**Identifying Sectors, Products and Services**

Decision 16/2 on digital sequence information includes an indicative list of sectors and makes reference to the International Standard Industrial Classification of All Economic Activities (ISIC) and the Central Product Classification. Decision 61/2 also makes reference to possible additional modalities that takes products and services into account.[[1]](#footnote-1)

A key task for Parties in operationalising the Multi-lateral benefit-sharing mechanism and the Cali Fund will be identifying relevant entities within their jurisdictions. Existing international, regional and national classification systems for types of economic activity and products and services can assist with this process. This paper:

1. provides a background to the use of classification systems within the United Nations system;
2. identifies relevant areas of classification;
3. briefly illustrates their use using the example of the United Kingdom, and;
4. outlines recent developments in United Nations classification systems to address topics such as cloud computing and artificial intelligence.

The paper concludes by proposing that Parties to the CBD may wish to request assistance from relevant bodies under the United Nations Statistical Commission (UNSC) in refining relevant areas of UN classification systems to support operationalisation of the Cali Fund. Parties may also wish to consult the United Nations Statistical Commission on recent work to incorporate

Natural capital accounting into the System of National Accounts of relevance to the future valuation and recognition of the economic contribution of DSI.

**The United Nations System of National Accounts**

The United Nations System of National Accounts (the SNA) was established in 1953 and is periodically updated based on consultations with Member States through the United Nations Statistical Commission (UNSC). The current version of the SNA dates to 2008 (and is known as the 2008 SNA). The United Nations Statistics Division describes the SNA as follows:

“The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity. The SNA describes a coherent, consistent and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications and accounting rules.”[[2]](#footnote-2)

The SNA is of relevance to the multilateral mechanism on DSI as well as the Global Biodiversity Framework and Resource Mobilization for two main reasons:

1. The classification systems agreed by UN Member States can support Parties in the further operationalisation and development of the Multi-Lateral Benefit Sharing Mechanism include, as appropriate, through requests to the United Nations Statistical Commission (the UNSC) for further elaboration of relevant classification systems to support the work of the CBD;
2. The SNA is increasingly incorporating the environment and natural capital accounting within its concepts, definitions, classifications and rules through the standards set by the System of Environmental-Economic Accounting (the SEEA).[[3]](#footnote-3) Parties may therefore wish to draw on existing work under the United Nations system on natural capital accounting in any future deliberations on the economic value of digital sequence information.[[4]](#footnote-4) [ Key issue from the LSE Roundtable is that we do not know what the economic value of dsi is as an asset]

**Identifying Entities by Sector**

Within the United Nations system standardised classification systems create the basis for international coherence and comparability in reporting. In the case of economic activity this was recognised early on in the history of the United Nations with the development in 1948 of the first edition of the International Standard Industrial Classification of All Economic Activities (ISIC). ISIC is currently transitioning from ISIC revision 4, adopted in 2008, to ISIC revision 5 (see below). It is reasonable to expect that governments will transition to the use of ISIC5 in the next 2-3 years.

ISIC is a hierarchical classification of entities by their type of economic activity. Individual countries and regions have developed their own classifications that link to ISIC. These classifications typically offer a greater level of detail in defining entities than ISIC. For example, the European Union has elaborated its own more detailed version of ISIC (currently NACE2).[[5]](#footnote-5) The classification used in North America (Canada, Mexico and the United States) is the North American Industry Classification System (NAICS).[[6]](#footnote-6) Regional and national level classification systems may be more detailed than the higher-level ISIC and include topics such as biotechnology, cloud computing and artificial intelligence. The different classifications maintained by individual member states and regions are mapped to ISIC using correspondence tables.[[7]](#footnote-7) Revisions to ISIC are organized by the United Nations Statistical Commission and are informed by a global consultation process with member states and international organizations.[[8]](#footnote-8) For example, consultations for the development of ISIC5 included questions on how to address cloud computing, databases and artificial intelligence.

In preparation for the 2024 *LSE Roundtable on Biodiversity Finance and Digital Sequence Information* a review was conducted of ISIC4 and ISIC5. An additional review was conducted of the Central Product Classification (CPC version 2.1 and draft version 3). This review was updated based on the list of sectors identified in decision 16/2.

UN classification systems are commonly hierarchical and range from the general to the specific. The ISIC hierarchy is divided into Sections, Divisions, Groups and Classes and may be elaborated in further detail on the regional or national level. The ISIC hierarchy for pharmaceuticals is shown below.

* Section C = Manufacturing
  + Division 21 = Manufacture of basic pharmaceutical products and pharmaceutical preparations
    - Group 210 = Manufacture of pharmaceuticals, medicinal chemistry and botanical products
      * Class 2100 = as above
      * National/Regional details e.g. UK SIC 2007 includes:
        + 21100 Manufacture of basic pharmaceutical products
        + 21200 Manufacture of pharmaceutical preparations

Table 1 provides a summary correspondence table between the sectors contained in Enclosure 1 of decision 16/2 and sectors within ISIC4. Because ISIC5 has yet to be fully implemented we address relevant additions and changes under recent developments along with draft CPC3 for products. Table 1 is organized in the order of sectors listed in Enclosure 1 of decision 16/2.

