

Logistics flows

The District Logistics Analysis (DLA) was carried out during 2003 interviewing a sample (40) of locally-based businesses in the following sectors: industry, agriculture and services.

The DLA questionnaire gathered information regarding the flows of supply logistics, distribution logistics, reverse logistics and refuse/waste logistics.

In each table information regarded: origin, destination, average distance, volume, costs, transport mode, transshipment nodes and load type.

Data concerning each company were inserted in separated spreadsheets to calculate tonnes and Tkm related to supply, distribution, reverse and refuse/waste logistics, as well as the total flow. Specific formulas were used to calculate:

1. total Tkm occurring completely within the concerned local area, e.g. Tkm internally borne and internally provided in the supply chain, Tkm internally borne and internally delivered in the distribution chain; these are strictly endogenous flows which occur between origins and destinations located within the concerned local area;
2. total Tkm of flows beginning or ending outside the concerned local area, e.g. Tkm externally borne and internally utilised in the supply chain, Tkm internally borne and externally delivered in the distribution chain; these are exogenous flows and take into account the overall distances between origins and destinations;
3. the share of exogenous Tkm (from point 2) that transits within the local area e.g. tonnes of an externally delivered product that transit within the local area for a certain distance (km); these flows take into account the distances from and to the boundaries of the concerned local area by exogenous flows. Information was obtained to identify the main routes utilised to enter or to leave the concerned local area.

As a conclusion,

-the total Tkm occurred within the concerned local area were obtained by summing the results of the above-mentioned points 1 + 3;

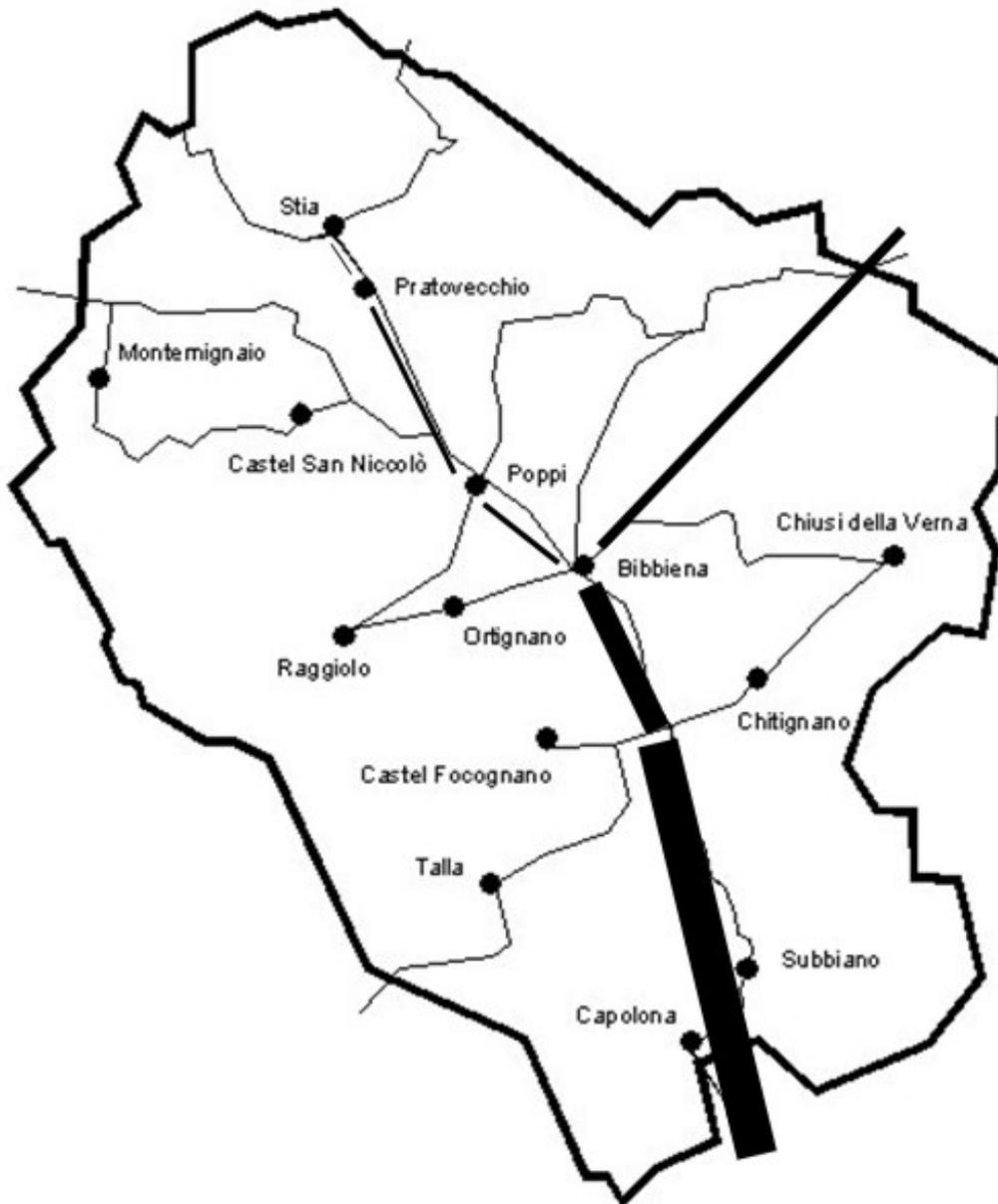
-the total Tkm occurred outside the concerned local area were obtained by difference between the results of the above-mentioned points 2 - 3.

