

# Identification of clusters in Switzerland\*

## Analysis of I/O-data for 1995 \*\*

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## Presentation and interpretation of first results

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\*\* Results are not to be quoted

# Cluster approaches and methodology

## ■ Cluster approaches

- qualitative approaches (Porter) <-> quantitative approaches (I/O-data)
- spatial level
  - > regional level, national level
  - > national / international linkages

## ■ I/O linkages

- supplier-user linkages (transaction matrix)
- linkage method <-> method of the maxima
- outside of analysis
  - > final demand side
  - > flow of capital goods (investments)
  - > financial transactions
  - > innovation and technology linkages

## ■ Database

- I/O data 1995 (updated 1990 I/O-table)
  - > 37 sectors

▶ *Diagonal elements of transaction matrix are set to zero*

# „Method of the maxima“

## ■ Analysis of forward chains

- step 1: (horizontal / row by row reading)
  - > user sector  $k$  is strongly linked with supply sector  $i$  if:
    - ▶  $b_{ik} = \max_j z_{ij} / \text{tot}_j \geq \theta_r$  for every  $i$
  - > binary matrix [0,1]; cell value = 1 if  $b_{ik} \geq \theta_r$ 
    - ▶ *most significant delivery from the suppliers's view*
- step 2: (vertical / column by column reading)
  - > supply sector  $i$  is strongly linked with user sector  $k$  if:
    - ▶  $a_{ik} = z_{ik} / \text{tot}_k \geq \theta_c$  for every  $k$  from step 1
  - > binary matrix [0,1]; cell value = 1 if  $a_{ik} \geq \theta_r$ 
    - ▶ *additionally to step 1:  
most significant delivery from the users's view*
- step 3: combination
  - > merging of binary matrices from step 1 and step 2
  - > cells with value 2 represent final forward economic clusters

# „Method of the maxima“

## ■ Analysis of backward chains

- step 1: (vertical / column by column reading)
  - > supply sector  $k$  is strongly linked with user sector  $j$  if:
    - ▶  $b_{kj} = \max_j z_{ij} / \text{tot}_j \geq \theta_r$  for every  $j$
  - > binary matrix [0,1]; cell value = 1 if  $b_{kj} \geq \theta_c$
- step 2: (horizontal / row by row reading)
  - > user sector  $j$  is strongly linked with supply sector  $k$  if:
    - ▶  $a_{kj} = z_{kj} / \text{tot}_k \geq \theta_c$  for every  $k$  from step 1
  - > binary matrix [0,1]; cell value = 1 if  $a_{jk} \geq \theta_r$
- step 3: combination
  - > merging of binary matrices from step 1 and step 2
  - > cells with value 2 represent final backward economic clusters

## ■ Megaclusters

- Merging of forward and backward linkages

# Interpretation of cluster relations

## ■ Choice of threshold values

- forward linkages:                      step1: 0.20                      step2: 0.05
- backward linkages                      step1: 0.15                      step2: 0.05

▶ *based on previous experiences in Flanders*

## ■ User and supplier linkages

- $a \longrightarrow b$   
>  $b$  is the most important user of  $a$  (max. of row)

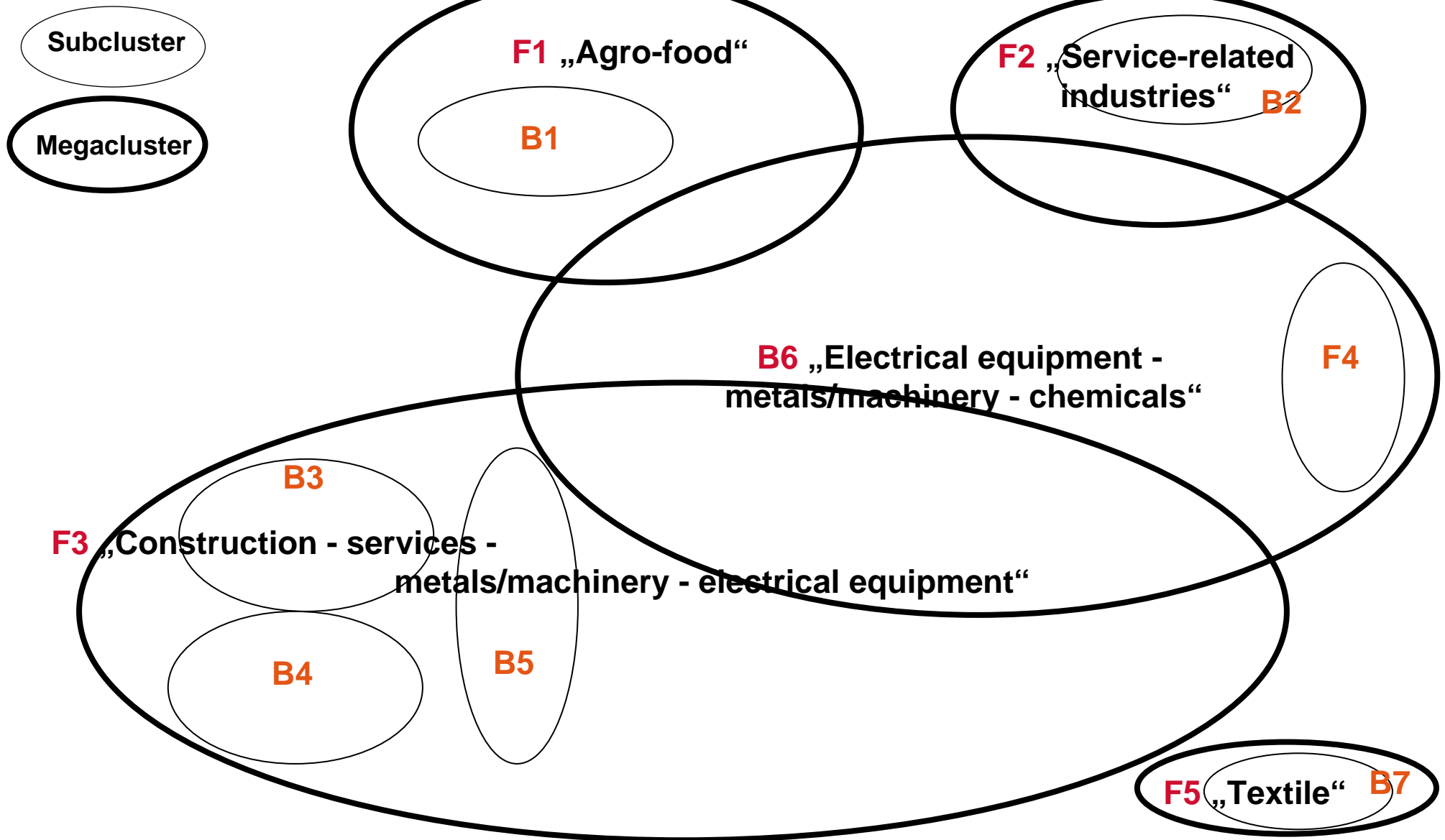
- $a \dashrightarrow b$   
>  $b$  is the most important supplier to  $a$  (max. of col.)