**Table 1 DSI Sectors and the International Standard Industrial Classification**

| **DSI Sector** | **ISIC Section** | **ISIC Section Title** | **ISIC Division** | **ISIC Detail** |
| --- | --- | --- | --- | --- |
| Pharmaceuticals | C | Manufacturing | Division 21 | Division 21, Class 2100: Manufacture of pharmaceuticals, medicinal chemistry and botanical products. |
| Nutraceuticals (food and health supplements) | C | Manufacturing | Division 10 | Division 10, Class 1079: Manufacturing of other food products n.e.c.[[9]](#footnote-9) |
| Cosmetics | C | Manufacturing | Division 20 | Division 20, Class 2023: Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations.[[10]](#footnote-10) |
| Animal and plant breeding | A | Agriculture, forestry and fishing | Division 1  Division 2  Division 3 | Division 1, Crop and animal production, hunting and related service activities:  Groups 11-13 crop and plant propagation.  Group 14 animal production.  Group 15 Mixed farming.  Group 16 Support activities to agriculture and post-harvest crop activities.  Division 2 Forestry and Logging:  Group 21-24 Silviculture, non-wood forest products and support services to forestry.  Division 3 Fishing and Aquaculture:  Group 21-33 Fishing, Aquaculture and support services. |
| Biotechnology | N | Professional, scientific and technical activities | Division 72 | Division 72, Class 7210: Research and experimental development on natural sciences and engineering. In ISIC5 “This class includes also – DNA sequencing for general research on biological processes”. |
| Laboratory equipment associated with the sequencing and use of digital sequence  information on genetic resources, including reagents and supplies | C | Manufacturing | Division 23  Division 26  Division 32 | Division 23, Class 2310: Manufacture of glass and glass products  Division 26, Class 2651: Manufacture of measuring, testing, navigating and control equipment  Division 32, Class 3250: Manufacture of medical and dental instruments and supplies  Division 32, Class 3250: Manufacture of dental instruments and supplies  Division 32, Class 3290: Other manufacturing n.e.c. |
| Information, scientific & technical services including artificial intelligence | K | Telecommunications, computer programming, consultancy, computing infrastructure, and other information service activities | Division 62 | Division 62, Class 6219: Other computer programming activities includes: databases, machine learning, artificial intelligence.[[11]](#footnote-11)  Division 62, Class 6310: Computing infrastructure, data processing, hosting and related activities.[[12]](#footnote-12) |
| Of Direct Relevance to DSI but not noted in Enclosure A | C | Manufacturing | Division 20 | Division 20, Class 2011: Manufacture of basic chemicals (see note regarding nucleic acids).[[13]](#footnote-13) |

The review revealed that areas of the classification that may be directly or indirectly relevant to DSI fall into four main sections of ISIC (A, C, K and N) in 11 divisions. Within the divisions we identified xxx groups and xxx specific classes.

A number of observations can be made regarding the correspondence between the sectors identified by Parties, ISIC and the CPC

1. In some cases, such as pharmaceuticals, cosmetics, or biotechnology there is a one to one or very close correspondence between the sectors identified by Parties and ISIC;
2. Areas of the classification relating to animal and plant breeding are extensive and encompass growing of a wide range of food crops, mixed farming and similar activities. It is assumed for the purpose of the present paper that fisheries and aquaculture are included by virtue of involving animals;
3. Some areas identified by Parties are ambiguous in both the ISIC and the Central Product Classification. For example the category ‘nutraceuticals (food and health supplements)’ in Enclosure A involves terminology that is not currently present in either classification scheme. This suggests that further work to clarify entities in this category is likely to be needed. In other cases, such as laboratory equipment including reagents and supplies it is possible to identify entities involved in production of these types of products, but the extent to which certain kinds of activity such as the manufacture of glassware can be described as directly or indirectly benefitting from DSI may require further clarification.

At this stage in the work by Parties to operationalise the mechanism it is likely to be more relevant to focus on those sectors that directly benefit from digital sequence information pending further clarification on the identification of other entities that may directly or indirectly benefit from the use of DSI. We return to this topic below.

**A Worked Example from the UK**

As noted above, individual countries and regions have elaborated classification systems for economic activity that are typically more detailed than the United Nations level framework provided by the ISIC. For example, the UK currently uses SIC07 (Standard Industrial Classification 2007) which is a more detailed version of the current EU standard NACE2 rev. 2 (Nomenclature statistique des activités économiques dans la Communauté européenne). It is reasonable to expect that governments will vary in the level of detail used in their respective statistical classification systems for types of economic activity.

