International Labour Organization

Decent Work Supply Chain Survey

Pilot on the Electronics Supply Chain in Viet Nam

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Acronyms and abbreviations

ASEAN	Association of Southeast Asian Nations
CAPI	computer-assisted personal interview
CAT	Compliance Assessment Tool
CBCR	collective bargaining coverage rate
DW-SCS	Decent Work Supply Chain Survey
ED	employers' organization density rate
EMS	electronics manufacturing services
EQ	Enterprise Questionnaire
FA	freedom of association
FDI	foreign direct investment
GSO	General Statistics Office of Viet Nam
GWG	gender wage gap
ILO	International Labour Office/Organization
ILSSA	Institute of Labour Science and Social Affairs (ILSSA) of Ministry of Labour, Invalids and Social Affairs of Viet Nam (MOLISA)
ISIC	International Standard Industrial Classification of All Economic Activities
MOLISA	Ministry of Labour, Invalids and Social Affairs
OEM	original equipment manufactures
OSH	occupational safety and health
RDS	respondent-driven sampling
SC	supply chain
VCCI	Vietnam Chamber of Commerce and Industry
VGCL	Vietnam General Confederation of Labour
VSIC	Vietnam Standard Industrial Classification
WQ	Worker Questionnaire

1. Introduction

Supply chains are a common way of organizing investment, production and trade in today's global economy, and have contributed to economic growth, job creation, poverty reduction and entrepreneurship all over the world. At the same time, aspects of supply chains have raised concerns about their impact on working conditions and the protection of workers' rights.

In March 2023, the ILO launched a five-year strategy on decent work in supply chains. The strategy promotes a smart mix of national and international mandatory and voluntary measures to optimize the impact of the ILO's work to ensure decent work in supply chains, building on its tripartite structure and international labour standards system and using all available ILO means of action.

The strategy places a strong emphasis on the importance of establishing a "robust evidence base" on decent work in supply chains to ensure the ILO's leadership role in this area and defines the collection of sex-disaggregated data along supply chains as a critical element of the ILO research agenda. The strategy makes specific reference to using innovative methodologies to map decent work at all supply chain tiers and to apply the generated data to inform policymaking.

In alignment with the ILO strategy on decent work in the supply chains, the ILO FUNDAMENTALS Branch developed the Decent Work Supply Chain Survey (DW-SCS) methodology to obtain better and replicable data on decent work opportunities and challenges across the different tiers of supply chains. This approach creates more granular data on gender, age groups, geography, and formal and informal sectors, and will help to identify the challenges posed to businesses and workers, including for example those related to COVID-19. Ultimately, the data will enable informed discussions and facilitate targeted policy responses. In particular, the DW-SCS contributes to Output 12 of the strategy, which is concerned with strengthened data collection approaches to measure decent work in supply chains.

2. An innovative method for supply chains data

The objective of the survey

The DW-SCS aims to produce high-quality, replicable data on supply chains to identify decent work deficits as well as provide critical information to create more and better opportunities for employment and growth.

The statistical information made available about enterprises and workers in the supply chains will inform governments to put in place targeted policies and action plans to detect and eradicate decent work deficits along supply chains.

The intuition behind a complex methodology

The DW-SCS methodology relies on two main pillars:

1. An innovative sampling design to identify the linkages between economic units in the supply chains,
2. Decent work questionnaires to inform the sampling strategy and create indicators of decent work.

The key innovation of the sampling design is that the sampling process begins with economic units[1] that are unequivocally part of the supply chain[2] of interest and then reaches the other economic units along the supply chains. Typically, the economic units belonging to the sector can be identified through secondary data such as the Economic Census or other data sources and represent a good entering point for the sampling design (see figure 1). Other economic units in the supply chain are then reached by sampling through the links[3] of the initial sampled economic units within the sector. The links between economic units are identified through an Enterprise Questionnaire that asks enterprises about their clients and suppliers of goods and services. The approach is meant to avoid unnecessary sampling in branches of economic activity where many enterprises may not belong to the supply chain of interest. Once the sample of economic units is created, a sub-sample of workers is interviewed with the Worker Questionnaire.

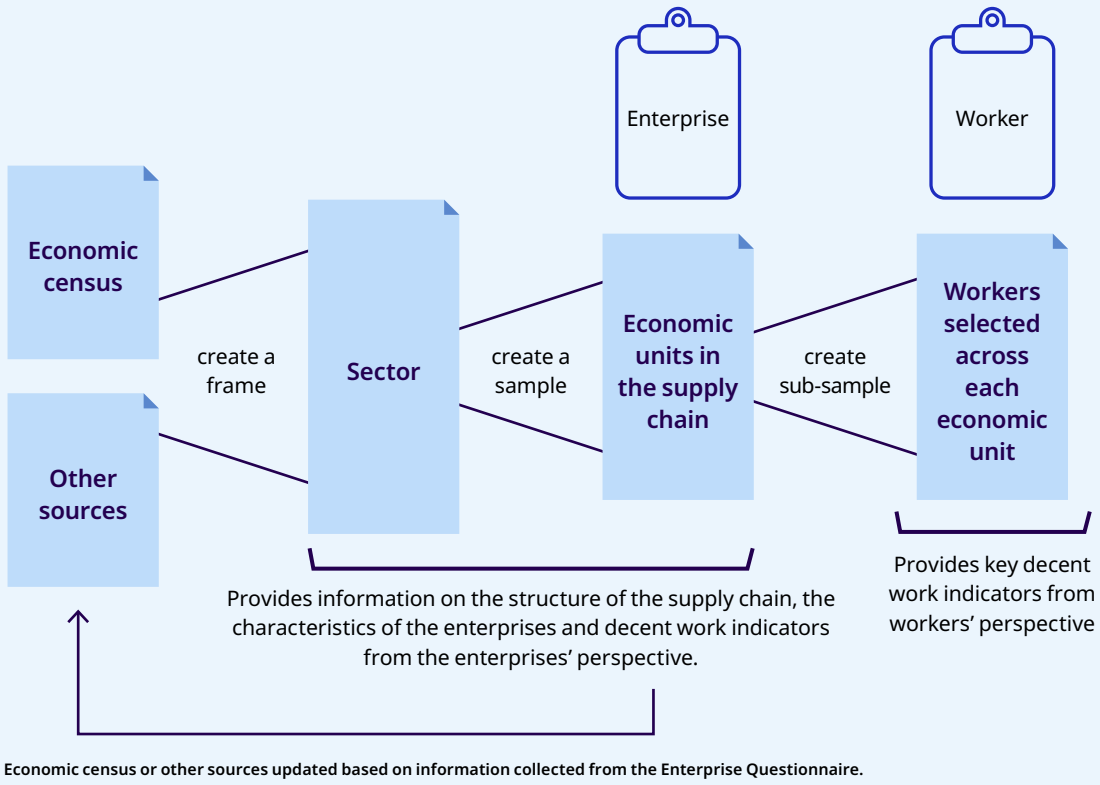
> The links between economic units are identified through an Enterprise Questionnaire that asks enterprises about their clients and suppliers of goods and services.

1 Depending on the circumstances, economic units can be enterprises, establishments, household businesses, among others.

2 For example, in the electronics supply chain the entry points for the sampling are Tier 2 (Producers of final electronics and electrical products) and Tier 3 (Suppliers of electronics and electrical components).

3 The link can be intended as a procurement relationship between two enterprises in the supply chain.

▶ **Figure 1. Overview of the methodological framework**



The decent work questionnaires include an Enterprise Questionnaire and a Worker Questionnaire.

