Impact of ICTs Adoption and Application on Innovation in Selected Manufacturing Firms in Tanzania

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Outline

- Introduction
- Problem statement
- Methodology
- Description of the surveyed firms
- Key findings
- Conclusions and Recommendations

Intro

- SMEs contributes about a third of Tz economy..
- 96.9% of the Manufacturing firms in TZ are SMEs
- The growing importance of Manufacturing sector in the country's economy
- Supporting other sectors such as agriculture, mining and infrastructural development
- Manufacturing contributed 9.8% of GDP in 2010
- The government targets 15% in 2015 (IIDS)

Intro…

- Innovation is a key driver to industrial competitiveness (Solow, 1957; Griliches, 1958; Freeman, 1982)
- The role of technological capability in innovativeness (Von Tunzelmann, 1997; Teece)
- Taxonomical patterns (Pavitt, 1984)
- Small firms invests less in ICT (Hadjimanolis, 2000)
- ICT intensity correlation to innovation (Granstrand,)
- The boom of ICT development in TZ (UNESCO, 2011; URT, 2011)

Intro…

- Codification and transfer of knowledge
- Design, controllers
- Automation and operational efficiency
- Communication, collaboration and marketing

Research problem

- Existence of a complex causal relationship between ICT usage and competitiveness
- Mixed results on role of ICT in productivity and return of ICT investments in EA (Chowdhury & Wolf, 2003)
- Lacking evidence on role played by ICT on innovation of Tanzania SMEs

Methodology

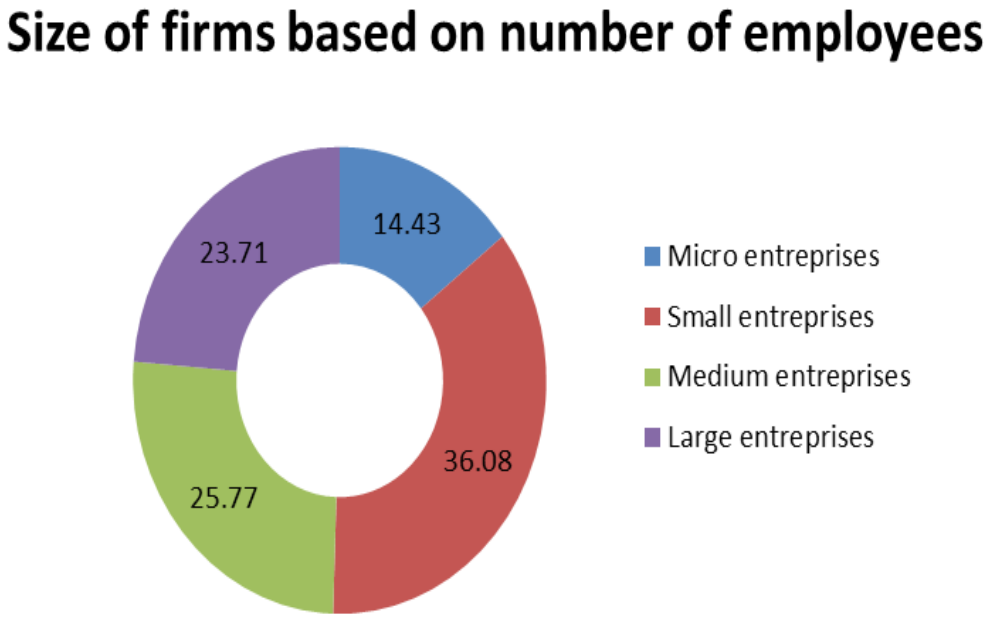
- The survey covered 120 firms in Dar es Salaam
- 102 responded
- Both quantitative and qualitative instruments
- Questionnaires, interviews and observations
- Pre-testing
- Quantitative analysis with SPSS (mainly descriptive statistics)
- Frequencies, charts and cross tabulations

The surveyed firms

- From six months to 20 years old
- 67.4% Locally owned, 18.9 % joint venture local & foreign and 13.7 other combinations

