

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**FINANCIAL CHARACTERISTICS, CEO
CHARACTERISTICS, RESEARCH AND
DEVELOPMENT INVESTMENT AND FIRM
PERFORMANCE**



NADHIRAH BINTI MOHD NIZA @ MOHD NIZAL

**MASTER OF SCIENCES
(INTERNATIONAL ACCOUNTING)
UNIVERSITI UTARA MALAYSIA
December 2018**

**FINANCIAL CHARACTERISTICS, CEO CHARACTERISTICS,
RESEARCH AND DEVELOPMENT INVESTMENT AND FIRM
PERFORMANCE**



By

NADHIRAH BINTI MOHD NIZA @ MOHD NIZAL

**Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
In Partial Fulfillment of the Requirement for the Master of Sciences (International
Accounting)**



PERAKUAN KERJA KERTAS PENYELIDIKAN
(Certification of Research Paper)

Saya, mengaku bertandatangan, memperakukan bahawa
(I, the undersigned, certified that)

NADHIRAH MOHD NIZA@MOHD NIZAL (822974)

Calon untuk Ijazah Sarjana

(Candidate for the degree of)

MASTER OF SCIENCE (INTERNATIONAL ACCOUNTING)

telah mengemukakan kertas penyelidikan yang bertajuk
(has presented his/her research paper of the following title)

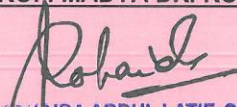
**FINANCIAL CHARACTERISTICS, CEO CHARACTERISTICS, RESEARCH AND DEVELOPMENT
INVESTMENT AND FIRM PERFORMANCE**

Seperti yang tercatat di muka surat tajuk dan kulit kertas penyelidikan
(as it appears on the title page and front cover of the research paper)

Bahawa kertas penyelidikan tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu
dengan memuaskan.

(that the research paper acceptable in the form and content and that a satisfactory knowledge of the field is covered
by the research paper).

Nama Penyelia : **PROF. MADYA DR. ROHAIDA ABDUL LATIF**
(Name of Supervisor)

Tandatangan : 
(Signature) **DR. ROHAIDA ABDUL LATIF, CFP**
Associate Professor
Tunku Puteri Intan Safinaz
School of Accountancy (TISSA-UUM)
Universiti Utara Malaysia

Tarikh : **6/12/2018**
(Date)

PERMISSION TO USE

In presenting this thesis in fulfilment of the requirements for a Post Graduate degree from the Universiti Utara Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my thesis. It is understood that any copying or publication or use of this thesis or parts of it for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholarly use which may be made of any material in my thesis.

Request for permission to copy or to make other use of materials in this thesis in whole or in part should be addressed to:



ABSTRACT

The government of Malaysia, once again, had pointed out the importance of productivity and innovation in the Eleventh Malaysia Plan (2016-2020). The issue on research and development had become alarming when only three percent of the amount of research and development had been successfully commercialized. Hence, this study aimed to examine the relationship between financial characteristics (leverage and cash flow), CEO characteristics (CEO duality, CEO financial expertise, CEO age), and research and development investment on firm performance (ROE and return index) based on the agency theory, the stewardship theory and the upper echelon theory. The sample companies were based on non-financial listed companies which had been actively involved in research and development activities from 2014 to 2016. The fixed effects panel data regression was used to analyze the data. Based on 183 firm-year observations, the results revealed a significant relationship between leverage, CEO duality, and research and development investment and firm performance as represented by ROE and return index. Even though cash flow and CEO financial expertise had a significant relationship with ROE, it did not have any significant relationship with return index. Meanwhile, CEO age did not have any significant relationship with ROE, but it had a positive and significant relationship with return index. The result also showed the control variable, namely market value, had a significant relationship with firm performance (ROE and return index). The findings of this study offer a better insight into the importance of CEO attributes and their implication on firm performance. Additionally, they provide an understanding of the contribution of research and development investments towards firm's overall performance.

Keywords: Financial characteristics, chief executive officer characteristics, research and development investment, firm performance.

ABSTRAK

Kerajaan Malaysia telah menonjolkan kepentingan produktiviti dan inovasi di dalam Rancangan Malaysia Kesebelas (2016-2020). Isu mengenai penyelidikan dan pembangunan telah menjadi perhatian apabila hanya tiga peratus daripada jumlah penyelidikan dan pembangunan berjaya dikomersialkan. Oleh itu, kajian ini mengkaji hubungan di antara ciri-ciri kewangan (leveraj dan aliran tunai), ciri-ciri Ketua Pegawai Eksekutif (dualiti, kepakaran kewangan dan umur), pelaburan dalam penyelidikan dan pembangunan ke atas prestasi syarikat (pulangan atas ekuiti dan pulangan indeks) berdasarkan teori agensi, teori pengawasan dan teori ‘upper echelon’. Sampel syarikat adalah terdiri daripada syarikat-syarikat tersenarai bukan kewangan yang aktif terlibat dalam aktiviti penyelidikan dan pembangunan pada tahun 2014 hingga 2016. “Fixed-effect” data panel digunakan untuk menganalisis data. Berdasarkan 183 pemerhatian-tahun firma, hasil kajian menunjukkan hubungan yang signifikan dalam leveraj, dualiti Ketua Pegawai Eksekutif, dan pelaburan dalam penyelidikan dan pembangunan ke atas prestasi firma yang dijelaskan menerusi pulangan atas ekuiti dan pulangan indeks. Walaupun aliran tunai dan kepakaran kewangan Ketua Pegawai Eksekutif mempunyai hubungan yang signifikan dengan pulangan atas ekuiti, tetapi hasil kajian menunjukkan tiada hubungan yang signifikan di antara aliran tunai dan kepakaran kewangan Ketua Pegawai Eksekutif dengan pulangan indeks. Sementara itu, umur Ketua Pegawai Eksekutif didapati tiada hubungan yang signifikan dengan pulangan atas ekuiti, namun terdapat hubungan yang positif dan signifikan di antara umur Ketua Pegawai Eksekutif dengan pulangan indeks. Hasil kajian turut menunjukkan pembolehubah kawalan iaitu nilai pasaran mempunyai hubungan yang signifikan dengan prestasi firma (pulangan atas ekuiti dan pulangan indeks). Penemuan dari kajian ini dapat memberikan maklumat tentang kepentingan atribut CEO dan implikasinya terhadap prestasi firma. Di samping itu, dapatan kajian memberikan pemahaman mengenai sumbangan pelaburan penyelidikan dan pembangunan ke arah prestasi keseluruhan firma.

