**An ICT Economy Wide Interaction Social Accounting Matrix for Egypt**

“Structure, Economic Rationale and Analytical Indicators”

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**Introduction:**

I

n its efforts to develop an Information and knowledge Society as a basic feature of the 21st century, Egypt recognized the potential of information and communication technology (ICT) and its important role in enhancing the productivity of economic sectors and improving the welfare level of its citizens. ICT in Egypt – as well as other developing countries - has become a prerequisite and a critical factor in achieving socioeconomic development objectives. The rapid spreading out of ICT in Egypt, and the need to assess its economy wide impact, has triggered a demand for an issue-oriented ICT-based social accounting matrix (SAM).

A SAM is a comprehensive, economy-wide data framework, typically representing the economy of a country. King (1988) points out that a SAM has two main objectives; first, organizing information about the economic and social structure of a country over a period of time (generally one year) and second, providing statistical basis for the creation of a plausible model capable of simulating the direct and indirect effects of policy interventions in the economy. The ICT economy interaction SAM can serve then two distinctive purposes; a) to establish an analytical data-centered decision support system (DSS) that can be used to generate appropriate economic indicators for ICT policy formulation and analysis, and b) to provide the necessary socioeconomic accounting framework for constructing economy wide issue oriented computable general equilibrium (CGE) models.

The constructed SAM disaggregates ICT sector into seven activities: ICT manufacturing industries; ICT trade industries; software publishing; telecommunications; computer programming, consultancy and related activities; data processing, hosting and related activities; web portals and Repair of computers and communication equipment. This classification scheme is applied to the production activities and various commodity groups. Final consumption of ICT services by households and government sector is computed based on detailed information from the Ministry of Finance and the Household budget survey. Gross fixed capital formation is classified into ICT and non-ICT. Finally, exports and imports of non-ICT activities are distinguished from ICT trade.

The paper is organized around 4 sections. The first section outlines the concepts and methods used to estimate the ICT sector within the framework of the revised United Nations system of national accounts and their adaptation to Egypt’s ICT-specific SAM.

In the second section, the shortage or lack of ICT related information in the Egyptian socioeconomic databases are discussed. The paper pinpoints the increasing need for specific data of income and expenditure accounts of ICT, value added of ICT producing industries and data to be used by other economic sectors.

The third section describes how the SAM for Egypt was constructed and assembled from Egypt’s 2007/2008 National accounts. Three related issues are carefully investigated the correspondence of the national accounts to the constructed ICT - based SAM, the mapping of ICT products to activities and alternative means for closing data gaps.

Finally, the paper ends up with a review and assessment of the interactions among the ICT sector and the rest of the economy – with special reference to Egypt’s case – and suggests some policy measures to be adopted in this respect.

**1. Conceptual framework**

The first step to develop a consistent accounting framework for ICT sector in Egypt – within the comprehensive SAM structure – is to find a widely accepted definition for the ICT sector that complies with the revised United Nations system of national accounts (SNA). Being widely accepted is the gateway towards comparisons across time and countries [5]. To fulfill the SNA requirements, the definition of the ICT sector included in the United Nations classification of economic activities (ISIC, Rev.4) was applied [2]. In ISIC, Rev.4, the following general principle is used to identify ICT economic activities (or industries):

“The production (goods and services) of a candidate industry must primarily be intended to fulfill or enable the function of information processing and communication by electronic means, including transmission and display”. The activities of the ICT sector can then be grouped into ICT **manufacturing** industries, ICT **trade** industries and ICT **services** industries. The ISIC, Rev.4 industries that comply with the above definition are provided in Appendix (1).

In order to assemble an ICT-SAM interaction data system, international trade and consumption data relevant to the ICT sector are also required. The definition of ICT goods used in this research is based on the 2003 definition by the member countries of the Organization for Economic Cooperation and Development (OECD) [6]. It is based on the Harmonized System (HS) classifications of 2002 [7]. This classification scheme – shown in appendix (2) - grouped the ICT goods into the following broad categories:

1. Telecommunication equipment
2. Computer and related equipment
3. Electronic components
4. Audio and video equipment
5. Other ICT goods

As for the software product, it is treated as recorded media. It is subsumed within several 6-digit HS categories. The distinction is made by type of medium rather than by type of content. The most important category recording software is 852431- Discs for laser readings systems for reproducing phenomena other than sound or image. This issue is discussed again in the next section [2].

**2. ICT data in Egypt**

Although, the national income accounts represent a comprehensive and consistent socioeconomic data system for the economic activities they cover, some of the activities with special nature – like ICT – are only partially dealt with. The availability of ICT data was a real obstacle to construct an ICT-based SAM for Egypt. To spot ICT data gaps, the status of ICT data as appeared in Egypt’s national accounts would be first described.

The ICT activities in the ISIC, Rev.4 are arranged as follows:

1. ICT manufacturing industries are bundled with “other manufacturing sector”;
2. ICT trade industries are bundled with “wholesale and retail trade, repair of motor vehicles and motorcycles”;
3. content and media sector is mixed with information technology activities;
4. repair of computers and communication equipment is buried in “other services”;
5. telecommunications is the only ICT activity whose data are readily available.

The ICT data on Gross output, intermediate consumption, taxes and subsidies on production, compensation of employees and gross operating surplus are not promptly available. Most of the data about the supply side of the ICT are generally “mixed’ with other data. The need arises then to extract them from another sector data or apply an indirect statistical method to estimate their values. Furthermore, the data about ICT commodities which are produced by non-ICT economic activities[[1]](#footnote-1) was unavailable. This part was neglected because it is difficult to be estimated for all economic activities and its relative weight in the GDP of ICT is not significant.

Recently, The Central Agency for Public Mobilization and Statistics (CAPMAS) in cooperation with Ministry of Communications and Information Technology (MCIT) launched a national project that monitor ICT use in Egypt within different sectors and across the country. The aim of this project is to build a database for ICT indicators to identify the characteristics of the Egyptian information society and estimate its size according to the international standards [5]. These indicators – which are concentrating on the digital divide - include the percent of households with a fixed line telephone, the proportion of households having computers, the percentage share of business corporations with local area networks (LAN) and so on[[2]](#footnote-2). Although these ICT utilization indicators can still be of great help to the decision makers to formulate appropriate policies and strategies of the ICT sector, they are less useful in constructing SAMs and developing analytical Computable General Equilibrium (CGE) models. Consequently, to construct an ICT economy interaction SAM, various data items need to be estimated using a multiplicity of statistical methods. The estimation of the SAM is explained in the next section. Examples of ICT utilization data that are not available include the following economic aggregates:

1. the intermediate inputs of the ICT sector (or commodity) per economic activity;
2. household and government final consumption spending on ICT services, and
3. Investment expenditures on ICT per economic activity.

Exports and imports of ICT goods are produced by the Ministry of Trade and Industry that records and classifies export and import of goods using the Harmonized System. In this context, software exports and imports was a major problem. Software is only partially covered in the HS, where it is treated as “recorded media”, much like music or video. The HS has not been designed to classify intangibles like software, but rather to classify tangible goods as they cross a border[[3]](#footnote-3). Again here, there was a need to estimate exports and imports of software products.

**3. Construction of an ICT economy interaction SAM**

Constructing an ICT economy wide interaction SAM for Egypt has undergone three phases:

1. Transforming a national accounts-like SAM into an analytical aggregated SAM consistent with the purpose of analyzing the economic impact of the ICT.
2. Constructing an aggregate SAM with a breakdown of the production, consumption, investment, foreign trade and firms data into ICT and non ICT sectors.
3. Assemble a disaggregated SAM with respect to both the ICT and non-ICT activities and commodities.

These stages are explained in the following subsections.

**3.1 Transforming a national accounts-like SAM into an analytical aggregated SAM**

A schematic presentation of an aggregate national accounts-like SAM is shown in table (1).

Because the SAM of Table (1) is a simplified representation of the national accounting aggregates in a matrix format without a clear orientation and analytical purpose, It would be useful, as well as important, to adjust the standard SNA-based SAM to explicitly include the following steps.