The calculations allowed researchers to identify additional questions that can improve the overall information value of the questionnaire: that being to add a specific question on the identification of the main transit entrance points entering and leaving the concerned local area.

The following maps show the freight flows (supply, distribution and total) along the main transport networks of the Casentino Valley.

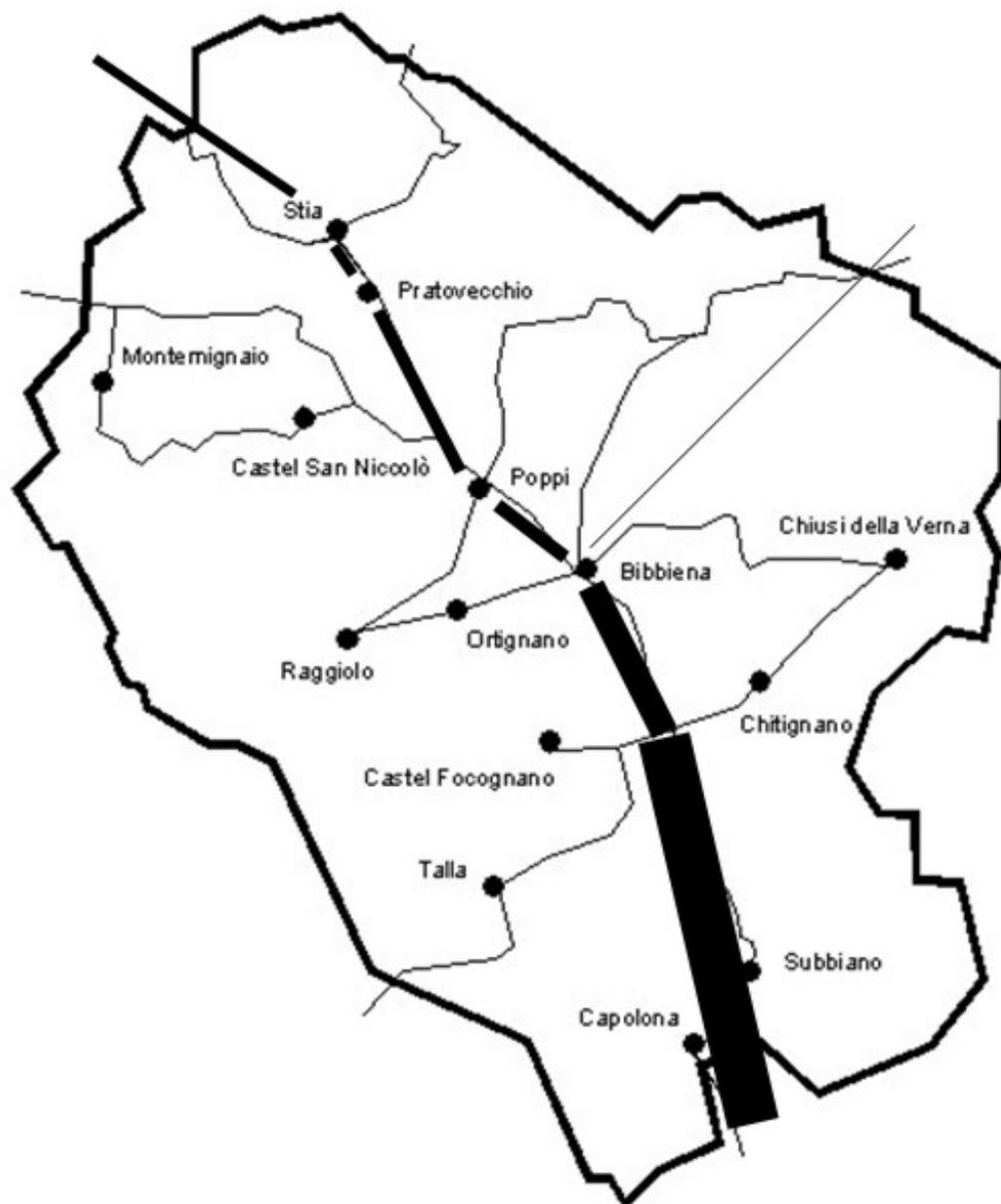
Supply logistics flow

Total road 35.525.168 Tkm



Distribution logistics flow

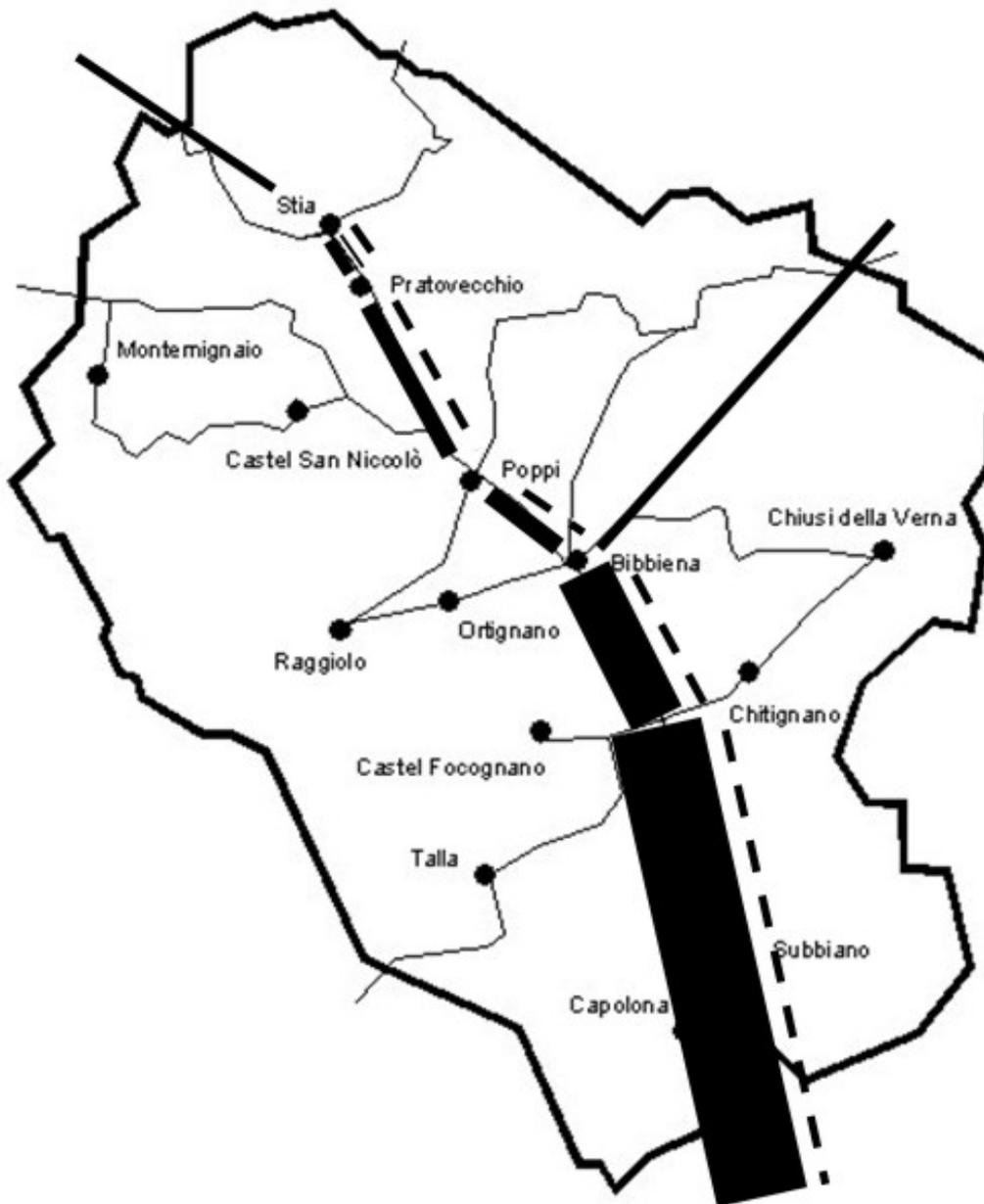
Total road 38.771.321 Tkm



Total freight flow

Distribution, supply, reverse and refusal and waste

Total road 75.042.472 Tkm
Total rail 4.090.640 Tkm



Freight flow

The following results (2003) regard freight flows:

