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**THE MEDIATING EFFECT OF KNOWLEDGE
MANAGEMENT CAPABILITY ON ENTERPRISE RISK
MANAGEMENT AND IT RESOURCES TOWARDS
SUSTAINABLE COMPETITIVE ADVANTAGE IN
PAKISTANI SOFTWARE COMPANIES**

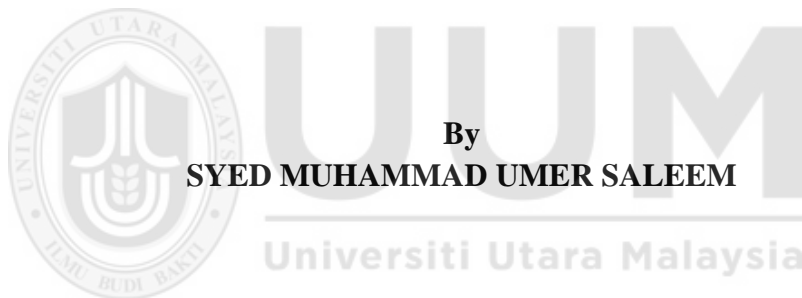


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Universiti Utara Malaysia

**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
December 2025**

**THE MEDIATING EFFECT OF KNOWLEDGE MANAGEMENT
CAPABILITY ON ENTERPRISE RISK MANAGEMENT AND IT
RESOURCES TOWARDS SUSTAINABLE COMPETITIVE ADVANTAGE
IN PAKISTANI SOFTWARE COMPANIES**



**Thesis Submitted to
College of Business,
Universiti Utara Malaysia,
in Fulfilment of the Requirement for the Degree of Doctor of Philosophy**

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Othman Yeop Abdullah Graduate School of Business

Kolej Perniagaan
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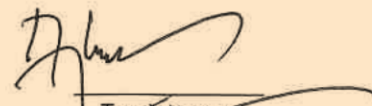
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(Title of the Thesis /
Dissertation) : **The Mediating Effect of Knowledge Management Capability on Enterprise Risk Management and It Resources Towards Sustainable Competitive Advantage in Pakistani Software Companies.**

Program Pengajian
(Programme of Study) : **Doctor of Philosophy (Technology, Operations & Logistics Management)**

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ABSTRACT

Pakistan's information technology (IT) sector struggles to achieve sustainable competitive advantage, as shown by low export growth and poor global rankings. This study explores the mediating role of knowledge management capability between enterprise risk management, IT resources, and sustainable competitive advantage. Drawing on the Resource-Based View (RBV) and Knowledge-Based View (KBV), a quantitative survey was conducted among private software firms in Islamabad, Rawalpindi, Lahore, and Karachi, which represent 90% of the country's software industry. The study analysed companies using stratified random sampling, yielding 181 valid responses (60.54% response rate). Data were analyzed with the Statistical Package for the Social Sciences (SPSS) and Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings support the RBV and KBV, demonstrating that enterprise risk management and knowledge management capability significantly enhance sustainable competitive advantage through the effective use of internal resources and organizational knowledge. However, IT resources did not show a direct significant impact when assessed independently. Moreover, knowledge management capability was found to mediate the relationships between enterprise risk management and IT resources with sustainable competitive advantage. This research offers practical implications for policymakers including Pakistan Software Export Board, Pakistan Software Houses Association, Ministry of IT, IT practitioners, and researchers in developing effective measures to enhance sustainable competitive advantage in countries like Pakistan. There is limited empirical evidence on how enterprise risk management and IT resources contribute to sustainable competitive advantage through knowledge management capability, particularly within Pakistan's private IT sector. To address this gap, this study integrates the RBV and KBV to examine the role of enterprise risk management and IT resources in fostering sustainable competitive advantage through knowledge management capability in the Pakistani private IT industry.

Keyword: Enterprise risk management, Information technology resources, Knowledge management capability, Sustainable competitive advantage.