1. Adjustment of the production activities accounts,
2. Composition of total demand for goods and services and its interaction with the supply of commodities and the production activities,
3. Distribution of the factors income and compensation of employees from the outside world to different institutions;
4. Redistribution of institutional incomes;
5. Breakdown of the fixed capital formation;
6. Transactions with rest of the world.

These six steps will be briefly explained in the following six subsections. The correspondence with the national accounts is also identified.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Goods and services account | Production account | Generation of income account | Allocation of primary income account | Secondary distribution of income | Use of disposable income account | Capital account | Fixed capital formation account | Financial account | Rest of the world- current account | Rest of the world – capital account | Total |
| Goods and services account | Trade and transport margins | Intermediate consumption |  |  |  | Final consumption expenditure | Changes in inventories | Gross fixed capital formation |  | Exports of goods and services |  | Total demand |
| Production account | Output, at basic prices |  |  |  |  |  |  |  |  |  |  | Total output |
| Generation of income account |  | Net value added, at basic prices |  |  |  |  |  |  |  | Compensation of employees from ROW |  | Generated income |
| Allocation of primary income account | Taxes on products less subsidies |  | Net generated income, at basic prices | Property income |  |  |  |  |  | Property income from ROW |  | Total primary income |
| Secondary distribution of income |  |  |  | Net national income | Current taxes on income and wealth and current transfers |  |  |  |  | Current taxes on income and wealth and current transfers from ROW |  | Total secondary income |
| Use of disposable income account |  |  |  |  | Net disposable income | Adjustment for the change in net equity of households in pension funds |  |  |  | Adjustment for the change in net equity of households in pension funds from ROW |  | Total disposable income |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Goods and services account | Production account | Generation of income account | Allocation of primary income account | Secondary distribution of income | Use of disposable income account | Capital account | Fixed capital formation account | Financial account | Rest of the world- current account | Rest of the world – capital account | Total |
| Capital account |  |  |  |  |  | Net saving | Capital transfers |  | Borrowing |  | Capital transfers from ROW | Total changes in liabilities |
| Fixed capital formation account |  | Consumption of fixed capital |  |  |  |  | Net fixed capital formation |  |  |  |  | Gross fixed capital formation |
| Financial account |  |  |  |  |  |  | Lending |  |  |  | Net lending of ROW | Total lending |
| Rest of the world- current account | Imports of goods and services |  | Compensation of employees to ROW | Property income to ROW | Current taxes on income and wealth and current transfers to ROW | Adjustment for the change in net equity of households in pension funds to ROW |  |  |  |  |  | Total current outlay towards abroad |
| Rest of the world – capital account |  |  |  |  |  |  | Capital transfers to ROW |  |  | Current external balance |  | Total capital outlay towards abroad |
| Total | Total supply | Total input | Allocation of generated income | Allocation of primary income | Allocation of secondary income | Allocation of disposable income | Total changes in assets | Gross fixed capital formation | Total borrowing | Total current inflow from abroad | Total capital inflow from abroad |  |

**Table 1: Schematic presentation of SAM**

Source: The revised United Nations system of national accounts - 1993

**1) Production process**

To produce domestic output, inputs should be used. These inputs include intermediated consumption, incomes to the factors of production – called net value added and consumption of fixed capital. For the economy as a whole, total output and input must be equal to each other. Thus:

The production process – input and output is shown in the system of national accounts by the production account.

**2 ) Composition of total demand and how it is met by total supply**

Total supply includes output domestically produced and imports of goods and services. If output is at basic prices we have to add taxes on products less subsides to make this output at market prices. Total demand includes intermediate consumption, final consumption expenditure, changes in inventories, gross fixed capital formation and exports of goods and services. Logically, total demand and total supply will be equal to each other.

In the system of national accounts, the composition of total demand and how it is met by total supply is shown by goods and services account.

**3) Distribution of factors income and compensation of employees from rest of world on different institutions**

Incomes generated by the production activities (net value added) and compensation of employees from the rest of world can now be distributed among different institutions. Compensation of employees and net mixed income will be paid to the household sector. Firms will receive net operating surplus and government receives net taxes on production (taxes less subsidies). Compensation of employees to rest of world will be paid to rest of world account.

In the system of national accounts, the distribution of factors income and compensation of employees from the rest of world on different institutions is shown by the generation of income accounts.

**4) Redistribution of institutional incomes**

Four institutions are usually included; households, firms sector, government and NPISH sector. In general, in addition to factor income each institution will receive from other institutions property income[[4]](#footnote-4) , current transfers, taxes on income and wealth. Institutions may also receive transfers and property incomes from the rest of world. These receipts are directed to consumption, paying taxes to government and transfers and property incomes to other institutions. There may also be transfers or property incomes to the rest of the world. Excess of any institution’s receipts over its current spending represents the savings. Redistribution of the income of any institution and calculating this institution’s net saving can be shown in the system of national accounts by summing together three accounts: allocation of primary income account, secondary distribution of income account and use of disposable income account.

**5) Fixed capital formation**

Fixed capital formation and its finance by savings and/or borrowing is now shown. Fixed capital formation or investments include changes in inventories, net fixed capital formation and capital transfers to ROW. Investments are financed by net savings, capital transfers from ROW and net lending of ROW. This process and its finance are shown in the system of national accounts by adding together three accounts: capital account, fixed capital formation account and financial account. Thus:

**6) Transactions with ROW**

Most SAMs distinguish between current and capital transactions with the rest of world. The same convention will be applied here.

1. **Current transactions with ROW**

Current foreign expenditure inflows will result in a receipt of payment from foreigners. Current inflows include exports of goods and services, compensation of employees from ROW and property income and transfers from ROW. Current foreign expenditure outflows, on the other hand, will result in payment to foreigners. Current outflows include imports of goods and services, compensation of employees to ROW and property income and transfers to ROW. The excess of current inflows over current outflows is the current external balance[[5]](#footnote-5).

**b) Capital transactions with ROW**

Capital inflows include capital transfers from ROW and net lending of ROW while capital transfers to ROW are the main capital outflow. The balance of the capital transactions with ROW (the difference between capital inflows and capital outflows) is the negative of the current external balance simply because the country can have a current account deficit by running a surplus on its capital account. Equally, it can run a current account surplus by running a deficit on its capital account.

Table 2 clearly shows the concordance between the above-mentioned six steps, the national accounts and the accounts of the constructed SAM (the aggregated analytical SAM).

|  |  |  |
| --- | --- | --- |
| **The stage** | **Corresponding national accounts as in SNA-93** | **The corresponding account in the constructed SAM** |
| Production process | Production account | Activities account |
| Composition of total demand and how it is met by total supply | Goods and services account | Commodities account |
| Distribution of production’s incomes and compensation of employees from rest of world over different institutions | Generation of income account | Factors account |
| Redistribution of institutional incomes | Allocation of primary income account + Secondary distribution of income account + Use of income account | Institutions’ accounts (households, firms, government and NPISHs) |
| Process of fixed capital formation | Capital account + Fixed capital formation account + Financial account | Savings – Investments account |
| Transactions with rest of the world |  |  |
| * Current transactions with ROW | * Rest of world – current account | * Rest of world – current account |
| * Capital transactions with ROW | * Rest of world – capital account | * Rest of world – capital account |