The Enterprise Questionnaire is used to interview employers/managers in the sampled economic units and aims to capture the characteristics of these units. In addition, it collects data on the clients and suppliers of the economic unit, which allows us to identify the links between economic units in the same supply chain across tiers and inform the sampling strategy. The Worker Questionnaire is used to interview workers from the economic units in a safe and comfortable place (such as workers' homes). Both questionnaires aim to identify decent work challenges and opportunities for enterprises and workers, including working time, income from employment, occupational safety and health, and skills and training activities, as well as the fundamental principles and rights at work, among others.

The sampling design

The sampling design can be adapted to the specificity of the sectoral supply chain and the country. Here we describe the sampling design adopted for the pilot in the electronics supply chain in Viet Nam. However, for each sectoral supply chain, it is necessary to define the scope of the supply chain survey and the entry point to start the sampling design (that is, the economic units that unequivocally belong to the supply chain). Box 1 describes the scope of the pilot electronics supply chain survey in Viet Nam and why Tiers 2 and 3 were chosen as entry points for the sampling design.

▶ Box 1. Scope of the electronics supply chain survey

The electronics supply chain is defined as all enterprises and household businesses within the national territory of Viet Nam that fall into one of the following two categories:

a. Enterprises and household businesses engaged in economic activities of the central tiers of the electronics supply chain (Tiers 2 and 3).

b. Suppliers, clients, subcontractors and clients of manufacturing services of enterprises and household businesses in category (a) that are engaged in economic activities in any tier of the supply chain (Tiers 1–5).

Where:

Tier 1. Wholesale and retail distributors

Tier 2. Producers of final electronics and electrical products

Tier 3. Suppliers of electronics and electrical components

Tier 4. Suppliers of other components

Tier 5. Producers of raw materials and inputs to other components

Strictly speaking, the scope of the survey covers the electronics and the electrical supply chain, but for simplicity we will refer to the electronics supply chain.

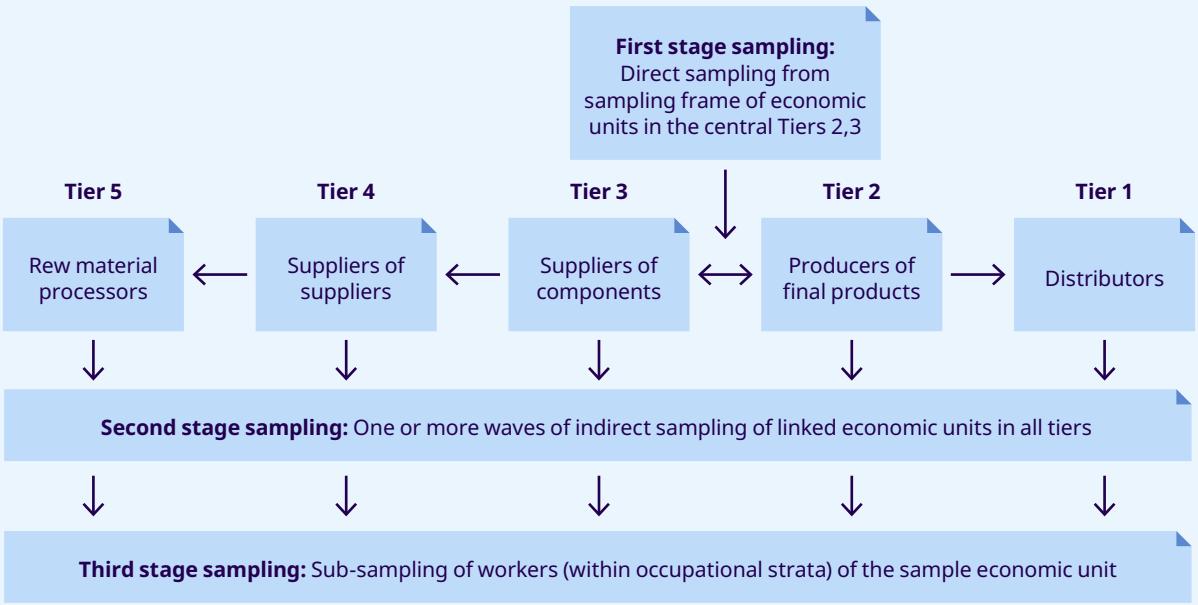
The economic activities of each tier of the supply chain are defined by their Viet Nam Standard Industrial Classification (VSIC 2018) codes and their corresponding International Standard Classification of All Economic Activities (ISIC Rev. 4) codes (see Annex 1). It should be noted that the ISIC Rev. 4 codes and VSIC 2018 codes reported in Tiers 1, 4 and 5 include economic activities that are relevant to the electrical and electronics sector but serve also other sectors. For the sampling design, the enterprises and household businesses in Tiers 2 and 3 (for which the VSIC 2018 code is available from the Economic Census) represent the entry point, as the VSIC 2018 codes unequivocally identify them as belonging to the electronics supply chain, while enterprises in the other tiers are in the scope of the survey only if linked to enterprises or household businesses in the central tiers.

Note: The definitions of "supplier", "client", "subcontractor" and "client of manufacturing services" are for illustrative purposes:
- "Supplier": an economic unit that provides goods and services to other economic units or consumers of the supply chain.
- "Client": an economic unit or consumer that receives goods and services from other economic units of the supply chain.
- "Subcontractor": an economic unit that performs a specific task or service as part of a larger project by a contractual arrangement with another economic unit. In the electronics supply chain, a subcontractor can be an economic unit that design, manufacture, test, distribute, and provide return/repair services for components and assemblies for original equipment manufacturers (OEM) of the supply chain. They are often referred to as Electronics Manufacturing Services (EMS).
- "Client of manufacturing services": an economic unit that receives electronic manufacturing services from a subcontracted economic unit. In the electronics supply chains, this is often referred to as the original equipment manufacturer (OEM).

In the sense described here, an economic unit (that is, an enterprise or household business) may be, at the same time, a client, a supplier, and subcontractor and a client of manufacturing services of the supply chain depending on the nature of the transaction with the other enterprise or production unit of the supply chain.

The main elements of the sampling design of the decent work survey in the electronics supply chain in Viet Nam are shown schematically in figure 2 (for a detailed description see Mehran 2023). The design involves three stages of sampling. In the first stage, a sample of economic units (enterprises and household businesses in the case of Viet Nam) in the central tiers of the supply is created. This was drawn from the sampling frame of the 2021 Viet Nam Economic Census and comprised enterprises and household businesses from Tier 2 (producers of final electronics and electrical products) and Tier 3 (suppliers of electronics and electrical components). Before sample selection, the sampling frame is stratified according to provinces, tiers of the supply chain, branches of economic activity and size of economic units, and the total sample is allocated across strata by the square-root allocation method. The tiers are defined in terms of branches of economic activity (Frederick 2022).

▶ **Figure 2. Schematic representation of sampling design**



In the second stage, all economic units linked to those sampled in Stage 1 are identified. These include suppliers of goods and services, subcontractors, clients of goods and services and clients of manufacturing services within the territory of Viet Nam. These may include additional economic units of the central tiers, as well as economic units of other tiers of the supply chain. If the coverage of the linked economic units does not span all tiers of the supply chain or the number of economic units is not enough to produce sufficiently precise estimates of the reporting domains, the sample design provides for multiple waves of indirect sampling of linked economic units. This means identifying economic units linked to economic units already identified as linked economic units in a previous wave or in the initial sampling of the central tiers. By contrast, if the linked economic units identified at a given wave of indirect sampling are too numerous for practical implementation, the sampling design provides for sub-sampling of the linked economic units.