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- > delineation/overlapping of megaclusters

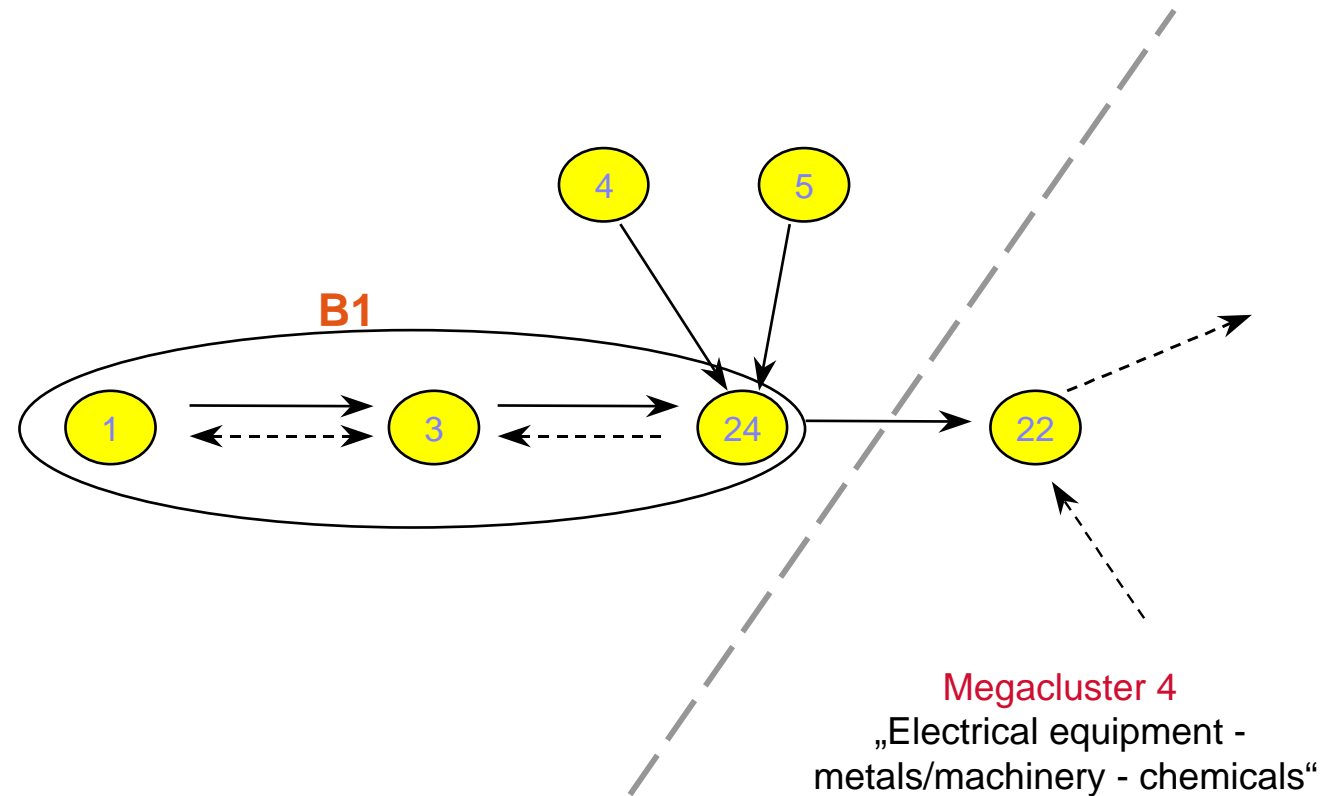


# 5 Megaclusters and subclusters



# Megacluster 1

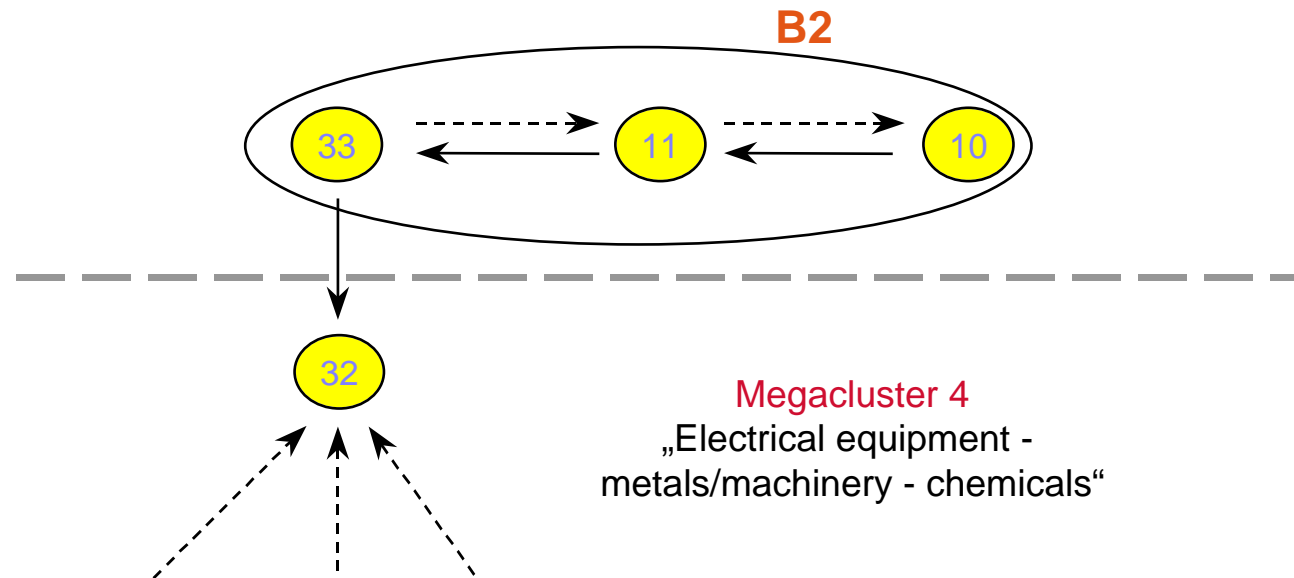
## „Agro-food“



[1] Agriculture; [3] Alimentary products; [4] Beverage; [5] Tobacco;  
[22] Wholesale Trade; [24] Hotel and Catering