**Table 2: the correspondence between the national accounts and the analytical-aggregated SAM.**

In table 3, the basic structure of an analytical-aggregated SAM is shown.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Activities** | **Commodities** | **Factors** | **Institutions** | | | | **Savings - Investments** | **Rest of world** | | **Total** |
| **Households** | **Firms (including financial sector)** | **Government** | **NPISH** | **Current** | **Capital** |
| **Activities** | | |  | Output, at basic prices |  |  |  |  |  |  |  |  | Total output |
| **Commodities** | | | Intermediate consumption |  |  | Households consumption |  | Government consumption | NPISH’s final consumption expenditure | Changes in inventories + Gross fixed capital formation | Exports of goods and services |  | Total demand |
| **Factors** | | | Net value added, at basic prices |  |  |  |  |  |  |  | Compensation of employees from ROW |  | Factor income |
| **Institutions** | **Households** | |  |  | Compensation of employees + Net mixed income | Transfers between institutions | | | |  | Property income and transfers from ROW |  | Household income |
| **Firms (including financial sector)** | |  |  | Net operating surplus |  |  |  | Corporate income |
| **Government** | |  | Taxes on products less subsidies | Other taxes on production less other subsidies on production |  | Transfers from ROW |  | Government income |
| **NPISH** | |  |  |  |  | Transfers from ROW |  | NPISHs income |
| **Savings – Investments** | | | Consumption of fixed capital |  |  | Nat savings | | | |  |  | Capital transfers from ROW + Net lending of ROW | Savings |
| **Rest of world** | | **Current** |  | Imports of goods and services | Compensation of employees to ROW | Transfers to ROW | | | |  |  |  | Current expenditure outflows |
| **Capital** |  |  |  |  |  |  |  | Capital transfers to ROW | Current external balance |  | Capital expenditure outflows |
| **Total** | |  | Total input | Total supply | Factor expenditure | Household expenditure | Corporate expenditure | Government expenditure | NPISHs expenditure | Investments | Current foreign expenditure inflows | Capital foreign expenditure inflows |  |

**Table 3: The basic structure of an analytical-aggregated SAM**

**3.2 Constructing an aggregate ICT/non-ICT SAM**

In order to weigh up the relative weight of the ICT sector within the Egyptian economy, there was a need for a two sector SAM that includes ICT and non-ICT sectors. This SAM will divide activities, commodities and firms into ICT and non-ICT helping to show:

1. output of the ICT sector compared to the total of the economy;
2. contribution of the ICT sector to the GDP;
3. total demand for ICT commodities and how it is being met by total supply;
4. gross operating surplus of ICT firms compared to the total for the whole corporate sector;
5. ICT consumption of households and government and
6. ICT exports compared to gross export earnings.

**3.3 Constructing a disaggregated ICT/non-ICT SAM**

**3.3.1 Disaggregating economic activities, commodities and firms**

In the national accounting data produced by the Egyptian Ministry of Economic Development, the production account is disaggregated into 20 non-financial activities, 3 financial activities, government and NPISH. This classification scheme of activities does not support the purpose of the ICT-based SAM as it does not include an ICT sector. Furthermore, some economic activities are not also relevant to our research work. Table (4) shows the changes in the activities accounts according to the aggregation scheme of the 2008/2009 national accounts bulletin of Egypt.

|  |  |  |  |
| --- | --- | --- | --- |
| **Economic activities disaggregated by Egypt’s Ministry of Economic Development** | **Changes** | **Economic activities as appeared in the ICT economy wide interaction social accounting matrix** | |
| **Non-ICT** | **ICT** |
| 1. Agriculture | These three activities are aggregated into one non-ICT activity to be renamed “primary”. | 1. Primary |  |
| 1. Extraction of crude petroleum & natural gas |
| 1. Other extraction |
| 1. Petroleum refinement | 1. “ICT manufacturing industries” is taken out of “other manufacturing”. 2. The rest of “other manufacturing” will be aggregated with other activities in this group to obtain “non-ICT industry”. | 1. Non-ICT industry | 1. ICT manufacturing industries |
| 1. Other manufacturing |
| 1. Electricity and gas |
| 1. Water |
| 1. Sewerage |
| 1. Building & construction |

|  |  |  |  |
| --- | --- | --- | --- |
| **Economic activities disaggregated by Egypt’s Ministry of Economic Development** | **Changes** | **Economic activities as appeared in the ICT economy wide interaction social accounting matrix** | |
| **Non-ICT** | **ICT** |
| 1. Wholesale and retail trade | 1. “ICT trade industries” is taken out of “Wholesale and retail trade”; 2. Three activities are taken out of “information technology”. These are “software publishing”, “computer programming, consultancy & related activities” and “data processing, hosting & related activities; web portals”; 3. “Repair of computers and communication equipment” is taken out of “other services”; 4. “Business activities” will appear as a separate non-ICT activity that is called “Business services”; 5. “Education” and “Health” are grouped together under “social services”; 6. “Government” appears as a separate activity under “General government productive services”; 7. The residual of this group is grouped under “other productive services”. | 1. Business services 2. Social services 3. General government productive services 4. Other productive services | 1. ICT trade industries 2. Software publishing 3. Communication 4. Computer programming, consultancy & related activities 5. Data processing, hosting & related activities; web portals 6. Repair of computers and communication equipment |
| 1. Financial services |
| 1. Insurance |
| 1. Social insurance |
| 1. Transportation & storage |
| 1. Communication |
| 1. Information technology |
| 1. Suez Canal |
| 1. Restaurants and hotels |
| 1. Real estate ownership |
| 1. Business activities |
| 1. Education |
| 1. Health |
| 1. Other services |
| 1. Government |
| 1. NPISH |

**Table 4: The different changes made to the activities as disaggregated in 2008/2009 national accounts**

With respect to commodities, given that we are constrained by the availability of ICT international trade and use data, all ICT commodities were treated as one bundle called “ICT commodities”. The ICT sector itself is disaggregated; the output and intermediate consumption of all ICT activities are also included. Based on this rationale, the constructed SAM can clearly show the contribution of each ICT activity to the gross value added. All other demand and supply data were aggregated for the whole bundle.

With respect to the accounts, all non-ICT firms were grouped in one account. In order to show the gross operating surplus of each ICT activity, there was a pressing need to disaggregate the ICT firms according to the adopted definition of the ICT sector.

**3.3.2 Mapping ICT products to activity Accounts**

If the SAM contains different commodity and activity accounts, the mapping of ICT products to activities would be crucial. In our case, the mapping would relate ICT supply to ICT uses. ICT supply originates from both domestic production and imports and ICT uses show how those supplies are allocated to intermediate and final consumption spending, investment expenditures and exports. In most countries, data about ICT domestic production is recorded using the ISIC classification and data about ICT consumption is recorded using the harmonized system (HS). Exports and imports of ICT goods are also recorded using the harmonized coding system. Regarding the ICT services, the UN’s Central Product Classification (CPC) is suggested. Thus, three different classification schemes are used to record ICT data: the ISIC for ICT activities, the HS for ICT goods and finally the CPC for ICT services. Table (5) shows our approach to realize this mapping.

|  |  |  |  |
| --- | --- | --- | --- |
| **ICT activities** | | **ICT commodities** | |
| **ISIC, Rev.4** | **ICT manufacturing industries** | **HS ( 2002)** | **ICT goods** |
| 2610 | Manufacture of electronic components and boards | The HS codes of the goods included in each group are shown in Appendix 2 of this research | Electronic components |
| 2620 | Manufacture of computers and peripheral equipment | Computer and related equipment |
| 2630 | Manufacture of communication equipment | Telecommunications equipment |
| 2640 | Manufacture of consumer electronics[[6]](#footnote-6) | Audi and video equipment |
| 2680 | Manufacture of magnetic and optical media | Other ICT goods |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ICT trade industries** | | | **CPC, Ver. 2** | | | **ICT services** |
| 4651 | Wholesale of computers, computer peripheral equipment and software | | There is no corresponding service in CPC | | | |
| 4652 | Wholesale of electronic and telecommunications equipment and parts | |
| **ICT services industries** | | | | **CPC, Ver 2** | **ICT services** | |
| 5820 | | Software publishing | | 478 | Packaged software | |
| 83143 | Software originals | |
| 8343 | Software downloads | |
| 61 | | Telecommunications | | 841 | Telephony and other telecommunications services | |
| 842 | Internet communications services | |
| 62 | | Computer programming, consultancy and related activities | | 8313 | Information technology (IT) design and development services | |
| 8314 | Information technology (IT) design and development services | |
| 8316 | IT infrastructure and network management services | |
| 631 | | Data processing, hosting and related activities; web portals | | 8315 | Hosting and information technology (IT) infrastructure provisioning services | |
| 83159 | Other hosting and IT infrastructure provisioning services | |
| 84392 | On-line software | |
| 951 | | Repair of computers and communication equipment | | 8713 | Maintenance and repair services of computers and peripheral equipment | |
| 7730[[7]](#footnote-7) | | Renting and leasing of other machinery, equipment and tangible goods | | 73123 | Leasing or rental services concerning office machinery and equipment (excl. computers) without operator | |
| 73124 | Leasing or rental services concerning computers without operator | |
| 7020 | | Management consultancy activities | | 83117 | Business process management services | |
| 7740 | | Leasing of intellectual property and similar products, except copyrighted works | | 73310 | Licensing services for the right to use computer software | |

**Table 5: Mapping ICT products to activities**

**3.3.3 Closing ICT data gaps**

To finalize the ICT-based SAM computations based on the availability of the required ICT data, the following SAM data items were estimated.