In the third stage, a sample of workers is drawn from each economic unit of the sample or from a sub-sample of the economic units. The sampling approach to be adopted for the third stage of sampling of workers within economic units depends on the degree of cooperation of the economic units. If these units agree to provide a complete list of employees engaged by them, direct sampling of workers from the list is conducted. If such cooperation is not secured, a sample of workers by occupation is selected by economic unit. The sampled workers will then provide the seeds for respondent-driven sampling to reach other workers from the economic unit. If even such partial cooperation of the economic units could not be secured, the sampling design provides for an extreme option: to sample workers at their place of residence – that is, by conducting a household-based survey in areas of concentration in the vicinity of the sampled economic units.

The decent work questionnaires

The decent work questionnaires align with the ILO Decent Work Framework (ILO 2013) and the ILO Better Work Compliance Assessment Tools (CAT) used by the ILO to assess compliance with core international labour standards and national labour laws in the garment global supply chain.

Questions in the Enterprise and Worker Questionnaires are grouped in modules by topic: the Enterprise Questionnaire consists of six modules and the Worker Questionnaire consists of ten modules (see table 1). A modular approach permits the selection of all or part of the modules of the questionnaires in line with country priorities. A committee of technical and political experts is typically created at the national level to facilitate the adaptation of the questionnaires to the national context and priorities.[4]

The questions in the Enterprise Questionnaire are used to identify the links between economic units (enterprises, establishments, household businesses and so on) within the supply chain in the country of study. The survey permits linkage of the decent work indicators derived from the Worker Questionnaire with the characteristics of the enterprise where they work, such as location, size, tier, and so on.

The DW-SCS indicators have been identified by combining the approach used in both the Decent Work Framework and the Better Work CAT. The comparison of the two methodologies brought a list of about 60 potential indicators for the DW-SCS (see table 2).

▶ **Table 1. Structure of the DW-SCS questionnaires**

Enterprise Questionnaire		Worker Questionnaire	
Module	**Topic**	**Module**	**Topic**
A	Characteristics of the business unit	A	Socio-demographic characteristics
B	Contracts, working time and payment	B	Employment characteristics
C	Skills and training	C	Working time
D	Occupational safety and health	D	Earnings
E	Freedom of association and collective bargaining	E	Skills and training
F	Equality and inclusion	F	Occupational safety and health
		G	Freedom of association and collective bargaining
		H	Equality and inclusion
		I	Work to be abolished

4 For the pilot DW-SCS in electronics in Viet Nam a tripartite committee of experts was created who contributed to the adaptation of the questionnaires to the national context. All the modules were kept in the questionnaires for the pilot to test the full questionnaires.

▶ Table 2. DW-SCS themes, sources and examples of indicators

N.	Code	Theme	Source	Example of indicators
1	SC	Supply chain structure	EQ	Share of cross-board supply chain (by tier), average number of economic units (by tier), share of FDI on SC enterprise total capital (by tier), share of expenditures in subcontracted production over total revenue.
2	EMP	Employment	EQ, WQ	Percentage of workers by demographic characteristics (age, sex, nationality, etc.), employment status and type of contract, share of informal employment, precarious employment rate, and average job tenure.
3	TIME	Working time	EQ, WQ	Employment in excessive working time, employment by weekly hours worked, time-related unemployment rate, share of enterprises that comply with required daily break periods, share of enterprises that comply with weekly break periods, share of workers reporting working hours over the legal national limits for overtime hours.
4	EARN	Earnings	WQ	Employees with low pay rate, average hourly earnings by occupation group, average real wages, subsistence worker rate (only agriculture SC), real earnings of casual workers, share of workers paid at least minimum wage, share of enterprises that comply with payment of atypical work hours, share of enterprises that comply with written payment notification, proportion of workers who are paid regularly and on time, proportion of workers whose employer made any unauthorized deductions from wages.
5	SKILLS	Skills	EQ, WQ	Rate of employment mismatch of job-specific/technical skills, rate of employment mismatch of basic skills, rate of employment mismatch of transferable skills, rate of employment over-skilled and under-skilled, share of enterprises with a shortage of job-specific/technical skills for production and non-production workers, share of enterprises with a shortage of basic skills of production and non-production workers, share of enterprises with a shortage of transferable skills for production and non-production workers.
6	OSH	Occupational safety and health	EQ, WQ	Occupational injury incidence rate (fatal and not fatal), occupational injury incidence, time lost due to occupational injuries, enterprises and workers that use chemicals and hazardous materials, enterprises and workers with decent worker protection, enterprises with a decent working environment, workers with decent working facilities, workers with decent welfare facilities, workers with decent work accommodation (among workers in employer accommodation), enterprises/workers with decent emergency preparedness, enterprises that have a written OSH policy, enterprises that have assessed general occupational safety and health issues in the factory.
7	FACB	Freedom of association and collective bargaining	EQ, WQ	Trade union density rate, employers' organization density rate (ED), Collective bargaining coverage rate (CBCR), days not worked due to strikes and lockouts, average number of active trade unions in the sector, percentage of enterprises with employer interference in freedom of association, share of enterprises where union representatives have no access to the workplace.
8	EQUAL	Equality and inclusion	EQ, WQ	Occupational segregation by sex, female share of employment in senior and middle management, female share of non-production workers, gender wage gap (GWG), share of subjective gender discrimination on equal pay for equal work, share of workers who reported discrimination based on pregnancy, share of establishments that discriminate in hiring.
9	ABOL	Work to be abolished	EQ, WQ	People in forced labour, people in involuntary work, people subject to any form of coercion, child labour, compliance with legal protocol on the minimum age.

Note: EQ=Enterprise Questionnaire, WQ=Worker Questionnaire.

A methodology tailored to countries and sectoral supply chains

The DW-SCS methodology can be adapted and adopted in any country and sectoral supply chain. To have the best access to local data and knowledge, the creation of a tripartite committee of experts is recommended at the inception phase to contribute to the adaptation of the sampling design and the decent work questionnaires to the specificities of the country and the sectoral supply chain. The experts will also guide the research through the collection of data and the creation of indicators useful for local policymakers, ensuring the relevance and effectiveness of the approach.

Towards better data on supply chains

The DW-SCS has been tested in the electronic supply chain in Viet Nam in Phase 1 of the study with a selected number of enterprises and workers. The findings of the pilot are reported in the remaining sections of this document. As a pilot, Phase 1 is intended to validate the methodology rather than producing statistically representative indicators of decent work. The objective of Phase 2 is to conduct a full-scale DW-SCS in countries and sectoral supply chains that express interest (see table 3).

▶ Table 3. DW-SCS pilot timeline

2021–24	Key activities
Phase 1 October 2021–December 2023	The methodology of the DW-SCS is tested across the electronics supply chain in Viet Nam.
Phase 2 January 2024	Full-scale DW-SCS to be conducted.

3. Decent work in the electronics supply chain in Viet Nam: Results of pilot test

The electronics supply chain in Viet Nam

In 2020, Viet Nam exported US$126 billion in electronic and electrical products, an increase from the US$56 billion of products exported in 2015. The number of enterprises in electronics in Viet Nam nearly doubled between 2015 and 2019, rising from roughly 2,400 to 4,400. In the same period, the number of employees in the sector increased from more than 665,000 to almost one million (GSO data). In 2021, Viet Nam ranked ninth in the world and third in the Association of Southeast Asian Nations (ASEAN) as electronic circuit component exporters, and the industry continues to grow (Workman 2023).

