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The Information Revolution and the Industrial Revolution: Today's Egypt in the Shadow of the Past – A Note

By Nagla Rizk
The American University in Cairo
Email: naglarzk@aucegypt.edu

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"…[T]he transport system provided channels to the remotest villages, but the water that might have flowed through such channels was simply not there". (Issawi, 1968)

I. Introduction

This note is an attempt to view Egypt's present human development within the Information Revolution in light of the country's historical experience with the Industrial Revolution. The objective is not to undertake an exhaustive review of Egypt's economic history at this time, but rather to draw attention to some historical parallel between today's Egypt and Egypt of the second half of the nineteenth and early twentieth century. The purpose of this note is to raise questions rather than answer them. It is an introduction to a more extensive research analyzing the many aspects of Egypt's human development then and now. Within such research, the historical lens would be used to draw lessons from the past to ensure proper utilization of the potential benefits of the Information Revolution for Egypt's current and future human development.

Specifically, the analysis draws on Charles Issawi's argument of an "asymmetric" model characterizing Egypt's development in response to the Industrial Revolution in the second half of the nineteenth century. Issawi's main thesis is that Egypt was "hit" by the Industrial Revolution at a time when the country lacked the appropriate social and economic conditions, the necessary trained manpower, strong experienced native bourgeoisie/middle class, and the enlightened government required to adapt to the new paradigm (Issawi 1968). This paper is a preliminary attempt to use Issawi's lens to look at today's Egypt as the country is "hit" by the Information Revolution.

The analysis will be provided in five parts. The second section will present Issawi's image of Egypt at the start of World War 1. Section 3 presents a parallel picture of Egypt against the Information Revolution. In Section 4, I provide a concluding comparison. A final word wraps up this presentation.

II. Egypt and the Industrial Revolution

At the start of World War 1, Egypt is described by Issawi as being "far ahead in economic development as measured by agricultural output, foreign trade, transport facilities, and, to a lesser degree, employment in industry" (Issawi 1968). In 1913, Egypt's GDP per capita was

higher than Japan, more than double India's, half of Italy's, and one eighth of the United States'. Egypt also experienced a positive trade balance (a surplus of L.E. 7 million) as well as strong communication channels (Issawi 1968).

In particular, Egypt was strong on railway connectivity. Building the railways in Egypt started in 1853 -- far ahead of other underdeveloped countries, and indeed developed countries like Sweden and Japan. By 1913, "relative to its inhabited area, Egypt… was as well provided with railways as any country in the world and … relative to its population, it was better off than most". Only in 1870s were Argentina and Brazil able to surpass Egypt's mileage. Japan was not able to catch up until 1890s, and China in 1900s (Issawi 1968).

With one of the highest railway mileage at the time, the railways were used mainly for transporting Egypt's main export crops (cotton, rice, and onions), and imports, (coal, timber, building material). Given that all materials and skills remained to be imported, the railways were not utilized to develop Egypt's indigenous capacity. They did not generate feeding industries, provide a market for local industries, encourage indigenous technical innovation and/or develop entrepreneurial and financial endeavors. According to Issawi, the railways practically had "no multiplier" effect on the Egyptian economy; they actually exposed the country's handicrafts to foreign competition which eliminated most of them, eradicating "an important potential breeding ground for a native bourgeoisie" (Issawi 1968). The railways simply maintained the status quo as far as Egypt's economic development was concerned and were not utilized as drivers for human development.

In fact, except for GDP, the state of what we today call "human development" [1] was rather dismal in Egypt at the start of the twentieth century. In 1907, the adult illiteracy rate was 97%, and the quality of the existing education remained poor (Issawi 1968). Investment in education was very low. From 1882 to1901, only 1.5% of the state expenditure went to education, increasing to 3% in the beginning of 1900s, then down again to 1.7% in 1920/21 (Hershlag 1980). Life expectancy was low, infant mortality rates were high, and hygienic conditions in Egypt's villages "were the worst in the world" (Issawi 1968).

