

ROLE & PERFORMANCE OF INPUT-OUTPUT COEFFICIENT ORGANIZATION IN THE LIGHT OF INTERNATIONAL EXPERIENCE AND WAY FORWARD WITH REFERENCE TO INDUSTRIAL COMPETITIVENESS.

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Introduction

Introduction to Research Idea

Input-Output Tables (IOTs) help to describe the purchase and sale relationships between the consumers and producers in an economy (OECD, 2019). The IOT, defined simply, shows how the output of one industrial sector becomes the input of another, depicting thereby the degree of dependence of each sector in an economy on another, on the basis of product and industry classifications (Gretton, 2013)¹. In fact, the input-output model is part of the national accounts of most developed countries along with Supply Use Tables (SUTs) which are often used to calculate a country's GDP (United Nations, 2018). The SUTs describe how products (goods and services) enter an economy (either through imports or through domestic production) (the Supply Table), and the various ways in which these products are then used (household final consumption, intermediate consumption by industries for manufacturing of other products, government final consumption, exports, gross capital formation etc.) (the Use Table). They play an important role in providing a mechanism for the compilation of a single comprehensive GDP estimate comprising of all parts of production, expenditure and income (United Nations, 2018). Increasingly now, SUTs provide the base for derivation of IOTs.

¹ Input output analysis is a kind of economic analysis developed by the 20th century Russian born US economist Wassily W. Leontief, that measures the interdependence of an economy's productive sectors through observing the product of each industry both as a good used for final consumption as well as an input in the production process for the manufacture of other goods.

² The ratio of a change in national income to the change in government spending that causes it.

³ the ratio of deposits to reserves in the banking system.

IOTs are often used for the calculation of output, employment and income

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multipliers on the basis of industrial interdependence relating specifically to the provision and usage of products. They help summarise both the explicit and the implied effects on employment and economic activity across all industries within an economy resulting from an adjustment in a specific industry's final output. Consequently, (unlike SUTs), IOTs have a strong micro focus, clearly differentiating them from other economic multipliers, i.e. fiscal multipliers² or money multipliers³ which focus on macroeconomic and monetary relationships respectively (Gretton, 2013).

Globally, measurement of value addition at different stages of production contributes towards better policy making in various fields, including taxation, import substitution etc. Better policies require better evidence and data. In fact, although IOTs have been in evidence for some time now, it was only in the first decade of the twenty first century that there was a surge in reliance on input output coefficients for experiential analysis to inform a broad range of policy issues (Wixted, Yamano & Webb, 2006).

Gretton (2013), however, points out that IOTs and their multipliers have some limitations which need to be considered when carrying out an IOT analysis. For instance, they may not recognize the following: 2

- Resource-related limitations: the employment of inputs such as capital or labour by a certain industrial activity is at the expense of its employment elsewhere;
- Relative changes in production technology or prices resulting in a change in the combination of inputs employed in production; and
- how policy interventions that impact, for instance, tariffs on imports (input goods), support to industry, industrial competitiveness, workforce participation etc. affect price and other variables.

To overcome the above-mentioned constraints of IO Multipliers, Gretton (2013) suggests a slightly different approach, also based on input-output data: Computable General Equilibrium (CGE) modelling, more flexible than the traditional and static input-output model and, therefore, increasingly employed for simulating economic impacts. It provides a framework that makes allowances for economic interdependencies and the major role played by relative prices on economic activity. Nevertheless, effective use of CGE models for assessment of the contribution of industrial activity to economy is still dependent upon updated and authentic input-output tables (Gretton, 2013). With increasing globalisation, and resultant frequent economic change, it is imperative that IOTs are regularly updated to enhance their

relevance for policy making.

As per international best practices, input-output coefficients (IOCs) are used to develop policies focused on enhancing industrial competitiveness. Many countries, thus, make policy interventions based on these coefficients. In most countries, national statistical organizations/institutions are responsible for compilation of National Accounts data, including both SUTs and IOTs, although, in some countries, these functions may be shared between the national statistical institutions/organizations and national central banks.

