

博士論文審査結果報告
Doctoral Dissertation Defense Results

審査委員会を代表し、以下のとおり、当該学生が博士論文審査に合格したことを報告します。
On behalf of the Examination Committee, I am pleased to report that the student indicated below has successfully defended her/his dissertation.

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プログラム名 Program	GRIPS グローバルガバナンスプログラム GRIPS Global Governance Program	
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(和訳/ English Translation)	(ハイテク企業への知識移転にもたらす国家政策の影響: ルワンダの事例)	
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1. 論文概要と判定理由

1. Summary of the Dissertation and the Committee's Evaluation

This dissertation examines the innovation capability upgrading process through international collaboration between local startups and foreign tech firms, using Rwanda as a case study. The study focuses on capability upgrading at two levels of interaction: 1) the national policy level and 2) the firm strategy level.

The first part explores how national policies, through vision creation, implementation, and leveraging international cooperation, transformed Rwanda from an agriculture-based economy to an ICT-based economy. The findings confirm the Mission Oriented Innovation Policy (MOIP), demonstrating that national policies driven by a broad, long-term vision fostered private partnerships between foreign firms and domestic startups. While MOIP has been primarily studied in developed countries, its implementation in an African context is a unique feature of this thesis.

The second level examines the firm-level innovation capability upgrading process, using case study methods to illustrate the internal mechanisms of international collaboration. This part reveals how a Rwandan ICT startup, Wired-in, acquired innovation capabilities through interactions with a Japanese tech firm, Rexvert through working collaboratively on development of software. In the ICT sector, the learning process has special feature of involving iterative interactions aimed at solving programming challenges. Results show that international collaboration between the tech firm and the startup significantly enhanced the innovation capabilities of Rwandan ICT startups. However, capability acquisition was contingent on the support provided by various national policies, which created a conducive environment and laid out incentives for startups, as discussed earlier. Additionally, given the ICT sector's strong market potential in Africa, the business relationship between the Rwandan ICT startup and the Japanese tech firm evolved into a partnership of equal footing. This case provides a detailed account of building ICT capabilities through iterative interaction.

Research on technological catching up in developing countries has generally focused on one directional knowledge flow from Multinational Enterprises (MNEs) to local subsidiaries, primarily within the manufacturing sector and the Asian context. Studies on this process in Africa have been limited, partly due to the continent's underdeveloped manufacturing sector and the fact that most MNEs are involved in natural

resource extraction, which typically limits subsidiary development and knowledge transfer. This study's unique contribution is its focus on capability upgrading in Rwanda's ICT sector, addressing the gap in literature regarding technological capability upgrading in Africa.

Furthermore, this case highlights the ICT sector as a potential developmental pathway for small, landlocked, resource-scarce countries like Rwanda. Despite the limitations of a single-country case study, this thesis offers an alternative approach to enhancing innovation capabilities in Africa.

2. 論文の内容（手法や結論など）と学術的貢献

2. The Dissertation's Findings, Methodologies, and its Academic Contribution

This thesis illustrates Rwanda's transformation from an agriculture-based to an ICT-based economy through two levels of analysis: national policy and the technological capability acquisition process by firms.

At the country level, the research addresses the following questions: 1) How do national policies promote private partnerships between foreign firms and startups in emerging technologies? and 2) What factors of national policy contribute to attracting private international firms to developing countries? These questions are answered using a mixed methodology of qualitative analysis, incorporating both primary and secondary sources.

The primary information was obtained from semi-structured interviews with key stakeholders, including ministries, public agencies, the private sector, universities, bilateral cooperation agencies, and foreign firms in Rwanda. The interview data were transcribed using software called Nvivo for thematic analysis. The thematic analysis identified the following common critical drivers from the diverse stakeholders: (i) learning and capability building; (ii) a conducive legal framework environment; (iii) flexibility and agility of policy; and (iv) infrastructure to promote inter-firm international cooperation. These factors align with those identified in the literature on Mission-Oriented Innovation Policy (MOIP). The themes were further corroborated with secondary information, showing that important factors were effectively improved during the implementation of national policy in Rwanda. This policy aimed to transform the country into an ICT-based economy by gradually providing the necessary incentives to build identified capabilities. The analysis of primary and

secondary information suggests that national policy was effectively enforced, transforming Rwanda through processes as follows: identifying an overarching vision, setting up different phases of implementable policies, establishing implementing agencies, gradually building the necessary human resources, and leveraging essential knowledge through collaboration with foreign entities by preparing an innovation-conducive institutional environment.

