

# India KLEMS

## Capital Input by Industry

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## Objectives of the Study

- ❑ Construct asset-wise capital stock and capital services for India-KLEMS database at industry and aggregate economy level

## Plan of Action

- ❑ Obtain measures of investment in asset categories (IT equipment, communication equipment, other machinery, transport equipment, software, non-residential structures, dwellings), subsequent estimation of capital stocks and user costs of these asset categories
- ❑ Development of price indices for investment and user cost to obtain capital services. The latter are based on internal rate of return, depreciation patterns, tax schemes, and capital gains. Obtain measures of total capital compensation
- ❑ Sources for investment and capital measures are **CSO (National accounts, ASI and NSSO)** databases, where possible extended to obtain greater industry detail and additional breakdowns on the basis of I/O tables (using commodity flow methods) and production statistics
- ❑ Methodological research may focus on topics including measurement of software; treatment of owner occupied housing; analysis of role of land and inventories; hedonic price measures for ICT capital inputs (computers, communication equipment, software); age of physical capital stock; age- efficiency profiles; role of taxation differences; ex post vs. ex ante returns

# Capital Input

- ❑ Capital input along with Labor input will be used in a value added formulation of growth accounting to derive estimates of total factor productivity (TFP) by 31 industries
- ❑ Previous studies on estimation of TFP growth in India have used capital input measured as gross fixed capital stock at constant prices using perpetual inventory method
- ❑ Majority of the studies have utilized three things to arrive at gross fixed capital stock as a measure of capital input – (1) an estimate of bench mark capital stock, (2) time series on gross investment and (3) time series of capital goods price
- ❑ Ahluwalia (1986, 1991), Goldar (1986), Mohan Rao (1996), Balakrishnan and Pushpangadan (1994) and Das (2004) have all constructed estimates of capital input using a capital stock measure following the above procedure

# Capital input in KLEMS

## Capital services using Jorgenson methodology:

Asset-wise capital stock growth rates are aggregated using compensation shares of each asset as weights, so that differences in marginal productivities of these assets are incorporated

- Capital service growth rates are arrived at as the weighted growth rate of individual capital stock, where the weights being the compensation share of each asset type, i.e.

$$\Delta \ln K_j = \sum_k \bar{v}_{k,j}^K \Delta \ln K_{k,j}$$

- Where weights are

$$v_{k,j}^K = \frac{p_{k,j}^K K_{k,j}}{p_j^K K_j}$$

- And individual asset wise capital stock is estimated using Perpetual Inventory Method:

$$S_{k,T} = S_{k,T-1} (1 - \delta_k) + I_{k,T}$$

- And rental prices as

$$p_{k,t}^K = p_{k,t-1}^I i_t^* + \delta_k p_{k,t}^I$$

## Capital Input and India KLEMS

- ❑ The objective is to create a capital services series for the 31 India KLEMS industries for the period 1980-2004
- ❑ The challenge is in construction of a capital services series from a series of capital stock by the 31 India KLEMS industry classification
- ❑ We need capital stock estimates for all detailed asset types and shares of capital remuneration in total output value
- ❑ We consider a FOUR asset classification- Construction, Transport Machinery, Non ICT Machinery and ICT Machinery
- ❑ We also form a TWO asset classification: ICT capital asset and Non ICT capital asset

# Data sources for measuring Capital Input

- ❑ **National Accounts Statistics, CSO**
  - Asset wise Gross Fixed Capital Formation (GFCF) at current prices, 1950-2007 for 9 broad sectors, further de-classified into Public and Private units which have been further divided into Administrative, Departmental Enterprises and Non Departmental Enterprises
- ❑ **Annual Survey of Industries for organized manufacturing**
  - $\text{New\_Purchased} + \text{Used\_Purchased} + \text{New Construction assets} = \text{GFCF}$ 
    - From 1964-65 till 2004-05 with some missing time points
    - The missing values have been interpolated
- ❑ **NSSO surveys on unorganized manufacturing**
  - Rounds 45<sup>th</sup> (1989-90), 51<sup>st</sup> (1994-95), 56<sup>th</sup> (2000-01) and 62<sup>nd</sup> (2005-06)
  - Data for in between years are interpolated
- ❑ **Input-Output tables, CSO**
- ❑ **CMIE's Prowess firm level database**
  - Used in ICT estimation