# Megacluster 2

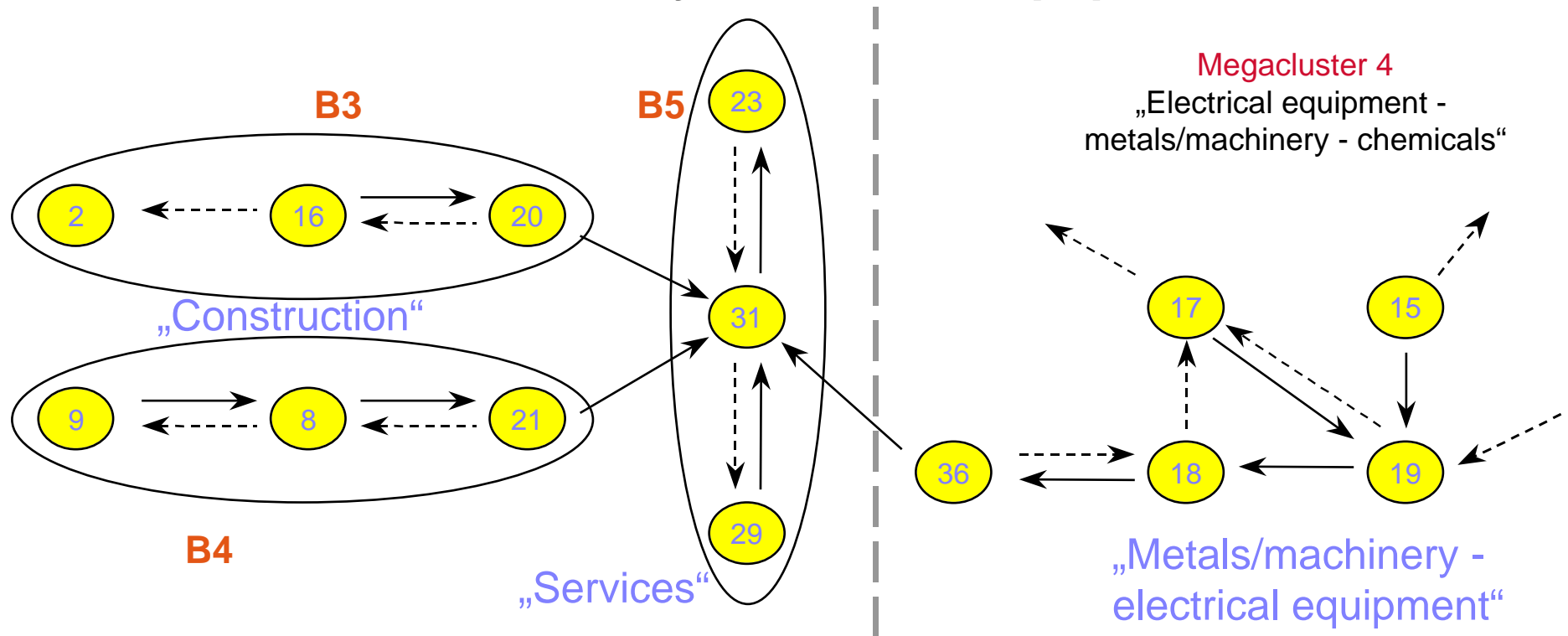
## „Service-related industries“



[10] Paper; [11] Graphical industry; [32] Business and Personal Services;  
[33] Education, R&D and General Leisure

## Megacluster 3

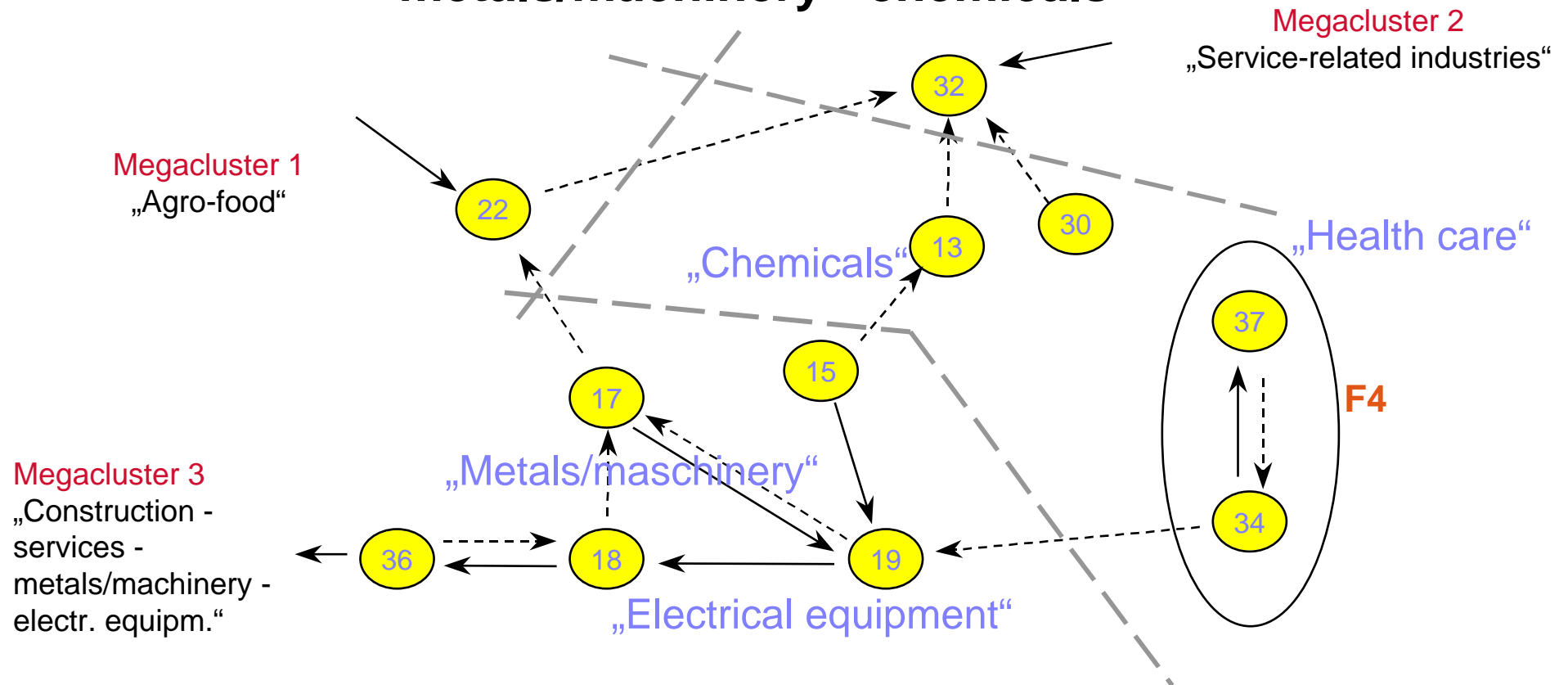
### „Construction - services - metals/machinery - electrical equipment“



[2] Electricity, Gas and Water; [8] Woods and Furniture; [9] Wood industry; [15] Rubber and Plastics; [16] Non-ferrous Metals; [17] Metals; [18] Machine Building; [19] Electrical Equipment; [20] Construction (main activities); [21] Building (Finishing and Completion); [23] Retail Trade; [29] Banking; [31] Real Estate; [36] Government

# Megacluster 4

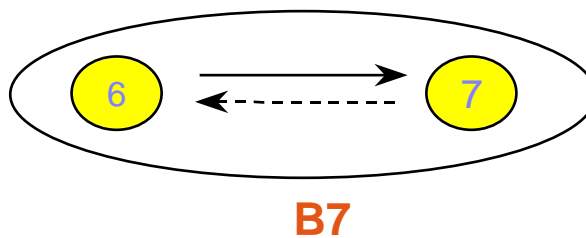
## „Electrical equipment - metals/machinery - chemicals“



[13] Chemicals; [15] Rubber and Plastics; [17] Metals; [18] Machine Building; [19] Electrical Equipment and Watch Industry; [22] Wholesale Trade; [30] Insurances; [32] Business and Personal Services; [34] Health Care; [36] Government; [37] Social Insurances

# Megacluster 5

## „Textiles“



[6] Textile industry; [7] Confection

## Sectors outside of clusters

[12] Leather and shoe industries

[14] Oil refineries;