- originated by the sample of interviewed;
- estimated in the economy fabric and the territorial dimension through the inference from the sample results;
- occurred inside and outside the local area (both supply and distribution logistics);
- distinguished according to their endogenous or exogenous nature with respect to the local territory;
- distinguished per transported goods;
- evaluated in terms of range of transport costs per main sectors: agriculture, industry and services

Sample results

1) The provided data do not allow for disaggregating them in each logistics typology

Supply logistics tonnes Tkm	2.638.848	35.525.168
Distribution logistics tonnes Tkm	1.723.162	38.771.321

Reverse logistics tonnes Tkm	2.177	50.699
Logistics of refusals and wastes tonnes Tkm	29.441	695.283
Total tonnes Tkm	4.393.628	75.042.472
Rail stations' flow(1) tonnes Tkm	106.694	4.090.640
Overall total tonnes Tkm	4.500.322	79.133.112

From the sample to the Valley economic fabric and territorial dimension

Taking into account the characteristics of each main sector (agriculture, industry and services) in terms of employment dimensions, the results of the sample were utilised to determine the overall Valley entrepreneurial fabric.

Data (Tkm) resulted from the inference

164.081.491

Data (Tkm) estimated (Local Context Analysis)

164.177.600

Sample results (Tkm) over the universe estimated data (%)

48

The most distant places reached in

From the sample the most distant places emerged, demonstrating that the economic structure of the Valley is open to international market. This result is due more to large - medium enterprises (primarily industrial) than to the other sectors and sizes.

supply logistics	distribution logistics
Chile	America
Japan	Argentina
China - Far East	Thailand
USA North/South	Hong Gong
	Singapore

Tkm inside and outside Casentino area

Excluding reverse logistics and that of refuse and waste because of the very low amount (1% of the total Tkm) declared by the respondent companies, freight flows were distinguished between those occurred inside and outside the local area with the following results.

SUPPLY LOGISTICS

Tkm occurred within the local area

35.525.168

Tkm occurred outside the local area

376.400.513

Total Tkm

411.925.681

DISTRIBUTION LOGISTICS

Tkm occurred within the local area

38.771.321

Tkm occurred outside the local area

355.256.233

Total Tkm

394.027.554

TOTAL SUPPLY AND DISTRIBUTION LOGISTICS

805.953.235

Tkm occurred within the local area

74.296.489

Tkm occurred outside the local area

731.656.746

Endogenous or exogenous flows

More specifically, flows were identified according to their endogenous or exogenous nature with respect to the local area.

SUPPLY LOGISTICS

Internally borne and Internally provided freight (Tkm)

1.864.995

Externally borne and Internally provided freight (Tkm)

410.060.686

DISTRIBUTION LOGISTICS

Internally borne and Internally delivered freight (Tkm)

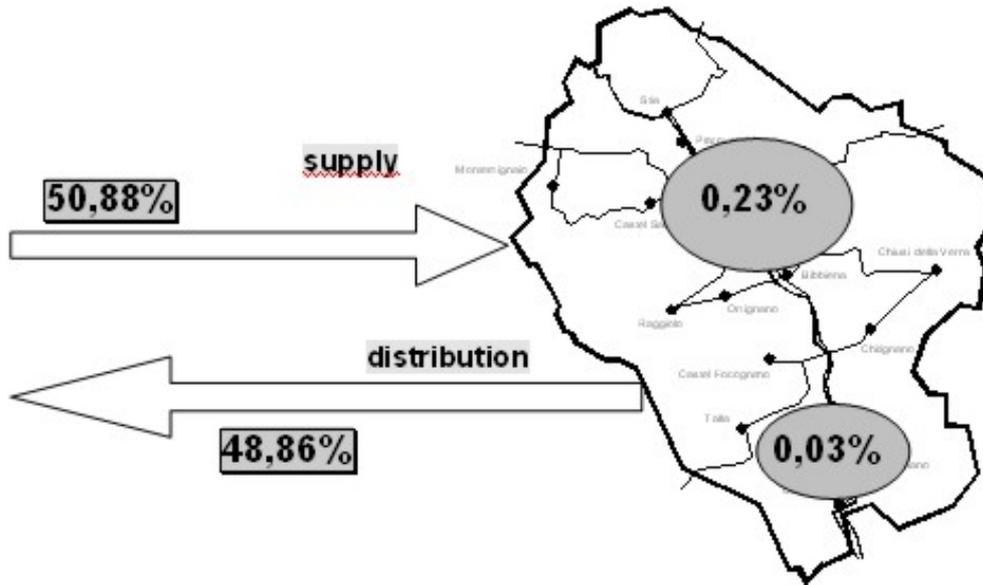
239.534

Internally borne and Externally delivered freight (Tkm)