# Asset Classification in India KLEMS

	NAS	ASI	NSSO	CMIE
<b>Total ICT investment</b>		√	√	√
Software	√			√
Hardware				√
Communication				√
<b>Transport Equipment</b>	√	√	√	√
<b>Machinery &amp; Equipment</b>	√	√	√	√
<b>Land</b>		√	√	√
<b>Construction</b>	√	√	√	√
Non-residential structures	√			
Residential structures	√			
<b>Other assets</b>			√	



# India KLEMS 31 industries and NAS

India KLEMS		NAS	
1	Agriculture, hunting, forestry and fishing	Agriculture, hunting, forestry and fishing	
2	Mining and quarrying	Mining and quarrying	
3	Food , beverages and tobacco	Manufacturing	
4	Textiles, textile , leather and footwear		
5	Wood and of wood and cork		
6	Pulp, paper, paper , printing and publishing		
7	Coke, refined petroleum and nuclear fuel		
8	Chemicals and chemical products		
9	Rubber and plastics		
10	Other non-metallic mineral		
11	Basic metals and fabricated metal		
12	Machinery, nec		
13	Electrical and optical equipment		
14	Transport equipment		
15	Manufacturing nec; recycling		
16	Electricity, gas and water supply		Electricity, gas and water supply
17	Construction		Construction
18	Sale, maintenance and repair of motor vehicles	Trade	
19	Wholesale trade and commission trade		
20	Retail trade		
21	Hotels and restaurants	Hotels and restaurants	
22	Transport and storage	Transport and storage	
23	Post and telecommunications	Post and telecommunications	
24	Financial intermediation	Financial intermediation	
25	Real estate activities	Real Estate, Ownership of dwelling and business activities	
26	Renting of machinery & equipment		
27	Public admin and defence; compulsory social security	Public admin and defence; compulsory social security	
28	Education	Other Services	
29	Health and social work		
30	Other community, social and personal services		
31	Private households with employed persons		

## Investment series by asset types

Our construction of investment series is broadly divided into two parts: investment series for Non-manufacturing sub sectors and investment series for Manufacturing sub sectors.

### STEP-I: Non-manufacturing sectors

- ❑ Data files from NAS containing information on capital formation by industry of use (**Statement 13: GFCF at current prices in Rs Crore**) split into public and private sectors were made available
- ❑ CSO, Government of India provided data on GFCF on NAS sectors by private as well as public sector. For public sector, data was aggregated from Administrative units, Departmental as well as Non Departmental enterprises. The time series provided extended from 1950-51 to 2004-05
- ❑ On matching with 31 India KLEMS industry classification, it was found that this CSO data was only available for aggregate categories: **TRADE, HOTELS AND RESTAURANTS and OTHER SERVICES**. Further, India KLEMS industry # 26: **RENTING OF MACHINERY AND EQUIPMENTS AND BUSINESS ACTIVITIES** was not available from NAS because it is a part of **REAL ESTATE ACTIVITIES** in NAS.

# Investment series by asset types

## STEP-I:Non-manufacturing sectors cont..

- ❑ We have utilized information on value added series for sectors 18, 19 and 20 (as well as 28,29, 30, 31) to create data on GFCF for sectors 18, 19 and 20 (28, 29, 30 and 31).
- ❑ Two methods of computing GFCF values for the above sectors: (1) Y from value added series and (2) L from labor input series. In the first method, we have utilized information (Y1, Y2, Y3 and Y) and (L1, L2, L3 and L). To create GFCF for 18, 19 and 20, (28, 29, 30 and 31) we have in fact  $GFCF * Y1/Y$  or  $(GFCF * L1/L)$  to create GFCF for 18 at current price. Similar for others.
- ❑ A sensitivity check on the two alternative methods were done and value added method of breaking up the broad sectors was preferred.

