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Sharing Innovation’s Benefits[†]

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Abstract

WTR articles to date have addressed raising innovation capacity in lagging regions. We now move to the question of sharing the benefits of specific innovations, noting that one way to do this is to focus on a particular technology as a demonstration project within a capacity-building project. The word “sharing” implies mechanisms that go beyond simple buy-sell transactions. This paper catalogs a number of these mechanisms, which in fact include many well-known technology transfer techniques. The paper focuses in particular on two mechanisms, technology assessment and new institutions, the latter including three Korean institutions. A manager seeking to benefit from the several mechanisms currently must find them in as many different places. We therefore present the possible “roll-up” of sharing mechanisms as an opportunity in social entrepreneurship. We hope the paper will lead to an expanded list of sharing mechanisms, consideration of their feasibility in different regions, and ultimately a one-stop shop for managers seeking to benefit their own and other organizations by the sharing of innovations.

Keywords

Innovation’s benefits, Sharing, Cooperation models

1. INTRODUCTION

We wish to share innovations and their benefits. This sharing can occur domestically or internationally. The direction of sharing can be from the developed world to the developing world or vice versa. Sharing can be initiated by the technology leader countries or by the technology follower countries, as <Fig. 1> implies.

“Sharing” implies that transfers are not limited to commercial transactions. Therefore we look further than “commercialization of innovation” to find examples of sharing mechanisms.

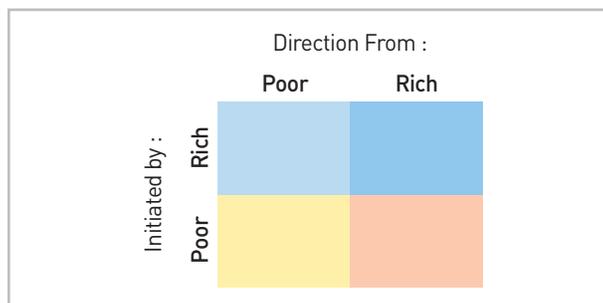


Fig. 1. A notional classification of sharing of innovation’s benefits

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In this paper we will discuss mechanisms for (i) preparing to share innovation’s benefits, and (ii) sharing them.

Under the heading “preparing to share,” we will mention technology assessment; technical standards, free trade agreements, technology transfer policies, and dedicated institutions and programs, on the latter delving into detail on three Korean institutions. Moving on to active sharing, we will discuss humanitarian discounts on books, journals, and drugs; student exchanges and other people exchanges; and multi-national R&D teams.

Our purpose is to invite discussion among DGIF panelists and attendees on how these mechanisms, and others to be suggested, may be packaged, bundled, improved, or leveraged for more efficient and beneficial sharing of innovation's benefits.

2. PREPARING TO SHARE

An important precursor of Sharing Innovation's Benefits is Technology Assessment (TA). TA determines what the benefits of an innovation are, and who will benefit, in what kinds of situations. In this way, TA forestalls harm ("negative benefits").

As innovations diffuse across regions at different rates, it makes sense to share TA results across regions. Oh and Phillips propose that research parks may take on TA tasks as a way to benefit their own and other regions, but also as a way to resolve the dilemma described by Gulbrandsen (2011), namely, that research parks (STPs) struggle for identity and legitimacy because they are caught between diverse cultures while being part of none of them. See <Fig. 2>. TA is an activity that appeals to all four cultures in the Figure. It can be a path to acceptance of STPs within their social milieux.¹

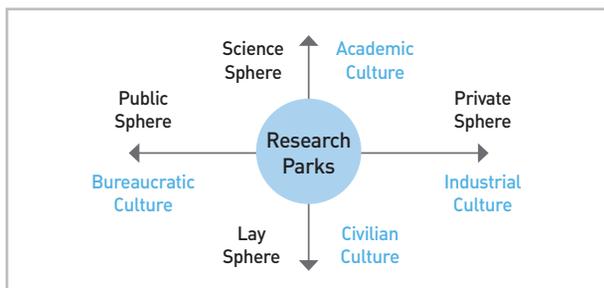


Fig. 2. Between cultures: Technology Assessment and STPs

Adapted from Gulbrandsen, M. (2011) Research institutes as hybrid organizations: Central challenges to their legitimacy, *Policy Sciences* 44(3): 215–230.

