

Global INTAN Invest

Intangible Assets in the Global Economy
Better Data for Better Policy

Estimating intangible assets for the Indian economy:
methods and data description

Technical report
June 2026

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1 Estimating intangibles in India

This section offers an overview of the sources and methods employed in generating estimates of investment in intangible assets for India, also illustrating the main challenges and methodological strategies followed so far. The goal is to generate estimates for both intangible assets already included in the assets boundary of national accounts – Software and databases, R&D and Other Intellectual Property Products - as well as for those assets not included in GDP, namely Brand, Design, Organizational Capital and Financial product development. The estimates for India refer to the total economy over the years 2011-2023. Notice that the Indian data sources refer to the fiscal year, April to March. Therefore, 2011 stands for April 2011 to March 2012, and so on.

The next subsection provides a description of the data sources that have been explored and adopted to generate measures of intangibles for India.

1.1 Data sources and methods: national account intangible assets

Data on investment in Intellectual Property Products (IPP) are from Indian National Accounts, that provide information on Gross Fixed Capital Formation (GFCF) by industry¹ and four assets at current prices (Table 1).

Table 1: Asset disaggregation. NAS 2023

Variable	Asset
I_Rstruc	Dwellings, Other Buildings Structures
I_Mach	Machinery and Equipment
I_Cult	Cultivated Biological Resources
I_IPP	Intellectual Property Products (IPP)

To get intangible asset disaggregation for India comparable with other countries covered by Global INTAN-Invest it is thus necessary to identify proper indicators to split investment in Intellectual Property Products into Software and Databases, R&D and Other intellectual

¹ Availability of data by industry is not homogeneous across the national account indicators. Table 7 in Appendix A summarizes the industries' grouping for the different indicators in the NAS. The column Capital indicates the industries available for all indicators related to GFCF from the NAS.

property products. To this purpose, we use the information on gross fixed capital formation by product gathered from the Indian Supply and Use Tables (SUTs) to estimate specific weights that are then applied to IPP investment to get the individual assets. More specifically, the weights refer to the following product categories from the SUT: Research and Development Services' (product code 132), 'Computer-related services' (product code 135), and 'Recreation, entertainment and radio & TV broadcasting and other services' (product code 140) as summarized in Table 2.

Table 2: Asset from Use Table to build IPP category

Code	Product	Asset disaggregated	Asset broad category
132	Research & Development Services	Research & Development Services	Research & Development Services
135	Computer related services	Computer software and database	Software and database
140	Recreation, entertainment and radio and TV broadcasting and other services	Entertainment, literacy or artistic originals	Other intellectual property products

Figure 1 shows the share of individual assets over total IPP indicating a considerable decrease in the share of R&D (panel b), and a surge in the share of Software and database (panel c)².

Considering these patterns, we have explored also an alternative computation approach to better capture the trends for each asset³.

² See appendix for more details about individual asset dynamics.

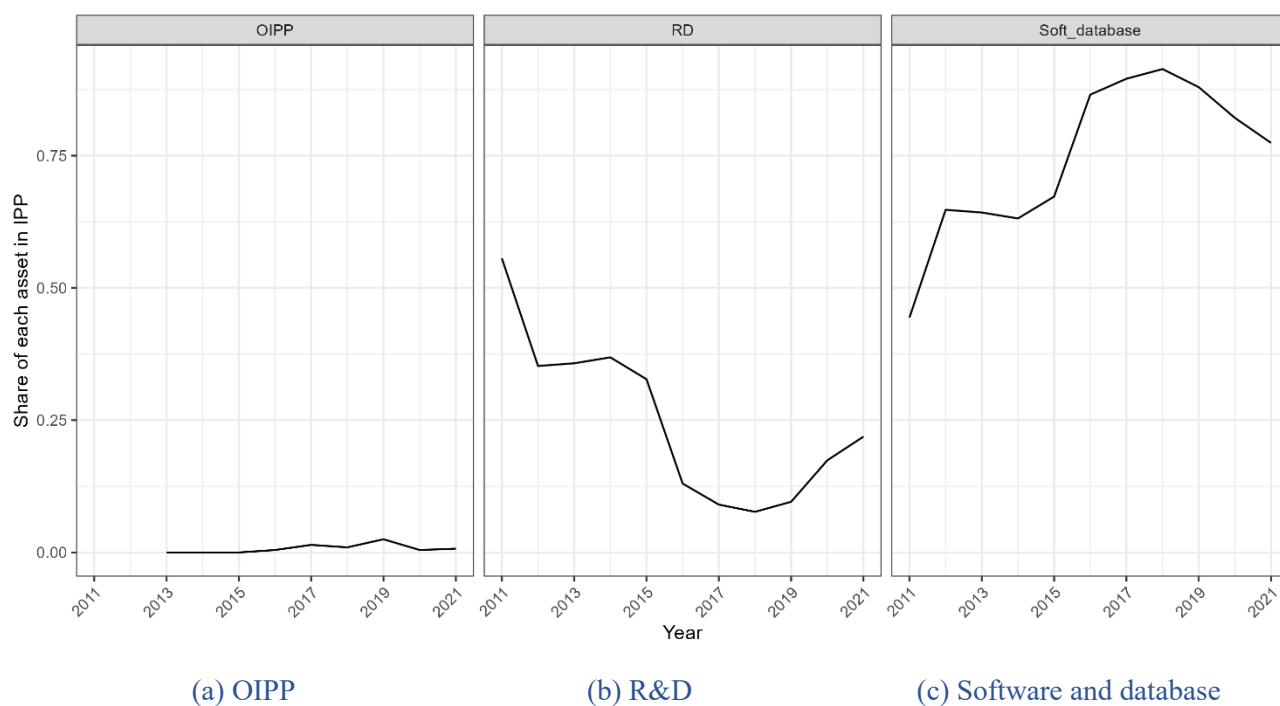
³ The procedure is in three steps as follows:

$$\begin{aligned}
 R\&D &= \frac{R\&D_{SUT}}{GFCF_{SUT}} \times GFCF_{NAS} \\
 Soft_DB &= \frac{Soft_DB_{SUT}}{GFCF_{SUT}} \times GFCF_{NAS} \\
 OIPP &= GFCF_{NAS} - R\&D - Soft_DB
 \end{aligned}$$

Where subindexes refer to Supply and Use Tables (SUTs) and National Accounts (NAS).

This approach allows to tackle two issues. First, we avoid overestimating the drop in R&D, and secondly, we can better capture investment in OIPP likely underestimated with the current approach.

Figure 1 Share of OIPP, R&D and software and database in IPP over the sample period



Finally, estimates of GFCF by asset and industry at constant prices, are produced resorting to the implicit price indexes (IPIs) of output for the industries related to the production of these assets from NAS 2023. Table 3 shows the industries of reference for each type of asset.

Table 3: Correspondence between Industries and Asset

Asset	Industry
Dwellings, Other Buildings Structures	Construction
Machinery and Equipment	Manufacture of machinery & equipment n.e.c
Cultivated Biological Resources	Crop Sector
Research and Development	Professional, scientific & technical services including R&D
Software and database	Information and computer related services

1.2 Estimating intangible assets beyond the boundaries of GDP

Estimates of investment in Design, New Financial Products, Brand, and Organizational Capital for Global INTAN Invest are generated adopting the same expenditure approach as in EUKLEMS&INTANProd (see Corrado et al (2022) and Corrado et al (2024) for overview), and usually adopted to estimate gross fixed capital formation in official national accounts.

There can be two different expenditures: firms purchase intangible assets from external sources (purchased components) and/or produce them internally for their own use (own-account components). In terms of data sources, the former relies on the Use Tables from the National SUTs Tables, whereas the latter are estimated based on the Indian Employment and Unemployment Survey (EUS) and Periodic Labour Force Survey (PLFS). However, due to data limitations, we make some methodological assumptions to construct a time series comparable to other countries. In the remainder of this section, we describe the data sources and methodology in further detail for each component for the total economy.

1.2.1 Methods and sources: purchased component.

The main variable and data source for estimating the purchased component of intangibles is intermediate consumption from the Use Tables. The National Accounts Division from the Ministry of Statistics and Programme Implementation from India produces the SUT Tables for the period that goes from 2011-12 to 2021-22. The Indian Use Tables provides information on 66 industries following the SUT 66 Sector Industry Classification⁴. Only agriculture and

⁴ The SUT 66 Sector Industry Classification is a classification of industries that is close to NACE Rev 3.1, though there are some differences.

manufacturing are further disaggregated into 2-digits, while the remaining sectors are more aggregated (Table 7 in Appendix A shows the industry availability in the Indian SUT). The SUT Tables are in Lakh Rupees up to 2015 and from 2016 in Crore Rupees. We converted everything into Crores before 2016, as the national accounts are measured in Crores.

The first limitation that we face is that the assets of interest (attributed designs, market research and brand, and operating models) are all included in an aggregate category under the product ‘Other Business Services’ (OBS). More specifically, the definition of OBS from the Indian SUT Tables is as follows: “Professional, technical and other business services such as consultancy and management services, accounting, bookkeeping, architectural services, engineering services, specialty design services, advertising services etc”.

Table 4 summarizes the correspondence between the reference CPA products in the use tables used by EUKLEMS&INTAN-Prod and their codification in the Indian Use Tables.

