

Strengthening innovation-driven inclusive and sustainable development

Asia-Pacific

Tech Monitor

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**Social innovation for inclusive
and sustainable development**

Current practices and challenges



Plus

- Technology News and Events
- Tech Ventures & Opportunities
- Business Coach

The **Asian and Pacific Centre for Transfer of Technology** (APCTT), a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives to: assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

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- Training of national personnel, particularly national scientists and policy analysts.



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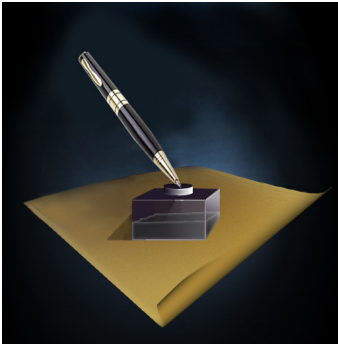
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Introductory note

The social innovation approach is used to improve human well-being through developing appropriate solutions, services and delivery models that better address the critical social issues. It is considered to offer more effective, efficient and sustainable solution to a social problem. In addition, the value created in the process accrues primarily to the society rather than to individuals. Due to its more inclusive approach, social innovation is being used as a tool for development across the world by citizens, civil society organizations, communities, businesses and the public sector.

In the context of 2030 development agenda, social innovation is considered an important means to foster inclusive and sustainable development, particularly in the developing and least developed countries. The strategy could play a critical role in achieving the Sustainable Development Goals (SDGs) to wipe out poverty, fight inequality and tackle climate change among others over the next 15 years. Recognizing that the three dimensions of sustainable development will be key to achieving the SDGs, the concept of social innovation is gaining popularity as a viable development strategy in many countries.

There are ample examples across the world showing how social innovations are used to address many critical challenges in the society. Social entrepreneurs and enterprises are known to use low-cost and affordable technologies for solving many problems – diseases, malnutrition, pollution and illiteracy – to name just a few. Social innovation is considered more inclusive due to its collaborative approach involving all relevant stakeholders to develop an appropriate solution that is better designed and delivered to satisfy the needs of communities at large.

Traditional development strategies focusing on stimulating economic growth and increasing competitiveness of countries did not always focus on social inclusion and sustainable development. However, there are potentially significant social and environmental gains by creating an enabling environment for social innovation to provide affordable technological solutions and promote responsible businesses. For the inclusive and sustainable development of Asia Pacific, it is therefore imperative that the national governments should adopt viable models of social innovation which could act as a key driver for the success of their businesses, economy and society at large.

This issue of *Asia-Pacific Tech Monitor* discusses different social innovation approaches and models as well as highlights the challenges, opportunities and current practices of developing social innovation to achieve inclusive and sustainable development in the Asia-Pacific countries.

Michiko Enomoto
Head, APCTT-ESCAP

Technology Market Scan

ASIA-PACIFIC CHINA

Strategy for innovation-driven development

China has unveiled a guideline for a national strategy that maps out three major steps to promote the country's innovation-driven development. The document, jointly published by the Central Committee of the Communist Party of China (CPC) and the State Council, pledges to build China into an innovative nation by 2020, and an international leader in innovation by 2030. The blueprint vows to make China a world powerhouse of scientific and technological innovation by 2050, the third step of the strategy.

Innovation-driven development requires making innovation the primary driving force for development, according to the document. It also calls for integration of innovation in scientific and technological fields as well as in systems, management and business models. The guideline demands efforts to construct a new driving force for development and to build a national innovative system. It also highlights quality and efficiency of development and the leading role of innovative factors. Moreover, it urges promoting the talent pool and stimulating mass innovation to implement the strategy, while pledging greater investment in innovation.

The document puts forward missions for developing technology in information networks, modern agriculture, energy, environmental protection, oceanic and space industries and health and service industries. Research in fields related to the country's strategic demands and which helps solve bottlenecks in the country's long-term development and national security should be strengthened, it said.

<http://news.xinhuanet.com>

Manufacturers prioritise growth, R&D: survey

Growth opportunities and increased spending on research and development (R&D) are key priorities for China's manufacturing executives, according to an

annual KPMG global survey released. The report surveyed 360 senior executives, including 36 from China, across 6 industries – aerospace and defence, automotive, conglomerates, medical devices, engineering and industrial products and metals.

About 95% of Chinese respondents indicated that growth was a high or extremely high priority in the next 2 years, compared to just two-thirds in the last 24 months. More than 62% of China's executives plan to spend over 6% of revenue on R&D over the next 2 years, whereas less than half of global respondents plan to do the same, according to the survey.

'China's own manufacturers are keen to move up the value chain and expand their global footprint, bringing not only competition but also opportunities for collaboration', according to Daniel Chan, Co-Sector Head of KPMG China's industrial manufacturing department. China remains a significant market that cannot be ignored by the manufacturers looking for growth. Foreign investors, who are able to bring innovation and investment into new technologies, should find strong growth opportunities in China, Chan said. Meanwhile, up to 94% of China's executives plan to enter new geographic markets in the next 24 months, whereas 89% said that they intend to enter new sectors, according to the survey.

<http://news.xinhuanet.com>

INDIA

National intellectual property rights policy approved

Recently, the Union Cabinet has approved the National Intellectual Property Rights (IPR) Policy that will lay the future roadmap for intellectual property in India. The policy recognises the abundance of creative and innovative energies that flow in India, and the need to tap into and channelise these energies towards a better and brighter future for all.

The National IPR Policy is a vision document that aims to create and exploit synergies between all forms of intellectual property (IP), concerned statutes and

agencies. It sets in place an institutional mechanism for implementation, monitoring and review. It aims to incorporate and adapt global best practices to the Indian scenario. This policy shall weave in the strengths of the Government, R&D organisations, educational institutions, corporate entities including MSMEs, start-ups and other stakeholders in the creation of an innovation-conducive environment, which stimulates creativity and innovation across sectors, as also facilitates a stable, transparent and service-oriented IPR administration in the country.

The policy recognises that India has a well-established TRIPS-compliant legislative, administrative and judicial framework to safeguard IPRs, which meets its international obligations while utilising the flexibilities provided in the international regime to address its developmental concerns. It reiterates India's commitment to the Doha Development Agenda and the TRIPS agreement.

<http://pib.nic.in>

Funding support for innovation

To boost innovation in the country, National Institution for Transforming India (NITI) Aayog has invited applications from schools, institutions and individuals seeking financial support for setting up research laboratories under the Atal Innovation Mission (AIM). With a view to give substantial boost to the innovation ecosystem and to catalyse the entrepreneurial spirit in the country, Finance Minister in his Budget Speech 2015–16 had announced that the government's intention to establish AIM in NITI Aayog with an initial sum of INR 500 crore.

NITI Aayog is inviting applications from eligible schools/organisations and individuals to apply for the three major schemes under AIM, it said in a release. First scheme will be for establishing tinkering laboratories in schools, whereas the second scheme will be for establishing new incubation centres. And the third scheme will be for scaling-up established incubation centres. It further said that to foster creativity and scientific temper in students, AIM will

establish 500 Atal Tinkering Laboratories (ATL) in schools. It will provide a one-time establishment grant-in-aid of INR 10 lakh for establishing ATLs (Grade VI–XII) across India. In addition, an amount of INR 10 lakh would also be provided for each ATL over a period of 5 years for operational expenses of ATLs. Thus, an amount of INR 20 lakhs per ATL in each selected school will be spent. AIM will also provide financial support to academic and non-academic institutions (companies/technology parks/group of individuals) to establish new incubation centres across India. These will be called as Atal Incubation Centres (AIC). They will be established in subject-specific areas such as manufacturing, transport, energy, health, education, agriculture, water and sanitation. AIM's objective is to set-up 100 AICs during FY17.

AIM will provide a grant-in-aid of INR 10 crore for establishing an AIC over a period of 5 years towards capital investment as well as operation and maintenance of expenses. AIM will also provide scale-up support of INR 10 crore over a period of 2 years to established incubation centres for augmenting their capacity. They will be shortlisted based on the key performance indicators. Both these schemes will radically transform the start-up ecosystem in the country by creating a network of incubation centres of world-class standards, it said.

The guidelines for the implementation of these schemes have been developed after multiple intensive stakeholders consultations. A competitive approach will be used for the selection of applicants for establishing the above facilities. Applicants desirous of participating in these schemes can refer to the AIM guidelines on www.niti.gov.in and submit their applications online.

<http://www.business-standard.com>

MALAYSIA

R&D products to be commercialised

The Ministry of Science, Technology and Innovation (MOSTI) is on track to commercialise 145 new R&D products by year-end. The products, which will become the special key performance indicators (KPIs)

in conjunction with Malaysia Commercialisation Year 2016 (MCY 2016), are developed by 26 research institutes nationwide comprising 13 research agencies, 5 research universities and 8 technology development agencies.

'Currently, we are introducing the products to the industry players and companies', said Minister Datuk Seri Madius Tangau. He was speaking to reporters after officiating the pre-launch of MCY 2016, on Tuesday. Madius has also launched the MCY 2016 logo, slogan and theme song, as well as two products, namely 'My Fon' and 'Quantum Brakepads' at the ceremony.

Meanwhile, Madius has expressed confidence that the ministry could achieve the target of commercialising 150 new products by year-end. 'With 145 products already in hand, it should be no problem for us to achieve the 150 KPIs this year', he said. Earlier, Mosti has identified 150 KPIs for the 25 research institutes to fast-track new innovations and inventions, and to-date four new products have been introduced this year. The four products – Malaysian Integrity Test, Smart Lock-up System, My Fon and Quantum Brakepads – have been commercialised, whereas the others will be introduced in stages.

<http://www.dailyexpress.com.my>

PAKISTAN

Regulations for SME financing revised

The State Bank of Pakistan (SBP) has revised regulations for small and medium-sized enterprises (SMEs) financing to facilitate promotion of the sector.

The SBP has amended prudential regulations issued on May 07, 2013 and allowed guarantees of only sponsor directors would be obtained as personal guarantee in case of limited companies. As per other amendments, for small enterprises annual sales turnover upper limit has been increased from INR 75 to INR 150 million and upper limit regarding the number of employees has also been enhanced from 20 to 50 employees. Further, an entity has to fulfil both the criteria of number of employees and sales turnover for categorisation as small enterprise.

However, in cases where an entity fulfils one parameter of SE and its second parameter falls within the range prescribed for medium enterprise (ME) or above the upper limit prescribed for ME, then the subject entity shall be classified as ME or commercial/corporate entity, the Central Bank said. For small enterprises, maximum per party exposure limit has been increased from INR 15 to INR 25 million. Besides, the banks/Development Financial Institutes (DFIs) are now also allowed to deduct the liquid assets held under their perfected lien for the purpose of calculation of per party exposure limit.

Banks/DFIs have been directed to obtain a copy of audited financials from small enterprises for exposure above INR 15 million. General Reserve requirement against non-fund-based small enterprises portfolio has been abolished through latest amendments. Furthermore, for calculation of general reserve, netting of liquid securities has been allowed, the State Bank of Pakistan said. For immediate declassification of loans to small enterprises, the condition of 50% payment in cash of restructured loan amount has been replaced with 35% cash payment.

The State Bank of Pakistan has amended the definition for medium enterprises and parameters of annual sales turnovers and number of employees revised upward. As per revised parameter, number of employees 51–250 for manufacturers in MEs and 51–100 in trading having annual sales turnover above INR 150 million to INR 800 million will be classified as the medium enterprises. Further, an entity has to fulfil both the criteria of number of employees and sales turnover for categorisation as medium enterprise, the State Bank of Pakistan said.

