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# Innovation networks in the Polish economy: Current state and development prospects

# Results from two research projects

- “Innovation networks in the Polish economy: Current state and development prospects”: innovation networks in two traditional industries – clothing and furniture – in Poland (2003-2005)
- Research conducted under a project entitled “Changes in Industrial Competitiveness as a Factor of Integration: Identifying Challenges of the Enlarged Single European Market” (EU 5FP): Relationship between networks and competitiveness for firms in four industries (pharmaceuticals, automotive, food, and electronics) in four countries (the Czech Republic, Hungary, Poland and Spain)
- Questionnaires similar but not identical

# Polish manufacturing and 6 studied industries: Overview

- Very low R&D spending (industrial R&D 0.2% of GDP)
- Relatively low R&D intensity of foreign-owned companies
- Low shares of high-tech industries in manufacturing
- Auto industry is fastest-growing industry; followed by furniture and pharmaceuticals; electronics, clothing and food & beverages growing slowly by Polish standards
- Furniture is Poland's largest export industry
- Auto/auto parts most export-oriented (ca. 70% of sales), followed by electronics, clothing and furniture (40-50%)
- Traditional importance of OEM for W. European customers in clothing and furniture
- Low productivity (especially labor productivity) in furniture and especially clothing compared to Polish manufacturing as a whole; other four industries have above-average productivity

# Samples of firms

## First sample:

- 140 firms: 70 clothing, 70 furniture
- 99 small, 39 medium
- 2 large firms, 3 foreign-owned (1 small, 2 medium)

## Second sample:

- 226 firms: 125 food and beverages, 43 automotive, 38 electronics, 21 pharmaceuticals

# Overview of situation in samples: Skills and certification

Clothing, furniture:

- Low rates of certification (ISO etc.)
- Poor employee qualifications (both white- and blue-collar) and little investment in training

In four relatively high-productivity industries :

- Food & beverages leader for certification
- ISO most prevalent in industries dominated by companies producing intermediate goods (only ca. 1/3 of companies in consumer goods industries – food and beverages and pharmaceuticals – ISO certified)
- Education level of work force increasing

# Overview of situation in samples: R&D, innovation

Clothing, furniture:

- High-end production relatively rare, but more frequent among furniture firms
- Very low rates of innovation in SMEs
- Innovation in these industries is related to design, not R&D, though we do observe some patent activity (more in furniture than clothing and strongly concentrated in medium and large firms)

In four relatively high-productivity industries :

- Food least R&D-intensive; electronics most R&D-intensive
- Automotive industry most innovative, food least (electronics more innovative than pharmaceuticals)
- Little difference between domestically owned and foreign-owned companies with respect to the propensity to innovate
- Patents: electronics lead; foreign-owned companies less active than domestic companies

# Networks in traditional industries

- Low levels of cooperation, most frequent with supply chain partners (suppliers, customers), almost no R&D institutes, universities, or consultants
- Difficulties caused by poor IPR protection and poor performance of contract enforcement institutions (justice, police); also, shallow market - difficulty in finding competent partners
- Key role of network development in distribution (more frequent than horizontal linkages in production, though licensing relationships also developing)
- Low frequency of licensing arrangements in sample as a whole (case studies show somewhat different picture)
- Importance of embodied technology purchase (machinery & equipment)
- Research funding: EU more important than domestic state funding

# Networks in traditional industries: Case study evidence I

- Continued reliance of large companies on OEM, but this is seen as a trap
- OBM developed on domestic market (OBM export to E. European countries, but OBM export to W. Europe remains a dream); only exception was a small clothing enterprise
- Influx of FDI throughout the 1990s - two kinds of impacts on the domestic producers:
  - Impacts of mechanisms for positive spillovers from the foreign-owned firms on the innovativeness of the domestic firms (particularly the large ones)
  - Upgrading effects of competition from foreign investors in the domestic market

# Networks in traditional industries:

## Case study evidence II

- Network organisers at home: Large firms with better financial standing and strong brand recognition
- Development of *production networks* with suppliers in both industries (supply chain management capabilities)
- Development of *production networks* with complementary products producers operating in other segments of clothing industry (brand management capabilities)
- Development of *distribution networks* among complementary products' producers in the furniture industry starting in the late 1990s (clothing firms tried but failed in mid-1990s)
- In 2000s, *innovation in distribution networks* is becoming one of the most important area of innovation for Polish firms in these industries, and probably will be the most important innovation for these firms in the area of networking in the near future

# Inter-firm networks in higher productivity industries

- Dominance of arm's-length relationships (OEM, subcontracting) over equity-based relationships; however, licensing unpopular
- Foreign-owned companies cooperate with foreign partners more often than domestically owned companies
- However: no evidence of a low level of backward linkages of foreign-owned companies
- Top benefits from cooperation with customers and suppliers: delivery terms and timeliness

# Innovation and R&D linkages in higher productivity industries

- Domestic linkages dominate (for foreign-owned firms too)
- Domestic R&D institutes most important partners in innovation process, followed by domestic industrial customers
- Much of R&D cooperation is for quality control (subcontracting)
- Electronics and pharmaceuticals have most R&D linkages and most co-operation in innovation process, food least
- Subcontracting of R&D work is very rare; R&D subcontracting, R&D co-operation and in-house R&D seem to be complements, not substitutes
- Group most cooperated with is raw materials suppliers (domestic universities for pharmaceuticals); machinery & equipment suppliers and public R&D institutes also important

# Econometric analysis results

# Relationships between network activity and economic performance in traditional industries

- Strong positive relationship between performance strongly related to cost reduction strategies, product innovation, and certification
- Positive relationship between performance and top management responsibility for quality management and improvement initiatives and cooperation with suppliers (domestic and foreign) on product quality improvement and inventory management

# Relationships between network activity and competitiveness in higher productivity industries

- Network activity generally has positive effect on competitiveness, though a few network activities are negatively related to competitiveness
- Examples of network relationships that positively affect competitiveness: working with suppliers generally, and with customers on formulation of innovation ideas, delivery conditions, quality and marketing
- Company age and ownership do not affect competitiveness, but may have a weak effect on intensity of network activity
- Other important determinants of competitiveness: skilled work force, export intensity, conducting R&D activity

# Policy implications I

- Market mechanisms (relations with customers and suppliers) strongly dominate over cooperation with public sector actors in area of innovation and R&D networks
- However, public sector (industrial R&D institutes, universities) does play a non-negligible role
- Need to accelerate transformation, restructuring of public S&T sector
- Importance of certification and licensing - need for policy to improve access of SMEs?
- Significant differences across industry with respect to innovativeness suggest that a successful national innovation policy would have to take industry differences into account. But can a post-Communist state like Poland's, with its limited capacity and high rate of corruption, handle the challenge of constructing such a fine-tuned policy well? And in what ways would the design of such a policy need to reflect the constraints of EU competition policy?

# Policy implications II

Very small number of firms in low-productivity traditional industries with high level of patent activity - what do they say about barriers to innovation-related cooperation?

- Difficulties in the area of intellectual property rights protection
- Weakness of court system in contract enforcement
- Difficulties in finding competent partners (problem of shallow market resulting from generally low innovation capacity of firms in these industries – typical example of negative network effect)