Extending the definition of human development to include, among other things, technological development, income distribution, and the composition of the export basket, it is feasible to conclude that Egypt faired poorly on all those grounds. The country's technological achievement lagged far behind any positive economic performance. Technical skills and managers for the large enterprises were imported from Europe; small businesses were owned and run by the foreign local bourgeoisie, namely Greeks, Jews, Armenians, Lebanese and Syrians. In such a situation, income distribution was highly unequal and there was barely a local middle class (Issawi 1968).

Egypt's positive trade balance reflected an export basket that continued to be dominated by agricultural goods and primary products – mainly cotton. Capital goods dominated imports, mostly coming from Europe. In fact Egypt ended up by being an "export-oriented, lopsided economy", with minimum structural development on the social and economic levels. According to Issawi, Egypt's growth at that time was mainly through foreign capital inflow, transport and trade development, a process "whose course and speed (was)…prescribed by foreigners to suit their own interests" (Issawi 1968). It is not surprising to find that almost 50%

of Egypt's exports went to Britain, which was also the source of some 41% of Egypt's imports (Hershlag 1980).

Agriculture continued to represent the largest share in output, with very little development in local industry. The latter was characterized by "international uncompetitiveness, its low productivity and its heavy dependence on imported raw materials" (Owen 2002). Egypt imported the capital and the expertise needed to run the economy.

In short, despite some positive indicators of economic "growth" and strong connectivity, at the start of World War 1 Egypt suffered serious shortages in several other aspects of economic – and more generally – human development. Most importantly, what Egypt went through in the nineteenth century was a massive expansion in its railway connectivity that was not accompanied by a similar investment in human capital. Not surprisingly, this expansion in transport routes did not trickle down into a tangible developmental impact on the economy: no development of feeding industries, no use of the transport channels to export high value added products, limited investment in education, training and developing indigenous technological capacity. The "pipes" continued to be used for exporting primary products and importing capital goods along with foreign expertise. Naturally, this was also associated with social and technological backwardness, which meant that Egypt continued to witness, if at all, some growth, but without development (see Table 1).

III. Egypt and the Information Revolution

Just as Egypt was ahead in railway connectivity more than a century ago, Egypt has recently embarked on an ambitious plan to strengthen the infrastructure of information and communication technologies (ICTs). ICT expenditures soared in the second half of the nineties (see Fig. 1). In particular, since 1999, the Egyptian Government has taken several initiatives to expand ICT connectivity: the free Internet, Personal Computer for every home, Personal Computer for every student, laptop for every professional, Information Technology clubs, E-government gateway, and the Smart Village. Between 1999 and 2004, the number of fixed telephone line subscribers has almost doubled (from 4.9 million to 9.35 million lines), mobile telephone users have increased from 654 thousand to 6.8 million, Internet users have increased from 300 thousand to 3.7 million, communication capacity has increased from 20 million bit/second, to 1285 million bit/second (Ministry of Communication and Information Technology 2004). Egypt's data on teledensity, waiting lists, communication costs, radios and television sets were by far higher than the average for the Middle East and North Africa in 2001 (see Table 2). As far as ICT connectivity is concerned, Egypt can be considered a leader in the region, a status that is perhaps reminiscent of the railway leadership in the nineteenth century.

Alas, Egypt's current state of human development continues to lag behind (see Table 1). The country falls at the end of the third quartile under medium human development nations. Its Human Development Index ranking among 177 nations has deteriorated from 115 in 2000 to 120 in 2002 (UNDP 2001 & 2004a).

Egypt's GDP per capita rank minus HDI rank is a negative 12, which means that Egypt has been doing relatively better on GDP account than on human development, when education and health indices are included (UNDP 2004a). The adult illiteracy rate continues to be high (45%),

and 21% of the population aged 15 or higher possess a secondary or higher education (UNDP 2003). The quality of education is generally poor, and private lessons are the norm rather than the exception in government and indeed private schools which follow the state curricula. While health indicators are overall above average for other developing countries (UNDP 2004b), the quality of health services remains generally low.

Egypt's announced rate of unemployment is 10%; and sadly the percentage of the unemployed is highest among holders of secondary school education (22.4%). Almost 9% for university degree holders are unemployed, while only 1.5 % out of below secondary degree holders are unemployed (UNDP 2003). Such unemployment of the educated poses a threat to human development.

