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Graduate School of Technology Management

**Industrial Capability and National Technological
Competitiveness: The Case of South Africa's Civil
Aircraft Industry**

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DECLARATION

I, Daphney Hellen Mayindi, declare that the thesis *Industrial Capability and National Technological Competitiveness: The Case of South Africa's Civil Aircraft Industry* is my own work and that the views and opinions expressed in this work are those of the author and relevant literature references as shown in the reference list.

I further declare that the content of this thesis will not be handed in for any other qualification at any other tertiary institution.

Daphney Hellen Mayindi

Date



THESIS SUMMARY

INDUSTRIAL CAPABILITY AND NATIONAL TECHNOLOGICAL COMPETITIVENESS: THE CASE OF SOUTH AFRICA'S CIVIL AIRCRAFT INDUSTRY

by

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The thesis is about analysing the capability of the civil aircraft industry in contributing towards improved national technological competitiveness. The South African government recognises the potential for the country's aircraft industry to contribute to the growth of the national economy. However, it is not known if the current support mechanisms are adequate for developing the appropriate technological base and for promoting the innovative capabilities of the industry.

Countries with successful aircraft industries were studied: South Korea and Brazil were used to represent emerging economies and France was used to represent developed economies. This was done to analyse existing models or frameworks and/or commonalities that led to the successful development of technologically competitive civil aircraft industries internationally. The South African civil aircraft industry was also studied, and its technology development competence was compared to that of successful countries. How the local technology development framework could be structured or improved, using lessons from successful countries, was considered. Participants were representatives of the South African government departments or ministries (Department of Trade and Industry; and the Department of Science and Technology), academia (The University of the



Witwatersrand – Wits; and the University of Cape Town – UCT), research institutions (CSIR and NRF), and firms (Aerosud, Denel, and Aerospace Monitoring and Systems – AMS).

Based on the analysis of the findings, frameworks aimed at improving the technological base of the South African civil aircraft industry were proposed as follows:

- The development of technology capability building through government interventions. This emphasises aggressive government interventions that encourage collaboration between firms in the industry, and with research and higher education institutions, followed by major investment in research and development.
- An institutional structure for the development of national aircraft technology. This is aimed at strengthening the technology development arena of the South African aircraft industry, through acquired projects, but with less emphasis on business acquisition.
- The establishment of the South African Aircraft Industry Corporation (SAAIC), a technology development and skills-transfer programme.



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LIST OF ABBREVIATIONS

AAD:	Agency for Aircraft Development
ACARE:	Advisory Council for Aeronautical Research in Europe
ACSA:	Airports Company South Africa
ADD:	Advanced Agency for Defence Development
AeIGT:	Aerospace Innovation and Growth Team
AIDC:	Aero Industry Development Centre
AISI:	Aerospace Industry Support Initiative
AITRAM:	Advanced Integrated Training in Aeronautics Maintenance Program
AMD:	Aerospace, Maritime and Defence Association
AMS:	Aerospace Monitoring and Systems
AMTS:	Advanced Manufacturing Technology Strategy
ASSEGAI:	A Strategy for a Sustainable, Economical and Growing Aerospace Industry
ATAG:	Air Transport Action Group
ATE:	Advanced Technologies and Engineering Company
ATR:	Avionics de Transport Regional
BAE:	British Aerospace company
CASA:	Construcciones Aeronáuticas SA (Spanish aircraft manufacturer and a branch of EADS)
CAST:	Center for Aviation and Space Technology
CoPS:	Complex product system
CSIR:	Council for Scientific and Industrial Research
DMA:	Defence Manufacturers Association
DOD:	Department of Defence
DOT:	Department of Transport
DPE:	Department of Public Enterprise
DST:	Department of Science and Technology
DTI:	Department of Trade and Industry
EADS:	European Aeronautic Defence and Space Company
EU:	European Union
FAA:	Federal Aviation Administration
FAC:	Farnborough Aerospace Consortium
FDI:	Foreign direct investment
GA:	General Aviation
GDP:	Gross domestic product
GE:	General Electric
Govt:	Government
GRI:	Government Research Institutes
HFC:	Hankook Fibre Company
HEIs:	Higher education institutions
HRD:	Human resource development
IADF:	International Aircraft Development Fund
IAI:	Israel Aircraft Industries
IAS:	International Aviation Support
ICAO:	International Civil Aviation Organization
ICT:	Information and communication technology
IF:	Innovation Fund
IPP:	Industrial Participation Programme



IPR:	Intellectual Property Rights
IPTN:	Industri Pesawat Terbang Nusantara
JAA:	Joint Aviation Authorities
JADC:	Japan Aircraft Development Corporation
KARI:	Korea Aerospace Research Institute
KAI:	Korean Aerospace Industries Company Ltd
KIAT:	Korea Institute of Aerospace Technology
KIAFAR:	Korean Industrial Association for Aerospace Research
KIMM:	Korea Research Institute of Machinery and Metals
MOCT:	Ministry of Construction and Transport
MOD:	Ministry of Defence
MOST:	Ministry of Science and Technology
MOTIE:	Ministry of Trade, Industry and Energy
MOCIE:	Ministry of Commerce, Industry and Energy
MRO:	Maintenance, repair and overhaul
NASA:	National Aeronautics and Space Administration
NIC:	Newly industrialised country
NIE:	Newly industrialising economy
NRF:	National Research Foundation
NSI:	National system of innovation
OEM:	Original equipment manufacturer
R&D:	Research and development
SA:	South Africa/n
SAA:	South African Airways
SAAIC:	South African Aircraft Industry Corporation
SARS:	Severe acute respiratory syndrome
SBAC:	Society of British Aerospace Companies
SETAs:	Skills and education training authorities
SETIs:	Science, engineering and technology institutions
SIC:	Samsung Industry Company
SIH:	Systems integration hierarchy
SMEs:	Small and medium enterprises
SMMEs:	Small, medium and micro enterprises
SPII:	Support Programme for Industrial Innovation
TCs-proxies:	Technological capabilities proxies
THRIP:	Technology and Human Resources for Industry Programme
TISA:	Trade and Investment South Africa
UAVs:	Unmanned aerial vehicles
UCT:	University of Cape Town
UKAI:	The United Kingdom Aerospace Industry
UK:	United Kingdom
US:	United States
USA:	United States of America
Wits:	University of the Witwatersrand



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