1. **Exports and imports of software**.

Exports and imports of software – in most of the countries -are based on information directly collected from major players in the market of software products. An alternative approach is to take a representative percentage of exports and imports of the HS item (852431) with which the software products are likely to be recorded. A combination of both approaches is adopted in this paper. The exports and imports figure published by MCIT is verified against customs data regarding the item 852431 of the HS.

1. **ICT intermediate consumption by economic activity**

In light of the UNSNA-93, intermediate consumption represents the value of the goods and services consumed as inputs by a production activity. For any activity, the ICT component of the intermediate consumption is most likely composed of services whose percentage is less than 10% for almost all industries.

1. **Household and government consumption on ICT.**

According to a recent ICT utilization survey[[8]](#footnote-8) conducted by CAPMAS [2009], the Egyptian household spends around 15% of its monthly income on ICTs on average. So, it will be assumed that household expenditure on ICTs in 2007/2008 is 15% of total household consumption.

On the other hand, in the SNA-93 final consumption of general government is the value of the collective (as opposed to individual) consumption services provided to the community, or large sections of the community, by general government. Consistently, the ICT part of final consumption of general government is the value of the collective ICT consumption services provided to the community by general government. Most of these services are related to communications. So, in this research government consumption on ICTs is general final consumption expenditure on communications affairs. This information is readily available in the national accounts.

**4. Description of the ICT Economy Interaction SAM for Egypt**

**4.1 SAM Structure and accounts**

Table (6) provides an aggregate version of the ICT economy interaction SAM for Egypt. In this SAM, activities, commodities and firms are broken down into two distinctive accounts; ICT and non-ICT. The SAM is constructed for the fiscal year 2007/2008 and it is computed in LE thousands. The northwest corner of the SAM includes the activity-commodity accounts. The first two columns divide the gross output of both ICT and non-ICT sectors into intermediate consumption (intersections of columns 1 and 2 with rows 3 and 4). The intersection of the activities columns with the factors rows determines the gross value added generated in the production process. Factors of production are further broken down into labor income and the gross operating surplus (return on capital) for both ICT and non-ICT production.. The activity accounts deliver gross output to the commodity accounts from rows(1,2) to columns(3,4) which represents the value of domestic sales in 2007-2008.

The commodity accounts are shown in rows (or columns) number 3 and 4. The rows determine the components of demand for goods and services broken down into ICT and non ICT commodities. The demand for commodities is divided into intermediate consumption spending, final consumption expenditures by households, general government and the non profit institutions serving households, the gross capital formation and exports of goods and non factor services. These demand aggregates represents composite commodities composed of both domestic and imported goods. In the columns 3 and 4, the composition of the supply of goods into domestic sales (rows 1 and 2), imports at CIF prices (row 17) and import tax income (row 13).

Labor and capital income and spending are recorded in rows and columns 5 and 6. Labor income is composed of compensation of employees from both domestic activities and foreign sources (worker remittances from abroad). Capital income represents the nominal return on physical assets and it is recorded in columns 1 and 2. The distribution of factors income on domestic and foreign institutions is shown in columns 5 and 6. In case of labor income (column 5), This distributed income comprises transfers to households and transfers of foreign labor to abroad. The capital account (column 6) allocates its revenues to households, firms and general government as well as payment of corporate taxes and profits transferred to the outside world. The income (spending) of domestic institutions is recorded in rows (columns) from 7 to 15.

The capital accounts of domestic institutions are consolidated in the saving-investment account number 16. Column 16 shows the investment spending broken down into ICT and non ICT sectors. Note that, the division of investment spending is done here by sectors of origins (based on the Input-output convention). Row 16 records the gross savings of domestic and foreign institutions. The SAM ensures here the macro-balance relation that total savings equals total investment expenditures. Finally, the SAM identifies two accounts for the rest of the world in order to record its current and capital transactions with the domestic economy.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ICT aggregates | |  | **Egypt's ICT disaggregated SAM (2007/2008)** | | | | | | | | | | | | | | | | | | |
|  | **Activities** | | **Commodities** | | **Factors** | | **Institutions** | | | | | | | | | **Savings - Investment** | **Rest of the world** | | **Total** |
|  | **Non-ICT** | **ICT** | **Non-ICT** | **ICT** | **Labor** | **Capital** | **Households** | **Non-ICT firms** | **ICT firms** | **Government** | **Indirect taxes** | **Subsidies** | **Import duties** | **Direct taxes** | **NPISHs** | **Current** | **Capital** |
|  |  |  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| **Activities** | **Non-ICT** | **1** |  |  | 1,145,979,790 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,145,979,790 |
| **ICT** | **2** |  |  |  | 44,024,386 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 44,024,386 |
| **Commodities** | **Non-ICT** | **3** | 396,566,385 | 11,499,887 |  |  |  |  | 454,495,000 |  |  | 83,500,000 |  |  |  |  | 4,455,000 | 145,445,184 | 223,550,000 |  | 1,319,511,457 |
| **ICT** | **4** | 44,062,932 | 2,874,972 |  |  |  |  | 80,205,000 |  |  | 900,000 |  |  |  |  | 45,000 | 9,854,816 | 1,750,000 |  | 139,692,719 |
| **Factors** | **Labor** | **5** | 182,202,790 | 4,797,210 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 7,200,000 |  | 194,200,000 |
| **Capital** | **6** | 523,147,683 | 24,852,317 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 548,000,000 |
| **Institutions** | **Households** | **7** |  |  |  |  | 193,200,000 | 156,800,000 | 6,214,003 | 18,048,423 | 77,537,933 |  |  |  |  |  |  |  | 51,600,000 |  | 503,400,359 |
| **Non-ICT firms** | **8** |  |  |  |  |  | 344,370,300 | 32,835,767 | 48,972,581 | 7,314,080 | 55,100,000 |  |  |  |  | 900,000 |  |  |  | 489,492,727 |
| **ICT firms** | **9** |  |  |  |  |  | 22,229,700 |  | 63,524,161 |  |  |  |  |  |  |  |  |  |  | 85,753,862 |
| **Government** | **10** |  |  |  |  |  |  |  | -25,500,000 |  |  | 38,400,000 | -13,800,000 | 9,800,000 | 149,700,000 |  |  |  |  | 158,600,000 |
| **Indirect taxes** | **11** |  |  |  |  |  | 38,400,000 |  |  |  |  |  |  |  |  |  |  |  |  | 38,400,000 |
| **Subsidies** | **12** |  |  |  |  |  | -13,800,000 |  |  |  |  |  |  |  |  |  |  |  |  | -13,800,000 |
| **Import duties** | **13** |  |  | 9,437,448 | 362,552 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 9,800,000 |
| **Direct taxes** | **14** |  |  |  |  |  |  | 6,904,172 | 141,189,492 | 1,606,336 |  |  |  |  |  |  |  |  |  | 149,700,000 |
| **NPISH** | **15** |  |  |  |  |  |  |  | 6,400,000 |  |  |  |  |  |  |  |  |  |  | 6,400,000 |
| **Savings - Investment** | | **16** |  |  |  |  |  |  | -77,253,583 | 227,258,069 | -704,486 | 18,000,000 |  |  |  |  | 1,000,000 |  |  | -13,000,000 | 155,300,000 |
| **Rest of the world** | **Current** | **17** |  |  | 164,094,219 | 95,305,781 | 1,000,000 |  |  | 9,600,000 |  | 1,100,000 |  |  |  |  |  |  |  |  | 271,100,000 |
| **Capital** | **18** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0 | -13,000,000 |  | -13,000,000 |
| **Total** | | **19** | 1,145,979,790 | 44,024,386 | 1,319,511,457 | 139,692,719 | 194,200,000 | 548,000,000 | 503,400,359 | 489,492,727 | 85,753,862 | 158,600,000 | 38,400,000 | -13,800,000 | 9,800,000 | 149,700,000 | 6,400,000 | 155,300,000 | 271,100,000 | -13,000,000 |  |

