Economic effects of Swedish investment in ESS, 2010-2020

Summary and conclusions

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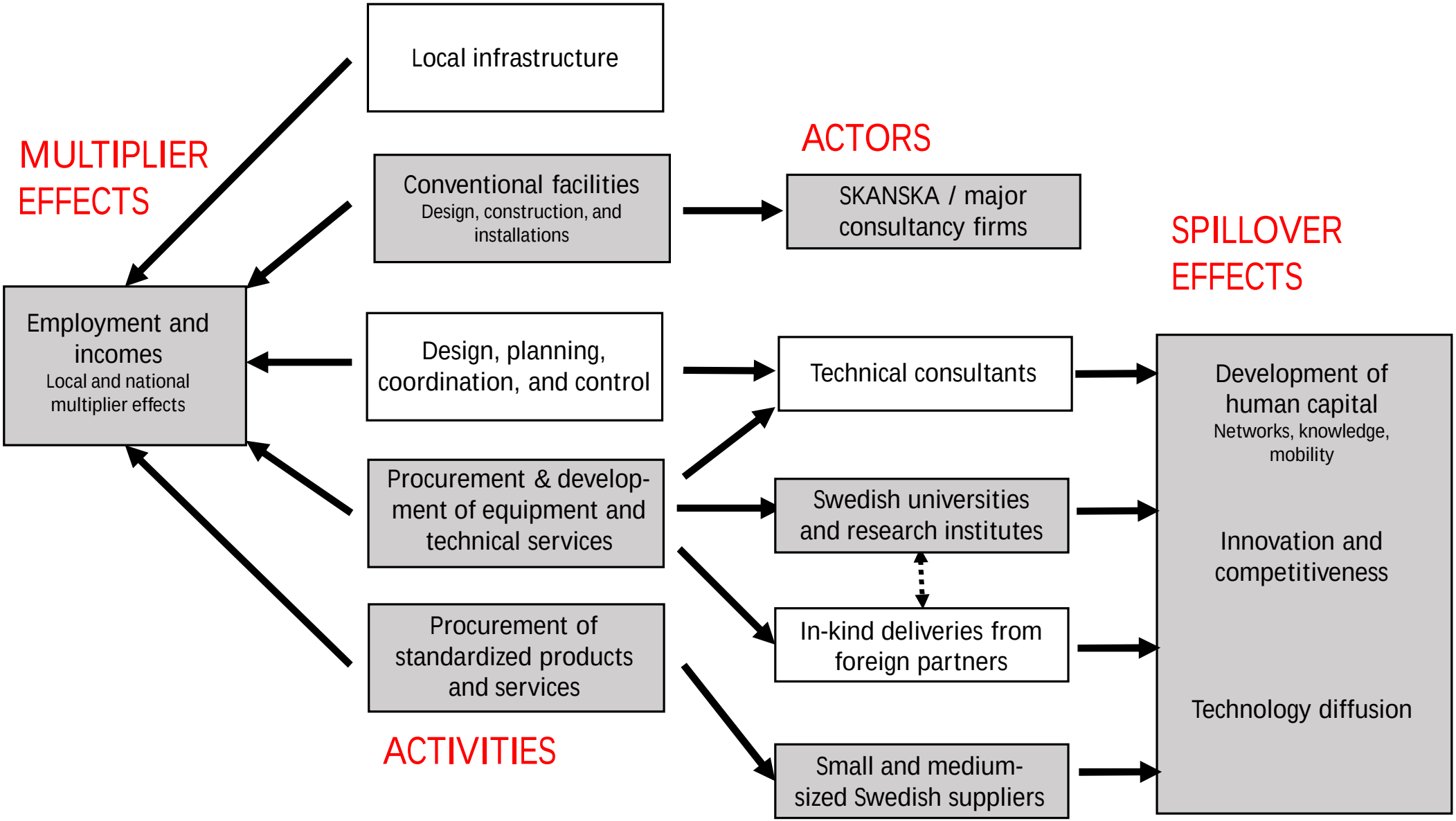
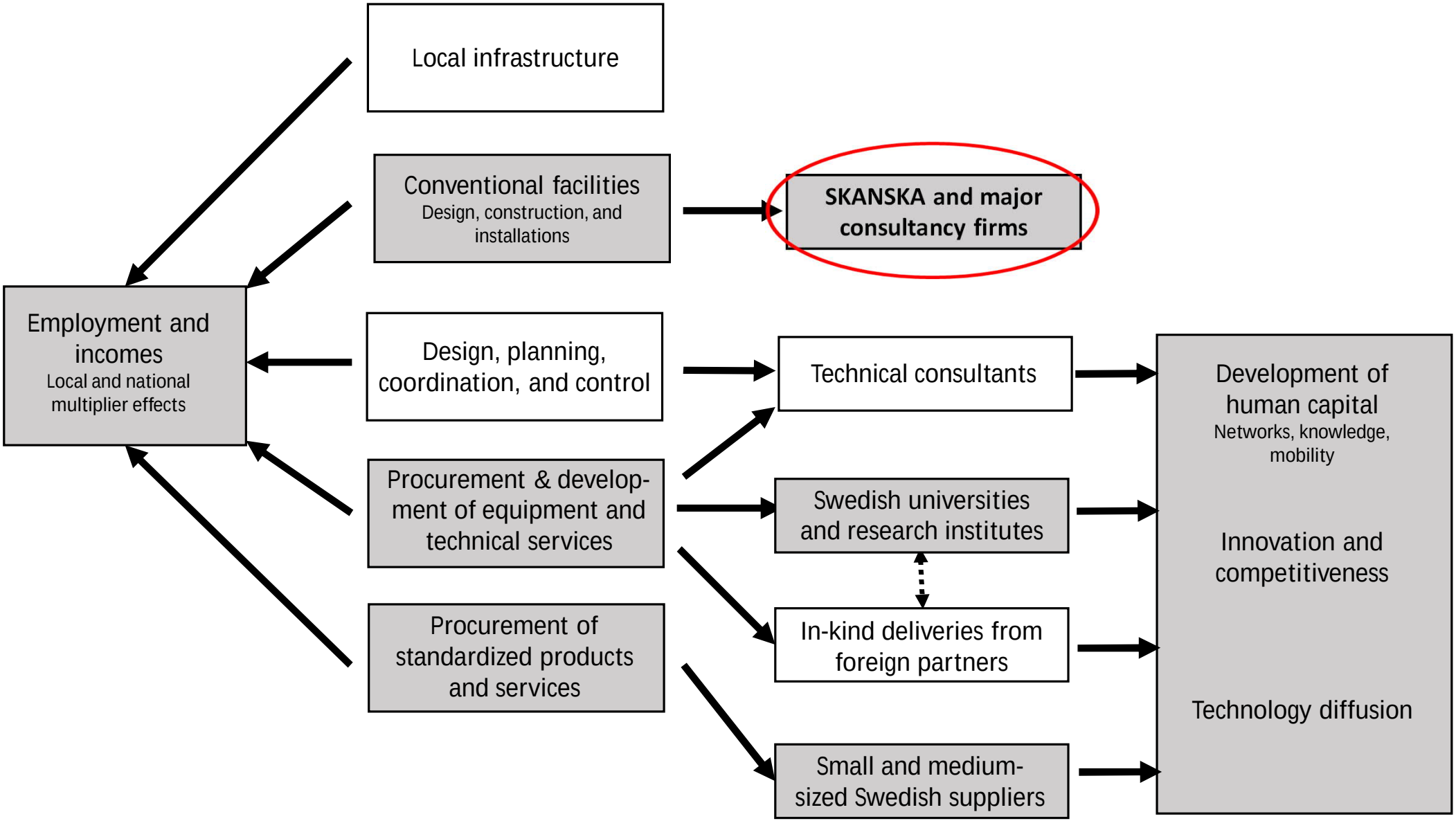

MULTIPLIER EFFECTS
Employment and incomes
Local and national multiplier effects
Local infrastructure
Conventional facilities
Design, construction, and installations