Kata kunci: Ciri-ciri kewangan, ciri-ciri Ketua Pegawai Eksekutif, pelaburan dalam penyelidikan dan pembangunan, prestasi firma.

ACKNOWLEDGEMENTS

All praise and thanks be to Allah, the Lord of all beings, for giving me the strength, patience and courage to complete this work.

There are no words adequate enough to describe my gratitude to my supervisor, Associate Professor Dr. Rohaida Bt Abdul Latif, for guiding me through every step of my Master journey; her complete support and encouragement made this thesis possible. She had spent a lot of her time, patiently and giving valuable information, correcting errors just to ensure the best effort had been given in the completion and achievement of this study. I am also very grateful to Associate Professor Dr. Hasnah Kamardin and Dr Robiah Bt Abu Bakar for their willingness to share knowledge and review my work in my Master journey (VIVA).

I would like also to express my great appreciation to the people who mean the world to me: my parents who made tremendous sacrifices to ensure that I received an excellent education. For this and much more, I am forever in their debt. I also must admit and thank for the continuous support that I received from my family members and all my friends.

Last but not least, my sincere appreciation goes out to all those involved in making this thesis a reality and those who have contributed towards this profound learning experience.

TABLE OF CONTENTS

Title	Page
TITLE PAGE	i
CERTIFICATION OF THESIS WORK.....	iii
PERMISSION TO USE.....	iv
ABSTRACT	v
ABSTRAK	vi
ACKNOWLEDGEMENTS.....	vii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
LIST OF ABBREVIATIONS	xvi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.2 Problem Statement.....	5
1.3 Research Questions.....	10
1.4 Research Objectives	10
1.5 Significance of the Study.....	11
1.6 Scope of the Study	13
1.7 Definition of Key Terms.....	14
1.8 Organization of the Thesis.....	15
CHAPTER TWO: LITERATURE REVIEW	16
2.1 Introduction	16
2.2 Research and Development in Malaysia	16
2.3 Accounting Treatment for Research and Development	17

2.4 Malaysian Code on Corporate Governance.....	20
2.5 Literature Review on Prior Studies	22
2.5.1 Firm Performance	22
2.5.2 Financial Characteristics.....	24
2.5.2.1 Leverage.....	26
2.5.2.2 Cash Flow	27
2.5.3 CEO Characteristics	28
2.5.3.1 CEO Duality	29
2.5.3.2 CEO Financial Expertise	32
2.5.3.3 CEO Age.....	35
2.5.4 Research and Development Investment	37
2.6 Underlying Theory	39
2.6.1 Agency Theory	39
2.6.2 Stewardship Theory.....	41
2.6.3 Upper Echelon Theory.....	41
2.7 Summary of the Chapter.....	42
CHAPTER THREE: METHODOLOGY AND HYPOTHESIS DEVELOPMENT	43
3.1 Introduction	43
3.2 Research Framework	43
3.3 Hypotheses Development	46
3.3.1 Leverage and Firm Performance	47
3.3.2 Cash Flow and Firm Performance	48
3.3.3 CEO Duality and Firm Performance	49
3.3.4 CEO Financial Expertise and Firm Performance	50
3.3.5 CEO Age and Firm Performance.....	52

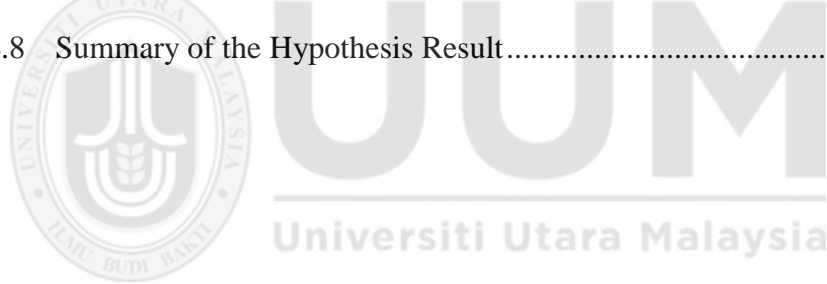
3.3.6 Research and Development Investment and Firm Performance	54
3.4 Research Design	55
3.5 Operational Definition and Measurement of the Variables.....	56
3.5.1 Dependent Variable	56
3.5.2 Independent Variable.....	58
3.5.2.1 Financial Characteristics	58
3.5.2.2 CEO Characteristics	59
3.5.2.3 Research and Development Investment	60
3.5.3 Control Variable	60
3.6 Data Collection	61
3.7 Data Collection Procedures	62
3.8 Sampling.....	62
3.8.1 Sample of the Study.....	63
3.9 Techniques of Data Analysis.....	64
3.9.1 Correlation Analysis.....	64
3.9.2 Regression Analysis	64
3.10 Summary of the Chapter.....	66
CHAPTER FOUR: RESULTS AND DISCUSSION	67
4.1 Introduction	67
4.2 Diagnostic Test.....	67
4.2.1 Outliers	67
4.2.2 Normality of Data	68
4.2.3 Heteroscedasticity Test.....	69
4.2.4 Multicollinearity Test	71
4.3 Descriptive Statistics	73