**Table (6): An aggregate version of the ICT economy interaction SAM for Egypt**

**4.2 Structure of the economy based on the SAM:**

**4.2.1 Spending Patterns**

The structural features of the economy can be captured by analyzing the percentage share of each non empty cell of the SAM to the totals of the columns and rows. These percentage shares reflect on the one hand, the cost or spending structure and identify on the other hand, the sources of income of each economic actor or agent within the economy. Based on this concept, the cost structure of the production activities can be derived from the columns 1 and 2. In the non ICT activities the intermediate inputs, labor cost and capital cost are 38%, 16% and 46%, respectively. The same percentage shares in the case of the ICT sector are 33%, 11% and 56%, respectively. These indicators confirm the high value added (or the capital intensive) nature of the ICT industry. The supply of composite commodities in the non ICT sector is divided into 87% for domestic production for domestic use (or domestic sales) and 13% for imported goods and non factor services. For ICT products, we observe the reversed situation with 68% for imports and around 32% for domestic sales. It is concluded then that the ICT industry is characterized by a high reliance on the outside world via imports.

The allocation of factor income is explained in columns 5 and 6. Most of the labor income – which consists of compensation of employees and worker remittances from abroad - is allocated to households. The distribution of capital income is mainly channeled to the household sector (in the form of profits of the unincorporated business with 29% of total capital income) and to the non-ICT companies with 63% of total income. The nominal return on capital in the ICT sector does not however exceed 4.1% of total capital income of the economy.

The spending patterns of domestic institutions appear under the columns from 7 to 15. Households’ final expenditures represent 92 percent of total household income. Households’ purchase of ICT commodities does not however exceed 15 percent of total private final consumption spending. The remaining income is used as transfers to the non-ICT companies, payment of direct taxes and accumulation of gross savings.

Non ICT incorporated firms realize gross savings that account for 46% of total income (or spending) and pay around 28% of their income as direct (or corporate taxes). Note here that gross savings are computed as the difference between total income and current spending and they include the value of the consumption of fixed capital (depreciation). Based on the Egyptian SAM, around 90% of the income of ICT firms is transferred to household sector. Indirectly, this indicator reflects the fact that most of the Egyptian ICT activities belongs to the unincorporated business. Based on this interpretation, the low level of ICT savings is justified. General government spending pattern is derived in column 10 of the SAM. Government final consumption spending represents (52%) of its total income. Transfers to non ICT companies are computed as 34% of its total income. Finally, government purchases of ICT final goods and services represent 0.57% of total government revenues and 1.1 % of total public consumption. Note here that this spending item includes only the current spending and not the purchase of investment goods. Since the SAM records only the investments by sector of origin (consistent with the input output convention), the purchase of ICT capital goods is not reflected in its structure.

The rest of the world payments to the Egyptian economy is shown in column 17 of the SAM. About 82 percent of these payments represents non ICT exports and 0.65 account for ICT products. It is concluded then that the government strategy to increase the ICT exports – with the objectives of diversifying exports and augmenting the Egyptian foreign exchange proceeds – is not achieved up to 2007-2008. Furthermore, the factors income and current transfers represent 21.7 percent of the total payment from the rest of the world.

**4.2.2 Income Generation and Demand**

The generation of national income within the Egyptian economy is articulated in the rows of the SAM. The domestic and foreign demand for non ICT and ICT commodities is shown in rows 3 and 4. The distribution pattern of this demand includes the follows:

**Economic Indicator Non ICT commodities (%) ICT commodities (%)**

Intermediate Consumption 30.9 33.6

Households Consumption 34.8 57.3

Government Consumption 6.4 0.7

Gross Investments 11 7.1

Exports of commodities 16.9 1.3

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

100 100

The percentage share of the demand for ICT commodities reflects a number of distinctive features. First, the largest component is private (or households) final consumption which accounts for 57.3%. It can be concluded then that the household sector is the main determinant of any demand management strategy for the development of the ICT products. Second, the pattern of intermediate demand in both the ICT and non ICT sectors has the same percentage share. Third, the percentage share of exports in the domestic and foreign demand vector of ICT is only 1.3%. This result stresses the need for more policy measures to enhance the ICT export industry.

Total Labor income is composed of the compensation of employees generated in the ICT and non ICT activities (2.5 and 93.8 percent, respectively) and worker’s remittances from abroad (3.7 percent). The ICT role in forming the national wage bill and labor demand is then very limited. Households’ income pattern is explained in the following figure:

**Economic Indicator Income (in Millions) Percent (%)**

Compensation of Employees 193,200 38.4

Profits of unincorporated Business 156,800 31.1

Transfers between households 6,214 1.2

Transfers from ICT companies 77,538 15.4

Transfers from Non ICT companies 18, 048 3.6

Transfers from the outside world 51,600 10.3

503,400 100

The main sources of household’s income are generated in the production process as compensation of employees (38.4%) and return on capital of the unincorporated sector (31.1%). Households transfer from the ICT industry a third important source of income (15.4%). Finally, current transfers from the outside world account for 10.3 percent. Note here the important role of the ICT sector as a source of households’ revenues.

Based on the SAM, the sources of income for the ICT firms are concentrated only in the nominal return on capital (25.9%) and transfers from the non ICT firms (74.1%). It should be noted however that the transfers from the non ICT companies is computed as a residual in the SAM.

General government income account is derived from raw 10 of the SAM. The main sources of income is the tax revenues which is divided as follows:

**Tax Account Income (in Millions) Percent (%)**

Direct Taxes 149,700 75.6

* Households 6,904 3.4
* Non ICT Firms 141,189 71.3
* ICT Firms 1,606 0.9

Import Taxes 9,800 5.0

Other Indirect Taxes 38,400 19.4

Total 197,900 100

The largest part of government tax income is the direct taxes which represent 75.6 percent of total revenues. These taxes include household personal tax income (3.4 percent), Non ICT corporate taxes (71.3 percent) and ICT corporate taxes (0.9 percent) . Import duties account for 5 percent of total tax income which are distributed between ICT and Non ICT imported commodities. Finally, other indirect taxes – such as sales tax, consumption tax and fees on production – represent around 19.4 percent of total tax revenues.

Row 17 determines the payments of the domestic economy to the outside world in the form of imports, payments of factor income and transfers of domestic institutions. Non ICT imports represent 60.3 percent and ICT imports account for 35.2 percent of the total rest of the world income. Other domestic transfers to the outside world do not exceed 4.5 percent of total the outside income.