## Investment series by asset types

### STEP-I:Non-manufacturing sectors cont..

- ❑ NAS files have provided information: Buildings (B), Residential & Buildings, (RB) Non Residential Buildings (NRB), Construction (C), Other construction (OC), Transport equipment (TE), Machinery equipment (ME), Software (only from 1990-00 onwards) (S) by NAS sectors.
- ❑ In public sector, we have information on the following assets - B, OC, TE, ME, S and RB and in private sector we have C, NRB, ME and S.
- ❑ In public sector, we have information separately on TE and ME, whereas in private sector only ME is provided. **If it is the case** that the TE is included in the ME for the private sector, then we can find out the ratio of TE in the total GFCF and then apply the same ratio to break up the ME into TE and ME for the private sector

# Investment series by asset types

## STEP-I:Non-manufacturing sectors cont..

- ❑ Combining public and private, we propose to have a **FOUR** fold asset classification for measuring capital stock .
  - Asset 1** = Building and Construction
  - Asset 2** = Transport Equipment
  - Asset 3** = Machinery and Equipment
  - Asset 4** = Software, Hardware and Telecommunication equipments (ICT)
- ❑ NAS provides information about Software since 1990-00. Before that it was part of Machinery equipments.
- ❑ For KLEMS Capital data we need Software, Hardware and Telecommunication equipments (ICT) as the **fourth Asset**
- ❑ Asset 4 has been extracted from Machinery equipment (detail methodology has been explained later)

# Investment series by asset types

## STEP-II: Manufacturing sectors

Information from two data sources: ASI and NSSO has been used to create the investment series by asset type for the organised and unorganised segments of the manufacturing sub sectors

### STEP-II-1: Organized manufacturing sectors

- ❑ Source: Annual Survey of Industries (Detailed yearly volumes) for registered manufacturing
- ❑ We have utilized information from **BLOCK C: FIXED ASSET** which gives us information on the following asset types:
  - Land
  - Buildings
  - Plants & Machinery
  - Transport Equipment
  - Computer Equipment including Software (from 1998)
  - Pollution control equipment (from 2000 onwards)
- ❑ Land was excluded because CSO does not take LAND into account while constructing GFCF.

# Investment series by asset types

## STEP-II-1: Organized manufacturing sectors

- ❑ These variables of interest are not uniformly available across all years. Further, in some years important variable like TE has been clubbed as Tools, Transport equipment and other fixed assets as one category or combinations of Tools, TE and other assets.
- ❑ **GFCF was defined as new purchased+ used purchased+ own construction** . This information is based on single year's investment series and avoids calculating INVESTMENT as book value of assets in period T and period T-1.
- ❑ Data were collected from detailed yearly volumes beginning 1964 to 1978. CSO [ASI] generated special tables out of BLOCK C from 1983-84 to 2004-05. Adjustments were done using GFCF for selected years wherever required.[1967-68, 1972, 1974 to 1977 and 1979-1982]
- ❑ **With interpolation, we could construct a continuous time series of GFCF by asset types from 1964 to 2004**
- ❑ But some adjustments were necessary so as to arrive at the final GFCF figures for the organised manufacturing sectors.

# Investment series by asset types

## STEP-II-1: Organized manufacturing sectors

- We have obtained published GFCF from ASI. But from 1960-61 to 1971-72, we have Census sector results and from 1973-74 we have factory sector results. We make the whole series as Factory sector compatible by using Factory - Census ratio. We have information for both census and factory sector for the year 1973-74, thus we are scaling up the Census sector results by this ratio

$$\text{Census Adjustment Ratio} = \text{Factory Sector} / \text{Census Sector}$$

- Multiply the census GFCF (from 1964 to 1973) by this census adjustment ratio. And the rest 1973 to 2004, we use the Factory sector results.
- Now we have GFCF for 13 KLEMS organised manufacturing sectors from ASI. NAS publishes aggregate GFCF for organised manufacturing sector and thus the KLEMS 13 sectors GFCF which we have calculated needs to be consistent with NAS published figures. So the industry GFCF for respective KLEMS sector is divided by sum of all 13 sectors GFCF and then multiplied by NAS organised manufacturing GFCF for **NAS consistency**. The asset wise ratios are then applied to create GFCF by asset types. **Thus, we obtain a time series of GFCF for organised manufacturing by asset types.**



# Investment series by asset types

## STEP-II-2: Unorganized manufacturing sectors

- The available unit level data from NSSO on Unorganized manufacturing in India which has been used for constructing unorganized capital series are:

Round 45<sup>th</sup>- (1989-90)

Round 51<sup>st</sup>- (1994-95)

Round 56<sup>th</sup>- (2000-01)

Round 62<sup>nd</sup>- (2005-06)

- The asset type information available in respective NSSO rounds are:

45th round	51st round	56th round	62nd Round
1.Land	1.Land	1.Land & Buildings	1.Land & Buildings
2.Building and other construction	2.Building	2.Plant and machinery	2.Plant and machinery
3.Plant & machinery	3.Other construction	3.Transport equipment	3.Transport equipment
4.Transport Equipments	4.Plant & machinery	4.Tools and other fixed assets	4.Software & hardware
5.Tools and other fixed assets	5.Transport Equipments		5.Tools and other fixed assets
	6.Tools		
	7.Other fixed assets		

- In terms of asset-wise breakup we had to extract out land as a separate asset from 56th and 62nd round. We have used ratio of land to land, buildings and other construction from 51st round and applied to these two rounds.

