Supplier Benefits from CERN Collaboration

Presentation at CERN IT event
Geneva, May 27, 2004

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Based on: Autio E., Bianchi-Streit M., Hameri A.-P., Technology transfer and technological learning through CERN's procurement activity, CERN-2003-005, Education and Technology Transfer Division, Geneva, 2003.

Economic Impact of Big-Science Research?

- In Europe, worth some 20 b€ of public money is annually spent on purchasing technology-oriented equipment from industry of which 2 b€ are for inter-governmental, scientific research projects (EU, 2000)

- Every € 1 invested in international research organizations' procurement budgets generates an impact of € 3 – € 3,5 in the member countries' economies when used to buy supplies from their industries (Schmied, 1987; Streit-Bianchi et al, 1984)

What is NOT Known?

- Much evidence that significant technological learning may take place amongst Big Science suppliers
  - Often very demanding technological specifications
  - Significant engineering challenges

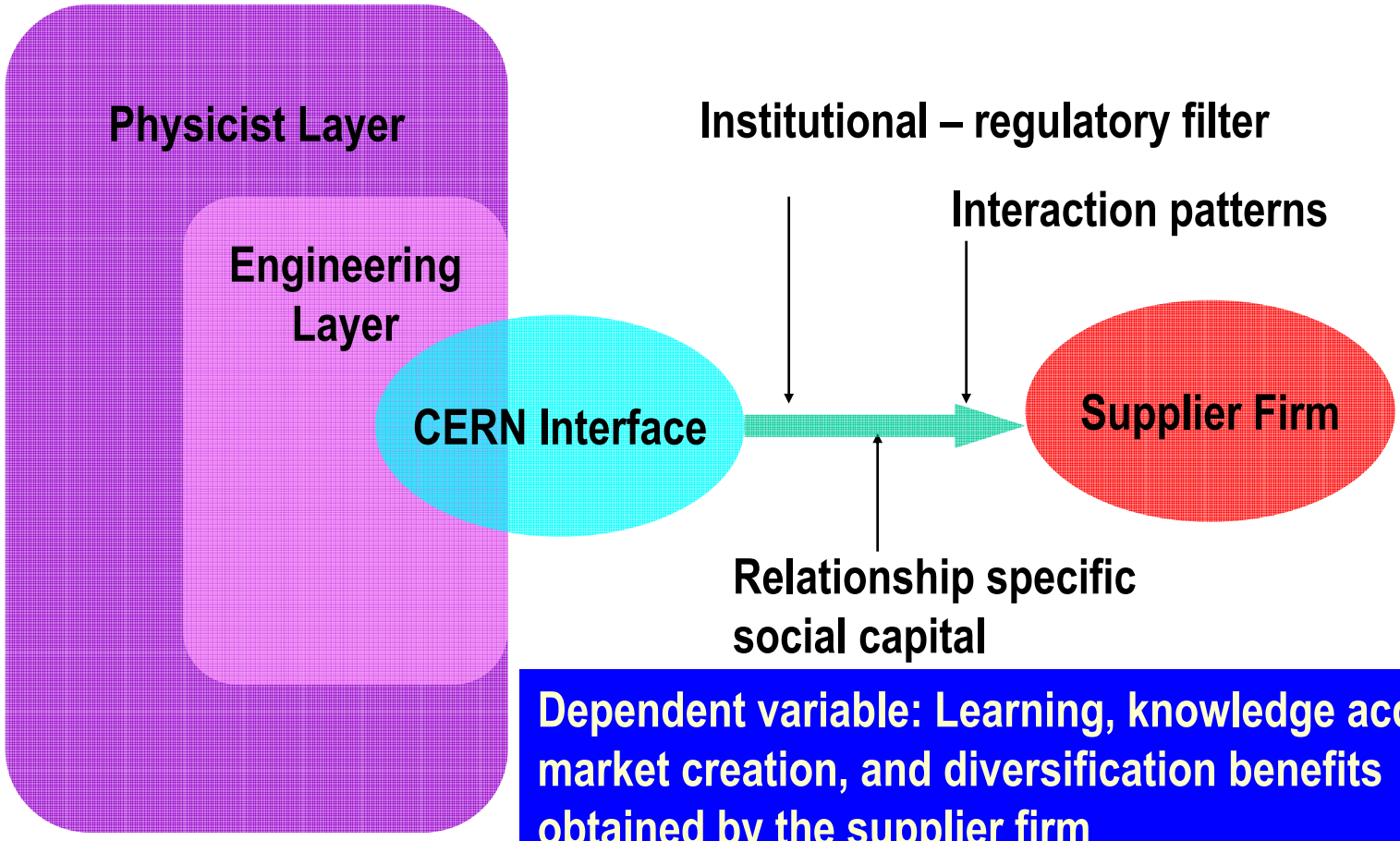
- However, we still do NOT know:
  - How big this learning impact is
  - How the learning environment of international research organizations actually works (e.g., do they differ from universities?)
  - How the learning impact is distributed among supplies
  - What influences this learning impact

