10.774		
	ATI5	0.737	0.114	10.178		
	ATI6	0.735	0.11	10.147		
	ATI7	0.593	0.093	8.198		
	ATI8	0.46	0.081	6.359		
	ATI9	0.751	0.101	10.376		
	ATI10	0.696	0.089	9.617		
Network leveraging capacity	NLC1	0.614			0.842	0.519
	NLC2	0.778	0.161	8.51		
	NLC3	0.83	0.169	8.804		
	NLC4	0.716	0.203	8.068		
	NLC5	0.64	0.155	7.44		
Degree of interaction	DOI1	0.779			0.755	0.515
	DOI2	0.817	0.129	6.986		
	DOI3	0.52	0.082	6.426		

4.2.36 Correlation matrix

	ATI	NLC	DOI
ATI	*0.714*		
NLC	0.347**	*0.72*	
DOI	0.377**	0.565**	*0.718*

**. Correlation is significant at the 0.01 level (2-tailed).

(iv) Structural model of human capital, organizational capital & relational capital

Table 4.2.37 below, summarizes the results of the structural model of human, organizational and relational capital for state universities in North India. In case of state universities, the results indicate that faculty commitment has been omitted from human capital. This is an indicator that state universities function more like a governmental set up where individual administrative and academic responsibility is not something that employees look up to. Though degree of interaction emerged as significant, but its contribution is low with a standardized factor loading of 0.397. Organizational capital emerges significant with knowledge sharing and knowledge infrastructure having strong factor loadings of 0.861 and 0.841 respectively. This indicates that state universities are focusing heavily on state of the art infrastructure coupled with a culture of knowledge sharing. Research facilitation doesn’t emerge as strong a predictor in state universities in contrast to private and central universities. This could be an indicator that state governments do not provide the adequate prerequisites for good quality research to take place.

4.2.37Structural model of human capital, organizational capital & relational capital

Factor		Construct	Standardized estimate	Estimate	S.E.	C.R.	P
Research facilitation	<---	Human capital	0.586	1			
Quality of work life	<---	Human capital	0.488	0.93	0.14	6.637	0.000***
Perks for employee retention	<---	Human capital	0.82	1.964	0.248	7.911	0.000***
Equal employment opportunity	<---	Human capital	0.752	1.619	0.188	8.608	0.000***
Knowledge infrastructure	<---	Organizational capital	0.841	1			
Knowledge sharing	<---	Organizational capital	0.861	1.341	0.109	12.326	0.000***
Access to information	<---	Relational capital	0.741	1			
Network leveraging capacity	<---	Relational capital	0.48	0.775	0.129	5.991	0.000***
Degree of interaction	<---	Relational capital	0.397	0.602	0.114	5.267	0.000***

Goodness of fit CMIN/df= 1.391, GFI=0.985, NFI=0.984, TLI=0.984, CFI=0.995, RMSEA=0.043

(v) Structural model of intellectual capital

Table 4.2.38 summarizes the outcomes of the structural modelling carried out to establish human, organizational and relational capital as sub dimensions of intellectual capital. Results show that in case of state universities, relational capital has the maximum explanation power (standardized factor loading= 0.88, p< 0.001), followed by organizational capital (standardized factor loading= 0.784, p< 0.001) and very closely human capital (standardized factor loading= 0.777, p< 0.001). Fit indices clearly show that all the values are within the prescribed limits and the data completely fits the hypothesized model.

4.2.38 Structural model of intellectual capital

Factor		Construct	Standardized Estimate	S.E.	C.R.	P
Human capital	<---	IC	0.777			
Organizational capital	<---	IC	0.784	0.127	9.681	0.000***
Relational capital	<---	IC	0.88	0.106	9.907	0.000***

Goodness of fit CMIN/df= 1.542, GFI=0.984, NFI=0.987, TLI=0.988, CFI=0.995, RMSEA=0.051

(vi) Measurement model, reliability and validity of organizational performance

1st order CFA was conducted on 33 items of organizational performance in order to confirm their reliability and validity. On the basis of the analysis, 26 out of 33 items got carried ahead in the study. 5 items of financial (FIN), 1 item of customer (CUST) and 1 item of learning (LEARN) were eliminated due to unclear factor structure. Table 4.2.39 summarizes the outcomes of confirmatory factor analysis pointing towards the significance of all the remaining items. Instrument demonstrates convergent validity as AVE values on all occasions is more than 0.5. The instrument also demonstrates reliability since composite reliability of all the factors is more than the threshold value of 0.7. Finally table 4.2.40 demonstrates discriminant validity by showcasing that the square root of AVE for all constructs is more than the correlation among them.

4.2.39Measurement model, organizational performance

Factor	Item	Standardized Estimates	S.E	C.R	Composite reliability	AVE
Financial	Fin1	0.543	0.119	4.95	0.724	0.497
	Fin2	0.55	0.13	4.971		
	Fin3	0.924				
Customer	Cust1	0.546			0.894	0.519
	Cust2	0.64	0.165	7.027		
	Cust3	0.807	0.151	8.032		
	Cust4	0.813	0.166	8.063		
	Cust5	0.871	0.163	8.333		
	Cust6	0.725	0.151	7.576		
	Cust7	0.634	0.151	6.981		
	Cust8	0.669	0.151	7.221		
Learning	Learn1	0.719			0.866	0.521
	Learn2	0.843	0.141	11.124		
	Learn3	0.757	0.143	10.126		
	Learn4	0.737	0.129	9.862		
	Learn5	0.664	0.121	8.918		
	Learn6	0.583	0.12	7.849		
Process	Pro1	0.72			0.917	0.556
	Pro2	0.759	0.096	10.673		
	Pro3	0.631	0.093	8.843		
	Pro4	0.711	0.11	9.978		
	Pro5	0.833	0.124	11.731		
	Pro6	0.84	0.119	11.827		
	Pro7	0.874	0.112	12.307		
	Pro8	0.655	0.135	9.173		
	Pro9	0.642	0.11	8.993		

4.2.40 Correlation matrix

	Financial	Customer	Learning	Process
Financial	*0.707*			
Customer	0.633**	*0.72*		
Learning	0.610**	0.656**	*0.722*	
Process	0.625**	0.72**	0.708**	*0.745*

**. Correlation is significant at the 0.01 level (2-tailed).

(vii)Structural model of organizational performance

Table 4.2.41 summarizes the results of structural model of organizational performance for state universities. All the four factors emerged as significant ($p<0.001$) in explaining performance of a university. Process emerged as the strongest predictor of performance in case of state universities, indicating that course plans, student measurement scales, teacher performance and quality parameters like accreditation are extremely important. This was followed by learning (standardized loading= 0.845), customer (standardized loading= 0.793) and finally the financial aspect (standardized factor= 0.688). Moreover the fit indices indicate that the data fit is pretty good and the hypothesized model is acceptable.

4.2.41Structural model of organizational performance

Factor		Construct	Standardized Estimate	S.E.	C.R.	P
Financial	<---	OP	0.688			
Customer	<---	OP	0.793	0.086	11.588	0.000***
Learning	<---	OP	0.845	0.1	10.941	0.000***
Process	<---	OP	0.926	0.102	11.372	0.000***

Goodness of fit CMIN/df= 2.62, GFI=0.994, NFI=0.995, TLI=0.98, CFI=0.997, RMSEA=0.07

(viii) Path analysis of intellectual capital and organizational performance

In order to test the structural model and corresponding theoretical relationship with organizational performance, path analysis was performed. Findings revealed that intellectual capital of state universities had a significant positive association with organizational performance. The path coefficient was 0.838 which substantiates the significance of university intellectual capital. Table 4.2.42 depicts the results of path analysis.

4.2.42 Path analysis of intellectual capital and organizational performance

Construct	Path	Construct	Standardized Estimate	S.E.	C.R.	P
OP	<---	IC	0.838	0.13	8.747	0.000***

Goodness of fit CMIN/df= 1.474, GFI=0.986, NFI=0.989, TLI=0.989,

CFI=0.996, RMSEA= 0.048

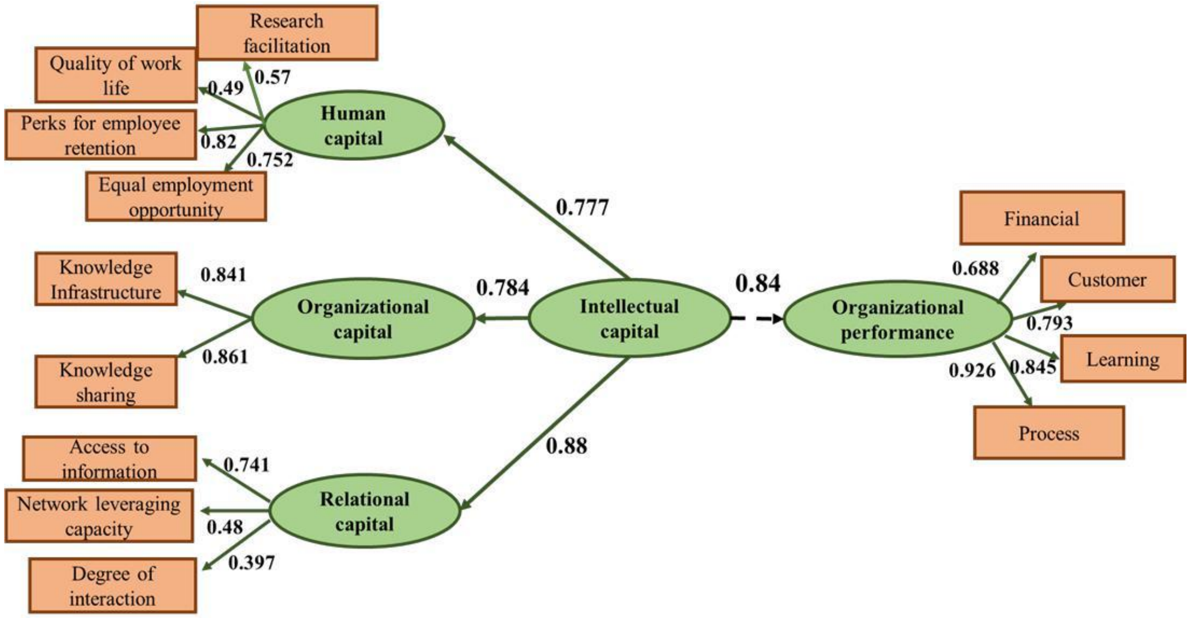


Figure 4.2.3: Intellectual capital and Organizational performance (State)