Table 4: Comparison between EU and India assets

Asset	EUKLEMS & INTAN-Prod	India Use Tables
Attributed designs	Architectural and engineering services, technical testing and analysis services (CPA M71)	Included in Other business services
Market research and brand	Advertising and market research services (CPA M73)	Included in Other business services
Operating models	Management consulting services (CPA M702)	Included in Other business services

Notes: This table presents the classification of assets in the EUKLEMS & INTANProd database (second column) and the Indian SUT Tables (third column).

To break the OBS category into the three assets, we assume that expenditure on these assets is proportional to the share of employment in this sector. Hence, we estimate a weight using the information from the PLFS⁵. More specifically, we estimate the share of employees in the industries that correspond to each of the three assets for each data source. The equation is as follows:

⁵ For the details of the PLFS data source refer to section 3.1.3.

Where $i \in \{69, \dots, 75\}$ and n_i is the share of employees in asset a , and N_i is the number of employees in industry i .⁶

From the PLFS, we compute the number of employees for 2017-18 to 2021-22 to estimate the yearly shares of employment by sector. We then compute the average of the shares by industry across years, which results in a time-invariant weight.⁷ Figure 11 in Appendix B shows the results.

Once we split the OBS components into our three assets of interest, we need to identify which part of the expenditure corresponds to the production of the individual asset. Then, to generate investment by assets, we use the same capitalization factors that are applied to the European countries as in EUKLEMS&INTAN-Prod⁸, taking the average across countries and industries by year.

⁶ We exclude industry 72 ‘Scientific Research and Development’ as in the Indian SUT Tables this asset is estimated separately (so it is not included in OBS).

⁷ Figure 12 in appendix B shows the evolution of the shares over time by industry.

⁸ See Bontadini et al (2023) available at <https://euklems-intanprod-lee.luiss.it/documentation/>

Table 5: Industries used for computing the weights - PLFS & Economic Census⁹

Other Business Services	Attributed design	Architectural and engineering services; technical testing and analysis (71)
	Market research and brand	Advertising and market research services (73)
	Operating models	Services of head offices; management consulting services (70)
	Rest	Other professional, scientific and technical services (74)
	Rest	Veterinary services (75)
	Rest	Legal and accounting services (69)

Overall, the estimation of the purchased component can be obtained as follows:

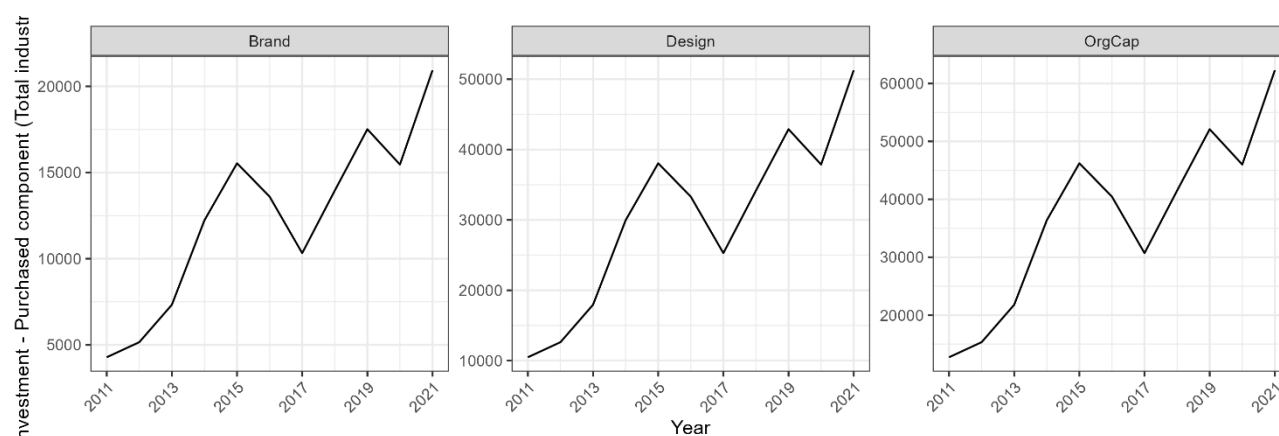
Where $I_{a,t}$ is investment in purchased component for asset a at time t for the total economy; α_a is the share of asset a estimated the previous equation, $C_{a,t}$ is the intermediate consumption in OBS at time t for the total economy, and β_a is the capitalization factor of asset a at time t .¹⁰

Figure 2 shows the estimation results for the total economy across three key assets: Brand, Design, and Organizational Capital. Notably, the weights used to identify these assets remain constant over time, implying that the dynamics is the same. However, Figure 2 indicates that Design and Organizational Capital are the most significant assets for the purchase components.

⁹ The industries labelled as ‘Rest’ are not included in our assets of interest, but rather in OBS. So we take them into account to compute the employment shares.

¹⁰ In order to compute the capitalization factor, we have taken the average of the coefficient across European countries by industry-year. To estimate total economy, the average was computed across countries and industries. Note that this last step is different to what is done in the EUKLEMS&INTANTProd, where the total is the aggregation of industries.

Figure 2 Estimates of purchased component. (in rupees, crore)



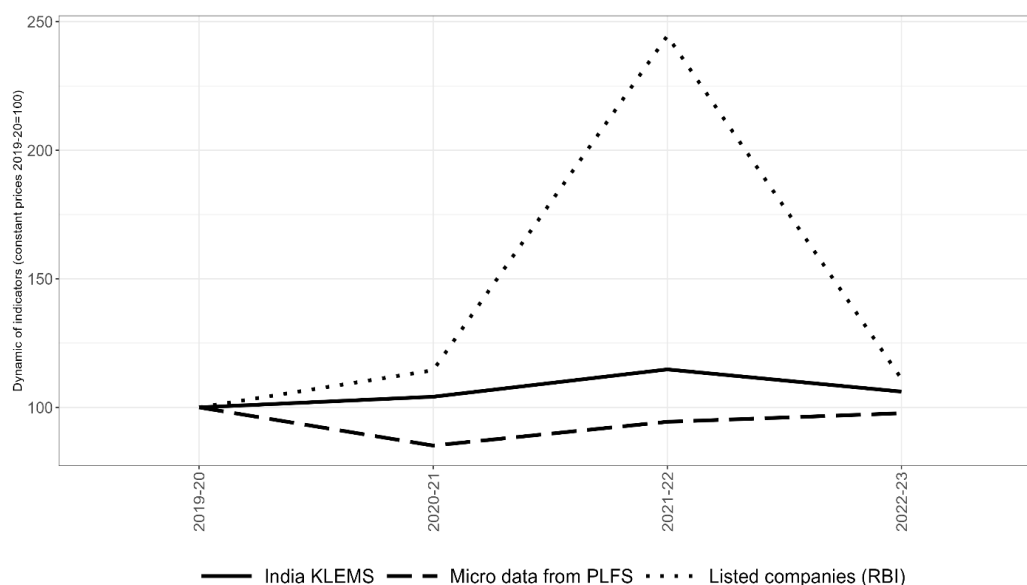
Extrapolating purchased component forward

As the Supply and Use Tables are available until 2021-22, we extrapolated it forward. To this end, we carefully assessed some potential indicators to extend the ‘Other Business Services’ asset from the SUT.

The first candidate is the sales turnover indicator for the industries that are related to the asset of interest in Other Business Services. More specifically, the indicator is obtained from the “Performance of Listed Non-Government Non-Financial Companies according to Industry” from the Database on Indian Economy, released by the Reserve Bank of India. The main drawback of this indicator is that it only covers listed companies, which are not representative of the dynamic of the total industry, as they only cover less than 1% of total output. Considering this limitation, we also evaluated two other indicators reflecting the dynamic of employment in the sectors included in ‘Other Business Services’ (refer Table 5 for details on the industries). The first is the employment trend from the India KLEMS in the Business Service sector and the other is the analogue computed using microdata from the PLFS.

Figure 3 Dynamic of the proposed indicators to extrapolate the purchased component (2019-20 = 100) shows the dynamic of the indicators from the baseline year 2019-20. It immediately stands out that sales dynamic from the RBI and employment dynamic from India KLEMS and PLFS differ widely. Although small, there are some non-negligible differences also between the dynamic of employment from the India KLEMS and the PLFS. The former indicator suggests an increase in employment of around 6% between 2019-20 and 2022-23, while the latter indicates a decrease of slightly more than 2%.

Figure 3 Dynamic of the proposed indicators to extrapolate the purchased component (2019-20 =



Considering the enormous growth of the sales indicators for listed companies in 2021-22 and its low representativeness of the performance of the Other Business Services industry as a whole, we preferred to use the employment-based indicator from India KLEMS.¹¹ It is worth noting that the most recent year available in the India KLEMS employment data is 2022–23. To extrapolate values for 2023–24, we assume the same evolution rate as observed in 2022–23, which implies that employment growth between 2023–24 and 2022–23 is equal to that between 2022–23 and 2021–22.