A second important precursor to sharing is international standards. These cover most aspects of technology products, from plug shapes and voltages, to data exchange protocols for USB2, to the pitch of the screws at the base of light bulbs. With effective standards agreements, innovators find the existing infrastructure (e.g., light bulb sockets) will accommodate their invention. Im-

porters find they need not devise a 220-volt version of an appliance before introducing it to the domestic market.

When contemplating sharing of beneficial innovations, one should exercise extreme caution when it comes to Free Trade Agreements (FTAs) and International Intellectual Property (IP) Agreements. Will patented GMO seeds enrich or impoverish farmers in poor countries? Will tariff-free import of goods from foreign MNCs advance or retard local innovation?

Should you accede to these treaties or protest them? Demand time to research questionable outcomes. Oppose secret negotiations. Remember you will be helped, as well as harmed, by strong IP policies.²

Readers who keep up with the business news will have noticed that different technology transfer (T²) policies and practices lead to different outcomes for different countries, when it comes to sharing beneficial innovation. China inches upward in the manufacturing value chain by negotiating T² in vendor and FDI agreements. However, China's IP protection remains weak. Japan aggressively (but usually legally) engages in external technology scanning, but usually offshores only the least value-added manufacturing. The USA is historically generous with international T², but also imposes T² sanctions on some countries, constrains brain gain by restricting H1B visas, and is increasingly litigious regarding patent infringements.

There are many dedicated institutions and programs for requiring, encouraging, and/or facilitating the sharing of innovation's benefits. The USA, with such programs as the IC² Institute's in Colombia, Korea, and Ecuador, and Victor Hwang's Rainforest Rev, focus on exporting entrepreneurship and commercialization skills.

These organizations prepare clients and recipients of innovation. That is, they work to raise absorptive capacity. From Rainforest Rev: "By 2009, entrepreneurship classes were mandatory in secondary school [in Rwanda]. The government also runs workshops, radio programs and contests aimed at promoting entrepreneurialism. Strong entrepreneurship is equated with patriotism and nation-building."

While these American organizations are private, Korea has created public agencies directed to share innovation's benefits. We look in depth at three of these.³

Model 1: Cooperation Model of Enterprises and SMEs (Startups): Center for Creative Economy & Innovation

The central government has established the 'Center for Creative Economy & Innovation' as a cooperation model of large

¹ Deog-Seong Oh and Fred Young Phillips, Technology Assessment: A role for UNESCO and S&T Parks. WTA working paper, July 2015.

² F. Phillips, "Trading Down: The Intellectual Poverty of the New FTAs." *Technological Forecasting & Social Change*, Volume 71, Issue 8, October 2004, pp. 865-876. See also Sunil Mani and Richard R. Nelson (eds.), *TRIPS Compliance, National Patent Regimes, and Innovation*. Elgar, 2013.

³ And also mention in passing STEPI's International Innovation Cooperation Center (IICC), www.stepi.re.kr.

enterprises and SMEs, which would enable the enterprises to contribute in regional industry development. Large enterprises are to establish a foundation for regional innovation economic growth by providing support for SMEs, startups, etc. Large enterprises, which have developed into global brands, will share their own experience with regional companies. Furthermore, cooperation of enterprises and SMEs will assist in creating the sustainable regional innovation ecosystem.

The Center for Creative Economy & Innovation (below 'Innovation Center') will discover innovative ideas from different regions, support startups with commercialization, and take on the role of advanced base to stimulate the innovation ecosystem through network ties with multiple innovation leaders and enterprises. Dedicated businesses (Large enterprises) were selected from each region to foster specialized industry. These dedicated enterprises will support technology development and startups, and assume a role to assist in development of SMEs. (3-year investment of 136 trillion won in plan, and investment of 5 trillion won is expected to support mutual growth of SMEs and cooperative firms⁴.) Aforementioned cooperation and support will help in establishment of the creative economic clusters that are specialized industry oriented. In more details, the Innovation Center will undertake the role of the incubator, which will provide one-stop assistance (provide occupant space for startup, raise startup funds (Angel Fund) and provide economic assistance, occupant space for startup, legal services, mentoring assistance, VC investment securement, etc.) for technology commercialization, startup, and fostering SMEs. In addition, the Innovation Center will manage the creative human resources program (innovation economy academy, fab-truck, startup forum, startup ideas competition, 3D modeling education program, etc.) for expansion of innovation culture. Furthermore, global network of enterprises and marketing support will assist in global market entrance and market development.