**4.3 Structure of the ICT sector in the disaggregated SAM**

Table (7) summarizes the structure of the ICT sector as well as its relative importance in the Egyptian economy in a more disaggregated manner.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Structure of the ICT sector**  Thousands LE | | | | | | | |
|  |  | **Output** | **%** | **Gross value added** | **%** | **Gross operating surplus** | **%** | **Gross fixed capital formation** | **%** |
| **ICT manufacturing industries** | |  |  |  |  |  |  |  |  |
|  | **Manufacture of electronic components and boards (2610)** | 184,679 | 0.42 | 48,001 | 0.16 | 40,828 | 0.18 | 614 | 0.01 |
|  | **Manufacture of computers and peripheral equipment (2620)** | 368,790 | 0.84 | 57,450 | 0.19 | 28,482 | 0.13 | 8,037 | 0.08 |
|  | **Manufacture of communication equipment (2630)** | 631,823 | 1.44 | 247,709 | 0.84 | 160,779 | 0.72 | -369 | 0.00 |
|  | **Manufacture of consumer electronics (2640)** | 399,928 | 0.91 | 254,148 | 0.86 | 236,340 | 1.06 | 18,475 | 0.19 |
|  | **Manufacture of magnetic and optical media (2680)** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| ICT manufacturing industries – total | | **1,585,220** | **3.60** | **607,308** | **2.05** | **466,429** | **2.10** | **26,757** | **0.28** |
| **ICT trade industries** | |  |  |  |  |  |  |  |  |
|  | **Wholesale of computers, computer peripheral equipment and software (4651)** | 1,372,328 | 3.12 | 1,363,607 | 4.60 | 1,336,619 | 6.01 | 857 | 0.01 |
|  | **Wholesale of electronic and telecommunications equipment and parts (4652)** | 1,520,704 | 3.45 | 1,515,792 | 5.11 | 1,507,270 | 6.78 | 2,185 | 0.02 |
| ICT trade industries – total | | **2,893,032** | **6.57** | **2,879,400** | **9.71** | **2,843,889** | **12.79** | **3,042** | **0.03** |
| **ICT services industries** | |  |  |  |  |  |  |  |  |
|  | **Communications** | 38,472,496 | 87.39 | 25,654,077 | 86.52 | 18,726,405 | 84.24 | 9,621,400 | 98.93 |
|  | **Software publishing** | 35,292 | 0.08 | 3,044 | 0.01 | -737 | 0.00 | 920 | 0.01 |
|  | **Computer programming, consultancy and related activities** | 255,337 | 0.58 | 80,473 | 0.27 | 30,071 | 0.14 | 2,263 | 0.02 |
|  | **Data processing, hosting & related activities; web portals** | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |  | 0.00 |
|  | **Repair of computers and communication equipment** | 783,009 | 1.78 | 425,225 | 1.43 | 163,643 | 0.74 | 71,022 | 0.73 |
| **ICT services industries** | | **39,546,134** | **89.83** | **26,162,819** | **88.24** | **18,919,382** | **85.11** | **9,695,605** | **99.69** |
|  | **ICT totals** | **44,024,386** | **100** | 29,649,527 | **100** | 22,229,700 | **100** | 9,725,404 | **100** |
|  |  |  |  |  |  |  |  |  |  |
|  |  | **Relative weight of the ICT sector in the Egyptian economy** | | | | | | | |
|  |  | **Output** | **%** | **Gross value added** | **%** | **Gross operating surplus** | **%** | **Gross fixed capital formation** | **%** |
| Primary | | 249,562,202 | 20.97 | 206,830,749 | 28.14 | 189,608,445 | 36.22 | 32,460,358 | 21.35 |
| Non-ICT industry | | 424,396,484 | 35.66 | 169,985,691 | 23.13 | 106,473,879 | 20.34 | 43,563,790 | 28.65 |
| Business services | | 12,892,855 | 1.08 | 10,426,270 | 1.42 | 7,682,580 | 1.47 | 4,045,189 | 2.66 |
| Other productive services | | 330,505,871 | 27.77 | 232,375,744 | 31.62 | 185,519,347 | 35.44 | 33,195,579 | 21.83 |
| Social services | | 34,222,378 | 2.88 | 19,032,019 | 2.59 | 9,506,238 | 1.82 | 3,551,700 | 2.34 |
| General government services | | 94,400,000 | 7.93 | 66,700,000 | 9.07 | 2,500,000 | 0.48 | 25,500,000 | 16.77 |
| ICT sector | | 44,024,386 | 3.70 | 29,649,527 | 4.03 | 22,229,700 | 4.25 | 9,725,404 | 6.40 |
| **Total of the economy** | | **1,190,004,176** | **100** | 735,000,000 | **100** | 523,520,189 | **100** | 152,042,020 | **100** |

**Table 7: The structure of the ICT sector and its relative weight in Egypt**

**4.3.1 Structure of the ICT sector**

The components of the ICT sector are broadly grouped under three aggregate activity/commodity categories which are; a) ICT manufacturing industries, b) ICT trade industries and ICT services industries. These 3 commodity groups are further disaggregated to a number of subsectors. Based on the collected data and the adjusted accounting structure, the percentage share of the ICT manufacturing to total value added of the sector is around 2.05%. This result confirms that the ICT industry in Egypt is dominated by trading and services activities. To reduce the reliance on the rest of the world, government policy measures are needed to encourage the ICT manufacturing industries and exports. Table (7) shows also that the ICT services industries – in the form of communications, software publishing, computer programming, data processing and repair of computers – dominate the activities of the ICT sector with 88% in total value added of the sector. This result may be explained by the comparative advantage of the ICT services on the regional Arabic level. But the expansion of the production and exports of these services needs however to be supported by an enhanced ICT manufacturing industries. Furthermore, the communications services represents 86.5 percent of the value added generated in the ICT sector with very limited contribution of software development services. This represents another development area that needs considerable attention and appropriate strategies, in particular with the increasing number of university graduates in the field of computer science, information systems and software engineering.

**4.3.2 The relative weight of the ICT sector**

Based on the 2007/2008 data, the ICT sector represents 3.7 percent of the gross production, 4 percent of the generated value added and 4.25 percent of the gross operating surplus of the Egyptian economy. As a growing industry that reflects a basic feature of the twenty one century, these percentage shares need to improve over time. It should be noted however that the impact of the ICT industry requires indirect methods to capture the effects on efficiency of the factors of production by economic sector. These effects needs however a more elaborated analytical tool – or a model- to estimate this indirect impact.

**5. Concluding Remarks**

In this paper, an ICT economy interaction social accounting matrix for Egypt is constructed and analyzed. This issue oriented sector specific SAM represents a consistent and comprehensive tool not only to study the economics of the ICT sector but also to quantitatively estimate its economy wide impact. To our Knowledge, this SAM represents the first effort to assemble an accounting framework for analyzing the economy wide impact of the ICT in a detailed manner. This SAM should be however complemented by an economy wide computational model in order to properly analyze the direct and indirect impact of the ICT sector and to project its future performance.

The construction of SAM for Egypt has identified several data gaps that need to be closed in order to have a more reliable estimates, coverage and scope of the ICT industry along with its impact on the economy. An ICT satellite account may be the answer. ICT satellite account will use the national accounting framework to present a picture of ICT within the economy. It will define ICT products and identify their supply and use, so that a comprehensive set of economic data relating to ICT activity can be compiled for the Egyptian economy. Among other things, this will allow us to quantify the relative weight of the ICT production, consumption and investment compared with other economic activity. ICT satellite accounts have been developed in several countries such as Australia [3].

**6. References**

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[4] Internal document: STD/CSTAT/WPNA(2006)4 – Australian Information and Communication Technology Satellite Account, OECD, Sept 2006

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[www.oecd.org/sti/measuring-infoeconomy/guide](http://www.oecd.org/sti/measuring-infoeconomy/guide)

[6] United Nations: International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4, New York 2008

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**Appendixes**

|  |  |
| --- | --- |
| Appendix 1 | ICT SECTOR DEFINITION |

|  |  |
| --- | --- |
| **ICT manufacturing industries** | |
| 2610 | Manufacture of electronic components and boards |
| 2620 | Manufacture of computers and peripheral equipment |
| 2630 | Manufacture of communication equipment |
| 2640 | Manufacture of consumer electronics |
| 2680 | Manufacture of magnetic and optical media |
| **ICT trade industries** | |
| 4651 | Wholesale of computers, computer peripheral equipment and software |
| 4652 | Wholesale of electronic and telecommunications equipment and parts |
| **ICT services industries** | |
| 5820 | Software publishing |
| 61 | Telecommunications |
| 6110 | Wired telecommunications activities |
| 6120 | Wireless telecommunications activities |
| 6130 | Satellite telecommunications activities |
| 6190 | Other telecommunications activities |
| 62 | Computer programming, consultancy and related activities |
| 6201 | Computer programming activities |
| 6202 | Computer consultancy and computer facilities management activities |
| 6209 | Other information technology and computer service activities |
| 631 | Data processing, hosting and related activities; web portals |
| 6311 | Data processing, hosting and related activities |
| 6312 | Web portals |
| 951 | Repair of computers and communication equipment |
| 9511 | Repair of computers and peripheral equipment |
| 9512 | Repair of communication equipment |