# Investment series by asset types

## STEP-II-2: Unorganized manufacturing sectors

### Calculating two sets of ratios

- ❑ From NAS we have one figure for unregistered manufacturing GFCF at current price which needs to be broken down into **KLEMS 13 unorganized sectors GFCF** and each of these GFCF across each sector into **three asset types**.
- ❑ From NSSO. We have extracted “Net additions to owned assets during the reference period” across the available asset types for all the KLEMS 13 sectors.
- ❑ For the first task of **breaking the NAS unregistered manufacturing GFCF into 13 KLEMS sectors** we calculated the ratio of each sector’s Total assets (which is sum of all the asset types Net additions to owned assets during the reference period) to aggregate total of 13 unorganized manufacturing sectors. Thus we get **First set of ratio** across four rounds.
- ❑ The second set of ratios which we calculate is to **break the GFCF into three asset types** for each KLEMS sectors. The ratio of respective asset to total asset in each sector is calculated and grouped them into three type of assets (1) Buildings and other Construction (2) Transport Equipments & (3) Plant & Machinery+ Tools & other fixed assets+ ICT

# Investment series by asset types

## STEP-II-2: Unorganized manufacturing sectors

- For building up of our capital series we need to construct the GFCF from 1964-65, but we have only four rounds information. Till 1989-90, we use the same ratio as of round 45<sup>th</sup> (1989-90). For the period during 1990-91 to 2004-05, we use all the four rounds to interpolate, for the years when there are no NSSO rounds, for both the set of ratios using linear interpolation method.

## Breaking NAS Unregister manufacturing GFCF

- We have GFCF at current price from NAS for the whole unregistered manufacturing, we multiply the each year GFCF with the First set of ratio to break it into 13 KLEMS sectors.
- After obtaining sector wise GFCF, the next task is to break the sector wise GFCF into three asset types. This is done by multiplying the sector wise GFCF with the second set of ratio.

## Measuring ICT capital in Indian Economy

- ❑ ICT investments: hardware, communication and software
- ❑ No comprehensive data on ICT investments available yet
- ❑ Available pieces of information include
  - Software investment from NAS since 1990-00
  - Firm level data on GFA in computers, software and communication equipment from CMIE's PROWESS, 1989-2009
  - ASI's ICT investment for organized Manufacturing since 1999-00
  - ICT investment in unorganized manufacturing from NSSO 62<sup>nd</sup> round survey on unorganized manufacturing, 2005-06
  - WITSA estimates on ICT 'spending' by broad sectors of the economy

# Measuring ICT capital in Indian Economy

## Past attempts

- ❑ Jorgenson and Vu (2005)
  - Total Economy
  - WITSA data on ICT spending
  - US investment/spending ratio
  
- ❑ Insufficient for KLEMS purpose
  - Only total economy, no sectoral perspective
  - Inconsistent with available official data
  - US investment/spending ratio might produce biased investment in developing countries

# Measuring ICT investment, making use of available information

## Three-step approach

### STEP-I: Total economy ICT estimates

- ❑ Hardware and Communication equipment
- ❑ Commodity flow approach (Timmer and van Ark, 2005; de Vries et al, 2008)

$$I_{i,t} = \frac{I_{i,s}^{IO}}{\left( Y_{i,s}^{IO} + M_{i,s}^{IO} - X_{i,s}^{IO} \right)} \left( Y_{i,t} + M_{i,t} - X_{i,t} \right)$$

*I=current investment, Y =gross domestic output, M =imports; X =exports; all in asset i. IO refers to input-output tables for benchmark year s, while others are time-series data from NAS*

- ❑ Considers office equipment and machinery as computer hardware and radio, TV and communication equipment as communication equipment.