ABSTRAK

Sektor teknologi maklumat (IT) di Pakistan berdepan kesukaran untuk mencapai kelebihan daya saing lestari, sebagaimana ditunjukkan melalui pertumbuhan eksport yang rendah serta kedudukan global yang lemah. Kajian ini meneliti peranan pengantaraan keupayaan pengurusan pengetahuan dalam hubungan antara pengurusan risiko perusahaan, sumber IT, dan kelebihan daya saing lestari. Berlandaskan Teori Pandangan Berasaskan Sumber (RBV) dan Teori Pandangan Berasaskan Pengetahuan (KBV), satu tinjauan kuantitatif dijalankan ke atas firma perisian swasta di Islamabad, Rawalpindi, Lahore, dan Karachi yang merangkumi 90% daripada industri perisian negara. Analisis menggunakan kaedah pensampelan rawak berstrata telah menghasilkan 181 respons sah (kadar respons 60.54%). Data kemudiannya dianalisis menggunakan Pakej Statistik untuk Sains Sosial (SPSS) dan Pemodelan Persamaan Struktur Separa Kuasa Dua Terkecil (PLS-SEM). Dapatan kajian menyokong RBV dan KBV dengan menunjukkan bahawa pengurusan risiko perusahaan serta keupayaan pengurusan pengetahuan secara signifikan meningkatkan kelebihan daya saing lestari melalui penggunaan sumber dalaman dan pengetahuan organisasi yang berkesan. Walau bagaimanapun, sumber IT tidak menunjukkan kesan langsung yang signifikan apabila dinilai secara bebas. Selain itu, keupayaan pengurusan pengetahuan didapati memainkan peranan sebagai pengantara dalam hubungan antara pengurusan risiko perusahaan dan sumber IT terhadap kelebihan daya saing lestari. Kajian ini turut menawarkan implikasi praktikal kepada penggubal dasar seperti Lembaga Eksport Perisian Pakistan, Persatuan Rumah Perisian Pakistan, Kementerian IT, serta pengamal dan penyelidik dalam sektor IT bagi merangka langkah berkesan ke arah meningkatkan kelebihan daya saing lestari di negara membangun seperti Pakistan. Bukti empirik mengenai bagaimana pengurusan risiko perusahaan dan sumber IT menyumbang kepada kelebihan daya saing lestari melalui keupayaan pengurusan pengetahuan masih terhad, khususnya dalam sektor IT swasta di Pakistan. Bagi mengisi jurang ini, kajian ini mengintegrasikan RBV dan KBV untuk meneliti peranan pengurusan risiko perusahaan dan sumber IT dalam memperkukuh kelebihan daya saing lestari melalui keupayaan pengurusan pengetahuan dalam industri IT swasta Pakistan.

Kata kunci: Pengurusan risiko perusahaan, Sumber teknologi maklumat, Keupayaan pengurusan pengetahuan, Kelebihan daya saing lestari.

Acknowledgement

I would like to praise and thank Allah SWT for His uncountable blessings and Prophet Muhammad (peace be upon him) for giving me the ability, strength and motivation to complete this study. Without Allah's blessing and help, it would never be possible for me to complete such a long journey.

First, I would like to express sincere gratitude to my main supervisor, Professor Dr. Che Azlan Bin Taib, for his invaluable guidance, commitment and continuous encouragement throughout my PhD journey. His enthusiasm for research and prompt feedback were highly motivating and greatly contributed to the successful completion of this study. I am also thankful to my co-supervisor, Dr. Rosman Bin Iteng, for his professional support and constructive suggestions which enhanced the quality of this research. I further acknowledge my former supervisor, Dr. Mohd Norhasni bin Mohd Asaad, who supervised during the initial stage of my doctoral studies prior to his retirement, and whose early guidance helped shape this research.

I am very grateful to my father, Syed Shahid Saleem, for earning an honest living for our family and for his unwavering love, prayers and support which encouraged me to work hard and continue pursuing my PhD journey. His firm yet kind-hearted nature taught me to stay strong and motivated me always to do my best. I am equally thankful to my respected mother, whose continuous prayers, sacrifices, and care have shaped my values and character. I am truly thankful to my beloved parents.

To my loving wife, I would like to sincerely thank my wife for her unwavering support and love throughout this difficult journey. Prophet Muhammad (S.A.W) said, "The whole world is a provision, and the best object of benefit of the world is the pious woman". I am equally grateful to my beloved children Hafsa and Musa, whose presence and love gave me strength and inspiration throughout my PhD journey.

I am thankful to my brothers and sister, who took on family responsibilities to support financially and morally. I sincerely appreciate their kindness and will always remember their support. Finally, I extend my appreciation to all those who supported me directly or indirectly. May Allah reward them abundantly.

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List of Abbreviations

| | |
|------|--|
| AVE | Average Variance Extracted |
| CA | Competitive Advantage |
| CMB | Common Method Bias |
| CMV | Common Method Variance |
| CR | Composite Reliability |
| COSO | Committee of Sponsoring Organisations of the Treadway Commission |
| EI | Event Identification |
| ERM | Enterprise Risk Management |
| GDP | Gross Domestic Product |
| IC | Information and Communication |
| ICT | Information and Communication Technology |
| IE | Internal Environment |
| IT | Information Technology |
| ITHR | IT Human Resources |
| ITI | IT Infrastructure |
| ITR | Information Technology Resources |
| ITRR | IT Relationship Resource |
| KBV | Knowledge-Based View |
| KM | Knowledge Management |
| KMC | Knowledge Management Capability |
| MN | Monitoring |
| OS | Objective Setting |
| PSEB | Pakistan Software Export Board |

| | |
|------|--|
| RBV | Resource-Based View |
| RA | Risk Assessment |
| RR | Risk Response |
| SCA | Sustainable Competitive Advantage |
| SDG | Sustainable Development Goals |
| SECP | Securities and Exchange Commission of Pakistan |
| SEM | Structural Equation Modeling |
| SPSS | Statistical Package for the Social Sciences |
| VIF | Variance Inflation Factor |



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Sustainable Competitive Advantage (SCA) is one of the critical issues faced by strategic management scholars and is considered one of the primary concerns of managers and entrepreneurs around the globe. The topic of how to achieve and maintain the SCA to date is still the subject of debate and a critical issue among researchers (Navarro & Haag, 2024; Satar, 2024). Companies worldwide need significant attention to this issue in the era of the Industrial Revolution 5.0 (Muhani et al., 2024). According to Anwar et al. (2018), sustainable competitive advantage can enhance growth prospects and optimise profits, positively impacting a country's gross domestic product (GDP). Previous studies have shown that companies' inability to manage resources has led to a higher failure rate of these enterprises, irrespective of whether they operate in developed or developing nations (Arsawan et al., 2020). Therefore, academics in developing countries are also concerned about this phenomenon, in addition to managers and public policymakers (Singh et al., 2019).

