GPN and sustainability

GPN
GPN and Sustainability

Global Production Network (GPN)

Global Production Networks

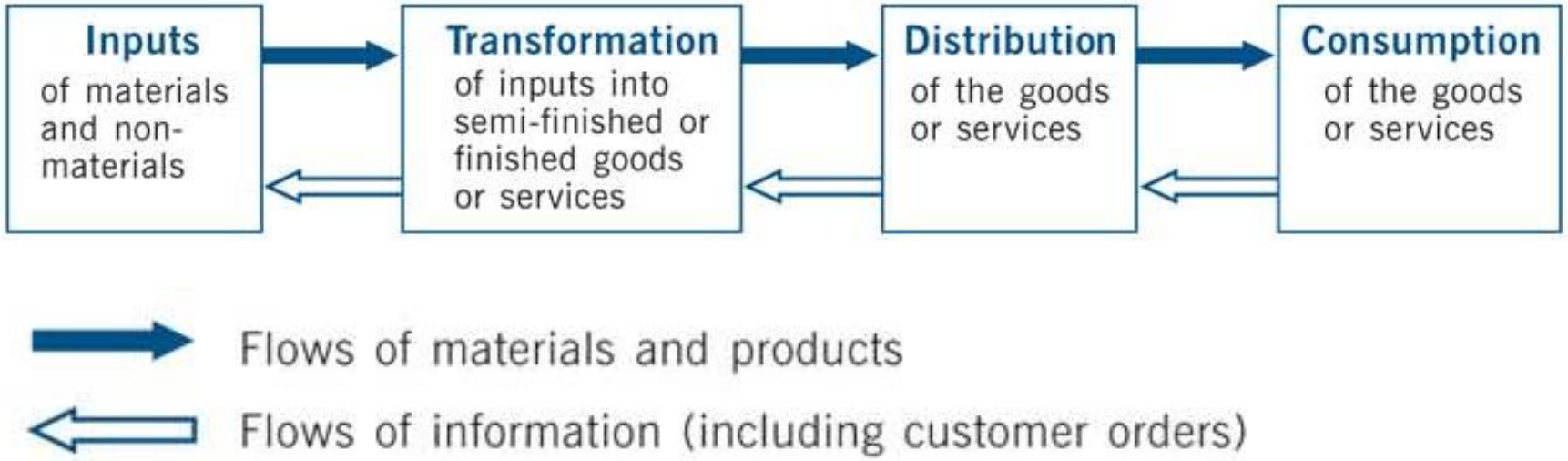
- **Circuits** of **interconnected** . . .

  . . . **functions**, **operations** and **transactions**, through which . . .

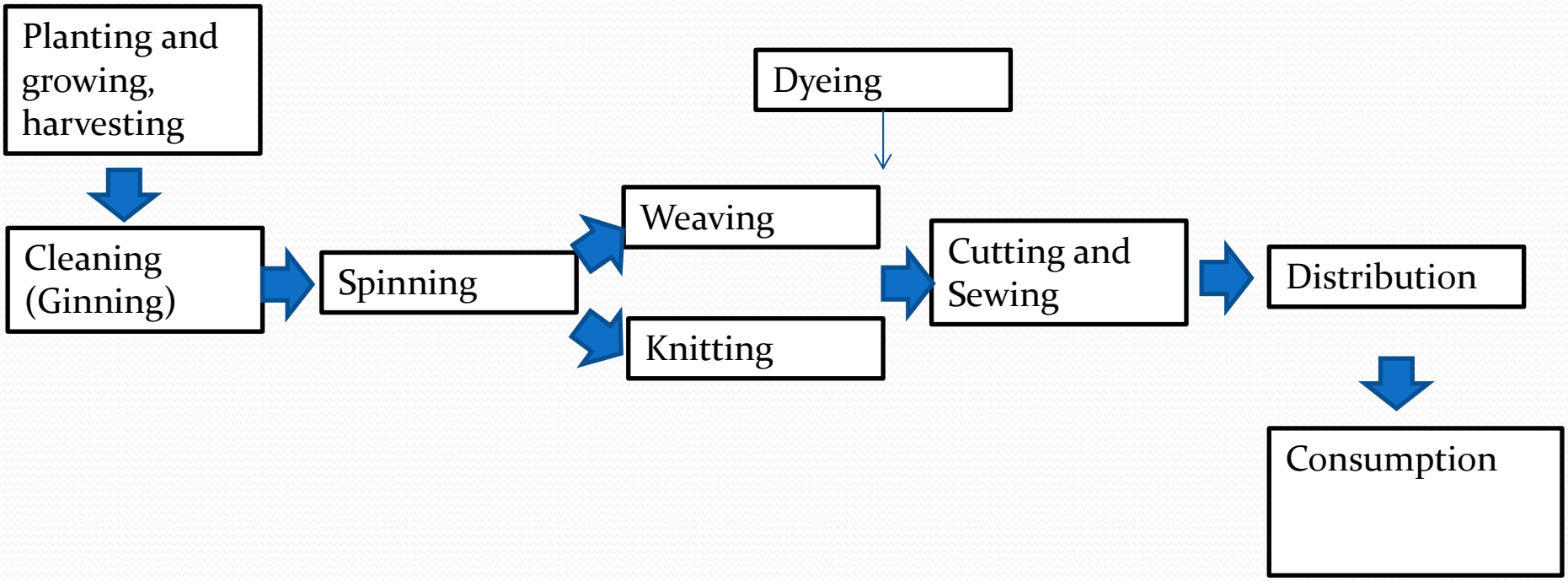
  . . . a specific **commodity**, **good** or **service** is . . .