The Innovation Center was established in 18 cities nationwide. 99,711 patents of enterprises were made available to innovative venture businesses, startups, and SMEs. For the past year, 250 venture businesses were established, 125 SMEs received assistance, 30 billion won of investment was secured, 17 billion won of revenue was created. In addition, 5,086 consulting for incubated firms in Innovation Center and 962 prototype productions were recorded. 2,500 business startups are expected until 2017 with assistance from 18 regional centers, and 2,500 promising SMEs are

expected to develop into innovation businesses. (CCEI 2015)

Main Achievements of Daejeon Center for Creative Economy & Innovation⁵ (Established in Oct. 2014)

- Raise 45 million won fund for startup assistance (SK Mutual Growth 15 million + SK-net Young Startup Investment 30 million)
- Raise 5 million won of Daejeon Angel Fund for activation of startup and business investment finance.
- At 'Dream VentureStar Contest Exhibit' in 2014, 10 technology (the VUE 1, VideoFactory, 3D Scanner SURFinder, Wearable body temperature measurement strategic production technology, etc.) were selected and provided with assistance for startup at the center.
- A few businesses (e.g. CMES, Altist, etc.) satisfied the target revenue at under a year from establishment of the center, and the number of businesses (Exsen, 1 million won) that received establishment fund has increased.

Model 2: Cooperation Model of Central and Regional Governments: Expansion of INNOPOLIS (Daedeok + Daegu, Gwangju, Busan)

The achievements of Daedeok INNOPOLIS, national center for science technology research and development, are to be expanded nationwide to supplement innovation capacity of economic regions. The specialized industry fields were selected at 4 regions, and development of advanced industry at each region were supported. In addition, commercialization of R&D achievements is to be expanded nationwide through a network and cooperation of Daedeok INNOPOLIS and other INNOPOLIS regions. (MTIE 2011)

The central government focused on fostering specialized industry that are based on innovation capacity of each region, and stimulated startups and business development through securement and commercialization of original technology. For advancement of national R&D capacity, Daedeok INNOPOLIS is to be developed into an international hub for advanced converging industries, and Gwangju (photonic-based converging industry cluster), Daegu (IT-based converging industry cluster), Busan (shipbuilding & offshore plant industry cluster) are to be improved as the innovation clusters that are specially designed for regional specialized industries⁶. In order to maximize the achievements of technology commercialization and its ripple effects within the

⁴ Ministry of Science, ICT and Future Planning (<http://www.msip.go.kr/english/main/main.do>)

⁵ Daejeon Center for Creative Economy and Innovation, https://ccei.creativekorea.or.kr/daejeon/info/pr_info.do (July 24, 2015)

INNOPOLIS, cooperative network among INNOPOLISEs was strengthened. Intimate and complementary cooperative relationship was reinforced not only between the Hub (Daedeok) and Spokes (Gwangju, Daegu, Busan) but also among Spokes to improve the national R&D capacity. In addition, there are efforts to support new industry creation (expansion of creative economy) and to expand joint technology commercialization businesses, which would create convergence synergy effect, utilizing complementary factors among INNOPOLISEs. For the sustainable development of INNOPOLIS, it requires improvement on business entry and residential conditions, securement of affordable factory site, and preparation of space for venture business entry. The role of local governments (regional government) is emphasized for such tasks. The local governments are expected to pursue mid-to-long promotion plans for development of advanced industry, securement of core companies of specialized fields, enlargement of value chain system involving regional SMEs, and expansion of science technology innovation culture. (MTIE 2011)

The summary of main achievements (2008 vs. 2014) of the expansion plan of INNOPOLIS by the means of cooperation of central and regional governments is as follows. Number of incidence of technology transfer was 42 in 2008 and 1,777 in 2014 (42 times increase), revenue of engineering fees showed 23 times increase, and employment rate exhibited 5 times increase. In addition, number of incidence in startup of early laboratory company was 2 in 2006 and 89 in 2014 (45 times increase). When reviewing the data by regionally, the number of early laboratory companies de-

velopment is 54 in Daedeok, 10 in Gwangju, 20 in Daegu, and 5 in Busan. All four regions demonstrated a growing trend activation of startups involving advanced technology. 'Creative Patent Technology Exhibition' was held to encourage nationwide distribution of technology of Daedeok INNOPOLIS and to stimulate transfer and commercialization of technology of specialized fields in regional INNOPOLISEs. As a result, 165 incidence of technology transfer, worth of 4.96 million won, was achieved in 2014⁷.

