

EMBARGO

The contents of this Report must not be quoted or summarized in the print, broadcast or electronic media before **3 December 2013, 17:00 hours GMT**

INFORMATION ECONOMY REPORT 2013

The Cloud Economy and Developing Countries



UNITED NATIONS



INFORMATION ECONOMY REPORT 2013

The Cloud Economy and Developing Countries



NOTE

Within the UNCTAD Division on Technology and Logistics, the ICT Analysis Section carries out policy-oriented analytical work on the development implications of information and communication technologies (ICTs). It is responsible for the preparation of the *Information Economy Report*. The ICT Analysis Section promotes international dialogue on issues related to ICTs for development, and contributes to building developing countries' capacities to measure the information economy and to design and implement relevant policies and legal frameworks.

In this Report, the terms country/economy refer, as appropriate, to territories or areas. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. In addition, the designations of country groups are intended solely for statistical or analytical convenience and do not necessarily express a judgement about the stage of development reached by a particular country or area in the development process. The major country groupings used in this Report follow the classification of the United Nations Statistical Office. These are:

Developed countries: the member countries of the Organization for Economic Cooperation and Development (OECD) (other than Chile, Mexico, the Republic of Korea and Turkey), plus the new European Union member countries that are not OECD members (Bulgaria, Cyprus, Latvia, Lithuania, Malta and Romania), plus Andorra, Liechtenstein, Monaco and San Marino. Countries with economies in transition: South-East Europe and the Commonwealth of Independent States. Developing economies: in general, all the economies that are not specified above. For statistical purposes, the data for China do not include those for Hong Kong Special Administrative Region (Hong Kong, China), Macao Special Administrative Region (Macao, China), or Taiwan Province of China.

Reference to companies and their activities should not be construed as an endorsement by UNCTAD of those companies or their activities.

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, unless otherwise indicated;

A slash (/) between dates representing years, for example, 1994/95, indicates a financial year;

Use of an en dash (–) between dates representing years, for example, 1994–1995, signifies the full period involved, including the beginning and end years;

Reference to “dollars” (\$) means United States of America 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 up to the totals because of rounding.

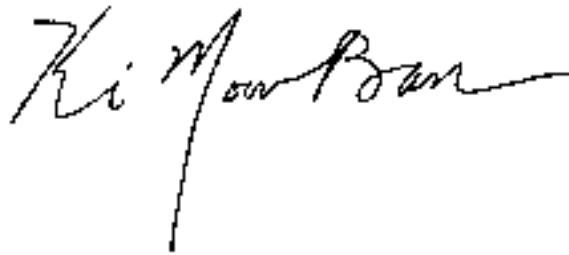
The material contained in this study may be freely quoted with appropriate acknowledgement.

UNITED NATIONS PUBLICATION
UNCTAD/IER/2013
Sales No. E.13.II.D.6
ISSN 2075-4396
ISBN 978-92-1-112869-7
e-ISBN 978-92-1-054154-1
Copyright © United Nations, 2013
All rights reserved. Printed in Switzerland

PREFACE

Innovation in the realm of information technology continues its rapid pace, with cloud computing representing one of the latest advances. Significant improvements in the capacity to process, transmit and store data are making cloud computing increasingly important in the delivery of public and private services. This has considerable potential for economic and social development, in particular our efforts to achieve the Millennium Development Goals and define a bold agenda for a prosperous, sustainable and equitable future.

The *Information Economy Report 2013* marks the first time the United Nations is examining the economic potential of cloud computing for low- and middle-income countries, where rates of adoption are currently low. With governments, businesses and other organizations in the developing world considering whether to migrate some or all of their data and activities to the cloud, this publication is especially timely. I commend its information and analysis to all those interested in learning more about the benefits and risks of the cloud economy.

A handwritten signature in black ink, reading "Ki Moon Ban". The signature is fluid and cursive, with a long, sweeping underline that extends downwards.

BAN Ki-moon
Secretary-General
United Nations

ACKNOWLEDGEMENTS

The *Information Economy Report 2013* was prepared by a team comprising Torbjörn Fredriksson (team leader), Cécile Barayre, Shubhangi Denblyden, Scarlett Fondeur Gil, Suwan Jang, Diana Korka, Smita Lakhe and Marie Sicat under the direction of Anne Miroux, Director of the Division on Technology and Logistics.

The report benefited from major substantive inputs provided by Michael Mingos, David Souter, Ian Walden and Shazna Zuhyle. Research ICT Africa provided original research for five country case studies. Additional inputs were contributed by Tiziana Bonapace, Axel Daiber, Nir Kshetri, Rémi Lang and Howard Williams.

Comments on the initial outline of the report were provided by experts attending a brainstorming meeting organized in Geneva in February 2013, including Jamil Chawki, Alison Gillwald, Abi Jagun, Martin Labbé, Juuso Moisander, Jason Munyan, Jorge Navarro, Thao Nguyen, Marta Pérez Cusó and Lucas von Zallinger. Valuable feedback on various parts of the text was also given by experts attending a peer review meeting organized in Geneva in July 2013, including Chris Connolly, Bernd Friedrich, Alison Gillwald, Angel González-Sanz, Nir Kshetri, Matthias Langenegger, Mpho Moyo, Tansuğ Ok, Daniel Ramos and Carlos Razo.

Additional comments were received at various stages of the production of the report from Dimo Calovski, Padmashree Gehl Sampath, Esperanza Magpantay, Markie Muryawan and Marco Obiso. Ngozi Onodugo provided helpful assistance and inputs during her internship with UNCTAD.