  . . . **produced**, **distributed** and **consumed**

(a)

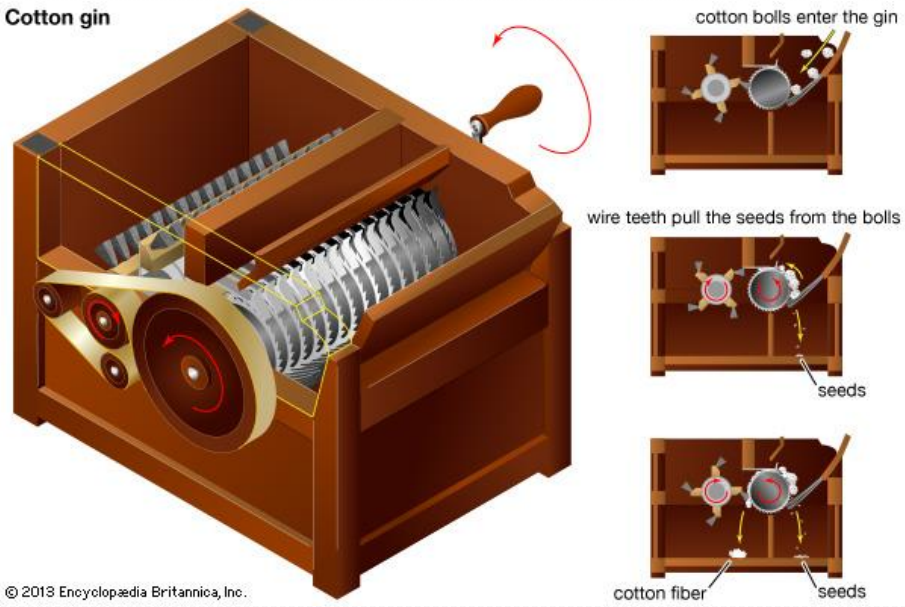


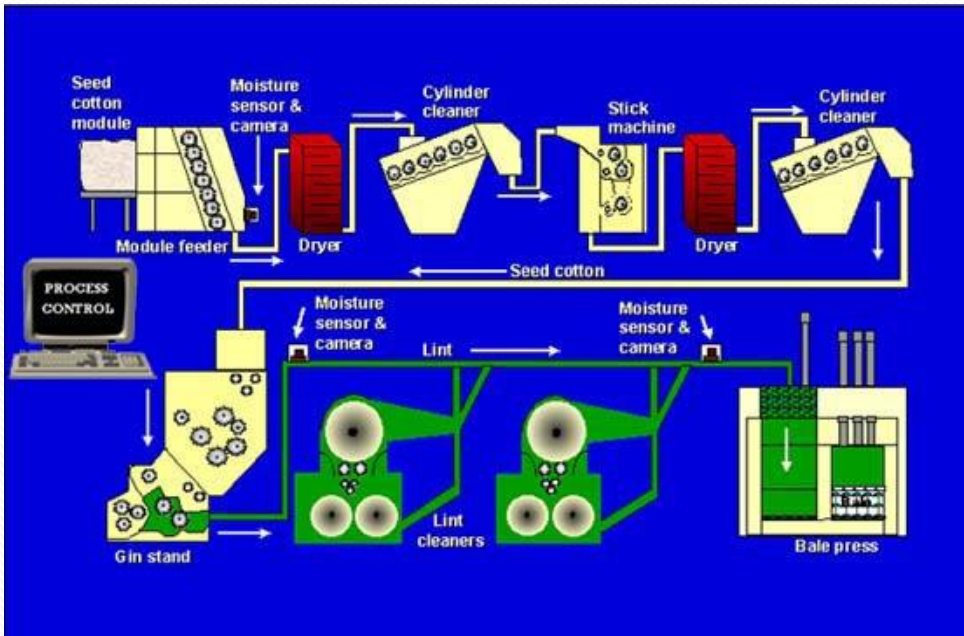
For Example. . .
cotton clothes production circuit



Each stage has its own I-T-D-C !

