

Chapter I: General Knowledge on Enterprises and Information Systems

Part I: The Enterprise

1. Definition of an Enterprise

Providing a clear and coherent definition of an enterprise is considered a very challenging process. This difficulty is partly due to the diversity of ideological and economic perspectives, and partly due to the continuous and rapid development of enterprises in legal and functional terms. According to the Oxford English Dictionary [1], “an enterprise is a business or company engaged in commercial, industrial, or professional activities.” This definition appears succinct and general, thus we adopt the one proposed by Gilles BRESSY and Christian KONKUYT, who offer a more comprehensive definition by considering an enterprise as “an autonomous economic unit possessing human and material resources that it combines to produce goods and services intended for sale” [2].

2. Types of Enterprises

Economic enterprises can be classified according to several criteria, but the economic criterion, the size criterion, and the legal criterion are the most commonly used.

2.1. Classification according to the Economic Criterion

In this classification, we distinguish enterprises according to their belonging to one of the three main economic sectors, namely [3]:

- **The primary sector:** corresponds to activities related to the extraction of natural resources. It includes agriculture, fishing, forestry, and mining.
- **The secondary sector:** corresponds to activities related to the transformation of raw materials, which come from the primary sector. It includes a wide range of activities such as the wood industry, aeronautics, electronics, oil refining, industrial production, construction, etc.

- **The tertiary sector:** encompasses all economic activities that do not fall within the other two sectors, primarily services. For example, consulting, insurance, education, retail, tourism, catering, and real estate agencies are part of the tertiary sector.

2.2. Classification by Size

In this classification, the following types of enterprises are distinguished:

- **Microenterprises** that do not employ any employees.
- **Very Small Enterprises (VSE)** that employ between 1 and 9 employees.
- **Small Enterprises (SE)** that employ between 10 and 49 employees.
- **Medium Enterprises (ME)** that employ between 50 and 499 employees.

Small and Medium Enterprises (SMEs) consist of both SEs and MEs.

- **Large Enterprises (LE)** that employ more than 500 employees.
- **Very Large Enterprises (VLE)** that employ more than 1,500 employees.

2.3. Legal Classification

This classification emphasizes the mode of ownership, the method of taxation, obligations, and responsibilities, leading to several types, namely [4]:

- **Sole Proprietorship (Entreprise Individuelle):** A business owned by one person who is fully responsible for all debts and obligations.
- **Single-Member Limited Liability Company (EURL - Entreprise Unipersonnelle à Responsabilité Limitée):** A type of company owned by one person, offering limited liability protection to the owner.
- **Limited Liability Company (SARL - Société à Responsabilité Limitée):** A business structure where the owners' liability is limited to their contributions, protecting personal assets from business debts.
- **Joint Stock Company (SPA - Société par Actions):** A company where capital is divided into shares and shareholders have limited liability for the company's debts.
- **General Partnership (SNC - Société en Nom Collectif):** A partnership where all partners share unlimited liability for the debts and obligations of the business.
- **Group (GR - Groupement):** An association of multiple companies or enterprises that collaborate under a unified interest.

3. Objectives of the Company

Economic enterprises, whether public or private, always seek to achieve a number of variable and multiple objectives, depending on the owners, the nature, and the field of activity of these enterprises. We can summarize these objectives in the following points:

3.1. Economic Objectives

- Ensure profit (the difference between expenses and revenue).
- Rationalize production.
- Meet the needs of society.

3.2. Social Objectives

- Ensure an acceptable wage level for workers.
- Improve the standard of living for workers.
- Provide workers with various forms of insurance (health, work-related accidents, retirement, etc.).
- Offer workers multiple services (consumer cooperatives, restaurants, transportation, etc.).
- Ensure workers have good qualifications.
- Guarantee the future sustainability of the planet and the environment.
- Uphold ethics and responsibility toward customers.

3.3. Technological Objectives

Through scientific research, the company constantly strives to enrich and improve its products and services, while optimizing processes and production tools to enhance its products and improve the working conditions and quality of life of its employees.