The release of the new SUTs for 2020–21 and 2021–22 provides an opportunity to empirically assess the performance of our indicator to extrapolate the purchase component. Specifically, we compare the new series with the updated SUT data with the previous series for India, in which the values for the purchase component for 2020–21 and 2021–22 were extrapolated using the approach described above. The results indicate that overall differences are minor, except for 2021–22, where the decline in intangibles is more pronounced when using the actual SUT data. The results are presented in Table 10 of the appendix.¹²

1.2.2 Own-account components

We estimate the own-account component for organizational capital, brand, design, and new financial products drawing upon a cost-based approach, following the same EUKLEMS&INTANProd (2023) procedure adopted for the rest of the countries. This method is

¹¹ For the sake of comparison, we have also computed the estimations with the employment indicator obtained from the PLFS microdata. While the non-national accounts intangibles show an increase when computed using the indicator from the KLEMS, they show a decrease when they are extrapolated with OBS from the PLFS (see Figure 13 in the appendix).

¹² It is worth noting that in the latest release of the national accounts, the Indian statistical office has adjusted GDP and components for the year 2022-23.

consistent with national statistical offices' procedures to compute own-account investment in software and databases. To conduct this estimation, it is necessary to collect information on the number of employees and their wages by occupation and industry. Further, it also requires data on the compensation of employees to harmonize the estimations with national accounts. Finally, a blow-up factor is needed to account for other cost components besides the compensation of employees (intermediate consumptions, capital services and net taxes on production) and obtain a measure of output consistent with national accounts definitions. The steps to compute own account investment are described in detail in Box 2. It is worth noting that while Box 2 explains the computation at the industry level, the only asset that is computed at the industry level is New Financial Products (NFP), which is only produced in the financial services industry. The remaining assets are estimated for the total economy.

The main information is gathered from the Periodic Labour Force Survey (PLFS) which is available on a quarterly basis from 2017-18 onward from the National Statistical Organization (NSO). To extend the series backwards, we use the Employment and Unemployment Survey (EUS). This survey is the previous version of the PLFS and was conducted every four/five years between 1972-73 and 2011-12 by India's National Sample Survey Office (NSSO). Both data sources provide information on the number of employees by occupation at the three-digit level of the National Classification of Occupations (NCO) 2004, which is compatible with the International Standard Classification of Occupations (ISCO) 88. The economic activity is available at 2- and 5-digit levels (depending on the variable) from the National Industry Classification (NIC) 2008, which is compatible with the International Standard Industry Classification Rev. 4. Although the main advantage lies in the consistency of the main classifications between the two data sources, there have been several changes in the latter that are likely to impact the estimations. We will provide a brief description of these changes later in this section.

In what follows we will describe the major characteristics of the databases used to compute the own-account component, then we describe in detail the methodology. The main variables and sources are the following:

Compensation of Employees (NAS 2023) The data on compensation of employees (hereafter, CE) is available from 2011-12 onward for 24 NAS industries (column 'NAS curr prices' in Table 6 shows the details of industry availability for this indicator). It is at a higher level of aggregation in comparison to the data from the SUT Tables and the PLFS/EUS.

Periodic Labour Force Survey (PLFS) The PLFS is conducted on a quarterly basis since

2017-18. It is the main source to estimate the level and change of the main labour force indicators such as worker population ratio, labour force participation rate, and unemployment rate, among others. It covers almost all the Indian Union, except for the villages in Andaman and Nicobar Islands due to accessibility constraints. For the urban areas, it relies on a rotational panel sampling of two years duration. Therefore, each household in urban areas is visited four times. This means that 75% of the urban sample coincides between consecutive quarters. For rural areas, samples for all eight quarters are determined before the beginning of the survey and they remain the same throughout. A multi-stage design with stratification is used. The first stage units (FSU) comprise the Urban Frame Survey (UFS) blocks in urban areas and for rural areas the 2011 Population Census villages (Panchayat wards for Kerala). Households constitute the ultimate stage units (USU). For large FSUs, an intermediate stage unit, named hamlet group/sub-block, is also used.

Employment and Unemployment Survey (EUS) 2011-12 Round. The coverage of the survey embraced the entire Indian Union, except for the interior villages of Nagaland situated beyond five kilometres of the bus route and the villages in Andaman and Nicobar Islands. The period of the survey is extended throughout the year, from 1st July 2011 to 30th June 2012. There are four sub-rounds of three months' duration along each FSU that should be surveyed.¹³ It has a multi-stage stratified design. The first stage units (FSU) in the rural sector are the 2001 census villages (Panchayat wards in the case of Kerala) and in the urban sector the Urban Frame Survey (UFS) blocks in the urban sector. The ultimate stage units (USU) are the households.

Main changes between PLFS and EUS. One of the main changes between these two data sources is the sampling framework. In particular, the PLFS attributes greater weight to the skilled population in comparison to the unskilled population. In practice, this implies that when comparing the EUS 2011-12 and the PLFS 2017-18, there is a remarkable drop in low-educated workers (Goldar, 2023). Nevertheless, the India KLEMS still uses the information from the previous rounds of the EUS and the PLFS to compute the labour indicators (Chattopadhyay et al., 2023). Further, they estimate the years not available between the EUS and the PLFS by simple interpolation, following the procedure used in India KLEMS (Chattopadhyay et al., 2023).

1.3 Methodology to compute own-account.

¹³ However, due to weather conditions there are some villages that are not interviewed in all sub-rounds.

To estimate own-account intangible investment we need to compute the wage bill share by occupation-industry-year from our micro-data sources. The first step is then to identify the relevant occupations associated with the production of our assets of interest consistently with EUKLEMS&INTANProd (2023), where the relevant occupations are classified at 3-digit level of the ISCO-08 classification. But as the Indian micro-data provide information at NIC-2004 until 2020-2021, which corresponds to ISCO-88, some adjustments to map the two classifications are necessary. Therefore, in order to identify the occupations that are relevant for our assets of interest we adjust the time allocations that were originally built under the ISCO-08 for the European countries to the occupations of interest in ISCO-88. The rationality behind this is that most of the relevant ISCO-08 occupations at 3-digit levels are found within the 4-digit ISCO-88. Thus, the time allocation can be adjusted by assuming a certain proportionality of the 4-digit occupations within the 3-digit categories. Table 8 in Appendix I shows the steps for adjusting the coefficients.

As of 2021-22 the PLFS implemented the NCO-2015 classification which is compatible with ISCO-08. Therefore as of this year we use the same occupations and time assumptions as we used for European countries.

It is worth noting that given that there is no year overlap between the two classifications NCO-2004 and NCO-2015, it is not straightforward to harmonize the series. To do this, the original investment values for the period 2011/12 to 2020/21 were adjusted by extrapolating backwards the newest time series. To do this, we first estimated the value for 2020 by deflating the 2021 value using the relative change in the wage bill index between 2020 and 2021. Specifically, for organizational capital, the 2020 value was computed as the 2021 investment value divided by the ratio of the wage index in 2021 to that in 2020. A similar correction was applied to other asset types using their respective wage indices.¹⁴ This adjustment eliminates the discontinuity at 2020 and ensures a smooth transition in the time series.

¹⁴ Note that for organizational capital, we use the wage bill for the managers (ISCO broad category 1), while we use ISCO category 2 for the wage bill index for Brand and Design.

BOX 2. STEPS TO COMPUTE INVESTMENT IN OWN-ACCOUNT FOR EACH YEAR OF THE PLFS

1. We compute the wage bill in occupation o and industry i (W_{oi}) by multiplying the average wage ($\bar{w}_{oi}$) and the total number of employees (N_{oi}) in each occupation-industry cell.

$$W_{oi} = \bar{w}_{oi} \times N_{oi},$$

2. We assume that workers employed in a certain occupation o that produces asset a spend $x\%$ of their time in the production of the asset of interest. We then multiply the wage bill in each occupation-industry cell by the time allocation coefficients that correspond to each asset of interest.^a

$$W_{oi}^a = W_{oi} \times \tau_o^a, \quad \tau_o^a \in \{0, 1\}$$

Where τ_o^a is the time allocation coefficient for occupation o and asset a

3. We aggregate the wage bill across all occupations involved in the production of each of the assets by industry.

$$W_i^a = \sum_o W_{oi}^a,$$

4. We compute the total wage bill in each industry by multiplying the average wage and the total number of employees in each industry.

$$W_i = \bar{w}_i \times N_i,$$

5. We compute the ratio between Step 3 and Step 4 for each of the four assets.

$$\omega_i^a = \frac{W_i^a}{W_i},$$

^aIn principle, we are using the same time allocations that are used for the European countries. Nevertheless, this might be revised in a later stage.