Ginning


Cotton gin
cotton bolls enter the gin
wire teeth pull the seeds from the bolls
seeds
cotton fiber
seeds
© 2013 Encyclopædia Britannica, Inc.


Seed cotton module
Moisture sensor & camera
Cylinder cleaner
Stick machine
Cylinder cleaner
Module feeder
Dryer
Dryer
Seed cotton
PROCESS CONTROL
Moisture sensor & camera
Lint
Moisture sensor & camera
Lint cleaners
Gin stand
Bale press

Spinning

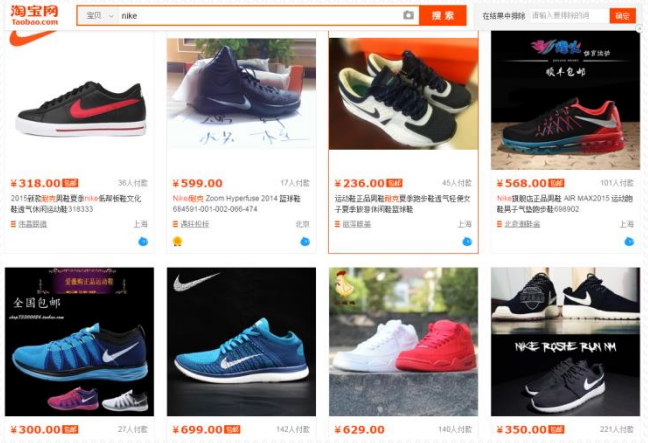
Weaving

Knitting

Dyeing

Cutting and Sewing

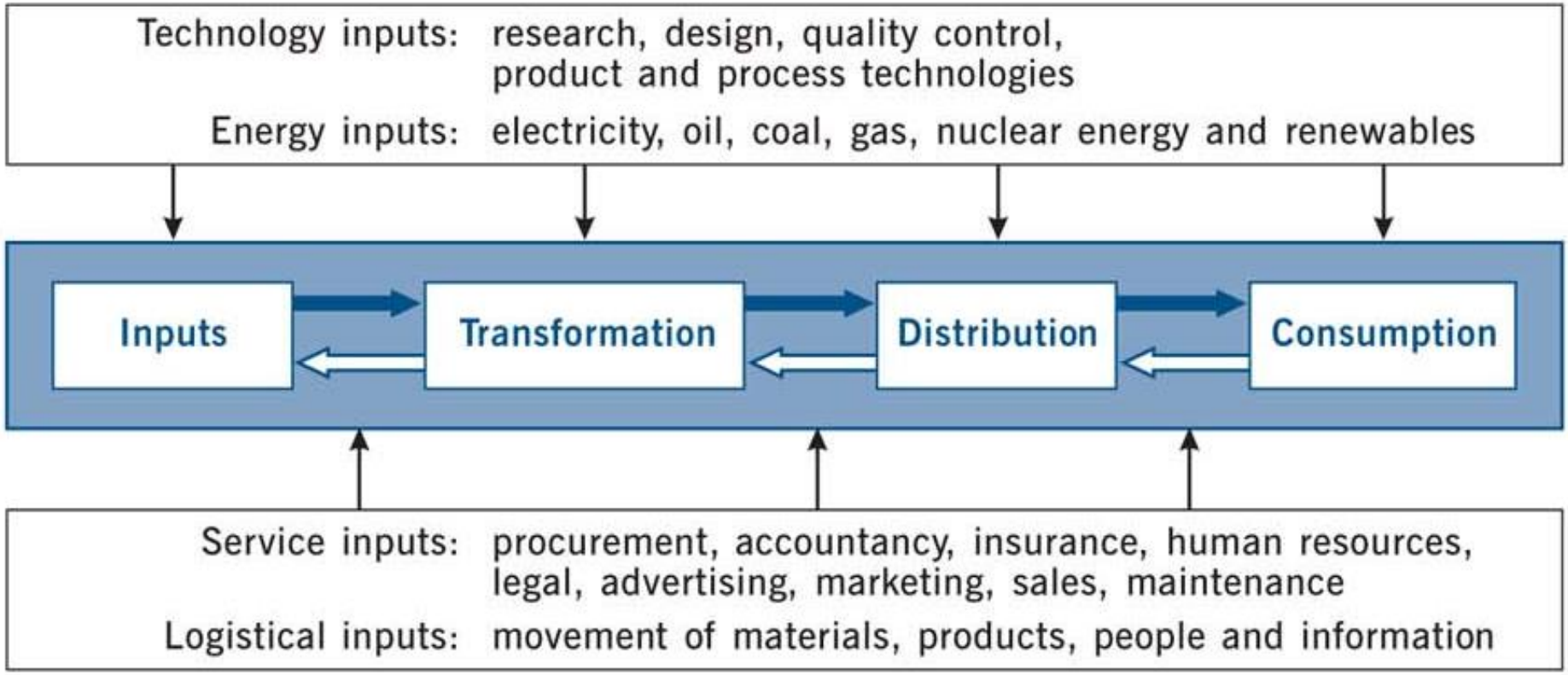
Distribution



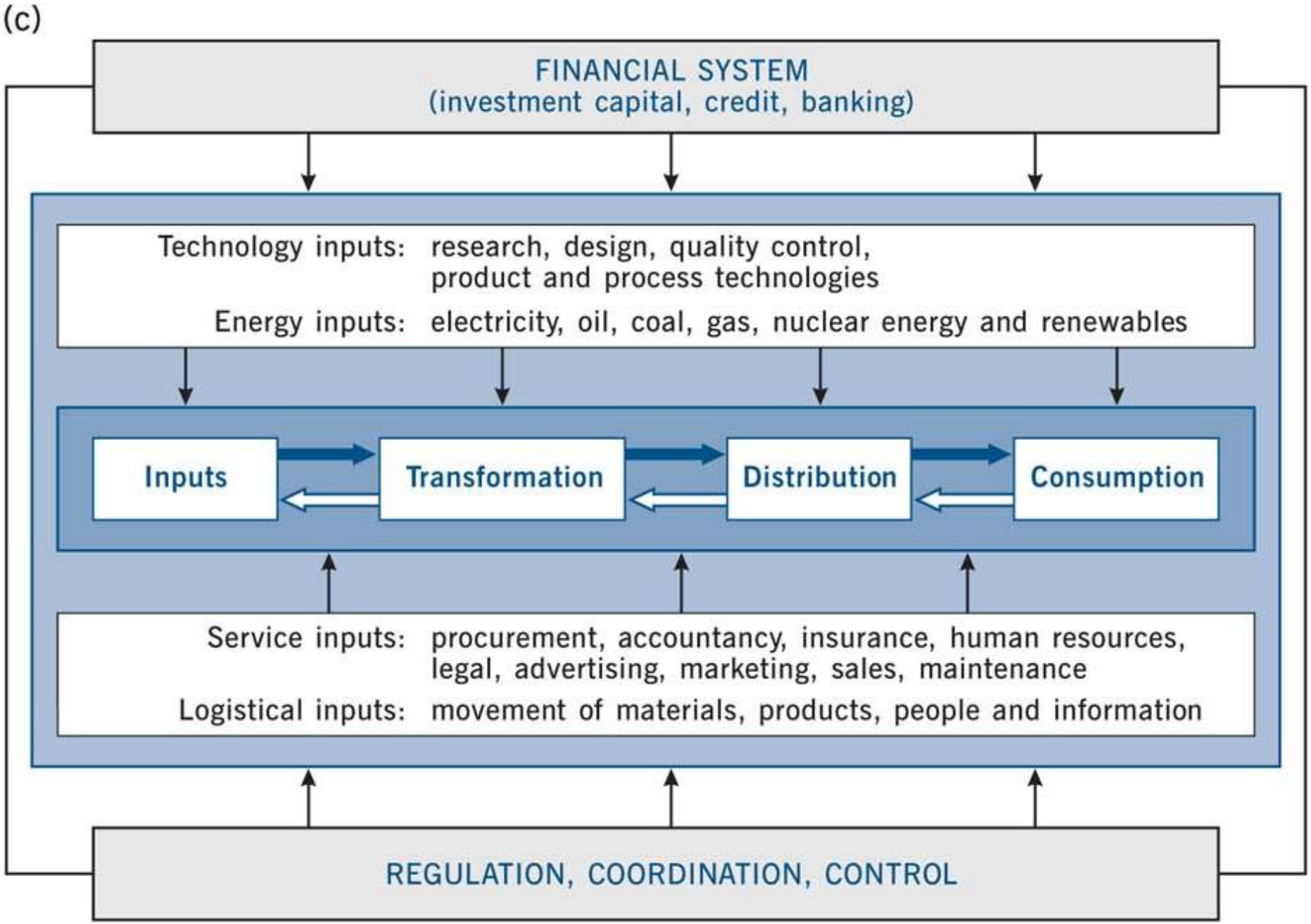
A production circuit depends on …

- . . . technological, energy, service and logistical inputs

(b)