4. Functions of the Company

A company operates only if tasks are precisely distributed and each person's role within the company is clearly defined. The larger the company, the more structured it needs to be to function effectively. The functions of the company vary according to its nature of activity, but

generally, we can distinguish the following eight functions [5]:

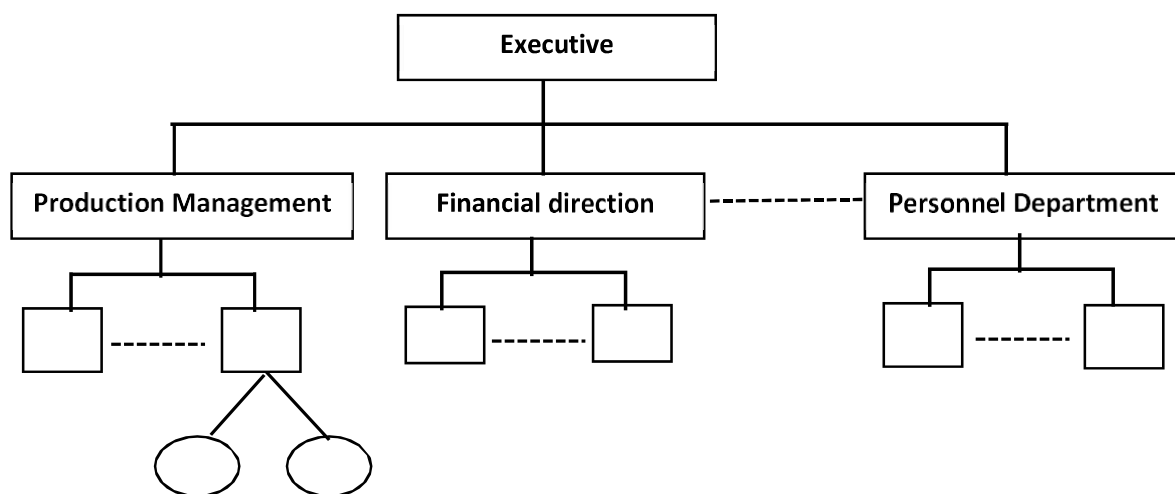
Functions	Objectives
<i>The function of management and general administration</i>	To plan, organize, command, coordinate, and control the functioning of the company
<i>The purchasing function</i>	Procure the raw materials and components necessary for production
<i>The finance and accounting function</i>	Acquire and use financial resources for the development of the company
<i>The logistics function</i>	Optimize all physical and informational flows of the company from suppliers, customers, stock, and transportation
<i>The marketing and sales function</i>	The Marketing and Sales function encompasses all activities and processes allowing a company to: Understand consumer expectations and the market situation in which it operates. Attempt to influence consumer behavior in line with its objectives.
<i>The production function</i>	The Production function encompasses all activities that transform raw materials and components into products sold to customers
<i>The research and development function</i>	The Research & Development function includes all processes that, starting from fundamental research or an invention, ensure its industrial feasibility

<i>The human resources function</i>	The Human Resources function's mission is to ensure that the organization has the necessary personnel for its operation and that this personnel does its best to improve the organization's performance while flourishing
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5. Enterprise structure

The structure of a company describes the way in which a company distributes, organizes, coordinates, and controls its activities. The company structure is represented by an organizational chart, which shows the distribution of the company's areas of activity along with the different interdependencies between these areas. There are several types of structures, such as [6]:

5.1. Hierarchical structure



This structure is based on the principle of unity of command, where each employee reports to only one supervisor.

Advantages: simplicity of command, clarity, and security.

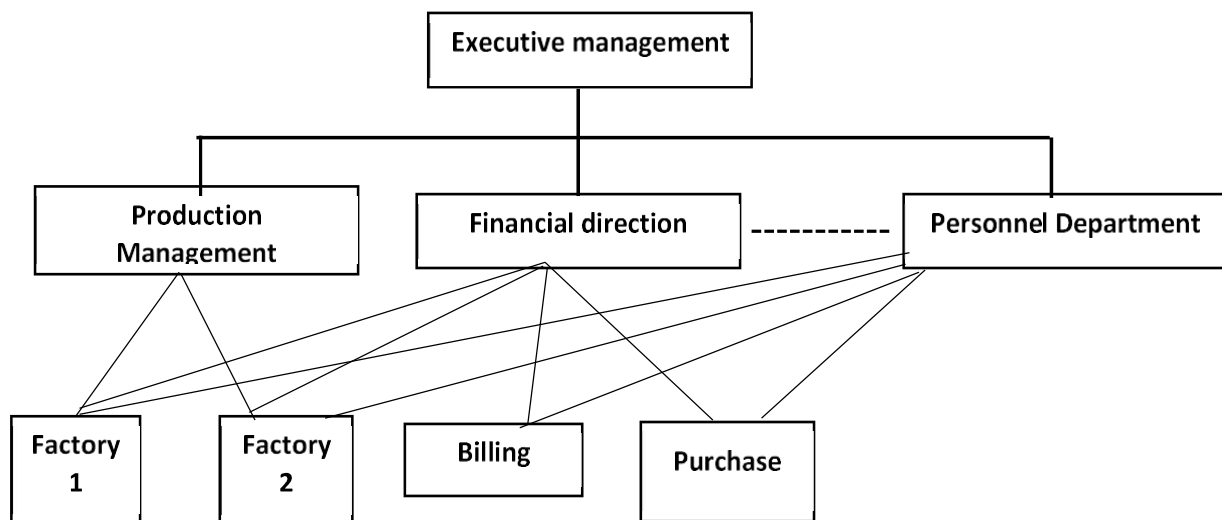
Disadvantages: compartmentalization, poor flow of information, rigidity, and bureaucracy.