4.2.5.3 Central

(i) Measurement model, reliability and validity of human capital

To study the hypothesized measurement model and confirm the reliability and validity of the scales, 1st order CFA was conducted on 30 items of human capital. After the CFA was conducted, 3 items of quality of work life (QWL), 1 item of faculty commitment (FC) and the complete factor of perks for employee retention (PFER) were removed due to unclear factor structure. Remaining 19 items were carried forward for further analysis. Results depicted in tables 4.2.43 and 4.2.44 show that the scale adopted demonstrates convergent validity. All the indicators merged into the four respective factors with standardized loadings greater than 0.5. Average variance extracted (AVE) on all occasions exceeded 0.5. Composite reliability values on all occasions was comfortably beyond 0.7. Finally, discriminant validity was also established since the square root of the AVE of all four factors was more than inter-factor correlations.

4.2.43 Measurement model, human capital

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Research facilitation	RF1	0.88			0.89	0.51
	RF2	0.819	0.073	12.88		
	RF3	0.619	0.098	8.336		
	RF4	0.542	0.075	7.037		
	RF5	0.785	0.075	11.994		
	RF6	0.681	0.061	9.633		
	RF7	0.792	0.074	12.034		
	RF8	0.5	0.122	6.442		
Quality of work life	QWL1	0.813			0.815	0.533
	QWL2	0.887	0.115	9.967		
	QWL3	0.566	0.112	6.867		
	QWL4	0.604	0.107	7.402		
Faculty commitment	FC1	0.754			0.809	0.522
	FC2	0.808	0.142	8.828		
	FC3	0.791	0.155	8.743		
	FC4	0.492	0.119	5.563		
Equal employment opportunity	EEO1	0.766			0.799	0.58
	EEO2	0.926	0.169	7.181		
	EEO3	0.545	0.1	6.493		

4.2.44 Correlation Matrix

	RF	QWL	FC	EEO
RF	*0.714*			
QWL	0.711**	*0.73*		
FC	0.494**	0.316**	*0.722*	
EEO	0.646**	0.609**	0.306**	*0.761*

**. Correlation is significant at the 0.01 level (2-tailed).

(ii) Measurement model, reliability and validity of organizational capital

To confirm the hypothesized measurement model and test the reliability and validity of the instrument, 1st CFA was conducted. None of the items were eliminated and all were retained for further analysis. Results of CFA are depicted in tables 4.2.45 and 4.2.46. Results depicted that all the standardized loadings are greater than 0.5 which clearly indicated that all the item indicators merged into the two factors of knowledge infrastructure and knowledge sharing. Also composite reliability of both the factors exceeded the threshold value of 0.7 thus confirming reliability of the instrument. Finally discriminant validity was established with the help of correlation matrix which showed that the square root of the AVE on all occasions was greater than the inter-factor correlations.

4.2.45Measurement model, organizational capital

Factor	Items	S.Estimates	S.E	C.R	Composite reliability	AVE
Knowledge infrastructure	KI1	0.731			0.883	0.601
	KI2	0.795	0.115	9.279		
	KI3	0.765	0.098	8.934		
	KI4	0.808	0.126	9.418		
	KI5	0.774	0.135	9.04		
Knowledge sharing	KS1	0.899			0.889	0.671
	KS2	0.865	0.07	14.171		
	KS3	0.848	0.074	13.746		
	KS4	0.638	0.077	8.818		

4.2.46 Correlation Matrix

	KI	KS
KI	*0.775*	
KS	0.603**	*0.819*

**. Correlation is significant at the 0.01 level (2-tailed).

(iii) Measurement model, reliability and validity of relational capital

Similarly, 1st order CFA was conducted in order to confirm the measurement model. Analysis was started with a total of 18 items. After the CFA was conducted, 1 item of access to information (ATI) and 1 item of network leveraging capacity (NLC) was removed due to unclear factor structure and low factor loading. Remaining 16 items were carried forward for further analysis. Tables 4.2.47 and 4.2.48 depict the reliability statistics and measurement model. The condition of convergent validity is fulfilled as all the indicators have a factor loading of more than 0.5. Moreover, composite reliability of all the 3 factors exceeds the threshold value of 0.7 thus establishing reliability of the instrument. Discriminant validity was established with the correlation matrix which substantiates that the square root values of AVE on all occasions were more than the inter-factor correlations.

4.2.47Measurement model, reliability and validity of relational capital

Factor	Items	S. Estimates	S.E	C.R	Composite reliability	AVE
Access to information	ATI1	0.761			0.901	0.503
	ATI2	0.753	0.112	9.388		
	ATI3	0.753	0.105	9.379		
	ATI4	0.63	0.102	7.698		
	ATI5	0.669	0.098	8.223		
	ATI6	0.727	0.095	9.023		
	ATI7	0.676	0.09	8.323		
	ATI8	0.661	0.087	8.123		
	ATI9	0.74	0.074	9.198		
Network leveraging capacity	NLC1	0.585			0.817	0.535
	NLC2	0.613	0.194	5.933		
	NLC3	0.82	0.223	7.075		
	NLC4	0.865	0.221	7.138		
Degree of interaction	DOI1	0.629			0.742	0.5
	DOI2	0.717	0.255	5.852		
	DOI3	0.749	0.212	5.797		

4.2.48 Correlation Matrix

	ATI	NLC	DOI
ATI	*0.709*		
NLC	0.437**	*0.731*	
DOI	0.606**	0.592**	*0.707*

**. Correlation is significant at the 0.01 level (2-tailed).

(iv) Structural model of human capital, organizational capital & relational capital

Table 4.2.49 summarizes the results of structural model of the different dimensions of human, organizational and relational capital. Research facilitation emerged as the strongest factor contributing towards human capital. Not only this, research facilitation's standardized loading was also the maximum among all the factors contributing towards intellectual capital on the whole (standardized factor loading= 0.851). This clearly indicates the strong research orientation of central universities. The lowest factor loading was that of faculty commitment (standardized factor loading= 0.397) which also indicates that though it is significantly important, there is negligible focus on channelizing commitment of faculty towards the vision & mission of the university. Fit indices clearly indicated that the data is acceptable and fits the hypothesized model pretty well.

4.2.49Structural model of human capital, organizational capital & relational capital

Factor		Construct	Standardized Estimate	S.E.	C.R.	P
Research facilitation	<---	Human capital	0.851			
Quality of work life	<---	Human capital	0.827	0.1	11.493	0.000***
Faculty commitment	<---	Human capital	0.397	0.074	5.135	0.000***
Equal employment opportunity	<---	Human capital	0.756	0.1	10.281	0.000***
Knowledge infrastructure	<---	Organizational capital	0.81			
Knowledge sharing	<---	Organizational capital	0.745	0.124	9.461	0.000***
Access to information	<---	Relational capital	0.783			
Network leveraging capacity	<---	Relational capital	0.608	0.135	7.116	0.000***
Degree of interaction	<---	Relational capital	0.758	0.133	9.123	0.000***

Goodness of fit CMIN/df=1.48, GFI=0.96, NFI=0.956, TLI=0.974, CFI=0.985, RMSEA=0.056

(v) Structural model of intellectual capital

The hypothesized second order model was tested on the data from central universities to establish human, organizational and relational capital as dimensions of intellectual capital. Table 4.2.50 summarizes the findings of the 2nd order CFA that was carried out. Results clearly indicate that organizational capital emerged as the strongest determinant of intellectual capital (standardized factor loading= 0.845, $p < 0.001$), followed by relational capital (standardized factor loading= 0.829, $p < 0.001$) and human capital (standardized factor loading= 0.702, $p < 0.001$), though all the three factors are significant predictors of intellectual capital. This clearly brings out the importance of an innovative decision support system and a knowledge sharing culture in central universities of North India. Fit indices substantiate the acceptability of the hypothesized model.

4.2.50 Structural model of intellectual capital

Factor		Construct	S. Estimate	S.E.	C.R.	P
Human capital	<---	Intellectual capital	0.702			
Organizational capital	<---	Intellectual capital	0.845	0.215	9.426	0.000***
Relational capital	<---	Intellectual capital	0.829	0.174	9.343	0.000***

Goodness of fit CMIN/df=1.127, GFI=0.979, NFI=0.982, TLI=0.995, CFI=0.998, RMSEA=0.029

(vi) Measurement model, reliability and validity of organizational performance

To test the hypothesized measurement model and establish reliability and validity, 1st order confirmatory factor analysis (CFA) was carried out. There were a total of 33 items of organizational performance. Tables 4.2.51 and 4.2.52 summarize the findings. After the 1st order CFA, 6 items of financial (FIN), 1 item of customer (CUST), 3 items of learning (LEARN) and 1 items of process (PROCESS) were eliminated due unclear factor structure. Remaining 22 items were taken for further analysis and were carried forward. It is shown in the tables that all the 22 items converge successfully into the four factors of financial, customer, learning and process. The standardized factor loadings of all items and the AVE of all the four factors was more than 0.5 thus satisfying convergent validity condition. Reliability was established by the composite reliability values which were on all occasions greater than 0.7. Lastly, the condition of discriminant validity was also fulfilled with the help of correlation matrix depicted in table 4.2.52. The table clearly indicates that the square root of AVE on all occasions was more than the inter-construct correlations. Thus the hypothesized measurement model is valid and acceptable.