The second substantial chapter examines the capability upgrading process at the firm level through international collaboration. This chapter employs a case study method to explore the growing software outsourcing industry in Rwanda. The case focuses on the international collaboration between the Rwandan ICT startup, Wired-In, and the Japanese tech firm, Rexvert, to address the following research questions: (1) How does the new model of international collaboration between small-scale tech firms from developed and developing countries evolve? and (2) What are the effects of adopting this new model? The analysis aims to understand how international collaboration occurs between start-up in developing countries with tech firm in developed countries. The case study utilized qualitative information obtained from interviews with key informants from collaborating firms and other stakeholders facilitating international collaborations, such as Rwandan and Japanese public institutions. Primary information from the interviews was analyzed using Nvivo software. This result were used to build learning process of Wired-In as the firm enhance collaboration with Rexvert. The information obtained from the interviews were cross referenced with the secondary information from company records, illustrated the gradual process of learning in historical perspective, that are reactively to underlying national policies mentioned in previous chapter.

Indeed, Rwanda's strategy to transition from an agrarian to an ICT-oriented economy has involved a series of strategic policy initiatives, starting with Vision 2020 and extending to recent policies like Vision 2050 and the Science, Technology, and Innovation (STI) policy. These policies have focused on building ICT infrastructure, developing human resources, and supporting innovation through various mechanisms. They have successfully created an environment conducive to foreign investment, aligning with theoretical frameworks that advocate for policy mechanisms fostering economic growth and market creation.

Key to Rwanda's success has been its flexible and supportive legal framework, including the investment code and specific policies for startups and SMEs. This has attracted foreign direct investment and facilitated international collaborations, reflecting findings from other successful countries such as Singapore and Chile. However, challenges remain, particularly in ensuring the maturity of the startup ecosystem to fully leverage foreign investments and collaborations.

The analysis on international collaboration highlighted the importance of this new mode of international cooperation, where learning occurs through iterative interaction of trying to make the program together in a flexible and innovative environment, capability of the Rwandan firm dynamically evolves to leverage emerging market opportunities with the Japanese firm. The analysis identified a bidirectional flow of knowledge between the two small-scale companies achieved recently, contrary to the conventional one-directional knowledge flow from developed to developing countries.

The study concludes that Rwanda's national policies have effectively supported partnerships between foreign tech firms and local startups. Key factors include a gradual policy implementation process, a flexible legal environment, and the development of infrastructure and human resources. Successful partnerships are also influenced by the capability of local firms to absorb and utilize foreign knowledge, underscoring the importance of both policy support and institutional factors.

Based on Rwanda's experience, the study recommends that developing countries should:

- ✧ Implement gradual, consistent policy frameworks that support ICT infrastructure and innovation.
- ✧ Focus on creating flexible, agile policies to attract foreign investment and new technologies.
- ✧ Develop robust institutions dedicated to fostering international partnerships and supporting local startups.
- ✧ Invest in human resource development and provide essential resources to facilitate successful collaborations.

These recommendations highlight the importance of well-defined policies and institutional support in

achieving economic transformation and fostering international cooperation in developing countries.

Research on technological catching up has predominantly examined how knowledge flows from Multinational Enterprises (MNEs) to their local subsidiaries, with a focus on the manufacturing sector within the Asian context. Studies on this process in Africa have been sparse, largely due to the continent's limited manufacturing base and the predominance of MNEs engaged in natural resource extraction, which typically results in minimal subsidiary development and knowledge transfer. This study is distinctive in its focus on the ICT sector in Rwanda, addressing the gap in literature concerning technological capability upgrading in Africa. It highlights the ICT sector as a viable developmental path for small, landlocked, resource-scarce countries like Rwanda. Despite the limitations of a single-country case study, this thesis contributes by demonstrating an alternative route to enhancing innovation capabilities in Africa.

3. 審査員からの主要コメントおよび修正内容

3. Comments by the Examiners and the Revisions Made

Several issues were raised when the first draft was presented. These comments are grouped into following categories.

The format of thesis and incompleteness of the details in the manuscript: simple mistakes of misspellings, unidentified copyright of citation, misquotes of the literature, presence of irrelevant literature, mismatch of figures and text description, structure of thesis not following the standard format recommended. Above are being corrected in the revised version.

Another section being mentioned was the section in the motivation. The draft made comparison between Rwanda and Central African Republic to illustrate and identify the importance of sound national policy to justify the focus of analysis. Examiners concurred that comparison should be made with Burundi, which is better fit to be compared with Rwanda for the size and for the presence of ICT sector. This point was corrected. Now the comparison is made between Rwanda and Burundi in the text.

Substantial point was identified by the examiners on the structure and content of introduction. The comment was made to re-organize, remove the redundancy in the arguments and combine the introduction with

subsequent chapter that existed in the draft which explained the motivation of studying this case via describing the current condition of ICT sector in Africa as well as investment behavior of Japan and other countries towards Africa. The introductory chapter currently integrated two previously existed that explained the motivation of the thesis are were combined.

Moreover, the examiners coincided in enriching the conclusion and policy recommendation to be more fine-tuned to the case as these were given in very generic terms. This point was also being corrected.