UNCTAD is grateful for the sharing of data by national statistical offices and responses received to UNCTAD's annual survey questionnaire on ICT usage by enterprises and on the ICT sector. The sharing of data for this report by the International Telecommunication Union, LIRNEasia, Research ICT Africa and TeleGeography is highly appreciated.

The cover was done by Sophie Combette. Desktop publishing was done by Nathalie Lorient, graphics were carried out by Stephane Porzi and Christian Rosé and the *Information Economy Report 2013* was edited by Maritza Ascencios, Lucy Annette Deleze-Black and John Rogers.

Financial support from the Government of Finland and the Republic of Korea is gratefully acknowledged.

CONTENTS

Note	ii
Preface	iii
Acknowledgements	iv
List of abbreviations	ix
Overview	xi
CHAPTER I THE CLOUD ECONOMY ECOSYSTEM	1
A. Evolution to the cloud	2
B. Definitions of key terms concerned with cloud computing	4
1. Cloud computing and cloud services.....	4
2. Cloud service categories	5
3. Cloud deployment models.....	6
C. Drivers and barriers related to cloud computing	8
D. The cloud economy ecosystem	10
E. Implications for developing countries	12
CHAPTER II TRENDS IN THE CLOUD ECONOMY AND RELATED INFRASTRUCTURE	15
A. Trends in the cloud economy	16
1. Cloud markets and traffic	16
2. Leading corporate players in the cloud economy.....	17
3. Can cloud computing trends be seen in trade statistics?	20
B. Trends in cloud-related infrastructure	23
1. Factors determining the cloud readiness of countries	23
2. International broadband connectivity	25
3. National backbone, Internet exchange points and data centres.....	25
4. Broadband infrastructure trends	27
5. Quality of service of broadband networks	30
6. Affordability of broadband services	34
C. Conclusions	36
CHAPTER III IMPLICATIONS FOR DEVELOPING COUNTRIES	43
A. Drivers and barriers of cloud adoption	44
1. Drivers of cloud adoption.....	44
2. Barriers to cloud adoption	45
3. Assessing drivers and barriers to cloud adoption in developing countries	49
B. Cloud adoption in selected countries: experiences and opportunities	51
1. Supply-side cloud opportunities in developing countries.....	51
2. Cloud use by different stakeholders in developing countries	57
C. Conclusions	63

CHAPTER IV GOVERNANCE, LAW AND REGULATION OF CLOUD SERVICES IN DEVELOPING COUNTRIES	67
A. International legal and regulatory trends.....	68
B. Public law and cloud services.....	69
1. Cloud as a regulated activity.....	69
2. Regulating in a multi-jurisdictional environment.....	70
C. Private law and cloud services	72
D. Implications for developing countries.....	74
1. Provision of cloud services	74
2. Conditions of supply.....	74
3. Treatment of data	75
E. Concluding remarks and policy recommendations.....	76
CHAPTER V POLICY RECOMMENDATIONS	81
A. Recognizing the diversity of cloud adoption strategies.....	82
B. Recommendations to Governments	83
1. Designing strategic policy approaches to the cloud.....	83
2. Addressing the infrastructure challenge	85
3. Strengthening the legal framework	88
4. Map opportunities on the supply side.....	89
5. The human resource challenge.....	90
6. Government use of the cloud	91
7. Implementation and follow-up of the strategy	91
8. Raising awareness	91
C. Recommendations to development partners.....	92
References.....	95
STATISTICAL ANNEX	101
Glossary	111
List of selected publications in the area of science, technology and ICT for development	113
Readership survey.....	116

Boxes

I.1.	The expansion of computing and communication power	2
I.2.	Economies of scale and the cloud	6
II.1.	Cloud computing services in international classifications	20
II.2.	Cloud services over satellite.....	29
III.1.	Barriers to cloud adoption in Ghana.....	47
III.2.	Government data centres in developing countries.....	53
III.3.	Examples of cloud service provision in developing countries	55
III.4.	Selected cloud aggregators in developing countries	56
III.5.	Government cloud use in the Republic of Korea	58
III.6.	Towards a government cloud in India.....	60
III.7.	Benefiting from the cloud's elasticity – the case of Zenga Media	63
IV.1.	Protecting personal data in the cloud – different options and challenges.....	69
IV.2.	Legislating for cloud: the case of Mexico	71
IV.3.	UNCTAD support to e-commerce legislation harmonization	77
V.1.	Promoting the cloud economy in Kenya.....	84
V.2.	Approaches to measuring the quality of broadband services.....	86
V.3.	The African Internet Exchange System Project.....	88

Tables

I.1.	From mainframes to the cloud	3
I.2.	Different computing categories	5
II.1.	Estimates and forecasts of cloud revenue, 2010 and 2015 (Billions of dollars).....	16
II.2.	Top 10 companies by estimated number of servers, 2012	18
II.3.	Top 10 generators of SaaS revenue among the global 100 software firms, 2011	19
II.4.	Top importing and exporting economies of computer servers of the type described under HS 847150, 2008–2012	22
II.5.	Infrastructure-related indicators used in different cloud readiness indices	25
II.6.	Theoretical highest mobile broadband speeds, W-CDMA family	30
II.7.	Comparison of 3G and LTE speeds and latency in Finland.....	30
II.8.	Relevance of broadband characteristics by cloud service	31
II.9.	Quality of service performance, by groups of economies	33
III.1.	Selected cloud service providers in Ghana, 2013.....	54
V.1.	Potential advantages and risks/disadvantages of cloud adoption.....	82

Box table and figure

预览已结束，完整报告链接和二维码

<https://www.yunbaogao.cn/report/index/report?re>