Design, planning, coordination, and control
Procurement & develop-ment of equipment and technical services
Procurement of standardized products and services
ACTIVITIES
ACTORS
SKANSKA / major consultancy firms
Technical consultants
Swedish universities and research institutes
In-kind deliveries from foreign partners
Small and medium-sized Swedish suppliers
SPILLOVER EFFECTS
Development of human capital
Networks, knowledge, mobility
Innovation and competitiveness
Technology diffusion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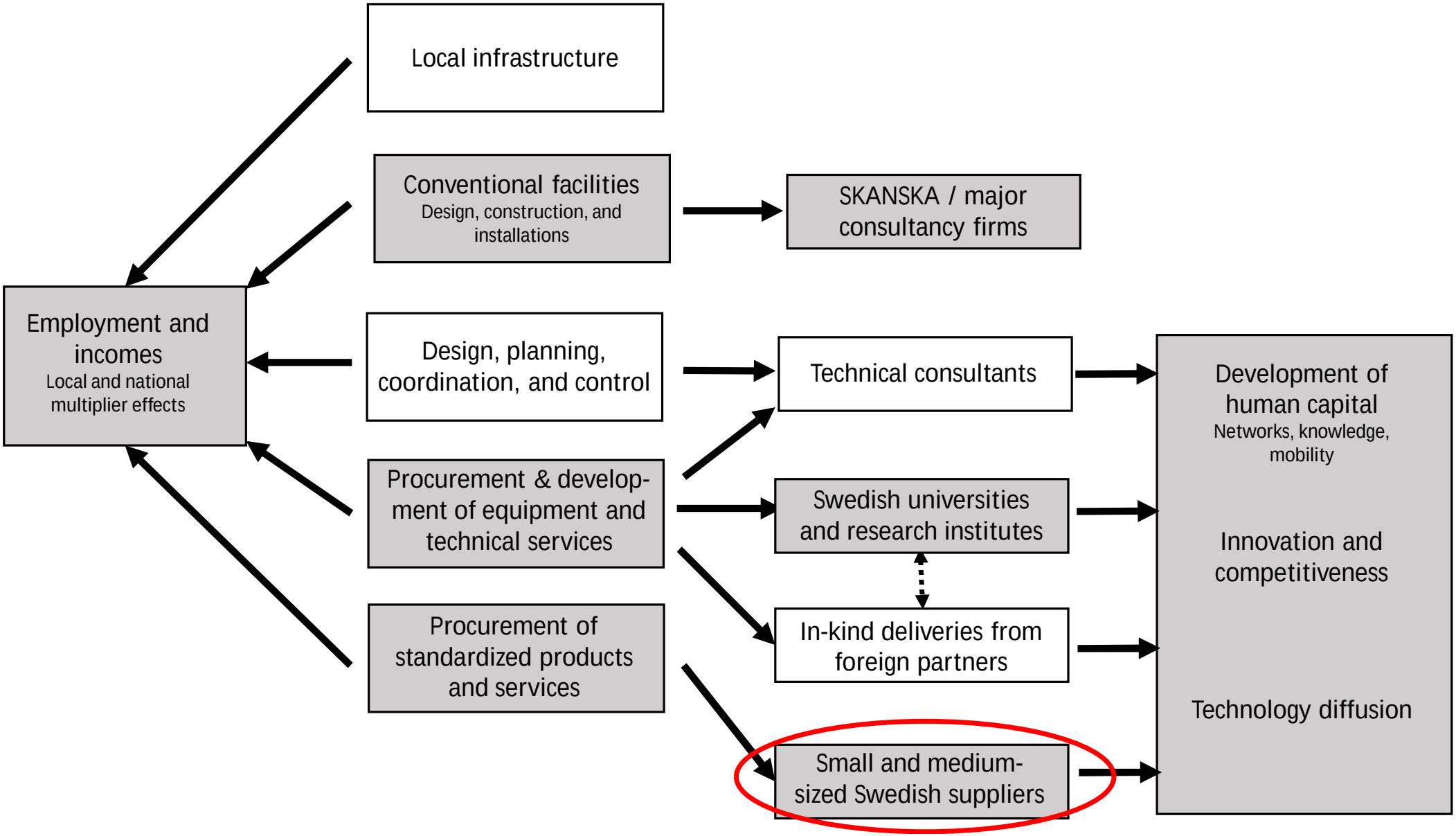
Skanska och the major engineering consultancy firms (SWECO, AFRY, COWI, etc.)

- Large and complex project, but broadly within existing areas of expertise and competencies.