5.2. Functional Structure

This structure is simple and promotes specialization, based on the principle of functional division of authority and multiple command, where each employee reports to several supervisors, each having authority only in their area of expertise.

Advantages: highly effective staff specialization, grouping of skills.

Disadvantages: potential conflicts due to multiple command, risk of responsibility dilution.

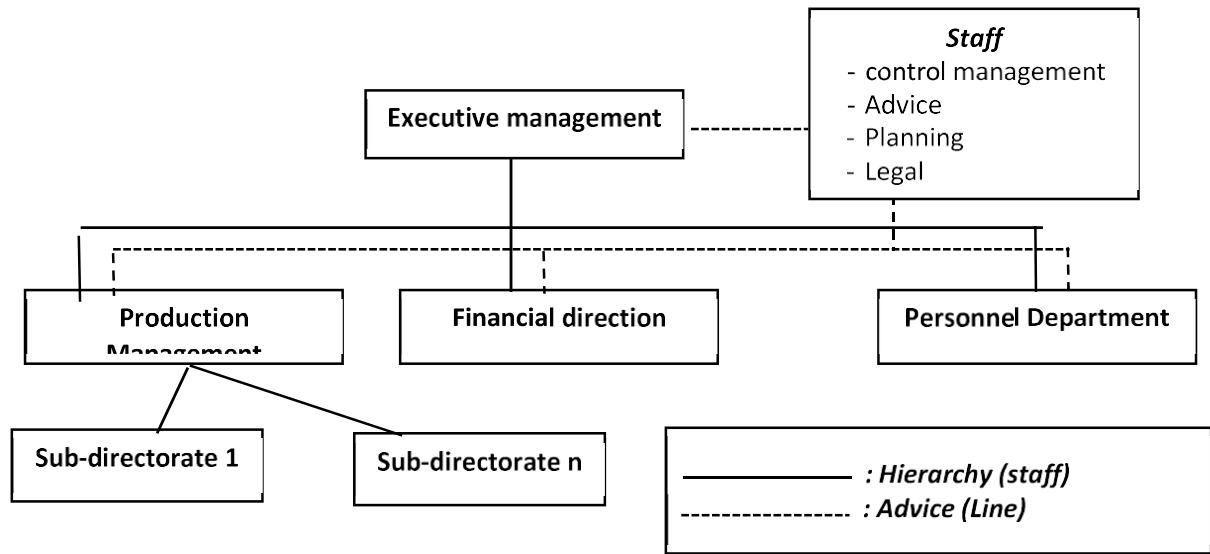


5.3. Hierarchical-functional structure (Staff and Line)

This structure is based on the unity of command formed by hierarchical leaders (Line). However, these leaders must consider suggestions and recommendations from specialists or advisors (Staff).

Advantages: specialist advisors who offer advice and make suggestions to help them make better decisions support Decision-makers.

Disadvantages: Risk of difficult relationships between operational staff and functional staff.



6. Information System

6.1. System

Many definitions have been proposed for the concept of a system. Among the most relevant is that of Joël De Rosnay, who defines a system as a set of elements in dynamic interaction, organized with a purpose [7]. J.L. LEMOINE, in the general system theory [8], highlights that a system is:

- Something (anything, identifiable),
- That does something (activity, function),
- Is endowed with a structure,
- Evolves over time,
- Exists within something (environment),
- For a purpose (finality).

6.2. Information

Information is an organized set of data that constitutes a message about a given phenomenon or event. Information helps solve problems and make decisions, as its rational use is the foundation of knowledge [9]. For information to be considered good, it must meet certain relevance or quality criteria, such as:

- Identifiability of the source
- Accessibility
- Reliability
- Providing novelty
- Precision, accuracy, and completeness
- Dated and updated
- Usefulness

6.3. Information System

An information system is the organization (people, organizational chart, management rules, procedures, ...) and the tools (software applications, methods, calculation rules, equipment, ...) that allow the members of a company to communicate, process, and store information. It represents the set of elements involved in managing, storing, processing, transporting, and disseminating information within an organization or company [10].