Egypt continues to have large income disparities. Almost 44% of the population lives below $2 a day. The share of the richest 20% of the population in income is 44%, while that of the poorest is 8.6% (UNDP 2004b).

Egypt no longer has a positive trade balance. The trade deficit reached more than $ 6 billion in 2003. Primary products continue to dominate the export basket (47% of exports in 2002), with very limited diversification. While the share of manufactures in exports has increased to 35% in 2002, high technology exports still represented a meager 1% of merchandize exports in 2002. This comes in sharp contrast to an average of 20% for developing countries (see Fig. 2). Capital goods continue to occupy a relatively high share of Egypt's imports, 21% in 2003 (Central Bank of Egypt 2004a). Egypt's trade balance in IT is negative (see Fig. 3).

Egypt also continues to have a high concentration of trade markets between Europe and the United States. In 2003, 37% of Egypt's exports went to the United States; 34% to the European Union; 35% of Egypt's imports come from the European Union and 25% from United States (Central Bank of Egypt 2004a & 2004b). Egypt's IT trade in particular is mostly with the United States (see Fig. 4). This is reminiscent of Egypt in the past when most of the trade was with a single country, Britain in that case.

What is also disturbing is that Egypt's performance on technology achievement is quite modest. In 2001, the country ranked 57 among 72 countries with respect to technology achievement indices [2]. Egypt's e-readiness rankings have been very modest compared to other countries in the world [3]. The country's global competitiveness ranking deteriorated from 41 out of 102 countries in 2000 to 58 in 2003 [4]. From 1996-2002, Egypt spent 0.2% of GDP on R&D, a figure that comes in sharp contract to Jordan's 6.3% and Israel's 5% (UNDP 2004b), or even an average of 0.9% for lower middle income countries. The number of scientists and engineers per million people in Egypt was 493 in 1995, a figure that falls short of an average of 808 for lower middle income countries (World Bank 2003b).

The above exposition points to a picture of Egypt that is currently experiencing modest levels of economic – and more generally - human development. Egypt has been witnessing an expansion in ICT connectivity at the same time that the country has poor education, technological achievement and e-readiness indicators, uncompetitive industrial base, continued reliance on primary products for exports, undiversified export basket, concentration of trade partners, and unequal income distribution. This is reminiscent of nineteenth and early twentieth

century Egypt where leadership in railway connectivity did not trickle down into a tangible developmental impact on the economy, specifically the indigenous technological capacity.

Based on this, one may conclude that Egypt has faired relatively well on ICT connectivity indicators, but not so high on human development. At this point, one may only raise alert to the danger of focusing on expanding the "pipes" without much attention to the "water" that flows, and to developing the human capital that engineers the process. In order to make a more assertive assessment, further research is needed on the potential and current multiplier effects of ICTs on the Egyptian economy, linkages to feeding industries and the productivity impact of ICT production vs. ICT use. This will be the subject of future research.

IV. Conclusion: Today's Egypt in the Shadow of the Past

The above note has been a preliminary attempt at rereading Issawi's analysis of Egypt in the nineteenth and early twentieth century as it pertains to today's Egypt against the information revolution. Egypt is now being "hit" by the information revolution which is providing a potential for developing countries. Just like Egypt faired well on railway connectivity after the Industrial revolution, the country seems to have focused on expanding ICT connectivity channels in response to the Information Revolution. Such expansion in the ICT "pipes" - telephone lines, computers, Internet connectivity and mobile telephony – does not seem to have been accompanied by similarly impressive indicators of economic and human development.

As the government embarks on ambitious programs to expand ICT connectivity, one cannot help but wonder whether Egypt is again facing a situation where the expansion in communication could be triggering current and/or potential economic growth that falls short of achieving an improvement in human development. The context might seem different, yet Egypt's challenges could simply be another manifestation of history repeating itself (see Table 1). Unless Egypt learns from its past, we might very well be witnessing another cycle of, if at all, some growth without development.