Furthermore, international organizations such as the Organization for Economic Cooperation (OECD) and World Trade Organization (WTO) have produced “a new global data base on trade in value added” to trace distribution of value added along Global Value Chains (GVCs) (Xing, 2016, p.2). This is often enabled through international IOTs (IIOTs) which help trace the origins of inputs for goods and services as well as their use between countries and industries and can be used to assess “trade flows between both upstream and downstream partners of GVCs” (Xing, 2016, p.3). IIOTs are essentially derived from national IOTs, approximated bilateral trade coefficients and national accounts.

In Pakistan’s case, IOCs have been developed by various authorities including the Directorate General of Input Output Coefficient Organization-Customs (DGIOCO-Customs) and the Pakistan Bureau of Statistics (PBS). PBS developed three inter-industry IOTs (for the years 1984-85, 1989-90 and 1990-91). The last official IOT was developed by PBS for 1990-91 relying on the 1993 System of National Accounts⁴ (SNAs) (Zeeshan & Nasir, 2019).

⁴ An accounting framework used to both compile and report a country’s economic statistics for economic evaluation followed by policy decisions. 3

The DGIOCO-Customs was notified as a Directorate General in 2013. Recently, the Directorate General of Input Output Coefficient Organization-Inland Revenue has also been notified in this regard. The DGIOCO is responsible only for preparing/verifying input-output ratios and wastages that are industry and commodity specific in order to bring some uniformity to the exemptions regime for the industrial sector.

Scope

The aim of this research is to explore the significance of IOTs in evidence-based decision-making and to identify the institutional gaps in this regard in Pakistan. This paper reviews the development of IOCs by the above-mentioned organizations in

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Pakistan and analyses the global role of IOT development in enhancing industrial competitiveness. It compares Pakistan's IOT development, usage and experience against international best practices, thereby identifying the gaps that need to be addressed to achieve the desired goals. On the basis of the gaps identified, the best way forward has been suggested and possible policy recommendations have been suggested. Research questions that have been explored in this piece of work are:

- i. Which organizations in Pakistan are producing IOTs?
- ii. Whether these tables are being used for economic analysis and enhancing industrial competitiveness?
- iii. What is the gap when compared with the international experience of input output organizations?
- iv. How can this gap be reduced and what is the way forward?

Due to time constraints, however, best practice experiences of only a limited number of countries/organizations were drawn upon including Singapore, Australia, Brazil and Greece. Furthermore, this study is non-technical in nature, focusing not so much on the formulation of input output tables themselves as on their significance for planning and policy formulation, especially with regard to industrial competitiveness.

Literature Review

Most of the local research available on the subject is technical in nature, limited to the formulation of IOTs and coefficients, and not so much focused on an analysis of how they can feed policy. Saleem, Mahmood et Al (1983) formulated Input Output IO tables for the year 1975-76 in their research report for Pakistan Institute of Development Economics (PIDE). Recently, Zeeshan & Nasir (2019) constructed the IO table for 2010-11 on the basis of the 2008 SNAs, employing the industry-by-industry approach and using the data to analyse backwards and forward linkages⁵ of various industrial sectors. Wixted, Yamano and Webb discuss the applications of OECD's harmonised international tables in some detail (2006) while Xing (2016) points out the importance of new ways of measuring trade in value added along the

⁵ Linkage of an industry with its suppliers.

⁶ Linkage of an industry with its customers/clients. 4

Global Value Chain (GVC), including IOTs. Sonis and Hewings (2007, p.2) explain how the "innovation spread" of emerging new technologies and consequent

reorganization of economic processes has contributed to a change in the direct input coefficients and altered input output dynamics. A report by Gretton (2013) on the Australian Government Productivity Commission's website discusses the benefits and limitations of IOTs in terms of enhancing future use of this tool for economic analysis. It is evident from the foregoing, therefore, that no research has so far been carried out on the role and performance of input output organizations in Pakistan as compared to international best practices, with particular focus on their role in influencing policy-making for industrial competitiveness. This area is, therefore, what the subject study shall focus upon.

Methodology

Research Strategy

The study adopted a qualitative research approach utilizing primary sources collected through unstructured interviews of various relevant stakeholders from PBS and the DGIOCO as well as secondary data sources. Secondary data sources were collected in the following ways: searching for relevant literature online, including books, articles, working papers etc. and browsing literature available in libraries.