In the fields of computing and telecommunications, and more generally in the business world, the term Information System (IS) has the following meanings:

- An organized set of resources (personnel, data, procedures, hardware, software, ...) that allows the acquisition, storage, structuring, and communication of information in the form of texts, images, sounds, or coded data within organizations.
- Based on their main purpose, we distinguish Information Systems that support operations (transaction processing, industrial process control, office and communication operations support) and Information Systems that support management (assisting in report production, decision-making support, etc.).

7. The Company as a System

The company, as a system, is considered an organized set composed of different functions, services, and individuals in constant interaction, all of which may have contradictory objectives.

In the systemic approach, a system must meet the following six characteristics:

- A system is a finite set.
- A system acts according to a purpose.
- A system has regulated behavior.
- A system informs itself about its own behavior.
- A system decides its behavior.
- A system memorizes.

The company meets all of these characteristics, and therefore we can consider it a system:

First characteristic: A company constitutes a finite set.

A company is an identifiable organization made up of individuals and resources (financial, physical, informational, etc.) brought together in a sustainable manner.

Second characteristic: A company acts according to a purpose.

A company is an economic organization that produces goods and/or services to create wealth.

Third characteristic: A company is a regulated organization.

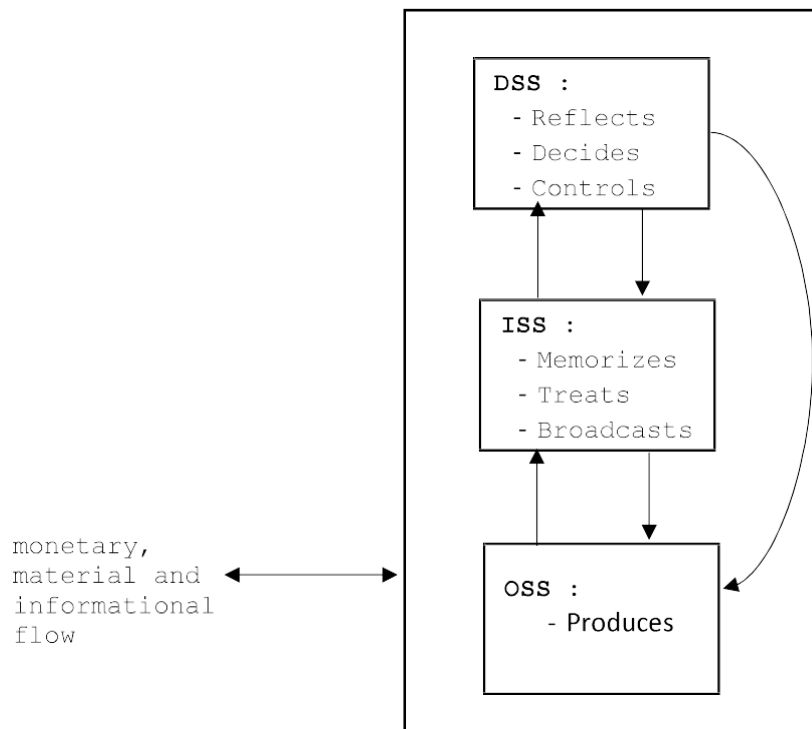
Disturbances due to the environment may arise. The company must have a set of resources and methods to control its activity to achieve its goals and protect itself against potential disturbances. The company thus has a subsystem, the decision system, which performs regulation based on information flows.

Fourth, fifth, and sixth characteristics

A company informs itself about its own behavior, stores various pieces of information, and makes decisions based on this information.

8. The Three Subsystems of a Company

A company is a system composed of three interdependent subsystems, which are:



8.1. The Operating System (or Operational System)

Ensures the functioning of the system by carrying out the physical production of goods and services, both internally and externally. It is connected to the environment through external flows and to other subsystems via internal information flows. Its activity is controlled by the decision system.

8.2. The Decision System (or Control System or Management System)

Defines the company's objectives. It is connected to other subsystems through internal information flows. It analyzes the environment and the company's internal operations. It controls the execution of tasks in the operating system and ensures system regulation by designing solution scenarios. In addition to the two types of regulation previously mentioned, "alert

regulation" is added, based on information signaling internal malfunctions. For example, a machine stopping on a production line requires adjustment.