Medium enterprises now avail financing (including leased assets) up to INR 200 million from a single bank/DFI or from all banks/DFIs. Besides, the banks/DFIs are now also allowed to deduct the liquid assets held under their perfected lien for the purpose of calculation of per party exposure limit, the SBP said. The changes are applicable with immediate effect, the State Bank of Pakistan said. However, since

the banks/DFIs need to segregate their existing portfolio according to the revised definition of small and medium enterprise, banks/DFIs are allowed an implementation period up to September 30, 2016 for the purpose of existing portfolio, it added.

<http://www.thenews.com.pk>

PHILIPPINES

Innovation hubs for business start-ups, SMEs

The Department of Trade and Industry (DTI) is looking to set up three more innovation hubs catering to start-ups this year, thereby offering coworking spaces to technology-based micro, small and medium enterprises (MSMEs). This was announced at the soft launch of the DTI's first 'Negosyo Center Plus: Innovation Hub' – an iteration of the agency's one-stop shop Negosyo Centers – that specifically caters to the start-ups, at the DTI International Building in Makati City. The project is done through the Export Marketing Bureau (EMB), an attached office of the DTI, in support of the SlingshotMNL initiative to create an 'innovation ecosystem' nationwide.

Trade Secretary, Adrian Cristobal said that the hub provides space for the start-ups to meet with prospective clients, network with government-agency experts and conduct businesses, under the guidance of concerned government agencies. EMB Director, Senen Perlada said that enabling innovation is a key goal in the Philippine Export Development Plan (PEDP), the export component of the PEDP.

The PEDP underscores that having a National Innovative System (NIS) plays a part in enhancing the innovative capacity of the export sector. Part of the NIS is providing an avenue for interaction and collaboration between and industries, which is what the innovation centres provide. The innovation centres will serve as venues where technology-based start-ups can meet and pitch ideas to investors, as well as collaborate with similar start-ups. Aside from the EMB, the DTI's 'Innovation Circle' – DTI agencies and bureaus tasked to spur innovation in their programme –

is spearheaded by the Philippine Trade Training Center and the Intellectual Property Office of the Philippines. It is also assisted by the Department of Science and Technology.

The 3-year PEDP, the government's primary blueprint for development, details government agencies' specific goals and projects for the medium term to achieve growth. The DTI considers the establishment of these innovation centres – essentially Internet-enabled venues for collaboration of 'technopreneurs' with limited resources – to fulfil the PDP's goal for industry developments. The DTI has set up a total of 180 Negosyo Centers nationwide that aid small and medium enterprises in business registrations, provides business advisory, and business information and advocacy.

<http://www.businessmirror.com.ph>

REPUBLIC OF KOREA

Fund to promote biotech start-ups

The Republic of Korean government has come up with measures to promote the ecosystem of the bio-sector, which is considered as the nation's next-generation growth engine. It has decided to end the R&D projects carried out by various agencies and focus on investing in the development of stem cells and gene therapy, which have far reaching powers. It will also create funds with 80 billion won (US\$67.62 million) to support bio-start-ups, and carry out '10 projects', which will fill up the vacuum of the bioindustry ecosystem, by injecting 130 billion won (US\$109.89 million) for 3 years.

The Ministry of Science, ICT and Future Planning (MSIP) has announced that it considered and confirmed 'bioindustry promotion strategy in the medium term' and '10 bio-creative economy vitalisation projects' at the second Bio Special Committee meeting held by National Science & Technology Council on May 25.

The bioindustry is widely viewed as the nation's next growth engine after IT, as Hanmi Pharmaceutical has recently signed a large-scale export deal for new drug technology and Celltrion Samsung Bioepis pushed into the global biosimilar market.

When looking into the industry, however, it is not full of rosy forecasts. The government's R&D budget for the bio-sector this year amounts to 2.77 trillion won (US\$2.34 billion), the second largest amount in the overall technology sectors. But, they are going to separate small and short-term projects in various agencies and the rate of commercialisation R&D stands at only 3%. The industry also shows a small number of start-ups. The number of bio-venture start-ups plunged from 71 in 2007 to 2 in 2013. Since private investors are reluctant to make a high-risk and long-term investment, the companies also see a low growth rate. Currently, 69% of bio companies couldn't pass the break-even point.

To fill up the blank of such industry ecosystem and create the virtuous cycle, the government will drive the mid-range strategy by 2018. It will first raise the R&D investment in the bio-sector by more than the increase in the overall R&D budget, and focus on its R&D investment strategy and the investment in developing 19 suggested future growth engines, such as stem cells and gene therapy, converged diagnosis and treatment device and body replacement and assistive device. The MSIP will play a concrete role in 'basic', the Ministry of Health and Welfare in 'clinical trials', the Ministry of Trade, Industry and Energy (MOTIE) in 'commercialisation' and Korea Food & Drug Administration in 'permission'. Then, the government will end similar or overlapping projects from next year. In a bid to create the bio-start-up ecosystem, it will create two funds with 80 billion won (US\$67.62 million) – 30 billion won (US\$25.36 million) from the MOTIE and 50 billion won (US\$42.27 million) from Small and Medium Business Administration – to support the start-ups. It will also foster regional clusters by coming up with 'advanced medical complex operation efficiency strategy' by September this year.

In addition, the government will carry out 10 bio-specialised projects. For open innovation with the cooperation of industry, academic and institutes, it will help companies with 'matching R&D' based on their demand and establishment of special purpose firms for corporate R&D. The MSIP will

invest 130 billion won (US\$109.89 million) in the programme in the next 3 years.

<http://www.businesskorea.co.kr>

R&D funding for IoT, new drugs, robotics

The Republic of Korean government has decided to invest intensively in nine sectors (including new drugs, medical equipment and the IoT) while restructuring government-funded R&D projects that have been underperforming. The Ministry of Science, ICT and Future Planning (MSIP) said on May 23 that the government will focus its R&D efforts on nine sectors. The announcement came after the MSIP held the first R&D budget allocation and adjustment meeting since the launch of the Science and Technology Strategy Office.

The nine sectors are software and content; new drugs and medical devices; energy storage and renewable energy; manufacturing-based technology and robotics; food, animal husbandry and veterinary science; aviation, satellites, offshore and polar projects; rail and road transportation and atmospheric sciences (e.g., meteorology, the environment, health and weather forecasts). The nine sectors were finalised at the 10th National Science and Technology Council meeting, which took place in January presided over by Prime Minister Hwang Kyo-ahn and Co-chairman Lee Jang-moo.

Financial resources needed for funding R&D projects in the nine sectors will be procured by aggressively restructuring government-funded R&D projects that are either struggling or considered less important. Each relevant ministry will cut its R&D budget roughly 10% by restructuring underperforming R&D projects.

<http://www.koreaittimes.com>

Midterm strategy on bioindustry

The Republic of Korea has mapped out a 3-year comprehensive plan on Wednesday to boost the bio-sector by investing more in R&D on stem cells and gene therapy. In the coming 3 years, the government will also strive to resolve 'structural' problems

in efforts to promote the industry, widely viewed as the nation's next growth engine after IT. The decision was made at the second Bio Special Committee meeting chaired by Hong Nam-ki, Vice Minister of science, ICT and future planning.

The panel, composed of 20 senior government officials and civilian experts, serves as the 'control tower' of South Korea's bio-related policy. Its inaugural session was held in March. 'Bio is the next key industry to lead South Korea's growth after IT', Hong said. 'We will make joint efforts with other related ministries to make the results of today's meeting effective in creating a new future growth engine'.

The ministry has pointed out that South Korea has a long way to go to enhance the competitiveness of its bioindustry despite sharp growth in R&D investment, technology and market size. It admitted some structural setbacks, such as lack of a co-ordinated strategy and overlapping projects by government offices and relevant institutions. The government has decided to focus on three main fields – developing new medicine and medical devices, and preventing the spread of infectious diseases, the ministry said. It will expand the R&D budget for the development of stem cells and gene therapy, and create funds with 80 billion won (US\$67 million) to support bio-start-ups. It also plans to lower the bar for local bio-firms to be listed on the tech-heavy KOSDAQ market.

<http://english.yonhapnews.co.kr>

SRI LANKA

National R&D proposal approved

The National R&D Proposal, which outlines the necessary interventions from a science and technology standpoint to solve development-related national problems, has been approved by the Cabinet, Senior Professor of Physics, Professor Dammika Tantrigoda said.

Emeritus Professor at the Department of Physics of the Faculty of Applied Sciences of the University of Sri Jayawardenepura, Professor Tantrigoda has added that 10 areas including water, food, nutrition and

agriculture, health, shelter, energy, the environment, textiles and apparel, information and communications technologies and knowledge services, basic sciences and emerging technologies, in which science and technology can be of help to intervene and solve problems that had been identified.

He explained that the above-said interventions included the formulation of policies, pure and applied research, the application of biotechnology, the application of nanotechnology, the application of computer technology, the application of indigenous technology and the testing, standardising, accreditation and popularising of intellectual property rights.

'These focus areas have subareas where the problems associated with the areas where R&D is needed to solve matters is looked at. There are 500 interventions including policies, rules and regulations. Research-oriented towards national development and which addresses Sri Lanka's problems should be nourished', he observed.

<http://nation.lk>

ADB support for small business venture capital fund

The Asian Development Bank (ADB) is to help Sri Lanka set-up a venture capital fund for small and medium-sized enterprises (SMEs) who face difficulties in getting access to finance. The support comes in response to a government request to the ADB to formulate a plan for a venture capital fund for SMEs, and is aligned with the lending agency's interim country partnership strategy. The ADB will provide technical assistance to help set-up the venture capital fund for SMEs, and has also been invited to contribute to it.

The fund will lend to responsible venture capital firms for a guaranteed minimum rate of return, with the venture capital firms making equity investments in small businesses. 'SMEs are responsible for 30% of the country's economic output and are critical for Sri Lanka's economic growth', the ADB said in a report. 'Despite their importance, SMEs struggle to access

financing'. The ADB said that it will also assess the feasibility of an SME credit guarantee facility. 'Equity capital is still a constraint on SMEs. The venture capital industry is in a nascent stage, with only 0.1% of total assets in the financial system of Sri Lanka in 2014'. The bank said that this was partly due to a lack of risk management expertise and insufficient funding from long-term strategic investors for further growth.

<http://www.economynext.com>

THAILAND

Initiatives to boost capabilities, modernise SME products

To increase the potential of local businesses, Thailand's Ministry of Industry has initiated a project entitled 'SMEs Spring Up'. Atchaka Sibunruang, the minister for industry, chaired the opening of the 'SMEs Spring Up' project which aims to improve the abilities of small and medium-sized businesses in Thailand. More than 100 businesses have been recruited to join the project.

Under the 'SMEs Spring Up' project, the government will educate participating entrepreneurs on quality control, quality enhancement, innovation, R&D and leadership. In addition, they will learn how to successfully run a business through the eyes of experienced business persons and influential business figures. According to the Minister, 'SMEs Spring Up' is the first initiative of its kind. All participants will be followed up and evaluated throughout the entire project to ensure concrete and positive results.