4.4 Correlation Analysis	75
4.5 Regression Analysis	79
4.5.1 Result of Regression Analysis	83
4.6 Summary of the Chapter.....	93
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION.....	94
5.1 Introduction	94
5.2 Overview of the Study.....	94
5.3 Implication of the Study	99
5.3.1 Theoretical Implication.....	99
5.3.2 Practical Implication	101
5.4 Limitations of the Study and Suggestions for Future Research	102
5.5 Summary of the Chapter.....	104
REFERENCES.....	106



LIST OF TABLES

Table	Page
Table 3.1 Summary of Operationalization and Definition of the Variables	61
Table 3.2 Number of R&D Companies based on Industry	63
Table 4.1 Shapiro Wilk Normality Test	68
Table 4.2 Breusch and Pagan Lagrangian Multiplier Test	70
Table 4.3 Hausman Specification Tests	70
Table 4.4 Variance Inflation Factor (VIF)	72
Table 4.5 Descriptive Analysis	73
Table 4.6 Pearson Correlation Matrix	78
Table 4.7 Regression Analysis	85
Table 4.8 Summary of the Hypothesis Result	92



LIST OF FIGURES

Figure	Page
Figure 3.1 Research Framework	46



LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
ETP	Economic Transformation Programme
GERD	Gross Expenditure on Research and Development
IAS	International Accounting Standard
ICT	Information and Communication Technology
MASB	Malaysian Accounting Standard Board
MCCG	Malaysian Code on Corporate Governance
MFRS	Malaysian Financial Reporting Standard
MIA	Malaysian Institute of Accountant
MIDA	Malaysian Investment Development Authority
OLS	Ordinary Least Square
R&D	Research and Development
RI	Return Index
ROE	Return on Equity
SEC	Securities and Exchange Commission
SME	Small and Medium Enterprise
SPSS	Statistical Package for the Social Sciences
STATA	Statistics Data Analysis
US	The United States of America
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Research and development (R&D) is viewed as the process of increasing the stock of knowledge, such as knowledge of culture, man, and society, comprised from the creative work of R&D on a systematic basis in order to devise new applications through the use of this stock of knowledge (OECD, 2013). According to Ayaydin and Karaaslan (2014), R&D is known as a crucial factor that can influence a firm's sustainable competitive capability. This is because, companies can gain their growth, effectiveness, and competitive advantage through R&D (Karaveg, Thawesaengskulthai, & Chandrachai, 2014). As a result, a successful R&D will have a positive impact on firm performance (Anuar, Zulhumadi, & Udin, 2012).

Realising the need for greater R&D activities for the public and private sectors in Malaysia, the Malaysian government had allocated RM150 million to the Business Development Fund and the provision of tax incentives for R&D in budget 2010 (Economic Planning Unit [EPU], 2010). On the other hand, the agenda has been in doubt since it was reported that the R&D gross expenditure had been reduced from 0.69% in 2004 to 0.21% in 2008 (EPU, 2010). However, it was later reported that the R&D gross expenditure had increased from 1.07% in 2010 to 1.13% in 2012 (EPU, 2010). Furthermore, Akoum (2016) found a significant increase in terms of the number of researchers and technicians that were involved with R&D activities ever since

REFERENCES

- Abdul Latif, R., Taufil Mohd, K. N., & Kamardin, H. (2016a). CEO Characteristics and frequency of share repurchases. *International Information Institute*, 19(8A), 3155–3160.
- Abdul Latif, R., Taufil Mohd, K. N., & Kamardin, H. (2016b). Financial characteristics and cancelling treasury shares events. *Indian Journal of Science and Technology*, 8(32), 1–6.
- Abels, P. B., & Martelli, J. T. (2013). CEO duality: How many hats are too many? *Corporate Governance: The International Journal of Business in Society*, 13(2), 135–147.
- Acqua, A. D., Etro, L. L., Teti, E., & Barbalace, P. (2013). Market value and corporate debt: The 2006-2010 international evidence. *Applied Financial Economics*, 23(6), 495–504.
- Adams, M. B. (1994). Agency theory and the internal audit. *Managerial Auditing Journal*, 9(8), 8–12.
- Adebayo, P. A., & Adebisi, W. K. (2016). Effect of firm characteristics on the timeliness of corporate financial reporting: Evidence from Nigerian deposit money banks. *International Journal of Economics, Commerce and Management*, IV(3), 369–381.
- Adnan, N., Ahmad, M. H., & Adnan, R. (2006). A comparative study on some methods for handling multicollinearity problems. *Matematika*, 22(2), 109–119.
- Ahmed Haji, A., & Mubaraq, S. (2015). The implication of the revised code of