BOX 2. STEPS TO COMPUTE INVESTMENT IN OWN-ACCOUNT FOR EACH YEAR OF THE PLFS

6. We multiply the shares obtained for each asset-industry in Step 5 (ω_i^a) by CE in each industry, ensuring compatibility with national accounts. In this sense the labor cost of asset a for industry i is given by:

$$CE_i^a = CE_i \times \omega_i^a,$$

7. Finally, we apply the blow-up factors. The main assumption of the cost-based approach is that the value of an asset can be obtained as the sum of the costs sustained for producing it. The benchmark equation to be estimated is as follows:

$$Y_i^a = CE_i^a + IC_i^a + CK_i^a + T_i^a,$$

where a is the asset type, Y is the value of the produced asset a at basic prices in industry i , CE_i^a is the labor cost of the relevant personnel measured as compensation of employees, IC_i^a are intermediate costs related to the activity, CK_i^a refers to the costs of capital services and T_i^a to net taxes on production related to these activities. The labor cost component can be estimated based on data on employment of relevant occupation, but other costs component can hardly be observed and needs to be estimated. The standard approach, adopted in EUKLEMS&INTANProd too, is to account for the sum of these components by multiplying the estimated labor cost component by a blow-up factor, bp_i^a . Thus, the value of the produced asset is determined as:

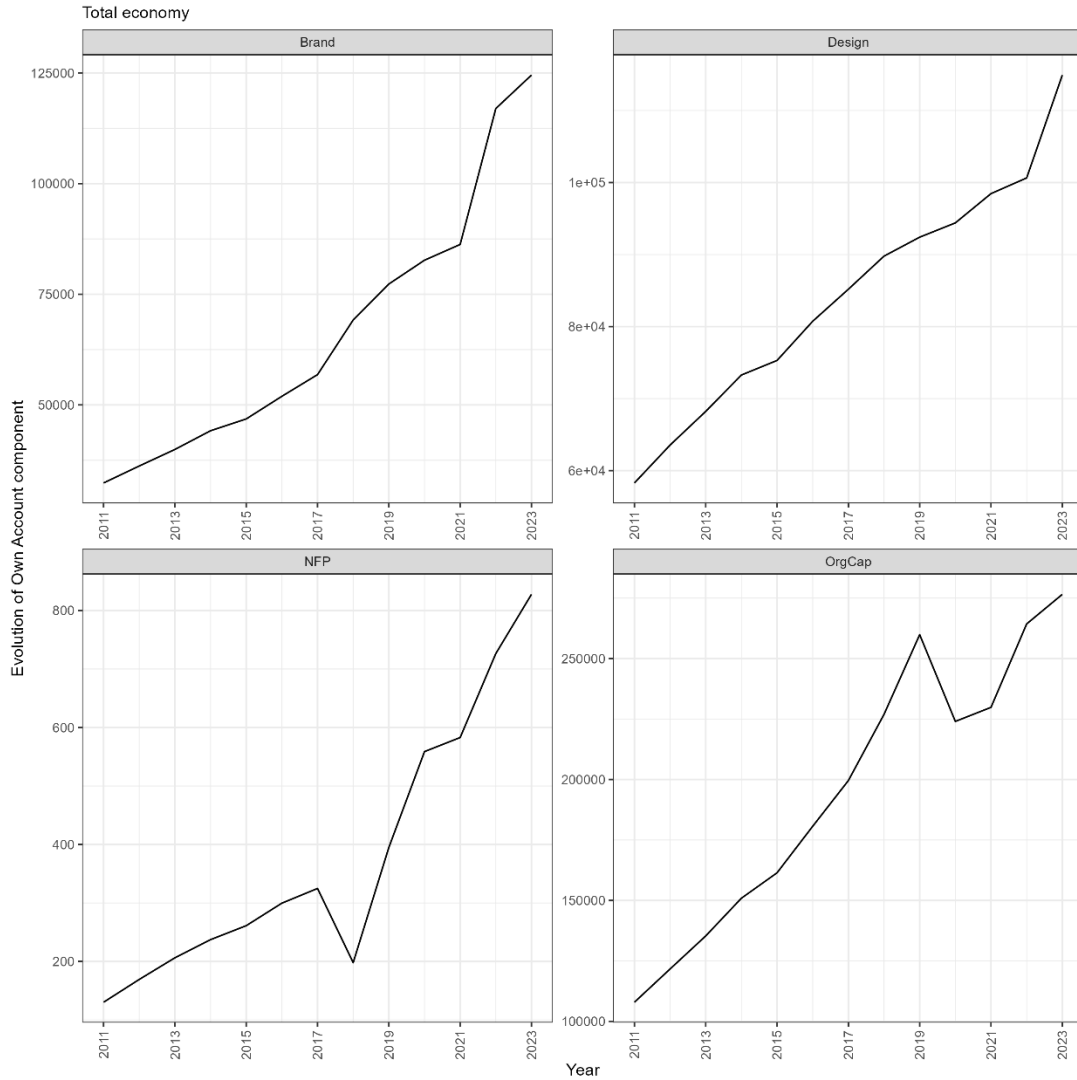
$$I_i^a = CE_i^a \times bp_i^a$$

where bp_i^a is a blow-up factor that accounts for other cost components besides the compensation of employees and essential to develop a measure of output consistent with national accounts.

1.4 Results own-account component

In this section, we present the results of the estimation of the own-account component. Figure 4 shows the dynamics of the own-account component of investment in Brand, Design, and Organizational Capital, where the first two assets decrease in 2018 and 2019 while by contrast Organization capital increases along the years.

Figure 4: Investment in non-NA intangibles own-account component. PLFS



2 Measuring Real Intangible Investment

To convert nominal intangible investments into constant prices we deflate each asset with the IPIs of gross output for industries that are similar to the assets of interest. In this respect, for Brand, Organization Capital, and Design, we use the implicit price index of the sector “Professional, scientific & technical services including R&D”, while for new financial products, we use the IPI from the “Financial Services” sector.

3 Empirical evidence on intangible investment in India

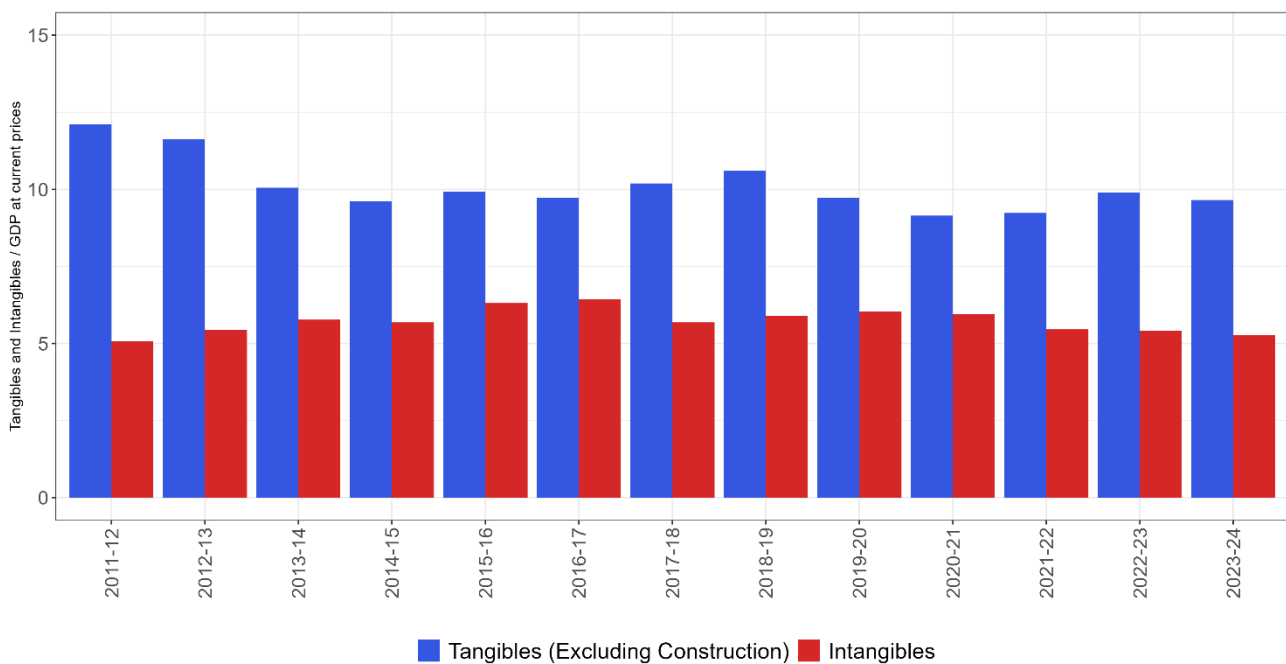
In this section, we will present the main results related to the share of tangibles and intangible assets for the total economy in India. It is worth reminding two important points. First, the fiscal year in India goes from April to March. For simplicity, we keep the year of the first half to refer to the whole fiscal year. Therefore, 2011 refers to the period that goes from April 2011 to March

2012. Secondly, the most robust estimates of intangible assets not measured in national accounts are only available until 2021-22, because this is the last year for which the SUTs are currently available. From 2022-23 onwards, we present preliminary estimates extrapolating the purchase components as explained in Section 1.2.1.

Figure 5 shows the share of Tangibles (excluding construction) and Intangibles in GDP at current prices. The share of total intangibles increased over time. In 2011-10, intangible assets accounted for 5%, while the share increased to 5.3% in 2023-24 ¹⁵¹⁶.

Figure 6 shows the trend of tangibles and intangibles assets at constant prices suggesting that intangible assets have been growing at a faster speed than tangible assets since 2011-12, driven by national accounts intangibles.