. . .as well as financial systems and regulation, coordination and control systems


(c)
FINANCIAL SYSTEM
(investment capital, credit, banking)
Technology inputs: research, design, quality control, product and process technologies
Energy inputs: electricity, oil, coal, gas, nuclear energy and renewables
Inputs
Transformation
Distribution
Consumption
Service inputs: procurement, accountancy, insurance, human resources, legal, advertising, marketing, sales, maintenance
Logistical inputs: movement of materials, products, people and information
REGULATION, COORDINATION, CONTROL

Why bother with the chain, or network, or…?

Different stages have different production **characteristics**

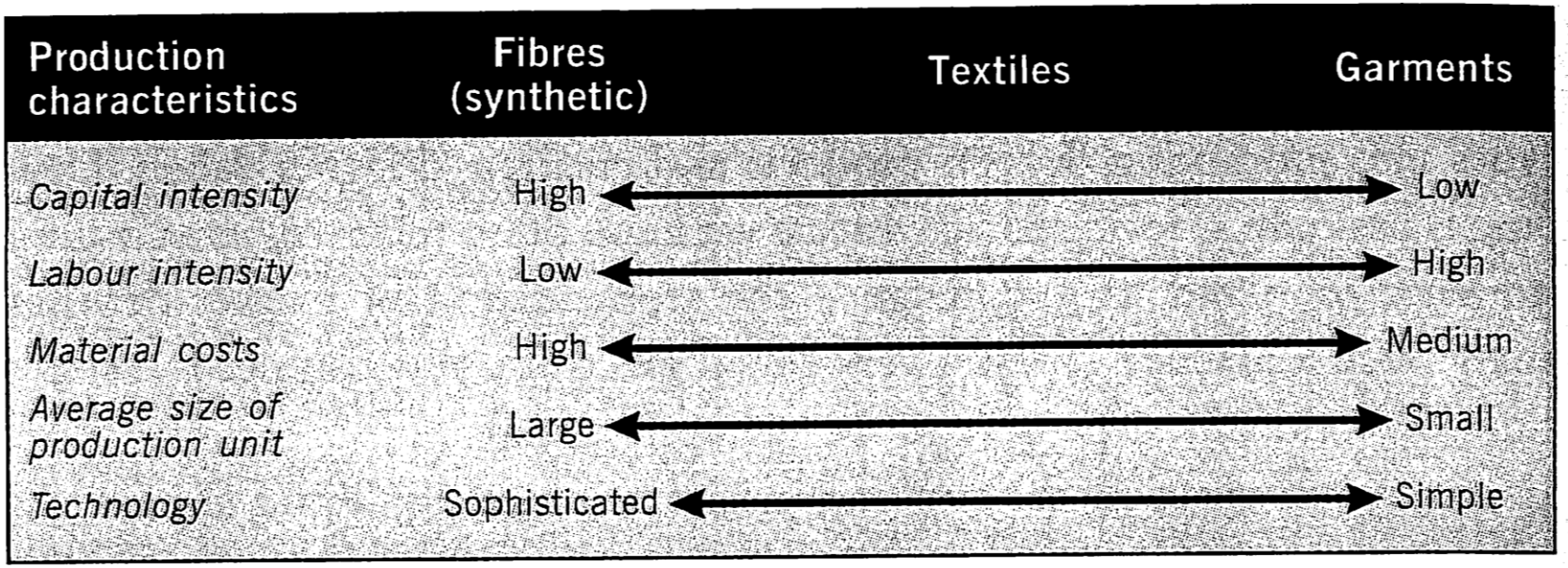


Figure 9.6 **Variations in production characteristics between major components of the textiles–clothing production circuit**

(Dicken 2007, 256)