[25] Railroad transportation

[26] Road transportation and related services

[27] Inland waterway transportation

[28] Communication services

[35] Non-profit organisations and household services

# Cluster profiles

## ■ Economic profile (clusters, sectors)

- gross value added employment
- gross value added / employee
- export orientation import patterns
- dynamics of economic development final demand
- economic competitiveness = f(...., innovation / technological profile)

## ■ Innovation / technological profile (clusters, sectors)

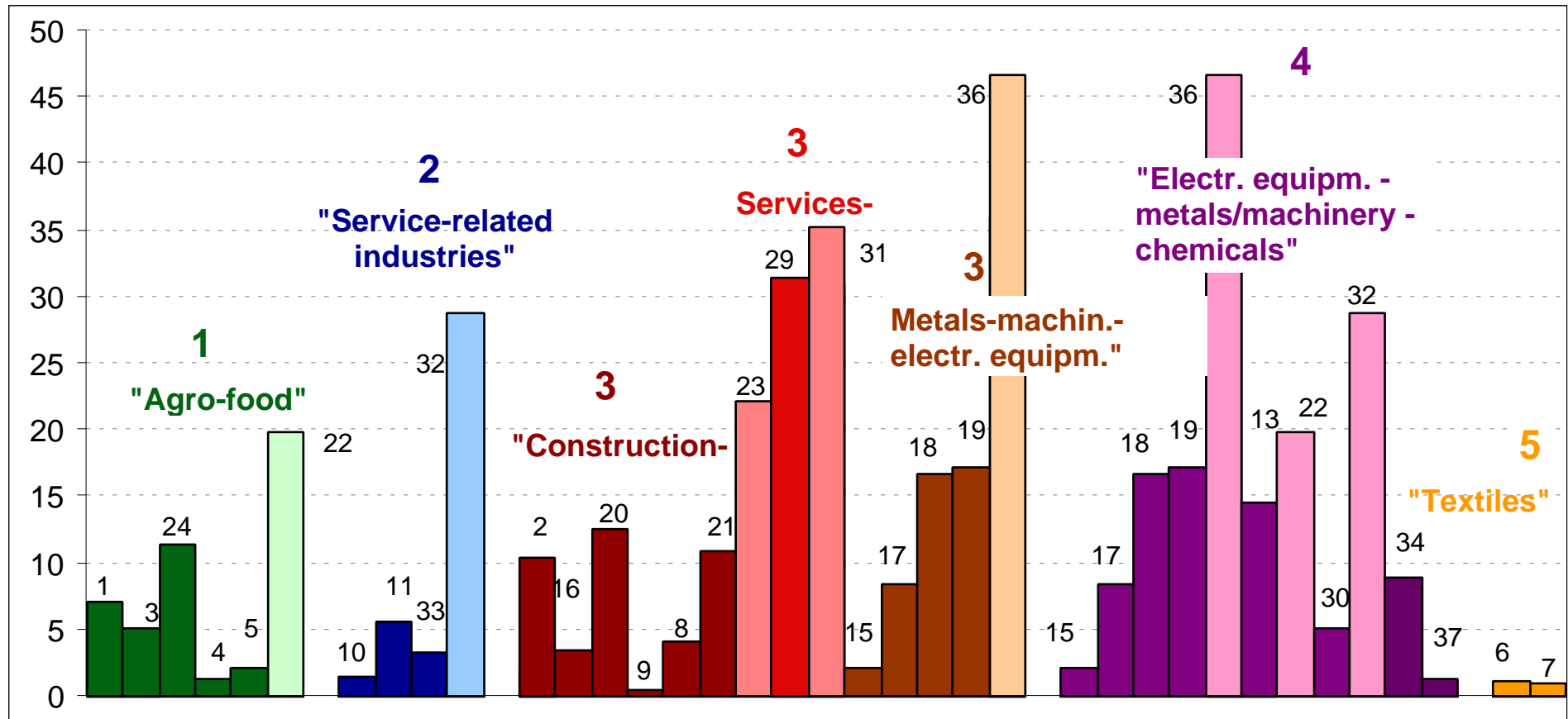
- input-oriented indicators output-oriented indicators
- market-oriented indicators aggregation of single indicators (e.g. innovation performance)
- dynamics of innovation and technology developments

## ■ Quality aspects of clusters

- strategic importance of transactions
- important relationships outside of I/O-linkages
- incubation and diffusion of innovation and technologies
- quality of innovation and technology

# Economic profile

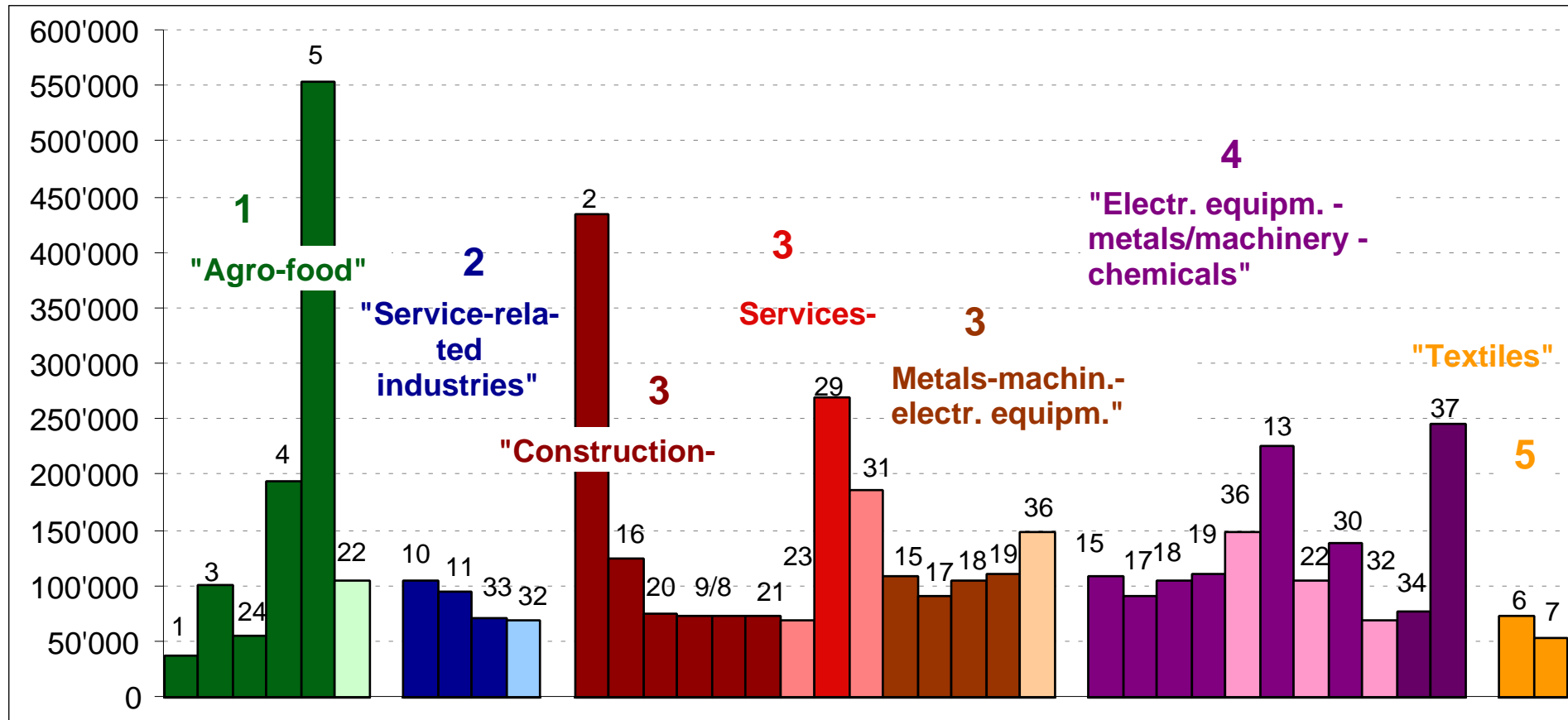
Gross value added in 1'000 Mio. Fr. 1995



Source: Input/Output-table 1995 ; Sector (31) including business rents.