**Source: International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4**

|  |  |
| --- | --- |
| Appendix 2 | ICT goods classification |

|  |  |
| --- | --- |
| **HS 2002** |  |
|  | **Telecommunications equipment** |
| 851711 | Line telephone sets with cordless handsets |
| 851719 | Other telephone sets, video phones |
| 851721 | Facsimile machines |
| 851722 | Teleprinters |
| 851730 | Telephonic or telegraphic switching apparatus |
| 851750 | Other apparatus, for carrier-current line systems or for digital line systems |
| 851780 | Other electrical apparatus for line telephony or line telegraphy |
| 851790 | Parts for other electrical apparatus for line telephony or line telegraphy |
| 852020 | Telephone answering machines |
| 852510 | Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television not incorporating reception apparatus |
| 852520 | Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television incorporating reception apparatus |
| 852530 | Television cameras |
| 852610 | Radar apparatus |
| 852790 | Reception apparatus for radio-telephony, radio-telegraphy or radio-broadcasting, whether or not combined, in the same housing, with sound recording or reproducing apparatus or a clock, n.e.s |
| 852910 | Aerials and aerial reflectors of all kinds; parts suitable for use therewith |
| 853110 | Burglar or fire alarms and similar apparatus |
| 854420 | Co-axial cable and other co-axial electric conductors |
| 854470 | Optical fibre cables |
|  | **Computer and related equipment** |
| 847110 | Analogue or hybrid automatic data processing machines |
| 847130 | Portable digital automatic data processing machines, weighing not more than 10 kg, consisting of at least a central processing unit, a keyboard and a display |
| 847141 | Digital automatic data processing machines comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined |
| 847149 | Other digital automatic data processing machines, presented in the form of systems |
| 847150 | Digital processing units other than those of subheadings 8471.41 and 8471.49, whether or not containing in the same housing one or two of the following types of unit : storage units, input units,  output units |
| 847160 | Automatic data processing machines, input or output units, whether or not containing storage units in the same housing |
| 847170 | Automatic data processing machines, storage units |
| 847180 | Other units of automatic data processing machines |
| 847190 | Magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included |
| 847330 | Parts and accessories of the machines of heading No. 84.71 |
|  | **Electronic Components** |
| 850431 | Electrical transformers having a power handling capacity not exceeding 1 kVA |
| 850450 | Inductors |
| 850490 | Parts of: electrical transformers, static converters (for example, rectifiers) and inductors |
| 852330 | Cards incorporating a magnetic stripe, unrecorded |
| 852460 | Cards incorporating a magnetic stripe, recorded |
| 852990 | Parts suitable for use solely or principally with the apparatus of headings Nos. 85.25 to 85.28 except aerials and aerials reflectors |
| 853221 | Capacitors, fixed, tantalum having a reactive power handling capacity of less than 0.5 kvar |
| 853224 | Capacitors, fixed, ceramic dielectric, multilayer having a reactive power handling capacity of less than 0.5 kvar |
| 853230 | Variable or adjustable (pre-set) capacitors |
| 853310 | Fixed carbon resistors, composition or film types |
| 853321 | Electrical resistors, fixed, (including rheostats and potentiometers), other than heating resistors, for a power handling capacity <= 20 W |
| 853329 | Electrical resistors, fixed, (including rheostats and potentiometers), other than heating resistors, n.e.s.. |
| 853331 | Wirewound variable resistors, for a power handling capacity <= 20 W |
| 853339 | Wirewound variable resistors, for a power handling capacity <= 20 W |
| 853340 | Other variable resistors, including rheostats and potentiometers |
| 853390 | Parts for electrical resistors (including rheostats and potentiometers), other than heating resistors |
| 853400 | Printed circuits |
| 854011 | Cathode-ray television picture tubes, including video monitor tubes, colour |
| 854012 | Cathode-ray television picture tubes, including video monitor tubes, black and white or other monochrome |
| 854020 | Television camera tubes; image converters and intensifiers; other photo-cathode tubes |
| 854040 | Data/graphic display tubes, colour, with a phosphor dot screen pitch smaller than 0.4 mm |
| 854050 | Data/graphic display tubes, black and white or other monochrome |
| 854060 | Other cathode-ray tubes |
| 854071 | Microwave tubes, magnetrons, excluding grid-controlled tubes |
| 854072 | Microwave tubes - klystrons, excluding grid-controlled tubes |
| 854079 | Microwave tubes, other, excluding grid-controlled tubes |
| 854081 | Receiver or amplifier valves and tubes |
| 854089 | Valve and tubes, n.e.s. |
| 854091 | Parts of cathode-ray tubes |
| 854099 | Parts of thermionic or photo-cathode, valve and tubes, other than cathode-ray tubes |
| 854110 | Diodes, other than photosensitive or light emitting diodes |
| 854121 | Transistors, other than photosensitive, dissipation rate < 1 W |
| 854129 | Transistors, other than photosensitive transistors, n.e.s. |
| 854130 | Thyristors, diacs and triacs, other than photosensitive devices |
| 854140 | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes |
| 854150 | Other semiconductor devices |
| 854160 | Mounted piezo-electric crystals |
| 854190 | Parts for semiconductor devices |
| 854210 | Cards incorporating electronic integrated circuits ("smart" cards) |
| 854221 | Digital monolitihic integrated circuits |
| 854229 | Other monolithic integrated circuits (3 |
| 854260 | Hybrid integrated circuits |
| 854270 | Electronic microassemblies |
| 854290 | Parts for electronic integrated circuits and microassemblies |
|  | **Audio and video equipment** |
| 851810 | Microphones and stands therefor |
| 851821 | Single loudspeakers, mounted in their enclosures |
| 851822 | Multiple loudspeakers, mounted in the same enclosure |
| 851829 | Other loudspeakers, n.e.s |
| 851830 | Headphones and earphones, whether or not combined with a microphone, and sets consisting of a microphone and one or more loudspeakers |
| 851840 | Audio-frequency electric amplifiers |
| 851850 | Electric sound amplifier sets |
| 851890 | Parts of microphones, loudspeakers, headphones, earphones, combined microphone/loudspeaker sets, audio-frequency electric amplifiers and electric sound amplifier sets |
| 851910 | Coin- or disc-operated record-players |
| 851921 | Record-players, without loudspeaker |
| 851929 | Record-players, n.e.s. |
| 851931 | Turntables with automatic record changing mechanism |
| 851939 | Turntables, n.e.s. |
| 851940 | Transcribing machines |
| 851992 | Pocket-size cassette-players |
| 851993 | Other sound reproducing apparatus, cassette-type |
| 851999 | Sound reproducing apparatus, not incorporating a sound recording device, n.e.s. |
| 852010 | Dictating machines not capable of operating without an external source of power |
| 852032 | Other magnetic tape recorders incorporating sound reproducing apparatus, Digital audio type |
| 852033 | Other magnetic tape recorders incorporating sound reproducing apparatus, cassette-type |
| 852039 | Other magnetic tape recorders incorporating sound reproducing apparatus |
| 852090 | Magnetic tape recorders and other sound recording apparatus, whether or not incorporating a sound reproducing device, n.e.s. |
| 852110 | Video recording or reproducing apparatus, whether or not incorporating a video tuner - magnetic tape type |
| 852190 | Video recording or reproducing apparatus, whether or not incorporating a video tuner - other type |
| 852210 | Parts and accessories suitable for use solely or principally with the apparatus of headings Nos. 85.19 to 85.21 - pick-up cartridges |
| 852290 | Parts and accessories suitable for use solely or principally with the apparatus of headings Nos. 85.19 to 85.21 - other |
| 852311 | Magnetic tapes, unrecorded, width <= 4 mm (1/6 in.) |
| 852312 | Magnetic tapes, unrecorded, width > 4 mm (1/6 in.) but <= 6.5 mm (1/4 in.) |
| 852313 | Magnetic tapes, unrecorded, width > 6.5 mm (1/4 in.) |
| 852320 | Magnetic discs, unrecorded |
| 852390 | Other prepared unrecorded media for sound recording or similar recording of other phenomena, other than products of Chapter 37 |
| 852540 | Still image video cameras and other video camera recorders, digital cameras |
| 852712 | Pocket-size radio cassette-players capable of operating without an external source of power |
| 852713 | Radio-broadcast receivers, capable of operating without an external source of power, combined with sound recording or reproducing apparatus |
| 852719 | Other radio-broadcast receivers, capable of operating without an external source of power, not combined with sound recording or reproducing apparatus |
| 852721 | Radio-broadcast receivers with sound recording or reproducing apparatus, for motor vehicles, requiring external source of power |
| 852729 | Other radio-broadcast receivers for motor vehicles, not combined with sound recording or reproducing apparatus |
| 852731 | Other radio-broadcast receivers, including apparatus capable of receiving also radio-telephony or radiotelegraphy, combined with sound recording or reproducing apparatus |
| 852732 | Other radio-broadcast receivers, including apparatus capable of receiving also radio-telephony or radiotelegraphy, not combined with sound recording or reproducing apparatus but combined with a clock |
| 852739 | Other radio-broadcast receivers, including apparatus capable of receiving radio-telephony or radiotelegraphy, n.e.s. |
| 852812 | Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus, colour |
| 852813 | Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus, black and white or other monochrome |
| 852821 | Video monitors, colour |
| 852822 | Video monitors, black and white or other monochrome |
| 852830 | Video projectors |
|  | **Other ICT goods** |
| 846911 | Word-processing machines |
| 847010 | Electronic calculators capable of operation without an external source of electric power and pocket-size data recording, reproducing and displaying machines with calculating functions |
| 847021 | Other electronic calculating machines incorporating a printing device |
| 847029 | Other electronic calculating machines |
| 847040 | Accounting machines |
| 847050 | Cash registers |
| 847310 | Parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines of heading No. 84.69 |
| 847321 | Parts and accessories of the electronic calculating machines of subheading No. 8470.10, 8470.21 or 8470.29 |
| 847350 | Parts and accessories equally suitable for use with machines of two or more of the headings Nos. 84.69 to 84.72 |
| 852691 | Radio navigational aid apparatus |
| 852692 | Radio remote control apparatus |
| 901041 | Apparatus for the projection or drawing of circuit patterns on sensitised semiconductor materials – direct write-on-wafer apparatus |
| 901042 | Apparatus for the projection or drawing of circuit patterns on sensitised semiconductor materials – step and repeat aligners |
| 901049 | Apparatus for the projection or drawing of circuit patterns on sensitised semiconductor materials - other |
| 901410 | Direction finding compasses |
| 901420 | Instruments and appliances for aeronautical or space navigation (other than compasses) |
| 901480 | Other navigational instruments and appliances |
| 901490 | Parts and accessories of direction finding compasses, other navigational instruments and appliances |
| 901540 | Photogrammetrical surveying instruments and appliances |
| 901580 | Other surveying instruments and appliances |
| 901811 | Electro-cardiographs |
| 901812 | Ultrasonic scanning apparatus |
| 901813 | Magnetic resonance imaging apparatus |
| 901814 | Scintigraphic apparatus |
| 901819 | Other electro-diagnostic apparatus (including apparatus for functional exploratory examination or for checking physiological parameters) |
| 902212 | Computed tomography apparatus |
| 902213 | Other apparatus based on the use of X-rays, for dental uses |
| 902214 | Other apparatus based on the use of X-rays, for medical, surgical or veterinary uses |
| 902219 | Other apparatus based on the use of X-rays, for other uses |
| 902410 | Machines and appliances for testing the hardness, strength, compressibility, elasticity or other mechanical properties of materials, metals |
| 902480 | Other machines and appliances for testing the hardness, strength, compressibility, elasticity or other mechanical properties of materials |
| 902490 | Parts and accessories for machines and appliances for testing the hardness, strength, compressibility, elasticity or other mechanical properties of materials |
| 902620 | Instruments and apparatus for measuring or checking the pressure of liquids or gases, excluding instruments and apparatus of heading Nos. 9014, 9015, 9028 or 9032 |
| 902710 | Instruments and apparatus for physical or chemical analysis, gas or smoke analysis apparatus |
| 902730 | Spectrometers, spectrophotometers and spectrographs using optical radiations (UV, visible, IR) |
| 902740 | Instruments and apparatus for measuring or checking quantities of heat, sound or light, exposure meters |
| 902750 | Other instruments and apparatus using optical radiations (UV, visible, IR) |
| 902780 | Other instruments and apparatus for physical or chemical analysis |
| 902810 | Gas meters |
| 902820 | Liquid meters |
| 902830 | Electricity meters |
| 902890 | Parts for gas, liquid or electricity supply or production meters, including calibrating meters therefor |
| 902910 | Revolution counters, production counters, taximeters, mileometers, pedometers and the like |
| 902920 | Speed indicators and tachometers; stroboscopes |
| 902990 | Parts and accessories for revolution counters, production counters, taximeters, mileometers, pedometers and the like; speed indicators and tachometers, other than those of heading No. 90.14 or 90.15; stroboscopes |
| 903010 | Instruments and apparatus for measuring or detecting ionising radiations |
| 903020 | Cathode-ray oscilloscopes and cathode-ray oscillographs |
| 903031 | Multimeters without a recording device |
| 903039 | Other instruments and apparatus for measuring or checking voltage, current, etc. without a recording device |
| 903040 | Other instruments and apparatus, specially designed for telecommunications (for example, cross-talk meters, gain measuring instruments, distortion factor meters, psophometers) |
| 903082 | Other instruments for measuring or checking semiconductor wafers or devices |
| 903083 | Other instruments for measuring or checking semiconductor wafers or devices with a recording device |
| 903110 | Measuring or checking instruments, appliances and machines n.e.s, machines for balancing mechanical parts |
| 903120 | Measuring or checking instruments, appliances and machines n.e.s, test benches |
| 903130 | Measuring or checking instruments, appliances and machines n.e.s, profile projectors |
| 903141 | Other optical instruments and appliances, for inspecting semiconductor wafers or devices or for inspecting photomasks or reticles used in manufacturing semiconductor devices |
| 903180 | Other measuring or checking instruments, appliances and machines, n.e.s. |
| 903190 | Parts and accessories for measuring or checking instruments, appliances and machines, n.e.s. |
| 903210 | Thermostats |
| 903220 | Manostats |
| 903289 | Other automatic regulating or controlling instruments and apparatus, n.e.s. |
| 903290 | Parts and accessories for automatic regulating or controlling instruments and apparatus |