4.2.51Measurement model, organizational performance

Factor	Items	S.Estimates	S.E	C.R	Composite reliability	AVE
Financial	Fin1	0.717			0.702	0.541
	Fin2	0.754				
Customer	Cust1	0.58	0.108	7.05	0.909	0.559
	Cust2	0.766	0.094	9.552		
	Cust3	0.769	0.106	9.589		
	Cust4	0.78	0.097	9.748		
	Cust5	0.856	0.101	10.795		
	Cust6	0.712	0.11	8.804		
	Cust7	0.74	0.11	9.192		
	Cust8	0.75				
Learning	Learn1	0.829			0.829	0.554
	Learn2	0.859	0.096	10.396		
	Learn3	0.554	0.099	6.728		
	Learn4	0.697	0.091	8.759		
Process	Pro1	0.774			0.889	0.505
	Pro2	0.641	0.091	7.933		
	Pro3	0.652	0.083	8.095		
	Pro4	0.743	0.11	9.414		
	Pro5	0.598	0.111	7.351		
	Pro6	0.77	0.105	9.809		
	Pro7	0.865	0.099	11.197		
	Pro8	0.597	0.123	7.345		

4.2.52 Correlation Matrix

	Financial	Customer	Learning	Process
Financial	*0.735*			
Customer	0.371**	*0.747*		
Learning	0.397**	0.593**	*0.744*	
Process	0.313**	0.640**	0.627**	*0.71*

**. Correlation is significant at the 0.01 level (2-tailed).

(vii) Structural model of organizational performance

For testing the 2nd order model, confirmatory factor analysis was carried out yet again. Result is summarized in table 4.2.53. It is clear that out of the factors of performance, the strongest factor that emerged was process (standardized factor loading= 0.802), indicating the importance of standardized operating procedures as far university functioning is considered. This was followed by customer (standardized factor loading= 0.784) substantiating the importance of stakeholder orientation and rising neo-liberal policies in the functioning of central universities. The fit indices indicate that data fits the hypothesized model, thus making the model acceptable.

4.2.53*Structural model of organizational performance*

Factor		Construct	Standardized estimate	S.E.	C.R.	P
Financial	<---	OP	0.454			
Customer	<---	OP	0.784	0.284	5.198	0.000***
Learning	<---	OP	0.777	0.305	5.186	0.000***
Process	<---	OP	0.802	0.255	5.227	0.000***

Goodness of fit CMIN/df=1.501, GFI=0.991, NFI=0.985, TLI=0.985, CFI=0.995, RMSEA=0.058

(viii) Path analysis of intellectual capital and organizational performance

Table 4.2.54 clearly indicates that the impact of intellectual capital on university performance was strongest in case of central universities out of all three categories of universities studied. Except for faculty commitment, the standardized loadings of all the eight factors are much more than the threshold limit of 0.5. This indicates the strength of human, organizational and relational capital at central universities in North India.

4.2.54 Path analysis of intellectual capital and organizational performance

Construct	Path	Construct	Standardized Estimate	S.E.	C.R.	P
OP	<---	IC	0.98	0.254	4.944	0.000***

Goodness of fit CMIN/df= 1.127, GFI=0.979, NFI=0.982, TLI=0.995, CFI=0.998, RMSEA=0.029

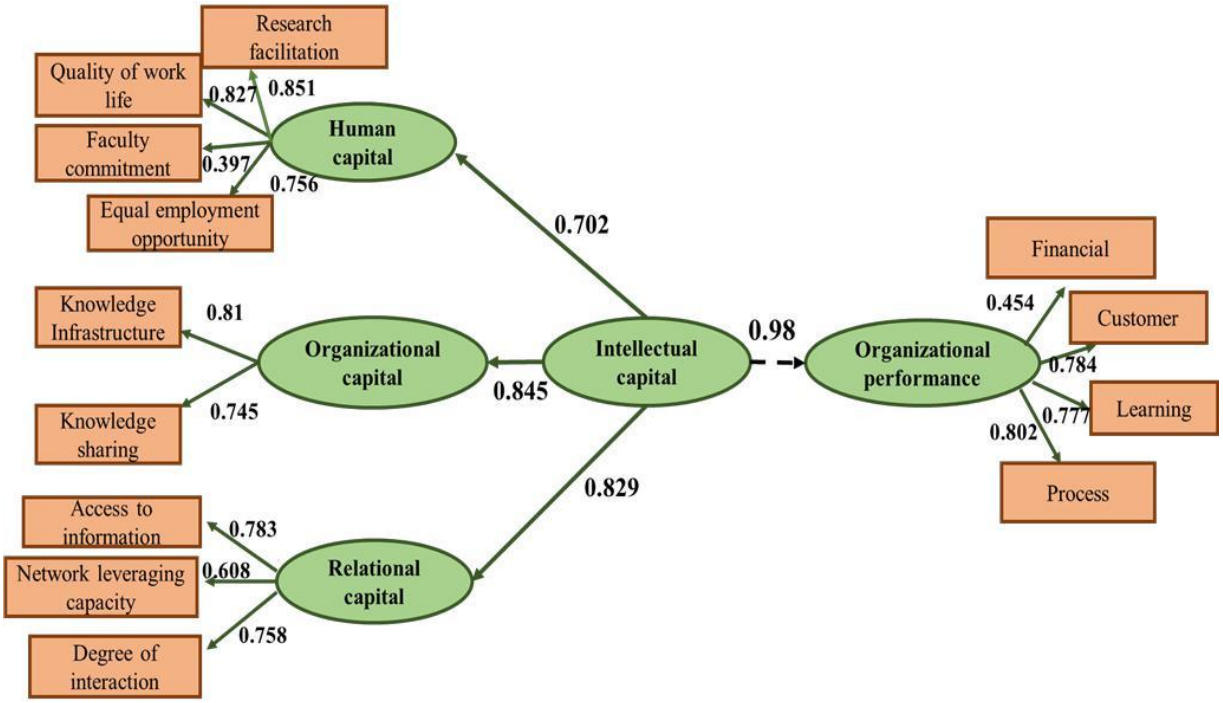


Figure 4.2.4: Intellectual capital and Organizational performance (Central)

4.3 Concluding remarks

This chapter deals with the detailed analysis of the data collected from faculty of 13 universities covered all over North India. The chapter starts with the graphic representation of the demographic profile of respondents. The chapter also focusses on analyzing the features of human, organizational, relational capital and organizational performance. The analysis also focusses on establishing the three constructs as sub dimensions of intellectual capital and majorly on exploring the association between intellectual capital and organizational performance of universities. This chapter concludes with a detailed comparison of the relationship between intellectual capital and organizational performance of the three categories of universities covered: private, state and central.

CHAPTER 5

CONCLUSION

The present study has tried to touch upon the two major paradigm shifts across the world. First is the shift to knowledge economy and second is the shift to intangibles. The research tries to bring together intellectual capital (intangible aspect) of universities (knowledge aspect) and explore how it affects performance. Higher education across the globe is under the radar of constantly depleting resources and this has engendered into movements like measuring performance of universities strategically, developing performance indicators and triple helix.

The preparedness related to utilization of intellectual capital and political will of governments to handle the shifts in education sector is much stronger in developed economies than the developing ones. Developed economies are well equipped with the infrastructure and also human capital. While developing countries are groping in the dark, still accumulating the pre requisite human and social capital needed to create, manage and disseminate knowledge. Hence it is timely and relevant to investigate the role of universities in supporting a quality higher education sector, in context to a developing country. Importance of university performance in a knowledge economy is poorly understood for developing economies. Also, most of the previous explanations offered were not based on any empirically tested model. Universities are reciprocating to the changing needs of economies by resorting to knowledge transfer and skill development. In the backdrop of so many changes, even the governments across the world have shifted their focus on improving the performance of universities. The present research builds upon the same and explores the impact of intellectual capital on organizational performance of universities.

Present chapter deliberates upon the experiences and observations that were gathered in the research, and reports the outcomes of the research undertaken. Section 5.1 reports the major findings of the study followed by section 5.2 which covers the responses to the major research questions by revisiting the objectives of this research. Section 5.3 provides the implications of the present research for practitioners in higher education sector, industry and academics. In conclusion, this chapter talks about the constraints of the present study and suggestions for future studies are highlighted in section 5.4.

5.1 Major findings of the study

The major highlights of the current study are mentioned below:

- The proposed research model identified the features of human, organizational and relational capital and empirically explored their relationship with organizational performance. Exploratory factor analysis (EFA) was conducted on 40 indicators of human capital, 9 indicators of organizational capital and 21 indicators of relational capital. The Principal Component Analysis (PCA) was used, covering varimax rotation with Eigen value greater than 1. For further confirmatory factor analysis (CFA), indicators with standardized factor loadings greater than 0.5 were considered. The KMO (Kaiser-Mayer-Olkin) value of 0.843 at significance level $\leq$ 0.001 was attained using Bartlett's Sphericity test. This recommended that the inter-correlation matrix contained adequate common variance which helps to make factor analysis constructive. EFA divided the items of human capital into six factors namely, research facilitation, quality of work life, perks for employee retention, faculty commitment, teaching effectiveness and equal employment opportunity. Organizational capital was divided into two factors namely, knowledge infrastructure and knowledge sharing. Similarly, relational capital was divided into four factors namely, access to information, network leveraging capacity, degree of interaction and outreach.