- corporate governance on firm performance: A longitudinal examination of malaysian listed companies. *Journal of Accounting in Emerging Economies*, 5(3), 350–380.
- Akintoye, I. R. (2008). Effect of capital structure on firm's performance: The Nigeria experience. *European Journal of Economics, Finance and Administrative Sciences*, 10(10), 233–243.
- Akoum, I. (2016). Research, development and innovation in Malaysia: Elements of an effective growth model. *Asian Economic and Financial Review*, 6(7), 390–403.
- Al-Matari, E. M., Al-Swidi, A. K., & Fadzil, F. H. B. (2014). The measurements of firm performance's dimensions. *Asian Journal of Finance & Accounting*, 6(1), 24.
- Amran, N. A., Yusof, M., Atef M., Ishak, R., & Aripin, N. (2014). Do characteristics of CEO and chairman influence government-linked companies performance? *Procedia - Social and Behavioral Sciences*, 109, 799–803.
- Anderson, R. C., Reeb, D. M., Upadhyay, A., & Zhao, W. (2011). The economics of director heterogeneity. *Financial Management*, 40(1), 5–38.
- Anton, S. G. (2016). The impact of leverage on firm growth. Empirical evidence from Romanian listed firms. *Review of Economic and Business Studies*, 9(2), 147–158.
- Anuar, H., Zulhumadi, F., & Udin, Z. (2012). The role of internal r&d in operational performance as moderated by intellectual property rights: The Malaysian manufacturing perspective. *Journal of Innovation & Business Best Practice*, 2012, 1–15.

- Ararat, M., Aksu, M., & Cetin, A. T. (2010). How board diversity affects firm performance in emerging markets: Evidence on channels in controlled firms. In 7th International Accounting Conference in Istanbul (pp. 1–62).
- Asthana, S. C., & Zhang, Y. (2006). Effect of R&D investment on persistence of abnormal earnings. *Review of Accounting and Finance*, 5(2), 124–139.
- Ayaydin, H., & Karaaslan, I. (2014). The effect of research and development investment on firms' financial performance: Evidence from manufacturing firms in Turkey. *The Journal of Knowledge Economy & Knowledge Management*, 4(1), 1–39.
- Baatwah, S. R., Salleh, Z., & Ahmad, N. (2015). CEO characteristics and audit report timeliness: Do CEO tenure and financial expertise matter? *Managerial Auditing Journal*, 30(8/9), 998–1022.
- Babaei, Z., Shahveisi, F., Jamshidinaid, B., & Branch, K. (2013). Correlation between financial leverage and firm value in companies listed in the Tehran stock exchange : A Case Study, 4(5), 39–49.
- Beld, B. (2014). The effects of R&D investment on firm performance. 4th IBA Bachelor Thesis Conference, Netherlands.
- Berle, A. A., & Means, G. C. (1932). *The modern corporation and private property*. New Brunswick, U.S.A: Transaction Publishers.
- Berzkalne, I., & Zelgalve, E. (2014). Return on equity and company characteristics : An empirical study of industries in Latvia. *The 8th International Days of Statistics and Economics*, 94–103.

- Bhuiyan, M. B. U. (2015). Do problem directors affect firm operating performance? *Asian Review of Accounting*, 23(2), 170–185.
- Blanco, L., Gu, J., & Prieger, J. (2015). The impact of research and development on economic growth and productivity in the U.S. States. *Southern Economic Association*, 82(3), 914–934.
- Booltink, L. W. A., & Helmhout, A. S.-. (2018). The effects of R&D intensity and internationalization on the performance of non-high-tech SMEs. *International Small Business Journal: Researching Entrepreneurship*, 36(1), 81–103.
- Butt, V., Horton, J., & Millo, Y. (2012). The impact of CEO characteristics on the value of the firm. Unpublished, University of Exeter, UK, 1–108.
- Chang, A. (2015). The role of internal and external corporate governance mechanisms on firm's financial performance in Malaysia. *Asian Journal of Accounting and Governance*, 6, 55–65.
- Chou, Y., & Chan, M. (2018). The impact of CEO characteristics on real earnings management: Evidence from the US banking industry. *Journal of Applied Finance & Banking*, 8(2), 17–44.
- Claessens, S., & Yurtoglu, B. B. (2013). Corporate governance in emerging markets: A survey. *Emerging Markets Review*, 15, 1–33.
- Conheady, B., McIlkenny, P., Opong, K. K., & Pignatelli, I. (2015). Board effectiveness and firm performance of Canadian listed firms. *British Accounting Review*, 47(3), 290–303.
- Custodio, C., & Metzger, D. (2014). Financial expert CEOs: CEO's work experience

- and firm's financial policies. *Journal of Financial Economics*, 114(1), 125–154.
- Daniel, E. (2016). The usefulness of qualitative and quantitative approaches and methods in researching problem-solving ability in science education curriculum. *Journal of Education and Practice*, 7(15), 91–100.
- Denis, D. J., & Sibilkov, V. (2010). Financial constraints, investment, and the value of cash holdings. *Review of Financial Studies*, 23(1), 247–269.
- Dictionary.com. Financial characteristics. Retrieved from <https://www.dictionary.com/browse/financial>.
- Donaldson, L., & Davis, J. H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1), 49–65.
- Duppati, G., Sune, A., & Samanta, N. (2017). Corporate governance, research and development volatility and firm performance - Evidence from Spain and Ireland. *Cogent Economics & Finance*, 5(1), 1–16.
- Economic Planning Unit (2004). 9th Malaysia Plan (2005-2010). Retrieved from http://www.pmo.gov.my/dokumenattached/RMK/RM9_E.pdf
- Economic Planning Unit (2010). 10th Malaysia Plan (2011-2015). Retrieved from http://www.pmo.gov.my/dokumenattached/RMK/RMK10_E.pdf
- Economic Planning Unit (2015). 10th Malaysia Plan (2016-2020). Retrieved from http://www.pmo.gov.my/dokumenattached/RMK/RM11_E.pdf
- Eduardo, M., & Poole, B. (2016). CEO age and gender: Subsequent market performance. *Cogent Business and Management*, 3(1), 1–8.