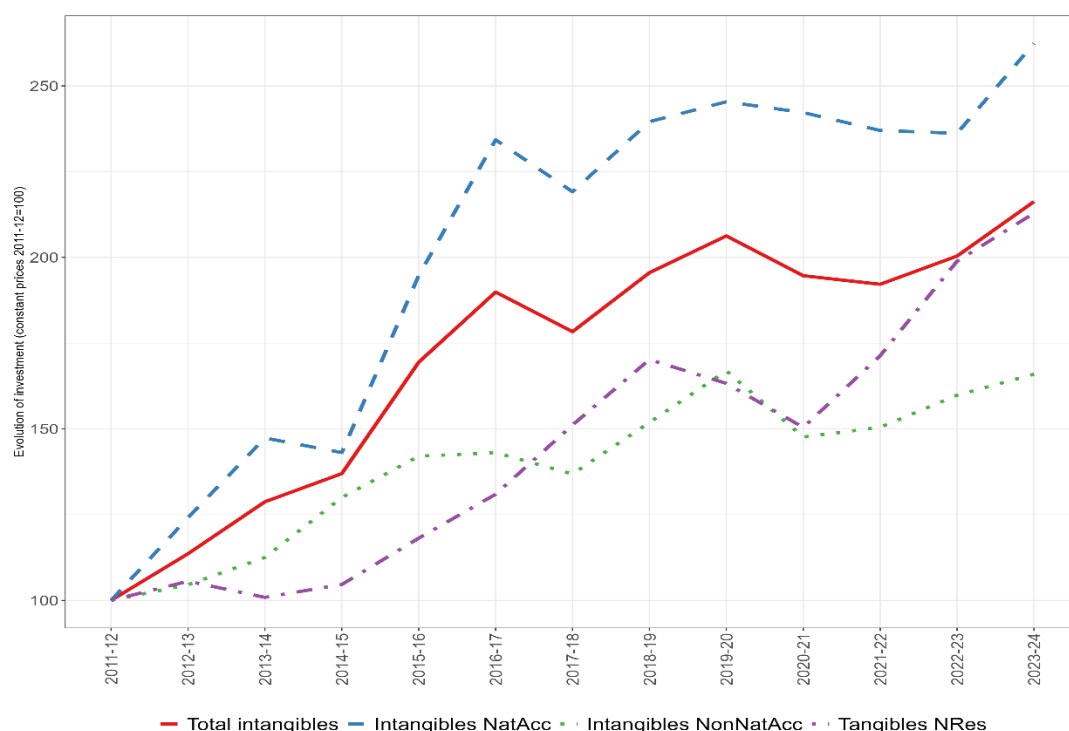
Figure 5: Share of Tangibles (Non-Residential) and Intangibles



¹⁵ In the appendix, Figure 14 shows that the pattern observed for the case of constant prices is very similar.

¹⁶ Table 9 shows the growth rates at current prices of GDP, tangibles, and intangibles.

Figure 6: Evolution of investment in Tangibles (Non-Residential) and Intangibles at constant prices with respect to the initial year. 2011-12=100



In the remainder of the section, we will focus on the composition of intangible assets. The figures are at current prices, though they are extremely similar at constant prices. National accounts intangibles account for more than 50% of the share in total intangibles (Figure 7), mainly driven by Software and databases (Figure 8). Moreover, Figure 8, also highlights a dramatic increase in the share of Software and databases, at the expense of R&D, which has been decreasing over the sample years. Figure 9 shows the composition of the non-national accounts assets.

Organizational capital accounts for the largest share. In 2011-12 the share was 54.33%, while it increased to around 58% in 2022-23.

*Figure 7: Share of National Account and Non-National Accounts in total intangibles
(at current prices)*

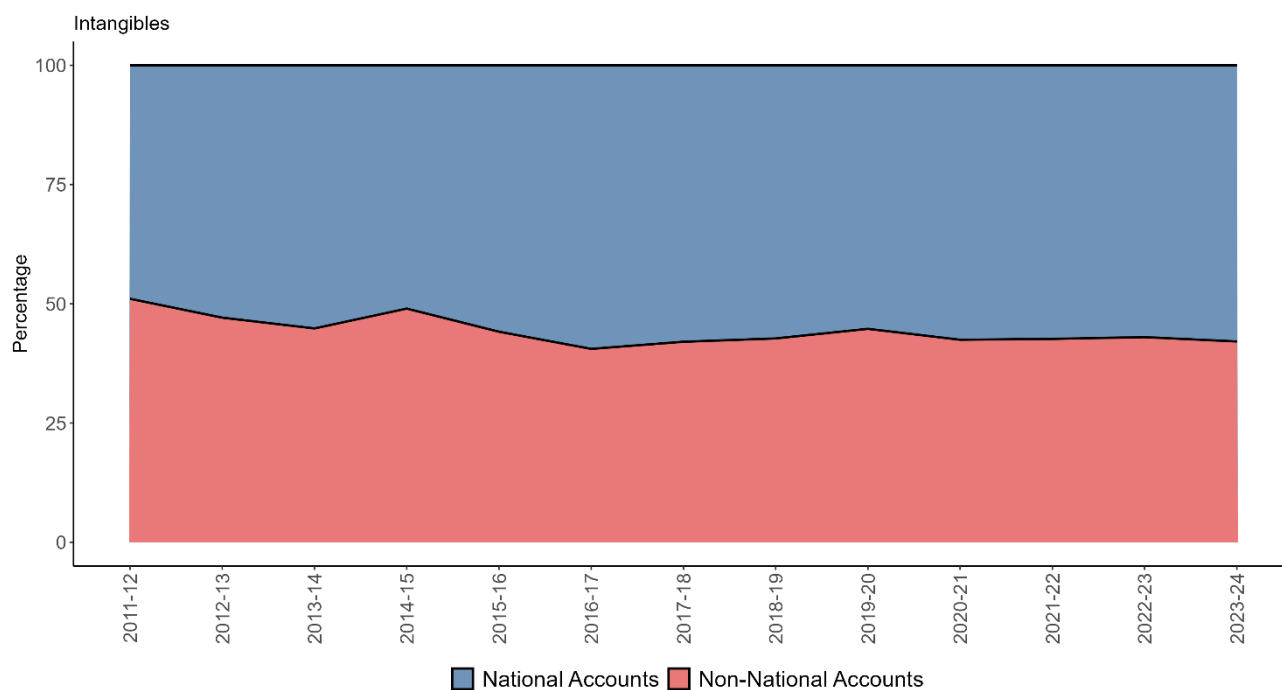


Figure 8 Composition of the assets measured in National Accounts (at current prices)

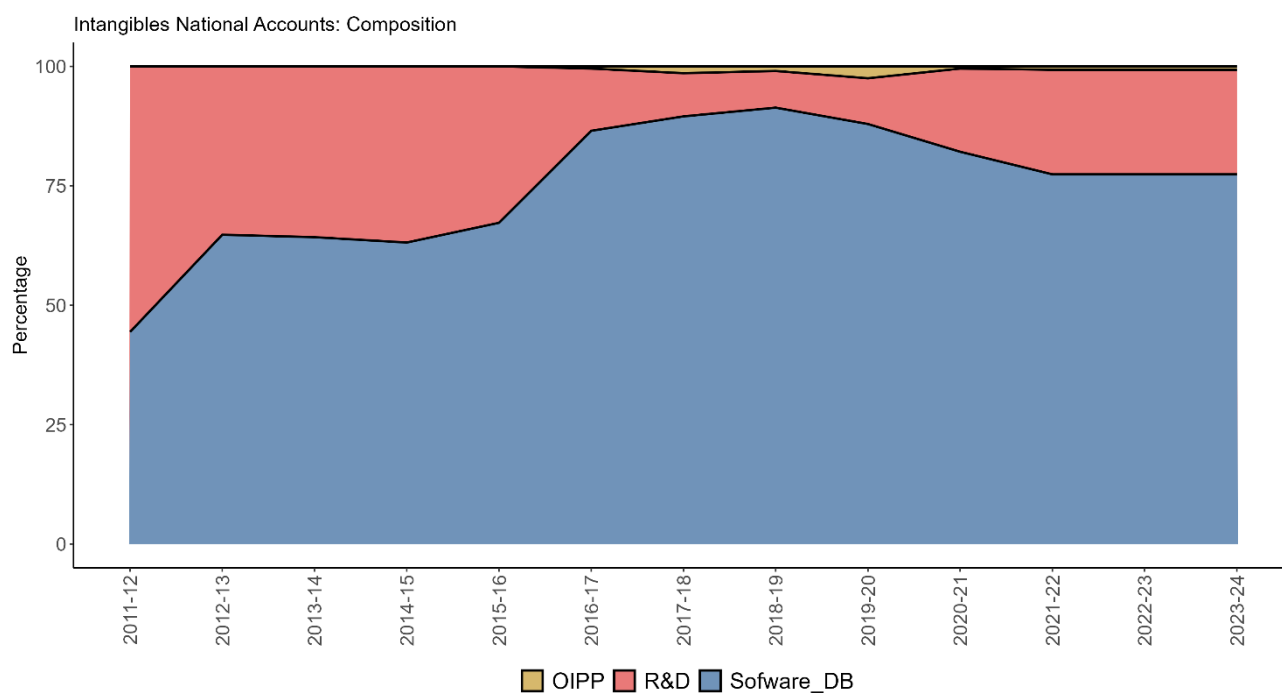
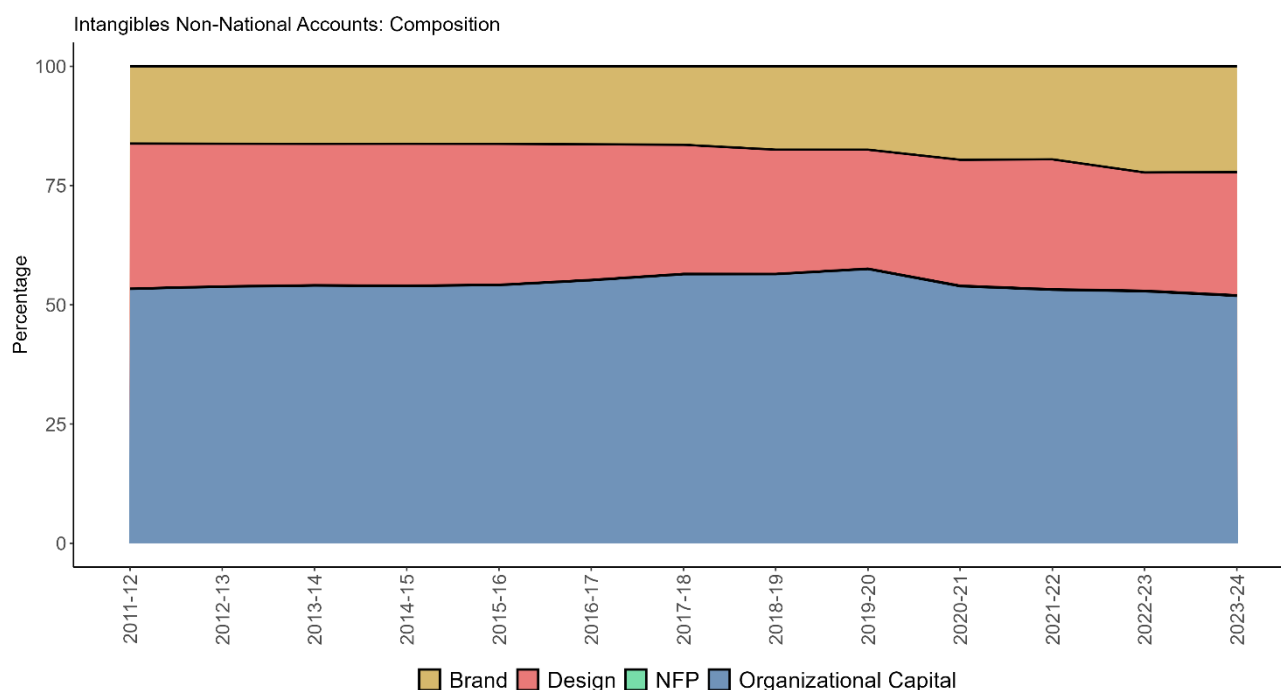