- Confirmatory factor analysis was carried out after exploratory factor analysis and items with low factor loadings were removed. As a consequence of 1st order CFA, in case of human capital, the items of teaching effectiveness were removed. Further, 2 items of quality of work life (QWL), 4 items of perks for employee retention (PFER) and 2 items of faculty commitment (FC) were removed. Remaining 22 items were carried forward for further analysis and it was confirmed through CFA, that all the variables carried forward in the study had acceptable factor loadings. None of the items of organizational capital were eliminated thus indicating that all the items adopted to measure the construct were valid and reliable. Out of the 21 items of relational capital, the items of outreach aspect were removed indicating unclear factor structure. None of the other items were eliminated, again indicating clear factor structure.

- Further, structural modelling was carried out using 2^{nd} order CFA which reinforced that the identified factors of human, organizational and relational capital were significant predictors of the three 2^{nd} order variables respectively.
- Research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity emerged as significant predictors of human capital. Research facilitation emerged as the strongest predictor of human capital, followed by quality of work life, equal employment opportunity, perks for employee retention and faculty commitment. This indicates and substantiates that human capital is multidimensional construct and reiterates the findings of the previous studies (Altbach, 2013; Huang, 2015; Postiglione, 2013, 2015; Shin & Lee, 2015). The measurement model indicated that having research oriented policies, employee oriented practices and equal employment opportunities at universities significantly contribute towards human capital.
- The results indicate that despite the increasing pressure on universities to be neo-liberal and stakeholder oriented in their functioning, when it comes to human capital, research and research orientation is still at the apex of the hierarchy. It indicates that collaboration for research among faculty, inter university research collaborations, workshops and research oriented seminars, quality publications and extent of research grant provided to faculty, still contribute the most towards developing the human capital aspect of a university.
- The second factor that emerged was quality of work life. This provides an interesting insight into the shift that is taking place in universities from a pure academic to that of corporate philosophy based culture. It brings out that apart from the quality of research platform/facilities provided to academicians, their work life balance, physical and emotional environment at workplace, opportunity for promotions and quality of supervision are also those factors which determine the

human capital aspect of a university. While many researchers (Ferrer & Morris, 2013; Pick *et al*., 2012; Taylor, 2013)lend support to the findings, there were others like Nadolny and Ryan (2015) who opposed the view and questioned the idea of applying the McDonaldization theory to higher education.

- The next factor that emerged as an important contributor to human capital was equal employment opportunity. Diversity at workplace not just opens up people to different possibilities but is an extremely important source of enhancing creativity and encouraging out of the box thinking. This study brings out that at the heart of a diverse workforce, lies the key to enriching human capital. Studies have been made on various facets of workforce diversity (Alleman & Haviland, 2017; Amano, 1997, Dobeleet al., 2014, Sayed, 2013) and all have supported the concept in some form or the other. Whether it is about the inclusion of women in mainstream workforce, remuneration status as compared to their male counterparts or the difference between tenure and non-tenured faculty, all studies converge on one thing and that is appreciating equality as far as terms of employment are concerned. Taking literature support from previous studies, this study further builds on the factor, by adding two new items of 'different ability' and 'religious/caste minorities' which have not been studied or validated earlier. The fact that these items were retained throughout the study shows that bringing religious/caste minorities and people with special abilities under an inclusive workforce at universities, contributes positively towards building human capital. The item indicator of 'minorities' had a standardized loading of 0.94, the maximum out of all item indicators and emerged significant. This indicates that university policies regarding recruitment of religious/caste minorities holds utmost importance for a country like India and this cannot be neglected since it was found to be contributing immensely to human capital. This is one of the major theoretical and practical contributions of the present study because as per authors' knowledge there are no such studies undertaken in India previously which have brought out the importance of this indicator theoretically or empirically.
- An important finding was regarding the contribution of faculty commitment towards building human capital. Though the item emerged as significant, its standardized factor loading was the minimum (0.400). This clearly indicates that

despite the fact that faculty commitment has a significant capacity to contribute towards human capital, it is not being explored appropriately in our universities currently. Significant work needs to be done in instilling a culture of ownership among the faculty members in universities. Ownership here not just refers to 'individual academic responsibility' but also 'individual administrative responsibility', which also happen to be the two new scale items under the faculty commitment aspect. Findings reveal that faculty in universities need to develop an attitude of going beyond the call of their academic duties and involve themselves in the administrative and other departmental affairs. Moreover maintaining cordial and healthy relations with colleagues is an important thing to focus on.

- EFA divided the construct of organizational capital into 'knowledge infrastructure' and 'knowledge sharing'. Researchers have focused on knowledge sharing as item indicator. By taking literature support from the previous studies (Bontis, 1998; Bontis*et al*., 2000) and modifying the items from Corcoles*et al*., (2011), the present study extends the previous studies by exploring knowledge sharing as a factor and not as an indicator. The 4 items designed to measure knowledge sharing were based on literature support and modification of items in order to suit university requirements. Items of 'knowledge infrastructure' were also adopted and modified from the mentioned studies. All the 9 items of organizational capital were retained after 1^{st} order CFA indicating that the measures adopted were valid and reliable. Structural modeling of organizational capital brought out the significance of both 'knowledge infrastructure' and 'knowledge sharing' for universities. Out of the two, 'knowledge sharing' emerged as the stronger predictor of organizational capital, indicating that a culture of knowledge sharing and communities of practice in universities is a pre-requisite for a strong organizational capital. Having state-of-the-art decision support systems, innovative structural processes and technology based infrastructure is of negligible use unless there is a proper culture of knowledge sharing in place. The findings indicate that in universities, digital archives that help in accessing papers, articles and scholarly publications of other faculty members go a long way in providing a platform where inter faculty research, academic knowledge sharing and collaborations can gain grounds.

Similarly knowledge sharing should take place between students and faculty through online portals where teaching material of faculty can be uploaded for access by students. The study also covers the importance of knowledge networks and communities of practice.

- Moving ahead with relational capital, EFA divided the construct into 4 factors namely access to information, network leveraging capacity, outreach and degree of interaction. After the 1st order CFA, items related to outreach got removed due to unclear factor structure and the remaining 18 items were retained where all the item indicators were valid, reliable and had standardized factor loadings greater than 0.5.

Out of the 3 predictors, the strongest that emerged was ‘access to information’.

Previous studies conducted on reporting of information in the university accounting system and through websites with the objective of making universities more flexible, transparent, competitive, comparable and accountable reiterate this thought(Corcoles*et al*., 2011; Leitner, 2004; Sanchez *et al*., 2013; Sanchez & Elena, 2006; Utulu&Okoye, 2010; Zhang & Halloran, 2013). This clearly brings out the importance of disseminating relevant information to the stakeholders of universities and the fact that universities in India are banking heavily on this relational approach in order to enhance performance. Giving users access to relevant information for informed decision making constitutes a healthy exercise for the transparency of an organization. This concept equally applies to universities and is reiterated in studies (Achua & Alabar, 2014; Shore & Wright, 2004) which highlight internal auditing in universities. Researchers upheld the view that internal audit is an effective investment towards ensuring transparency between universities and its stakeholders to ensure that key risks are being managed effectively and highlight the areas of value-added operations. Present study, though does not cover internal audit but supports the idea of giving users access to relevant information through their websites. In this sense, the present research builds on the work by previous researchers (Salehi *et al*.. 2012; Siano *et al*.,2015) who brought out the importance of corporate websites as one of the most significant tools of communicating with stakeholders in order to create successful value proposition. This study extends the previous works to universities in context to India.

- The next strong factor that emerged was network leveraging capacity. This goes on to prove that Indian universities are changing in their way of functioning, going ahead to become more industry oriented and operating on a relationship based on reciprocation with the industry. The study brought out the importance of having a strong alumni network and their role in stimulating a university's performance. Active participation in conducting mdp/fdp/edps, utilizing the archived knowledge of faculty for industry consulting, student exchange programs and making use of alumni as a platform for industry academia interaction emerged as the underpinnings of a high performance university. These findings have been reiterated in previous works (Dill, 1995, Freitas *et al*., 2013; Harman, 2001; McDearmon, 2013; Weerts *et al*., 2010).
- The next factor which closely followed network leveraging capacity was degree interaction. This is another important finding of the study. Though the standardized loading of this factor was the least out of the three, but it emerged as equally significant and is an indicator that universities these days have to treat their students as stakeholders and themselves as service providers. This means that universities have to increasingly follow a student-centered learning model, in terms of technology usage, pedagogy and quality of teaching and interaction with students in addition to interaction with their parents. Literature supports these conclusions (Corcoles *et al*., 2011; Finney & Finney, 2010; Kim & Lundberg, 2016; Koc & Celik, 2015). Interaction with parents is a newly added item indicator that has not been validated in previous studies. Thus, the new item is a theoretical contribution of the study, while the other two items have found literature support.
- Performance was measured by making use of the empirically validated model of Balanced Score Card (BSC) for which there is established literature support (Cullen *et al*., 2003; Kaplan & Norton, 1992, 1996, 2001; Karathanos & Karathanos, 2005; Tohidi *et al*., 2010; Umashankar& Dutta, 2007). The present work extends this by applying the model of BSC empirically in the Indian university context. As per the authors' knowledge, this is the first attempt. The measures have been developed in a previous study by Umashankar and Dutta (2007) but they were not tested

empirically. Hence this study is a novel attempt in implementing the measures of BSC and evaluating university performance using the BSC model in India.