8.3. The Information System

Supplies the company with information (from internal or environmental sources), stores, processes, and communicates this information to the other subsystems to which it is connected. The information system thus acts as the mandatory passage point for all company information, whether external or internal.

Internal information comes in different forms. Information sent by the operating system to the information system provides detailed insights into the results obtained by its activities.

The information system's task is to store and synthesize this information before transmitting it to the decision system.

The decision system uses the synthesized information received from the information system to make decisions and sends its orders in the form of directive information.

To perform its tasks, the operating system uses the information stored by the information system.

9. Decision-Making Process

The decision-making process is a method of gathering information, evaluating alternatives, and then making a final decision. This process generally occurs in seven steps [11]:

- ***Identify the decision to be made***

Identify clearly the problem to be solved to make an effective decision.

- ***Gather useful information***

Once identifying the problem, it is time to collect the necessary information to make a choice.

- ***Propose alternatives***

After gathering the necessary information, identify potential solutions to the problem.

- ***Narrow down the options***

In this phase, each possible solution is evaluated by focusing on its pros and cons. As a result, priorities are established among the possible alternatives.

- ***Make a choice***

After evaluating the alternatives, a decision is made.

- ***Take action***

Once the decision is made, it must be implemented.

- **Analyze the final decision and its consequences (positive and negative)**

In this step, answer the following questions: Has the problem been solved? Have the objectives been achieved? The answers to these questions allow for lessons to be learned for future decision-making processes.

9.1. Programmable Decision-Making Techniques

9.1.1. Decision Table

A decision table is a logical tool that makes it easy to model a set of choices of a certain complexity. Instead of having a series of nested conditions with IF...THEN...ELSE..., a table can be created containing them. This type of table is particularly useful in computer programming [12].

Information expressed in decision tables can also be represented in the form of decision trees or in a programming language as a series of if-then-else and switch-case instructions.

A decision table is divided into two parts [13]:

1. **The stub:** It also has two parts that describe:
 - **Conditions:** These are the propositions to be tested.
 - **Actions:** These are the actions to be executed for each set of conditions.
2. **The body:** This also consists of two parts:
 - **Condition values (condition inputs):** These are the values that a condition can take and form a rule.
 - **Action values (action inputs):** These are the actions to be executed if the corresponding rule is satisfied.

Example:

The following example represents a decision table provided by a technical support company to diagnose printer issues based on symptoms described by their clients over the phone.

		Rules							
Conditions	The printer prints	F	F	F	F	T	T	T	T
	The red-light flashes	T	T	F	F	T	T	F	F
	The printer is recognized by the computer	F	T	F	T	F	T	F	T
Actions	Check the power cable			X					—
	Check the printer-to-computer cable	X		X					—
	Make sure the printer software is installed	X		X		X		X	—
	Check/replace ink	X	X				X		—
	Check for paper jams		X		X				—

9.1.2. Decision Tree

In graph theory, a tree is an undirected, acyclic, and connected graph. The set of nodes is divided into three categories [14]:

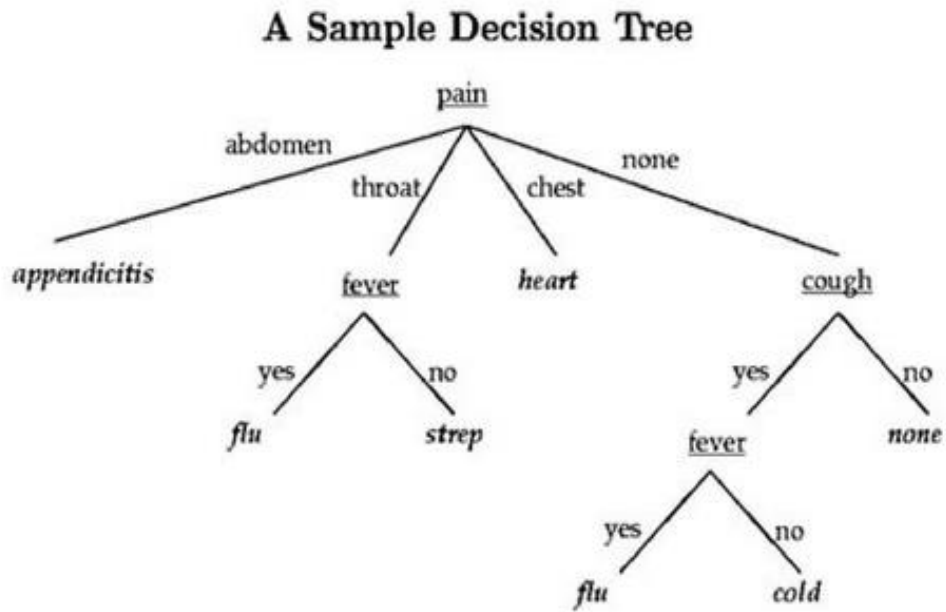
- **Root node:** This is the entry point of the tree,
- **Internal nodes:** These nodes have descendants (or children), which are also nodes,
- **Terminal nodes (or leaves):** These nodes have no descendants.