Worldwide IT spending is estimated to reach \$5.26 trillion in 2024, a 7.5% rise over 2023, with software spending increasing by 12.6 per cent to \$1,0969 trillion in 2024 (STAMFORD, 2024). This increasing trend indicates the expansion of the worldwide IT market.

As per Standish Group, the global software projects success ratio is only 31% (Johnson, 2020). Large IT projects seem to fail worldwide (Anthopoulos et al., 2016; Payne, 2018). This consistent underperformance can be attributed to several

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Appendices



Appendix A: Research Instrument

The Questionnaire

Dear Respondent

Subject: The Role of Knowledge Management Capability Towards Sustainable Competitive Advantage in Pakistani Software Companies.

General Information

This is a PhD study to determine the impact of enterprise risk management, IT resources in software companies in Pakistan. It is hoped that the outcome of the study will be of immense benefit to the development of Pakistani software companies. Your willingness to answer the questionnaire is highly appreciated since it will contribute to the quality of the study.

Instructions

The questionnaire contains six sections A, B, C, D, E and F. It will take about 15-20 minutes to complete the survey. I ensure that all responses provided by you will only be used for academic purposes and will be kept **STRICTLY CONFIDENTIAL**.

I highly appreciate your participation in this research.

Sincerely,

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Section A:

In this section, following items ask for some personal and institutional information.

Please provide information and fill in or put a Tick (✓) as appropriate as follow:

1. **Company Name** _____
2. **No. of Employees** Less than 20 21-50
 51 - 250 251-500
 500+
3. **Annual Sales Turnover (PKR)** Up to 150 million 150 – 800 million
 800 million and above
4. **Qualification** Bachelor Masters
 MPhil Doctorate
5. **Job Position** Middle-level Mgt. Top-level Mgt.
 Frontline Mgt. Others
6. **Total Job experience** Up to 5 Years 5-9 years
 10 years and above
7. **Gender** Male Female
8. **Age** Less than 20 20-29
 30-39 40-49
 50-59 60 and above

9. Office City

Lahore

Karachi

Rawalpindi

Islamabad



UUM
Universiti Utara Malaysia

| | | | | |
|---|-----------------------------|----------------------------|--------------------------|--|
| On the following scale. Please tick (✓) the appropriate number which best reflects your perception. | | | | |
| Scales | | | | |
| (1) Strongly Disagree (SD) | (2) Disagree (D) | (3) Neutral (N) | (4) Agree (A) | (5) Strongly Agree (SA) |

Section B: Enterprise Risk Management

| <u>B1: Internal environment</u> | | SD | D | N | A | SA |
|---|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the internal environment . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | There is a common understanding of risk management across the organization. | 1 | 2 | 3 | 4 | 5 |
| 2 | Your organization has an effective risk management policy. | 1 | 2 | 3 | 4 | 5 |
| 3 | In your organization, risk appetite is considered in strategy setting. | 1 | 2 | 3 | 4 | 5 |
| 4 | Responsibility for risk management is clearly set out and understood throughout the organization. | 1 | 2 | 3 | 4 | 5 |
| 5 | Risk management is embedded in your organization's culture | 1 | 2 | 3 | 4 | 5 |

| <u>B2: Objective Setting</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the objective setting . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | Management has in place a process and procedure to set business objectives (strategic, operational, reporting, compliance). | 1 | 2 | 3 | 4 | 5 |
| 2 | Organization's objectives support entity's mission and are aligned with that. | 1 | 2 | 3 | 4 | 5 |
| 3 | When formulating the Strategic plans, to what extent are risks identified and factored in. | 1 | 2 | 3 | 4 | 5 |
| 4 | When formulating the Budgets plans, to what extent are risks identified and factored in. | 1 | 2 | 3 | 4 | 5 |
| 5 | When formulating the Operational plans, to what extent are risks identified and factored in. | 1 | 2 | 3 | 4 | 5 |
| 6 | When formulating the Project management plans, to what extent are risks identified and factored in. | 1 | 2 | 3 | 4 | 5 |
| 7 | When formulating the Capital investment plans, to what extent are risks identified and factored in. | 1 | 2 | 3 | 4 | 5 |