- As per the model, performance was divided into 4 factors namely, 'financial', 'customer', 'learning' and 'process'. 1st order confirmatory factor analysis was carried out on a total of 33 items. Some items were self-designed which have not been studied earlier while rest of the items were adopted and modified from previous studies. After 1st order CFA, 4 items of financial (FIN), 2 items of customer (CUST) and 1 item of learning (LEARN) aspect were eliminated due to low factor loadings, which were resulting in an unclear factor structure. Remaining 26 items were acceptable and were retained for analysis.
- Structural modeling results indicated that all four factors significantly predict performance. Learning aspect indicated the maximum contribution towards performance thus corroborating the fact that universities constantly need to innovate in the way they operate and function and be ahead on the learning curve. They need to focus on collaboration with industry through vehicles like consultancy, live projects, spin offs and start-ups. This will help promote entrepreneurial aspect of not only universities as organizations but also involve students and faculty in the process. Entrepreneurial universities have received a significant mention in previous studies (Dill, 1995, Freitas*et al*.,2013, Harman, 2001). The present study reiterates these thoughts and indicates the inclination of Indian universities towards nurturing their entrepreneurial side. Results also indicate that having adequacy of classroom facilities and the required financial support for fulfilling the hardware/software requirements will go a long way in imparting a quality learning experience to students and teachers as well. The current study also adopts measurement and evaluation of teacher performance as a yardstick to be ahead on the learning curve based on previous studies (Binden*et al*., 2014; Casey *et al*., 1997; Rompho, 2008).
- The next two factors that emerged as strong predictors of organizational performance were 'process' and 'customer'. Significance of process and as a factor in explaining organizational performance indicated that a continuous improvement of services, facilities and processes are the prerequisites for a high performance in an organization and the same applies to universities. Introduction of new products and services is

indispensable and in context to universities it amounts to new and unique courses, regular session plans and curriculum changes. Results also highlighted the importance of having proper student measurement scales and a proper quality assurance system in place. Previous studies (Lietner, 2004; Umashankar& Dutta, 2007) lend support to these findings. Similarly, significance of customer aspect indicated that a new wave of institution building in universities is taking place which is based not only on academic finesse but a proper stakeholder orientation. This can take different forms like students' and parents' satisfaction, collaboration with industry, curriculum improvisation as per the industry standards and extent of work/training opportunities available with industry.Present study will enable policymakers in the Indian higher education sector to strategize around stakeholder demands and become more service oriented than ever.

- Four path relationships have been analyzed in the present study. Intellectual capital was found to have a significant and a positive association with organizational performance. Similarly, path analysis also confirmed that human, organizational and relational capital have a significant positive relation with organizational performance.
- Final structural model indicates that having research oriented policies, employee oriented practices in terms of quality work life and perks to retain competent faculty, securing faculty commitment towards university visions and equal employment opportunities, proper decision support systems, culture of knowledge sharing, dissemination of relevant information, interactive environment at universities and networking taken together significantly contribute towards human capital, organizational capital and relational capital respectively. Final path analysis establishes the fact that intellectual capital has a strong impact on university performance. Thus the study provides an empirically tested model for planners in the higher education sector to enable them to take cognizance of intellectual capital in order to enhance the overall university performance.
- The study also undertook a comparative analysis among private, state and central universities as a part of the research objectives. It was hypothesized that there are differences in the 3 dimensions of intellectual capital and the differences in the

relation between intellectual capital and organizational performance across the three categories of universities. Previous studies lend support to this hypothesis and reiterate the findings (Bayraktar*et al*., 2013; Obadara, 2012). As far as research in context to India is concerned, as per authors' knowledge, there have been no such comparative studies previously. This lends novelty to the present work of research.

- Results revealed that the factor of 'equal employment opportunity' was totally eliminated because of poor factor structure. This is a clear indication that till date, private universities in North India are not recruiting, taking into consideration equal employment opportunities especially for minorities and people with special abilities. This is one area where private universities need to focus. While in case of central and state universities not only was the factor retained but on both occasions the standardized factor loading was good enough. It was 0.756 and 0.752 respectively indicating that in government controlled institutions, equal employment opportunity is being religiously followed as a practice.
- All items of research facilitation have been retained in case of all the three universities, which clearly indicates that the importance of research as a contributor to human capital cannot be downplayed irrespective of where the control of a university lies. Whether private, state or central, research output is indispensable. But having said that, results also revealed that the comparative importance of research facilitation across the three categories of universities was different. Maximum standardized loading of research facilitation was achieved in case of central universities (standardized factor loading= 0.851), followed by private (standardized factor loading= 0.693) and state (standardized factor loading= 0.586). This is a pointer that central universities of North India are the most research oriented while state universities still need to work on the research aspect.
- Another insightful finding of the study is related to the factor of faculty commitment. In case of private universities, faculty commitment not just emerged significant but also had a strong factor loading of 0.687. This is an important pointer to the fact that private universities expect their faculty to have an ownership towards their work and go beyond the call of normal day to day teaching and research by channelizing their efforts towards the holistic vision & mission of the university. On the contrary, in

case of central universities, though the factor emerged significant but the factor loading was quite low at 0.397 which shows that there is negligible culture of instilling commitment among the faculty. The worst case was that of state universities, where the factor of faculty commitment got completely eliminated due to poor structure. Thus, it can be concluded that state universities are totally negligent on this aspect. Study by Eser andBirkan (2005) lend support to this observation.

- Quality of work life emerged as a stronger factor contributing towards human capital for both private and central universities as compared to state universities. In case of state universities it was perks for employee retention which came out to be a better predictor of human capital. The reason could be that since both, private and central universities score high on the research factor, faculty at these universities expect a better working environment not only in terms of physical but also emotional which is conducive to a quality research output. Since state universities score low on research orientation, what works for the faculty there is extrinsic motivation like perks and fringe benefits.
- Knowledge infrastructure and knowledge sharing were the only two factors which didn't eliminate even a single item neither from any of the three groups of universities nor from the complete dataset. This speaks volumes about the importance of both the factors in contributing towards organizational capital at universities and the focus of all universities whether private, state or central towards these two.
- Talking about the importance of knowledge infrastructure and knowledge sharing relative to the three sets of universities, it was found that knowledge sharing was more or less equally important as knowledge infrastructure. This proves that both knowledge infrastructure and knowledge sharing are complimentary to each other and that one cannot exist without the other. But an interesting observation made here was that as compared to private universities the standardized loading of knowledge sharing in case of central universities was relatively less. In case of private, it was 0.907 while in case of central it was 0.745, despite the fact that both universities are research oriented.
- All three factors of relational capital: access to information, network leveraging capacity and degree of interaction and their respective items were retained across all

the three categories. Structural modeling brought out some differences in state universities as compared to private and central. Standardized factor loadings of network leveraging capacity and degree of interaction were 0.48 and 0.397 respectively for state universities. This is a clear indication that state universities are low on both fronts. They are neither focusing on alumni and industry nor focusing on students. In a nutshell, state universities lack a stakeholder orientation. On the contrary, private and central universities had much better values for both the factors. Also out of the two, it was found that private universities were more inclined towards networking with industry while central universities were more student centric. As far as information dissemination is concerned, the maximum value was achieved for private universities (standardized factor loading= 0.82) pointing at the fact that private universities have taken cognizance of information dissemination through their websites in order to increase their visibility in the external world. This finding has also been established empirically in a previous study by Sanchez *et al*., (2013).

- All items of financial aspect were retained in case of private universities, while only two items of internal audit and finance from research were retained in case of central universities and three items of scholarships, PDA (Professional development allowance) and TA/stipends were retained in case of state universities. This is a significant indication of the elements of the financial aspect that hold importance for the three categories of universities. In case of private universities, all items were retained for analysis after the 1st order CFA. This shows that all items were relevant, acceptable and valid to measure the financial aspect of private universities. This is a pointer towards the inclination of private universities towards financial aspect of overall performance. This was further substantiated when we compared the standardized factor loadings of financial aspect across all the three groups. It was revealed that the maximum value (0.778) is achieved in case of private universities thus reiterating the significance of financial aspect for private universities, while it is the least (0.454) in case of central universities. Authors believe that this could be due to the comparatively consistent funding received by central universities from the government unlike that of private universities. Out of the two items retained in financial aspect for central universities, one item was finance from research which again proves the significance of research for central universities.

- Out of the other three factors: Process, Learning and Customer, the best values were achieved in case of process aspect across all the three groups, though the other two factors also emerged significant and strong predictors of performance. Almost all the items of process were retained for all three categories of university. This indicates that whether it is private, state or central, factors like improvisation in courses, regular preparation of session plans, student measurement scales and quality-assurance programs like accreditation will always remain at the heart of a university's performance. As far as the customer orientation was concerned, it was the strongest in case of private (0.893) followed by state (0.793) and central (0.784). This finding is in contradiction to the study by Brunetto & Wharton (2006) who proposed that ambiguity with respect to customers was prevalent in both the categories.
- Accreditation which is an item indicator for the process aspect in the current study was compared for private and state universities in a previous study (Dattey *et al.*, 2014). They concluded that though the overall score was more in case of private universities but over the time state universities had shown a growth in information dissemination due to isomorphic pressures. These findings are in consistency with the findings of the present study where standardized factor loadings of accreditation was found to be maximum (0.683) in case of private universities closely followed by state (0.642).
- Finally the comparison in path analysis of intellectual capital and organizational performance across the three categories of universities revealed that there were some differences. The highest value was achieved in case of central universities (0.98), closely followed by private (0.954) and finally state (0.838). This brings out the overall significance of intellectual capital in explaining university performance, irrespective of its ownership.

5.2 Revising the objectives

It is critical to understand whether the study is able to fulfill the objectives for which it was conducted.

The first objective was:

O1. To study the relationship between human capital and organizational performance.

For designing a model and to test the hypotheses associated with the above objective, CFA and SEM using AMOS 20 was employed. Table 5.1 summarizes the results of the hypotheses tested for this part of the study.

Table 5.1 Hypotheses testing of Human capital

	Hypotheses	**Result**
H1(a)	***Human Capital is a multidimensional construct significantly predicted by research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity.***	**Accept**
H1(b)	***There is a significant positive relation between human capital and organizational performance.***	**Accept**

Thus it was concluded that human capital is a multidimensional construct consisting of research facilitation, quality of work life, perks for employee retention, faculty commitment and equal employment opportunity. Thus focusing on these factors will help improve human capital and in turn organizational performance of universities.