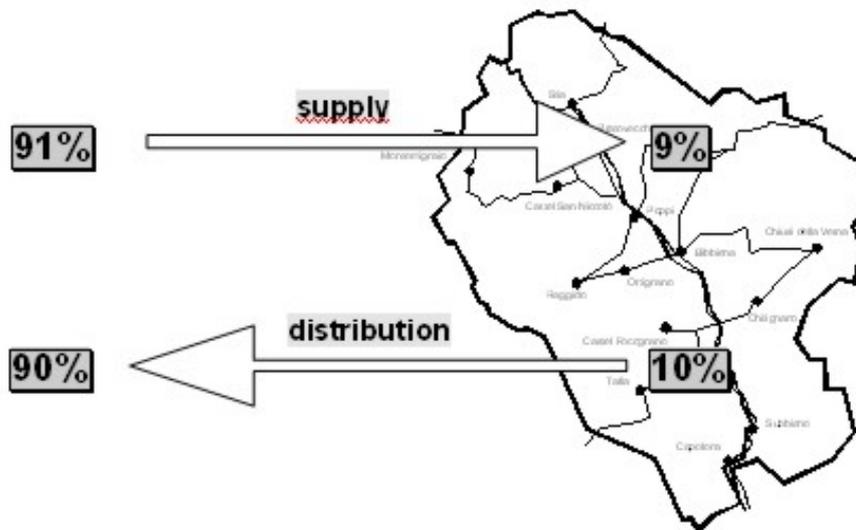
393.788.020

Transport flow in Tkm

1 – Average share of freight transport internally borne, externally borne, and transit traffic: transit 0%; supply internally borne and internally provided 0,23%; supply externally borne and internally provided 50,88%; distribution internally borne and internally delivered 0,03%; distribution internally borne and externally delivered 48,86%



2 - Tkm inside and outside Casentino area: nearly 9% of the total Tkm of the supply chain occurs within the Casentino and 91% occurs outside the Valley. For distribution, the Tkm percentages are respectively 10% and 90%



GOODS TRANSPORTED

The main load typologies were semi-bulk (82% in supply and 71% in distribution logistics), unitised (13% in supply and 15% in distribution) and bulk (5% in supply and 14% in distribution). While the main transport mode was road in the inner connection of the Valley, sea-road combined transport prevailed especially in the supply traffic for international relationships, followed by the road-rail combined transport especially in distribution logistics.

The total amount of tonnes concerning the main aggregated typologies of goods transported gave the following results. In the left column data concerning supply logistics ; in the right column data concerning distribution logistics

Livestock and agricultural products (%)	0,61	0,53
Food and forage products (%)	0,48	0,18

Petroleum products (%)	3,58	0,00
Mining products (%)	0,98	0,07
Raw materials, manufacture products and building materials (%)	88,19	85,19
Chemicals (%)	4,03	4,64
Industrial machinery, vehicles and different merchandise (%)	1,21	7,90
Waste - Urban, industrial agricultural (%)	0,91	1,47
Waste - Special and dangerous (%)	0,00	0,01
TOTAL (tonnes)	2.638.848	1.723.162

Transport costs

Range of Transport Cost to each mains Sectors (Euro per Tkm)

Agriculture supply (from to)	0,14	11,89
Agriculture distribution (from to)	-	-
Industry supply (from to)	0,01	6,00
Industry distribution (from to)	0,03	1,16
Services supply (from to)	0,22	2,60
Services distribution (from to)	0,09	0,28

Freight flow: main characteristics per aggregated sectors

Different logistics profiles emerged between the three main sectors confirming a more reduced range of material flow in agriculture than in the sectors of services and industry.

Percentage of Tkm occurred the local area: Agriculture

Total (inside outside)	20	80
Supply (inside outside)	13	87
Distribution (inside outside)	32	68

Percentage of Tkm occurred the local area: Industry

Total (inside outside)	9	91
Supply (inside outside)	8	92
Distribution (inside outside)	10	90

Percentage of Tkm occurred the local area: Services

Total (inside outside)	10	90
Supply (inside outside)	16	84
Distribution (inside outside)	7	93

Average distance in km : Agriculture

Total (inside outside)	10	48
Supply (inside outside)	12	87
Distribution (inside outside)	17	52

Average distance in km : Industry

Total (inside outside)	17	187
Supply (inside outside)	13	162
Distribution (inside outside)	23	226

Average distance in km : Services

Total (inside outside)	17	171
Supply (inside outside)	16	97
Distribution (inside outside)	17	243

Business performances

SDL indices

The elaboration of the sensitive data collected through the questionnaires was made with the aim of identifying the current profiles of the interviewed firms.

