THE IMPACT OF TECHNOLOGICAL INNOVATION CAPABILITIES ON COMPETITIVE ADVANTAGE AND FIRM PERFORMANCE: AN EMPIRICAL STUDY IN THE AUTOMOTIVE INDUSTRY IN MALAYSIA

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy (Technology Management).

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I hereby declare that the work in this thesis is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Inovasi memainkan peranan penting dalam menentukan kejayaan dan jangka hayat sesebuah firma serta mengekalkan daya saing global dalam jangka panjang. Walau bagaimanapun, kajian mengenai keupayaan inovasi teknologi (TIC) adalah terhad, terutamanya dalam industri automotif di Malaysia. Oleh itu, kajian ini cuba untuk mengisi jurang dalam analisis semasa, berkaitan keupayaan inovasi teknologi (TIC) dari segi industri automotif di Malaysia. Kajian ini mengkaji kesan keupayaan inovasi teknologi (keupayaan R&D [RDC]), keupayaan pembuatan (MC), keupayaan rangkaian (NC), dan keupayaan sumber manusia (HRC)) terhadap daya saing (CA) dari segi kelebihan kos (COA), kelebihan pembezaan (DA), inovasi produk (PT), dan inovasi proses (PS), dan prestasi firma dalam industri automotif di Malaysia. Kajian ini menggunakan Teori Berasaskan Sumber *(Resourced-Based View)* dan teori Keupayaan Dinamik *(Dynamic Capabilities View)* untuk membangunkan rangka konsep kajian. Pendekatan penyelidikan kuantitatif telah digunakan untuk menjalankan kajian ini, di mana 136 responden dari industri automotif telah ditinjau melalui Prosedur persampelan kemudahan *(convenience)* dan persampelan bertujuan *(purposive)*. *Partial Least Squares-Structural Equation Modelling* (PLS-SEM) telah digunakan untuk menguji hipotesis kajian menggunakan perisian WarpPLS 6.0. Hasil Kajian mendedahkan bahawa RDC, MC, NC, dan HRC sebagai dimensi TIC dan COA, DA, PT, dan PS sebagai dimensi CA adalah faktor penting bagi prestasi firma dalam industri automotif di Malaysia. Empat penemuan diperolehi daripada kajian ini. Pertama, berkenaan dengan kesan langsung dimensi TIC terhadap dimensi CA, kajian mendedahkan bahawa semua dimensi TIC (RDC, MC, NC, dan HRC) memberi kesan signifikan kepada COA. Manakala RDC, NC, dan HRC memberi kesan positif dan signifikan ke atas DA, kecuali MC yang memberi kesan negatif kepada DA. Hanya HRC memberi kesan signifikan ke atas PT. Walau bagaimanapun, hanya MC dan NC memberi kesan signifikan kepada PS. Kedua, mengenai kesan langsung dimensi TIC terhadap prestasi firma, kajian ini mengesahkan RDC, MC, dan NC memberi kesan positif dan ketara kepada prestasi firma, kecuali HRC yang tidak memberi kesan ke atas prestasi firma. Ketiga, dimensi CA seperti DA, PT, dan PS mempunyai kesan signifikan terhadap prestasi firma. Keempat, hasil kajian menunjukkan DA pengantara sepenuhnya hubungan antara HRC dan prestasi firma, manakala DA juga sebahagian pengantara hubungan antara NC dan prestasi firma. Ini menunjukkan bahawa meningkatkannya CA, terutama dari segi DA, adalah penting untuk mencapai prestasi firma yang tinggi. Sehubungan itu, kajian ini menunjukkan pentingnya dimensi TIC dan dimensi CA dalam meningkatkan prestasi firma dalam industri automotif. Penemuan ini mempunyai sumbangan teori serta implikasi praktikal dan polisi. Sumbangan teori serta implikasi praktikal dan polisi merupakan penemuan yang signifikan kepada firma-firma dalam industri automotif di Malaysia. Kajian ini memberi sumbangan pertama, kepada pengetahuan baru dengan memeriksa peranan pengantara CA. Kedua, ia melengkapkan teori pandangan berdasarkan sumber (RBV) dan Pandangan Keupayaan Dinamik mengenai hubungan antara dimensi TIC dan prestasi syarikat. Ketiga, ini sangat memberi manfaat kepada pengamal industri, di mana kajian ini memberikan maklumat praktikal berkaitan industri automotif. Keempat, para pengamal juga mempunyai kelebihan apabila mereka mengetahui strategi inovasi teknologi, yang disorot dalam kajian ini, untuk mengatasi cabaran yang dihadapi dalam perniagaan. Akhir sekali, beberapa batasan kajian yang dikenalpasti turut memberi ruang dan arah kepada penyelidikan pada masa hadapan.