The second objective was:

O2. To study the relationship between organizational capital and organizational performance.

CFA and SEM was employed using AMOS 20 to study the hypothesized relationships. Table 5.2 below, depicts the outcome.

Table 5.2 Hypotheses testing of Organizational capital

	Hypotheses	Result
H2(a)	***Organizational capital is multidimensional construct significantly predicted by knowledge infrastructure and knowledge sharing.***	**Accept**
H2(b)	***Organizational capital has a significant positive relation with organizational performance.***	**Accept**

Thus, it was concluded that knowledge infrastructure and knowledge sharing significantly predict organizational capital and organizational capital goes further in positively affecting organizational performance.

The third objective was:

O3. To study the relationship between relational capital and organizational performance.

In order to fulfil the objective and study the hypothesized relationships 1st order CFA, 2nd order CFA and SEM was employed using AMOS 20. Table 5.3 below, depicts the outcome

Table 5.3 Hypotheses testing of Relational capital

	Hypotheses	Result
H3(a)	***Relational capital is a multidimensional construct significantly predicted by access to information, network leveraging capacity and degree of interaction.***	**Accept**
H3(b)	***Relational Capital has a significant positive relation with organizational performance.***	**Accept**

Hence it was concluded that access to information, network leveraging capacity and degree of interaction significantly predict the relational capital of universities. It proves that universities need to be stakeholder oriented in terms of their functioning whether it is internal stakeholders like students and employees or external like industry.

Next objective was:

O4. To identify the predictors of organizational performance.

Based on the empirically established BSC model, it was hypothesized that financial, customer, learning and process aspects are the predictors of organizational performance. Intellectual capital was hypothesized to have a significant positive association with organizational performance. Hypotheses testing has been summarized in Table 5.4 as under using AMOS 20

Table 5.4 Hypotheses testing of organizational performance

	Hypotheses	**Result**
H4a)	***Organizational performance at universities is predicted by financial, customer, learning and process aspects.***	**Accept**
H4(b)	***Intellectual capital has a significant positive association with organizational performance.***	**Accept**

It was concluded that finance, customer, learning and process aspects are important predictors of university performance. Their relative significance may vary but all four emerged as important in determining performance.

Last objective was:

O5. To study the difference in human, organizational, relational capital and organizational performance of private, public and central universities.

Similarly AMOS 20 was employed to study the hypothesized relationships. Table 5.5 below, depicts the outcome.

Table 5.5 Hypothesis testing of private, state and central universities

	Hypotheses	**Result**
H5	***H5: There is a significant difference in human, organizational, relational capital and organizational performance of private, state and central universities.***	**Partially Accept**

Findings revealed that there are major differences in the predictors of human capital in all the three categories of universities while organizational and relational capital emerged important for all. Path analysis concluded that there are differences in the relationship of intellectual capital and performance among private, state and central universities.

5.3 Implications of the study

The present work of research provides immensely valuable insights on how to strive for enhanced performance in universities. The study strongly recommends that human capital is driven by factors like research facilitation, quality of work life provided by the university, perks and benefits to retain competent faculty, securing faculty commitment and policies of diversity and pluralism at workplace. Similarly access to relevant information, robust networking strategies and being consumer oriented in its way of working, gives the required emphatic push to the creation of relational capital in universities. Researchers also recommend university planners to focus strongly on organizational capital in order to achieve enhanced performance. This study has adopted the factor of knowledge sharing to validate the significance of fostering a culture based on knowledge sharing apart from having infrastructure and established that having the right kind of technology and infrastructure together with a knowledge sharing environment contribute to organizational capital and eventually performance.

5.3.1 Theoretical implication

The present study is, to a considerable extent exploratory in its research design and has not only added to the existing knowledge of intellectual capital and organizational performance, but also deepened its knowledge, specifically in context to India where not much work has been done in this domain. First and foremost the factor of quality of work life hasn't been studied as it is in any other previous study as per the authors' knowledge. Also the item indicators that were retained like physical environment, emotional environment, hiring experienced faculty have not been validated and studied earlier, though they have literature support. Hence this is a theoretical contribution of the study. Moreover the item of mentoring new faculty has been studied under the customer aspect of organizational performance, while the present study explores the same indicator as a determinant of human capital. In a way it is a change in the structure of the already validated scale. Also the items of accreditation and salary hike have been studied under customer aspect by Umashankar and Dutta (2007) while the present study explores salary hike as a financial and accreditation as a process indicator.

Similarly, another factor of human capital: perks for employee retention and its three item indicators were of a purely exploratory nature. At present there is negligible research reported on perks for employee retention and its contribution to human capital. Hence this is another theoretical contribution of the present research. Two out the three items of the factor of faculty commitment were new scale items and a completely novel attempt has been made to study them. While the item of individual administrative responsibility had some literature support, the other item of individual academic responsibility had no literature back up.

The factor of equal employment opportunity is also a theoretical contribution to the knowledge of intellectual capital. Though, considerable literature support is available but most of the studies talk of gender diversity. Negligible reporting has been done on people with special abilities and religious/caste minorities. Hence this study introduces a fresh theoretical perspective to measure the construct of human capital.

All three item indicators of financial aspect that have been used to measure performance are new scale items that have not been empirically validated earlier. Moreover the standardized estimates, validity and reliability establishes the credibility of the scale adopted. It shows that extent of student scholarship, regularity in salary hike, PDA provided to faculty and TA/stipends granted to students and scholars are genuine measures of the financial performance of a university.

Financial support for hardware/software and financial support for short term programs and faculty development programs were also two new scale items that were introduced to measure the learning aspect of university performance. The two indicators emerged as important parameters in the process of analysis.

Knowledge sharing that has emerged a strong predictor of organizational capital for all the three categories of universities studied, shows how universities in this part of the country are depending heavily on the culture of collaboration, knowledge sharing and community based learning. But there is negligible reporting about the same in Indian literature. Hence, this is another major theoretical contribution of the present work.

Another significant theoretical contribution towards the existing body of knowledge of intellectual capital and university performance is the comparative analysis of private, state and central universities. So far, all the previous studies have compared private sector with the state owned institutions. This study extends the previous body of knowledge to include a third category of central universities. Moreover, as per the authors' knowledge this comparative study among private, state and central universities is the first of its kind in context to the Indian higher education sector.

5.3.2 Practical Implications

A practical policy implication of the present research directly stems from one of the key policy documents of the government of India. In order to address the concerns of the entire knowledge spectrum and create a roadmap to reform the knowledge sector, the government of India set up the National Knowledge Commission (NKC) to tap into the enormous reservoir of our knowledge. By constituting the commission, the Indian government showcased its vision and political will to transform India into a global knowledge hub. The present work of research directly contributes to one of the five pillars of the framework given by the NKC and which focuses specifically on higher education. The present research provides an empirically tested model enabling decision makers at universities to strategize around intellectual capital and influence performance. The study strongly recommends that human capital is driven by factors like research facilitation, quality of work life provided by the university, perks and benefits to retain competent faculty, securing faculty commitment, and policies of diversity and pluralism at workplace. Similarly access to relevant information, robust networking strategies and being consumer oriented in its way of working, gives the required emphatic push to the creation of relational capital in universities.

Another important policy document is the report issued by Higher Education Committee of Federation of Indian Chambers of Commerce & Industry (FICCI)& E&Y (Ernst & Young), called the Vision 2030 for Indian higher education. It focusses on three major imperatives of Indian higher education: economic, social and intellectual. The present research directly contributes to the third imperative viz. intellectual. The two major dimensions of the intellectual imperative are developing research focused universities and excellence. The present study has inculcated all the possible parameters of research and excellence as part of its analysis. Hence authors feel that the current research also provides a framework to the decision makers at universities to convert Government of India's Vision 2030 into a reality. Results of this study imply that in addition to relying on the conventional areas, that are faculty expertise, teaching pedagogy and research quality, planners in the education sector need to focus equally if not more on the infrastructural and knowledge sharing aspects and keep themselves abreast of the technological changes which influence the way of teaching and learning.

As the free market logic extends to higher education also, students have become customers and institutions, the service providers. The paradigm shift from a teacher driven to a student driven education model is because of the increasing service orientation of education sector. This customer oriented philosophy that stems from the concept of relational capital can help promote India as a symbol of international excellence in education which happens to be the major objective of the Indian higher education sector as per the Vision 2030 report.

The present study also has international relevance. Not just India, but policymakers across BRICS and other emerging economies give far more importance to universities and the significant contribution they make in steering economic growth and competitiveness as compared to the developed economies. Hence the model developed in the study can be successfully emulated in other developing economies around the world.

Another major reason why the study holds international significance is because of the framework of university rankings given by the Times Higher Education BRICS & Emerging Economies University Rankings 2016-17. The proposed framework on the basis of which universities across the world have been ranked is based on the five pillars: teaching, research, citations, international orientation and industry collaboration, all of which also constitute an integral part of the present study. Against the backdrop of the framework provided by the Time Higher Education rankings, the results of this research will be of paramount importance in helping policy makers in the higher education sector to take cognizance of the importance of university intellectual capital.

Finally, the inclusion of a third category of central university in the analysis of the present study holds many insightful observations for planners and policymakers at the central universities of

North India. Especially these results and findings can be of immense importance for the two newly established central universities in the states of Punjab and Haryana. The findings and results can be taken as recommendations and these nascent universities can practically implement these recommendations for enhancing their performance.

5.4 Limitations of the research

Like every research, the present study also has its own set of limitations. The data collected only represents the Northern part of the country and accordingly the results may or may not be applicable to other parts of the country. This can also be treated as an opportunity to extend the present study to other regions of India. The present study has considered cross sectional survey method for collecting data which means that the data was collected once. This may mean that faculty perception may also change and differ with time and as a result the outcome may be different. An assumption that has been made in the current research is that universities are organizations. There is literature support which does not consider universities as traditional organizations due to the difference in its nature of functioning and conventional characteristics as compared to for-profit institutions. Accordingly, the findings and results of this study may not hold relevance if universities are not treated as organizations. Since many of the factors and item indicators considered in the present study are exploratory in nature and newly studied, it cannot be claimed that they will be equally applicable and valid for other countries. However, these item indicators can be improvised and modified according to the characteristics of the education sector and then implemented in the particular country or region.