In another development, the Small and Medium Enterprise Development Bank (SME Bank) has joined with Silapakorn University and Ubon Ratchathani University to organise 'Modern SMEs: Design & Story', a project seeking to modernise SME and OTOP products. The two universities are to create teams of design students who will work with business operators in their areas, helping them to improve the designs of their products and packaging. The project will be piloted in all the 4 regions as well as in the 3 southernmost provinces and will assist

100 SMEs. Participating businesses will be offered funding help by SME Bank.

<http://www.enterpriseinnovation.net>

VIET NAM

New law set to assist SMEs

The law on support to small and medium-sized enterprises (SMEs), which is being drafted, is set to facilitate the development of the firms making up 97% of the businesses in Viet nam. A 3-day consultation on the draft was opened in Ho Chi Minh City on June 9.

At a press conference as part of the event, Deputy Minister of Planning and Investment Dang Huy Dong said that in many developed countries, it is normal to have SMEs accounting for >90% of the enterprises. In Japan, ~99.7% of local companies are SMEs, and they are working effectively and greatly contributing to local development. It is a must to improve the view about SMEs in Vietnam as they generate 40% of total GDP and create jobs for 52% of the workforce, he noted. He admitted that Vietnamese SMEs are facing an array of difficulties in loan, land and technology access and market expansion. That fact partly explains the private economic sector's modest competitiveness and vulnerability to policy and social vagaries.

The law drafting, supported by USAID Governance for Inclusive Growth Programme, aims to provide a comprehensive approach for SME support. Dong said that under the draft law, there will be five SME support programmes that assist start-ups, give advice on production improvement, develop inter-sectoral connectivity and value chains, support innovation and help SMEs in integration. Some of the programmes will be applied for all SMEs, whereas others will focus on the most potential firms. Other incentives include a 5% reduction in the corporate income tax for up to five years from an SME's inception, along with preferential treatment during public procurement and in forming a distribution chain. In the draft, the Government also encourages commercial banks to give more loans to SMEs. Organisations and persons who provide support ser-

vices for SMEs such as research institutes, universities and businesses will also receive certain benefits.

<https://www.vietnambreakingnews.com>

Special policy to support start-ups and SMEs

Small and medium-sized enterprises (SMEs), start-ups and innovative enterprises are to receive special support from the government, according a resolution to support enterprise until 2020. Under the resolution, all enterprises, irrespective of type and sector, have equal right in access to resources like funding, land and investment.

Vo Tri Thanh, Deputy Director of Central Institute for Economic Management – the key government think tank, told VnExpress International, the resolution shows that the new Prime Minister is sending a message about his commitment to reform. However, 'it's a long road from intent to implementation', he added. The resolution signed by Prime Minister, Nguyen Xuan Phuc on May 16 aims that by 2020, Vietnam will have at least 1 million enterprises, which are competitive and sustainable. The private sector is to contribute as much as 49% of GDP and one-third of enterprises have innovative activities each year.

To achieve the above objectives, the resolution lays out five solutions, most of which are designed to support SMEs, start-ups and innovative companies. The reason for the recent focus on SMEs, according to Thanh, is the relative absence of medium-sized enterprises in Vietnam, which limit diffusion of FDI and technology. In addition, 'Vietnam is interested in developing the support industry', which relies on medium enterprises. On the other hand, 'it is unadvisable to focus on large state-owned enterprises as their the monopoly power harms the business environment'.

On the basis of the principle that the government should be serving the private sector, the resolution is geared towards creating a favourable ecosystem for start-ups and SMEs. This includes policies to en-

courage entrepreneurship and to provide financial support.

The Ministry of Planning and Investment will set up a Council to Encourage Development of SMEs with the Prime Minister as chairman. The council will coordinate and monitor implementation of SME policies. On the individual level, Vietnam plans to halve income tax for individuals working in hi-tech information technology, application of high-tech in agriculture and food processing. Universities are also to encourage their students to become entrepreneurs through a specially designed curriculum. Plans are in place to establish enterprise nurseries, support centres and programmes to encourage innovation and start-up under a public private partnership.

Funding for start-ups and SMEs will be more readily available as Vietnam will re-design the SME Development fund, the National Technological Innovation Fund and other private sector funds. Ministry of Agriculture and Rural Development will also design a mechanism to improve access and use of agricultural land by businesses while by Q3/2016 the Ministry of Finance will submit revised regulations on credit guarantee for SMEs through Vietnam Development Bank and Credit Guarantee Fund. Regarding costs, Ministry of Finance will study options to reduce taxes incurred by SMEs.

Enterprises in industrial zones would be able to use their land as collateral to take loans from banks and mobilise long-term funding after the Ministry of Natural Resources and Environment revises land regulations in Q3/2016.

Additionally, Ministry of Finance will devise a mechanism to allow revenue from land transfer to compensate for revenue from business operations. The Ministry of Science and Technology will introduce additional quality standards to help commercialise the products by enterprises. Procedures to apply for intellectual property are to be simplified while also better protecting this right.

Land rent and fees payable by enterprises, as well as expressway toll are to be lowered. The MOF will also study to revise Corporate Tax Law to expand on costs eligible for tax exemption, including capacity building, administrative support, advertising and marketing. Furthermore, Vietnam Chamber of Commerce and Industry will investigate and calculate official and unofficial costs incurred by enterprises and compare these with the region to propose a solution to reduce costs.

<http://e.vnexpress.net>

Technology transfer law to be revised

The National Assembly Standing Committee (NASC) has agreed to fully adjust and supplement regulations of the Law on Technological Transfer which came into effect in 2006. In the September 13 meeting, the NA deputies heard the Government report on ten years of implementing the law. The report affirmed that the law had contributed to pushing up the domestic technological renovation and transfer in production which helped increase the competitiveness of businesses as well as the growth rate of the economy. However, the law needed to be adjusted to meet the demand of economic growth and in-depth international integration processes.

Minister of Science and Technology, Chu Ngoc Anh, told the meeting that “the adjustment of the current Law on Technological Transfer aims to create favorable conditions for technological transfer activities inside and outside Vietnam so as to help businesses renew the technologies.” “The technology transfer activities would help Vietnamese businesses enhance their production capacity and competitiveness in both domestic and overseas markets”, said Anh.

The draft of the adjusted law was built on renewal of State management on the technological transfer in accordance with trade liberation and international integration trends, Anh told the deputies. According to the report, the current law

was revised and 16 out of 61 clauses were supplemented.

After discussion, the NASC agreed that the law should consider businesses as a core for technological renewal, application and transfer so as to increase the production capacity and competitiveness, and environment protection as well. The technological transfer must ensure support for the domestic technological and science market as well as preventing the transfer of outdated technologies to Vietnam.

<http://english.vietnamnet.vn>

Ministry's fund lends SMEs

A Ministry of Planning and Investment fund will finance small- and medium-sized enterprises (SMEs) with a total amount of 660 billion VND (29.3 million USD) this year, an official said. Hoang Thi Hong, Director of the SME Development Fund, said that the funding is reserved for enterprises involved in innovative and creative activities, and those contributing to chains of production, processing and maintenance of agricultural, aquaculture and forestry products.

Companies involved in support industries for electronics, mechanics and sewage treatment, can also apply for funding. Firms can borrow between 10 billion VND and 25 billion VND for 18-24 months and a preferential interest rate of 5 percent per year. This is reportedly the first time the SME Development Fund lends money to enterprises since it was established in 2013 by a Government decision, with a charter capital of 2 trillion VND. The fund mandated the Bank for Foreign Trade of Vietnam, Bank for Investment and Development of Vietnam, and Housing Development Bank to disburse the loans.

Official data indicates Vietnam has about 500,000 operating enterprises, of which SMEs account for 97 percent. SMEs contribute some 46 percent to the national gross domestic product (GDP) and 31 percent of all tax revenues, while employing 60 percent of the country's workforce of more than 52.2 million people.

<https://m.vietnambreakingnews.com>

Technology Scan

Focus: Technologies for Rural Application

INTERNATIONAL

Sowing application for farmers

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in partnership with Microsoft has developed a new sowing application for farmers combined with a personalised village advisory dashboard for Andhra Pradesh. These applications are expected to help farmers cope up with the climatic changes and bring radical improvements for small-holder farmers in the state. The sowing application is to help farmers achieve optimal harvests by advising on the best time to sow crops depending on the weather conditions, soil and other indicators. This has been made possible through a partnership among the ICRISAT, Microsoft and the Andhra Pradesh government.

'Bringing a lot of scattered data together and developing an analytical tool that is comprehensive and gives accurate predictions to the farmers, is urgently needed. We are excited to work with Microsoft to enhance incomes and improve the lives of small-holder farmers, and this is going to boost our digital agriculture initiative in a big way,' said David Bergvinson, Director General of ICRISAT.

ICRISAT has adopted Microsoft Cortana Intelligence Suite including Machine Learning and Power BI or Business Intelligence, to empower farmers and government officials with technology and promote digital farming practices in the state.

'The Sowing App and Personalized Village Advisory Dashboard are developed to provide powerful cloud-based predictive analytics to empower farmers with crucial information and insights to help reduce crop failures and increase yield, in turn, reducing stress and generating better income,' said Anil Bhansali, Managing Director of Microsoft India (R&D) Pvt. Ltd.

The sowing application utilises powerful artificial intelligence to interface with weather forecasting models provided by the US-based aWhere Inc. and extensive data including rainfall over the last 45

years as well as 10 years of groundnut sowing progress data for Kurnool district. These data are then downscaled to build predictability and guide farmers to pick the ideal sowing week. When combined with other data collected from the Rythu Kosam project, it can create rich datasets that can be processed to build predictive models for the farmers, said ICRISAT in a statement.

Similarly, the personalised village advisory dashboard provides an instant overview across several environmental factors that determine a healthy crop yield. In the pilot that has been recently launched, information will be sent to farmers about the sowing date via SMS in Telugu. Data collected manually from the farms in 13 districts of the state by ICRISAT field officers for Rythu Kosam have been uploaded to Microsoft's Azure Cloud. Using powerful Business Intelligence (BI) tools, this dashboard provides important insights around soil health, fertiliser recommendations and 7-days weather forecast derived from the world's best available weather observations systems and global forecast models.

These data are then downscaled for the highest possible accuracy at the village level, to transform how small-holder farmers tackle climatic change to drive effective decision-making.

<http://www.financialexpress.com>

Graphene filter to solve water crisis

A new type of graphene-based filter could be the key to manage the global water crisis, a study has revealed. The new graphene filter, which has been developed by Monash University, Australia and the University of Kentucky, the United States, allows water and other liquids to be filtered nine times faster than the current leading commercial filter. According to the World Economic Forum's Global Risks Report, lack of access to safe, clean water is the biggest risk to society over the coming decade. Yet, some of these risks could be mitigated by the development of this filter, which is so strong and stable that it can be used for extended periods in the harshest corrosive environments, and with

less maintenance than other filters on the market.

The research team was led by the Associate Professor, Mainak Majumder, from Monash University. Majumder said that the key to making their filter was developing a viscous form of graphene oxide that could be spread very thinly with a blade. In addition, he said that 'This technique creates a uniform arrangement in the graphene, and that evenness gives our filter special properties'.

This technique allows the filters to be produced much faster and in larger sizes, which is critical for developing commercial applications. The graphene-based filter could be used to filter chemicals, viruses or bacteria from a range of liquids. It could be used to purify water, dairy products or wine or in the production of pharmaceuticals. This is the first time that a graphene filter has been able to be produced on an industrial scale – a problem that has plagued the scientific community for years.

Research Team Member and PhD Candidate, Abozar Akbari, said that the scientists had known for years that graphene filters had impressive qualities, but in the past they had been difficult and expensive to produce.

The team's new filter can filter out anything bigger than 1 nm, which is about 100,000 times smaller than the width of a human hair. The research has gathered interest from a number of companies in the United States and the Asia Pacific, the largest and fastest-growing markets for nano-filtration technologies.