In the UK, entities are invited to select the relevant classification describing their economic activity at the time of legal registration. Entities may choose more than one classification at the time of registration. A lookup tool is available through UK Companies House to assist those seeking to register as shown in Figure 1.

Figure 1 shows that for pharmaceutical related activity there are two main codes. The first in essence mirrors ISIC with respect to basic pharmaceutical products (21100) and the second (21200) focuses on manufacture of pharmaceutical preparations. A search for biotechnology (not show) using this tool would inform those registering their company that they should use code 72110 for ‘Research and experimental development on biotechnology’. This is a UK (and EU) detailed classifier linked to ISIC class 7210 for Research and experimental development on natural sciences and engineering (see Table 1). A similar classification is recorded in the North American NAICS classification (AND IS X Y Z).

In the case of the UK, Companies House makes data on companies available through an Application Programming Interface (an API). This allows information on companies to be retrieved at scale and to combine the data with additional information by geocoding company addresses. Figure 2 presents an outline map of biotechnology and pharmaceutical companies in the UK based on data from Companies House and has been geocoded using the Google Maps API.

**Figure 2 UK Biotechnology and Pharmaceutical Companies (source: Companies House)**

A screenshot of a map

Description automatically generated

In practice, countries are likely to differ significantly in the extent to which information on companies and other entities can be easily accessed. In some cases a country may maintain a central register of entities (e.g. such as a Companies House or equivalent). In other cases, such as federal systems, it is possible that information may be held at the level of individual states. Access to information in digital form, either through a web portal or an application programming interface, is also likely to vary. When seeking to identify entities that either directly or indirectly benefit from digital sequence information it is recommended to engage with the relevant register for legal entities and to consult the national statistical authority for guidance. In addition, online data resources such as Open Corporates (<https://opencorporates.com/>) are an important source of open access information.

As part of this process of engagement the current paper suggests that the majority of entities will be located in the following ISIC divisions (and their national or regional equivalents). Correspondence tables for ISIC to national and regional classifications are likely to be available from national statistical authorities.

INSERT TABLE 2

**Sector and Products**

Decision 16/2 refers to entities that directly or indirectly benefit

**A Note on Services**

An important advantage of the use of the Central Product Classification is that it includes both good and services. Services can be more difficult to ‘see’ in economic statistics than goods (e.g. sales of particular types of pharmaceuticals, enzymes or nucleic acids) because

1. Reference to the exploration of possible additional modalities is made in the context of para 7 of decision 15/9. [↑](#footnote-ref-1)
2. https://unstats.un.org/unsd/nationalaccount/sna.asp [↑](#footnote-ref-2)
3. https://seea.un.org/content/homepage [↑](#footnote-ref-3)
4. FN THE LSE ROUNDTABLE AND LEA IN PARTICULAR [↑](#footnote-ref-4)
5. [↑](#footnote-ref-5)
6. The importance of industrial classification for a range of economic reporting purposes is perhaps suggested by the fact that the official guide to NAICS 2022 is 958 pages long. https://www.census.gov/naics/reference\_files\_tools/2022\_NAICS\_Manual.pdf [↑](#footnote-ref-6)
7. [↑](#footnote-ref-7)
8. See for example: https://unstats.un.org/unsd/Classifications/isic/rev5consultation [↑](#footnote-ref-8)
9. ISIC and the CPC do not contain references to nutraceuticals, food supplements or health supplements. Within ISIC4 Class 1079 is the most likely to include entities engaged in economic activity producing these products. [↑](#footnote-ref-9)
10. In international classification systems ‘toilet preparations’ captures personal hygiene and cosmetic products. [↑](#footnote-ref-10)
11. ISIC5 explanatory note: “This class includes: - designing the structure and content of, and/or writing, modifying (including updates and patches), customizing, testing and supporting of the computer code necessary to create and implement: \* systems software \* business, finance, and other software applications (other than video game applications) \* machine learning applications \* artificial intelligence/machine vision applications \* cybersecurity applications \* distributed ledger applications \* databases \* web pages”. REF [↑](#footnote-ref-11)
12. ISIC5 explanatory note: “This class includes: - provision of computing infrastructure including cloud infrastructure and platform provision (IaaS, PaaS) - cloud computing (except software publishing and computer systems design), whether or not in combination with infrastructure provision - provision of technical infrastructure related to streaming services - data processing services and related activities: • complete processing of data supplied by clients • generation of specialized reports from data supplied by clients • blockchain/distributed ledger technology (DLT) data processing activities - specialized hosting activities such as: • web hosting • application hosting - general time-share provision of mainframe facilities to clients - digitalisation of files (for further processing of data) - provision of data entry services - data centre colocation activities (i.e., rental of server and networking space in data centres, ) - computer data storage services”. REF [↑](#footnote-ref-12)
13. Refers to manufacturers of basic chemicals under CPC code 34160 Organo-sulphur compounds and other organo-inorganic compounds; heterocyclic compounds n.e.c.; nucleic acids and their salts. REF [↑](#footnote-ref-13)