The COVID-19 pandemic created new challenges in electronics supply chains due to restrictions of movement, a loss of working hours and wages, suspension of collective bargaining agreements and cancellations of wage increases, along with health and safety risks. Despite the immediate negative impact of COVID-19, in 2021, the electronics industry in Viet Nam was able to quickly rebound due to policies implemented by the Vietnamese Government and increased demand for electronic goods from trading partners (ILO 2023). However, recent OECD reporting predicts that in 2023, weakened global demand will hamper the growth of the electronics industry across emerging Asian economies (OECD 2023). The WTO *World Trade Statistical Review 2023* estimates that the value of exports from Viet Nam of office and telecom equipment, which includes electronic data processing and telecommunications equipment as well as integrated circuits and electronic components, fell by around 17 per cent in 2023 (WTO 2023).

The DW-SCS methodology aims to produce data that will inform policy for a more resilient, inclusive and sustainable electronics supply chain. As a major engine of economic growth in Viet Nam, the electronics industry can play an important role in advancing decent work, including by establishing labour relations systems that enable the achievement of better productivity and working conditions. With Viet Nam's new industrial relations framework (see ILO 2018) and the recent revision of its Labour Code (ILO 2019), which addresses freedom of association, discrimination at work, and contractual practices, the country is taking important steps towards strengthening decent work opportunities and creating an enabling environment for sustainable enterprises.

Pilot test

Phase I of the project started in late 2021 and involved the development of a methodology for mapping the electronics supply chain and measuring decent work along the chain in Viet Nam. It included a strategy for conducting a pilot that would:

1. Assess the proposed sampling approach in terms of its effectiveness in:
   - **a.** identifying the links of the supply chain;
   - **b.** reaching out into the tiers of the supply chain;

c. sub-sampling the employees of the sample enterprises; and

d. providing the necessary information for calculating the sampling weights and reconstructing the underlying supply chain.

2. Assess the proposed decent work questionnaires in terms of their effectiveness in:

a. measuring indicators on decent work gaps and opportunities across tiers;

b. measuring indicators on decent work gaps and opportunities disaggregated by workers' characteristics including gender; and

c. linking information on workers' working conditions with enterprise characteristics.

The pilot was organized in three steps (Singh 2021a). In Pilot Step 1, a sample of 26 enterprises were interviewed to test the feasibility of obtaining information on suppliers and customers using a specially designed set of questions (Module A of the Enterprise Questionnaire) (). Based on the results of Pilot Step 1, the set of questions was revised and tested on another sample of 25 enterprises in Pilot Step 2 (GSO 2022a, Singh 2021b). In parallel, work was carried out to delineate the different tiers of the electronics supply chain in Viet Nam, define the scope of the survey and identify the appropriate entry point for sampling (Frederick 2022).

Building on the results of Step 2 (GSO 2022b), Pilot Step 3 was carried out in 2023 to test the proposed sample design with 25 establishments and 100 employees. It involved an initial sample of 12 enterprises and 2 household businesses drawn from the sampling frame of the central tiers (Tiers 2 and 3) of the supply chain stratified by location, tier and size class (number of employees).

- For ease of access and better control, the sample was selected in two of the four provinces of concentration close to the General Statistics Office (GSO): Hanoi (province 01) and Bac Giang (province 24).
- The sample was selected to cover both tiers of the central tiers of the supply chain: five enterprises and one household business in Tier 2 (producers of final products); and seven enterprises and one household business in Tier 3 (suppliers of electronics and electrical components).
- The sample enterprises in each tier were selected to reflect the range of size classes of the enterprises: one or two small (size class 1 = 1 to 9 employees); two or three medium (size class 3 = 50 to 99 employees); and two large (size class 5 = 500 employees or more).

To test the feasibility of sampling over the supply chain, the initial sample (wave 0) was followed by another sample (wave 1) composed of 14 new enterprises and household businesses that were linked to the initial sample either as suppliers, clients, subcontractors or as clients of manufacturing services.

The information on the enterprises and household businesses linked to the initial sample – and later to all economic units interviewed – was obtained from Module A of the Enterprise Questionnaire (table 4). Questions A15, A17, A21, and A25 inform on the total number of links (that is, the total number of suppliers, clients, subcontractors, and clients of manufacturing services of each economic unit). Questions A16, A19, A23 and A27 report the listed links which are required to be up to six suppliers, clients, subcontractors, and clients of manufacturing services representing a range of large, medium, small, micro and informal businesses.

Work was carried out to delineate the different tiers of the electronics supply chain in Viet Nam, define the scope of the survey and identify the appropriate entry point for sampling.

▶ Table 4. Selected questions from the Enterprise Questionnaire (Module A)

A15	From 1 January to 31 December 2022, to how many clients did your enterprise sell goods and services for electronic and electrical manufacturing in Viet Nam (A15a) and abroad (A15b)?
A16	Please list six clients in Viet Nam to which your enterprise sold goods and services for electronic and electrical manufacturing (from 1 January to 31 December 2022).
A17	How many business suppliers supplied your enterprise with goods and services for electronic and electrical manufacturing in 2022 (from 1 January to 31 December) in Viet Nam (A17a) and abroad (A17b)?
A19	List six business suppliers in Viet Nam that supplied goods and services for electronics and electrical manufacturing to your enterprise in 2022 (from 1 January to 31 December).
A21	How many subcontractors did the enterprise use to complete all or part of the production process of goods and services for electronics and electrical manufacture in 2022 (from 1 January to 31 December) in Viet Nam (A21a) and abroad (A21b)?
A23	List six business subcontractors in Viet Nam that your enterprise used to complete all or part of the production process of goods and services for electronics and electrical manufacturing in 2022 (from 1 January to 31 December).
A25	How many clients did the enterprise provide contract manufacturing services to in 2022 (from 1 January to 31 December) in Viet Nam (A25a) and abroad (A25b)?
A27	List six clients in Viet Nam to which your enterprise provided contract manufacturing services in 2022 (from 1 January to 31 December).

The composition of the sample by wave, tier and size class of enterprise is shown in table 5. The initial sample (wave 0) was selected to be almost equally distributed between the two central tiers of the supply chain (tiers 2 and 3) and, also, among the three size classes of enterprise according to the original sampling frame (Economic Census 2021).

The follow-up sample (wave 1) was selected from among the enterprises or household businesses linked to the initial sample in wave 0. Therefore, its composition, to a great extent, reflects the linkages of the underlying supply chain. The wave 1 sample consisted of three new enterprises in Tier 1 of the supply chain, eight new enterprises in the central tiers of the supply chain and three new enterprises in Tier 4 of the supply chain. There was no linked enterprise in Tier 5 of the supply chain to include in the wave 1 sample. The sample enterprises in wave 1 were distributed unevenly in terms of size: two small enterprises (2 and 6 employees, respectively); seven medium-size enterprises (13, 29, 34, 38, 38, 42, 64 employees, respectively) and two large enterprises (448 and

▶ Table 5. Composition of pilot sample in terms of wave, tier, and size class of enterprise

Wave	Tier	Size class of enterprise[1]				Total
		Small	Medium	Large	N.A.	
0	2	3	0	2	1	6
0	3	2	4	2	0	8
1	1	2	0	0	1	3
1	2	0	4	2	0	6
1	3	0	0	1	1	2
1	4	0	3	0	0	3
1	5	0	0	0	0	0
Total		**7**	**11**	**7**	**3**	**28**

Note: 1 Small = 0-9 employees; Medium = 10-99 employees; Large = 100+ employees.

5,911 employees, respectively). The sample also included two new enterprises with no response to the question on number of employees.

Identification of links in the supply chain

Table 6 shows the number of links reported by the enterprises interviewed in the pilot test when asked to report their number of clients, suppliers, subcontractors and clients of manufacturing services. Overall, the 28 pilot enterprises reported a total of 1,209 links in Viet Nam, as indicated in table 6.[5] This means that a pilot enterprise had on average 43 links with other enterprises in the supply chain in Viet Nam; the average was composed of about 11 clients, 30 suppliers, and two clients of manufacturing services. There were very few subcontractors reported by the pilot enterprises. As expected, the number of links was generally greater for enterprises in the central tiers of the supply chain (tiers 2 and 3) than for other tiers of the supply chain (tiers 1 and 4).