| <u>B3: Event Identification</u> | | SD | D | N | A | SA |
|---|--|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the Event identification . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Your organization considers external factors driving events that could affect the achievement of objectives (e.g. Economic, Natural environment, Political, Social, Technological). | 1 | 2 | 3 | 4 | 5 |
| 2 | Your organization considers internal factors driving events that could affect the achievement of objectives (e.g. Infrastructure, Personnel, Process, Technology). | 1 | 2 | 3 | 4 | 5 |
| 3 | Your organization considers the positive events and opportunities that could affect the achievement of objectives. | 1 | 2 | 3 | 4 | 5 |
| 4 | The organization has system to ensure that policies and procedures that are in place to manage the achievement of the firm's objectives/plan are functioning and effective. | 1 | 2 | 3 | 4 | 5 |

| <u>B4: Risk assessment</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the risk assessment . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | The positive and negative impacts of potential events are examined across the entity. | 1 | 2 | 3 | 4 | 5 |
| 2 | This organization's risks are assessed by using qualitative analysis methods (e.g. high, moderate, low) | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | This organization's risks are assessed by using quantitative analysis methods. (e.g. percentages or probability charts, or using tools such as metrics and software). | 1 | 2 | 3 | 4 | 5 |
| 4 | The organization is effective at prioritizing risks and determining the residual risks. | 1 | 2 | 3 | 4 | 5 |

| <u>B5: Risk Response</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the risk response . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | Your organization selects a set of actions to align risks with the entity's risk tolerance and risk appetite. | 1 | 2 | 3 | 4 | 5 |
| 2 | In determining risk response, your organization considers possible opportunities to achieve entity objectives going beyond dealing with the specific risk. | 1 | 2 | 3 | 4 | 5 |
| 3 | In determining risk response, your organization considers possible residual risk and assesses and determines that the residual risk is within the entity's risk tolerance and appetite. | 1 | 2 | 3 | 4 | 5 |
| 4 | Your organization's response to analyzed risks includes prioritizing risk treatments where there are resource constraints on risk treatment implementation. | 1 | 2 | 3 | 4 | 5 |

| <u>B6: Control Activities</u> | | SD | D | N | A | SA |
|---|--|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the control activities . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | The organization's risk management procedures include policies and processes which help to ensure that risk responses are appropriately carried out. | 1 | 2 | 3 | 4 | 5 |
| 2 | In your organization control activities are executed to ensure risk responses are in a timely manner. | 1 | 2 | 3 | 4 | 5 |
| 3 | The level of existing control activities by your organization are sufficient and appropriate for the risks that it faces. | 1 | 2 | 3 | 4 | 5 |
| 4 | Many different types of control activities are performed by your organization at various organizational level and entities. | 1 | 2 | 3 | 4 | 5 |

| <u>B7: Information and communication</u> | | SD | D | N | A | SA |
|--|--|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the Information and communication . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | In the organization relevant information is identified, captured and communicated in a form and time frame that enable people to carry out their responsibilities. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | The information infrastructure is consistent with an entity's need to identify, assess, and respond to risk and remained within its risk tolerance. | 1 | 2 | 3 | 4 | 5 |
| 3 | Formal procedures are in place for reporting risks. | 1 | 2 | 3 | 4 | 5 |
| 4 | Changes to risks are assessed and reported on an ongoing basis. | 1 | 2 | 3 | 4 | 5 |
| 5 | In your organization, there is appropriate communication with people outside of the organization. (e.g. customers, suppliers, shareholders). | 1 | 2 | 3 | 4 | 5 |

| <u>B8: Monitoring</u> | | SD | D | N | A | SA |
|---|--|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the monitoring . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | In your organization some combination of ongoing monitoring and separate evaluations will ensure that ERM maintains its effectiveness over time. | 1 | 2 | 3 | 4 | 5 |
| 2 | Monitoring the effectiveness of risk management is an integral part of routine management reporting. | 1 | 2 | 3 | 4 | 5 |
| 3 | Your organization has highly effective continuous review/feedback on risk management strategies and performance. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | Your organization regularly reviews internal controls | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|



Section C: IT Resources

| <u>C1: IT Infrastructure</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the IT infrastructure . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | The data management services and architectures in my organization are adequate | 1 | 2 | 3 | 4 | 5 |
| 2 | The network communication is sufficient with good connectivity, reliability, and availability | 1 | 2 | 3 | 4 | 5 |
| 3 | The quality of IT application and services (e.g. ERP and ASP) can meet the organizational needs | 1 | 2 | 3 | 4 | 5 |
| 4 | IT management services can coordinate the physical infrastructure and manage its relationship with business units effectively and efficiently | 1 | 2 | 3 | 4 | 5 |

| <u>C2: IT Human Resource</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| This section consists on the various elements of the IT human resource . By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements. | | | | | | |
| 1 | My organization has an adequate IT skill base | 1 | 2 | 3 | 4 | 5 |
| 2 | My organization has skilled technical support staff | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|--|---|---|---|---|---|
| 3 | The staff in my organization knows how to solve problems related to IT | 1 | 2 | 3 | 4 | 5 |
| 4 | The IT groups are knowledgeable in business strategies for IT planning | 1 | 2 | 3 | 4 | 5 |
| 5 | The staff in my organization can evaluate and control IT projects | 1 | 2 | 3 | 4 | 5 |

| <u>C3: IT Relation Resource</u> | | SD | D | N | A | SA |
|---|--|-----------|----------|----------|----------|-----------|
| <p>This section consists on the various elements of the IT relation resource. By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements.</p> | | | | | | |
| 1 | My organization has technology-based links with customers | 1 | 2 | 3 | 4 | 5 |
| 2 | My organization has technology-based links with suppliers | 1 | 2 | 3 | 4 | 5 |
| 3 | We have a good line management sponsorship of IT initiatives | 1 | 2 | 3 | 4 | 5 |
| 4 | My organization has a good relationship between line management and IT service providers | 1 | 2 | 3 | 4 | 5 |