**Source: OECD – 2005 [2]**

1. The possibility that enterprises which are classified to ICT sector industries may produce non-ICT products was also skipped. [↑](#footnote-ref-1)
2. These indicators are available at: http://www.egyptictindicators.gov.eg/ [↑](#footnote-ref-2)
3. Because of this, OECD suggested an independent definition for ICT services – including software – using the UN’s Central Product Classification (CPC Ver. 2) [6] [↑](#footnote-ref-3)
4. Property income is the income receivable by the owner of a financial asset or a tangible non-produced asset in return for providing funds to or putting the tangible non-produced asset at the disposal of, another institutional unit; it consists of interest, the distributed income of corporations, reinvested earnings on direct foreign investment, property income attributed to insurance policy holders, and rent. [↑](#footnote-ref-4)
5. The current external balance is actually the balance of the current account. If it is positive, the current account is in surplus and if negative it is in deficit. [↑](#footnote-ref-5)
6. This activity includes the manufacture of electronic audio and video equipment for home entertainment, motor vehicle, public address systems and musical instrument and amplification. [↑](#footnote-ref-6)
7. This activity is not classified as ICT activity according to the definition of the ICT sector as included in the UN’s ISIC, Rev. 4. It has been added just to complete the mapping. The same applies to management consultancy activities (7020) and leasing of intellectual property (7740). [↑](#footnote-ref-7)
8. The survey involved a total of 21,000 households (300 areas × 70households); covering 24 governorates representing the urban areas and rural areas. [↑](#footnote-ref-8)