The sampling design provided for sub-sampling of the linked enterprises based on the lists of links that the sample enterprises give as a response to questions A16, A19, A23 and A27.

The pilot enterprises listed, in total, 173 links.[6] This means that each pilot enterprise provided, on average, information on six links of the supply chain: three clients, two suppliers, and one client of manufacturing services. This result is in line with the sampling design which expected precisely six links per sample enterprise based on the information obtained from the earlier pilot steps. It is also instructive to note that the pilot enterprises tended to list clients more abundantly than suppliers. The data show that the pilot enterprises listed 78 clients among their 300 clients (about 26 per cent), while they listed 66 suppliers among their 841 suppliers (about 8 per cent). A similar pattern is found when the data are analysed by tier (except for Tier 1 where the proportion of listed suppliers is 100 per cent against about 30 per cent for clients). Annex 2 provides an example of links between enterprises and household business clients from the pilot.

▶ Table 6. Number of supply chain links of the sample enterprises: Total versus listed

Wave	Tier	Total number of links					Listed links				
		Clients	Suppliers	Subcontractors	Manufacturing services	Total	Clients	Suppliers	Subcontractors	Manufacturing services	Total
0	2	23	171	0	1	195	13	12	0	0	25
0	3	38	365	1	20	424	20	27	1	11	59
1	1	35	2	0	0	37	11	2	0	0	13
1	2	105	141	7	8	261	11	3	0	3	17
1	3	84	147	0	29	260	12	12	0	12	36
1	4	15	15	0	2	32	11	10	0	2	23
1	5	0	0	0	0	0	0	0	0	0	0
Total		**300**	**841**	**8**	**60**	**1 209**	**78**	**66**	**1**	**28**	**173**
Average Total/28		**10.7**	**30.0**	**0.3**	**2.1**	**43.2**	**2.9**	**2.4**	**0.0**	**1.0**	**6.2**

Note: The definitions of "supplier", "client", "subcontractor" and "client of manufacturing services" are for illustrative purposes and are explained in the note to box 1.

5 In addition, there were 333 other links reported with enterprises abroad, 28 clients, 301 suppliers, and 4 clients of manufacturing services.

6 In data processing, a link was considered to have been listed if the response provided information on the tax code or the telephone number of the linked enterprise. Thus, the provision of the name of the enterprise or its address was not considered sufficient for identifying a link.

Reaching the tiers of the supply chain

The pilot test permits an assessment of the degree of penetration into the tiers of the supply chain in one or two waves of sampling. As described in the preceding section, the pilot enterprises generated 173 links, representing a base for potential sampling in two waves. The analysis of these 173 links shows that they form, together with the wave 0 and wave 1 pilot enterprises, a set of 163 distinct enterprises with valid tax codes.[7] The tax code may be used to find the branch of economic activity of the enterprise (VSIC code) from the Economic Census and the corresponding tier to which the enterprise belongs. This permits the construction of table 7, showing the extent of potential reach-out in each tier of the supply chain by wave.

The results show that the sampling approach permits reaching Tier 4 with a satisfactory sample size in two waves. But for reaching Tiers 1 and 5 of the supply chain, it may be necessary to conduct additional waves of sampling or broaden the procedure of tier determination by using 3-digit VSIC codes instead of 4-digit. The data in table 7 also show that a significant number of enterprises (37 per cent) cannot be classified by tier of the supply chain according to the scope of the electronics supply chain as defined in Annex 1. In a few cases (10 cases) this is because the VSIC code of the enterprise could not be obtained from the tax code. But in the other cases, the result may be interpreted to mean that the activity of the enterprise does not belong to the electronics supply chain, or that the correspondence between VSIC codes and tiers developed by the ILO in Annex 1 needs further examination.[8]

Sub-sampling of employees

At any wave of sampling of employees, the sampling design envisages sub-sampling employees of the sample enterprises. Sub-sampling is to be carried out on the base of the list of employees given by the enterprise in question B24 of the Enterprise Questionnaire (see table 8). If the enterprise is not willing to provide the full list of employees, the contact details of ten current employees in different occupations are asked.

▶ **Table 7. Number of pilot and potential sample enterprises, by tier and wave**

Tier	Wave			
	Wave 0	Wave 1	Potential wave 2[1]	Potential wave 22
1	0	3	2	12
2	6	12	27	27
3	8	10	43	43
4	0	3	17	19
5	0	0	0	1
NA	0	0	74	61
Total	**14**	**28**	**163**	**163**

Notes: [1]Data provided by GSO, Viet Nam, in response to a request from the ILO. The tiers are obtained by deriving the 4-digit VSIC codes of enterprises based on their tax code from the Economic Census. 2 The tiers are obtained using 3-digit VSIC codes of enterprises.

7 Some of the links are duplicates because of the multi-wave sampling procedure and some are without tax codes representing non-response or household businesses.

8 VSIC codes of the linked enterprises that are not reflected in Annex 1 include, among others: 46599 – Wholesale of other machinery and equipment not equipment not elsewhere classified (this sub-class includes: wholesale of computer-controlled machine tools; wholesale of production-line robots); 7822 – Supplying of temporary workers; 46692 – Wholesale of other chemicals (except for agricultural use); 25999 – Manufacture of remaining fabricated metal products not elsewhere classified; 25920 – Machining; treatment and coating of metals; 46900 – Non-specialized wholesale trade.

▶ Table 8. Selected questions from the Enterprise Questionnaire (Module B)

B24	This survey is designed to also collect data on the employment characteristics of the employees of your enterprise. Will you provide a list of your current employees with contact details so that a sample can be drawn for survey interviewing?
B25	If you are not able or willing to provide the list mentioned above, please provide the contact details of ten of your current employees, preferably in different occupations (including both production and non-production workers), for possible survey interviewing. [1. Name; 2. Sex; 3. Occupation; 4. Address; 5. Phone number; 6. Email; 7. Name and address of factory or shop]

Since no enterprises or household businesses provided a complete list of employees, the list of up to ten employees from question B25 was used for the sampling of the employees. A respondent-driven sampling (RDS) approach is envisaged so that each sample employee "recruits" other employees to participate in the survey and the process continues until convergence. In theory, the final sample, under certain assumptions, does not depend on the initial sample and can be regarded as a probability sample with probabilities of selection proportional to the number of employees known to the sample employee.

Table 9 gives the total number of enterprises and employees in the pilot (columns 3 and 5), the number of selected enterprises for sub-sampling of employees and the number of employees obtained in the final sample (columns 4 and 7) organized by wave of sampling and tier of the supply chain. The penultimate column (column 6) gives the number of employees listed by the pilot enterprises. The list formed the base for selecting the "seeds" to start the sub-sampling process.

In total, the 28 pilot enterprises were reported to engage 24,249 employees. Four enterprises did not provide data on the number of employees, and one reported no employees. These enterprises were excluded from the sampling of the employees. The average number of employees per enterprise is about 836 and the median is about 42 employees. The average number of employees is significantly higher in the central tiers of the supply chain (Tiers 2 and 3) than in the other tiers (Tiers 1 and 4).

The pilot enterprises provided a total of 98 listed employees in response to question B25. The count of listed employees was based on telephone numbers. The name of the employee, as well as his or her street or email address, were not used for the count. Thus, employees for whom a telephone number was not reported were not counted in table 9 even if their names and addresses were reported. All pilot enterprises listed at least one employee, except three that listed no employees. The average number of employees listed per enterprise is thus about four, and the median is about three.