Section D: Knowledge Management Capability

| <u>E1: Knowledge Management Capability</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| <p>This section consists on the various elements of the knowledge management capability. By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements.</p> | | | | | | |
| 1 | My organization has processes to gain knowledge on our suppliers, customers, and partners. | 1 | 2 | 3 | 4 | 5 |
| 2 | My organization can generate new knowledge from existing knowledge. | 1 | 2 | 3 | 4 | 5 |
| 3 | My organization has processes in place to distribute knowledge throughout the organization. | 1 | 2 | 3 | 4 | 5 |
| 4 | My organization holds periodic meetings to inform employees about the latest innovations. | 1 | 2 | 3 | 4 | 5 |
| 5 | My organization has formal processes to share the best practice among the different fields of activities. | 1 | 2 | 3 | 4 | 5 |
| 6 | In my organization, knowledge is accessible to those who need it. | 1 | 2 | 3 | 4 | 5 |
| 7 | My organization has processes for using knowledge to develop new products or services. | 1 | 2 | 3 | 4 | 5 |

Section E: Sustainable Competitive Advantage

| <u>F1: Sustainable Competitive Advantage</u> | | SD | D | N | A | SA |
|--|---|-----------|----------|----------|----------|-----------|
| <p>This section consists on the various elements of the sustainable competitive advantage. By answering these questions, you are providing the opinion as per having experience with your software company to each of these elements.</p> | | | | | | |
| 1 | The quality of the products or services that your company offers is better than that of the competitor's products or services | 1 | 2 | 3 | 4 | 5 |
| 2 | Your company is more capable of R&D and innovation than the competitors | 1 | 2 | 3 | 4 | 5 |
| 3 | Your company has better managerial capability than the competitors | 1 | 2 | 3 | 4 | 5 |
| 4 | Your company's profitability is better than the competitors | 1 | 2 | 3 | 4 | 5 |
| 5 | Your corporate image is better than your competitors | 1 | 2 | 3 | 4 | 5 |
| 6 | Your company is much more flexible (regarding the risks and challenges) than the competitors | 1 | 2 | 3 | 4 | 5 |
| 7 | Overall, your company's growth is better than the competitors | 1 | 2 | 3 | 4 | 5 |