Data Sources

The main sources of data included online publications of local and international organizations like Pakistan Institute of Development Economics (PIDE), OECD and Asian Development Bank (ADB) and their official websites as well as the official websites of PBS and Federal Board of Revenue (FBR). Physical books, reports and articles on the use of input-output coefficients for policy making were also consulted from local libraries. Senior officers posted at the DGIOCO-Customs, Karachi and Lahore, as well as relevant officials at PBS were interviewed to get their perspectives on the subject. Thus, data was collected from diverse sources for analysis and the drawing of conclusions.

Findings and Discussion

Organizations Producing Input-Output Coefficients in Pakistan

Directorate General of Input Output Coefficient Organization-Customs (DGIOCO-Customs)

The DGIOCO-Customs was established under Section 3DDD of the Customs Act, 1969 and notified through Customs Rules, 2001 vide SRO 450(I)/2001 dated 18-06-2001, for the purpose of bringing uniformity to the process of Customs exemptions (FBR, 2019). The following Customs departments/functions were, therefore merged

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to form the subject Directorate General: 5

- Duty Suspension and Audit Office (DSAO)
- No Duty No Drawback
- Survey and Rebate

The various Directorates of IOCO were notified vide SRO 646(I)/2008 dated 24.05.2018. They were divided region-wise: Central (Punjab excluding Rawalpindi Division); North ((ICT and Rawalpindi Division, Khyber Pakhtunkhwa and Gilgit Baltistan); South (Sindh and Balochistan) and Headquarters (Karachi). The scope of DGIOCO extends to the export sector with the aim of boosting exports by reducing cost of doing business and enhancing ease of doing business. The organization also aims at providing support to local industry by enhancing import substitution and promoting industrialization.

As far as exports are concerned, the Organization determines input-output ratios and wastages for various export exemption regimes including the Duty and Tax Remission for Exports (DTRE), Manufacturing Bonds, Duty Drawback, Export Oriented Units (Home Textile, Textile, Leather, Garments and Chemicals) and finally, Small and Medium enterprises (SMEs). The relevant SROs are SRO 450(I)/2001 dated 18.06.2001 and 327(I)/2008 dated 29.03.2008 (FBR, 2019).

With regard to local industry, the organization is responsible for calculation of annual quantitative entitlement of inputs/ raw materials, including packing material for the pharmaceutical industry, assembly of cellular mobile phone in SKD/ CKD, assembly of LED Lights, multiply paper aseptic food packaging etc. under SRO 450(I)/2001 dated 18.06.2001, 5th schedule to the Customs Act, 1969 and 565(I)/2006 dated 05.06.2006 (FBR, 2019).

Additional Collector, Directorate of IOCO-Central, Lahore, revealed, however, that the organization is severely constrained due to absence of technically trained sector specialists and limited human resource (Qasmi, 2019). Customs officials (appraisers and inspector-level officers) carry out the work of surveying production processes and calculating wastages and input-output ratios. They lack the technical know-how for this job and the limited workforce available (the IOCO organization is not perceived as a prime posting for Customs officers) makes it difficult to carry out regular surveys for updating purposes, including the mandatory annual review of input output ratios required under the Duty Drawback scheme. As per international best practices followed in East Asia (China, Korea and Taiwan), the task of

tabulating input output coefficients needs to be carried out by qualified engineers, completely distinct from Customs, with Customs focusing entirely on the implementation of drawbacks and exemptions on the basis of the preformulated and published ratios (Harrold, Jayawickrama & Bhattasali, 1996).

Another impediment faced by the organization is the fact that much of the industrial and export-oriented sector in Pakistan, especially in the areas of Sialkot and Gujranwala, comprises of cottage industry (Qasmi, 2019). Their records are not streamlined and they require training and awareness with regard to correctly filling in their input-output and wastage declarations. 6

It is clear, however, that the input output ratios determined by DGIOCO-Customs are entirely specific to manufacturers cum exporters and manufacturers cum importers and are an integral part of the exemptions regime for export-oriented industries and local manufacturers. For instance, the organization will verify the actual quantity of input goods used and wastage incurred for the manufacture of one unit of output goods of a specific industry. DGIOCO's focus and scope, therefore, does not extend to determining industrial interdependencies in the economy. It is quite limited, as emphasised by Additional Director, Directorate of IOCO-South, Karachi (Mohammad, 2019), and the ratios determined by the organization play no part in macroeconomic policy-formulation especially for enhancing industrial competitiveness. It is in fact the IOTs compiled by the Pakistan Bureau of Statistics as part of the National Accounts series that reflect the industrial interconnections in the economy and can be used for macroeconomic policy-making.

