

The Diffusion of Innovation in Low Income Countries

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- Innovation as a major engine for long term growth
 - Most of formal innovations are concentrated in a few countries
 - Technology diffusion and adoption is a key element of industrialisation and catch-up
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- The diffusion of innovation in low income countries
(The DILIC Project)



Objectives of the DILIC project

- Understand the barriers to innovation creation and diffusion in LICs and redefine the space for innovation policy;
- Analyse the determinants of knowledge diffusion *in* LICs;
- Examine the effect of external knowledge diffusion *to* LICs, in particular the role of South-South trade and FDI;
- Develop an SME open innovation network model to increase frugal innovation in LICs.

Definition of innovation

- Creation or adoption of new product or process, or new organisational and marketing practices (where “new” means new to the world or new to the country or the firm), but, also new business models and new sources of supply. (Oslo Manual, 2005)
- It includes the whole innovation chain which covers both the creation and adoption of new knowledge and the commercialisation process.

Channels of technology diffusion

- Technology transaction, eg. licensing
- Trade (imports & exports)
- Foreign direct investment (MNEs)
- Production network (value chain, cluster)
- Training
- Innovation collaboration
- Labour mobility
- Social & professional network
- Standards
- Internet
- Short term foreign visit

Research Methods

- Fieldwork and in-depth case studies
 - Firm level survey of 500 firms (formal+informal)
 - Firm level secondary data + trade data
 - Statistical analysis
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- Sectors: textile/apparel, food processing, mineral processing, wood/furniture, construction
 - Both technology and managerial innovation
 - Compare Chinese MNEs with OECD MNEs

People

- Principal Investigator: Xiaolan Fu (Oxford University)
- Co-Is: Pierre Mohnen, Luc Soete (UNU-MERIT)
- Local Collaborator: George Essegbe (STEPRI-CSID)
- Researchers: Giacomo Zanello, Jun Hou
- Coordinator: Mafalda Picarra
- PhD Student: Jieun Choi
- PhD co-supervisor: Chris Adam
- Advisors: Anne Miroux (UNCTAD), Mammo Muchie (TUT), David Kaplan (UCT), Marc Ventresca (Oxford)

Case study

- In-depth understanding, inform survey questionnaire design.
- 3 Industries: Textile, food sector, construction
- 2 sectors: Formal and informal
- 10 firms and a total of 32 in-depth interviews

Image 1: Formal (left) and informal (right) establishments in the textile sector.



Image 2: Formal (left) and informal (right) establishments in the food processing sector.

