

Technology transfer and commercialisation infrastructure

Infrastructure forms the part of enabling conditions for technology transfer and commercialisation that provides the physical and virtual habitats of knowledge. Infrastructure is essential for the creation of knowledge, its storage, evaluation, sharing and transformation.

What infrastructure is traditionally required for technology transfer and commercialization?

In addition to the human and financial resources devoted to research, the process of technology transfer and commercialisation is dependent on the existence of a physical and virtual supporting infrastructure. Physical infrastructure refers to the facilities, tools and scientific instrumentation used by the scientific and technological communities to carry out research as well as the localities offered to host spin-off companies and all other organizations' involved in the process. Virtual infrastructure refers to the personal contacts, networks, and knowledge intermediaries and brokers. The provision of infrastructure may be directly linked to policy action (e.g. establishment of publically funded Science and Technology Parks) or can form part of the core activities of the participants themselves (e.g. networking of researchers, entrepreneurs, investors, knowledge brokers and so forth).

The individual components in this infrastructure – also referred to as an ecosystem – require efficient connectivity and low transaction costs to produce the results expected. It has been suggested that a knowledge economy is an ensemble of elements that must be in balance. It is not necessarily the lack of technological infrastructure or skilled engineers that restrains economic growth. It might equally well be the lack of entrepreneurs or proper economic incentives and opportunities. In competitiveness surveys, a good public infrastructure and an efficiently functioning administration have been valued very highly.

What new infrastructure additions are required for technology transfer and commercialization?

As knowledge continues to increase in importance as one of the main driving forces of economic and social development there is a need in both industrialized and developing countries to add to the traditional infrastructure for knowledge economies new support components for technology transfer and commercialisation. Additions are needed to respond to and take advantage of a more networked world. An effective infrastructure must support transferring and commercialising technology in all its modes. This includes:

- Technology transfer offices to transfer and commercialise technology outward as well as absorbing and adapting technology from elsewhere;
- Industry liaison offices to develop research-industry cooperation;
- Proof of concept centers to verify if new products and services should function;
- Prototype development support to demonstrate that new products and services will function;
- Market and competitor intelligence surveillance facilities to assess the market potential of commercialised technologies;
- Incubators to grow early stage businesses;
- Scale-up centers for industrial production testing;
- Venture accelerators to accelerate business growth; science and technology parks (also

called technoparks);

- Investment funds (seed capital and later stage) to support business development;
- Intellectual property (IP) laws, regulations, and practices which are supportive of technology commercialisation;
- Others which are unknown but will become apparent as technology transfer and commercialisation models mature further.

The most important factor for an effective infrastructure is not so much the individual components but how these components are connected. An infrastructure having all the necessary organizations apparently required in place but whose “wiring” is defective will not function well.

However, if no advance towards improving an ecosystem component can be made at the present time, consider making the best of what you have, use for now, improve later; a system may be efficient even though its individual component agents may be operating sub-optimally.

In many technology commercialisation applications it is important to know how well solutions will scale up for widespread applications. There is a paradox in how scaling of innovation is approached [Bank ref]. In theory an innovation is tested in order to determine whether it works and has potential for scaling up, but in practice the decision to move toward scaling up must often be made on the basis of inadequate information, producing fallible indicators, or indicators of unknown reliability, and also before all contextual conditions are in place.

Networks

Personal networks have always be a way of supporting scientific cooperation across national boundaries. Individual working relationships between researchers in business and those at universities and PRIs are effective in initiating successful licensing and joint R&D contracts between universities and companies to be followed-up by professional help from technology transfer offices to make these initial relationship produce results.

Weak network links, as opposed to strong links, are vital in complex technology transfer and commercialisation networks. The weak link concept was introduced in a study which found that rather than relying on their close friends (their strong links) most people find their jobs through contacts they knew less well, such as friends of friends. The analogous situation is to consider how we find new ideas. If entrepreneurs only talk to the people they know well it’s likely that discussions will proceed along familiar lines and new thinking will not emerge. In technology transfer and commercialisation, individuals with few weak ties will be deprived of information from distant parts of the social system and will be confined to their own views and those of close contacts, thus insulating them from new ideas (Granovetter 1989). In individuals’ professional networks weak links are formed and also disappear all the time.

References

- Granovetter, M. (1983), The Strength of Weak Ties: A Network Theory Revisited, *Sociological Theory*, Vol. 1 pp. 201-233.

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