- Ehie, I. C., & Olibe, K. (2010). The effect of R&D investment on firm value : An examination of US manufacturing and service industries. *International Journal of Production Economics*, 128(1), 127–135.
- Enekwe, C. I., Agu, C. I., & Nnagbogu, E. K. (2014). The effect of financial leverage on financial performance: Evidence of quoted pharmaceutical companies in Nigeria. *IOSR Journal of Economics and Finance*, 5(3), 17–25.
- Economic Transformation Programme. (2012). Science and technology: Crucial areas for development.
- Farag, H., & Mallin, C. (2016). The influence of CEO demographic characteristics on corporate risk-taking: evidence from Chinese IPOs. *European Journal of Finance*, 4364(April), 1–30.
- Ferdaous, D. J., & Rahman, M. M. (2017). The effects of research and development expenditure on the firm performance: An examination of pharmaceuticals industry in Bangladesh. *Business & Entrepreneurship Journal*, 6(2), 1–20.
- Francis, B. B., Hasan, I., & Wu, Q. (2012). Do corporate boards affect firm performance? New evidence from the financial crisis. Bank of Finland research discussion papers.
- Frank, B. P., & James, O. K. (2014). Cash flow and corporate performance: a study of selected food and beverages companies in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 2(7), 77–87.
- Fresard, L. (2010). Financial strength and product market behavior: The real effects of corporate cash holdings. *The Journal of Finance*, 65(3), 1097–1122.

- Froot, K. A., Perold, A. F., & Stein, J. C. (1992). Shareholder Trading Practices and Corporate Investment Horizons. *Journal of Applied Corporate Finance*, 5(2), 42–58.
- Ghaffar, A., & Khan, W. A. (2014). Impact of research and development on firm performance. *International Journal of Accounting and Financial Reporting*, 4(1), 357.
- Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism*, 10(2), 486–489.
- Ghasemi, M., Razak, N. A., & Muhammad, J. (2018). Dividends , leverage and endogeneity : a simultaneous equations study on malaysia dividends , leverage and endogeneity : A simultaneous equations study. *Australasian Accounting, Business and Finance Journal*, 12(1), 47–64.
- Ghazali, Z., & Manab, N. A. (2013). The effect of Malaysian Code of Corporate Governance (MCCG) implementation to companies' performances. *Journal of Accounting, Finance and Economics*, 3(2), 43–52.
- Glick, M. B. (2011). The role of chief executive officer. *Advances in Developing Human Resources*, 13(2), 171–207.
- Golez, B. (2011). Expected returns and dividend growth rates implied in derivative markets. *Job Market Paper*, 27(3), 790–822.
- Gonzales, M. D.-. (2013). Empirical determinants and patterns of research and development investment in Asia. *ADB Economics Working Paper Series*, 364, 1–45.

- Gounopoulos, D., & Pham, H. (2018). Financial expert ceos and earnings management around initial public offerings. *International Journal of Accounting*, 53(2), 102–117.
- Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics*, 109(1), 103–121.
- Greene, W. H. (2002). *Econometric Analysis_5th*. New York. Prentice Hall.
- Gupta, G., Mahakud, J., & Debata, B. (2018). Impact of CEO's characteristics on investment decisions of Indian listed firms: Does crisis make any difference? *Cogent Economics and Finance*, 6(1), 1–15.
- Hambrick, D. C., & Mason, P. a. (1984). Upper echelon: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206.
- Hamid, M. A., Ting, I. W. K., & Kweh, Q. L. (2016). The relationship between corporate governance and expropriation of minority shareholders' interests. *Procedia Economics and Finance*, 35(16), 99–106.
- Hardwick, P., Adams, M., & Zou, H. (2011). Board characteristics and profit efficiency in the United Kingdom life insurance industry. *Journal of Business Finance and Accounting*, 38(7–8), 987–1015.
- Heydari, I., Mirzaeifar, M., & Javadghayedi, M. (2014). Investigating the relationship between free cash flows and firm performance: Evidence from Tehran stock exchange, 4(6), 269–279.
- Hong, Z., Shuai, G., & Luzhuang, W. (2014). Relationship between free cash flow and financial performance: Evidence from the listed real estate companies in

China. *Applied Mechanics and Materials*, 556–562, 6445–6448.

Hsu, W. T., Chen, H. L., & Cheng, C. Y. (2013). Internationalization and firm performance of SMEs: The moderating effects of CEO attributes. *Journal of World Business*, 48(1), 1–12.

Hua, N., Nusair, K. K., & Upneja, A. (2012). Financial characteristics and outperformance: Evidence of a contemporary framework from the US lodging industry. *International Journal of Contemporary Hospitality Management*, 24(4), 574–593.

Hua, N., Xiao, Q., & Yost, E. (2013). An empirical framework of financial characteristics and outperformance in troubled economic times: Evidence from the restaurant industry. *International Journal of Contemporary Hospitality Management*, 25(6), 945–964.