- Special challenges:
    1) Design and construction carried out at the same time
    2) New requirements/standards after Fukushima
    3) Many companies involved
- Responses:
    1) "*Collaborative construction"*
    2) Systems for planning and risk management
    3) Documentation and information management
- Limited spillovers on the firms' competitiveness. There was learning, but it was difficult to use it systematically at the firm level.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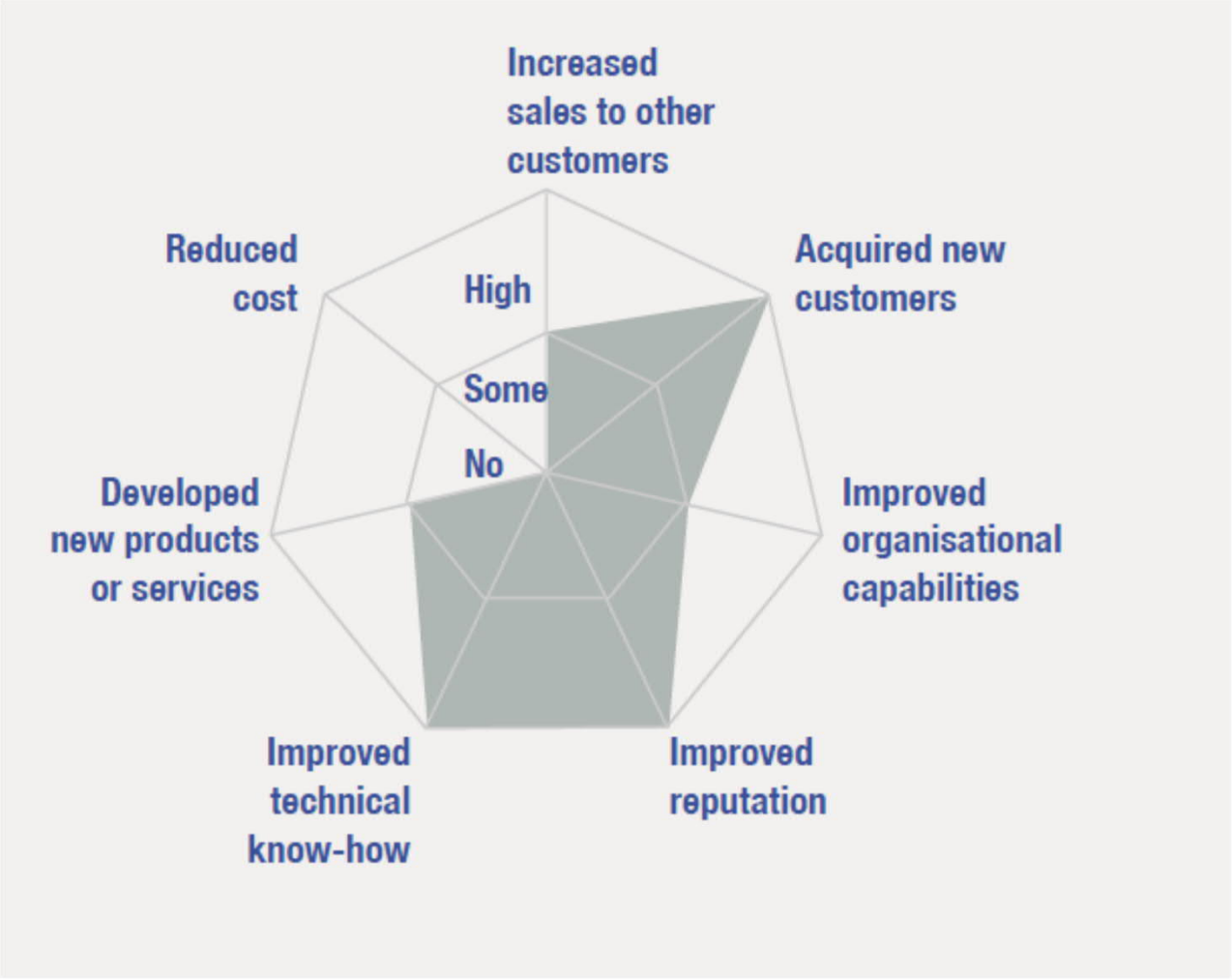
Example: Effects on suppliers to CERN

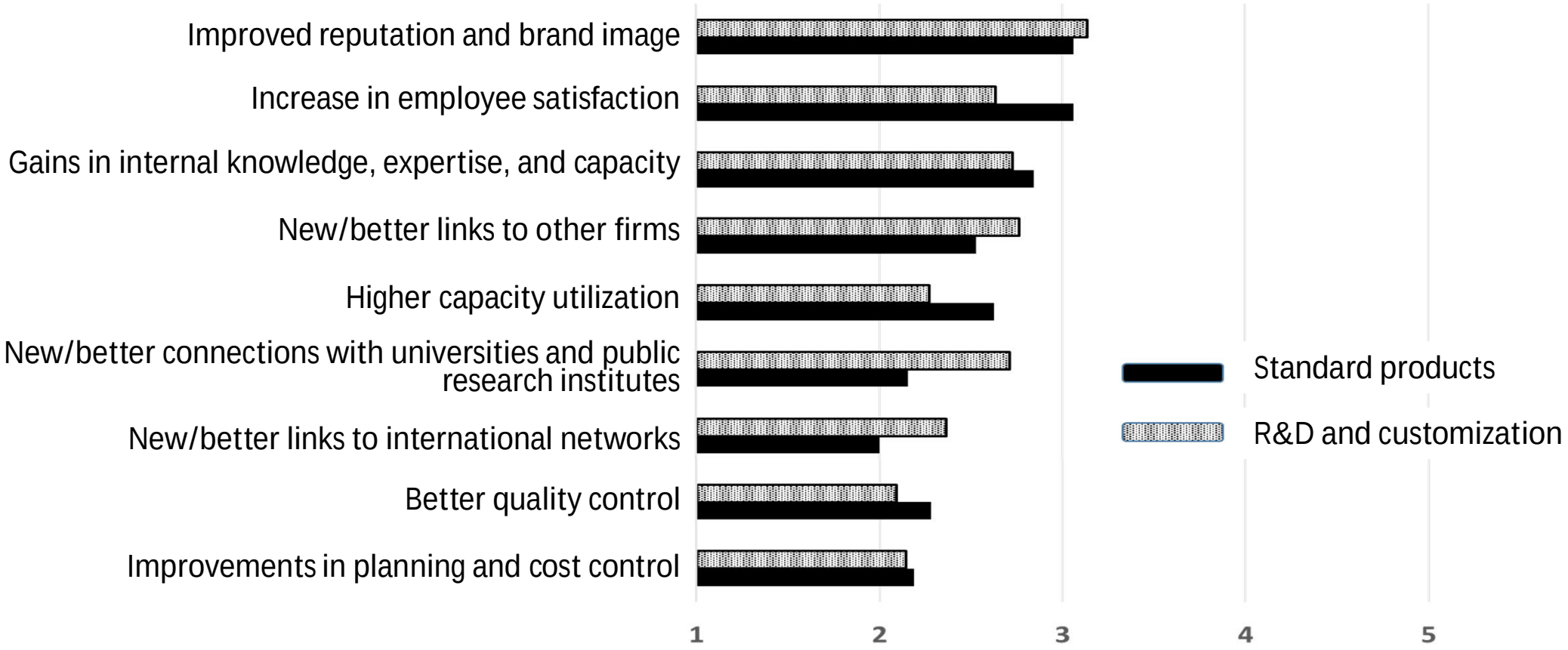
Source: CSIL (2019)



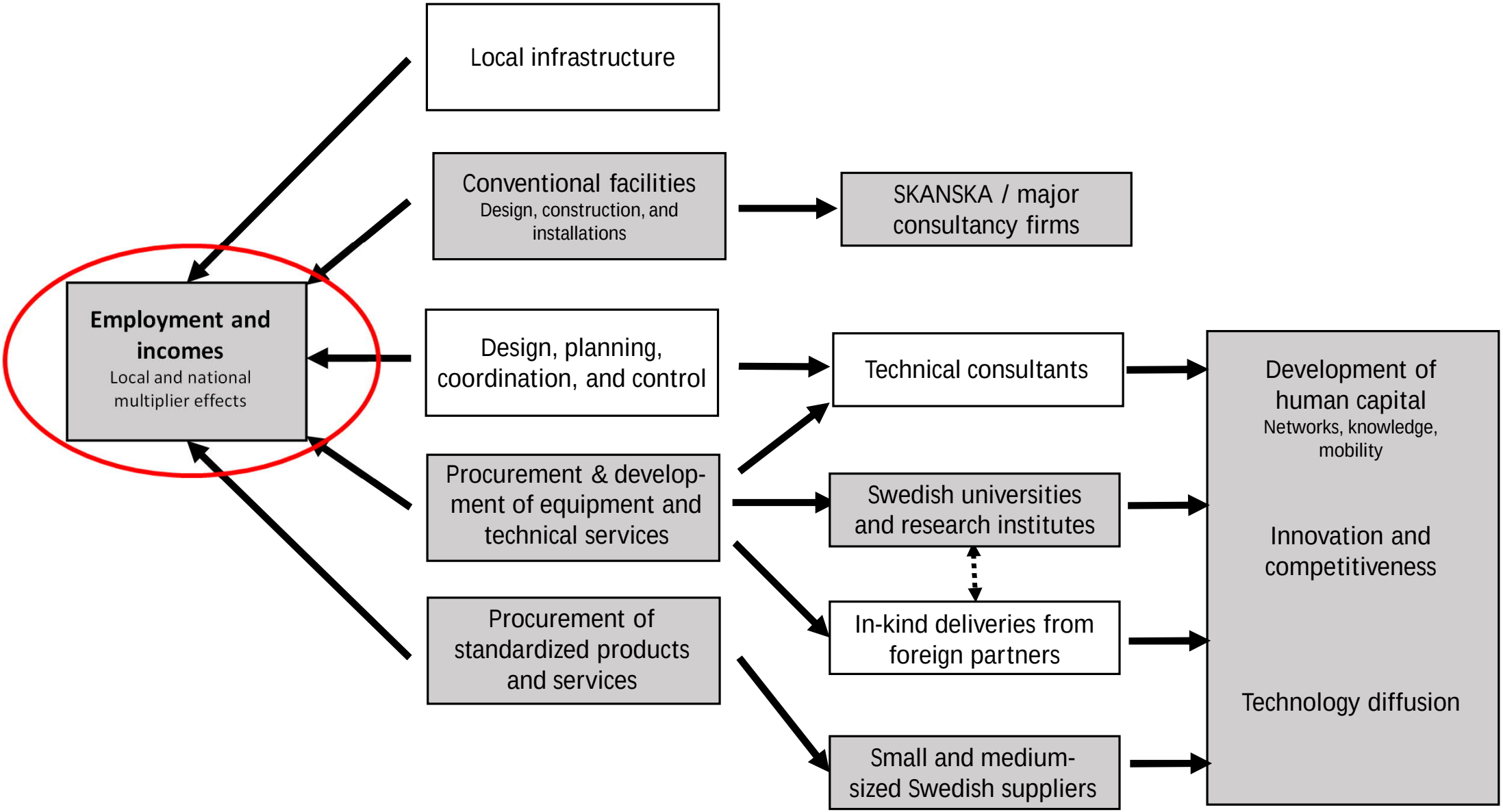
Small and medium-sized Swedish suppliers

- The bulk of deliveries involved standardized (off-the-shelf) products and services.
- Only a small share of companies reported positive effects on technological innovations and competitiveness.
  - But many reported positive effects on brand image/reputation and employee satisfaction

To what extent have assignments for ESS contributed to strengthening the firm's competitiveness?