Seven enterprises were selected for sub-sampling of employees, six from the initial sample (wave 0) and one from Tier 4 in the follow-up sample (wave 1). Up to three employees were selected from the list of employees given by the seven pilot enterprises. In cases where the

▶ Table 9. Total pilot and sub-sample number of employees, by wave and tier

Wave	Tier	Number of enterprises		Number of employees		
		Pilot	Sample	Pilot	Listed	Sub-sample
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	2	6	1	15 617	17	26
0	3	8	5	1 855	48	41
1	1	3	0	8	2	0
1	2	6	0	744	17	0
1	3	2	0	5 911	1	0
1	4	3	1	114	13	20
1	5	0	0	0	0	0
Total		**28**	**7**	**24 249**	**98**	**87**

number of listed employees was less than three, all listed employees were selected. There were, in total, 18 "seed employees". These employees were interviewed using the Worker Questionnaire and were asked to provide the names of three other employees in their enterprise for participation in the survey. In the end, some 87 employees completed the survey interview.

Table 10 provides the corresponding data of table 9 for each of the seven sample enterprises for the selection of employees to be interviewed, separately.

Table 11 shows the distribution of the sample employees by occupational group, with specifications of the top occupations in each group.

▶ Table 10. Total pilot and sub-sample number of employees, by wave and tier

i	Wave	Tier	Number of employees			Employee sample		
			Production workers	Non-production workers	Total employees	Listed	Sub-sample	Proportion interviewed (%)
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0	3	58	21	79	3	1	1.3
2	0	2	36	5	41	1	22	54
3	0	3	53	11	64	10	30	47
4	0	3	420	351	771	10	4	0.52
5	0	3	5	4	9	1	8	89
6	0	3	70	20	90	3	2	2.2
7	1	4	34	8	42	0	20	48
Total			**705**	**427**	**1 096**	**98**	**87**	

▶ Table 11. Sample employees and top occupations, by occupational group

Code[1]	Occupational group	Number	Top Viet Nam occupations[2]		
			1	2	3
1	Managers	41	17 220	17 420	17 290
2	Professionals	6	21 520	24 111	24 230
3	Technicians and Associate Professionals	7	31 220	-	-
4	Clerical Support Workers	9	43 220	43 210	-
5	Services and Sales Workers	2	51 311	-	-
6	Skilled Agricultural, Forestry and Fishery workers	0	-	-	-
7	Craft and Related Trades Workers	3	74 211	-	-
8	Plant and Machine Operators and Assemblers	17	82 022	-	-
9	Elementary Occupations	2	93 290	-	-
	Total	**87**			

Notes: [1] List of Vietnamese Occupations (Issued under Decision No. 34/2020/QD-TTg dated 26 November 2020, by the Prime Minister); [2] Top occupations are those with at least two sample employees.

Table 11 indicates also that the final sample of employees covers all occupational groups excluding, understandably, skilled agricultural, forestry and fishery workers. The distribution, however, seems to disproportionally cover managers and non-production workers (about 75 per cent) as opposed to production workers at the bottom of the distribution (about 25 per cent). The analysis of the detailed occupations at the five-digit level of the occupational classification shows that the sample covers a wide range of occupations (23 distinct occupations). The top occupations in each occupational group include:

- 17220 Full-time managers of groups, corporations and equivalent in mining, processing industry, manufacturing, production and distribution of electricity, gas, hot water, steam and air conditioning (27)
- 17420 Full-time directors, deputy directors of companies, enterprises, factories, cooperatives; rectors, deputy rectors of small schools and equivalent in mining, processing industry, manufacturing, production and distribution of electricity, gas, hot water, steam and air conditioning (9)
- 17290 Full-time directors, deputy directors of production and affiliated units under major corporations, universities and equivalent in other unclassified production and service units (3)
- 21520 Engineer, electronics (2)
- 24111 Accountant (except tax accountant) (2)
- 24320 Public relations specialist (2)
- 31220 Production supervisor (4)
- 43220 Production staff (6)
- 43210 Inventory recorder (2)
- 51311 Leader/supervisor of waiters/waitresses (2)
- 74211 (General) electronics installer (2)
- 82021 Electrical equipment/component assembler (15)
- 93290 Other unclassified industrial workers (2)

It is instructive to note that the distribution by sex of the sub-sample of employees is closely in line with that of the total number of employees reported by the 29 pilot enterprises. According to the data shown in table 12, about 34.5 per cent of the sub-sample employees are male and 85.5 per cent are female. The corresponding figures among all employees of the pilot enterprises are 38.1 and 61.9 per cent, respectively.

Calculating the sampling weights

The sampling design of the survey requires special attention in the calculation of the sampling weights. Because the sample enterprises after the initial sample (wave 0) are selected through their links with the initial sample of enterprises in the central tiers of the supply chain, one needs to know in how many other ways they could have been selected in the sample. This requires information on the number of links of

▶ **Table 12. Total pilot and sub-sample number of employees, by sex**

Gender	Number of employees		Percentage	
	Total pilot	Sub-sample	Total pilot	Sub-sample
Male	9 243	30	38.1	34.5
Female	15 006	57	61.9	65.5
Total	**24 249**	**87**	**100.0**	**100.0**

the enterprise with the central tiers of the supply chain. Questions A15, A17, A21 and A25 of the Enterprise Questionnaire provide, in principle, the necessary information. But, in practice, it could be that the enterprise misunderstands the question and gives information on the total number of its clients, suppliers, subcontractors and clients of manufacturing services instead of those that provided goods and services for electronic and electrical manufacturing. When the enterprise is further away from the central tiers, as in Tier 5, the enterprise may simply not know, for example, "how many clients [in Viet Nam] did the enterprise sell goods and services to for electronic and electrical manufacture" (A15). Non-response or response errors on these questions will not only affect the effectiveness of the sampling process but also the accuracy of the calculation of the sampling weights.

For employees, the calculation of the sampling weights under respondent-driven sampling (RDS) requires information on the "network degree" of each sample employee. In the present context, the "network degree" or simply the "degree" of a sample unit means the total number of employees in the enterprise that the person knows and from which the selection was made. At present, no such question is formulated in the Worker Questionnaire.[9] It was envisaged to obtain this information through a coupon system to be administered at the stage of sub-sampling of employees. The coupon system was, however, deemed unnecessary for sample selection in the circumstances prevailing in Viet Nam. For weight calculation, its use may be reconsidered. An alternative possibility which may be appropriate in many situations where the enterprise is small or medium-size is to assume that the "degree" of workers is equal to the size of the enterprise in which he or she works. Information on the size of the enterprise is available from the response to question B5 of the Enterprise Questionnaire.[10]

In general, the calculations of the sampling weights require the extraction of information from different data files. For example, for the calculation of the sampling weights of enterprise x in wave y, it is necessary to identify its parent enterprise in wave y-1 and extract from the questionnaire of the parent enterprise, say z, the data on its number of clients, suppliers, subcontractors, and clients of manufacturing services in Viet Nam reported in response to questions A15a, A17a, A21a and A25a. Similarly, for the calculation of the sampling weights of a sample employee, say u, it is necessary to identify the enterprise in which the employee worked, say v, and extract data on the total number of employees that were engaged by the enterprise, as reported in response to question B05 of the questionnaire of enterprise v.

The present version of the Enterprise and Worker Questionnaires has not been designed with these considerations in mind. Therefore, the matching of the datasets of the two questionnaires tends to be difficult in practice, although possible given the small sample. On the next revision of the Enterprise Questionnaire, the cover page should be modified to contain separate items to record:

- Wave number
- Identification number of the parent enterprise, applicable to all enterprises except those in the initial sample (wave 0). The identification number may be the tax code of the enterprise or, preferably, a unique serial number to cover enterprises or household businesses without a tax code.