Pakistan Bureau of Statistics (PBS)

PBS is the official agency in Pakistan responsible for the timely collection, compilation and dissemination of statistical data to policy makers, planners and researchers. It publishes a number of reports on various socio-economic subjects.

In 1992-93, a pilot IOT for 1984-85 was produced by the then Federal Bureau of Statistics (FBS) under a Dutch government funded project INAS in sync with SNA 1993. This was followed by a second IOT for the year 1989-90 comprising of a detailed data-set generated by three surveys: ISSMI Large and Small, Agriculture Input-Output Survey (AIOS) and Household Income and Expenditure Survey (HIES) carried out specifically for the purpose. It was published in December, 1996 and was also prepared under the INAS Project (Federal Bureau of Statistics, 2001). The IOT 1990-91 (published in 2001) was developed independently by the National Accounts Wing of FBS, again in line with SNA 93, but with enhanced coverage and relatively better database (Federal Bureau of Statistics, 2001). It included the

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following calculations:

- Supply Table/matrix commodity by Industry
- Use Table/matrix commodity by Industry
- Symmetrical Input-Output Table Industry by Industry
- Direct requirement coefficient matrix Industry by Industry
- Total requirement coefficient matrix Industry by Industry

Unfortunately, IOT 1990-91 was the last IOT to be prepared by PBS which represents a sad state of affairs (Zeeshan & Nasir, 2019). Even when these tables were prepared and published, they were not used by the government for economic policy making, as per feedback from Director National Accounts/Prices, PBS (Rehman, 2019). Several IOTs had also been compiled by individual researchers/research institutes prior to the first official exercise by PBS for the year 1984-85: in 1965 by Rasul for the year 1954; Ahmad in 1964 for the year 1959-60; Norbye in 1985 for 1960; Rasul again in 1966 and Pakistan Planning Commission in 1965 for the year 1975-76 and PIDE (1985) for 1975-76 (Zeeshan & Nasir, 2019). These too were mostly 7

academic exercises which were not really used for informed policy formulation by the government.

In April, 2008, the United Nations Statistical Commission recommended adoption of the 2008 SNA in order to bring the National Accounting framework in line with fresh developments in the economy, particularly as SNA 2008 catered for structural changes in the economy as well as technological advancements in methodology. All countries were expected to update their SUTs and IOs accordingly. However, as pointed out by Director National Accounts/Prices, PBS, Pakistan could not do the needful due to both financial and technical constraints of PBS (Rehman, 2019). In 2014, the Asian Development Bank (ADB) launched Regional Capacity Development Technical Assistance (RCDTA) 8838 for the updating and construction of SUTs for selected developing member economies. Nineteen countries participated in the said Programme, including Pakistan with the objective of implementing the 2008 SNA recommendations through the standard compilation of SUTs. Pakistan prepared SUTs for the year 2010-2011 (despite lack of complete data sets for that year), the results showing that 89% of total supply was from domestic sources, with only 9% share of imports, reflecting that Pakistan's total domestic output was sourced from industrial goods and services (Asian

Development Bank, 2017). During the Programme, technical assistance was provided by ADB through workshops and both direct and online expert support for compilation of data and production of tables. Although, PBS faced limitations of qualified human resource and lack of reliable data on the informal economy during the programme, PBS also benefitted from ADB's technical assistance to the extent that it is now ready to undertake the elaborate exercise of rebasing of National Accounts base from 2005-2006 to 2015-2016 as well as compiling SUTs for 2015-16 (Rehman, 2019). In fact, detailed surveys are presently going on in this regard.

Nevertheless, the fact remains that after construction of SUTs based on 2008 SNA, PBS was supposed to construct IOTs based on 2008 SNA as well but so far, this task has not been initiated (Zeeshan & Nasir, 2019). It is essential, therefore, that updated IOTs based on the 2008 SNA be compiled for effective policy decisions.

PBS, however, faces several issues and challenges in this regard. Firstly, of course, a large chunk of Pakistan's economy continues to be undocumented and part of the informal sector. Consequently, reliable data is not available since many small manufacturers are neither registered with the Securities and Exchange Commission of Pakistan (SECP) nor filing quarterly financial reports. Thus, it becomes next to impossible to compile accurate data for the formulation of input output tables.