Textile Wastewater Sources and Major Pollutants

Type of production	Source of Pollutant	Main Pollutants
Cotton mill	Withering, sizing	Cotton dust, fiber, pulp
Wool mill	Dyeing, shrinking, scouring	Lanolin, dyes, additives, fiber, wax, pectin, ammonia, sulfur compounds, suspended solids, chromium
Blended cotton and synthetic fabric dyeing and printing	De-sizing, scouring, bleaching, mercerizing, dyeing, printing, finishing	Pastes, dyes, additives, fiber, wax, pectin, ammonia, sulfur compounds, suspended solids, chromium
Ramie textile dyeing and printing	Degumming, dyeing, finishing	Lignin, pectin, ramie gum, dyes, additives, sulfide, fluoride, suspended solids, volatile phenol
Silk production	Silk spinning, refining (degumming), dyeing, finishing	Sericin, dyes, additives
Knitted fabric mill	Alkali reduction, scouring, dyeing, post-treatment	Fiber impurities, dyes, additives
Viscose fiber mill	Spinning, post-treatment	Alkali from black liquids and other organic matters, zinc, sulfides
Polyester fiber mill	Liquids, Post-treatment (oil wastewater)	Oils
Nylon mill	Washing, post-treatment	Caprolactam, oils, suspended solids, ammonia, nitrogen
Acrylic mill	Liquids, spinning, post-treatment	Sodium thiocyanate, acrylonitrile
Polyvinyl alcohol mill	Liquids, spinning, post-treatment	Cresol, sulfuric acid, oils, suspended solids, formaldehyde, chloride, zinc

[19] Bulletin on the first national pollution source survey, jointly released by the Ministry of Environmental Protection, Bureau of Statistics and Ministry of Agriculture, February 6th, 2010.
[20] Ibid.
[21] Countermeasures and Problems Facing the 21st Century Textile Industry, China Science & Technology Forum, No.5, 2005.

Different processes
Pose **different environmental challenges**

Environmental Action Network (2012)

Cleaning up the Fashion Industry.

Green Choice Apparel Supply Chain Investigation – Draft Report.

+ dust, pesticides, herbicides, wastewater, fabric wastes, working conditions, health. . .