Similarly, the cover page of the Worker Questionnaire should contain the following item:

- Identification number of the enterprise in which the worker is employed. As in the case of the Enterprise Questionnaire, the identification number may be the tax code of the

9 One possible set of questions that could be considered for this purpose is:
Q1. How many other employees can you name in your enterprise who could have also named you?
Number of employees ____
Q2. Please name three, preferably in different occupations in your enterprise.
a. Name Phone Occupation
b. Name Phone Occupation
c. Name Phone Occupation

10 B05. Provide the total number of employees for each type of employment contract listed below. Do not inlcude dispatch workers.

enterprise or, preferably, a unique serial number to cover the case of enterprises or household businesses without a tax code. The name of the enterprise as recorded in question B2 of the Worker Questionnaire is not practical as an identification criterion because of alternative spellings and abbreviations and other difficulties in data processing.

Finally, it should be stated that the wave number and enterprise identification number of the parent enterprise in the Enterprise Questionnaire and the enterprise identification number of the enterprise in which the employee works should be processed and included in the data files for data analysis.

Decent work questionnaires and indicators

The pilot aimed to test the effectiveness of the questionnaires in measuring indicators of decent work along the supply chain and at disaggregated levels by tiers and worker and enterprise characteristics. Producing indicators that are statistically representative of the electronics supply chain in Viet Nam is out of the scope of the pilot.

The Enterprise Questionnaire tested with the pilot included 102 questions and the Worker Questionnaire 135 questions, grouped into 6 modules and 10 modules respectively (see table 1). They permit the construction of about 60 indicators (see table 2).

The decent work questionnaires were developed by the ILO Fundamentals Branch and adapted to the Viet Nam context in collaboration with a tripartite committee of technical experts led by the GSO. The committee of technical experts included the Institute of Labour Science and Social Affairs (ILSSA) of Ministry of Labour, Invalids and Social Affairs of Viet Nam (MOLISA), the Vietnam Chamber of Commerce and Industry (VCCI), the Vietnam General Confederation of Labour (VGCL), and the Vietnam Electronics Industry Association (VEIA), among others.

The Enterprise Questionnaire was administered to the enterprises and household businesses through a web questionnaire. The system sends an email to the sample enterprises and household businesses, which includes an open letter, the account and login password for each enterprise/household business. The Worker Questionnaire was administered to employees with computer-assisted personal interviews (CAPI). The enumerators agreed with the workers on the time and location of the interview and met in person. It was a required condition that the interviews were conducted in a location safe for the workers and the enumerators. Enumerators were trained on the methodology, the questionnaires, and the software for the data collection in several sections organized jointly by the ILO and the GSO.

The duration of the interviews with the Worker Questionnaire was, on average, two hours. This result was longer than the estimated time based on testing before the interviews. In some circumstances, the interviews were conducted over two days or while the workers were carrying out other activities, which made them longer. The duration of the compilation of the Enterprise Questionnaire was not reported, but the questionnaire requires the engagement of several departments and the necessity of consulting internal registers to reply, so compilation took several weeks. However, data can be collected in parallel in all the sampled enterprises in the same wave.

Overall, the quality of the data collected was good. There were limited missing data, "don't know" answers and refusals.

In principle, almost all the indicators in table 2 could be calculated. However, due to the small sample of the pilot, there is not enough variation in the dataset to create some indicators. For instance, the indicator of workers in different statuses of employment cannot be calculated because all the workers are reported to be employees. However, some workers in different statuses of employment, such as apprentices or trainees, or workers helping in family household businesses, could have been captured in a larger sample.

A few questions were misinterpreted. An example is question A.13: *Do you consider this enterprise to be part of the electronics supply chain?* in the Enterprise Questionnaire. Out of 28 enterprises interviewed, nine replied *NO* and five *Don't know* to this question. However, when we checked the main activities of these enterprises (question A11a) and the VSIC code, most of them belonged to the electronics supply chain.

The GSO pointed out the difficulty encountered by workers in responding honestly to questions related to their level of skills, health status, negative measures against them, and any form of discrimination or coercion suffered because of fear of negative consequences (GSO 2023). However, even in these questions, the number of missing data and refusals is quite small. The questions on equity and inclusion seem to be the most problematic. A cognitive test can help to further improve the design of the questionnaire.

In addition, the GSO reported difficulty in collecting information on questions A16, A19, A23 and A27, which ask the enterprises to report their clients, suppliers, subcontractors and clients of manufacturing services (GSO 2023). Despite these difficulties, as discussed above, the data collected were in line with the expectations for the sampling design. The GSO also found it difficult to collect information on the establishment's employees (question A25) because most enterprises do not want to reveal information on their employees in the context of a shortage of skilled workers (GSO 2023). This is reflected in the distribution of occupations in table 11. Some recommendations are provided in section 4 below.

With some difficulty, datasets of the Enterprise Questionnaire and the Worker Questionnaire were merged using the tax code of the enterprises as an enterprise identifier and a worker identifier provided in the datasets. A unique identifier for the enterprises, ideally different from the tax code to cover household business without tax code, and a unique identifier for the workers, need to be created for the full survey.

4. Overall assessment and further recommendations

Sampling strategy

Overall, the results of the pilot test may be summarized as follows:

- The results suggest that all tiers of the supply chain can be reached in a limited number of waves of sampling, except possibly Tier 1 and particularly Tier 5, which may need more than two waves of sampling.
- Enterprises list, on average, six linked enterprises on the base of which sampling through the supply chain can be conducted. The information obtained from the pilot test, however, has not been sufficient to assess the feasibility of the sample design to cover household businesses of the supply chain.
- The sub-sampling of employees by respondent-driven sampling seems to be somewhat problematic. It tends to cover disproportionally fewer production workers and more managers and other non-production workers. A remedy action may be to improve the training of interviewers in sample selection under RDS and emphasize more forcefully the clause on the diversity of occupations in question B25 of the Enterprise Questionnaire. Also, it may be necessary to revise question B25 to limit the number of employees to be listed to say, three or four, and ask that the listed employees be each from a different occupation.

Decent work questionnaires

Overall, the results of the pilot test may be summarized as follows:

- Conducting the survey is complex because it aims to collect sensitive and confidential data. Some questions are subjective and subject to the interpretation of the respondent. Despite this, the quality of the pilot data was high, with a low proportion of missing data, *don't know* and refusal, and provided sufficient data for the sampling design, although with some limitations as explained above. A cognitive test can help to further improve the design of the questionnaires, especially for the most sensitive questions.
- Almost all the DW-SCS indicators identified by combining the approach used in the Decent Work Framework and the Better Work CAT can be calculated and in principle disaggregated by tiers, geography and worker characteristics including sex, subject to sample size.
- The questionnaires are too long. Further analysis should be done to identify the core questions (for example, questions needed for the sampling strategy and the core indicators on fundamental principles and rights at work) and optional questions. Going forward, Member States could adopt a modular approach in line with their policy priorities.