1 = not at all; 5 = very significantly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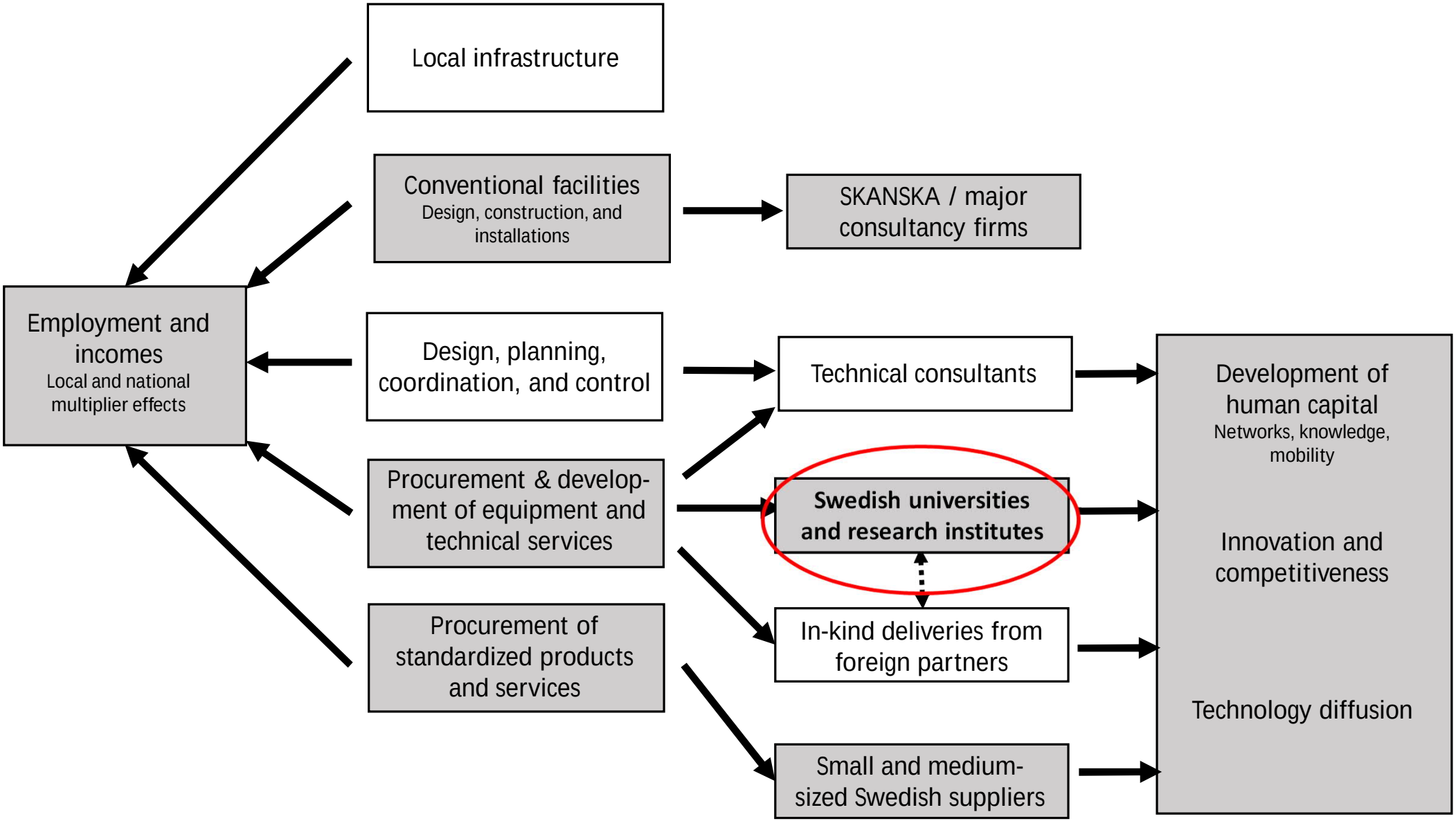
Employment and incomes

- The investments in ESS have created both direct and indirect employment (and incomes) locally (in the Malmö/Lund region), in the rest of Sweden, and in the rest of EU.
- We estimate the total employment effect at the EU level during the period 2010-2020 to 37,000 man-years. The employment effect in Sweden is approximately 16,000 man-years.
- The employment effects are strongly concentrated to the Malmö/Lund region.

- These results are based on simulations using EU's general equilibrium model BIOSAM, which was created to estimate employment and income effects of exogenous changes in external trade.