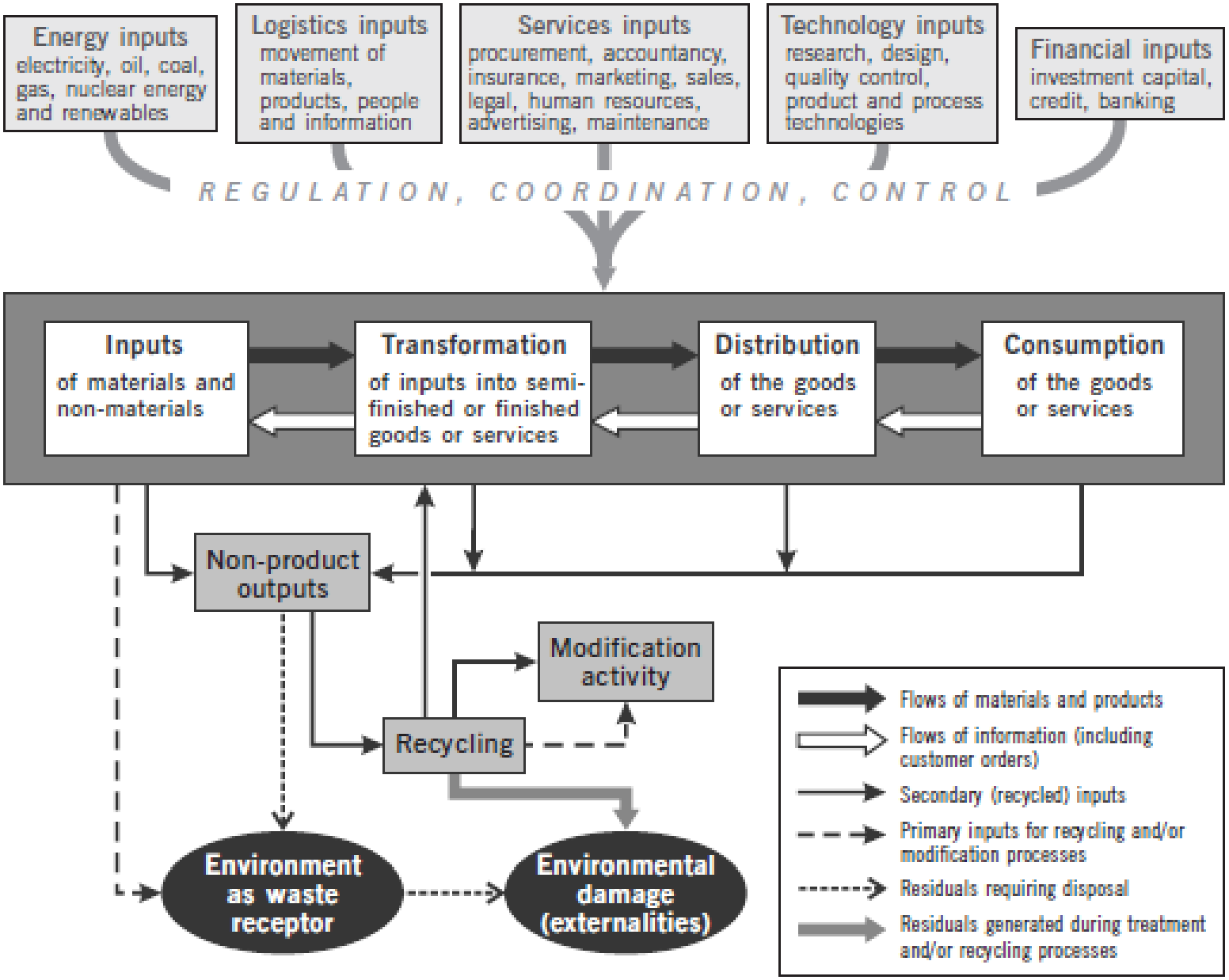


Figure 15.1 Production circuits and the environment

Source: based in part on Turner et al., 1994: Box 1.2

(Dicken 2011, 455)