<http://phys.org>

ASIA-PACIFIC

INDIA

Environmentally friendly technology brings electricity to rural households

A new disruptive technology is being spearheaded by the Indian Institute of Technology (IIT) Madras which promises to brighten the lives of 300 million

Indians who have no access to assured electric supply even today. The revolutionary new approach to supply electricity is being perfected amid the sand dunes of Jodhpur district.

Professor Bhaskar Ramamurthi (Director of IIT, Madras) calls it potentially a game changer technology. 'It is not a new invention but the world had abandoned using DC power to electrify homes', he said. Today in India, the out-of-the-box thinkers from IIT Madras are reviving DC power as a potential solution to India's electricity woes. The novel Indian technology also helps to cut down greenhouse emissions and is very environment-friendly and hence under Energy Minister, Piyush Goyal's leadership the Ministry of Power is pushing hard to field test the technological fix being offered by IIT, Madras.

The system is fairly straightforward but with a key twist in the tail. Houses that have no electric supply are provided with a simple one square meter solar panel. The electricity generated by the panel is stored in four regular lead-acid batteries and the electrical appliances instead of running on AC power run on DC power. In most solar power solutions or in battery backed-up systems, 'inverters' have to be deployed that convert DC power to AC power so that regular electrical appliances can be run.

In Phalodi, this off-grid power solution is totally run on DC power. This makes the whole system from 25% to 30% more efficient and brings down power consumption by almost 50%. It costs about Rs. 25,000 to install the entire 'inverter-less system', said an ex-IIT Madras Engineer and Project Manager for the Phalodi project, Surbhi Maheshwari, who asserts that 'even during the peak of the heat wave' the IIT Madras system did not break down and helped the locals get much-needed relief. Each beneficiary house in Phalodi gets one ceiling fan, one LED tube light, an LED bulb and cell phone charging point all run on DC power.

Maheshwari said that 'as of now, 1800 homes have been successfully connected and another 2200 will be done in the next few months'.

IIT Madras has mastered this technology in the last few years but the real proof that it works came home during the devastating floods that hit Chennai in 2015.

Professor Ashok Jhunjhunwala, from the Electrical Engineering Department, had installed a small 125-W solar system at his home. He recalls that for almost 3 days the entire campus of IIT in Chennai went without electricity in the aftermath of the heavy rains, the only home that had uninterrupted power was his own where he had installed the 'decentralized DC solar system'.

<http://www.dnaindia.com>

Technology for making jackfruit powder

In an effort to explore the full potential of jackfruit, which still remains underexploited as a food crop in the country, the Krishi Vigyan Kendra (KVK) attached to the Indian Council of Agricultural Research has developed a unique technology, enabling the common man to produce whole jackfruit powder. Robert, Senior Scientist and Head of the KVK Centre run by the Christian Agency for Rural Development (CARD) at Thelliyoor near Thiruvalla, told *The Hindu* that popularisation of the new technology, which itself was a simple and smart process, would ensure no wastage of jackfruit in Kerala.

"We have developed a smart way of tapping the potential of jackfruit which could make every Kerala household a hub for processing jackfruit. Our attempt is to ensure that no jackfruit is wasted in the State so that an estimated loss of this indigenous fruit to the tune of Rs.15,000 crore could be added to the State's coffers, besides enriching the health of every rural household," Robert said.

The whole jackfruit powder could be used as a raw material for developing health drinks and food products for patients, children and elderly people. The process of making jackfruit powder involved dehydration of the raw jack, after removing its rind portion, and no artificial food ad-

ditives or preservatives were used in the process, said Rincy Abraham, Subject Matter Specialist, KVK.

<http://www.thehindu.com>

Hybrid solar lighting device

Technologists at Kolkata-based NB Institute for Rural Technology (NBIRT) have developed, what is billed world's first hybrid solar lighting device. The device uses a combination of passive and active energy to light up homes without electricity. Union Science and Technology Minister, Harsh Vardhan, who unveiled the system, said that the low cost, micro solar dome named 'Surya Jyoti' would be a boon to millions of Indians, who do not have reliable access to electricity. The device has been developed under the aegis of Department of Science and Technology.

The micro solar dome captures sunlight through a transparent semi-spherical upper dome and concentrates it inside a dark room. The light passes through a sun-tube with a layer of high-reflective coating on the inner wall of the passage. It also contains a lower dome, with a shutter at the bottom, that can be closed if light is not required during day time. It is leak proof and works for almost 18 hours a day – throughout the day and 6 hours after sunset. The device has undergone extensive testing at TERI University, IIT Mumbai, Indian Institute of Engineering Science and Technology, Kolkata and field trials were conducted in slums of Delhi, Mumbai, Kolkata and Bengaluru. TERI has confirmed that the illumination level of the light goes as high as a 15-W LED bulb.

The minister said that the photovoltaic micro solar dome costs about Rs. 1200, whereas the non-photovoltaic version is around Rs. 500. He also said that the cost is expected to get further reduced once the manufacturing is scaled up to commercial scale. Professor Gon Chaudhuri, Director of NBIRT, said that it took 18 months of research to make the device, which is now ready for transfer of technology to any manufacturer.

'Conventional solar devices do not capture passive energy. It works only through storage battery. But here, it is a combination. It is hybrid. That is during day light, you are not using the battery or the solar panels. Sunlight is used in a guided mode. This is the difference between *Surya Jyoti* and conventional solar lights. When you work with photovoltaic (PV), it is called active, whereas when it works with direct sunshine, it is called passive. So, this combination gives you 18 hours of light – active 6 hours and passive 12 hours,' explained Professor Gon Chaudhuri. He also said that the device can be operated through conventional switch or using a remote control. He said that it is maintenance-free and has a life of 15 years, whereas the life of photovoltaic panel is of 25 years.

<http://www.indiansciencejournal.in>

Green technology for water purification

Indian scientists have developed an eco-friendly nanotechnology for water-softening applications that could be used in civic water treatment plants for generating potable water, said the official of a technical institute. The team, from Institute of Advance Study in Science & Technology (IASST) in Assam's Guwahati, crafted a biopolymer using a naturally occurring substance, called chitosan (obtained from the hard outer skeleton of shellfish, including crab, lobster and shrimp) as a backbone for the carbon nanoparticles to sit on.

'In the biopolymer, nanoparticles are the functional parts of the technology. They remove calcium and magnesium components of water through ion exchange, the same process that is used by common water purifiers,' Devasish Chowdhury, Associate Professor, Physical Sciences Division, IASST, told IANS. 'This material, we report, is the first of its kind with potential to act as a biodegradable and green material for water-softening applications,' he said.

Published online on 30 March in the *Journal Nanoscale*, the work involved IASST's Upama Baruah and Achyut Konwar. Although convention water-softening techniques use synthetic resins, Chowdhury said that the novel technology is biodegradable as

well. 'We have applied it to pond-water sample successfully. This could be used in civic water treatment plants since they do not have very effective water-softening methods and the resulting treated water is very crude,' he added.

<http://timesofindia.indiatimes.com>

Arsenic filter for safe drinking water

The Indian Institute of Technology Kharagpur has developed an ultra-low cost eco-friendly laterite-based arsenic filter for providing safe drinking water. The innovation has won Sirshendu De, the Head of Chemical Engineering Department, the Innovation Award 2016 from the Indian Desalination Association (South Zone).

'In India and Bangladesh, it is generally agreed that arsenic contamination of groundwater is of geological origin and derives from the geological strata. More than 200 million people are affected worldwide by arsenic menace and over 100 million people in India and Bangladesh are exposed to arsenic contamination risk. The need of the hour is an ultra-low cost, easy-to-handle solution for rural households,' said De.

The indigenous material developed by De is capable of adsorbing arsenic to the extent of 32 mg/g. 'It is made from naturally occurring red laterite soil. This material has undergone chemical treatment to enhance its capabilities to adsorb arsenic. Moreover, an optimised design of a filter, with the material, has been formulated as well that enjoys a plethora of advantages,' De added.

'The ultra-low cost of the filter is more appropriate for the socio-economic conditions of our country, especially when the filter has no power requirement. The arsenic concentration of filtrate is always within the WHO drinking water permissible limit, independent of the ground water concentration. In addition, the filter comparatively has extremely long life of about 5 years with no regeneration of the adsorbent (filter medium) required during its lifetime. The filter has facilities such as removal of arsenic (below 10 ppb),

iron (below 0.3 ppm) and bacteriological contamination (>98%) together in a single unit. On exhaustion of the filter, the medium can be safely dumped without any risk of leaking and further contamination,' he explained.

<http://timesofindia.indiatimes.com>

INDONESIA

Safer drinking water with simple technologies

Nazava Water Filters, the winner of the 2016 Ashden Award for Sustainable Energy and Water, are helping to tackle the problem of access to safe drinking water in Indonesia, where women struggle to get safe drinking water for their families, and where around 15,000 children under the age of five die from diarrhoea and other water-borne diseases every year.

The company has developed a low-cost water filter made using two locally available transparent plastic containers stacked one on top of another with a ceramic filter candle in between. The filter candle blocks pathogens and solid particles from passing through and reduces chemical contamination, thereby improving both the taste and odour of the water. Safe drinking water is dispensed through a tap in the lower container, making the filter a functional and aspirational household item for rural households, available in different shapes, sizes and colours.

The most popular filter costs \$20, which can be paid either in cash or in instalments, which means this household-level approach provides a cheaper and more reliable alternative to boiling or buying treated water, especially in isolated areas or on small islands. Eliminating the use of fuel to boil water cuts greenhouse gas emissions, saving ~10,000 tonnes/year CO₂. Till date, over 50,000 filters have been sold through an effective network of >120 women resellers, including community health workers and midwives working with the Ministry of Health, benefitting 200,000 people with affordable access to safe drinking water.

Runner up in the 2016 Ashden Award for Sustainable Energy and Water, 1001 Fontaines is a French NGO that sets up water

treatment kiosks in rural villages across Cambodia, where household income is <\$2 a day. Using a community-scale, decentralised approach appropriate for supplying safe drinking water to rural and peri-urban areas, the kiosks – that cost around \$25,000 to set up – filter and treat surface or ground water (from rivers, lakes, ponds or tube wells) using solar-powered Ultraviolet sterilisation techniques. At the same time, this creates jobs and supports income generation for local entrepreneurs who are trained to run these kiosks as social enterprises that produce, distribute and deliver large 20l bottles of safe drinking water to homes and primary schools. Till date, some 140 kiosks have been set up, providing 70 million litres of water per year to over 250,000 people in homes and close to 100,000 children in schools.

<http://www.theecologist.org>

JAPAN

Low-cost drinking water technology

The Japan International Cooperation Agency (JICA) is supporting the pilot testing of a water purifying technology in the Philippines in a move to share Japanese know-how and expertise in addressing developmental challenges including water supply in areas deprived of safe, affordable water. The technology called 'Aqua Cube' was pilot-tested recently in two far-flung and low-income barangays in Sagay City, Negros Occidental.

Aqua Cube, developed by Japanese company Murakami Manufacturing Co. Ltd, features a compact, all-in-one package (treatment, generator, water tank and simple operation and maintenance). The purification capacity of the equipment is 2,000 l/h. It was introduced in the Philippines and other countries by Japanese marketing company INADA, Inc. When implemented, the Aqua Cube technology could process raw water from irrigation channels, rivers and creeks. It has auto-cleaning function and can produce clean drinking water for 600 people in an hour. The initiative is part of JICA's Verification Survey with the Private Sector for Disseminating Japanese Technologies, a component of Japan's

Official Development Assistance (ODA) where Japanese companies work with the government agencies to share technologies that can help to address the needs of developing countries.