Figure 9 Composition of the assets not included in National Accounts (at current prices)



4 Future improvements

In this section, we provide an overview of the steps to be implemented to improve future estimates.

First, it would be desirable to delve deeper into product and sectoral definitions employed in the Indian SUT Tables, ideally through direct requests to the statistical offices.

Secondly, it would be relevant to identify a time-variant weight to break down the OBS asset for the purchase component by exploring firm-level data sources such as the Annual Survey of Industries (ASI), MCA21 from the Ministry of Corporate Affairs, and/ or Prowess.¹⁷ Further, explore whether these alternative firm-level sources can provide data on training, especially the MCA21 and Prowess.

Third, although our methodology for extrapolating the purchase component is empirically robust, it would be desirable to refine the indicator by incorporating a measure that better captures the dynamics of intangible production, such as turnover in sectors that produce intangible assets. This improvement could be achieved by leveraging information from ORBIS or PROWESS, complemented with data from the Annual Survey of Unincorporated Sector

¹⁷ The Prowess database is developed by the Centre for Monitoring the Indian Economy. It contains information on financial and non-financial variables from the income statements and balance sheets of listed companies, including assets, liabilities, income, and expenses. The database covers approximately 70% of the formal sector's economic activity in India.

Enterprises.

Fourth, our current methodology for disaggregating Intellectual Property Products (IPP) from the national accounts into three asset categories, R&D, software and databases, and other IPP, based on information from the SUTs may not fully capture the dynamics of R&D activities. To address this limitation, we plan to explore an alternative approach that leverages data on R&D expenditure as a share of GDP from the World Bank.

Finally, we acknowledge that population estimates derived from PLFS using sample weights may not represent the entire population accurately. To address this, we can explore adjusting the sample weights for both EUS and PLFS to align with population projections, as suggested by Goldar et al. (2023).

5 References

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Appendix I.
Table 6 Classification of industries in the different indicators from national accounts

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Code	GVA (cons and curr prices)	NAS (cons and curr prices)	NAS curr prices	
1.0	Agriculture, forestry and fishing	Agriculture, forestry and fishing	Agriculture, forestry & fishing	a
1.1	crops	NA	crops	c
1.2	livestock	NA	livestock	li
1.3	forestry and logging	NA	forestry & logging	fo
1.4	fishing and aquaculture	NA	fishing and aquaculture	fi
2.0	Mining and quarrying	Mining and quarrying	Mining & quarrying	m
3.0	Manufacturing	Manufacturing	Manufacturing	m
3.1	Food Products, Beverages and Tobacco	NA	NA	N
3.2	Textiles, Apparel and Leather Products	NA	NA	N
3.3	Metal Products	NA	NA	N
3.4	Machinery and Equipment	NA	NA	N
3.5	Other Manufactured Goods	NA	NA	N
4.0	Electricity, gas, water supply & other utility services	Electricity, gas, water supply and other utility services	Electricity, gas, water supply and other utility services	e u
5.0	Construction	Construction	Construction	c
6.0	Trade, repair, hotels and restaurants	Trade, repair, hotels and restaurants	Trade, repair, hotels and restaurants	tr
6.1	Trade & repair services	NA	Trade & Repair Services	tr
6.2	Hotels & restaurants	NA	Hotels & restaurants	h
7.0	Transport, storage, communication & services related to broadcasting	Transport, storage, communication & services related to broadcasting	Transport, storage, communication & services related to broadcasting	tr so

7.1	Railways	NA	Railways	ra
7.2	Road transport	NA	Road transport	R
7.3	Water transport	NA	Water transport	w
7.4	Air transport	NA	Air transport	A
7.5	Services incidental to transport	NA	Services incidental to transport	S
7.6	Storage	NA	Storage	S
7.7	Communication & services related to broadcasting	NA	Communication & services related to broadcasting	C b
8.0	Financial services	Financial services	Financial services	fi
9.0	Real estate, ownership of dwelling & professional services	Real estate, ownership of dwelling and professional services	Real estate, ownership of dwelling and professional services	R p
10.0	Public administration and defence	Public administration and defence	Public administration and defence	p
11.0	Other services	Other Services	Other services	o
12.0	TOTAL GVA at basic prices	Total	Total	T

Notes: This table presents the industries available in the different indicators of national accounts statistics.

Table 7 Classification of industries in Indian SUT Tables

Industry Classification	Industry Code in SUT	Sector
A01	1	Agriculture and Livestock
A01	2	Livestock
A02	3	Forestry and Logging
A03	4	Fishing & Aquaculture
B	5	Coal & Lignite
B	6	Crude Petroleum
B	7	Natural Gas
B	8	Iron Ores
B	9	Non ferrous metal ores
B	10	Other Mining
C10-12	11	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats
C10-12	12	Manufacture of dairy products
C10-12	13	Manufacture of grain mill products, etc. and animal feeds
C10-12	14	Manufacture of other food products
C10-12	15	Manufacture of beverages
C10-12	16	Manufacture of tobacco products
C13-15	17	Manufacture of textiles + cotton ginning
C13-15	18	Manufacture of wearing apparel, except custom tailoring
C13-15	19	Manufacture of leather and related products
C24	20	Manufacture of Basic Iron and Steel + Casting of iron and steel
C24	21	Manufacture of basic precious and non-ferrous metals + Casting of non-ferrous metals
C25	22	Manufacture of fabricated metal products, except machinery and equipments
C26	23	Manufacture of electronic component, consumer electronics, magnetic and optical media
C26	24	Manufacture of computer and peripheral equipment
C26	25	Manufacture of communication equipments
C26	26	Manufacture of optical and electronics products n.e.c
C27	27	Manufacture of Electrical equipments
C28	28	Manufacture of machinery and equipments n.e.c
C29-30	29	Manufacture of Transport
C19	30	Manufacture of coke and refined petroleum products

C20	31	Mfg of chemical & chemical products except pharmaceuticals, medicinal and botanical products
C21	32	Manufacture of pharmaceutical; medicinal chemicals and botanical products
C22	33	Manufacture of rubber & plastic products
C23	34	Manufacture of other non-metallic mineral products
C16	35	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting material
C17	36	Manufacture of paper and paper products
C18	37	Printing and reproduction of recorded media except publishing
C31-32	38	Manufacture of furniture
C31-32	39	Other Manufacturing
C33	40	Repair and installation of machinery and equipments
F	41	Construction
D	42	Electricity
D	43	Gas
E	44	Water supply
G	52	Trade
H-U	45	Railway Transport
H-U	46	Land Transport
H-U	47	Water Transport
H-U	48	Air Transport
H-U	49	Supportive & Auxilliary transport activities
H-U	50	Storage & warehousing
H-U	51	Communication
H-U	53	Hotels & Restaurant
H-U	54	Financial Services
H-U	55	Insurance Services
H-U	56	Ownership of dwellings
H-U	57	Education & Research
H-U	58	Medical and Health
H-U	59	Legal Services
H-U	60	Computer related services
H-U	61	Other Business services
H-U	62	Real estate activities

H-U	63	Renting of machinery and equipment
H-U	64	Community, Social & personal services
H-U	65	Other services
H-U	66	Public admn. & defence

Notes: This table presents the industry availability in the Indian SUT Tables.