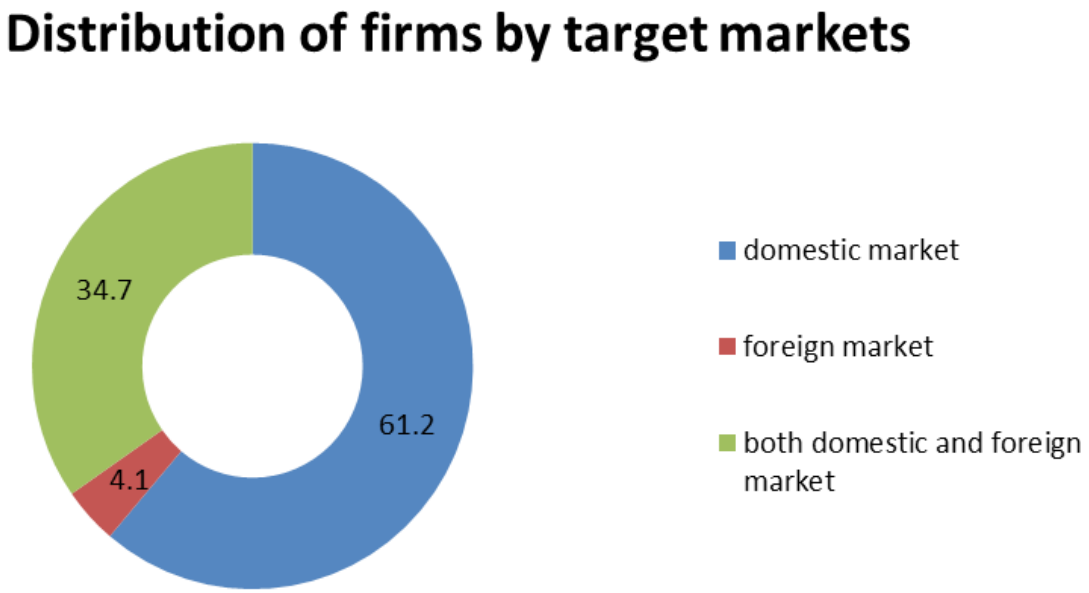
32.3 % of all employees attained primary education,

Only 6.9% attained a degree or higher



Firms…

- Raw Material mainly from local sources, followed by imports from Asia, Europe, USA …