Iatridis, G. (2008). Accounting disclosure and firms' financial attributes: Evidence from the UK stock market. *International Review of Financial Analysis*, 17(2), 219–241.

Investopedia (2018). Total return index. Retrieved from https://www.investopedia.com/terms/t/total_return_index.asp.

Iswati, S., & Anshori, M. (2007). The influence of intellectual capital to financial performance at insurance companies in Jakarta Stock Exchange (JSE). *Proceeding of the 13th Asia Pacific Management Conference*, 1393–1399.

Jeanjean, T., & Stolowy, H. (2009). Determinants of board members financial expertise: Empirical evidence from France. *27th congress of the Francophone Accounting Association*, 1–34.

- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Jermias, J., & Gani, L. (2013). The impact of board capital and board characteristics on firm performance. *British Accounting Review*, 46(2), 1–19.
- Jiang, F., Zhu, B., & Huang, J. (2013). CEO's financial experience and earnings management. *Journal of Multinational Financial Management*, 23(3), 134–145.
- Johl, S. K., Kaur, S., & Cooper, B. J. (2015). Board characteristics and firm performance: Evidence from Malaysian public listed firms. *Journal of Economics, Business and Management*, 3(2), 239–243.
- Kadioglu, E., Kilic, S., & Yilmaz, E. A. (2017). Testing the relationship between free cash flow and company performance in Borsa Istanbul, 10(5), 148–158.
- Kamaruddin, N. K., & Samsuddin, A. (2013). 2013 A case study of R&D technology commercialisation : Challenges , issues and the way forward. *Proceeding of the 2nd International Conference on Technology Management, Business and Entrepreneurship*, (December), 481–489.
- Kang, J., Gwon, S. hoon, Kim, S., & Cho, K. (2013). Determinants of successful technology commercialization: Implication for Korean Government-sponsored SMEs. *Asian Journal of Technology Innovation*, 21(1), 72–85.
- Karaveg, C., Thawesaengskulthai, N., & Chandrachai, A. (2014). Evaluation model for research and development commercialization capability. *Production & Manufacturing Research: An Open Access Journal*, 2(1), 586–602.

- Kasim, K. N., Amiruddin, R., & Auzair, S. M. (2012). Management control systems design of Malaysian research and development units. *Asian Journal of Accounting and Governance*, 3, 49–60.
- Khatab, H., Masood, M., Zaman, K., Saleem, S., & Saeed, B. (2011). Corporate governance and firm performance: A case study of Karachi stock market. *International Journal of Trade, Economics and Finance*, 2(1), 39–43.
- Kim, H., Kim, Y., & Cho, K. (2014). The effect of research and development investment and absorptive capacity on firm performance. *Asian Journal of Technology Innovation*, 22(2), 252–267.
- Kling, G., Harvey, C., & Maclean, M. (2017). Establishing causal order in longitudinal studies combining binary and continuous dependent variables. *Organizational Research Methods*, 20(4), 770–799.
- Kokeno, S. O., & Muturi, W. (2016). Effects of Chief Executive Officers' characteristics on the financial performance of firms listed at the Nairobi securities exchange. *International Journal of Economics, Commerce and Management United Kingdom*, IV(7), 307–318.
- Krause, R., Semadeni, M., & Cannella, A. A. (2014). CEO duality: A review and research agenda. *Journal of Management*, 40(1), 256–286.
- Laufs, K., Bembom, M., & Christian, S. (2016). CEO characteristics and SME foreign market entry mode choice: The moderating effect of firm's geographic experience and host-country political risk. *International Marketing Review*, 33(2), 1–42.
- Lee, C., Lai, S., Li, H., & Wang, J. (2017). Capital reduction, financial characteristics

- and corporate governance. *Asia Pacific Management Review*, 22(2), 88–96.
- Lee, M., & Choi, M. (2015). The determinants of research and development investment in the pharmaceutical industry: Focus on financial structures. *Osong Public Health and Research Perspectives*, 6(5), 302–309.
- Li, H., & Wang, W. (2014). Impact of intangible assets on profitability of Hong Kong listed information technology companies. *Business and Economic Research*, 4(2), 98.
- Liman, P. M., & Mohammed, A. S. (2018). Operating cash flow and corporate financial performance of listed conglomerate companies in Nigeria. *Journal of Humanities and Social Science*, 23(2), 1–11.
- Litai, C., Chuan, L. I. N., & Kim, Y. (2011). Financial characteristics , corporate governance and the propensity to pay cash dividends of Chinese listed companies, 3(1), 176–188.
- Machek, O., Brabec, M., & Hnilica, J. (2013). Measuring performance gaps between family and non-family businesses: A meta-analysis of existing evidence. *International Academic Research Journal of Business and Management*, 2(3), 436–448.
- Malaysia Investment Development Authority (2018). Research and Development. Retrieved from <http://www.mida.gov.my/home/research-and-development>.
- Malaysian Accounting Standard Board (2018). Malaysian Financial Reporting Standard. Retrieved from <http://masb.org.my/pages.php?id=89>
- MCCG (2017). Malaysian Code on Corporate Governance. Securities Commission

Malaysia. Retrieved from <https://www.sc.com.my>.

Meric, G., Welsh, C., Scarpa, R., & Meric, I. (2017). A comparison of the financial characteristics of European and Asian manufacturing firms. *Studies in Business and Economics*, 12(3), 112–125.