It is then important to note that connectivity alone is necessary but not sufficient for alleviating poverty and improving the state of human development. Investment in connectivity infrastructure should be accompanied by a parallel investment in human resources: a revamping of the educational system, an aggressive campaign to eradicate illiteracy, and a change in attitudes with respect to vocational training. This should be accompanied by efforts to modernize the business environment and provide opportunities for small and medium enterprises in order to build and strengthen the native bourgeoisie and middle class. Such change in the socio-techno-economic paradigm is needed in order to properly utilize the Information Revolution as a driver for development.

Issawi's conclusion on Egypt against the Industrial revolution becomes very appropriate here:

> *Egypt's social upsurge had to await a new age: the age of national governments working through a native middle class, universities, schools, radios, village roads, and motor car. This social upsurge may, in turn, be expected to lead to marked increase in the rate of economic growth*. (Issawi 1968)

V. A Final Word

If indeed today's Egypt is a mirror image of the past, the consequences of yet another asymmetric growth model would be quite serious. With the difference in the pace, pervasiveness and potential of the two Revolutions, Egypt cannot afford today to relive the experience of the nineteenth century. The country would then be in dire need to review its human capital and technological development strategies in order to secure the proper socio, cultural and techno economic paradigm for an information based economy that fully utilizes and capitalizes on the potential benefits of the Information Revolution as a driver for human development.

Table 1: Human and Other Development Indicators, Egypt Then and Now

	1913~	2003
Human Development Index (HDI)	LOW	0.653***
		HDI Rank deteriorating (from 115 in 2000 to 120 according in 2002) ***
	Low human indicators and slow social progress	Falls at the end of the third quartile under the Medium Human Development nations***
Population	12	70.5**
GDP	High GDP per capita	Low GDP per capita
Education Iliteracy Rate (15+)	97% (in 1907)	45%***
Expenditure on Education	1.5% of the State expenditure directed to education in 1882-1901; increased to 3% in the beginning of 1900s, then down again to 1.7% in 1920/21#	19.7% of Gov. expenditure, and 6.7% of GDP in 2000/01^^^
Health Life Expectancy	Low	69***
Infant Mortality Rate (per 1,000 people)	Very High	33^
Child Matnutrition (% of children under 5)	"Hygienic Conditions in Egyptian villges were among the worst in the world"	4^
Competitiveness	Industry characterized by "international uncompetitiveness", low productivity and heavy dependence on imported raw materials".##	GCI Ranking for Egypt out of 102 countries deteriorated from 41in 2000 to 58 in 2003 ^^
Trade Balance	**Surplus of about $ 7 mn L.E (1910-1914)**	**Deficit of more than $6 mn**
Imports/GDP	23%	23%***
Exports/GDP	26%	16%***
Composition of Exports	Low diversification	
Primary exports (% of merchandise exports)	Very High	47***
Manufactured exports (% of merchandize exports)	Very Low	35***
High-technology exports (% of merchandise exports)		1***
Capital Goods (% of Total Imports)	Very High	21%^

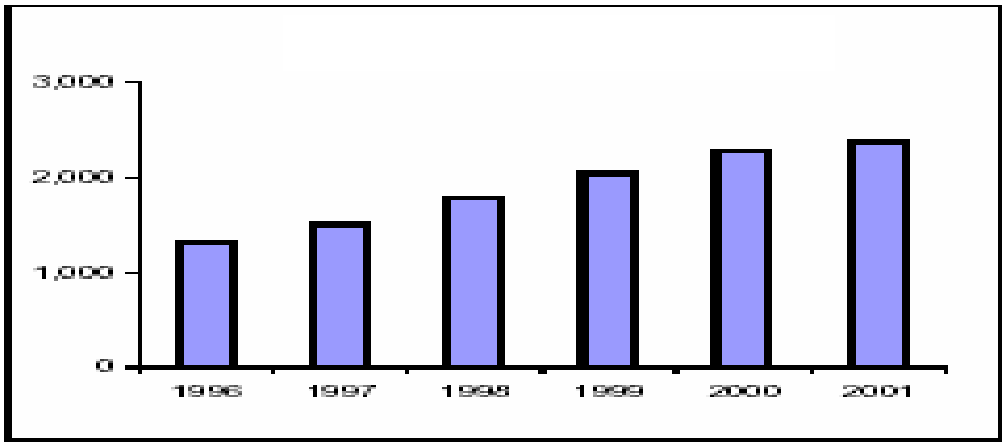
~ All 1913 information is from Issawi (1968) unless otherwise indicated.
# Hershlag (1980)
Owen (2002)
* UNDP (2001)
** Central Bank of Egypt (2004a)(Figure for the Year 2003/2004)
*** UNDP (2004)
^ World Bank (2003a)
^^ Egypt National Competitiveness Council (2004)
^^^ UNDP (2003).