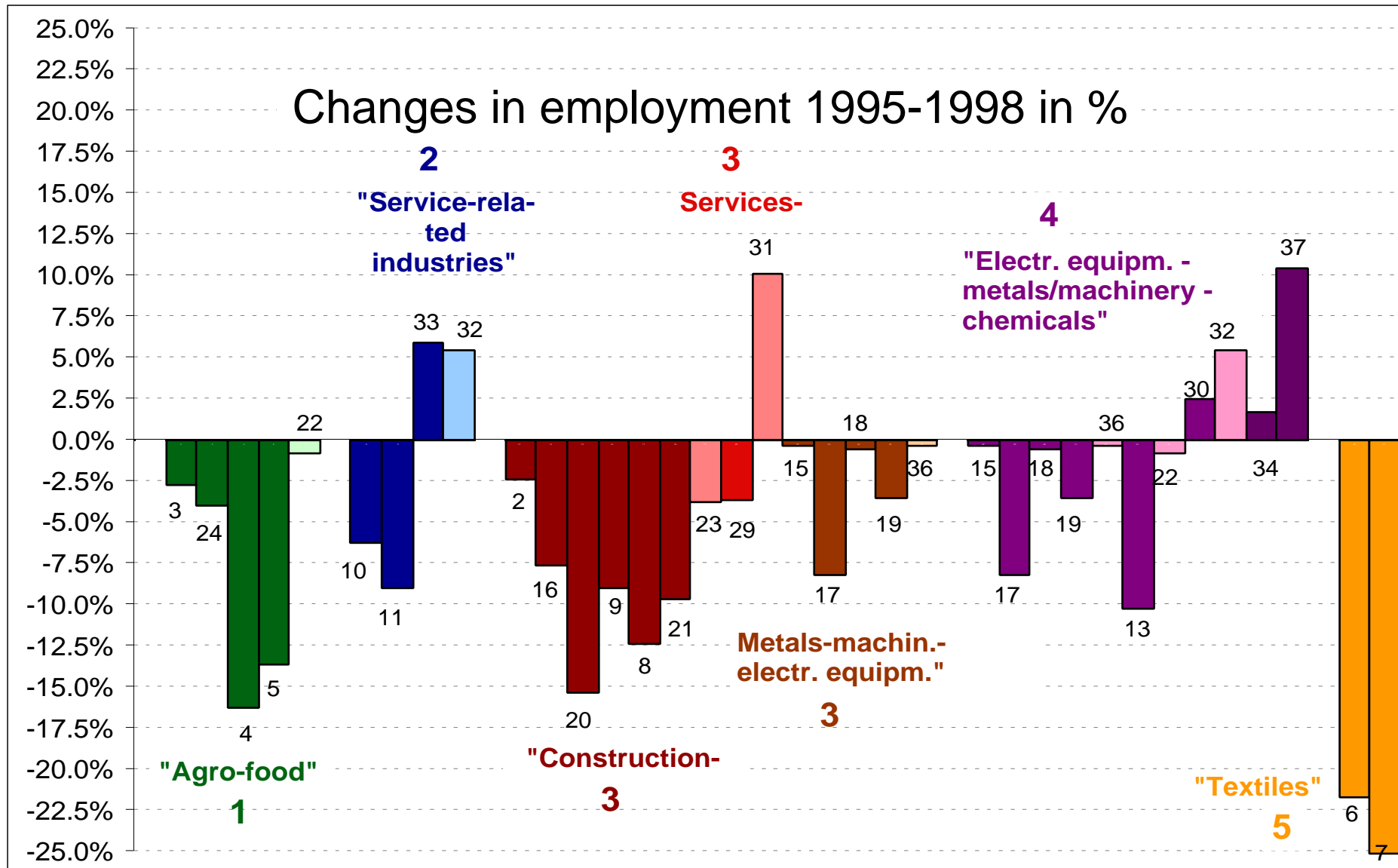
# Economic profile

## Gross value added per employee in Fr. 1994



Source: Swiss Federal Statistical Office; Production account 1994

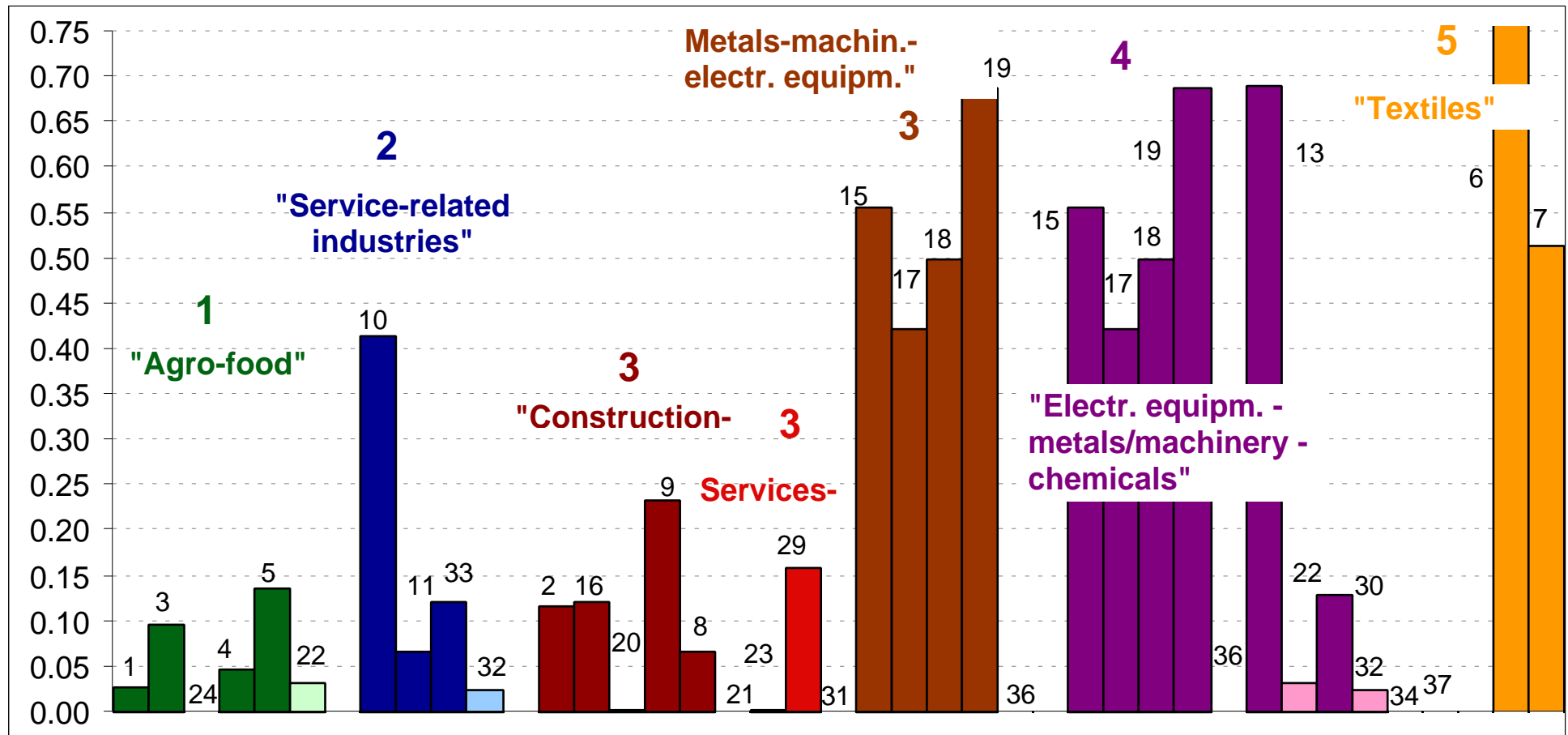
# Economic profile



Source: Swiss Federal Statistical Office; Standard classification of economic activities - Economic census 1995, 1998