Meric, I., Gong, L., Chaganti, R., & Meric, G. (2012). A comparison of the financial characteristics of U.S. and Japanese electrical and electronics equipment manufacturing firms. *Southwest Business and Economics Journal*, 27–36.

Meric, I., Lentz, C., Li, S. F., & Meric, G. (2014). A comparison of the financial characteristics of Hong Kong and Singapore manufacturing firms. *Global Journal of Business Research*, 8(3), 31–38.

Minton, B. A., Taillard, J. P. A., & Williamson, R. (2010). Do independence and financial expertise of the board matter for risk taking and performance. *Soil Science*, (5147), 351301–351301.

Mio, C., Fasan, M., & Ros, A. (2016). Owners' preferences for CEOs characteristics: did the world change after the global financial crisis? *Corporate Governance (Bingley)*, 16(1), 116–134.

Moghadam, N. S., Beigi, S. S., & Ahmadzadeh, M. (2016). Examining the impact of research and development department performance on the profitability of Golkaran agro-industrial company. *International Academic Journal of Accounting and Financial Management*, 3(8), 38–50.

Muhamad, S., Che Sulaiman, N. F., & Saputra, J. (2018). The role of human capital and innovation caacity on economic growth in ASEAN-3. *Jurnal Ekonomi Malaysia*, 52(1), 281–294.

- Mule, R. K., Mukras, M. S., & Nzioka, O. M. (2015). Corporate size , profitability and market value : An econometric panel analysis of listed firms in Kenya. *European Scientific Journal*, 11(13), 376–396.
- Muthusi, P. (2014). Effects of free cash flows on the profitability of five star hotels in Kenya (Master's thesis). University of Nairobi.
- Nazir, M. S., Aslam, A., & Nawaz, M. M. (2012). The impact of ceo duality on capital structure : A case from non-financial sector of Pakistan. *American Journal of Scientific Research*, 56(56), 5–12.
- Ness, R. K. Van, Miesing, P., & Kang, J. (2010). Board of director composition and financial performance in a sarbanes-oxley world. *Academy of Business and Economics Journal*, 10(5), 56–74.
- Nor, H. M., Saleh, N. M., Jaffar, R., & Shukor, Z. A. (2010). Corporate governance and R&D reporting in Malaysian MESDAQ market. *International Journal of Economics and Management*, 4(2), 350–372.
- Nord, J. L. (2011). R&D investment link to profitability: A pharmaceutical industry evaluation. *Undergraduate Economic Review*, 8(1), 6.
- Novak, J., & Petr, D. (2010). CAPM beta, size, book-to-market and momentum in realized stock returns
- Nunes, P. M., Serrasqueiro, Z., & Leitao, J. (2012). Is there a linear relationship between R&D intensity and growth? Empirical evidence of non-high-tech vs. high-tech SMEs. *Research Policy*, 41(1), 36–53.
- Nwakuya, M. T., & Ijomah, M. A. (2017). Fixed effect versus random effects

- modeling in a panel data analysis: A Consideration of economic and political indicators in six African countries. *International Journal of Statistics and Applications*, 7(6), 275–279.
- Nyberg, P., & Vaihekoski, M. (2009). A new value-weighted total return index for the Finnish stock market. *Bank of Finland Research Discussion Papers*, 21, 1–64.
- O'Brien, D., & Scot, P. S. (2012). "Correlation and regression", in approaches to quantitative research: A guide for dissertation students. *Management Sciences and Quantitative Methods Commons*, 0–16.
- OECD. (2013). Research and development. *OECD Factbook 2013*. Retrieved from http://www.oecd.org/std/08_Science_and_technology.pdf
- Ogbeide, S. (2017). A study on the relationship between cash-flow and financial performance of insurance companies: Evidence from a developing economy. *Review of International Comparative Management*, 18(2), 148-157.
- Oketch, J. (2018). Effect of financial leverage on performance of listed commercial banks in Kenya. *International Journal of Social Sciences and Information Technology*, 4(2), 2760–2766.
- Orens, R., & Reheul, A. M. (2013). Do CEO demographics explain cash holdings in SMEs? *European Management Journal*, 31(6), 549–563.
- Palanissamy, A. (2015). CEO duality: An explorative study. *European Scientific Journal* 1(1), 33–44.
- Park, S. (2016). Differences in technology innovation R&D performance creation behavior between for-profit institutions and not-for-profit institutions.

SpringerPlus, 5(1), 1–23.

Rahman, H. U. (2018). The impact of boardroom national diversity on firms performance and boards monitoring in emerging markets : A case of Malaysia. City University Research Journal, 8(1), 01–15.

Rahman, H. U., Ibrahim, M. Y., & Che-Ahmad, A. (2017). Physical characteristics of the Chief Executive Officer and firm accounting and market based performance. Asian Journal of Accounting and Governance, 8(1), 27–37.

Ramdani, D., & Witteloostuijn, A. van. (2010). The impact of board independence and CEO duality on firm performance: A quantile regression analysis for Indonesia, Malaysia, South Korea and Thailand. British Journal of Management, 21(3), 607–627.

Rashid, A. (2010). CEO duality and firm performance: Evidence from a developing country. Corporate Ownership and Control, 8(3), 163–175.

Rogers, W. H. (1994). Regression standard errors in clustered samples. Stata Technical Bulletin (13).

Roshan, B. (2009). Capital structure and ownership structure: A review of literature. The Journal of Online Education, 3(2), 1–8.