- Our cautious assumption is that jobs at ESS have the same job multipliers as Swedish public sector jobs in general, at slightly below two. In other words, one job at ESS generates an additional job somewhere else in Sweden.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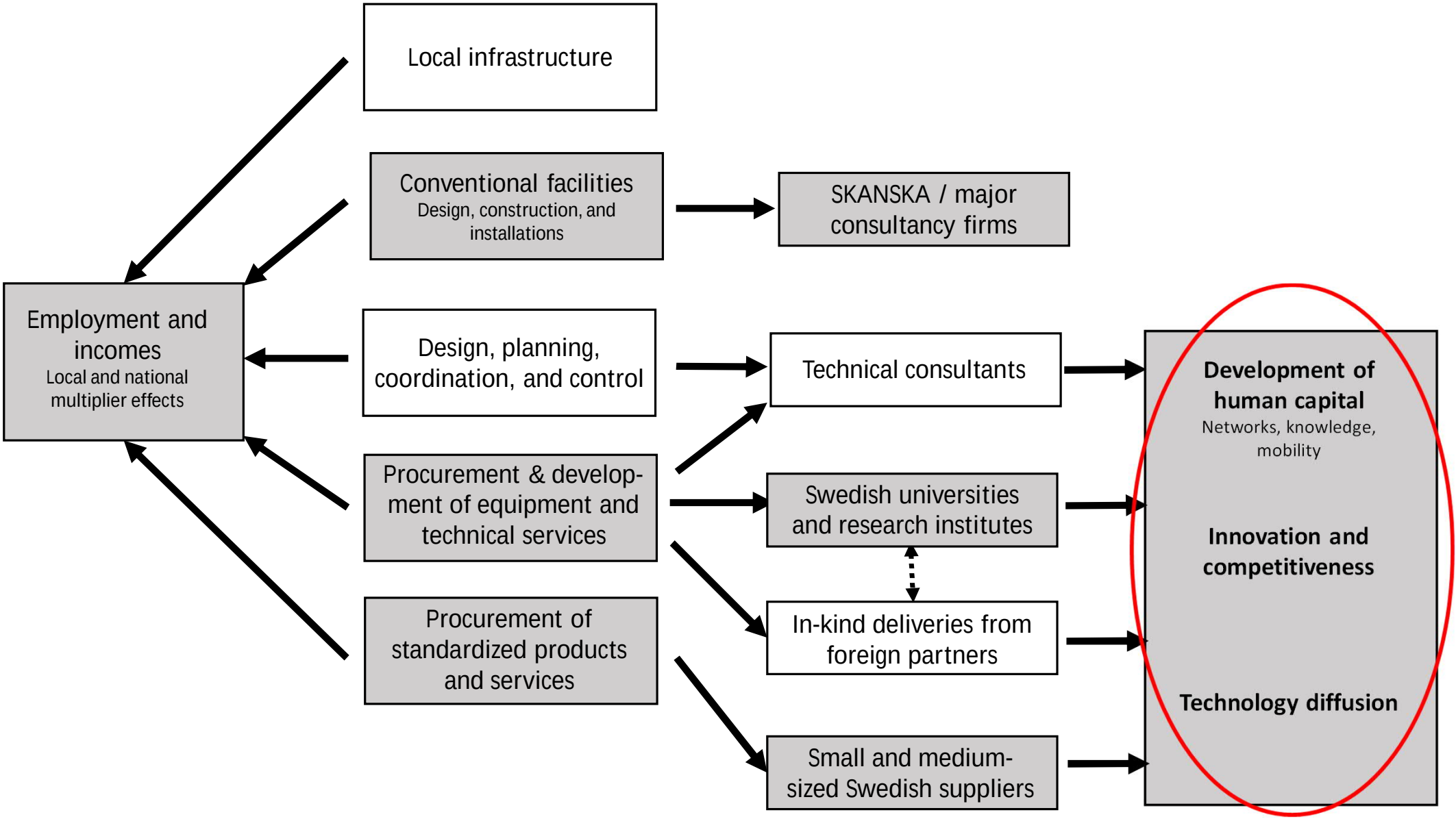
Swedish universities and research institutes

- Swedish universities and research institutes have strengthened their knowledge base and invested substantial resources in areas related to neutron science and spallation technology.
  - FREIA
  - SwedNess, Nordic Neutron Science Programme
  - Multiple research projects and research publications
- This has created a stronger position from which to compete for future *in-kind* projects focusing on the development of new instruments as well as for accellerator time.

- The strategically important long-term benefits from ESS will only materialize if Sweden can establish a strong ecosystem around ESS and Swedish actors can participate actively in innovative research projects.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Development of human capital, innovations, competitiveness, technology diffusion, spillovers

- The investments in ESS generated positive macroeconomic effects on Sweden already during the construction stage (until 2020).
- However, the really notable spillover effects can not be expected until ESS is in operation (2028?).
- To realize the potential long-term benefits, it is necessary that Sweden offers a dynamic ecosystem including enterprises, universities and research institutes, venture capital providers, proactive public sector authorities, and other actors, such as intermediaries and networking agents.
- Together, these actors can identify important research questions and translate abstract research findings into useful and valuable solutions to common problems. This is where the long-term socio-economic benefits of ESS will eventually be generated.