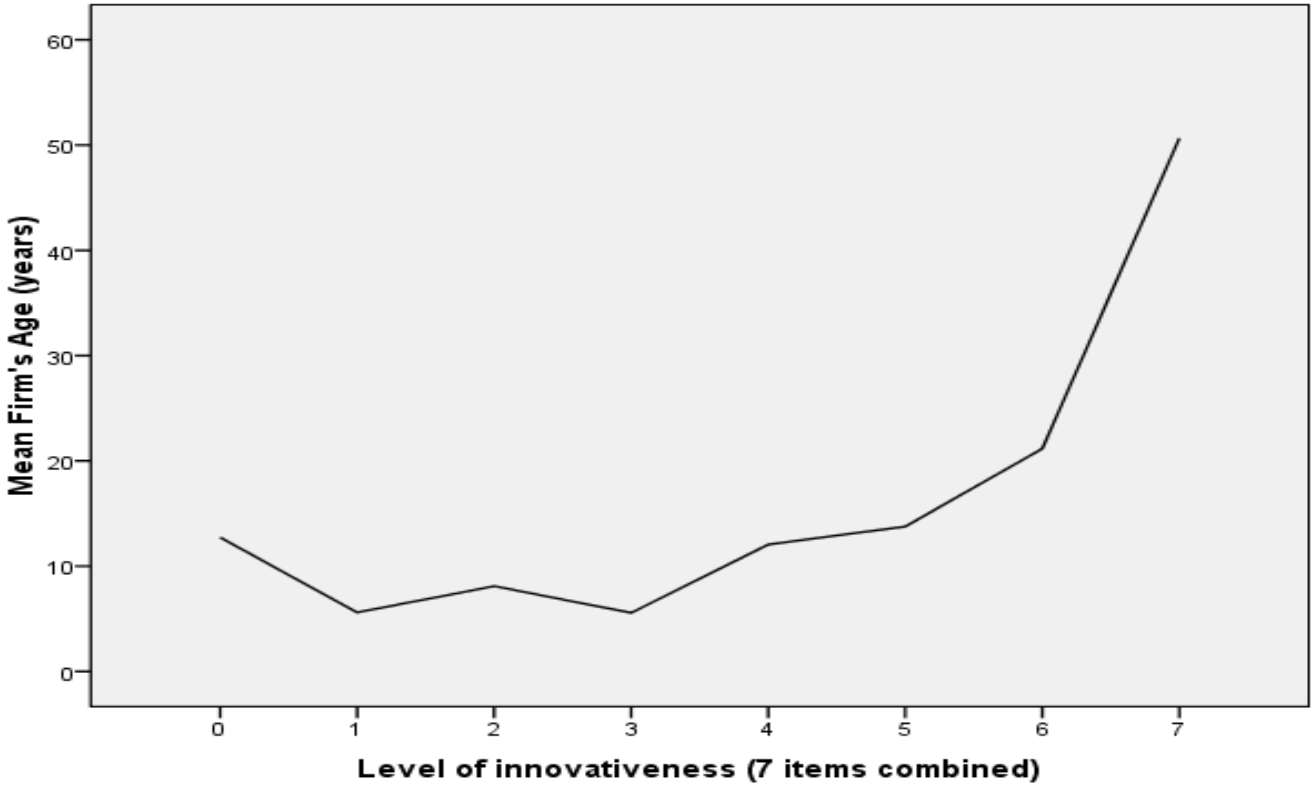
Findings

More adoption and modification than introducing “new to the world”

Parameter	Yes (N)	%	No (N)	%
Have you introduced any product that is new to the Tanzanian market in the past 3 years?	35	36.5	61	63.5
Have you adopted any new products?	63	64.3	35	35.7
Have you modified any product during the three years?	65	66.3	33	33.7
Have you developed any new techniques (processes) in the past three years?	11	11.2	87	88.8
Have you adopted any new techniques in the past 3 years?	66	67.3	32	32.7
Have you modified your production techniques in the past 3 years?	56	56.6	43	43.4
Has your firm been through organizational change in the past 3 years?	63	68.5	29	31.5

Findings…

- Cumulativeness and complimentary assets except for new entrants



Findings…

- Origin of innovation- diverse (within the firm, following competitors, customers suggestions, suppliers influence, R&D institution, training, trade fairs….

Findings…

What kind of ICT facilities do you use? (multiple responses)			
	Responses		Percent of Cases
ICT	N	% of Total	
mobile phones	101	19.20%	100.00%
computers	75	14.30%	74.30%
printers	59	11.20%	58.40%
land line	59	11.20%	58.40%
photocopy machine	58	11.00%	57.40%
radio	55	10.50%	54.50%
fax	51	9.70%	50.50%
television	33	6.30%	32.70%
radio call	12	2.30%	11.90%

Findings…

Which computer based communication services do you use?			
	Responses		% of Cases
	N	% of Total	
using electronic mail	70	27.50%	92.10%
using internet	65	25.50%	85.50%
advertisement/marketing (e-business)	23	9.00%	30.30%
sending and receiving faxes	23	9.00%	30.30%
using file transfer protocol (FTP)	17	6.70%	22.40%
using usernet/newsgroups/social network	17	6.70%	22.40%