# Measuring ICT investment, making use of available information

## STEP-I: Total economy ICT estimates cont.

- ❑ Software investment for total economy
  - NAS software investment for years since 1990-00, for total economy and 9 broad sectors
    - For years prior to 2000, aggregate Prowess firm level data to relevant industrial sectors, and compute software/hardware ratio.
    - Apply annual changes in software / hardware ratio from firm-level aggregated data backwards to software/hardware ratio obtained from published NAS data since 2000.
    - Use these interpolated software/hardware ratio, along with estimated hardware investment, to interpolate software investment backwards
    - Sensitivity (using software/hardware spending ratio in aggregate sectors from WITSA)

# Measuring ICT investment, making use of available information

## STEP-II: ICT investment in 31 KLEMS industrial sectors

- ❑ Organized manufacturing sector
  - Total ICT investment in 3-digit industries from ASI for years 1999 to 2004
  - For non-available years, apply changes in Prowess firm level ICT/total machinery investment ratio, aggregated to relevant industry group
- ❑ Unorganized manufacturing sector
  - NSSO ICT investment for unorganized sector for 2005-06, round 62
  - Generate time-series of ICT/non-ICT machinery ratio for years prior to 2005-06 using changes in organized sector ICT/non-ICT machinery ratio, applied to NSSO ICT/non-ICT machinery ratio in 2005-06
  - Use this ratio to generate ICT investments in unorganized sector for non-available years
- ❑ Non-manufacturing sectors
  - Use ICT/non-ICT machinery ratio from Prowess aggregated sectors to non-ICT investment in non-manufacturing sectors obtained from NAS



## Measuring ICT investment, making use of available information

### STEP-III: Benchmark industry wise ICT estimates to NAS/ASI aggregates, to ensure complete consistency with published official aggregates

- ❑ Use the distribution of the sectoral ICT investment obtained in step 2 and apply to the aggregate ICT estimates obtained in Step 1 for non-manufacturing sectors
  - Consistency with NAS and ASI published data at the aggregate level
  - Industry distribution comes from available sectoral data
  - Utilizing information from all available sources
- ❑ Gives complete account of ICT investment by industries for hardware, software and communication, consistent with published aggregates.
- ❑ Problems
  - Inconsistency between aggregated firm level data and published aggregate data for available years (e.g. ASI ICT/INV ratio for total manufacturing vs. Prowess aggregate)
  - Assumes same annual changes in ICT/non-ICT ratio for both formal and informal manufacturing

# Investment series by asset types

## Nominal Investment to Real investment:

- We now have asset wise distribution of investment series for our India KLEMS 31 sectors. The next step us to convert these current price series to real investment.
- We introduce the price deflator or the investment prices for three different assets. In this case we have taken the deflator to be same for all sectors starting from 1950/1964. We use a different deflator for each of our four assets  $A_1$ ,  $A_2$ ,  $A_3$  and  $A_4$  representing Buildings and Construction, Transport Equipment, Non ICT machinery and ICT machinery respectively.
- For ICT assets price deflators are computed using the harmonisation procedure suggested by Schreyer (2002) where US hedonic deflators are adjusted for India's domestic inflation rates
- After converting to real investment series we have to allow for discarding of these capital assets. The rate of discarding or real depreciation rate for asset  $A_1$ ,  $A_2$ ,  $A_3$  and  $A_4$  are based on their length of life time. For land and building assuming it to be 80 years, the rate of similarly for transport equipment its is 20 years and for Non ICT machinery it is 25 years.

Asset	Depreciation rate (%)
Buildings	1.25
Transport Equipments	5.00
Machinery (including ICT)	4.00
Hardware and Software	31.5
Communication Equipment	11.5

# Capital Stock Series by asset type

## Benchmark Capital

- For calculating capital stock using PIM, we need a benchmark capital stock on which we are going to add the real investment series. The benchmark or initial capital stock is prepared from the published net fixed capital stock from NAS, for the year 1950/1964 (the starting year of our data series for non-manufacturing and manufacturing sectors respectively).
- This net fixed capital stock figure needs to be split across asset types and also across industries ( in cases where disaggregate data is not available from NAS, (for e.g. manufacturing, trade, other services). We use the industry wise distribution in the GFCF for these industries to generate a Net Fixed Capital Stock for the 31 sectors. Then we use the asset distribution in each industry to compute the asset distribution of the benchmark capital.
- After getting the asset wise initial capital stock or benchmark capital, we use the PIM to construct our Capital Stock series for each sector from 1950/1964.