JICA said that they welcome the support of the Sagay City's LGU to the technology and lauded the LGU's effort in prioritising safe drinking water supply to sustain development. JICA has added that aside from providing safe and affordable water supply, the project also aims to address the vulnerability of drinking water sources during disasters like Typhoon Yolanda and the recent El Nino phenomenon. In Japan, the technology was developed to ensure stable, safe water supply during emergencies.

The local government of Sagay City said that the technology could help to ensure the health of the people of Sagay since it could purify the water from deep wells commonly contaminated with bacteria. The water supply system in Negros Occidental Province only covers 53% of the population (2012 data) and many of the poor areas without water system rely on boiled rain water or boiled water from wells for household use. The local residents also shared that the improved water quality helped extend the shelf-life of buko pie products (a specialty Filipino baked coconut pie), a livelihood source in the barangays. The food product's shelf-life was extended from few days to a week, thereby helping to increase the sales by 50%.

<http://www.jica.go.jp>

PHILIPPINES

Water-saving technology for irrigation system

The head of the Philippines' food security and agricultural modernisation agency is considering using a water-saving technology developed at the International Rice Research Institute (IRRI) for the country's national irrigation. Edel Guiza, Secretary of the Presidential Assistant for Food Security and Agricultural Modernization, visited IRRI on 19 May to study the measures that will help the government assist

rice farmers affected by the El Niño-induced drought in the southern Philippines.

Guiza, along with officials of the National Irrigation Administration and the National Food Authority, were briefed on the water-saving technology called alternate wetting and drying (AWD) by Bruce Tolentino, IRRI Deputy Director General for Communication and Partnerships; and James Quilty and Jun Correa, Head and Field Operations Manager, respectively, of the Zeigler Experiment Station. AWD helps farmers to reduce the amount of water they use by eliminating the traditional method of keeping their rice fields continuously flooded. Instead, the water level is allowed to drop to 10–15 cm below the soil surface before reflooding the field. A perforated water tube, which could be made from PVC pipes or bamboo, is used by the farmers to monitor the water level below the soil.

AWD is regarded as one of the most important rice cultivation methods that can dramatically save freshwater irrigation in the upcoming decades. It not only conserves water but also mitigates greenhouse gas emissions while maintaining rice yields. But in some countries, its adoption by farmers remains limited. 'From our experience, the key to getting the AWD system adopted is that it has to be done on a large scale and there has to be incentives for irrigation', explained Quilty. 'Most irrigation systems in the Philippines currently charge farmers a flat rate, regardless of the actual amount of water they use. But, if the farmers are saving water then the cost should be reduced'.

<http://news.irri.org>

New farm technology for rice

Two locally developed technologies will dramatically lower processing time for drying and milling rice. The Philippine Center for Postharvest Development and Mechanization (PhilMech) has developed a fluidised bed drying system and the brown rice huller that are seen to benefit the local farming community. PhilMech is an attached agency of the Department of Agriculture (DA).

Rex Bingabing, Executive Director of PhilMech, said that the fluidised bed drying system was built to accommodate large volumes of high-moisture paddy rice for drying during the rainy months when drying under the sun is not possible. The technology allows hot air or gas flow to pass through wet paddy rice for a short duration which results to fluidisation on the drying bed, eliminating grain clumping and results to uniform efficient drying. PhilMech field tests show the optimal drying time for palay with 24% moisture content to 14% final moisture content using the fluidised bed dryer can be attained in about 3 hours, compared to the 8–12 h required in conventional mechanical drying.

Powered by a biomass furnace that uses rice hull as energy source, the fluidised bed dryer that has a capacity to dry 500 kg/h of wet paddy rice at a cost of P0.63/kg. The fully automated dryer requires low energy, and made of locally available materials. The brown rice huller, on the other hand, was developed to address the milling needs of farmers and retailers as a response to growing demand from consumers. The power requirement of the 95-kg huller is 373 W from a single-phase electric motor, much lower than the conventional rubber-roll huller so the cost of milling is reduced.

<http://www.philstar.com>

REPUBLIC OF KOREA

Smart farm systems service

KT has launched its smart farm service that provides enhanced greenhouse control systems at reduced installation costs, the nation's second-largest telecom company said. KT, which has pushed to diversify its service portfolio under its GiGA wired and wireless networks brand, said that it will develop and offer more system services for farms based on big data analysis technologies.

'We have focussed on inconveniences at farms with services that actually benefit them', said Song Jae-ho, Senior Vice President of KT Future Convergence Office, during a media forum in central Seoul, on Thursday. 'We will take a leading role in

supporting farms to boost profitability by providing big data services that offer optimal information on cultivation'. The company said that the KT GiGA Smart Farm system service collects environmental data such as temperature, humidity, solar irradiance, concentration rate of CO₂ and quality of soil at cultivation facilities using sensors embedded in Internet of Things (IoT) devices. The system will analyse the collected data and run control systems accordingly, establishing the optimal environment for crops, KT said.

'We have applied our smart farm technologies developed at the KT Institute of Convergence Technology to lighten the burden of early investment', the telecom company said. 'In this way, we have reduced the expenses of introducing smart farm systems by up to 40%'. KT said that its integrated smart farm control centre monitors connected cultivation facilities around the clock. It has also strengthened security functions and adopted machine-learning technology to enable customised control of each greenhouse. Under cooperation with the agriculture ministry, KT will open 10 smart farm field training and support centres nationwide to aid farm owners in learning how to use complicated information and communication technology services.

<http://www.koreatimes.co.kr>

EUROPE

Solar-powered device provides drinking water, internet and electricity

An Italian-Spanish start-up called Watly has invented a solar-powered computer by the same name that can provide safe drinking water, electricity and internet access in remote areas. The system is currently being tested in Ghana and is expected to help in the development of rural areas in Sub-Saharan Africa.

The device has photovoltaic panels on its surface through which it takes solar energy and changes it into electricity via an enclosed 140 kWh battery, which then charges a patented water treatment system – where the water is boiled and distilled – that can deliver up to 5,000 l of

purified water a day. It also powers a connectivity hub that offers internet connection within an 800-m area and a charging station for electronic and mobile devices. The final design of the machine will be showcased to prospective customers and investors in July this year. The project has received £1.4m (\$2m) from the European Union's Horizon 2020 research funding programme.

'The project could have a huge social and economic impact especially in Africa. It aims to bring clean energy and clean water to people in countries that are in desperate need of both vital resources', explained Attisani. The company is planning to open branches in Nigeria and Sudan after its success in Ghana and expects to place 10,000 units across Africa offering around 50,000 jobs to locals.

<http://www.ibtimes.co.uk>

SWEDEN

Solar cells help purify water

Researchers at Lund University in Sweden have developed a water purification plant that provides clean water far beyond the reach of the electrical grid – thanks to solar cells. With the help of Nobel Peace Prize recipient, Muhammad Yunus, these small and portable solar cell stations have now been placed across rural Bangladesh.

'750 million people lack access to clean water across the globe. Providing safe drinking water is one of the biggest challenges and one of the most important goals for humanity', said Inventor Kenneth Persson, Professor of Water Resources Engineering at Lund University. The environmental company Watersprint, founded in 2013 by Kenneth Persson and Ola Hansson, Engineer, has patented the technology that helps to purify water by combining UV-LED technology with intelligent software and Wi-Fi. Its system of 12V is so effective that it can be run by a single solar panel. The solar cells also charge its battery, which means that the portable facility can be used around the clock and in rural areas without access to electricity.

Nobel Prize winner, Muhammad Yunus and his organization Yunus Centre have

ordered portable units as part of a pilot project. In October, the first unit was installed and by now, another nine units have been delivered to the project in Bangladesh.

The portable purification units, so-called Micro Production Centres (MPC), are managed by local suppliers and help to create jobs for young, unemployed people who run the small facilities and sell clean water in exchange for a small fee. A large part of the population in Bangladesh currently use water contaminated by arsenic. 'Thanks to these portable units, communities can now purchase inexpensive, clean water and at the same time – in accordance with Muhammad Yunus's model – a lot of them can make a small profit by running the plants themselves,' said Kenneth Persson.

Watersprint recently signed a contract with the United Nations about placing 500 portable units in Bangladesh. The units can be connected to Wi-Fi and they include software that monitors the machine. In case of malfunction, the unit will send out alerts via text message to any mobile phone that is connected to it, as well as through the LED lights on the machine.

<https://www.sciencedaily.com>

Programme (IPSP). Professor Xiu Yan, of Strathclyde's Space Mechatronic Systems Technology Laboratory (SMeSTech), in the Department of Design, Manufacture and Engineering Management, is the Principal Investigator in the research. He said that 'Advanced machinery has been used in agriculture worldwide for centuries but a range of factors are making innovation in this area more important than ever, including environmental considerations, demographic changes, urbanisation, sustainable farming, increasing competition and the need to provide food for a rapidly growing global population.

'Robotic technology will be a key technological enabler for precision farming and this project is a combination of frontier research programmes in space robotic technologies'. It focusses on a unique soil sensing technology, developed and built with UK capability; it is also based on space instrumentation and the deployment of a UK-developed, intuitive master robotic control system. 'By harnessing space technology for a new application in farming, and engaging in a valuable research collaboration with China, this project will deliver many benefits around the world'.

<http://phys.org>

UK **Nanotechnology-based waterless toilet**

New agricultural device using space technology

Space technology is to be put to work on Earth – in a device for testing soil quality, in research involving the University of Strathclyde. The agricultural monitoring system, consisting of a mobile rover platform with a robotic arm which carries a soil sensing instrument, will be based on technology previously developed for use in exploration on Mars.

The Strathclyde researchers, working with partners in the UK and China, will demonstrate in trials the feasibility of the device's agricultural operation by using an integrated, force feedback-controlled robotic system on the ground during the project. The project for the device, known as the AgriRover, is funded through the UK Space Agency's International Partnerships Space

Challenge' launched by the Bill and Melinda Gates Foundation. Parker said that despite 'significant' interest from developed countries, the toilet is being designed with those in mind who have no access to adequate toilets. Cranfield University said that its toilet is designed for a household of up to 10 people and will cost just \$0.05 per day per user. A replaceable bag containing solid waste coated with a biodegradable nano-polymer which blocks odour will be collected periodically by a local operator, said Cranfield University. Initial field testing of the toilet is likely to take place later this year, Parker said.

<http://www.abc.net.au>

NORTH AMERICA **USA**

Nanotechnology makes cheap, improved, water filters

Researchers have developed nano-scaled membranes that could potentially filter contaminants out of water faster and cheaper than the current methods. Baoxia Mi, an Assistant Professor of Environmental Engineering at the University of California, Berkeley, is developing a water filter comprised of membranes made up of layers of graphene 100,000 times thinner than a strand of human hair.

'We made it from graphite, which is a material that we use in pencils for example, so it is cheap and relatively abundant. So, we can use that and the process that we use to make from the graphite to the graphene oxide is actually quite scalable', said Mi. By scalable, Mi means that these membranes could potentially be adapted to filter water from a household faucet, as well as large systems used to treat waste water on an industrial scale.

The membranes are much like a maze for water molecules. The water enters the maze and passes through a series of layers separated by spaces specifically designed to remove different types of contaminants. 'In order to remove different targeted molecules, the most direct way of thinking about it is to control the spacing that we have between the layers', added Mi.