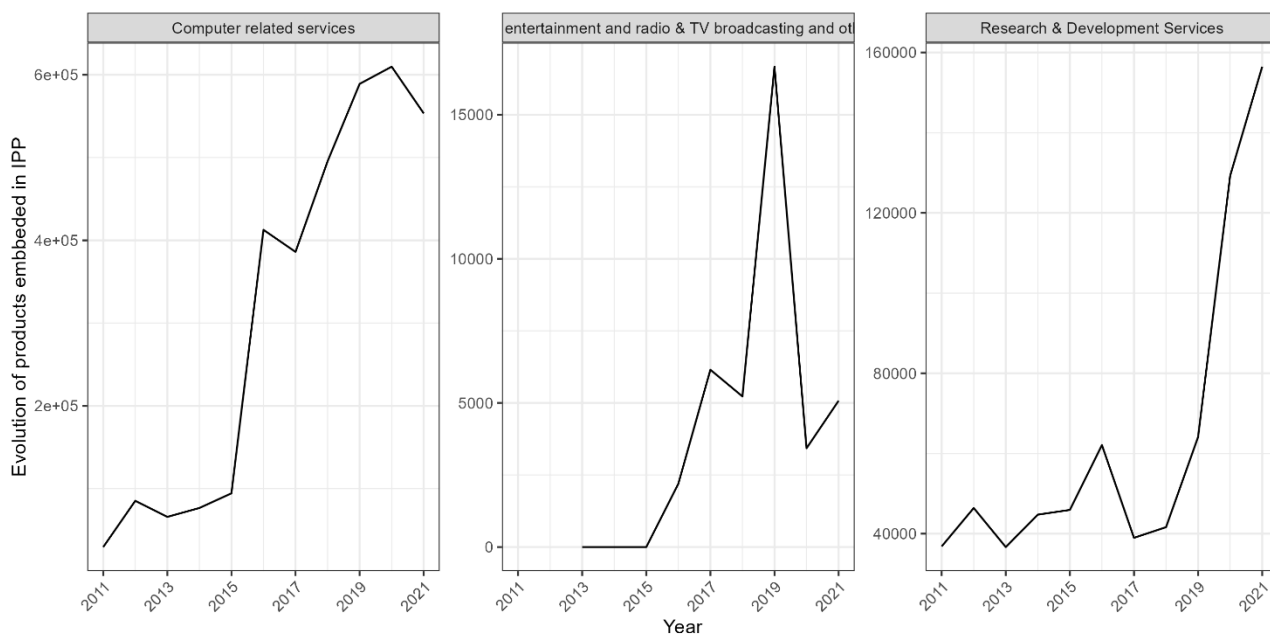
Compatibilization between ISCO-08 and ISCO-88

Table 8 Conversion between ISCO-08 and ISCO-88 for occupations relevant for intangible assets

			SHARE OF RELEVANT OCCUPATION (for ISCO-88)				TIME USE FOR EU COUNTRIES				ADJUSTED TIME ASSUMPTION INDIA			
ISCO 08	ISCO-88	ISCO-88 4d	Org Cap	Brand	Design	NFP	Org Cap	Brand	Design	NFP	Org Cap	Brand	Design	NFP
111	111		1	0	0	0	0.2	0	0	0	0.2	0	0	0
111	112		1	0	0	0	0.2	0	0	0	0.2	0	0	0
111	113		1	0	0	0	0.2	0	0	0	0.2	0	0	0
111	114		1	0	0	0	0.2	0	0	0	0.2	0	0	0
112	121		1	0	0	0	0.2	0	0	0	0.2	0	0	0
121	123	1231					0.2	0	0	0				
122	123	1233	1	0.38	0	0	0.2	0.15	0	0	0.2	0.06	0	0
122	123	1234					0.2	0	0	0				
131	122	1221					0.2	0	0	0				
132	122	1223					0.2	0	0	0				
133	122	1226	1	0	0	0	0.2	0	0	0	0.2	0	0	0
134	122	1227					0.2	0	0	0				
141	122	1225					0.2	0	0	0				
142	122	1224					0.2	0	0	0				
211	211		0	0	0	1	0	0	0	0.5	0	0	0	0.5
212	212		0	0	0	1	0	0	0	0.5	0	0	0	0.5
214	214		0	0	0.89	0	0	0	0.25	0	0	0	0.22	0
216	214						0	0	0.25	0				
241	241		0	0.17	0	0.17	0	0	0	0.25	0	0.08	0	0.04
243	241						0	0.5	0	0				
331	343		0	0	0	0.2	0	0	0	0.25	0	0	0	0.05

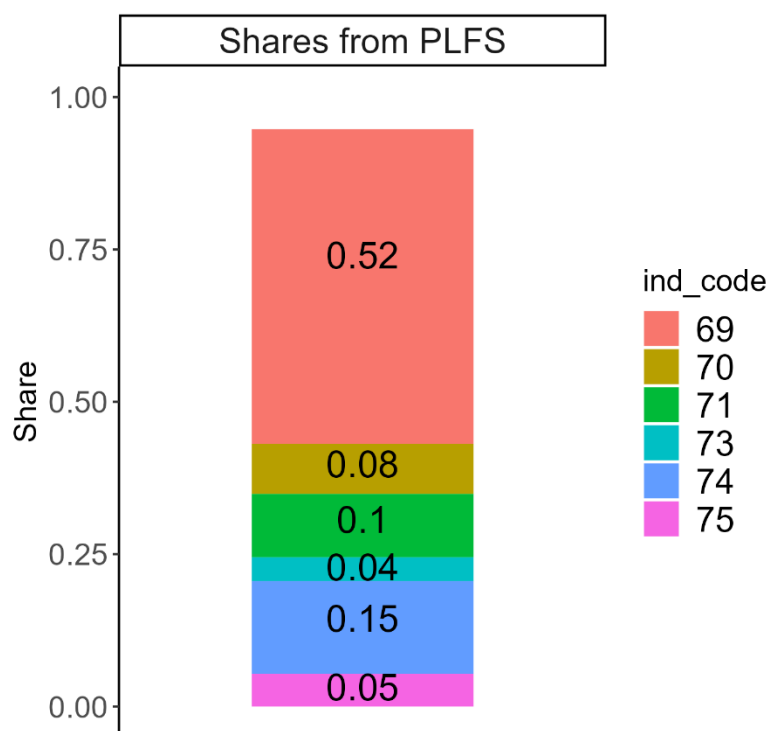
Appendix II. Additional Figures

Figure 10 Evolution of the assets included in the weights from SUT Tables (in Crore, current prices)



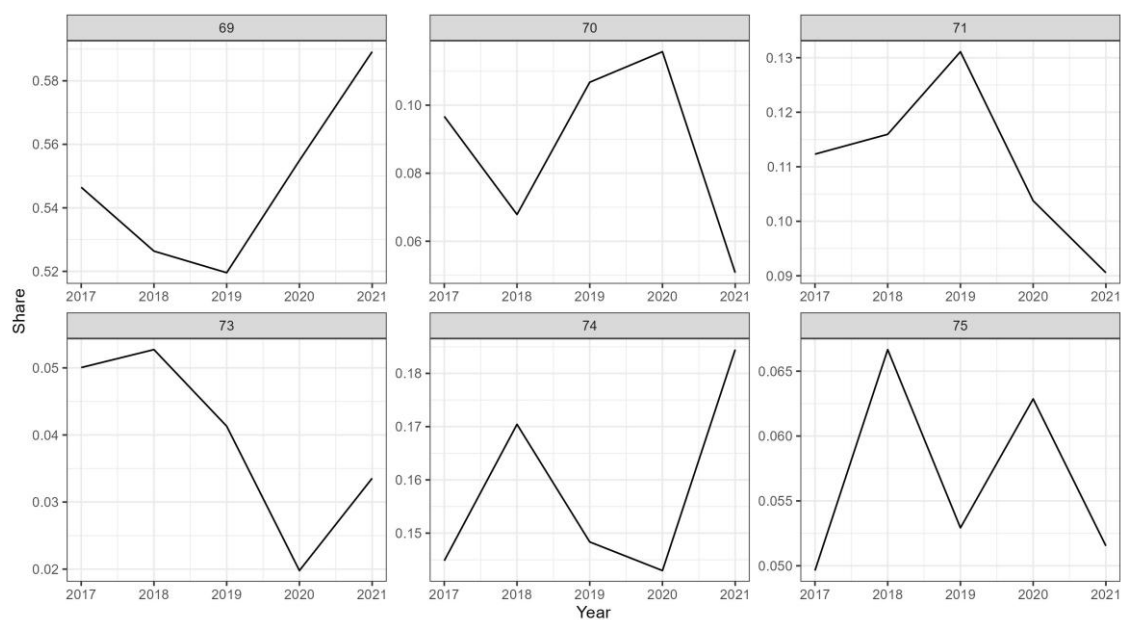
Notes: This figure shows the evolution of each of the assets that are used for the computation of the proportions to split IPP from the Indian Use Tables. Source: Indian Use Tables.

Figure 11 Weights to breakdown OBS from Census and PLFS



Notes: This figure shows the share of employment by sector in the Periodic Labour Force Survey (PLFS).