$$\text{Capital Stock} = \text{Benchmark Capital} * (1 - \text{Rate of Depreciation}) + \text{Real Investment}$$

## Capital Service Series by asset type

Flow of capital services from each asset is assumed proportional to the capital stock

- To calculate the capital service growth rates from capital stock, we need information on the following:
  - Time series of Capital stock and their growth rates (already obtained earlier)
  - Rental prices
- Rental prices are computed using the following formula where we assume an external rate of return (proxied by average of government securities and prime lending rate):

$$p_{k,t}^K = p_{k,t-1}^I i_t^* + \delta_k p_{k,t}^I$$

- This rental price when multiplied by the capital stock gives us the total rental. The shares of the asset wise rental multiplied with the asset wise capital stock growth rates gives us the growth rate of capital services

**We are therefore able to create a time series of capital services by four asset types all the 31 sectors of the INDIA KLEMS classification.**

# Measuring capital input for Indian industries- Summing Up

- ❑ **Investment in Non-ICT Assets**
  - Transport Equipment
  - Non-ICT machinery (Total Machinery - ICT equipments)
  - Construction
- ❑ **Investment in ICT assets**
  - Hardware
  - Software
  - Communication
- ❑ **Asset wise investment price deflators**
  - Non-ICT from NAS
  - ICT deflators from US hedonics adjusted for domestic inflation rate (Schreyer 2002)
- ❑ **Asset wise depreciation rates**
  - For non-ICT assets, based on NAS life times
  - For ICT assets, EU KLEMS
- ❑ **Bench mark initial capital stock for 1950**
  - NAS estimates of net capital stock
- ❑ **Real Rate of return**
  - External real rate of return, measured as the long term average of government securities and prime lending rate, corrected for consumer inflation

# The capital service estimates

Results to be presented in the  
Workshop

# Further Improvement

# ICT investment Manufacturing-What is available and what is not?

## ❑ What is available ?

- Registered Sector (ASI)
  - Total investment in ICT equipments including software
  - Available for 1999-00 to 2004-05
- Unregistered Sector (NSSO)
  - Net additions to ICT capital for 2005-06, NSSO round 62<sup>nd</sup>

## ❑ What is not available?

- Total ICT investment by asset type
  - ICT equipments (hardware/computers)
  - Communication equipment
  - Software (including own developed software)
- ICT investment series for years before 1999-00 in ASI
- Time-series of ICT investment for unregistered sector



## What we do in KLEMS to construct ICT series for manufacturing?

- ❑ Take total ICT investment for registered sector from ASI for 1999-00 to 2004-05
- ❑ Use software, communication, hardware shares from Prowess
- ❑ Normalize the prowess shares to keep consistency with NAS software/hardware ratio for total economy
  - Aggregate economy hardware and communication investment is derived using commodity flow approach, using input-output tables, international trade and NAS output
  - Aggregate economy software investment is taken from NAS for years after 2000 and are extrapolated backwards using software/hardware ratio.
- ❑ Apply the asset shares to ASI totals to obtain ICT investments in software, hardware and communication equipment
- ❑ For years before 1999 and after 2004, use the changes in prowess ICT/machinery ratio to extrapolate.
- ❑ Generate time-series of ICT/non-ICT machinery ratio for years prior to 2005 -06 using changes in ASI sector ICT/non-ICT machinery ratio, applied to NSSO ICT/non-ICT machinery ratio in 2005-06
- ❑ Use this ratio to generate ICT investments in unorganized sector for non-available years

## What could be Improved?

### ❑ Problems in KLEMS approach

- Inconsistency between aggregated firm level data and published aggregate data for available years (e.g. ASI ICT/INV ratio for total manufacturing vs. Prowess aggregate)
- Assumes same annual changes in ICT/non-ICT ratio for both formal and informal manufacturing

### ❑ What could be Improved in ASI and NSSO?

- Continue collecting this information in the subsequent surveys (the data is not available in ASI after 2004!)
- Provide break-up of capital formation separately for
  - ICT equipments (hardware/computers)
  - Software (own account software, purchase (or customized) software, and pre-packaged software)
  - Communication equipment

- ❑ **If ASI and NSSO provides asset break-up, we can further improve the data using the relationship for available years.**

# India KLEMS

# THANK YOU

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