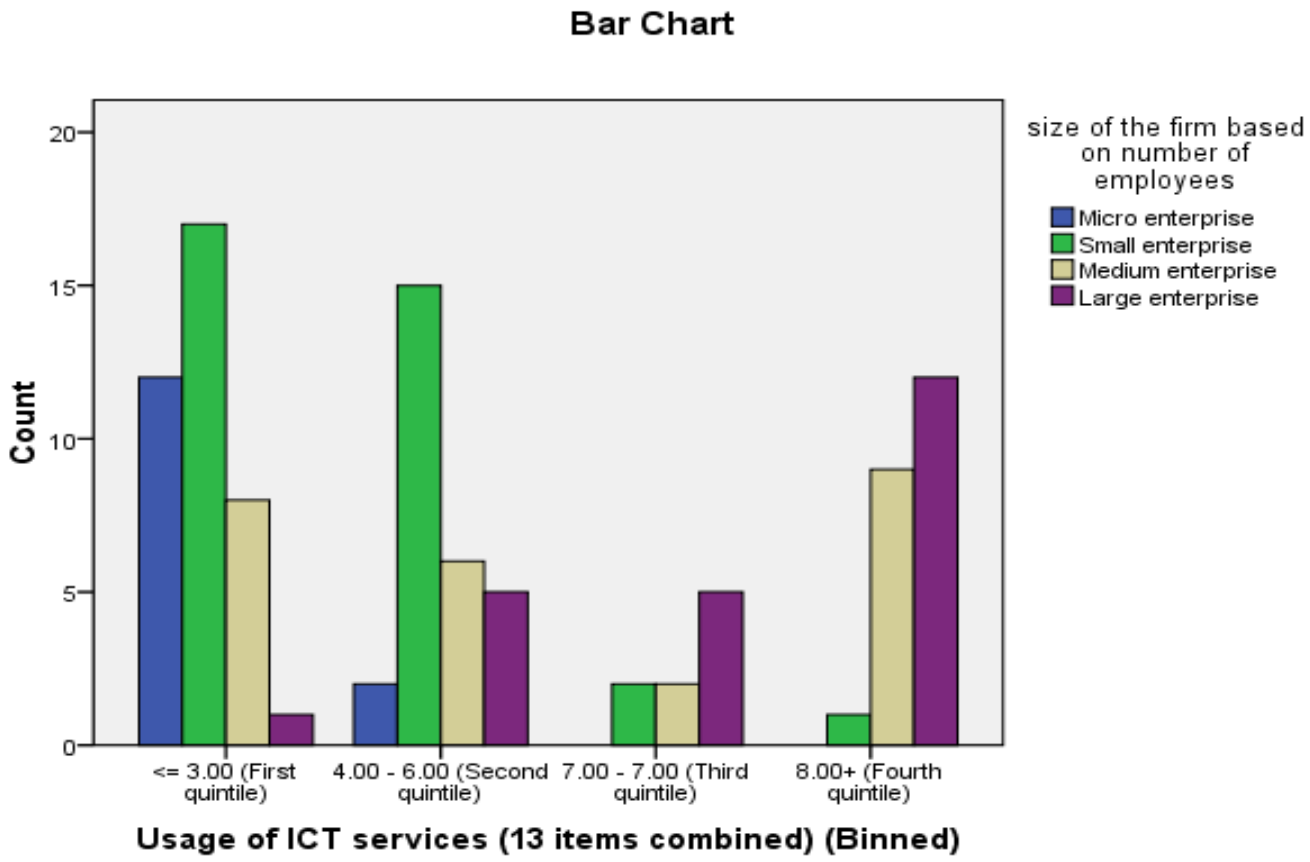
Findings…

High distribution of ICT usage into two lower quintiles of visually binned data

Usage of ICT services (13 items combined) (Binned)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<= 3.00 (First quintile)	38	37.3	37.3	37.3
	4.00 - 6.00 (Second quintile)	28	27.5	27.5	64.7
	7.00 - 7.00 (Third quintile)	11	10.8	10.8	75.5
	8.00+ (Fourth quintile)	25	24.5	24.5	100.0
	Total	102	100.0	100.0	