Model 3: Cooperation Model of International Organization and Developing Countries : 'Technical Assistance' Activity of UNESCO-WTA Technopolis Development Center

The technology assistance role of UNESCO-WTA Technopolis Development Center (below 'UW center') is to support development of science town and establishment of regional innovation system in developing countries for 'exchange of innovation achievements between developed and developing nations' by the means of cooperation of UNESCO and WTA. The purpose of UW center is to share the experience in regional development that is based on science technology and to enhance innovation capacity of developing countries.⁸

Main roles include reviewing successful cases of development and expertise in development of advanced science towns, and providing support for construction of science towns in developing countries. The aforementioned activities will allow capacity building, technology assistance, pilot business, research, and publication. UW center will provide International Training Workshop and Re-

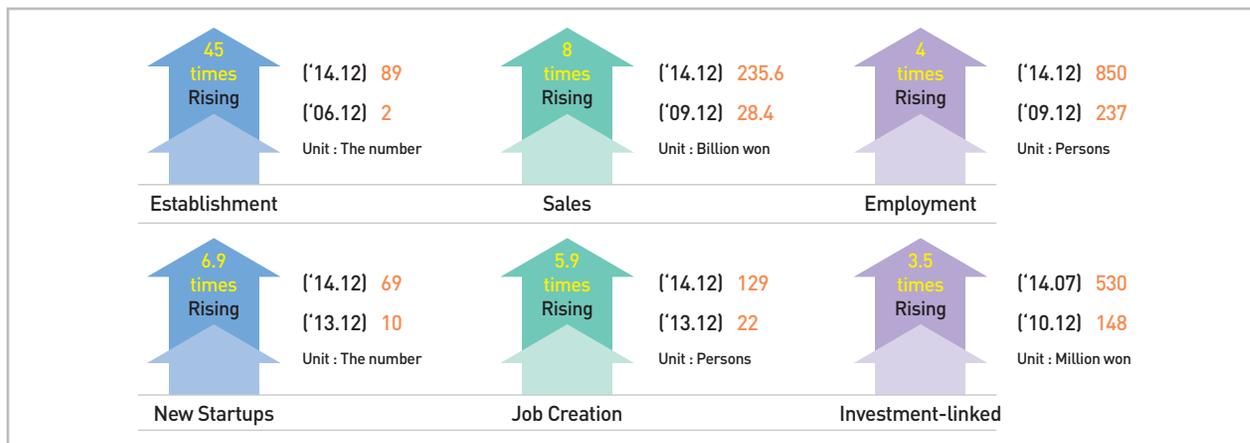


Fig. 3. Achievement increasing in accordance with the expansion of special R&D zone (INNOPOLIS)

Source: INNOPOLIS Foundation, <http://www.innopolis.or.kr/>

⁶ INNOPOLIS Foundation, <http://www.innopolis.or.kr/> (July 09, 2015)

⁷ INNOPOLIS Foundation, <http://www.innopolis.or.kr/> (July 09, 2015)

⁸ World Technopolis Association (<http://www.wtanet.org/main.html>)

gional Workshop, which consist of education/training on science town development and regional innovation center, for public officials, professors, researchers, and managers of science town in developing countries. The main goal of the workshops is to promote mutual exchange of knowledge and expertise. To assist in development of science town and establishment of regional innovation platform in developing nations through technology assistance activities, group of experts from UNESCO and WTA will provide assistance in feasibility analysis, comprehensive planning, and technology and policy consultation. Pilot projects include providing support for construction of science towns, specifically comprehensive planning, feasibility analysis, expert deployment, with the help of international network established between WTA and developing countries through capacity building and technical assistance. Research development and publication of international journal WTR and technical textbooks on development and management of science town, establishment of regional innovation center, startup encouragement, and regional development, will lead to exchange of knowledge and experience for sustainable development of Technopolis.

870 science park managers (including government officials, professors, etc.) completed education programs (Training workshop 587 + Regional workshop 283) through the capacity building. Technology and policy consultation for science town development was provided through technology assistance activity held a total of 11 times at 10 countries, including Egypt, Kenya, Indonesia, Mongol, Costa Rica, etc. In addition, 14 pilot projects were promoted in 10 countries, including Egypt, Indonesia, Sri Lanka, Mongol, Pakistan, Columbia, etc., with the help from central government institutions (science technology department and education department) in each country. Recipient nations of science town commended aforementioned cooperation work for contributing in promotion of capacity building, establishment of innovation platform, formation of groundwork for international network, improvement of regional innovation and economic growth.

