Digital Adoption and Trade Advantage in Africa

Economists have long touted the benefits of technological progress for economic growth and development. A recent World Bank study has confirmed that technological adoption by firms in developing countries is associated with greater productivity and competitiveness[1]. The question then arises as to whether there is an identifiable relationship between digital adoption in developing countries and export competitiveness. In order to shed some light on the question, we take advantage of several UNCTAD[2] databases on Revealed Comparative Advantage (RCA) and digital adoption scores for a large set of countries. A sample of this data, for Cameroon, is presented in Table 1 and Table 2 (see below).

Table 1 ranks sectors by their RCA (a proxy for trade competitiveness) from the top, with colour coding: green for agriculture, hunting and forestry, orange for mining & quarrying, mustard for manufacturing and blue for fishing. Table 2 ranks economic activity type and its associated score for digital adoption (aggregated by the author) from the top.

For the case of Cameroon and for the range of years selected,[3] it is clear that there is a positive relationship between the extent of digital adoption in a sector and the export competitiveness of that sector. Cameroon is an agricultural & forestry specialist with leading export sectors cocoa, natural rubber, fruit & nuts, and coffee. Its second most important export sector is mining & quarrying and it also has some success in light manufactures. However, its fishing industry is a non-tradable sector, with an RCA score below 1.

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[1] Cirera, Xavier; Comin, Diego; Cruz, Marcio. 2022. *Bridging the Technological Divide: Technology Adoption by Firms in Developing Countries*. The World Bank Productivity Project; Washington, DC: World Bank. http://hdl.handle.net/10986/37527

[2] UNCTAD 2023. UNCTAD Statistical Databases https://unctadstat.unctad.org/EN/Index.html

[3] The figures in the tables are aggregates over ten or more years of data, in order to smooth the data and prevent spikes or business cycle shocks from distorting the results.

Table 1: Revealed Comparative Advantage (RCA) by sector: Cameroon (2008-2021 aggregates) (truncated)

Sector	RCA
Cocoa	115.3065
Wood in the rough or roughly squared	61.30574
Wood simply worked, and railway sleepers of wood	34.61836
Cotton	32.82481
Natural rubber & similar gums, in primary forms	18.58209
Fruits and nuts (excluding oil nuts), fresh or dried	6.926936
Other cereal meals and flour	6.491321
Lime, cement, fabrica. constr. mat. (excluding glass, clay)	5.9167
Coffee and coffee substitutes	5.763793
Petroleum oils, oils from bitumin. materials, crude	5.404871
Soaps, cleansing and polishing preparations	4.214171
Aluminium	3.3321
Aluminium ores and concentrates (incl. alumina)	2.362593
Lead	2.330143
Glassware	2.09685
Natural gas, whether or not liquefied	2.015469
Residual petroleum products, n.e.s., related mater.	1.6721
Sugar confectionery	1.610807
Chocolate, food preparations with cocoa, n.e.s.	1.544043
Cereals, unmilled (excluding wheat, rice, barley, maize)	1.484323
Fixed vegetable fats & oils, crude, refined, fract.	1.273186
Edible products and preparations, n.e.s.	1.257893
Fish, fresh (live or dead), chilled or frozen	0.089736

Source: Author's calculations using UNCTAD (2023) data

Table 2: Digital adoption by economic activity type: Cameroon (2009-2021 aggregates)

Activity type	Digital Adoption
Real estate, renting and business activities	60%
Electricity, gas and water supply	51%
Agriculture, hunting and forestry	46%
Transport, storage and communications	43%
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	40%
Financial intermediation	40%
Renting of machinery and equipment without operator and of personal and household goods	39%
Education	38%
Health and social work	38%
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	37%
Mining and quarrying	33%
Hotels and restaurants	32%
Manufacturing	30%
Fishing	30%
Other community, social and personal service activities	30%
Wholesale trade and commission trade, except of motor vehicles and motorcycles	29%
Construction	27%
Land transport; transport via pipelines	26%
All activities	**25%**
Post and telecommunications	22%

Source: Author's calculations using UNCTAD (2023) data

Whereas Cameroon presents a good example of the relationship between digital adoption and export competitiveness, the pattern is not necessarily as clear when attempting to generalise. Table 3 and Table 4 present the analogous data to Table 1 and Table 2, while in aggregated form and for five additional countries plus Peru[4].

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[4] Peru was chosen due to its status as a developing country and primary products export specialist, similar to many African countries.

Table 3: Revealed Comparative Advantage (RCA) by broad sector: six African countries and Peru (2008-2021 aggregates)

| | Revealed Comparative Advantage (RCA) (aggregate) | | | |
	Manufacturing	Mining and quarrying	Agriculture, forestry and fishing* (except for Cameroon)	Fishing
Cameroon	2.15	2.35	39.33	0.09
Egypt		6.53	4.62	
Kenya		7.02	58.25	
Lesotho	12.67			
Mauritius	6.51	<1	28.51	
Tunisia		3.19		
Peru	0.97	20.20	7.00	

Table 4: Digital adoption by broad sector: six African countries and Peru (2009-2021 aggregates)

| | Digital Adoption (aggregate) | | | | | |
	All activities	Manufacturing	Mining and quarrying	Agriculture, forestry and fishing* (except for Cameroon)	Fishing	Export diversification (no. of sectors with RCA>1)
Cameroon	25%	30%	33%	46%	30%	28
Egypt	24%		16%	16%		83
Kenya	46%		49%	41%		63
Lesotho	50%	60%				27
Mauritius	64%	65%	61%	45%		42
Tunisia	46%		57%			71
Peru	35%	36%	55%	29%		49

In fact, the pattern roughly holds for this group of countries with the following 'modifiers' to be considered:

- Egypt's two competitive export sectors do not show greater digital adoption than its 'all activities' aggregate.

- Mauritius' extent of digital adoption in all activities is relatively high, this can be explained by the relatively high services component of their economy.

- In all cases but for Cameroon, digital adoption in agriculture, forestry and fishing is lower than for other sectors. This could indicate that this primary sector, due to its fundamental nature, may have a lower propensity for digital adoption. Alternatively, digital adoption in the agriculture sector in Africa may be adversely affected by broadband availability.

In summary, digital adoption by industry is believed to be correlated with productivity, unit cost reduction and competitiveness. Medium-term data for six African countries and a Latin America primary product exporting country does support this hypothesis, with some variation at the country and sector level. Strong agricultural specialists could benefit from prioritising digital adoption in this sector, as Cameroon has done.