According to [15], "A decision tree is a tool that aids decision-making. It organizes various possible choices in a situation into a single graph, represented as tree branches (hence its name), with a potential decision at the end of each branch."

Decision trees are used in many fields, such as medicine, business intelligence, data mining, security, etc.

Example:

Medical diagnosis [14]



10. Computerized Information System (CIS)

The computerized information system is the part of the company's information system that is automated using information technology (IT). The CIS should enable productivity and/or efficiency gains by optimizing the organization through the flow of information.

11. Contribution of Information Systems to Enterprise Management

The contribution of the information system to Enterprise management is highly significant and cannot be summarized in a few sentences. However, we can highlight the following key points:

- Leaders make decisions with more certainty, objectivity, and minimal risk.
- The achievement of goals is planned, and the means and strategies to achieve them are clearly defined.
- The organization understands and thus monitors the evolution and demands of its external environment.
- Collaboration and cooperation between the various systems within the organization, as well as their coordination, become easier.

12. Functional Aspects of an Information System

In its various tasks, an information system must perform four basic functions [15]:

12.1. Information Collection

The collection of information by the IS involves gathering the information and then entering it into the system. In other words, information collection is the process of recording information to enable its processing. The information collected can be either internal (information flows generated by internal entities of the organization, such as supply, production, employee management, accounting, sales, etc.) or external (information flows generated by external stakeholders, such as clients, suppliers, the government, etc.).

12.2. Information Storage

Once collected and entered, the information must be stored in a durable, stable, and secure way for future use or to meet legal obligations. Information storage can be organized through files or

databases, which can be stored in:

- Hard drives of the organization's IS servers, making the information accessible only from these servers;
- Storage areas within the organization's IS, consisting of large hard drives accessible through the company's network, where the information is available to all IS components but only within the organization;
- The Cloud, where information can be accessed from anywhere in the world.

12.3. Information Processing

Information processing involves creating new information from existing data using computer programs or manual operations. The processing of information includes the following tasks:

- **Consulting information:** The simplest form of processing, involving accessing the information as it was recorded;
- **Organizing information:** Structuring the information based on specific criteria, such as grouping by client, geographic area, or activity;
- **Updating information:** Revisiting previously recorded information to bring it up to date;
- **Producing new information:** Creating new information from existing data.

12.4. Information Diffusion

After processing, the resulting information must be made available to users. In this case, the information must be communicated to the right recipients, at the right time, and in a directly usable format.

13. The Flows on the Company

For a company to perform its basic functions (purchasing, production, sales, etc.), it must engage in exchanges or transfers either within its departments or with the external environment. These transfers are called flows, and we distinguish three types of flows:

13.1. Physical Flows (or Real Flows)

A physical flow corresponds to the transfer of goods or services (raw materials, finished products, office equipment, etc.).

13.2. Monetary Flows

A monetary flow represents a transfer of money (e.g., payment to a supplier, settlement from a client).

13.3. Information Flows

An information flow represents a transfer of information, either within the company (internal flow) or between the company and its partners (external flow). Information flows are often necessary and precede other types of flows, meaning that physical and monetary flows must always be accompanied by information flows.

14. Flow Diagram

A flow diagram provides an overview (or mapping) of the flow of information between internal or external actors involved in a specific area of study. The components of a flow diagram are:

14.1. Area of Study

An area of study represents the activities within a company that pertain to a specific and well-defined phenomenon.

14.2. Actor

An actor is an active entity involved in the area of study through flows. An actor can be a consumer or creator of information and might be:

- An external party to the company (suppliers, clients, etc.),
- A department within the company (HR, accounting, etc.),
- Buyers, sellers, students, depending on the context.

14.3. Flows

A flow symbolizes an exchange between two actors within the studied information system. It is represented by an arrow, labeled with a name, and, for chronological clarity, may be numbered.