Table 2: ICT Infrastructure & Access, Egypt vs. MENA & other Developing Countries

ICT infrastructure & access	Egypt	Middle East & North Africa	Lower Middle Income Countries
	2001	**2001**	**2001**
Telephone mainlines			
Per 1,000 people	104	99	146
In largest city (per 1,000 people)	173	127	524
Waiting list (thousands)	583	5,367	27,675
Revenue per line ($)	383	585	283
Cost of local call ($ per 3 minutes)	0.01	0.02	0.04
Mobile phones (per 1,000 people)	43	53	110
International telecommunications			
Outgoing traffic (minutes per subscriber)	33	102	58
Cost of call to U.S. ($ per 3 minutes)	2.91	..	4.50
Daily newspapers (per 1,000 people)	31	33	..
Radios (per 1,000 people)	339	277	346
Television sets (per 1,000 people)	217	171	292
Computers and the Internet			
Personal computers			
Per 1,000 people	15.5	31.7	28.1
Installed in education (thousands	48.8	..	..
Monthly off-peak access charges			
Service provider charge ($)	8.7	26.6	16.7
Telephone usage charge ($)	0.14	0.22	0.23

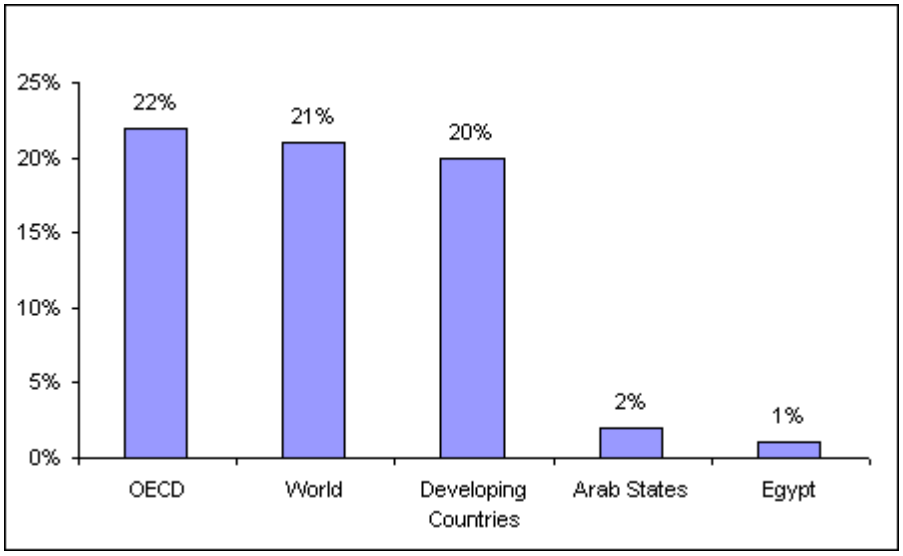
Source:World Bank (2003b)

Figure 1: ICT Expenditures in Egypt 1996-2001 ($ millions)