Rutledge, R. W., Karim, K. E., & Lu, S. (2016). The effects of board independence and CEO duality on firm performance: Evidence from the NASDAQ-100 index with controls for endogeneity. Journal of Applied Business and Economics, 18(2), 49–71.

Saeed, A., & Ziaulhaq, H. M. (2018). The impact of CEO characteristics on the

internationalization of SMEs: Evidence from the UK. *Canadian Journal of Administrative Sciences*.

Said, F. F., & Iglesias, E. M. (2017). Basel II and the Financing of R&D investments in Malaysia. *International Journal of Economics and Management*, 11(1), 127–152.

Salamudin, N., Bakar, R., Ibrahim, M. K., & Haji Hassan, F. (2010). Intangible assets valuation in the Malaysian capital market. *Journal of Intellectual Capital*, 11(3), 391–405.

Schrand, C. M., & Zechman, S. L. C. (2012). Executive overconfidence and the slippery slope to fraud. *Journal of Accounting and Economics*, 53(1–2), 8–25.

Scott, R. W. (2017). Do Institutional Investors Alleviate Agency Costs in R & D Investment Decisions ? *Accounting and Finance Research*, 6(3), 24–38.

Selvam, M., Gayathri, J., Vasanth, V., Lingaraja, K., & Marxiaoli, S. (2016). Determinants of firm performance: A subjective model. *International Journal of Social Science Studies*, 4(7), 90–100.

Semykina, A., & Wooldridge, J. M. (2010). Estimating panel data models in the presence of endogeneity and selection. *Journal of Econometrics*, 157(2), 375–380.

Serfling, M. A. (2014). CEO age and the riskiness of corporate policies. *Journal of Corporate Finance*, 25, 251–273.

Shamsudin, S. M., Abdullah, W. R. W., & Osman, A. H. (2015). Corporate governance practices and firm performance after revised Code of Corporate

Governance: Evidence from Malaysia. The 6th International Conference on Governance, Fraud, Ethics and Social Responsibility, 1–9.

Sinan, A., & Alkan, B. B. (2015). A useful approach to identify the multicollinearity in the presence of outliers. *Journal of Applied Statistics*, 42(5), 986–993.

Sitthipongpanich, T., & Polsiri, P. (2012). CEO characteristics and corporate financing in Thailand. *International Research Journal of Finance and Economics*, (102), 52–69.

Sohn, D. W., Hur, W., & Kim, H. J. (2010). Effects of R&D and patents on the financial performance of Korean venture firms. *Asian Journal of Technology Innovation*, 18(2), 169–185.

Steele, F., Clark, P., Crawford, C., Steele, F., & Vignoles, A. (2010). The choice between fixed and random effects models: Some considerations for educational research. Working Paper, (5287), 1–33.

Taufil Mohd, K. N., Abdul Latif, R., Kamardin, H., & Che Adam, N. (2016). The effect of busy directors, CEO duality and ownership on firm performance. *Information (Japan)*, 19(18A), 3149–3154.

Trivellas, P. (2012). Investigating the impact of Research and Development Strategy on firm performance. *Key Engineering Materials*, 495, 306–309.

Turel, A., Turel, A., & Needles, B. E. (2012). Financial Characteristics of high performance companies in Turkey : A comparative analysis of stable economy in the financial crisis era. *Accounting and Management Information Systems*, 11(1), 4–26.

- Vakilifard, H. R., & Shahmoradi, N. (2014). Investigating the effects of stable profitability and free cash flow on stock returns of companies listed in Tehran stock exchange. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4(3), 21–27.
- Varun Dawar. (2014). Agency theory , capital structure and firm performance : Some Indian evidence. *Managerial Finance*, 40(12), 1–25.
- Vatcheva, K. P., Lee, M., McCormick, J. B., & Rahbar, M. H. (2016). Multicollinearity in regression analyses conducted in epidemiologic studies. *HHS Public Access*, 6(2), 1–20.
- Wang, G., Holmes, R. M., Oh, I. S., & Zhu, W. (2016). Do CEOs matter to firm strategic actions and firm performance? A meta-analytic investigation based on upper echelons theory. *Personnel Psychology*, 69(4), 775–862.
- Wang, G. Y. (2010). The impacts of free cash flows and agency costs on firm performance. *Journal Service Science and Management*, 3(1), 408–418.
- Wang, X. (2016). The impact that research and development investment has on financial performance in environmental protection industry. *International Conference on Logistics, Informatics and Service Sciences*.
- Wath, N. Van Der. (2015). A total return index for South Africa. *Bureau for Economic Research*, 1–37.
- Wijethilake, C., Ekanayake, A., & Perera, S. (2015). Board involvement in corporate performance: Evidence from a developing country. *Journal of Accounting in Emerging Economies*, 5(3), 250–268.

- Yang, Q., Zimmerman, M., & Jiang, C. (2011). An empirical study of the impact of CEO characteristics on new firms' time to IPO. *Journal of Small Business Management*, 49(2), 163–184. \
- Yasser, Q. R., Mamun, A. Al, & Suriya, A. R. (2014). CEO duality structure and firm performance in Pakistan. *Asian Journal of Accounting and Governance*, 5, 57–69.
- Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of Financial Economics*, 108(1), 250–273.
- Zabri, S. M., Ahmad, K., & Wah, K. K. (2016). Corporate governance practices and firm performance: Evidence from Top 100 public listed companies in Malaysia. *Procedia Economics and Finance*, 35, 287–296.