The profiles regard the business performances and are structured according the SQM / SDL 10 orientators.

To this end, the questionnaire asked for more detailed information than those usually provided by the legally required balance sheet: Statements of Assets and Liabilities, Profit and Loss Accounts.

Data from the Statement of Assets and Liabilities gave information on total investments, tangible fixed assets, intangible fixed assets and financial fixed assets, as well as on inventory - stock value.

Data from the Profit and Loss Account gave information on turnover, purchases, production, commercial, administrative and leasing costs, amortizations and reserves and labour cost.

The questionnaire asked also for specific information on goods and services acquired from firms with a social and environmental quality profile, as well as on goods and services acquired from locally-based firms.

Data elaboration was made classifying the specific voices of the balance sheet according to their relevance and appropriateness in relation with the SDL orientators:

- in the case of turnover (Profit and Loss Account) the orientators concerning the environmental, socio-cultural and economic properties assigned to the value created
- in the case of all business costs (Profit and Loss Account) and all the 10 orientators
- in the case of the Statement of Assets and Liabilities, 6 orientators with the exclusion of Social Equity, Interlocal Equity, Intertemporal Equity and Diversity.

The results of the data elaboration were expressed in percentage values (SDL indices) in order to make it possible an easy comparison between the different profiles.

Profile results

The sensitive data are presented in an aggregated manner following benchmarking criteria that identify "ideal-types" combining information received from individual firms.

The procedure was as follows:

- a profile was determined for each respondent company, considering all the available answers and weighting the data in terms of percentage according to the SDL orientators utilised
- the profiles were separated in the three main sectors (industry, agriculture and services)
- for each sector, subcategories were created according to the typology of products, processes, markets (near or distant) and employment dimensions
- a selection was made to identify the best and the lowest results for each of the SDL orientators utilised
- the above results were handled again (weighted in terms of percentage) in order to draw two significant "ideal-types" for each main sector (industry, agriculture and services)
- the anonymous sectoral "ideal-types" were presented in an aggregated manner (SDL indices) by the following tables with the aims of demonstrating the tendency from a low to a better corporate performance.

PLEASE = Profit and Loss Economic Account with Social and Environmental dimensions

Production costs

Orientator | Percentage range

O1. Environment

Industry % range (from to)	2,61	53
Agriculture % range (from to)	10,32	62,67
Services % range (from to)	0	0

O2. Economy

Industry % range (from to)	30,08	97,06
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Agriculture % range (from to)	19,91	83,91
Services % range (from to)	98,75	100
03. Socio-culture		
Industry % range (from to)	0,02	1,30
Agriculture % range (from to)	0	0,14
Services % range (from to)	0	0
04. Equity between individuals		
Industry % range (from to)	0,07	0,46
Agriculture % range (from to)	0	0,11
Services % range (from to)	0	0
05. Equity between territories		
Industry % range (from to)	0	1,22
Agriculture % range (from to)	0	0
Services % range (from to)	0	0
06. Equity between generations		
Industry % range (from to)	0	0,01
Agriculture % range (from to)	0	0
Services % range (from to)	0	0
07. Diversity		
Industry % range (from to)	0	2,82
Services % range (from to)	0	0
Agriculture % range (from to)	0	0
08. Subsidiarity		
Industry % range (from to)	0	9,55
Agriculture % range (from to)	5,77	16,92
Services % range (from to)	0	0
09. Networking and partnership		
Industry % range (from to)	0,24	0,32
Agriculture % range (from to)	0	0
Services % range (from to)	0	0,58
10. Participation		
Industry % range (from to)	0	1,24
Agriculture % range (from to)	0	0,25
Services % range (from to)	0	0,67
Goods and services acquired from:percentage range on production costs		
03. Socio-culture - socially responsible firms (es. SA8000)		
Industry % range (from to)	0	1,3
Agriculture % range (from to)	0	0
Services % range (from to)	0	0
01. Environment - environmentally responsible firms (es. ISO 14001, EMASII)		
Industry % range (from to)	0	43
Agriculture % range (from to)	9	62,67
Services % range (from to)	0	0
08. Subsidiarity - local firms		
Industry % range (from to)	0	9,55
Agriculture % range (from to)	6	16,92
Services % range (from to)	0	0