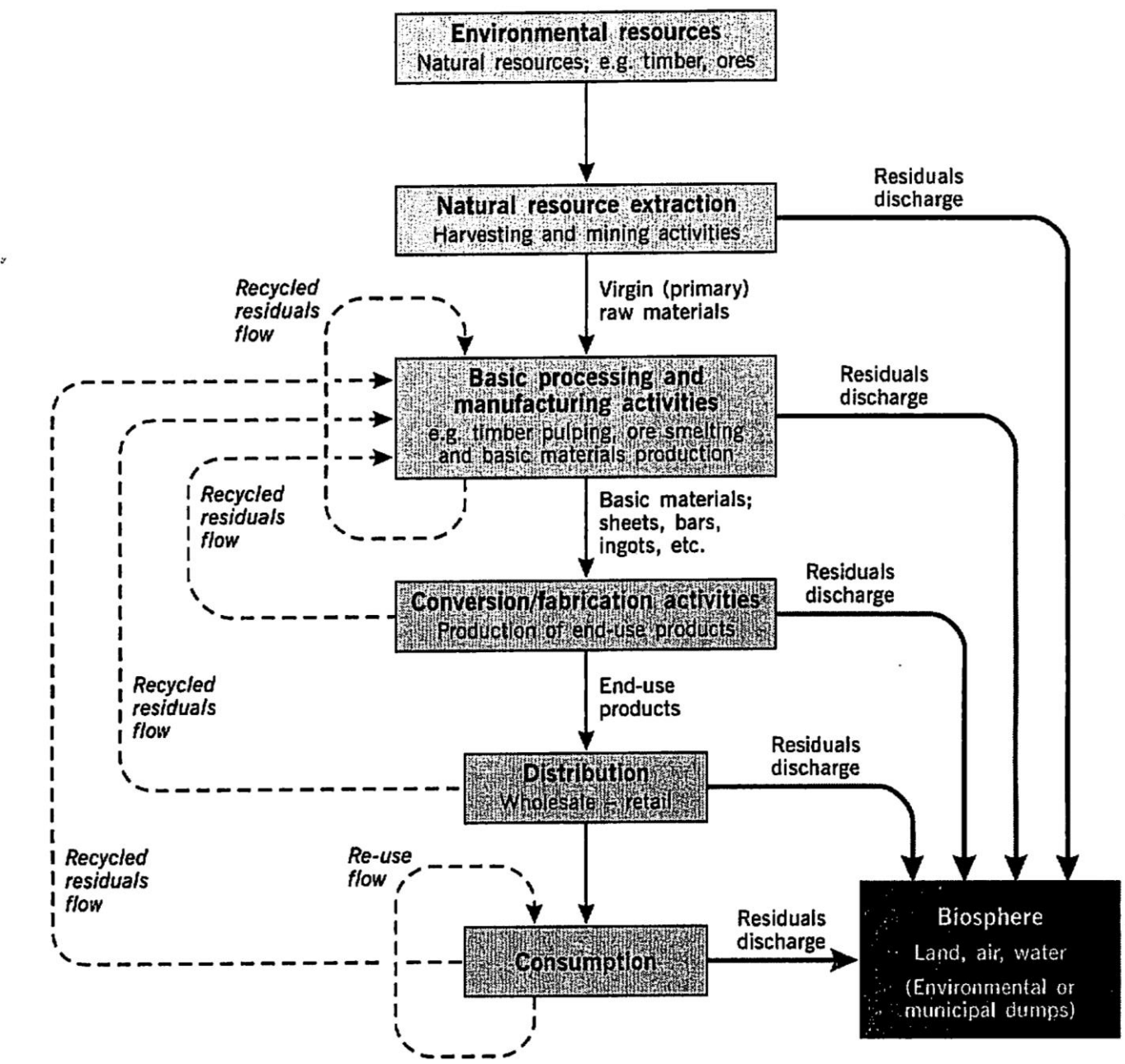


Figure 15.2 Materials flows in the process of production

Source: based on Turner et al., 1994: Box 1.3

This approach also enables identifying best way to achieve sustainability

→ Life Cycle Analysis (LCA)

→ C2C strategy

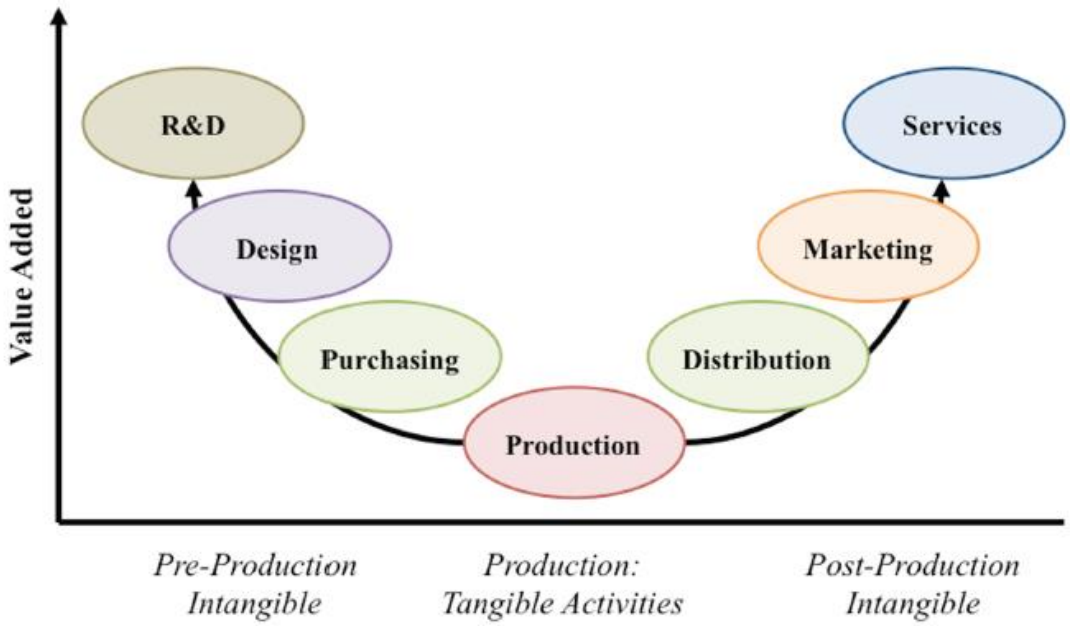
In the production process materials are dispersed and chemically transformed: they enter in a state of low entropy and leave in a state of high entropy

(Dicken 2011, 456)

The Smile Curve of Added Value

Value added = total revenue – cost of bought-in materials, services and components

Figure 2. Curve of Value-Added Stages in the Apparel Global Value Chain



Apparel Smile Curve (Fernandez-Stark et al. 2011)

Unequal impacts of wealth-creation depending on which part of the chain exist in your area.

Distribution of gains jeans sold for 50 € (Ruffier 2008)

Company	function	Cost in €	Cumulated cost	comments
Chinese textile factory	Raw material	1	1	
Chinese sewing factory	Manufacturing costs	2	3	
Chinese factory boss	Margin boss	0.2	3.2	
French Brand	design	0.1	3.3	
	Boat	0.2	3.5	
	Customs	0.5	4	Less than 15%
Chinese State Plant	quotas	0 to 0.5		Quotas could be paid directly to state plant or bought on black market
French Brand	distribution	20	24	
French Brand	Market studies	5	29	
French Brand	Advertising	15	44	price is a function of the volume of advertising.
French Brand	Marges	6	50	Estimated