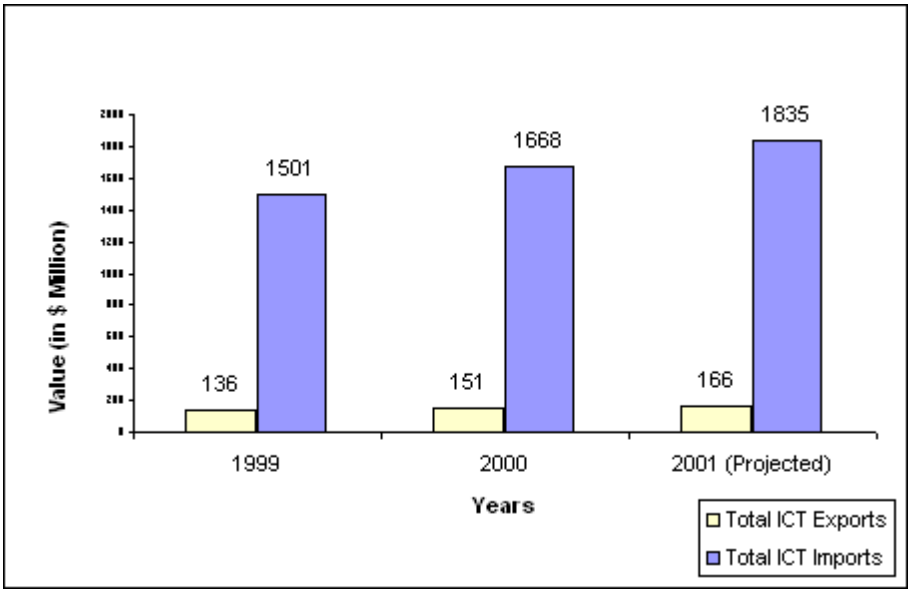
Source: World Bank (2003b)

Figure 2: High Technology Exports as a % of Manufactured Exports in 2002



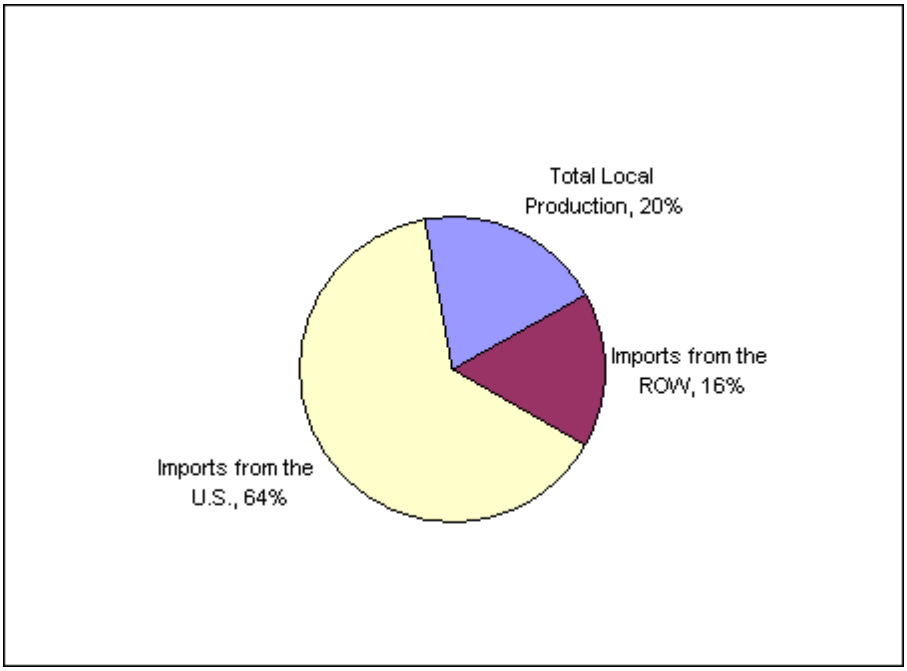
Source: UNDP (2004b)

Figure 3: Egypt's Total IT Imports and Exports



Source: American Chamber of Commerce (2002)

Figure 4: U.S. Presence in the IT Market in Egypt



Source: American Chamber of Commerce (2002)

Endnotes

[1] The Human Development Index (HDI) was devised by the UNDP and is measured as the average of indicators assessing three components: GDP per capita, education, and health.

[2] This ranking is based on the Technology Achievement Index (TAI) built on four components: technology creation, diffusion of recent innovations, diffusion of old innovations, and human skills (UNDP 2001).

[3] E-readiness indices vary depending on the source. Mainly an e-readiness index is a weighted average of indicators, some ICT related, and sometimes general economic indicators. For a review of e-readiness indicators, see Rizk (2004).

[4] This ranking is based on the Global Competitiveness Index (CGI) built on three pillars: macro economic environment, quality of public institutions, and technology diffusion (Egypt National Competitiveness Council 2004).

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