ABSTRACT

Innovation plays an important role in determining a firm's success and survival in sustaining its global competitiveness in the long-term. Nevertheless, there is a limited number of studies on technological innovation capabilities (TIC), especially in the automotive industry in Malaysia. Accordingly, this study attempts to fill the gap in the current analysis on the technological innovation capabilities (TIC) in the automotive industry in Malaysia. This study examines the impact of technological innovation capabilities, i.e. R&D capability (RDC), manufacturing capability (MC), networking capability (NC), and human resource capability (HRC) on competitive advantage (CA) in terms of cost advantage (COA), differentiation advantage (DA), product innovation (PT) and process innovation (PS), and firm performance in the automotive industry in Malaysia. Drawing upon the Resource-Based View (RBV) of the firm and the Dynamic Capabilities View (DCV), a conceptual framework is developed. A quantitative research approach was used to conduct this study, in which 136 respondents from the automotive industry were surveyed through convenience and purposive sampling procedures. Partial Least Squares-Structural Equation Modelling (PLS-SEM) was used to test the study's hypotheses using WarpPLS 6.0 software. The findings revealed that RDC, MC, NC, and HRC as TICs dimensions, and COA, DA, PT, and PS as CA dimensions, are important factors for the performance of firms in the automotive industry in Malaysia. Four conclusive findings are derived from the study. First, with respect to the direct effect of TICs dimensions on CA dimensions, the study reveals that all TICs dimensions (RDC, MC, NC, and HRC) have an influence on COA. Whereas RDC, NC, and HRC positively and significantly influence DA, but MC negatively influence DA. Only HRC has an influence on PT. However, for PS, only MC and NC significantly impact PS. Second, regarding direct impact of TICs dimensions on firm performance, the study confirms that RDC, MC, and NC positively and significantly impact firm performance, except for HRC, which has no significant effect on firm performance. Third, competitive advantage dimensions, such as DA, PT, and PS have a significant impact on firm performance. Fourth, the results also show that DA fully mediated the relationship between HRC and firm performance, while DA also partially mediated the relationship between NC and firm performance. This indicates that improving CA, especially in terms of DA, is crucial in achieving high firm performance. Therefore, this research shows the importance of TICs dimensions and CA dimensions in improving firm performance in the automotive industry. These findings have theoretical contributions as well as practical and policy implications. These contributions and implications are also significant findings for firms in the automotive industry in Malaysia. The study contributes firstly, to the body of knowledge by examining the mediating roles of CA. Secondly, it complements the resource-based view (RBV) theory and Dynamic Capability View regarding the interconnection between TIC dimensions and firm performance. Thirdly, it particularly benefits the industrial practitioners, where the study provides the practical information of the automotive industry. Fourthly, the practitioners are also at an advantage when they are aware of the technological innovation strategies, highlighted in this study, of overcoming the anticipated challenges in the business. Finally, some limitations are also acknowledged, that indicate future research directions.

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LIST OF ABBREVIATION

TICs	Technological Innovation Capabilities
MPC	Malaysia Productivity Corporation
MAI	Malaysia Automotive Institute
MITI	Ministry of International Trade and Industry, Malaysia
MARii	Malaysia Automotive and Robotics Institute
WIPO	World Intellectual Property Organization (WIPO)
OECD	Organization for Economic Cooperation and Development
OICA	International Organization of Motor Vehicle Manufacturers

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