Furthermore, there is general lack of commitment in this regard at the highest levels. To make matters more difficult, PBS has now been brought under the Planning Ministry which is likely to dent public perceptions of its impartiality (Rehman, 2019). One of PBS's tasks is to evaluate the planning of the government, and independent evaluation is likely to be compromised once it is a part of the Planning Ministry itself.

PBS also faces structural issues that adversely impact the motivation and morale of its employees. Prior to 2011, it existed as the Federal Bureau of Statistics (FBS) headed by a 8

Director General of BS-21, usually one of the officers who had risen from the ranks of PBS itself and had the necessary institutional memory and technical experience. Post 2011, however, the Pakistan Bureau of Statistics came into being after merger of FBS, Population Census Organization (PCO) and the Agriculture Census Organization (ACO). Consequently, the organization was completely restructured and capacity for work was compromised as no rules and regulations were formulated for promotion etc. Prior to 2011, there was a clear line of promotion right up to BS-21 for PBS employees. However, post 2011, BS-21 posts were abolished and replaced instead with MP1 and 2 positions (Chief Statistician and 5 members) for

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which any qualified individual from outside could also apply. PBS employees could compete for the said posts only after resignation from government service. As a result, the post of Chief Statistician has been vacant for the past two years while the organization has never had five functional members at one time. The crucial post of Member (National Accounts) has been vacant for the past three years despite having been repeatedly advertised (Rehman, 2019). The main flaw in the new system is that PBS is a purely technical organization where practical hands-on experience is an asset. However, members are now not being recruited through the system, which impacts the performance and in turn, the output of the organization according to Director PSLM & Sample Design, PBS (Awan, 2019).

Performance of PBS officials is not only impacted by limited opportunities for promotion to the highest levels but also by the low rates of remuneration they receive, which is not at par with their technical knowledge and expertise. As pointed out by both Rehman (2019) and Awan (2019), PBS has been losing many young PHDs due to dearth of research-oriented activities, lack of motivation, slow promotions and low salaries.

Furthermore, according to Director, National Accounts/Prices, after merger of FBS, PCO and ACO to form PBS, focus was shifted entirely to the census survey, which was previously the purview of the Population Census Organization, and all resources of the erstwhile FBS and ACO were also used for the Census (Rehman, 2019). Therefore, the work done up until then by the FBS suffered. For instance, the census of manufacturing industries that was carried out regularly every five years up until the merger, ceased entirely after report for 2005-2006 was released. The PSLM and Labour Reports both could not be prepared in routine (Awan, 2019).

Another problem is the perception industry has about the industrial and other surveys conducted by PBS for preparation of national accounts and IOTs and SUTs. Due to lack of awareness about PBS's actual role, industry is reluctant to fill out the said forms for fear that they might be used to impose higher taxes on them. They, thus, tend to club the PBS survey teams with tax officials and as a result, response from the industrial sector to these surveys is generally quite poor (Rehman, 2019).

Furthermore, PBS presently has 32 Regional and Field Offices spread across the country including an office in AJK and another in GB. PBS has trained staff of statistical assistants (male and female) in BPS-16 responsible for collection of primary data through various surveys designed by PBS HQ. Regional offices are headed by a Chief Statistical Officer (CSO) BPS-18 with a staff of two to three Statistical Officers (SOs) in BPS-17, and are equipped with vehicles and motorcycles

for monitoring of field staff. However, presently, paper-based data

collection prevails in PBS (except for price data). CSOs and SOs are responsible for credible data collection from the field and they physically visit the field staff to ensure this. Unfortunately, it is impossible for them to monitor each and every enumerator in the field (Rehman, 2019). Since, field staff is allowed TA/DA for field activities in addition to regular salary, there have been cases of abuse of the system when field enumerators are away from office ostensibly for field duties for up to 30 days in order to claim TA/DA allowed to them as per rules.

Finally, there is the issue of limited accountability. Presently, the PBS is operating in a state of limbo. No one at the helm of the government is actually asking about the reports and surveys being conducted or not conducted by PBS (Rehman, 2019). Since the subject is extremely technical, there is limited understanding of the data generated and consequently, it is not used for planning or policy formulation as it is in the developed world. According to Rehman (2019), even the weekly reports pertaining to prices that are regularly compiled and forwarded to the PM Office are not actually used for any policy making, often because there is no one in the PM office who has the requisite technical understanding to interpret statistical reports for policy formulation.