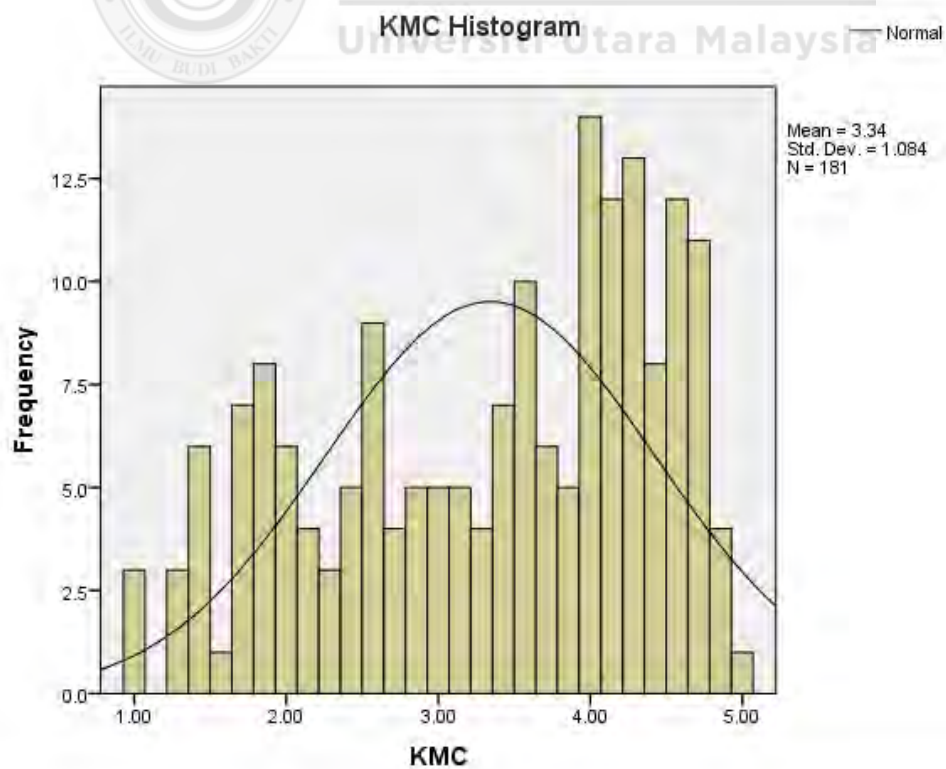
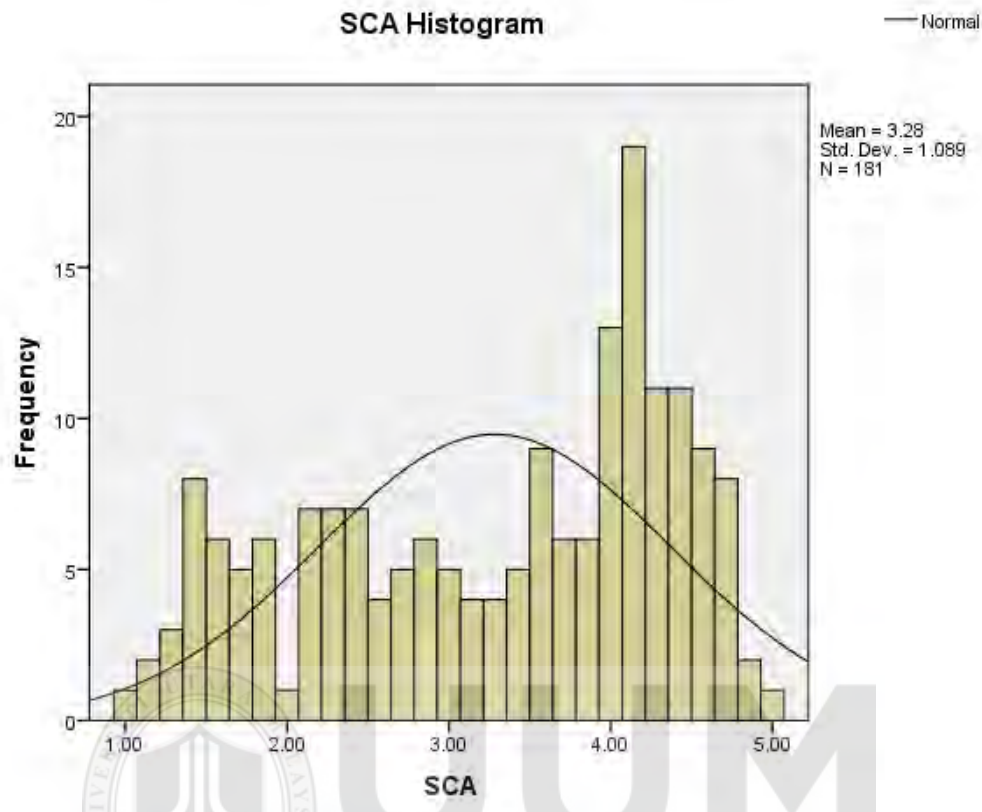
Thank you.

Appendix B: Descriptive Statistics

| Descriptive Statistics | | | | | | |
|------------------------|-----------|-----------|-----------|------------|-----------|------------|
| | N | Mean | Skewness | | Kurtosis | |
| | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| SCA1 | 181 | 3.22 | -.215 | .181 | -1.377 | .359 |
| SCA2 | 181 | 3.34 | -.302 | .181 | -1.309 | .359 |
| SCA3 | 181 | 3.36 | -.332 | .181 | -1.237 | .359 |
| SCA4 | 181 | 3.22 | -.216 | .181 | -1.384 | .359 |
| SCA5 | 181 | 3.29 | -.261 | .181 | -1.277 | .359 |
| SCA6 | 181 | 3.38 | -.373 | .181 | -1.276 | .359 |
| SCA7 | 181 | 3.18 | -.136 | .181 | -1.297 | .359 |
| ERM_IE1 | 181 | 3.28 | -.244 | .181 | -1.224 | .359 |
| ERM_IE2 | 181 | 3.34 | -.286 | .181 | -1.360 | .359 |
| ERM_IE3 | 181 | 3.29 | -.236 | .181 | -1.408 | .359 |
| ERM_IE4 | 181 | 3.42 | -.497 | .181 | -1.208 | .359 |
| ERM_IE5 | 181 | 3.17 | -.168 | .181 | -1.389 | .359 |
| ERM_OS1 | 181 | 3.30 | -.295 | .181 | -1.323 | .359 |
| ERM_OS2 | 181 | 3.41 | -.384 | .181 | -1.190 | .359 |
| ERM_OS3 | 181 | 3.39 | -.335 | .181 | -1.131 | .359 |
| ERM_OS4 | 181 | 3.45 | -.429 | .181 | -1.252 | .359 |
| ERM_OS5 | 181 | 3.24 | -.148 | .181 | -1.384 | .359 |
| ERM_OS6 | 181 | 3.25 | -.250 | .181 | -1.352 | .359 |
| ERM_OS7 | 181 | 3.43 | -.458 | .181 | -1.232 | .359 |
| ERM_EI1 | 181 | 3.15 | -.122 | .181 | -1.355 | .359 |
| ERM_EI2 | 181 | 3.25 | -.232 | .181 | -1.366 | .359 |
| ERM_EI3 | 181 | 3.30 | -.320 | .181 | -1.298 | .359 |
| ERM_EI4 | 181 | 3.22 | -.221 | .181 | -1.336 | .359 |
| ERM_RA1 | 181 | 3.33 | -.272 | .181 | -1.272 | .359 |
| ERM_RA2 | 181 | 3.24 | -.239 | .181 | -1.418 | .359 |
| ERM_RA3 | 181 | 3.19 | -.112 | .181 | -1.388 | .359 |
| ERM_RA4 | 181 | 3.34 | -.390 | .181 | -1.245 | .359 |
| ERM_RR1 | 181 | 3.46 | -.451 | .181 | -1.015 | .359 |
| ERM_RR2 | 181 | 3.32 | -.332 | .181 | -1.176 | .359 |
| ERM_RR3 | 181 | 3.27 | -.178 | .181 | -1.361 | .359 |
| ERM_RR4 | 181 | 3.43 | -.411 | .181 | -1.234 | .359 |
| ERM_CA1 | 181 | 3.31 | -.318 | .181 | -1.298 | .359 |
| ERM_CA2 | 181 | 3.47 | -.432 | .181 | -1.096 | .359 |
| ERM_CA3 | 181 | 3.40 | -.303 | .181 | -1.347 | .359 |
| ERM_CA4 | 181 | 3.31 | -.292 | .181 | -1.401 | .359 |
| ERM_IC1 | 181 | 3.38 | -.364 | .181 | -1.080 | .359 |
| ERM_IC2 | 181 | 3.33 | -.247 | .181 | -1.399 | .359 |