Objectives of the Survey

1. Model that describes the distinctive aspects of international research organizations (such as CERN) as learning environments

2. Survey of CERN's learning and innovation impact
   a) % of suppliers developing new products
   b) Organizational impact due to supplier project
   c) Technological and market learning
   d) Use of CERN as marketing reference
   e) Influences on this impact
   f) Distribution of the impact amongst the CERN supplier population

Theoretical Model



Dependent variable: Learning, knowledge acquisition, market creation, and diversification benefits obtained by the supplier firm

Method and Sample

- Focus on CERN purchases from 1997 to 2001
- Altogether 6 806 supplier projects
- Total procurement budget of 2 132 MCHF
- Analyzed the list, picked out technology-intensive purchases
- Companies with total orders less than 25 kCHF were ignored
- 629 cases (9%) – these were surveyed by questionnaire
  - these 629 cases nevertheles represented 1 197 MCHF in procurement budget – over 56% of the total budget
- 178 survey respondents (~30%), no respondent bias
- Survey questionnaire translated to six languages (10 countries covered in the survey population)

Significant Technological and Economic Impact

- As many as 38% of all respondents reported having developed new products as a direct result of the supplier project
  - 12% started new R&D teams because of the CERN project
  - 12% started a new business unit
  - 16% opened a new market
  - 40% increased their international exposure
  - 44% indicated technological learning
  - 40% indicated market learning
  - 50% would have had poorer sales performance without CERN
  - 20% would have had lower employment growth without CERN
  - 40% would have had poorer technological performance
  - 25% would have had poorer performance in valuation growth

High Technological Learners...

- Are younger (mean difference 14 years*)
- Have longer projects (m.d. 10 months*)
- Have more previous experience in CERN collaborations*
- Are more dependent on CERN as a customer**
- Did experience change in project specifications*
- Interacted with CERN more frequently during the project***
- Had a less trusting relationship with CERN* (kept promises less frequently)
- Experienced a greater increase in technological distinctiveness*
- Developed more relational social capital in the relationship*
- Had greater influence in the relationship with CERN*
- Had a greater number of previous projects with CERN*
- Had a more R&D intensive project**

* $p < 0,05$; ** $p < 0,01$; *** $p < 0,001$; 2-tailed significances

But There Was No Difference In...

- Size of the firm
- Cognitive social capital (understanding one another)
- Reliance on informal governance mechanisms
- Extent of interaction (in terms of number of persons)
- Newness of technology in the beginning of the project
- Length of the previous relationship with CERN
- Newness of the market

Some general implications

- Of CERN's total procurement budget, approximately one half (56%) carried some technological learning potential
- Of CERN's total cadre of suppliers, 9% were associated in technology-intensive projects
  - Within this subgroup, the technological learning impact was significant

- And with some speculation:
  - Respondent companies have developed 183 new products
  - When extrapolated over the base population of 629 companies an impressive total of 528 new products were developed during 1997 to 2001 among CERN's suppliers

Recommendations for CERN

- Manage 90% of projects as usual (lowest bidder wins, focus on cost, arms-length transactions)
- For the 10% of projects, however:
  - Consider building established supplier relationships
  - Consider 'CERN trusted supplier' status
  - Consider phasing and coordinating these projects such that mutual (horizontal) knowledge exchanges are maximized
- Also,
  - Greater attention to upstream collaboration (pre-project phase)
  - Maintain absorptive capacity (in-house R&D)
  - Licensing culminates an engagement process, not a transaction
- Finally,
  - More explicit focus on platform technologies (e.g., Grid)
  - Set up task force to consider CERN procurement strategies
  - Member countries: 'bean counting' may be misleading