Thus, in view of the above, it emerges that PBS is facing a host of issues that hinder its main function of working on SUTs and IOTs. Even when it was producing the said tables, however, these were seldom utilized for effective policymaking or the allocation of resources by the government as is the norm in the developed world.

International Experience

World over, national statistical institutions/organizations are responsible for the preparation of National Accounts and IOTs. In India, for instance, the Indian Statistical Institute (ISI) prepared IOTs from the late 1950s up to early 1970s, followed by the Central Statistical Organization (CSOrg.) from 1978 onwards, later renamed Central Statistical Office (CSO). The organization has been preparing IOTs at regular intervals of four to six years since IOTs are very much part of the planning process in India (Hiroshi & Hajime, 2009).

In most advanced economies, IOTs are often used to study industrial interdependence in an economy through simulating the economic effects of expenditure either on the output of one or more industries or on a group of specific goods and services. Through these simulations it is possible to understand direct, indirect and induced impacts on GDP including the industries that would benefit the most, how many jobs would be created and assessments of subsidies and indirect

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taxes etc.

As per the Scottish Government website (2019), IOTs generate a comprehensive snapshot of the movement of goods and services in an economy during a particular year, thereby describing the interconnections between consumers and producers and reflecting industrial dependencies. Consequently, most large-scale models of the Scottish economy are based on IOTs – in fact, these accounting tables are regularly used by the government and analysts, including academicians, for detailed study of the Scottish economy and for simulating the impact of 10

various possible economic events. IOTs help model the whole economy and measure complex industrial flows of goods and services on the basis of updated data received from a variety of sources including business surveys and UK National Accounts. National IOTs are, therefore, usually collated some years following the year to which they actually relate (Scottish Government, 2019).

Australia is another good example of a country where IOTs have been used to model the economic effects of an industry on the total output of the country and its importance vis a vis other industries. For example, the Australian Government's Department of Resources, Energy and Tourism (RET) carried out an IO analysis to study the broad contribution of the tourism sector to Australia's economy (Gretton, 2013).

The Australian Bureau of Statistics' IOTs were used and total output multiplier of tourism was estimated at 1.91. It emerged, thus, that for a single dollar earned directly by tourism in the Australian economy, there was value addition of a further 91 cents to other sections of the economy. Tourism's total multiplier (1.91) was, thus, larger than other major industries including retail trade (1.80), mining (1.67) and education and training (1.38) (RET [2011] as cited by Gretton [2013]). This meant that more investment in the tourism sector was likely to make it more competitive and boost economic development much more than investment in other industries.

The same method was used in another case when the tourism total employment multiplier was estimated at 11.4 while the indirect employment multiplier value was 4.04. On the basis of this multiplier, it emerged that an increase of one per cent of tourism direct consumption expenditure of \$80 billion (\$0.8 billion) generated output beyond tourism of \$0.7 billion (in nominal terms) and increase in employment beyond tourism of 2,800 persons (RET [2011] as cited by Gretton [2013]).

Furthermore, an article by Senator Kim Carr (as cited by Gretton [2013]) also used

IOTs to reflect the significance of Australia's motor vehicle manufacturing industry to the economy. On the basis of standard international employment multipliers, the report observed that the motor vehicle manufacturing industry was directly responsible for the wages of 46,000 Australians while simultaneously contributing indirectly to those of at least 200,000 in related manufacturing and service industries. Furthermore, the industry took \$1.3 billion in locally manufactured iron and steel, \$157 million in chemicals and \$444 million in polymer products. It also derived business of around \$2 billion for local wholesale trade and \$1.6 billion worth of professional, scientific and technical services.

Through this analysis, Senator Carr argued that due to the importance and contribution of the motor vehicle manufacturing industry, the government should keep supporting it to enable its continued competitiveness (Carr [2012] as cited by Gretton [2013]).

Similarly, the National Disability Services, Australia, on the basis of an IOT model, observed to a Productivity Commission inquiry, that were only 4 per cent of the people on the Disability Support Pension employed within the community services sector (a comparatively low-paid 11

sector with limited flow-on effects), the economic impact would amount to about \$5 billion dollars. However, were these same people employed across all industrial sectors (according to the workforce percentage working in each major industry sector), the economic impact (both consumption and industrial effects) could be as great as \$25 billion. (Productivity Commission Disability Care and Support Report No. 54 [2011] as cited by Gretton [2013]).