Turnover**Orientator | percentage range****O1. Environment**

Industry % range (from to)	5	40
Agriculture % range (from to)	70	100
Services % range (from to)	0	0

O2. Economy

Industry % range (from to)	55	90
Agriculture % range (from to)	0	30
Services % range (from to)	0	100

O3. Socio-culture

Industry % range (from to)	0	5
Agriculture % range (from to)	0	0
Services % range (from to)	0	0

SEALES = Statement of Economic Assets and Liabilities with Environmental and Social dimensions**Investments | Percentage range****O1. Environment**

Industry % range (from to)	8,6	11,29
Agriculture % range (from to)	0	24,93
Services % range (from to)	0	25,8

O2. Economy

Industry % range (from to)	79,51	85,74
Agriculture % range (from to)	74,76	100
Services % range (from to)	65,96	99,98

O3. Socio-culture

Industry % range (from to)	0	0,15
Agriculture % range (from to)	0	0
Services % range (from to)	0	0

O8. Subsidiarity

Industry % range (from to)	0	0,14
Agriculture % range (from to)	0	0
Services % range (from to)	0	0

O9. Networking and partnership

Industry % range (from to)	0	2,7
Agriculture % range (from to)	0	0,31
Services % range (from to)	0,02	8,24

10. Participation

Industry % range (from to)	5,66	6,21
Agriculture % range (from to)	0	0
Services % range (from to)	0	0

Trends during the last five years

Data extracted from the Statement of Assets and Liabilities and from the Profit and Loss Account were accompanied by a short assessment of trends concerning the economic values recorded in the last five years: increased, equal or decreased.

An inclusive business profile emerged from the received answers (66% of the final sample) that show the following prevalent trends.

A scale from 0 to 3 points underlines the trend intensity in terms of number of businesses that approached the profile.

Trend direction	Trend intensity	
Increased	Marked	3
Equal	Average	2
Decreased	Feeble	1

STATEMENT OF ASSETS AND LIABILITIES

A. TOTAL INVESTMENTS	Increased	3
A1. TOTAL TANGIBLE FIXED ASSETS, of which for:	Increased	3
Lands assigned to warehouse areas	Increased	2
Warehouses	Increased	2
- of which bio-buildings	None	0
Machineries for warehouse	Increased	1
- of which with low environmental impact (energy, noise, pollution, etc.)	Increased	1
Equipments for warehouses	Increased	2
- of which with low environmental impact (energy, noise, pollution, etc.)	Increased	1
Vehicles for warehouses	Increased	2
- of which with low environmental impact (energy, noise, pollution, etc.)	Increased	1
Systems to reduce packaging	Increased	1
Means of transport	Increased	2
- of which with low environmental impact (energy, noise, pollution, etc.)	None	0
Systems for energy saving and efficiency	Increased	1
Systems for water saving, efficiency and recycle	Increased	1
Systems for minimising greenhouse emissions	Increased	1
Systems for recovering and recycling of refusals, discards, used products	Increased	1
Bio-buildings	Increased	1
Systems for lowering ground pollution	Increased	1
Technologies for electronic commerce	Increased	1
A2. TOTAL INTANGIBLE FIXED ASSETS, of which for:	Increased	2
Environmental Quality certifications and marks (specify)	Increased	1
Social Quality certifications and marks (specify)	None	0
Economic Quality certifications and marks (specify)	Increased	1
Strategic environmental marketing	None	0
Strategic social marketing	None	0
Strategic economic marketing	Increased	1
A3. TOTAL FINANCIAL FIXED ASSETS, of which for:	Equal	2
Participations in firms and associations of an economic nature	Equal	2
Participations - donations in firms and associations involved in environmental and socio-cultural issues	Increased	1
Participations in ethical and green funds	Increased	1
Participations in local production and consumption networks (purchase groups, etc.)	Increased	1
Participations in organisations (networks) for responsible consumption	None	0

INVENTORY: STOCK VALUE	Increased	2
Final surplus of in working, semi-finished and finished products	Decreased	1
Final surplus of raw materials, subsidiary materials, consumables and goods	Increased	2