<http://www.reuters.com>

PROMOTING INCLUSIVE AND SUSTAINABLE DEVELOPMENT THROUGH SOCIAL INNOVATION AND SOCIAL ENTREPRENEURSHIP

Rosdiana Sijabat

Senior Lecturer

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Abstract

Social innovation and social entrepreneurship are together viewed as a medium that can be used to promote inclusive and sustainable development. 'Social innovation' refers to innovative activities that include tools, methods, ideas or strategies used by individuals and the public to fulfil social needs and overcome social issues. Whereas, 'social entrepreneurship' refers to individual or organisational activities that use a business model to realise the social goals and values and thus have social effects on society. 'Inclusive and sustainable' emphasise the importance of harmonising the goals of development and equity based on sustainable development with principles which prioritise economic growth, social inclusion and environmental protection.

What is meant by social innovation and social entrepreneurship? What is meant by inclusive and sustainable development? How can inclusive and sustainable development be realised through social innovation and social entrepreneurship? These questions will be explored in this article, using a review of the literature. A case study of a social business, Bloom Agro, is used to provide empirical contributions. This case study showed that, through a social business, social entrepreneurs can create social value; in this case, by helping farmers escape the vicious cycle of poverty and create a market for their agricultural products. Through the organic agriculture of Bloom Agro and its partner farmers, Emily, a social entrepreneur, was able to make a difference and have an impact on farmers and their families. This organic agriculture also provided income stability to the farmers and ensured environmental sustainability. The article is organised into five sections. After introducing the research problem, it outlines the methodology used, then provides a literature review which explores various definitions of social innovation, social entrepreneurship, inclusive and sustainable development and how these concepts are interrelated. The article then presents the findings from the case study before drawing conclusions from these findings.

Introduction

The Millennium Development Goals (MDGs) for 2000–2015 were intended to support the world's countries in their struggles with high levels of poverty, hunger, limited access to education and health care and environmental issues.

After decades of development, including 10 years under the MDG agenda, many countries have realised greater development and economic growth.

The economies of these countries, particularly those in Asia, have experienced significant growth under the influence of

globalisation and technological innovations. It is predicted that per capita incomes will increase six fold, and that Asia's share of the world's GDP will increase from 27% in 2010 to 50% in 2050 (Maclean, Jagannathan and Sarvi, 2013). The successful development undertaken since 2000 has enabled almost a billion people to escape the confines of extreme poverty and has been accompanied by an improvement in indicators of public health. Child health has been improved. School enrolment has increased. Fewer people suffer from AIDS, malaria, tuberculosis and other diseases. Access to clean water and sanitation has increased (Cruz, Foster, Quillin and Schellekens, 2015).

However, numerous obstacles still challenge development efforts, particularly high levels of poverty, limited access to education and health care and income disparity. In 2012, more than 900 million people lived on incomes of <\$1.90/day; most of these people lived in Sub-Saharan Africa and South Asia (Cruz, Foster, Quillin, & Schellekens, 2015). This indicates that development approaches and policies have been unable to address the root causes of poverty and inequality. The economic development paradigm, which emphasises growth through (among others) prioritising the use of technical innovations, has been heavily criticised for being unable to overcome socio-economic issues such as poverty and income disparity. Indeed, the growth-based approach has been considered to cause further social issues¹ because of its disparate distribution of economic benefits. This approach ignores the importance of economic growth in attaining sustainable development (UNIDO, 2014).

Murray, Caulier-Grice and Mulgan (2010) found that government policies

¹ Social issues are here understood as situations which lead to individuals being unable to reach their full potential. Examples of social issues include poverty, unemployment, unequal opportunities, racism, malnutrition, poor quality housing, and workplace discrimination (Glicksen, 2011).

and market mechanisms are incapable of fully overcoming issues such as climatic change, epidemics of chronic diseases and increased inequality. The failure of the market can be attributed to a lack of incentive and appropriate capital for overcoming various social issues. When the market fails, efforts to overcome social issues must be borne by the State and Civil societies. However, current government policies and structures tend to use old-fashioned approaches in addressing these issues, and civil society is too limited in its capital, skills and resources to challenge current beliefs regarding successful actions.

The ultimate effects of the MDGs may only become apparent in 2017–2020. Fukuda-Parr (2010), however, found that even though the world's countries have shown considerable commitment to realise the MDGs, poverty has yet to be eradicated. This is because not all of the MDG priorities were implemented; several developing nations only implemented a few MDG priorities. Another factor is the fact that developing nations' poverty eradication strategies were neither pro-poor growth nor pro-poor social investments. The governments in these developing nations were likewise unable to build a democratic government or an environment which is both conducive to social empowerment and promotes public participation (Fukuda-Parr, 2010). These indicators suggest a low goal and target achievement for the MDGs, a suggestion which is supported by the poor acceleration of improvement for most MDG indicators (Fukuda-Parr and Greenstein, 2010). Fukuda-Parr and Greenstein, in examining whether or not there was an acceleration of improvement and realisation of goals after the MDGs were launched, researched 177 countries with available information on their achievement of the MGDs and its indicators. They found that, of the 25 MDG indicators covered, only 5 showed accelerated improvement in >50% of the countries surveyed, namely debt service (65% improved to 76%), slum population as percentage of

urban population (76%–79%), seats held by women in national parliament (50%–82%), population living on <\$1/day (51%–55%) and employment-to-population ratio (64%–56%). After the MDG period ended in 2015, the United Nations launched the 2030 Sustainable Development Goals² (SDGs) programme. The SGDs are intended to reduce poverty, protect the Earth and ensure prosperity for all of humanity.

Social innovation and social entrepreneurship have a significant role in promoting inclusive and sustainable development. The use of unique approaches and innovations by social entrepreneurs to achieve their goals in both developed and developing countries has led to this approach being widely recognised. Social entrepreneurs use social innovation to fulfil society's needs which are ignored because of market failure. Social entrepreneurs employ creative methods of resource use to create social values (Dees, 2001; Mair and Marti, 2004; Mair and Noboa, 2005). Though many types of innovations can overcome social issues, social innovations are considered to be the most effective and sustainable, as they can ensure the distribution of finances and creation of social values which can impact all elements of society (Phills Jr., Miller and Deiglmeier, 2008).

This article is intended to explore the role of social innovation and social entrepreneurship in promoting inclusive and sustainable development. A case study of one social entrepreneurship organisation (i.e., a social business) has also been conducted to show how the use of social innovations can promote inclusive and sustainable development.

Methodology

To reach the above-mentioned research goals, the qualitative method has been used here together with the explorative research approach. This approach is particularly appropriate for answering descriptive questions ('what?', 'why?' and 'how?'). Questions such as these

are exploratory by nature and also descriptive in their relations with contemporarily developing phenomena (Yin, 2009; Robson, 2002; Myers, 2009). The results of explanatory and descriptive analysis produce new understanding and insight (Robson, 2002) as well as explorative knowledge of new phenomena (Teddlie and Tashakkori, 2009). The connections between social innovation and social entrepreneurship with inclusive and sustainable development are examined in this article through a review of the related literature.

This article also utilises an in-depth case study approach (Yin, 2009, 2013) to better understand how social entrepreneurs, by using social innovation, are able to promote inclusive and sustainable development. Case study is a technique used to examine contemporary real-life phenomena when the developing phenomena are not yet well-understood (Yin, 2013). Case study utilises semi-structured interviews conducted in natural settings (Creswell, 2009) with social entrepreneurs. Research using the case study approach is both deductive (confirmatory) and inductive (explanatory) in nature. Although the results are not used to generalise the research population, they can be used for analytical generalisation or developing new theories (Yin, 2009).

Review of the literature

Definition of social innovation

Research regarding innovation in business and science is common. However, there have yet to be any in-depth studies of social innovation. This has led to social innovation being less understood than innovation in the fields of business, science and technology (Mulgan, Tucker, Ali and Sanders, 2007; Schmitt, 2014; European Union, and the Young Foundation, 2010). Although an increasing amount of research into social innovation has begun producing a more detailed understanding of the process, a review of the literature on social innovation indicates that no comprehensive understanding has been

² The three central pillars of sustainable development are economic development, social development, and environmental development. The MDGs only focused on one of these pillars, namely social development, such as education, maternal health, and access to basic services (Stoddart, 2011).

reached which can define social innovation as it generally occurs (Schmitt, 2014). Owing to the continued lack of systematic and sustained research into social innovation, social innovation as a concept has remained underdeveloped (Mulgan, 2006). Efforts to define social innovation are ongoing (European Union, and the Young Foundation, 2010).

Attempts to formulate a theory of social innovation cannot be separated from the writings of Joseph Schumpeter and his 'theory of economic development', in which he introduced the concept of innovation (Howaldt, Kopp and Schwarz, 2015). According to Schumpeter, economic and technological developments can improve the quality of life. These developments are part of what he terms creative destruction, a dynamic process in which innovational discoveries and new technologies 'destroy' old ones (hence, the name creative destruction) (Mazzucato and Wray, 2015; Schumpeter, 1994).

Innovation involves new technologies which are used for productive forces or productive means and are capable of producing new products, new qualities or new markets. They are a way to realise new production factors as well as to create new industrial organisations (Mazzucato and Wray, 2015; Howaldt, Kopp and Schwarz, 2015). For Schumpeter, innovation is the product of outstanding entrepreneurs who cause structural changes in their societies and organisations (Howaldt, Kopp and Schwarz, 2015). Innovation occurs during the course of seeking opportunities and new activities which can provide broader streams of income (Cantwell, 2002). From this above definition, it is clear that innovation is an improvement process in which existing things are transformed into better things or new things, or are created/invented.

The word 'social' is derived from the Latin word *socios*, which means a companion or an associate. The word social has thus been understood as following someone or allying with someone and having something in common. However,

definitions of *social* have continued to be refined, and the term has since been limited to humans or modern societies (Latour, 2002). The *Merriam Webster Dictionary* defines *social*, meanwhile, as meaning 'relating to or involving activities in which people spend time talking to each other or doing enjoyable things with each other'³ From the above definitions of 'innovation' and 'social', we can understand (if somewhat simply) social innovation as the process through which methods or technologies which have to do with produces and services which involve relations between individuals or societies are created.

Defining social innovation is not simple, because social innovation as a concept is not located entirely within one academic field; aspects of social innovation have to do with a wide range of academic fields, including economics, management, sociology, politics, history, social psychology, business and technology (European Union and The Young Foundation, 2010; Cajarba-Santana, 2013). Social innovation is understood as 'innovative activities and services' which produces 'new ideas that meet unmet needs' and are undertaken to fulfil social needs (Mulgan, Tucker, Ali and Sanders, 2007). A similar definition is used by Murray, Caulier-Grice, and Mulgan (2010), who understand social innovation as new ideas (be they in the form of products, services or models) which are utilised to fulfil social needs and to create new linkages and social collaborations. Using this definition, social innovation can be seen as having a positive impact on capacity building in society.

In the literature, one idea which is often found in definitions of social innovation is 'something new', such as new ideas, new strategies, new products, new methods and new approaches, which are used either individually or non-individually to fulfil social needs and attain a social goal. Mulgan, Tucker, Ali, and Sanders (2007) have identified social innovation as involving new ideas which are used to realise a social goal. They define social innova-

tion as innovative activities and services which are employed to fulfil social needs, predominantly by organisations which are oriented predominantly towards social interests. According to Phills Jr., Miller and Deiglmeier (2008), social innovation can be understood as new solutions for social issues which are more efficient, effective and sustainable than previously existing solutions, and which create values that affect the entirety of society rather than utilise individuals. Here, social innovation can be seen as a process for finding, gathering support for and utilising new solutions to fulfil social needs and overcome social issues. The definition of Westley and Antadze (2010), meanwhile, presents social innovation as an initiative, product, process or programme which transforms the basic routines, resources and system of authority/belief in the social system (for instance, among individuals, organisations, communities or society) in which these transformations occur. Here, we can see an emphasis on the systemic change which is caused by social innovation.