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ANNEXURE 1

Construct and measurement details of human capital

Factor	S. NO	Human capital, Measurement items	Item
Research facilitation	**S. NO**	**Source: Ramirez et al., 2007, Postiglione, 2013,2015, Kezar, 2005, Ahmadi *et al*., 2012, Townsend *et al*., 2015**	
	1	University provides adequate research grant to faculty	RF1
	2	**Faculty is encouraged to be a part of committee/ reviewer/editorial in board of national/international journals.(New scale Item)**	RF2
	3	Faculty is encouraged to come up with publications.	RF3
	4	Faculty is encouraged for undertaking interdisciplinary research.	RF4
	5	Faculty is encouraged and facilitated to attend conferences/workshops.	RF5
	6	Faculty is encouraged to collaborate with industry for research projects.	RF6
	7	Faculty is encouraged to collaborate with other universities for research.	RF7
	8	Faculty is encouraged among themselves to collaborate for research.	RF8
Quality of work life		**Source: Farid *et al*., 2008; Pick *et al*., 2012**	
	1	Faculty is provided conducive physical working environment.	QWL1
	2	Faculty is provided conducive emotional working environment.	QWL2
	3	**University prefers hiring faculty with experience.(New scale Item)**	QWL3
	4	University has a strong system of promoting the faculty internally	QWL4
	5	**University adequately mentors its newly hired faculty. (New scale item)**	QWL5
Perks for employee retention		**Source: Literature Noaman et al., 2015**	
	1	University has an adequate provision of family benefits for the faculty.	PFER1
	2	University provides proper communication allowance for the faculty.	PFER2
	3	Provides enough recreation facility for the faculty and their family.	PFER3
Faculty commitment		**Source: Masron *et al*., 2012**	
	1	Maintain cordial relationship with fellow faculty members.	FC1
		Belief in individual academic responsibility in terms of motivation, knowledge sharing, task ability and domain expertise	

	2	**towards accomplishing university objectives. (New scale item)**	FC2
	3	**Belief in individual administrative responsibility in terms of motivation, knowledge sharing, task ability and domain expertise towards accomplishing university objectives. (New scale item)**	FC3
Equal employment opportunity		**Source: Amano, 1997, Alleman & Haviland, 2017, Bontis, 1998, Dobele *et al*., 2014**	
	1	**University encourages recruitment of people with different ability. (New scale item)**	EEO1
	2	University encourages gender diversity among faculty.	EEO2
	3	**University encourages recruitment of religious/caste minorities. (New scale item)**	EEO3

Construct and measurement details of organizational capital

Factor		Organizational capital, Measurement items	Item
Knowledge Infrastructure	**S.NO**	**Source: Corcoles et al., 2011, Bontis, 1998, Ahmadi et al., 2012, Lee, 2010**	
	1	Faculty has adequate access to a repository of video lectures and e-books.	KI1
	2	Faculty has adequate access to technologies like video conferencing and webinars.	KI2
	3	Faculty has adequate access to information technology infrastructure.	KI3
	4	Faculty has adequate access to working research papers/white papers/working papers/annual reports and policies.	KI4
	5	Faculty has adequate access to online journals/databases through departmental library in addition to Central library (if any).	KI5
Knowledge sharing	**S.NO**	**Source: Corcoles et al., 2011, Bontis, 1998, Ahmadi et al., 2012, Lee,2010**	
	1	Adequate access to CDs of national and international conferences/seminars/workshops.	KS1
	2	Adequate access to quality digital archives that help in accessing papers, articles, scholarly publications and reading material of other faculty.	KS2
	3	Sufficient access to online portals for uploading the teaching and reading material of faculty which can be accessed by students.	KS3
	4	Existence of knowledge networks and communities of practice.	KS4

Construct and measurement details of relational capital

Factor	S.NO	Relational capital, Measurement items	Item
Access to information	**S.NO**	**Source: Utulu & Okoye, 2010**	
	1	The university website provides adequate information on academic paper repository.	ATI1
	2	University website provides enough information on teaching and learning resources.	ATI2
	3	University website provides enough information on the funding and report on the ongoing research.	ATI3
	4	University website provides adequate information on upcoming conferences, workshops, seminars and/or colloquiums.	ATI4
	5	University website provides enough information on Online Public Access Catalogue (OPAC).	ATI5
	6	University website provides adequate information on academic regulations and admission related matters.	ATI6
	7	Website provides adequate information on university laws and handbooks.	ATI7
	8	University website provides enough information about the faculty profiles.	ATI8
	9	University website provides adequate information regarding the events and latest news happening across the university.	ATI9
	10	Website provides enough information about the university.	ATI10
Network leveraging capacity	**S.NO**	**Source: Noaman *et al*., 2015, Corcoles *et al*., 2011, Weerts *et al*., 2010, McDearmon, 2013**	
	1	Faculty participation in conducting MDPs/FDPs/EDPs.	NLC1
	2	Participation in exchange program at international level.	NLC2
	3	Utilizing the archived knowledge of faculty to facilitate industry consulting.	NLC3
	4	Making use of the alumni network as an interface between industry and academia.	NLC4
	5	Having a strong alumni network.	NLC5
Degree of interaction	**S.NO**	**Source: Corcoles *et al*., 2011; Finney & Finney, 2010; Kim & Lundberg, 2016; Koc & Celik, 2015**	
	1	Students as major stakeholders of the university.	DOI1
	2	Faculty members’ participation in the process of interaction with students regarding their expectations.	DOI2
	3	**Faculty members’ participation in the process of interaction with parents regarding their expectations. (New scale item)**	DOI3

Construct and measurement details of organizational performance

Factor		Organizational performance, Measurement items	Item
Financial	**S.NO**	**Source: Karathanos & Karathanos, 2005**	
	1	Regular scholarships to students.	FIN1
	2	**Regular salary hikes for faculty.(New scale item)**	FIN2
	3	**Professional development allowance for faculty.(New scale item)**	FIN3
	4	**Proper stipends/teaching assistantship to research scholars.(New scale item)**	FIN4
Customer	**S.NO**	**Source: Umashankar & Dutta, 2007, Cullen *et al*., 2003, Tohidi *et al*., 2010**	
	1	Course curriculum is in consistency with the needs of the industry.	CUST1
	2	Securing student satisfaction with respect to teaching pedagogy.	CUST2
	3	Securing student satisfaction with respect to infrastructure.	CUST3
	4	Good word of mouth among students.	CUST4
	5	Good word of mouth among parents.	CUST5
	6	Achieving effective student placement in terms of percentage of students with on campus jobs at the time of graduation.	CUST6
	7	Securing good internship/training opportunity in terms of percentage of students with on campus training offers during their graduation	CUST7
Learning	**S.NO**	**Source: Umashankar & Dutta, 2007, Bontis, 1998, Leitner, 2004, Rompho,2008, Binden *et al*., 2014, Sayed, 2013, Cullen et al., 2003**	
	1	There is an objective measure to assess the teaching performance of faculty.	LEARN1
	2	**Adequate financial support for computer hardware/software.(New scale item)**	LEARN2
	3	Adequacy of classrooms and equipment facilities for providing quality education.	LEARN3
	4	**Financial support for travel and stay while attending seminars, workshops, STPs and /or FDPs.(New scale item)**	LEARN4
	5	Promotion of entrepreneurial initiatives among faculty.	LEARN5
	6	Active involvement in consultancy projects for industry**.**	LEARN6
Process	**S.NO**	**Source: Lietner, 2004, Umashankar & Dutta, 2007, Karathanos & Karathanos, 2005, Sayed,2013**	
	1	Promoting the development of new courses.	PRO1
	2	**Preparation and maintenance of proper session plans/ course objectives and outcomes for each individual course. (New scale item)**	PRO2
	3	Quality institutional management in terms of degree completion rate.	PRO3
	4	Objective measurement scales to evaluate student performance.	PRO4
	5	Introducing unique courses which are not offered in other institutions.	PRO5
	6	Providing facilities that promote staff productivity.	PRO6

7	**Having a system to enhance the quality of program for regular students.(New scale item)**	PRO7
8	**Having a system to enhance the quality of program for part time students. (New scale item)**	PRO8
9	Stress on accreditation requirements from the various governing bodies in higher education.	PRO9

ANNEXURE 2

Questionnaire

Objective: In connection with my research project (Ph.D.), I wish to elicit some information pertaining to your organization related to the key components of Intellectual Capital and their effects on the performance of your organization. Kindly take few minutes to fill up this questionnaire. You can answer questions by ticking against the correct responses.
The information being collected is purely for research and academic purpose and will be kept confidential. Your cooperation is appreciated.