PROFIT AND LOSS ACCOUNT

A. TURNOVER:

Total revenues from products and performances	Increased	3
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B. PRODUCTION COSTS	Increased	3
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Total of the purchases of raw materials, subsidiary materials, consumables and goods	Increased	2
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- of which recyclable, recycled, substitutive of dangerous materials	Increased	1
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Total of production expenses, of which for:	Increased	2
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research, tests, training, books, newspapers and magazines, socio-cultural initiatives, etc.	Increased	1
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studies for appraisal and assessment of environmental, economic and socio-cultural impacts	None	0
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studies for economic, environmental and socio-cultural diversification and innovation	Increased	1
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improvement of work organisation, behaviour, motivation, participation and social relations	Increased	1
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utilisation of renewable and recycled resources (energy, water, etc.)	Increased	1
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Total of commercial expenses and charges, of which for:	Increased	2
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warehouse services	Increased	1
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transport services	Increased	1
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logistics and transport systems with environment saving	None	0
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packaging	Increased	1
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- of which re-usable and recycled	Increased	1
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operating social marketing	None	0
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operating environmental marketing	None	0
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fair trade	Increased	1
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Total of administrative and overhead expenses, of which for:	Increased	2
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customer services	Increased	1
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- of which electronic commerce	Increased	1
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risk assurance for warehouse and transport	Increased	1
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duties and taxes for the environment, waste, water, etc.	Increased	1
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penalties for lacked respect of social and environmental norms	None	0
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subsidies for associations of economic, socio-cultural and environmental interests	Increased	1
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Total of leasing expenses	Increased	1
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- of which for systems of environmental protection	None	0
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Total labour cost, of which for activities regarding:	Increased	2
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- transport	Increased	1
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- warehouse	Increased	1
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- customer services	Increased	1
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Total amortizations and reserves, of which:	Increased	2
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amortizations of investments in tangible fixed assets related to warehouses and transport	Increased	1
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amortizations of investments in intangible fixed assets related to quality improvement and business promotion	Increased	1
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amortizations of investments in financial assets related to participations in firms, associations, funds and networks	Decreased	1
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reserves for transport and warehouse risks	Increased	1
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Logistics costs

A calculation of the logistics costs is made elaborating data of the balance sheets and adjusting the results according to basic criteria defined by a long series of research e.g.:

- Donald J. Bowersox, David J. Closs and Omar K. Helferich, Logistics Management, 3rd ed., Macmillan, New York, 1986
- James C. Johnson and Donal F. Wood, Contemporary Physical Distribution and Logistics, 3rd ed. PenWell Publishing, Tulsa, 1986
- James R. Stock and Douglas M. Lambert, Strategic Logistics Management, 2nd ed., Irwin Homewood, Illinois, 1987
- A. T. Kearney, European Logistics, 1994, enquiry quoted in European Communities, Transport networks, Kogan Page Earthscan, London, 1997.

Logistics costs	Voice of the Profit & Loss Account	Voice of the Statement of Assets & Liabilities
Transportation	Production costs: <ul style="list-style-type: none"> • transport services • labour costs for transport • logistics and transport systems with environment saving 	
Warehousing	<ul style="list-style-type: none"> • warehouse services, packaging • labour costs for warehousing 	
Administration	<ul style="list-style-type: none"> • (labour costs for transport, warehouse, customer services) / total labour costs x Total administrative and overhead expenses 	
Inventory carrying	<ul style="list-style-type: none"> • packaging • operating social and economic marketing • fair trade • customer services (and electronic commerce) • risk assurance for warehouse and transport • reserves for transport and warehouse risks 	Inventory (stock value): <ul style="list-style-type: none"> • final surplus of in working, semi-finished and finished products • final surplus of raw materials, subsidiary materials, consumables and goods

Also the logistics costs are presented in an anonymous manner but they strictly refer to individual firms.

The procedure was as follows:

- a calculation was made for each respondent company
- the calculations were separated in the three main sectors (industry, agriculture and services)
- for each sector, subcategories were created according to the typology of products, processes, markets (near or distant) and employment dimensions
- a range was calculated from the lowest to the highest costs for each main sector (industry, agriculture and services)
- the best performances were selected within the above range and presented in the following tables.

Costs over turnover | percentage range

Transportation

Industry % range (from to)	3,3	16,8
Agriculture % range (from to)	0,2	5,3
Services % range (from to)	1,5	4,7

Warehousing

Industry % range (from to)	0,9	2,5
Agriculture % range (from to)	2,5	2,5
Services % range (from to)	2	10,4

Administration

Industry % range (from to)	0,6	0,6
Agriculture % range (from to)	1	2
Services % range (from to)	0,1	5

Inventory carrying

Industry % range (from to)	1,7	2
Agriculture % range (from to)	2,3	2,3
Services % range (from to)	1,1	1,7

Total on turnover

Industry % range (from to)	6,4	21,9
Agriculture % range (from to)	5,9	12,1
Services % range (from to)	10,2	16,2