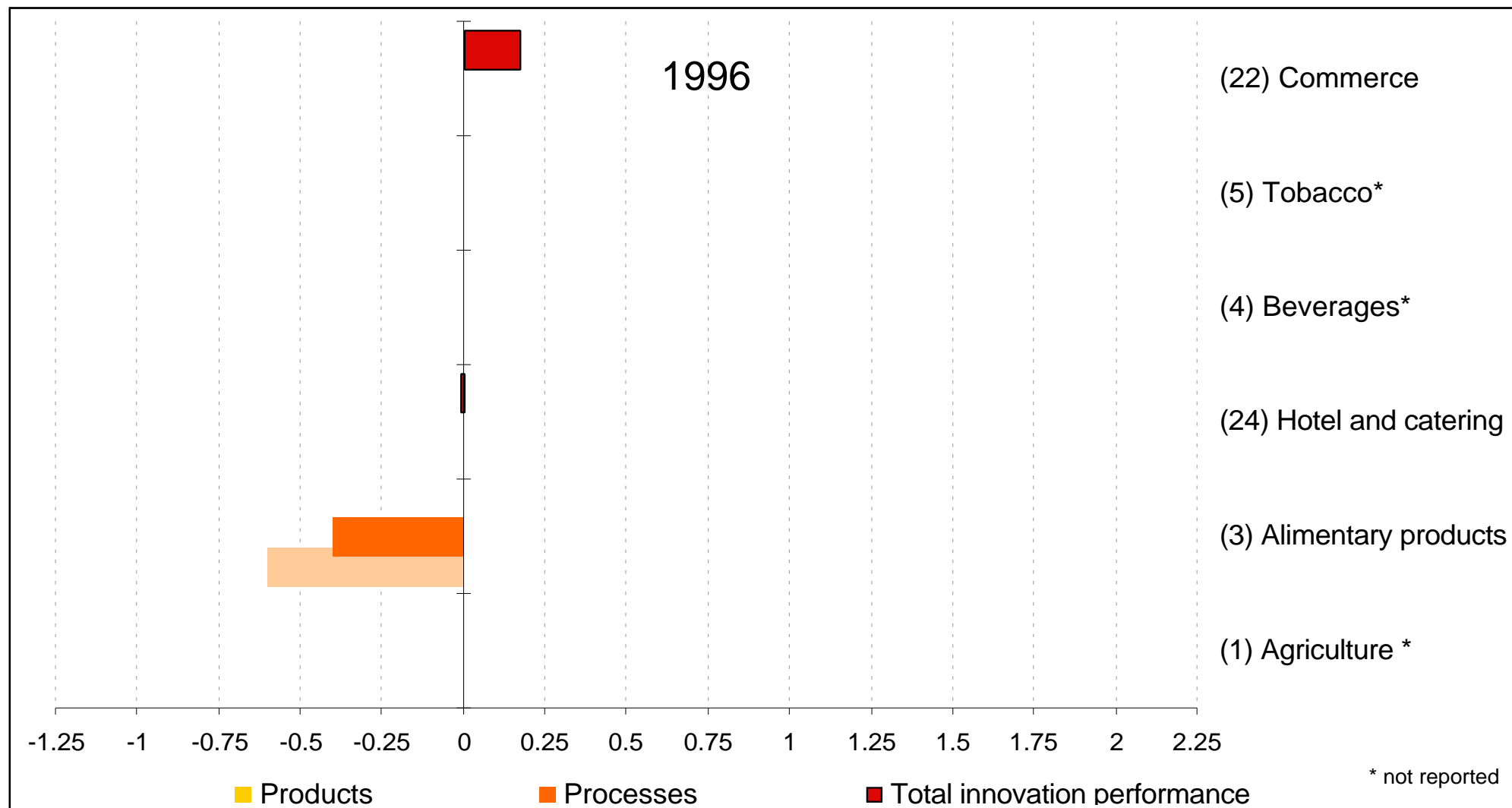
# Economic profile

## Exports / gross production 1995



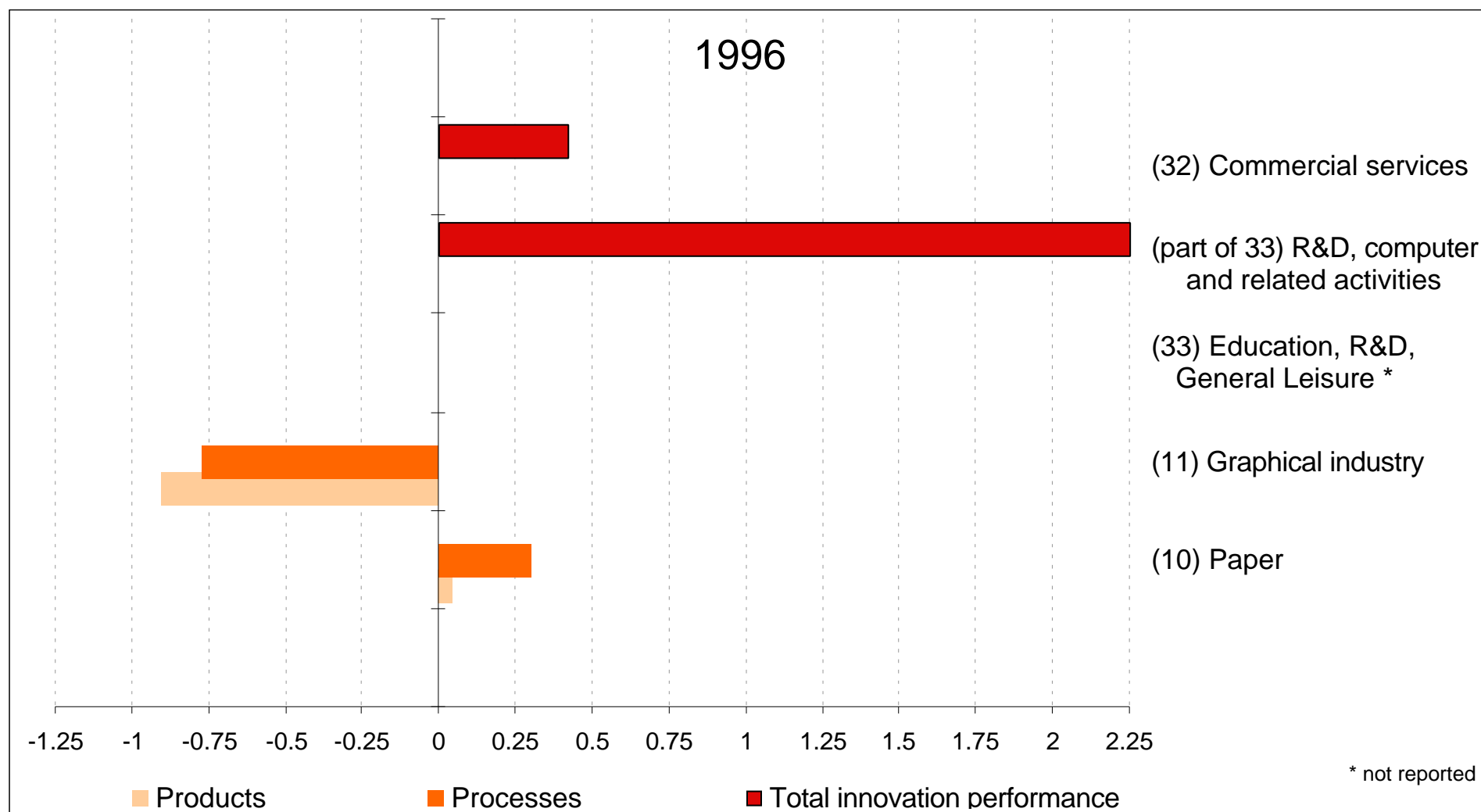
Source: Input/Output-table 1995

# Innovation performance – Megacluster 1



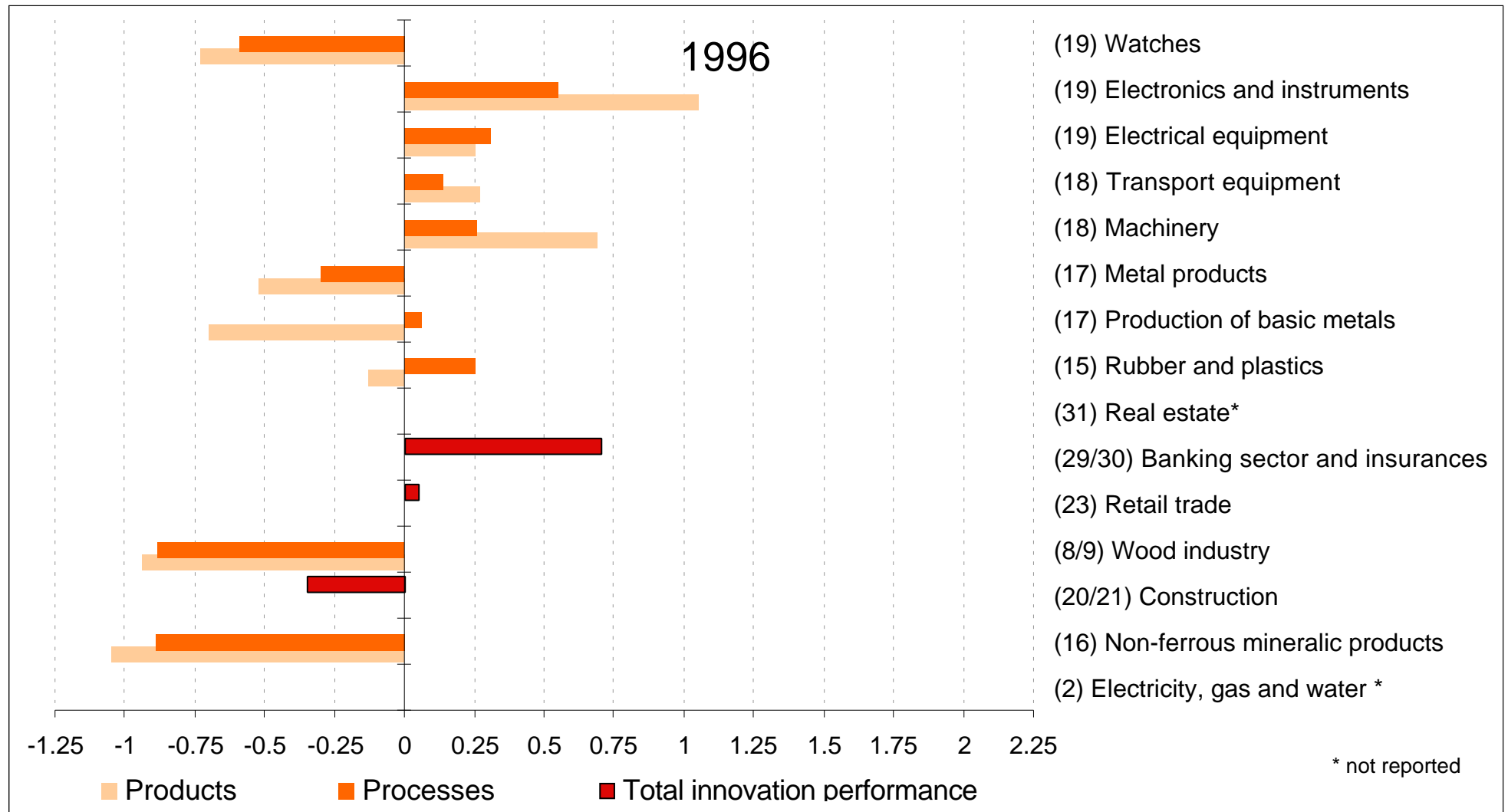
Source: KOF; Innovation surveys

## Innovation performance – Megacluster 2



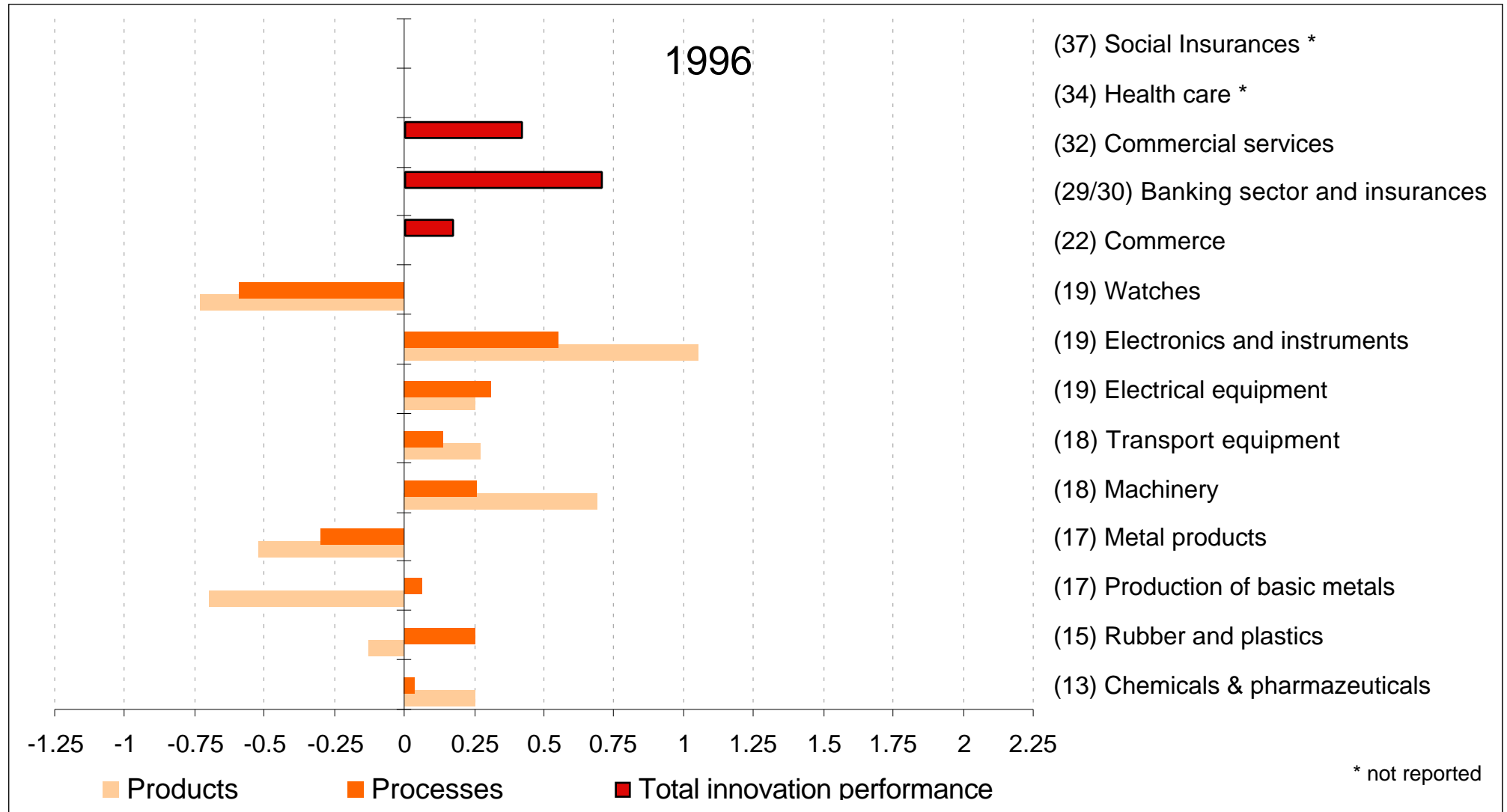