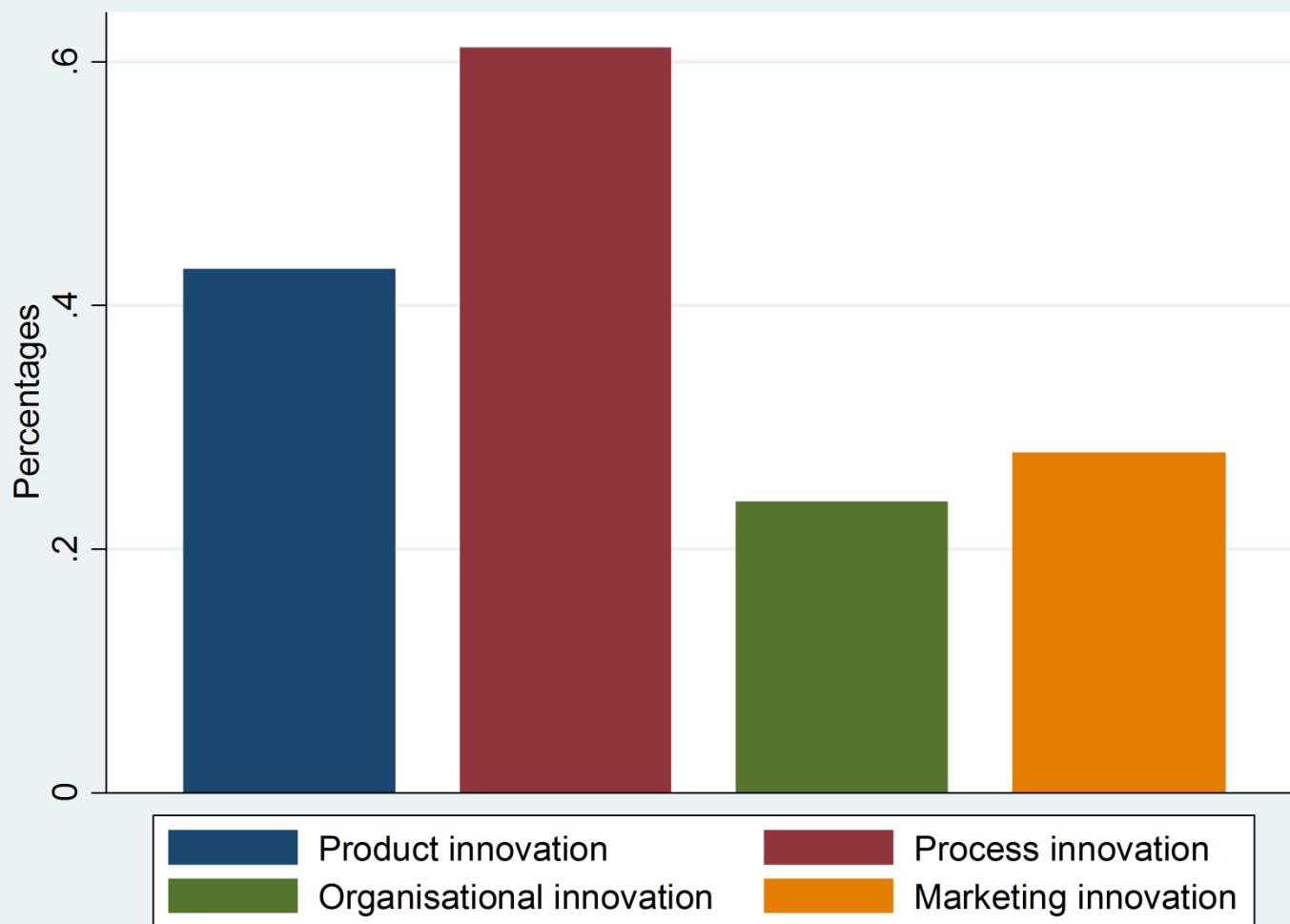


Innovation Diffusion from *within* and *outside* Ghana

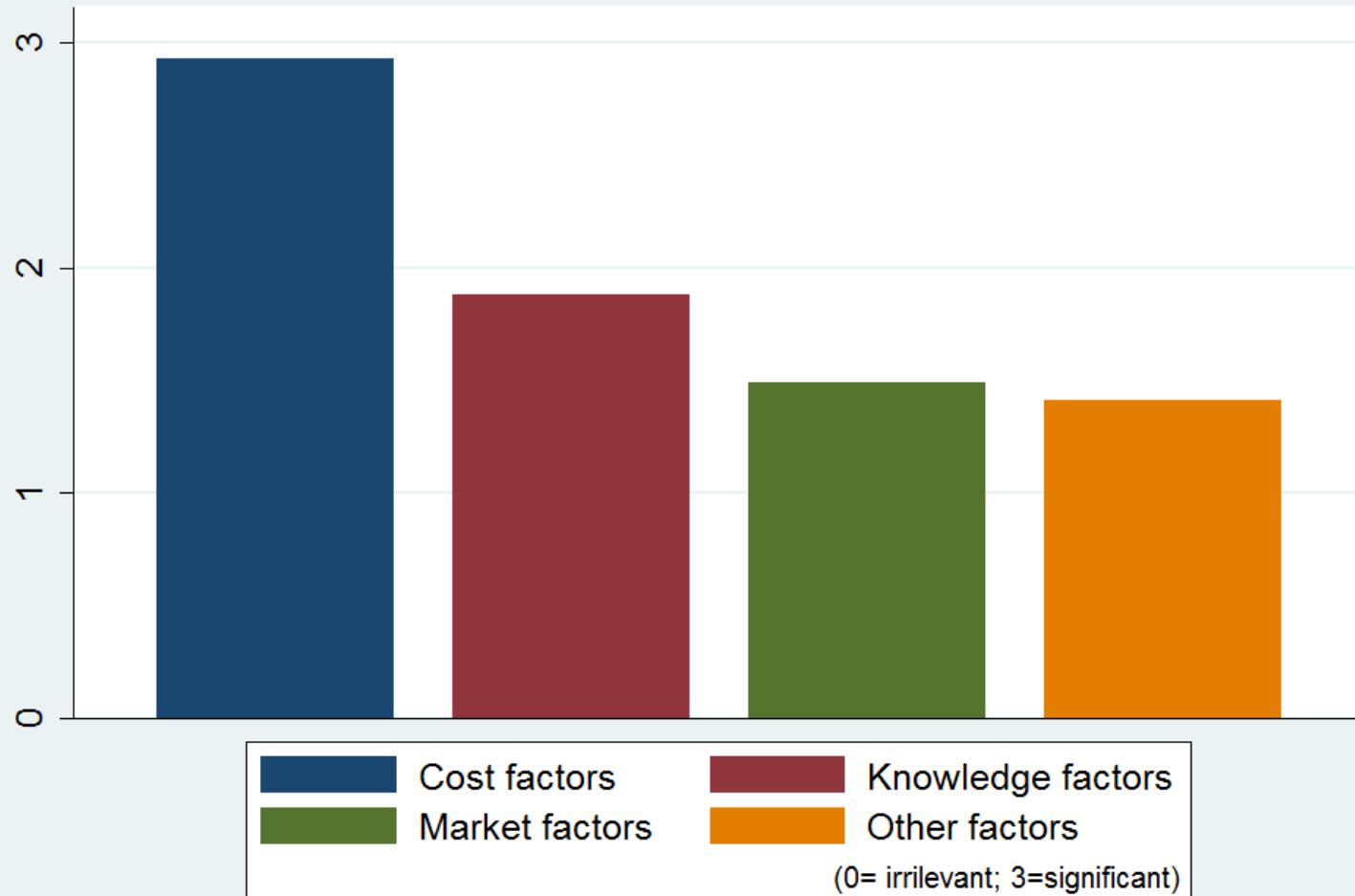
- Innovation diffusion *within* Ghana
 - Training courses
 - Being members of clusters
 - Market
 - Collaborations with local Universities
- Innovation diffusion from *outside* Ghana
 - Internet
 - Social network
 - Collaboration with foreign institution

