Competitive Advantage through Big Data Analytics

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as part of the collaborative doctoral degree and/or fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Usarat Thirathon

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LIST OF ABBREVIATIONS

ABDM	Analytics-Based Decision-Making
BDA	Big Data Analytics
BI	Business Intelligence
BI&A	Business Intelligence and Analytics
DSS	Decision Support Systems
ERP	Enterprise Resource Planning
FTE	Full-Time Equivalent
IS	Information Systems
OAC	Organisational Analytic Culture
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modelling
RBT	Resource-Based Theory

ABSTRACT

'Big Data' has become a major topic of interest and discussion for both academics and professionals in the IT and business disciplines, and evidence from case studies suggests that companies which have invested in Big Data outperform others. It has to be noted though that 'Bigger' Data as such does not provide any benefits, but rather how organisations make sense of data and gain insights from analysing it. Analytic capabilities and practices are required to gain insights from Big Data, and thereby arguably improving decision-making and gaining competitive advantage. While protagonists of such Big Data Analytics (BDA) imply that those effects exist, so far they have not been confirmed by rigorous empirical research.

The research questions in this thesis are: *can BDA create competitive advantage,* and *what mechanisms drive analytic organisations to achieve competitive advantage?* To explore the mechanisms, it is necessary to find out to what extent managers actually understand the implications of the analytic outputs and have capabilities and willingness to uncover and base their decisions on insights from BDA. In addition, the role of organisational culture in the context of BDA is also investigated.

Data was obtained using a cross-sectional online survey which targeted Chief Information Officers and senior IT managers of medium-to-large Australian for-profit organisations. The survey yielded 163 complete responses which showed no presence of common method and non-response biases, and met the standard criteria for measurement reliability and validity. Partial least squares structural equation modelling (PLS-SEM) and multiple bootstrapping methods were used to test the hypotheses.

The empirical results verify anecdotal claims made in the literature that Big Data and related analytics do actually lead to competitive advantage, partly directly and partly indirectly. The study reveals that such benefits are achieved primarily because BDA creates additional incentives for managers to base their strategic or operational decisions on analytics, and that more analytics-based decision-making actually leads to competitive advantage. Furthermore, the results also suggest that organisational culture, in contrast to BDA tools and methods, is a valuable, rare, inimitable and non-substitutable resource (as it cannot be changed easily or quickly), thereby indirectly driving and sustaining competitive advantage.