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Annexes

Annex 1. Electronics and electrical supply chain in Viet Nam: Correspondence between VSIC 2018 and ISIC Rev. 4

Tier	VSIC 2018 code[1]	ISIC Rev.4 code[2]	Description
Tier 1. Wholesale and retail distributors			
1	4651	4651	Wholesale of computers, computer peripheral equipment and software
1	4652	4652	Wholesale of electronics and telecommunications equipment and parts
1	4741	4741	Retail sale of computers, peripheral units, software and telecommunications equipment in specialized stores
1	4742	4742	Retail sale of audio and video equipment in specialized stores.
Tier 2. Producers of final electronics and electrical products			
2	2620	2620	Manufacturers of computers and peripheral equipment
2	2630	2630	Manufacturers of communication equipment
2	2640	2640	Manufacturers of consumer electronics
2	2651	2651	Manufacturers of measuring, testing, navigating and controlling equipment
2	2652	2652	Manufacturers of watches and clocks
2	2660	2660	Manufacturers of irradiation, electromedical, electrotherapeutic equipment
2	2670	2670	Manufacturers of optical instruments and photographic equipment
2	2740	2740	Manufacturers of electric lightening equipment and other electrical
2	2750	2750	Manufacturers of domestic appliances that may also produce electronics and electrical final products.
2	2790	2610	Manufacturers of other electronic equipment
Tier 3. Suppliers of electronics and electrical components			
3	2610	2610	Manufacturers of electronic components and boards
3	2680	2680	Manufacturers of magnetic and optical media
3	2710	2710	Manufacturers of electric motors, generators, transformers, electricity distribution, control apparatus
3	2720	2720	Manufacturers of batteries and accumulators
3	2733	2730	Manufacturers of wiring and wiring devices

Tier	VSIC 2018 code[1]	ISIC Rev.4 code[2]	Description
3	2731	2731	Manufacturers of optic cables
3	2732	2732	Manufacturers of other electronics and electrical wires and cables
Tier 4. Suppliers of other components			
4	2431	2410	Manufacturers of basic iron and steel
4	2420	2420	Manufacturers of basic precious and other non-ferrous metals
4	2410	2431	Manufacturers of casting iron and steel
4	2432	2432	Manufacturers of casting non-ferrous metals
4	2511	2590	Producers of other fabricated metal products, metalworking and service activities
4	2220	2220	Manufacturers of plastic products
4	2211	2219	Manufacturers of other rubber products
4	2310	2310	Manufacturers of glass and glass products
4	1701	1700	Manufacturers of paper and paper products for packaging
4	3290	3290	Other relevant manufacturing activities not elsewhere classified.
Tier 5. Producers of raw materials and inputs to other components			
5	0722	0729	Mining and other non-ferrous metal ores (aluminum, copper, lead, zinc, tin, manganese, chrome, nickel, cobalt, molybdenum, tantalum, vanadium, other)
5	0730	0729	Mining of precious metal ores (gold, silver, platinum)
5	0810	0810	Quarrying stone, sand and clay (silicon mining)
5	2013	2013	Manufacturing of plastics and synthetic rubber in primary forms, and possible other producers of raw materials for the electronics and electrical supply chain

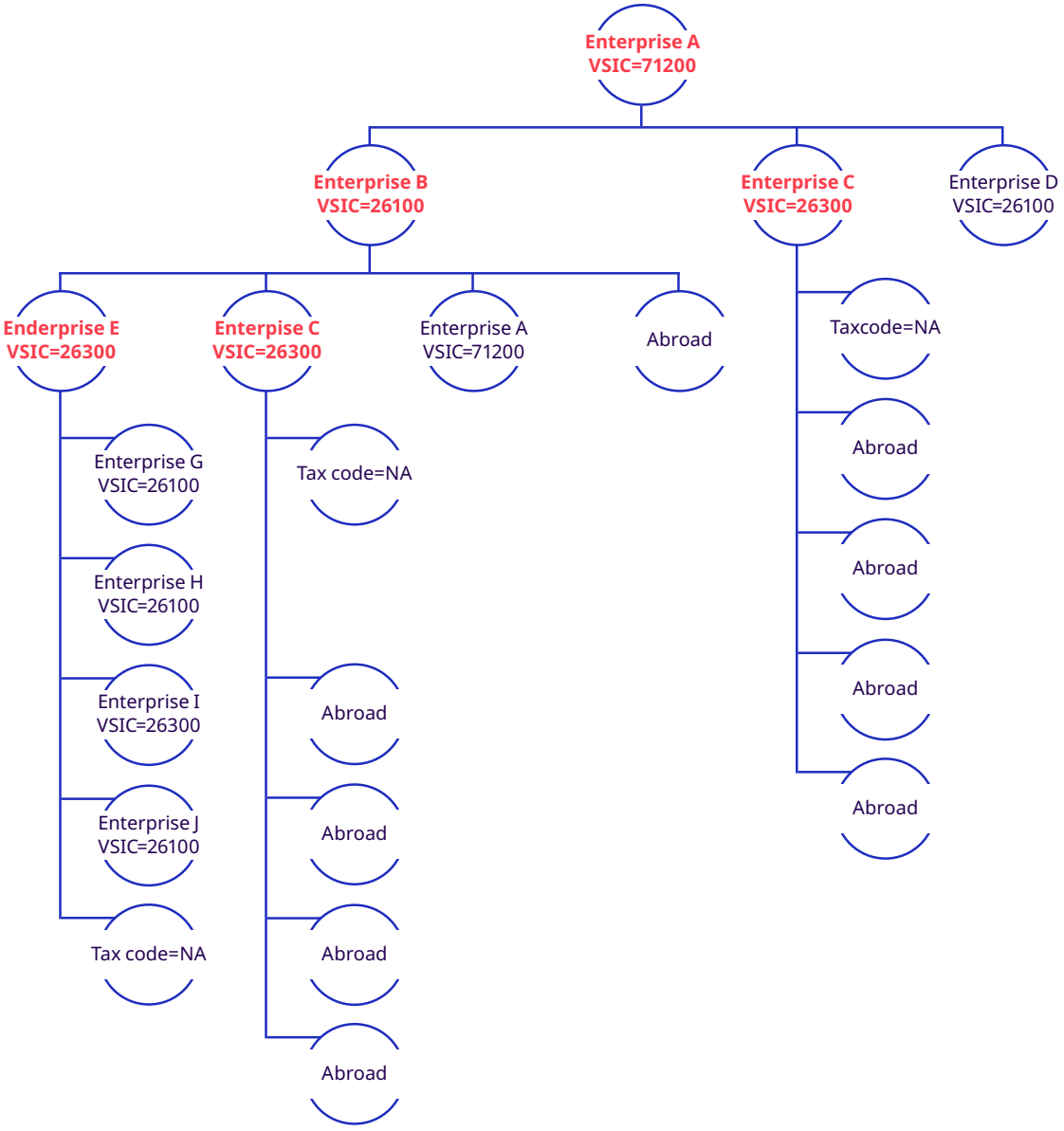
Source: Frederick 2022.
Notes: 1: GSO 2018. 2: UN 2008. 3When VSIC and ISIC codes descriptions are different the VSIC description is reported.

Given the crucial role played by the industrial classifications in defining the scope of the survey, it is important to review the list of economic activities specified in this annex, particularly with respect to manufacturing services (such as printing, packaging, etc.) and the statistical treatment of the following ISIC Rev. 4 codes:

ISIC Rev. 4 code 3313: Repair of electronic and optical equipment
ISIC Rev. 4 code 3314: Repair of electrical equipment
ISIC Rev. 4 code 9511: Repair of computers and peripheral equipment
ISIC Rev. 4 code 9512: Repair of communication equipment
ISIC Rev. 4 code 9521: Repair of consumer electronics

While the latter three are considered “services” in the ISIC classification, the former two (3313 and 3314) are assimilated with manufacturing under Section C of the classification.

Annex 2. Example of client links from pilot data



Note: in red are the enterprises interviewed in the pilot. 71200=Technical testing and analysis (Activity=check and classify FPCB circuit board appearance, self-classified Tier 3); 26300=Manufacture of communication equipment (Tier 2); 26100=Manufacture of electronic components and boards (Tier 3).

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