Figure 12 Evolution of weights from PLFS



Notes: This figure shows the evolution of the shares of employment by sector for the periods that go from 2017-18 to 2021-22. Source: Own elaboration based on Periodic Labour Force Survey (PLFS).

Figure 13. Share of intangible asset in GDP. Estimations from 2020-21 onwards are preliminary estimations with the dynamic of employment from the India KLEMS and the microdata from the

PLFS respectively

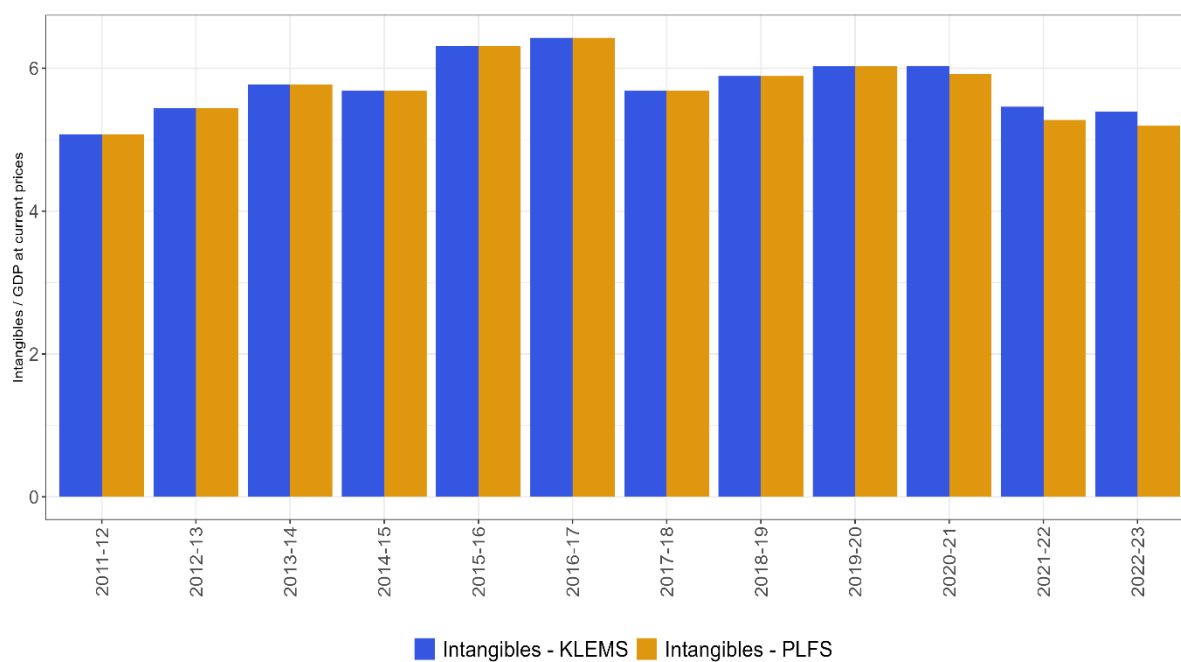


Figure 14. Share of tangibles and intangibles in GDP. Constant prices

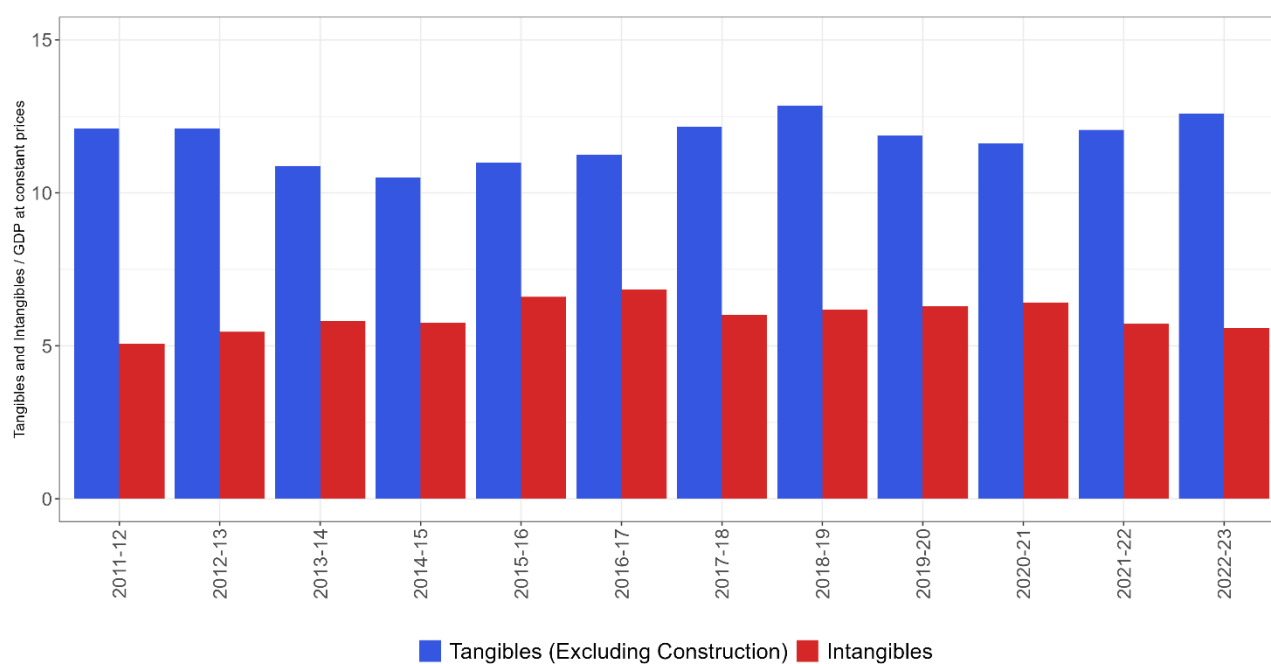


Table 9. Growth rates at current prices (in percentage)

	GDP	Intangibles	Tangibles (excluding construction)	NA Intangibles	Non NA Intangibles
2012-13	13,82	22,06	9,38	31,93	12,60

2013-14	12,97	19,91	-2,30	25,02	14,17
2014-15	10,99	9,26	6,18	1,02	19,39
2015-16	10,46	22,64	13,89	34,30	10,51
2016-17	11,76	13,81	9,59	21,14	4,54
2017-18	11,03	-1,82	16,38	-4,28	1,79
2018-19	10,59	14,64	15,09	13,26	16,54
2019-20	6,37	8,91	-2,50	5,08	14,04
2020-21	-1,24	-2,67	-7,06	1,36	-7,65
2021-22	18,85	9,23	19,87	8,89	9,70
2022-23	13,96	12,81	22,04	12,09	13,79
2023-24	12,02	9,17	9,43	10,91	6,86

*Table 10. Comparison of the series with updated SUTs (New) and the series with the extrapolation of the purchase component since 2020-21 (old)
at current prices*

	Intang/GDP in %			Intangibles			Non-NA Intangibles			NA Intangibles			GDP		
	new	old	diff	new	old	diff	new	old	diff	new	old	diff	new	old	diff
2011-12	5,1	5,1	0,0	443059,7	443059,7	0,0	226182,7	226182,7	0,0	216877,0	216877,0	0,0	8736328,7	8736328,7	0,0
2012-13	5,4	5,4	0,0	540811,9	540811,9	0,0	254684,9	254684,9	0,0	286127,0	286127,0	0,0	9944013,1	9944013,1	0,0
2013-14	5,8	5,8	0,0	648488,7	648488,7	0,0	290761,7	290761,7	0,0	357727,0	357727,0	0,0	11233521,6	11233521,6	0,0
2014-15	5,7	5,7	0,0	708535,4	708535,4	0,0	347144,4	347144,4	0,0	361391,0	361391,0	0,0	12467959,3	12467959,3	0,0
2015-16	6,3	6,3	0,0	868947,0	868947,0	0,0	383614,0	383614,0	0,0	485333,0	485333,0	0,0	13771873,9	13771873,9	0,0
2016-17	6,4	6,4	0,0	988928,6	988928,6	0,0	401017,6	401017,6	0,0	587911,0	587911,0	0,0	15391668,6	15391668,6	0,0
2017-18	5,7	5,7	0,0	970962,2	970962,2	0,0	408214,4	408214,4	0,0	562747,8	562747,8	0,0	17090042,4	17090042,4	0,0
2018-19	5,9	5,9	0,0	1113109,3	1113109,3	0,0	475716,7	475716,7	0,0	637392,5	637392,5	0,0	18899668,4	18899668,4	0,0
2019-20	6,0	6,0	0,0	1212271,9	1212271,9	0,0	542501,1	542501,1	0,0	669770,8	669770,8	0,0	20103592,9	20103592,9	0,0
2020-21	5,9	6,0	-0,1	1179887,3	1197711,1	-17823,8	500998,8	518822,6	-17823,8	678888,6	678888,6	0,0	19854096,0	19854096,0	0,0
2021-22	5,5	5,5	0,0	1288833,7	1288809,8	23,9	549613,2	549589,3	23,9	739220,5	739220,5	0,0	23597398,5	23597398,5	0,0
2022-23	5,4	5,4	0,0	1453947,9	1454658,8	-710,9	625389,2	626497,6	-1108,4	828558,7	828161,3	397,4	26890472,6	26949645,9	-59173,3
2023-24	5,3			1587297,6			668301,8			918995,8	0,0		30122955,9		