General information about the respondent

1. Name of respondent…….
2. Job Title
   (a) Lecturer ☐ (b) Assistant Professor ☐ (c) Associate Professor ☐
   (d) Professor ☐ (e) Any other please specify ☐

3 Age: (a) 25-30 ☐ (b) 30-35 ☐ (c) 35-40 ☐

(d) Above 40 ☐

4 Nature of university: (a) State ☐ (b) Private ☐
(c) Central ☐

5 Number of years of service in the current university (in years): (a) Less than 1 ☐ (b) 1 to 3 ☐
(c) 3 to 5 ☐ (d) More than 5 ☐

6 Industry Experience (in years): (a) Less than 1 ☐
(b) 1 to 3 ☐ (c) 3 to 5 ☐ (d) More than 5 ☐

7 Maximum qualification: (a) Graduation ☐
(b) Post Graduation ☐ (c) Doctorate ☐ (d) Any other ☐

8 Research experience (in years): (a) 0 to 5 ☐
(b) 5 to 10 ☐ (c) 10 to 15 ☐ (d) More than 15 ☐

9 Stream of your teaching/research: (a) Engineering ☐
(b) Applied Science ☐ (c) Management ☐
(d) Humanities and Social Science ☐ (e) Any other ☐

10 Total number of faculty in your department: (a) 0 to5
(b) 5 to 10 ☐ (c) 10 to 15 ☐ (d) More than 15 ☐

11 Are you serving the university as a permanent faculty:
(a) Yes ☐ (b) No ☐

Below are some questions about the Human capital aspects of your university. Please answer the following questions by ticking on the relevant box. Instructions: **5= strongly agree, 4= somewhat agree, 3= neither agree nor disagree, 2= somewhat disagree, 1= strongly disagree**

1	You are encouraged to come up with publications	5	4	3	2	1
2	You are encouraged and facilitated to attend conferences & workshops.	5	4	3	2	1
3	You get adequate grants to conduct research	5	4	3	2	1
4	You are encouraged to be a part of committee/ reviewer/editorial in board of national/international journals	5	4	3	2	1
5	You are encouraged to collaborate for research with other faculty.	5	4	3	2	1
6	You are encouraged to collaborate with industry for research projects.	5	4	3	2	1
7	You are encouraged to collaborate with other universities for research.	5	4	3	2	1
8	You are encouraged for undertaking interdisciplinary research.	5	4	3	2	1
9	You get a conducive physical working environment	5	4	3	2	1
10	You get a conducive emotional working environment	5	4	3	2	1
11	Your university prefers hiring faculty with experience.	5	4	3	2	1
12	Your university has a strong system of promoting the faculty internally.	5	4	3	2	1
13	The university adequately mentors its newly hired faculty.	5	4	3	2	1
14	The university has an adequate provision of family benefits for the faculty.	5	4	3	2	1
15	The university has an adequate provision of communication allowance for the faculty.	5	4	3	2	1
16	The university provides enough recreation facility for the faculty and their family.	5	4	3	2	1
17	You maintain cordial relationship with fellow faculty members.	5	4	3	2	1
18	You believe in individual academic responsibility in terms of motivation, knowledge sharing, task ability and domain expertise towards accomplishing university objectives.	5	4	3	2	1
19	You believe in individual administrative responsibility in terms of motivation, knowledge sharing, task ability and domain expertise towards accomplishing university objectives	5	4	3	2	1
20	The university encourages recruitment of religious/caste minorities	5	4	3	2	1
21	The university encourages gender diversity among faculty.	5	4	3	2	1
22	The university encourages recruitment of people with different	5	4	3	2	1

ability.

Below are some questions about the Organizational capital aspects of your university. Please answer the following questions by ticking on the relevant box. Instructions: **5= Strongly agree, 4= Somewhat agree, 3= Neither agree nor disagree, 2= Somewhat disagree, 1= Strongly disagree**

1	You have adequate access to information technology infrastructure.	5	4	3	2	1
2	You are able to adequately access online journals/databases through departmental library in addition to Central library (if any).	5	4	3	2	1
3	You are able to adequately access technologies like video conferencing and webinars.	5	4	3	2	1
4	You have access to a good quality repository of video lectures and e-books.	5	4	3	2	1
5	You have adequate access to working research papers/white papers/working papers/annual reports and policies.	5	4	3	2	1
6	You have adequate access to CDs of national and international conferences/seminars/workshops.	5	4	3	2	1
7	You have adequate access to good quality digital archives that help in accessing papers, articles, scholarly publications and reading material of other faculty.	5	4	3	2	1
8	You have sufficient access to online portals for uploading the teaching and reading material which can be accessed by students.	5	4	3	2	1
9	The university supports a culture of knowledge networks and communities of practice.	5	4	3	2	1

Below are some questions about the Relational capital aspects of your university. Please answer the following questions by ticking on the relevant box. Instructions: **5= Strongly agree, 4= Somewhat agree, 3= Neither agree nor disagree, 2= Somewhat disagree, 1= Strongly disagree**

1	University website provides adequate information about the university	5	4	3	2	1
2	University website provides enough information about faculty.	5	4	3	2	1
3	University website provides adequate information regarding the events and latest news happening across the university	5	4	3	2	1
4	University websites provides adequate information on university laws and handbooks	5	4	3	2	1
5	University website provides adequate information on academic paper repository.	5	4	3	2	1
6	University website provides adequate information on upcoming conferences, workshops, seminars and/or colloquiums.	5	4	3	2	1
7	University website provides enough information on	5	4	3	2	1

	teaching/learning resources					
8	University website provides enough information about the online public access catalogue	5	4	3	2	1
9	Provides enough information on the funding and report on the ongoing research	5	4	3	2	1
10	University website provides adequate information on academic regulations and admission related matters.	5	4	3	2	1
11	You are encouraged to conduct MDPs/FDPs/EDPs.	5	4	3	2	1
12	You are encouraged to actively involve yourself in student exchange programs at international platforms	5	4	3	2	1
13	You are facilitated to make use of your knowledge in industry consulting	5	4	3	2	1
14	University effectively uses its alumni network as an interface between industry and academia	5	4	3	2	1
15	University has a sufficiently strong alumni network	5	4	3	2	1
16	You are encouraged to participate in the process of interaction with parents regarding their expectations.	5	4	3	2	1
17	You are encouraged to participate in the process of interaction with students regarding their expectations.	5	4	3	2	1
18	University believes that students are its stakeholders	5	4	3	2	1

Below are some questions about the performance of your university. Please answer the following questions by ticking on the relevant box. Instructions: **5= Strongly agree, 4= Somewhat agree, 3= Neither agree nor disagree, 2= Somewhat disagree, 1= Strongly disagree**

1	Students are offered regular scholarships by the university	5	4	3	2	1
2	Faculty is offered regular raise in salary.	5	4	3	2	1
3	University provides adequate professional development allowance to the faculty.	5	4	3	2	1
4	University provides adequate stipends/teaching assistantship to research scholars.	5	4	3	2	1
5	Course curriculum is in consistency with industry requirements.	5	4	3	2	1
6	Students are satisfied with the teaching pedagogy.	5	4	3	2	1
7	Students are satisfied with the teaching/learning infrastructure.	5	4	3	2	1
8	University has generated a good word of mouth among students.	5	4	3	2	1
9	University has generated a good word of mouth among parents.	5	4	3	2	1

10	University has achieved effective student placement in terms of percentage of students with on campus jobs at the time of graduation.	5	4	3	2	1
11	University has achieved effective training/internship opportunities in terms of percentage of students with on campus training offers during their graduation	5	4	3	2	1
12	Faculty is actively involved in consultancy projects for industry.	5	4	3	2	1
13	University promotes entrepreneurial initiatives among faculty though start-ups, spin offs and incubation units	5	4	3	2	1
14	University provides adequate financial support for travel and stay while attending seminars, workshops, STPs and /or FDPs.	5	4	3	2	1
15	University ensures adequacy of classrooms and equipment facilities for providing quality education.	5	4	3	2	1
16	University provides adequate financial support for computer hardware/software requirements.	5	4	3	2	1
17	University has in place an objective measure to assess the teaching performance of faculty.	5	4	3	2	1
18	University curriculum stresses on developing new courses with time.	5	4	3	2	1
19	There is emphasis on preparation and maintenance of subject plan which includes session plans, course objectives and outcomes for each individual course.	5	4	3	2	1
20	The university has ensured quality institutional management in terms of degree completion rate.	5	4	3	2	1
21	The university has in place, objective measurement scales to evaluate student performance.	5	4	3	2	1
22	University curriculum stresses on developing unique courses which are not offered in other institutions.	5	4	3	2	1
23	University provides enough facilities to promote staff productivity.	5	4	3	2	1
24	University has a proper system in place to enhance the quality of program for regular students.	5	4	3	2	1
25	University has a proper system in place to enhance the quality of program for part-time students.	5	4	3	2	1
26	University gives required importance to the accreditation requirements from the various governing bodies in higher education.	5	4	3	2	1

List of Publications

S.NO	Name of the Journal	Title of Paper	Status of Publication	Journal Coverage
1	International Journal of Educational Development	Role of Human and Relational Capital of Universities as Underpinnings of a Knowledge Economy: A Structural Modelling perspective from North Indian universities	International Journal of Educational Development 56: 52-61	SSCI, Impact Factor:1.020
2	Eurasian Journal of Educational Research	Relationship between university performance and dimensions of Intellectual capital: An empirical investigation	Eurasian Journal of Educational Research 71 (2017) 215-232	ESCI, EBSCO Host, ERIC, Impact Factor: 0.41

Papers presented in Conferences

S.NO	Author(s)	Year	Title of Paper	Name and Place of conference
1	Chatterji Niti & Kiran Ravi	2014	Application of Balanced Scorecard in assessing university performance: An Indian perspective	International Conference on Education and Management Science (ICEMS2014). Beijing, China
2	Chatterji Niti & Kiran Ravi	2014	Application of Balanced Scorecard in assessing university performance: An Indian perspective. ISBN:978-1-60595-197-3. Paper also published as one of the chapters in Google ebook	International Conference on Education and Management Science (ICEMS2014). Beijing, China
3	Chatterji Niti & Kiran Ravi	2014	Exploring the role of Intellectual Capital in the performance of Universities: A theoretical perspective.	Global Conference on Managing in Recovering Markets "GCMRM" MDI, Gurgaon, India
4	Chatterji Niti & Kiran Ravi	2016	Relational Capital: A paradigm change in looking at University Performance	International Conference on Role and Relevance of Ethics, Innovation and IPRs in Changing Business Scenario, ICREII, Thapar University, Patiala