Survey

- Unique survey questionnaire seek information on the sources and diffusion channels of innovation in and to LICs
- A national survey of manufacturing firms, food processing (25%), mineral process (13%), wood processing furniture (25%), textile & apparel (25%).
- Include all sizes including micro firms
- 502 valid responses including 70% micro firms (<9).
- employed 10 local survey assistants, training.
- Face-to-face interview, using PDA to collect & monitor.
- Response rate: 83%



Obstacles of innovation



How the innovations materialize

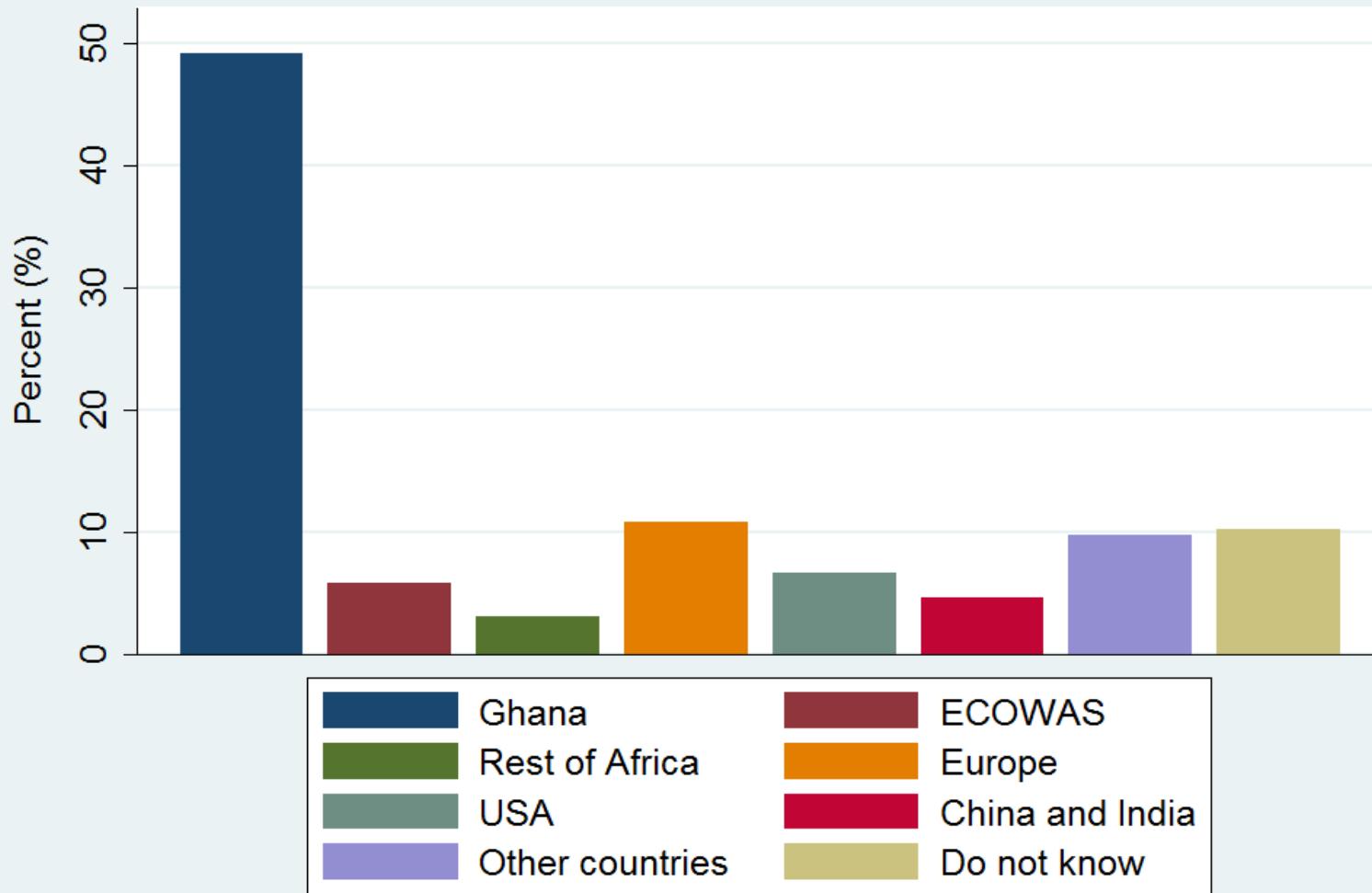
Top 6 sources

1. You modified the product in response to customers' requirement.	60 %
2. The product or process was mainly developed within the enterprise	58 %
3. Your firm observed/or heard of new products or production process or new ways of organising production and marketing by other companies and imitated it with some modification.	46 %
4. Your enterprise created it together with customers	46 %
5. Your firm observed/or heard of new products or production process or new ways of organising production and marketing by other companies and imitated it directly.	30%
6. Skilled workers in the company find out a better way for the production process after some experiments.	26%

Importance of information sources for innovation activities: Top 6 sources

1. Clients or customers
2. Internet (Conditional on being connected)
3. Sources within your enterprise (colleagues)
4. Member of cluster
5. Member of associations
6. Competitors or other enterprises in your sector

Sources of innovation



Collaboration & Universities

	Yes (1)	No (0)
1. During the three years 2011 to 2013, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?	8%	92%

	Yes (1)	No (0)
27A. Do you have the intention to collaborate with universities?	30%	70%

2. If you have NOT collaborated with universities, why? Please tick all that apply.	
A. We do not have such need	205 (43%)
B. They are not interested	113 (24%)
C. We are not connected	325 (68%)

3. How was the connection with the University established?	
Personal network (1)	74%
University approached us (2)	0%
Governmental initiative (3)	26%

Vertical SME production chain

	Yes (1)	No (0)
1. Is your firm a part of a vertical production chain consisting of SMEs?	51 (0.1)	451 (0.9)

34C. Which is the nature of the leading firm?	
Small local firm (1)	46%
Large local firm (2)	50%
University (3)	0%
Foreign firm (4)	1%

	Your region	Ghana	ECOWAS	Africa	Globally
Where is the network mainly located?	44%	54%	0%	0%	2%

	Yes (1)	No (0)
2. Is such network formed to produce something that firms in the country would otherwise not be able to produce?	46%	54%
3. Is such network formed to make existing products cheaper or better quality?	67%	33%

Top 10 important foreign knowledge sources

(1-5, Insignificant=1 , Crucial = 5)

	MEAN
A. Imported machinery and equipment	2.18
B. Imported goods in the same industry	1.73
C. Imported goods that input as intermediary goods into your production	1.72
D. Foreign customers	1.64
E. Observing and imitating competitors in export market	1.54
F. New product or quality requirement raised by customers in export market	1.50
G. Foreign firms in the same industry	1.52
H. Foreign firms In downstream industry	1.51
I. Information found via internet	1.55
J. Attending international trade fairs	1.52

Conclusions and policy implications (1)

- Innovation widespread, mainly incremental.
- But not fully recognized, not incentivised, unsupported.
- Customer needs is a major source of inspiration/driver
- Imitation and adaptation is the main method to achieve innovation
- Imports is the major channel for international technology transfer
- Used a variety of foreign transfer sources, but lack of depth
 - Policies to strengthen international tech transfer

Conclusions and policy implications (2)

- Clusters found an important source for tech diffusion.
- Profession network, eg. association, important source
- But overall lack of openness in collaborative innovation.
 - Policies to encourage more innovation collaboration
- Weak engagement with universities, esp. lack of information, lack of incentives in universities
 - Policies to initiative, incentivise and support
- SMEs production network found useful for innovation
 - Policies to encourage more

More to do

- Communicate the research to policy makers and practitioners
- Continue the work by developing multi-country, multi-year study



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