A different perspective is presented by Caulier-Grice, Davies, Patrick, and Norman (2012), who understand social innovation as the development of new concepts and strategies which can be used to create something previously inexistent to meet social, economic and/or environmental goals and thus promote the development of individuals'/groups' abilities. For them, the key characteristic of social innovation is 'novelty'. Social innovation need not be truly original or unique. Rather, it must only be new in several aspects. It may be new in and of itself, or may involve a new sector, a new area or a new process 'from idea to implementation' which transforms ideas into implemented practices such as financially sustainable services or initiatives. The goal of achieving social and environmental needs is explicit in social innovation's role in fulfilling social needs, which if left unfulfilled will cause social suffering. Also included is 'effectiveness', with social innovations being

³ Definition is based on that of the *Merriam Webster Dictionary*, retrieved from <http://www.merriam-webster.com/dictionary/social>, 5/15/2016.

more effective than previously existing solutions in promoting measurable improvements in quality, user satisfaction, adoption, expense reduction, prosperity and social cohesion. Social innovation can 'enhance society's capacity to act', empowering its recipients by creating new roles, relations and assets, developing abilities and/or streamlining the use of assets and resources. Social innovation is a prelude to changes to social relations, particularly in governance, and increased participation from vulnerable, marginalised and otherwise underrepresented social groups. In this understanding, social innovation involves the transformation of power relations and increase in recipients' socio-political capacity and access to resources, which pushes recipients to better meet their own needs.

On the basis of the various definitions presented above, the author proposes a definition of social innovation which is also used in this article, namely 'innovative activities which can take the form of tools, methods, ideas or strategies which are used by individuals or organisations, public or private, to fulfil social needs and/or to overcome social issues.

Stages of social innovation

According to Murray, Caulier-Grice, and Mulgan (2010), The Young Foundation (2012), European Union and the Young

Foundation, (2010) and Caulier-Grice, Davies, Patrick, and Norman (2012), there are six steps involved in social innovation. These six steps are not always present, and if present do not always occur in the order presented here (Figure 1). These six steps are as follows: (i) prompts, inspirations and diagnoses; (ii) proposals and ideas; (iii) prototyping and pilots; (iv) sustaining; (v) scaling and diffusion; and (vi) systemic change.

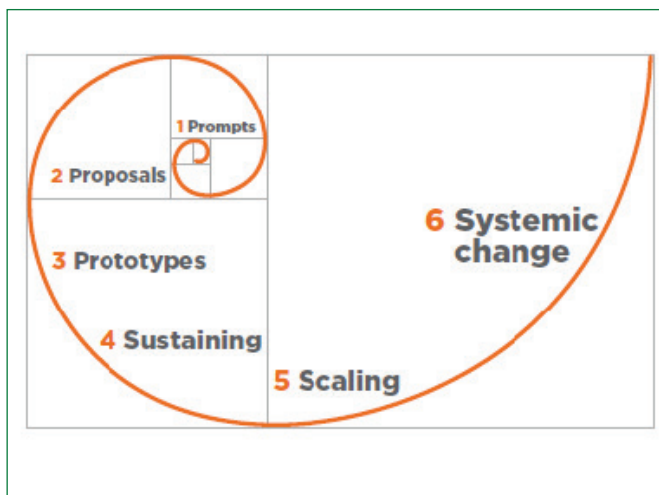
The first step involves identifying conditions which underscore the need for social innovation as well as strategies which can be used to realise said innovations. These conditions may include, for instance, a crisis in a society or an organisation which requires that problems be identified and formulated in the form of questions. By doing so, one identifies the problems' root causes, rather than symptoms. The second step describes how ideas are formed and developed, either through formal methods such as design or creative methods intended to provide insights and experiences from a wide range of sources. The following step involves testing the previously formulated ideas, which can be done through simple testing processes or through piloting or prototyping tests. Testing is an important step in social innovation because it is through iteration and trial and error that ideas are reaffirmed and conflict (such as that which

emerges from conflicts of interest) is overcome. The fourth step is related to the process of maintaining an innovation or idea and making it a part of day-to-day life. In this step, ideas are further refined. Important to this step are income-producing activities which ensure an organisation's financial sustainability. In the public sector, this step is often understood as the preparation of budgets, teams and other resources. The next step involves scaling and diffusion, which are both processes for promoting the further development and dissemination of an innovation. Emulation and inspiration have an important role in the distribution of ideas. Supply and demand, likewise, must be mobilised to promote the success of new models or approaches. The final step is also the main goal of social innovation, which generally consists of several elements (social movements, business models, laws and regulations, data and infrastructure). This step is related to establishing new working frameworks that consist of numerous smaller innovations.

Social innovation does not always develop easily. It may face severe challenges and obstacles which its pioneers must attempt to overcome (and perhaps succeed). The success of social innovation pioneers in overcoming challenges and obstacles depends on their ability to create new situations and conditions such as new technology, supply chains, institutional forms, skills, rules and fiscal frameworks. All of these conditions will help determine whether or not a social innovation can be economically sustained. Generally, systemic innovation is related to transformations in the public, private and household sectors, and occurs over a lengthy period of time.

Definition of social entrepreneurship

Social entrepreneurship is multidimensional in nature and refers to business activities (entrepreneurship) conducted to realise a social mission (Mort, Weerawardena and Carnegie, 2002). Definitions of social entrepreneurship always return to the definitions of *entrepreneur* and *entrepreneurship* (Abu-Shaifan, 2012; Santos, 2012). The most commonly used



Source: European Union & The Young Foundation (2010); Caulier-Grice et al., (2012)

Figure 1: Stages of social innovation

definition of *entrepreneur* is that formulated by Schumpeter (1994). According to Schumpeter, an entrepreneur is an innovative actor who discovers a combination of production factors which are capable of promoting economic development. This combination of production factors can take the form of, for instance, production techniques which better fulfil production needs as well as the invention of new products. For Schumpeter, entrepreneurship is a process of creative destruction, because entrepreneurs, in their efforts to find a new combination of production factors, may need to ignore existing technology and products. By adding the word *social* to *entrepreneur*, Schumpeter emphasises that social entrepreneurship is not simply 'business as usual', but is focussed on social development. Dees and Anderson (2006) and Dees (2001) understand social entrepreneurship as an act of change which is realised through entrepreneurial principles and models and is intended to fulfil social needs, overcome social problems, and maintain social values. From this definition, it is again clear that social entrepreneurship does not prioritise the attainment of economic value.

Entrepreneurship cannot be equated with entrepreneurship. A fundamental difference between social entrepreneurship and (business) entrepreneurship is the social mission and social impact attained through social entrepreneurship. As shown by Mair and Marti (2004), the main priority of social entrepreneurship is the creation of social wealth creation, whereas other business activities (i.e., business entrepreneurship) prioritise the creation of economic wealth. Santos (2012) similarly emphasises the main motivations of social entrepreneurs. According to Santos, the main motivation of any social entrepreneur is to create value for society, rather than to capture value. The process of value creation can be undertaken through business activities, business organisation or business/venture management, all of which are done for the sake of social change (George, 2009).

Another view positions social entrepreneurship as philanthropy which is

generally intended to meet certain social goals. According to Dacin, Dacin and Matear (2010), social entrepreneurs are social investors who use their resources and capital to manage businesses which are primarily intended to support poor populations through constructive methods. Philanthropic activities are thus an integral part of these non-profit organisations which emphasise the importance of social impact created through strong business and management principles, venture capital and strategic approaches. Thus, they may also be termed as venture philanthropists (Robinson, 2006).

Ashoka, which has been recognised as the first organisation in the world to employ social entrepreneurship, defines social entrepreneurs as individuals with innovative solutions for the social problems which plague their societies. These individuals tend to be visionary, ambitious and have a firmer understanding of the potential for a better future; as such, they are always seeking new ideas through which they can realise their vision and overcome social problems. Ashoka emphasises the role of other agents (i.e., those outside the government and private sector) in seeking solutions to social problems. Social entrepreneurs can transform existing systems, offer other solutions, and call on other members of society to take action and change the direction of the social issues they face. As such, social entrepreneurs see the important value of ideas and use their ideas to cause social transformations through a 'change of direction' (www.ashoka.org).

Santos (2012) has discovered social entrepreneurship's special role in overcoming market failure and profit-oriented organisations (Phillips, Lee, James, Ghobadian and O'Regan, 2015). Market mechanisms are unable to overcome the various social issues which are faced by modern society including malnutrition, unemployment and limited access to education. Social issues have remained chronic in society and are thus, as obstacles, difficult to surmount; if social issues were simple and profitable to address, market mechanisms would certainly work to do so.

Market failure demands that there can be change, a remedy capable of overcoming social problems (Yunus, 2007). Through their efforts to create new industries and innovations, social entrepreneurs allocate and distribute economic resources to overcome failures in the market. This is possible because social entrepreneurs attempt to find solutions to the economic and social issues found in society, rather than simply burden the market and existing systems with these issues (Ashoka, 2014; Groot and Dankbaar, 2014).

Martin and Osberg (2007) have defined social entrepreneurship as a process which can improve people's social and economic lives in three manners: (i) identifying the causes of unjust equilibrium which becomes stabilised through exclusion, marginalisation and human suffering as a result of minimal financial and political access, access which should be used to promote the interests of these individuals; (ii) identifying any opportunities which may be present behind this unjust equilibrium, developing programmes related to social values, and promoting inspiration, creativity, direct action and boldness, all of which can challenge the unjust equilibrium in society; and (iii) creating a stable equilibrium capable of reducing the human suffering faced by the less fortunate through the process of imitation and the creation of a stable ecosystem, thus allowing a new equilibrium to be created and providing the potential for a better future for society.

In the above discussion, the article has examined the general characteristics of social entrepreneurship as an individual and/or organisational act which uses a business model to achieve a social goal and value and thus effect on society.

Definition of inclusive and sustainable development

The increased push to employ inclusive development has emerged because not all elements of society have been capable of participating in or benefiting from earlier development programmes (Johnson and Andersen, 2012). Generally, inclusive development (also known as 'inclusive growth') has been defined as 'growth

which is followed by equal opportunities'; in other words, inclusive development must ensure that equal opportunities for access are provided to all elements of society. The focus is thus on 'equal opportunities' (Rauniyar and Kanbur, 2009; Kozuka, 2014; Vujanovic, 2015). Johnson and Andersen (2012), however, emphasise the participation of the poor in the development process, and as such understand inclusive growth to be 'pro-poor growth' or development which offers the poor greater opportunity to take an active role in and to benefit from economic development. Inclusive growth is the most important aspect of the type of development which can promote social sustainability, because inclusive growth promotes the active participation of the majority of the workforce and excluded people. This, in turn, leads to the creation of income and an increased standard of living.

A similar definition is presented by Kozuka (2014), who writes that inclusive development is development done to improve individual prosperity by creating the same opportunities for all members of society, particularly those who are poor, at-risk, or otherwise disadvantaged and are thus frequently excluded from the development process. From these definitions, it is clear that inclusive development involves an improvement in the distribution of income, education and health care, as well as reduced inequalities in these three dimensions (Rauniyar and Kanbur, 2010; Kozuka, 2014).