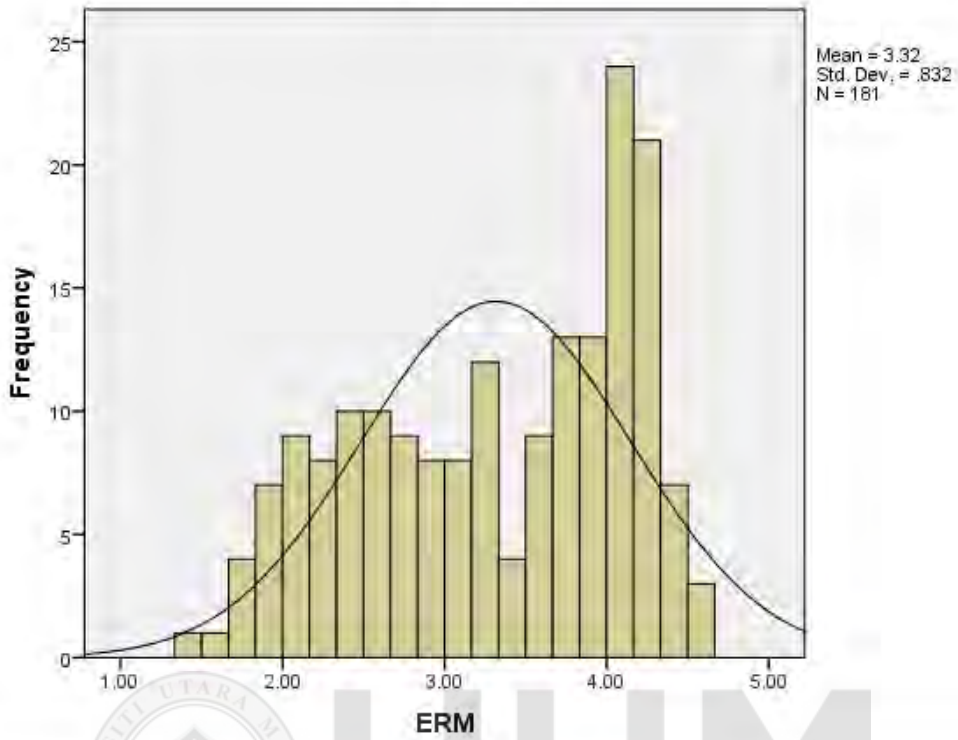
| | | | | | | |
|----------|-----|--------|-------|------|--------|------|
| ERM_IC3 | 181 | 3.38 | -.378 | .181 | -1.197 | .359 |
| ERM_IC4 | 181 | 3.29 | -.225 | .181 | -1.282 | .359 |
| ERM_IC5 | 181 | 3.35 | -.347 | .181 | -1.364 | .359 |
| ERM_MN1 | 181 | 3.14 | -.134 | .181 | -1.298 | .359 |
| ERM_MN2 | 181 | 3.36 | -.297 | .181 | -1.124 | .359 |
| ERM_MN3 | 181 | 3.22 | -.181 | .181 | -1.420 | .359 |
| ERM_MN4 | 181 | 3.41 | -.433 | .181 | -1.230 | .359 |
| ITR_ITI1 | 181 | 3.22 | -.228 | .181 | -1.418 | .359 |
| ITR_ITI2 | 181 | 3.30 | -.251 | .181 | -1.432 | .359 |
| ITR_ITI3 | 181 | 3.31 | -.269 | .181 | -1.340 | .359 |
| ITR_ITI4 | 181 | 3.17 | -.166 | .181 | -1.381 | .359 |
| ITR_HR1 | 181 | 3.29 | -.282 | .181 | -1.357 | .359 |
| ITR_HR2 | 181 | 3.30 | -.279 | .181 | -1.397 | .359 |
| ITR_HR3 | 181 | 3.33 | -.269 | .181 | -1.427 | .359 |
| ITR_HR4 | 181 | 3.30 | -.229 | .181 | -1.280 | .359 |
| ITR_HR5 | 181 | 3.31 | -.295 | .181 | -1.264 | .359 |
| ITR_RR1 | 181 | 3.23 | -.152 | .181 | -1.357 | .359 |
| ITR_RR2 | 181 | 3.24 | -.265 | .181 | -1.386 | .359 |
| ITR_RR3 | 181 | 3.22 | -.230 | .181 | -1.322 | .359 |
| ITR_RR4 | 181 | 3.07 | -.032 | .181 | -1.378 | .359 |
| KMC1 | 181 | 3.49 | -.459 | .181 | -1.189 | .359 |
| KMC2 | 181 | 3.33 | -.339 | .181 | -1.373 | .359 |
| KMC3 | 181 | 3.39 | -.311 | .181 | -1.294 | .359 |
| KMC4 | 181 | 3.30 | -.270 | .181 | -1.339 | .359 |
| KMC5 | 181 | 3.27 | -.195 | .181 | -1.343 | .359 |
| KMC6 | 181 | 3.35 | -.375 | .181 | -1.256 | .359 |
| KMC7 | 181 | 3.27 | -.229 | .181 | -1.390 | .359 |
| ERM_IE | 181 | 3.2994 | -.312 | .181 | -1.244 | .359 |
| ERM_OS | 181 | 3.3520 | -.460 | .181 | -1.097 | .359 |
| ERM_EI | 181 | 3.2293 | -.259 | .181 | -1.194 | .359 |
| ERM_RA | 181 | 3.2749 | -.258 | .181 | -1.185 | .359 |
| ERM_RR | 181 | 3.3688 | -.543 | .181 | -.932 | .359 |
| ERM_CA | 181 | 3.3743 | -.351 | .181 | -1.142 | .359 |
| ERM_IC | 181 | 3.3436 | -.344 | .181 | -1.037 | .359 |
| ERM_MN | 181 | 3.2831 | -.280 | .181 | -1.123 | .359 |
| ITR_ITI | 181 | 3.2500 | -.395 | .181 | -1.078 | .359 |
| ITR_HR | 181 | 3.3072 | -.332 | .181 | -1.053 | .359 |
| ITR_RR | 181 | 3.1920 | -.285 | .181 | -1.030 | .359 |
| SCA | 181 | 3.2833 | -.428 | .181 | -1.132 | .359 |
| ERM | 181 | 3.3157 | -.365 | .181 | -1.161 | .359 |
| ITR | 181 | 3.2497 | -.315 | .181 | -.795 | .359 |
| KMC | 181 | 3.3418 | -.447 | .181 | -1.034 | .359 |