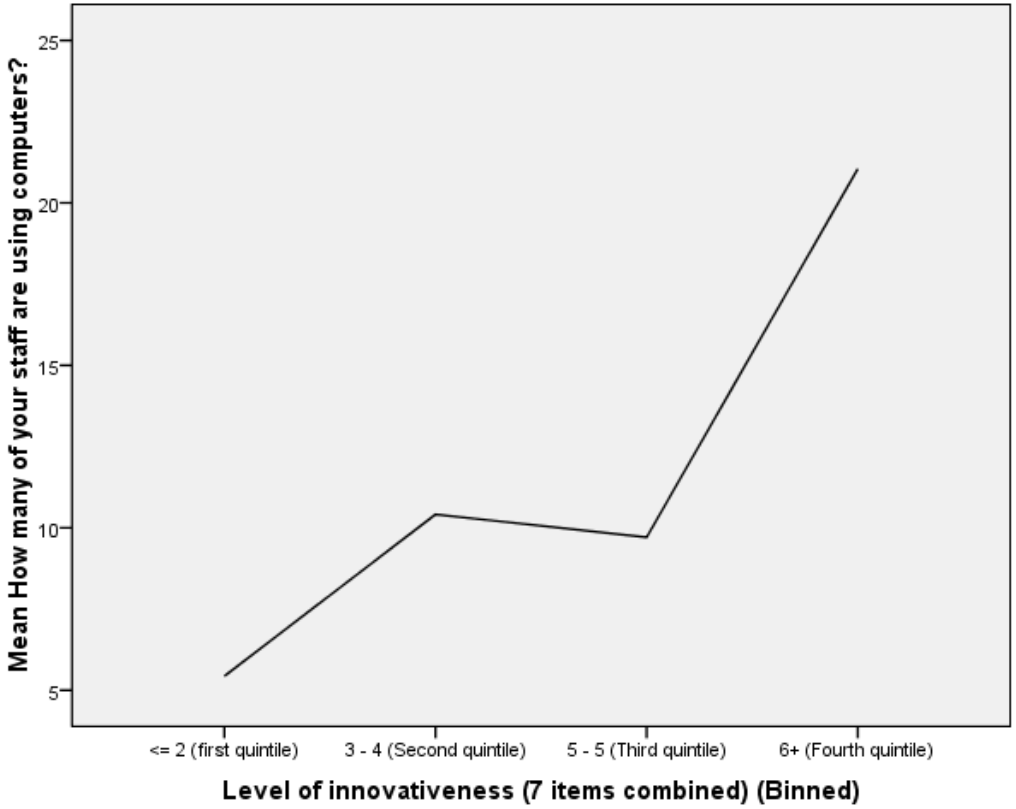
Findings…

- Large firms uses more ICT than small ones



Findings…

- Firms which uses computer are more innovative



Findings…

- ICT supports innovation in many ways

strongly agree/agree that ICT plays a role in;			
	Responses		Percent of Cases
roles	N	% of Total	Cases
shortening distance and eliminate hierarchy and geographical boundaries	82	13.10%	88.20%
important for decision making	63	10.00%	67.70%
resulting in the efficiency and effectiveness of operations	63	10.00%	67.70%
enabling knowledge exchange and management through networks	62	9.90%	66.70%
making easier to follow new technical development	60	9.60%	64.50%
access enhancement to better and cheaper supply sources	56	8.90%	60.20%
making possible to conduct e-commerce and business	52	8.30%	55.90%
making designing activities more simple	51	8.10%	54.80%
making the firm introduce the new products to markets	50	8.00%	53.80%
making the firm more competitive	49	7.80%	52.70%
supporting roll out of new goods, services and process through ICT	39	6.20%	41.90%
Total	627	100.00%	674.20%

Findings…

- Skills and infrastructure are the main barriers

Significant/most significant obstacles			
	Responses		Percent of Cases
Barrier	N	Percent	Cases
lack of ICT skills	66	14.50%	69.50%
inadequate technology base infrastructure	53	11.60%	55.80%
insufficient competent people	53	11.60%	55.80%
lack of knowledge in using ICT for processing	45	9.90%	47.40%
lack of knowledge in using ICT for marketing	41	9.00%	43.20%
lack of knowledge on where to recruit appropriate personnel with ICT	38	8.40%	40.00%
lack of information on customer demand	34	7.50%	35.80%
lack of information on available competitive product and process	32	7.00%	33.70%
lack of knowledge on ICT for distribution channels	31	6.80%	32.60%
selection of suitable vendor for hardware and software	23	5.10%	24.20%
lack of knowledge on where to send employees for ICT	23	5.10%	24.20%
legal and regulatory environment and framework	16	3.50%	16.80%
Total	455	100.00%	478.90%

Recommendations

- At Firm Level
  - Investment in ICT
  - Acquire specialized ICT training to their staff
  - Prioritize IT security issues
- At Government level
  - Incentivise the training in ICT related fields
  - Promote affordability of ICT and data services
  - Accelerate the expansion of ICT infrastructure

Conclusion

- Benefits of ICT usage by firms are evident
- Firms which invests more on ICT tends to be more innovative
- Large firms uses more ICT than micro and small ones
- Several barriers faces firms on towards their usage of ICTs,
- Measures for tackling the barriers needs to be taken by both firms' and the URT Government