AFRICA'S TECHNOLOGY GAP

Case Studies on

Kenya, Ghana, Uganda and Tanzania

July 2003

Note

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The following symbols have been used in the tables:

- Two dots (..) indicate that data are not available or are not separately reported. Rows in tables have been omitted in those cases where no data are available for any of the elements in the row;
- A dash (-) indicates that the item is equal to zero or its value is negligible;
- A blank in a table indicates that the item is not applicable;
- A slash (/) between dates representing years, e.g. 1994/95, indicates a financial year;
- Use of a hyphen (-) between dates representing years, e.g. 1994-1995, signifies the full period involved, including the beginning and end years.

Reference to "dollars" ($) means United States dollars, unless otherwise indicated. Annual rates of growth or change, unless otherwise stated, refer to annual compound rates. Details and percentages in tables do not necessarily add to totals because of rounding. The material contained in this study may be freely quoted with appropriate acknowledgement.

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PREFACE

The ability to create, acquire and adapt new technologies is a critical requirement for competing successfully in the global marketplace. Various international forums and agreements on technology access and technological capacity building have recognized the importance of the transfer of technology, especially to developing countries. It is also a well-documented fact that the African continent has not kept pace with technological advancement. Africa's technological gap could be the source of its increasing economic deterioration because other developing regions are constantly upgrading their own technological capabilities, and the global marketplace has become increasingly liberalized and competitive.

This report has been prepared in close cooperation with the Governments of the study countries. It offers decision makers in developing countries in general, and in the case study countries in particular, an assessment of existing conditions governing the transfer of technology and the requirements for upgrading technological capacity. Drawing on lessons from East and South-East Asian countries, the report aims to accelerate Africa's technological advancement by identifying weaknesses in the individual countries' technology frameworks, including at the policy level and in institutional set-up. It also recommends ways to address these shortcomings and options for upgrading technological capacities.

This study was prepared by Sanjaya Lall and Carlo Pietrobello, with the assistance of Joseph Oko Gogo (Ghana), Geoffrey Ngugi Mokabi (Kenya), Godwill George Wanga (United Republic of Tanzania), and Paul N. S. Sagala (Uganda). It has benefited from the comments of Ümit Efendioglu and Mongi Hamdi; from consultations with policy makers and other concerned officials; and from on-site visits of business concerns and in-depth interviews with business leaders and representatives of academia. UNCTAD staff members who participated in this project include Khalil Hamdani, Menelea Masin, Bonapas Onguglo, and Taffere Tesfachew. Production assistance was provided by Laila Sede and Deborah Wolde-Berhan.

This study was undertaken as part of the Joint Integrated Technical Assistance Programme (JITAP), a project undertaken jointly by UNCTAD, the World Trade Organization and the International Trade Centre to assist the integration of selected least-developed and other African countries into the multilateral trading system. JITAP identifies policies and institutions required to build and/or reinforce local supply capacity, as well as to improve the competitiveness of enterprises. One of JITAP's objectives is to carry out country-specific studies to help Governments better assess the potential impact of the multilateral trading system and to adopt effective and timely export strategies for taking advantage of emerging trading opportunities.

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ABBREVIATIONS

FDI	Foreign direct investment
GDP	Gross domestic product
IPR	Intellectual property rights
ISO	International Standards Organization
LT, MT, HT	Low-, Medium-, and High-Technology products
MVA	Manufacturing value added
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
RB	Resource-based products
SEEs	State-owned economic enterprises
SMEs	Small- and medium-sized enterprises
TRIPS	Trade-related aspects of intellectual property rights
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization

Chapter 1
An Overview

A. Introduction

Set against a global economy characterized by rapid technological advances, intensifying competition and growing liberalization, this study examines the "technology system" in four sub-Saharan countries, with a focus on the transfer of technology, as well as its absorption and use, in the manufacturing industry. It analyses the main institutions supporting technology import and absorption in Ghana, Kenya, Uganda and Tanzania and draws comparisons with other developing countries, particularly industrializing countries in East and South-East Asia. Further, it provides a strategic perspective on how Governments address the technological requirements for competitiveness, gain access to new technology, and nurture local technological development. This chapter provides an overview of the individual country studies, including the analytical framework for technology policy discussion, the industrial setting, and the main determinants of technology development.

B. The analytical framework

Effective technology strategies are based on a clear understanding of the basic unit of technological activity, the industrial firm, which imports, masters, uses and improves technology. It also subsequently stimulates the demand for innovative technologies. For the process to thrive, it needs active, supportive and dynamic government policies and institutions. Efficient technology use goes beyond importing machinery. It entails building capabilities, technical understanding and an informational base; acquiring new technical skills and managerial practices; and forging linkages with other firms and institutions. It requires the ability to understand and master new technology; to adapt it to local factors and conditions; and to upgrade it as technologies improve and new products appear. Different firms use the same technology at vastly different levels of efficiency. Moreover, countries vary in their technological capabilities.

Technological competitiveness lies in the effectiveness with which countries promote capabilities. Firms in developing countries often lack the expertise to determine which new skills, technical knowledge and organizational techniques are required to make newly imported technologies function at optimal levels. Changes in traditional mindsets are required to form interactions and linkages with other firms or