Singapore too uses IOTs to analyze not only value addition within an industry but also dependence of industry on domestic intermediate inputs vs imported intermediate inputs. According to a Department of Statistics Singapore Report, in 2014, Financial and Other services added the highest value to total output (Department of Statistics Singapore, 2019). The study revealed further that for the same year, the Construction sector was most dependent on domestic intermediate inputs whereas transport & storage and utilities sectors had the highest dependence on imported intermediate inputs. It emerged, therefore, that the utilities industry had the highest forward linkage, reflecting the importance of its services to all other domestic industries. Similarly, the construction industry has the highest backward linkages, reflecting its importance for all other domestic industries (Department of Statistics Singapore, 2019).

Input output analysis conducted on the Greek economy on the basis of calculation of

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output and employment multipliers and given the economy's underlying structures, indicated the possible role to be played by certain significant sectors including agriculture, tourism, health services, transport and construction, when formulating the country's growth policies. Results suggested further that improvement of education services and research & development might significantly boost output and employment, thereby promoting knowledge spill overs and innovation practices considered to be important for the production of intermediate and final value-added goods and services of higher quality. This is so because these sectors reflected significant induced effects, suggesting thereby that any improvements/structural changes in these sectors would impact a large range of activities in the Greek economy. For instance, education and research and development could improve the quality and value added of goods and services, thereby enhancing the country's competitiveness. (Athanassiou, Tsekeris & Tsouma, 2014).

An OECD simulation study employing the CGE method on the effect of trade liberalization in Brazil revealed how tariff reductions would affect the economy, consequently enhancing the competitiveness of Brazil's export industry (Arujo & Flaig, 2016). Simulation results based on three policy scenarios (reducing import tariffs on intermediate goods, decreasing existing local content requirements, zero-rating exports in indirect taxes) showed that Brazil's combined exports would likely increase by about 20% with a boost in exports in most sectors barring oil and gas, particularly in the manufacturing sectors. Thus, exports of items like leather products, motor vehicles, electronic and transport equipment, machinery and non-ferrous metals could rise to between 40% and 60%. It was further deduced that removing trade barriers would enable greater assimilation of the Brazilian economy in Global Value Chains (GVCs)

The study also revealed that while maximum gains in aggregate exports would result from removing tariffs on imports of intermediate goods and zero-rating of exports in indirect taxes, 12

the relative impact of all three policies on trade, employment and production would be sector specific (Arujo & Flaig, 2016).

According to results, lower trade barriers would clearly impact the efficiency of the economy, enabling the manufacturing sector to employ a greater share of foreign intermediate goods in production. This would in turn lower the prices of final goods, thereby improving the export competitiveness of Brazilian products and profiting Brazilian households. Furthermore, capital costs would fall and investment would surge, consequently supporting further increase of production (Arujo & Flaig, 2016).

It was further reinforced that trade liberalization would improve employment since lowering the afore-mentioned trade barriers would likely contribute around 1 and half million jobs to the economy. Significantly, creation of jobs was higher for relatively lower skilled occupations, thereby accruing more benefits for lower income groups.

Trade liberalization would also impact demand for labour at the sector level, based mostly on the specific policy shock. In the textile and gas sectors, for instance, job loss was higher than 5%. Although, zero-rating exports reallocated resources away from the gas sector, it reduced job losses in all other sectors where jobs would otherwise be lost following decrease in import tariffs and lower content requirements (LCRs).

Conclusions

Clearly, good data informs effective policy making and provides a solid basis for opting between competing demands and the subsequent allocation of scarce resources. Internationally, National Statistical Organizations/ institutions are responsible for the compilation of SUTs and IOTs which are then used to inform policy-making by respective governments, particularly with reference to efficient allocation of resources to enhance industrial and export competitiveness. Unfortunately, in Pakistan, PBS faces severe financial, technical and human resource constraints and is consequently not able to take on this important role. Furthermore, there is little interest shown by the government in informed decision making for industrial competitiveness. Thus, it is imperative that PBS be strengthened so it is able to take on the role of compiling and constructing SUTs and IOTs as is done by national statistical organizations regionally and globally.