3. SHARING

We move now from mechanisms that prepare us to share innovation's benefits, to mechanisms that actively share these benefits.

An obvious place to start is with the many "Robin Hood" programs in which richer customers subsidize discounts for poorer

customers overseas. Pharma companies donate drugs to poor countries, often drugs directed at diseases specific to the region. Major publishers offer discount programs in certain regions for current scientific journals. They also offer open-access journals. Textbook publishers create "International Editions" in cheaper covers, to be sold only outside the OECD countries.

Other give-away programs are charitable in nature, with individuals giving directly. One such is Books for Africa (booksforafrica.org).

Many smartphone apps are useful and free. Free PC software is downloadable from cnet.com, from the GNU Project, or from the Paluka Foundation. Likewise web tools such as HTML editors and web site builders.

Always useful, but especially for sharing the tacit knowledge essential for efficient use of innovations, is to send people abroad. This idea includes student exchanges, semesters abroad, and sending students overseas for degree studies. It also includes guest worker programs, and international internships.⁹

The trend to multinational R&D teams and online collaboration platforms also facilitates the sharing of benefits. For research, platforms such as TallyFox, which the Daejeon Global Innovation Forum will use. For product development, there is, e.g., multi-user Autodesk. For software development, "Daily Build" platforms such as Ant and Apache.

It has often been the case that a product solves a local problem and finds a global market. This is the hope of many exhibitors at the WTA Tech Fair. A wonderful example (from elsewhere) is the wind-up radio. It was developed to provide news coverage in African regions that are far from the electric grid or access to batteries (and to prevent pollution from discarded batteries). In this it succeeded. Now, however, every camper in America and Europe wants one (<Fig. 3>).

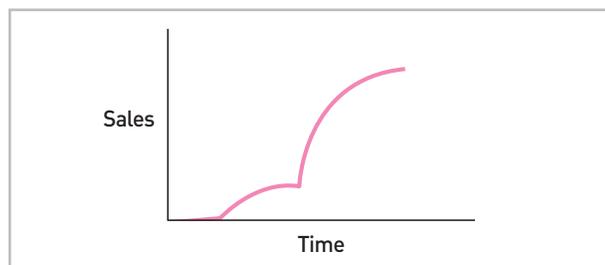


Fig. 4. The cart can pull the horse. An innovation that solves a problem in a small market may find a much larger, unexpected buyer base in a larger, richer market.

Source: F. Phillips, *Market-Oriented Technology Management*. Springer, 2001

⁹ Martin Kenney, Dan Breznitz and Michael Murphree, "Coming back home after the sun rises: Returnee entrepreneurs and growth of high tech industries." *Research Policy* 42 (2013) 391-407.

4. IMPLICATIONS

We have outlined several mechanisms and processes for sharing innovation's benefits. Few of the 'sharing' examples fall into just one quadrant of Figure 1. There is push-pull, quid pro quo, and back and forth.

The examples are isolated from each other. Are there opportunities for aggregating them? For instance, a single web site that makes sense of these complexities, for the use of innovation managers and officials in many countries? Building such a site appears to be a striking opportunity for a social entrepreneur.

To best share the benefits of innovation, one may take advantage of the saturation of the USA technology market, as well as saturation of the social networking space. Investors are turning attention to a wider range of innovative projects and pitches.

Start-up pitches are likewise maturing: Until recently, young Bay-area nerds were only making apps that do things their mothers used to do for them. Now, though, recent Y-Combinator pitches include "Venmo for Southeast Asia," Chaldal, the "Amazon Fresh in Bangladesh," and Red Carpet, putting India's local market system online (Source: Business Insider). Silicon Valley's Ruckus is providing high-speed Gigabit Wi-Fi Access Points body cameras for the Los Angeles Police Department. These developments signal a welcome shift of entrepreneurs' attention to larger social issues that exist across borders.

There are, no doubt, many more, and more varied kinds of mechanisms for the kind of sharing we seek. Their numbers (and kinds) will vary as trends in world finance, trade treaties, and entrepreneurship continue to unfold. We advise managers and officials to monitor these trends, to add to our list such additional mechanisms as they may think of, to share their lists with peers from other countries, and do such aggregation and roll-up as may benefit their constituencies. In this way we may work together across boundaries to best deliver shared benefit of innovations.

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