Appendix C: Histograms



ERM Histogram

— Normal

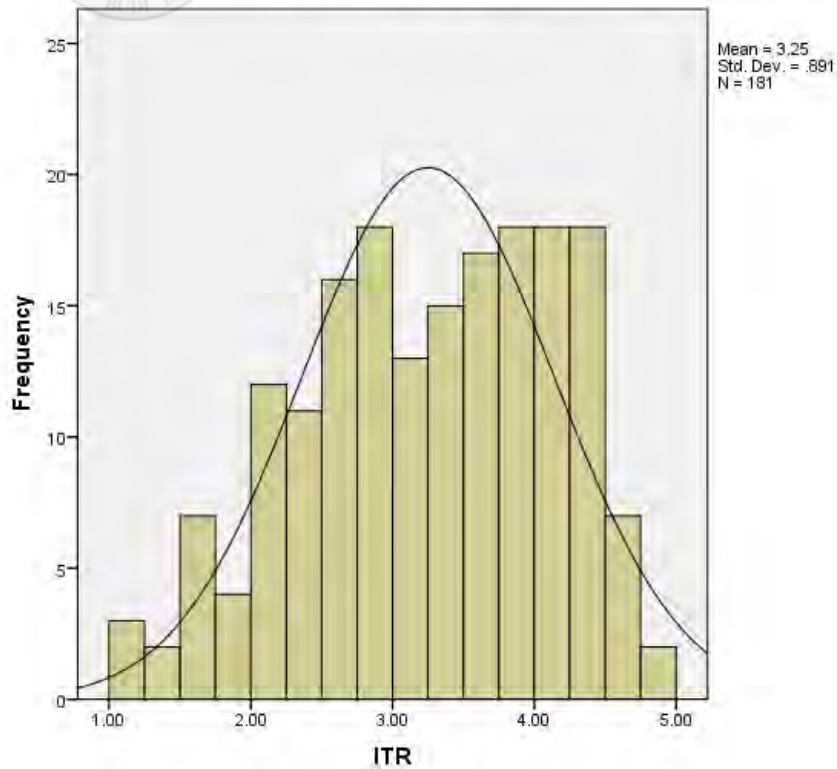


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ITR Histogram

— Normal





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