Policy Recommendations

Institutional Reforms in Pakistan Bureau of Statistics

An essential step forward would be autonomy for PBS on the lines of SECP, State Bank of Pakistan etc. It should preferably be made an independent or semi-independent organization in its own right under a Ministry of Statistics with its own resources and financial and administrative autonomy instead of being an attached department under the Ministry of Finance or Planning. In India, for instance, the Central Statistics Office is part of a separate Ministry, the Ministry of Statistics and Programme Implementation. In Sri Lanka, the Department of 13

Census and Statistics is autonomous. Structural reforms would also be required in order to ensure that PBS employees have better promotion prospects within the

ROLE & PERFORMANCE OF INPUT-OUTPUT COEFFICIENT ORGANIZATION IN THE LIGHT OF INTERNATIONAL EXPERIENCE AND WAY FORWARD WITH REFERENCE TO INDUSTRIAL COMPETITIVENESS.

organization, which would be a morale booster for them. Approval for autonomy for PBS and structural reforms within the organization would be required from the Prime Minister Office and the Cabinet.

Strengthening of the Law

While the General Statistics (Reorganization) Act, 2011 provides for conducting an industrial survey, it is quite weak with regard to enforcement of the said area. The penalties prescribed for failure by industries to fill in the industrial survey are too minor to impact compliance. The Act, therefore, needs strengthening with enhancement of penalties for non-compliance by the industrial sector. PBS may propose changes to strengthen the Act for approval by Parliament.

Redesigning of the Questionnaires for Industrial Survey

The questionnaires used for industrial survey are in English, which becomes an issue since not everyone can understand English, thereby adversely impacting response from the industry. Urdu versions of the questionnaires should also be made available by PBS in order to facilitate better responses. Furthermore, the jargon used in the questionnaires is highly technical and not easy to comprehend by the ordinary respondent. It would be advisable, therefore, that PBS redesign the questionnaires adding Urdu translations of all the questions and ensuring that the queries are in laymen's terms that are easily understood.

Proactive Role by PBS

As discussed earlier, there is widespread lack of awareness amongst the stakeholders (including industry) on PBS' actual role. Consequently, there is a perception amongst the general public that the forms and surveys PBS conducts are in some way connected to tax organizations – hence, the low rate of response to PBS surveys, particularly the industrial surveys. Since these surveys form the backbone for preparation of IOTs and SUTs, it is imperative that PBS play a more proactive role in creating awareness and publicity about its own role and the importance of SUTs and IOTs for the national economy and planning. This would include arranging regular awareness seminars and workshops for all stakeholders, including industry so that industry's erroneous perceptions about industrial surveys are managed.

Electronic Solutions & Innovation

Data collection would become far more effective if it was carried out electronically. Director National Accounts, PBS informed, for instance, that for the first time, price data was being collected electronically by PBS through the use of tablets, which also

allowed the supervisory officers to monitor movement of the field staff in real time. Thus, the same practice may be followed for collection of all data that shall feed the IOTs and SUTs, making the process a little less complex, lowering the margin of error and improving the reliability of the data collected. This would also save on petrol and TA/DA. 14

Furthermore, PBS may maintain only a skeleton staff of Statistical Assistants in BPS 16, and young graduates may instead be hired for each data collection activity through tablets. These young graduates would be more comfortable handling electronic gadgets and may be paid a fixed amount per questionnaire. This would save on salaries paid to regular staff and TA/DA claimed by them as well as petrol.

Statistical Awareness and Lack of Accountability

Presently, due to restricted statistical awareness and lack of interest or appreciation of statistics by policy makers across all tiers of government including at the very top, PBS is not really held accountable with regard to any of the reports and surveys it is unable to conduct due to time constraints. This naturally has an adverse impact on the efficiency of the organization. Furthermore, since the subject is extremely technical, there is limited understanding of the data generated and consequently, it is not used for planning or policy formulation as it is in the developed world.

In order to resolve this issue, statistical wings may be set up in the PM Office, Ministry of Planning as well as Ministry of Finance, manned by technical officers from PBS or statisticians recruited for the purpose from the private sector. These wings could then assist the policy formulation wings of the government by interpreting the data of supply use and input output tables in order to facilitate its use for policy formulation.

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