Source: KOF; Innovation surveys

# Innovation performance – Megacluster 3



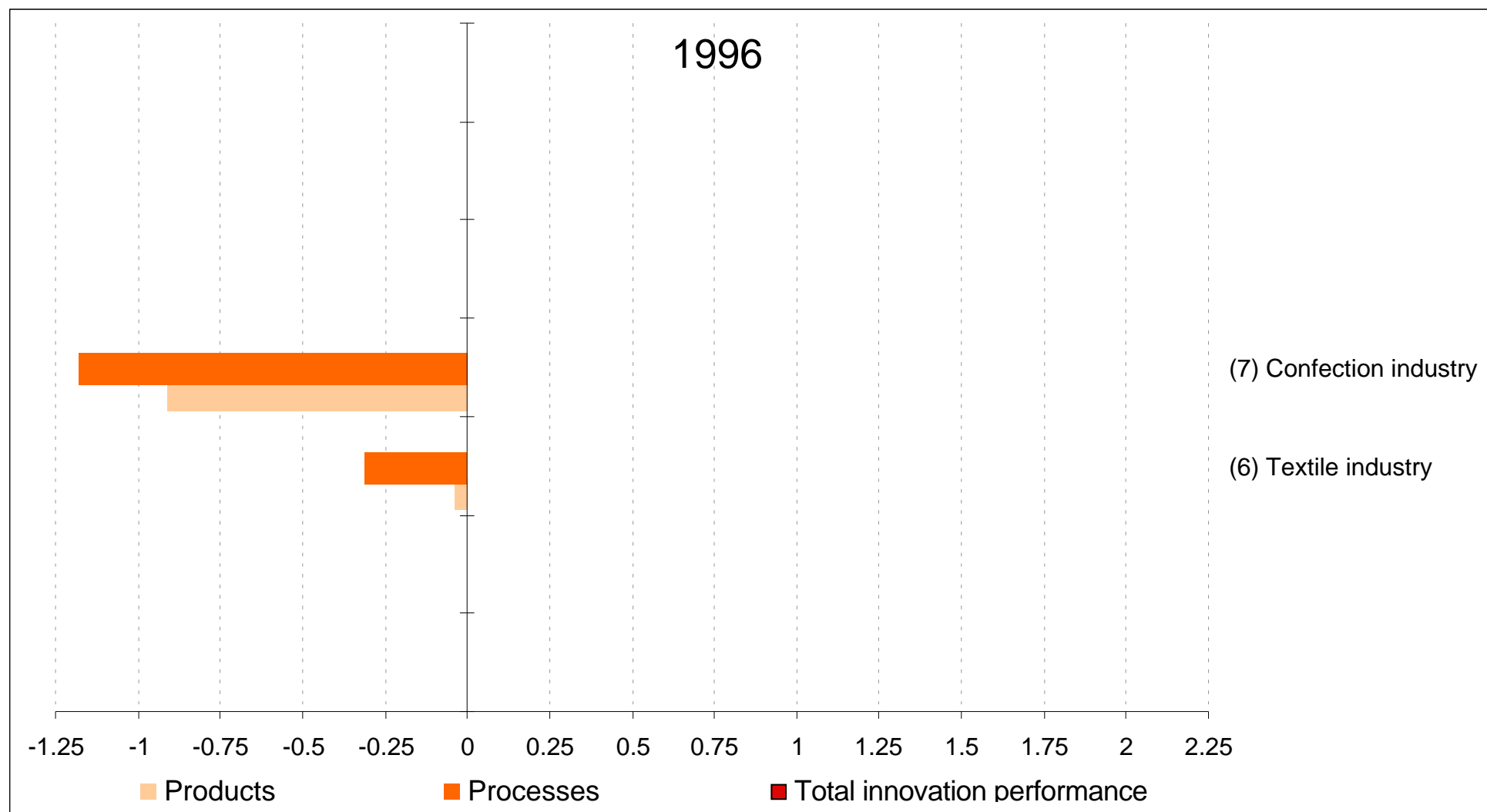
Source: KOF; Innovation surveys

# Innovation performance – Megacluster 4



Source: KOF; Innovation surveys

## Innovation performance – Megacluster 5



Source: KOF; Innovation surveys



# Conclusions

## ■ Problems

- economic interpretation
- „freefloating“ sectors ? overlapping of megaclusters
- aggregation of sectors / homogeneity of sectors
- actuality of 1995 data / new technologies (ICT) ?

## ■ Outlook

- sensitivity analysis
- economic relations <-> technological relations
- international linkages (import and export)
- international comparison of megaclusters
- ideas for policy discussion