Johnson and Andersen (2012) have defined inclusive development from an economic perspective, namely as development which reduces the income gap and assists people in escaping poverty. Kozuka (2014) adds that inclusive development is not solely limited to income improvements, but includes improvements to all dimensions of individual prosperity. Inclusive development is realised by reducing gaps between different genders, ethnic groups and age groups,

by promoting appropriate and dignified work, and by giving poor residents access to information and knowledge (Rauniyar and Kanbur, 2009; Paunov, 2013).

A political perspective is utilised by Sachs (2004) in defining inclusive development. Sachs understands inclusive development as making use of several of the effects of 'perverse growth',⁴ namely 'excluding' (from the consumer market) 'concentrating' (of income and wealth), a 'strongly segmented labour market' and 'feeble participation'. As such, for Sachs the main condition for inclusive development is the guarantee of the principles of democracy in the execution of civil and political rights, thus supporting transparency and accountability in development. The emphasis on political aspects is discussed in detail by Wood (2014), who argues that there are three indicators of inclusive development: voice, action and results. Voice is the first measure of inclusive development and refers to democratic ownership, representativeness and administration of government institutions which is capable of fulfilling basic service needs and reinforcing inclusive economic growth. These factors will allow the voices of the various stakeholders in society to be heard in a transparent and inclusive manner. To realise inclusive development, there must be dialogue between multiple stakeholders through various social accountability mechanisms (i.e., through surveys, community score cards or e-governance information), which can ensure that all elements of society, including the poor, at-risk and marginalised, have the ability to give voice to their aspirations and their concerns.

The second indicator of inclusive development is initiative, which pushes the development of leadership skills among various actors with their various priorities, plans and approaches. Action, thus, means that complementary roles can be implemented at all levels of government, as well as in the private sector

and in civil society, to promote the realisation of democratic ownership principles. This last indicator is oriented towards results, namely efforts to guarantee 'inclusive results', that is, efforts to guarantee that the results of development will be useful for all segments of society – particularly the poor and marginalised. Inclusive results are thus often viewed as the State's ability to reduce a wide variety of indicators, including poverty and disparity, as well as to improve gender equality, women's empowerment, inclusive and sustainable economic growth and dignified work for all people. For these inclusive results to be realised, it is necessary for policies to guarantee in discriminatory access to important services, to consider effects on social cohesion and to implement redistributive policies (Cook and Lee, 2014, cited in Wood, 2014).

From the above definitions of inclusive development, it can be seen that the principles of inclusive development, which emphasise the importance of harmonising the goals of development and the equity of the results of this development, are of a similar orientation to the principles of sustainable development, which similarly prioritise the realisation of sustainability. This will be underscored in the following discussion.

The definition of sustainable development has not been formalised, and continues to be subjected to lengthy debate (Soubbotina, 2004). Soubbotina (2004) emphasises the equity aspect of sustainable development by defining it as 'equitable and balanced'. For Soubbotina, sustainable development is development which ensures the implementation of the principles of equitable access to opportunities and prosperity. Equity can be realised by balancing the interests of various elements of society, both those of the same generation or different generations. However, the most common definition of sustainable development is that formulated by the United Nations, which understands

⁴ It should be remembered that the word "growth" refers to economic growth. Much criticism has been levelled at development policies which focus only on economic growth, as these are considered the cause of the social and economic gaps in society. The International Labor Organization (2015), for instance, emphasizes that economic growth leads to non inclusive development, leaves millions of people without the dignity of work, exacerbates inequalities, and hinders sustained development (p. 6). As such, inclusive development is often referred to as inclusive and sustainable growth, which stresses that the benefits of growth are enjoyed by all groups or parts of society (World Bank, 2008).

sustainable development as being 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (The 1987 Brundtland Report, cited in Stoddart, 2011). For sustainable development to be realised, then development which is both inclusive and sustainable – synergetic between the acts of people and natural conditions – is needed.

This definition offers the understanding that different generations share access and opportunities to benefit from development. As such, to ensure that fulfilling the needs of the current generation does not sacrifice the ability to fulfil the needs of future generations, development must integrate three important dimensions: economic growth, social inclusion and environmental protection.⁵ These

elements work towards fulfilling basic needs and aspirations to improve quality of life through two important concepts, namely: (i) needs, particularly the core needs of those living in poverty, who must be prioritised in development; and (ii) understanding of the environment's limited ability to provide current and future needs, particularly considering the current condition of technology and social organisations.⁶ It can thus be seen that sustainable development is strongly tied to efforts to alleviate poverty, as those who live in poverty are unable to meet their most basic needs such as food, clothing and shelter. A proper understanding of the limitations of technology and social organisation will allow people to realise that all of their actions have environmental consequences.

Social Innovation and social entrepreneurship in promoting inclusive and sustainable development: possible linkages

How can social entrepreneurship and social innovation promote inclusive and sustainable development? This question can be framed with several views. Aside from the increased level of uncertainty in politics, the economy, environmental development (Seelos and Mair, 2005), and the increasing variety of social needs, there are also market failures which cause various social needs to go unfulfilled (Phillips, Lee, James, Ghobadian and O'Regan, 2015). Market failures prevent certain social groups, particularly the poor, who do not have access to resources, from participating and taking advantage of existing economic opportunities (Rauniyar and Kanbur, 2009). Inclusive and sustainable development can reduce the negative effects of market failure, reduce poverty and also create joint prosperity (Maeda et al., 2014). According to Hansson et al., (2014), the failure of conventional methods, those funded by public institutions and government institutions, in fulfilling society's needs, and these methods' negative effects on social life means that social innovation must play a more important role in development than ever before. In their study, Hansson et al. indicate the importance of social innovation in achieving sustainable development, which is evidenced in by the Swiss government's efforts to establish a long-term development plan to become the foremost promoter (private or public) of social innovation. In a similar vein, Phillips Jr., Miller and Deiglmeier (2008) emphasise the use of social innovation to overcome market failure, pointing to the social innovation's novelty, improvement and sustainability. Through social innovation, new ideas and approaches can be applied intersectorally to better fulfil social needs than possible with existing mechanisms. Social innovation can create environmental, economic and organisational sustainability, which also offers sustainable long-term solutions.

The United Nations established 17 sustainable development goals and 169 targets to be reached by 2030⁷:

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

⁵ <http://www.un.org/sustainabledevelopment/development-agenda/>, retrieved on 6/16/16.

⁶ <http://www.un-documents.net/ocf-02.htm>, retrieved on 12 March 2016.

⁷ <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Social entrepreneurship activities are often tied to their use of social innovation, with social innovation being considered as an important basis for the field of social entrepreneurship (Dees, 1994). Social entrepreneurship refers to activities conducted by agents to cause social change, whereas social innovation is a process which can be used to realise specific social changes (Cunha, Benneworth, and Oliveira, 2015). Social entrepreneurs are viewed as the harbingers of creative destruction for their promotion of social change and social movement. This is what is often referred to as unconventional ways of acting and thinking, and it is a common characteristic of social entrepreneurs. Unconventional methods such as working collaboratively and creatively can be an important step towards achieving sustainability (Manzini, 2007).

Numerous studies and research projects have indicated social entrepreneurship's increased importance in social development, as many social entrepreneurs have been successful in overcoming economic challenges and promoting social changes through social innovation. The use of social innovation in social entrepreneurship is relevant because, even though social entrepreneurs' businesses can produce income and profit, these economic gains are not their main goal. Their profits are reinvested in their businesses to guarantee organisational sustainability. This is the key difference: whereas entrepreneurship generally relies on business innovations to maximise profit, social entrepreneurs use social innovation to fulfil social needs, and thus their main goal is social (Mulgan, Tucker, Ali and Sanders, 2007). According to Warnock (2013), social entrepreneurs are agents of change who use innovative solutions to overcome society's most

pressing social problems. As agents of change, social entrepreneurs make use of opportunities which others cannot. They also come up with new approaches and solutions to ensure social change and promote a better society.

This article has already discussed how social innovation can be used to create social change, such as by promoting inclusiveness and sustainable development through the provision of goods and services and/or new techniques, methods or strategies. This can be realised through social innovation because, by definition, social innovation requires one to have the ability to cross sectorial lines and challenge traditional viewpoints of (approaches to) development (Hansson et al., 2014). Seelos and Mair (2005) also show the connection between social entrepreneurship and social innovation in promoting inclusive and sustainable development. They argue that sustainable development can be realised through three approaches: (i) fulfilling basic life needs; (ii) creating communities which employ collaborative norms, rights, and activities to promote active participation in social and economic development and (iii) considering the needs of future generations in every activity done in the present day.

Through their research into social entrepreneurs, particularly those in developing countries, Seelos and Mair have shown that social entrepreneurs often provide communities with basic life necessities. This can be seen in the case of the Bangladesh Rehabilitation Assistance Committee (BRAC) in Bangladesh. Through its volunteers, BRAC has been able to provide poor women with the assistance they need to receive proper health care and to educate them in the best and safest ways to provide food for their families. The BRAC programme has successfully reduced poverty

by providing communities with economic and social access, including but not limited to access to education, health care and microcredit programmes to promote economic development.

A similar impact has been made by the social entrepreneurship organisation known as SEKEM.⁸ This organisation shows how a business can combine profitability and involvement in the world market with spiritual and humane approaches to people as well environmental awareness. The business activities of SEKEM are based on the four principles of sustainability, also known as the *Sustainability Flower*: (i) economy, (ii) societal life, (iii) cultural life, and (iv) ecology.⁹ These four principles help to ensure that SEKEM can implement sustainable business practices and realised through seven types of activities, namely those related to economic life, social life, cultural life, water, soil, plants, animals, energy and air. First is sustainability in economic activities, which is realised through fairness and ethical values together with environmental, social and cultural development. To measure the business' level of sustainability, the Self-Assessment Tool for the Sustainable Business Practice of a Company is used. This technique allows SEKEM and its business partners to anticipate sustainability gaps and other challenges to their businesses' sustainability, and to determine the correct form of intervention necessary to overcome these sustainability gaps. Through its own sustainable business practices, SEKEM intends to promote sustainable business practices in Egypt.

The second aspect is social sustainability, which is realised to develop inter-individual relations. SEKEM has developed a culture of mutual understanding and trust with its business partners and its

⁸ The founder of this organization, Ibrahim Abouleish, received the 'Right Livelihood Award, also known as the Alternative Nobel Prize, in 2003 (Seelos and Mair, 2005). From SEKEM's website, it is clear that Ibrahim Abouleish has received numerous awards for his role in promoting sustainable development and social entrepreneurship, including German Environmental Management Association B.A.U.M. Award for commitment to environmental protection and sustainable development (2011); the Sustainable Rural Development Award for sustainable rural development (1997), the Award for Outstanding Social Entrepreneurship from the Arab Academy for Banking and Financial Sciences (1988) and the Ashoka Foundation Award of Outstanding Social Entrepreneurship (2004). He was also named Outstanding Social Entrepreneur by the Schwab Foundation in 2003 (retrieved from <http://www.SEKEM.com/ibrahim.html>, on 6/10/2016). In 2015, SEKEM received the Land for Life Award, given as a form of international recognition for SEKEM's ability and commitment to addressing soil erosion and ensuring soil fertility by employing the principles of sustainable agriculture, as well as SEKEM's role in promoting human development (SEKEM, 2015: 12).

⁹ This section is drawn from the SEKEM Sustainability Report 2015 (SEKEM, 2015).

supporters. The goal of this approach is to create a sense of equality. SEKEM has also given attention to the need to promote gender equality to create a sustainable society. Next is the culture sustainability aspect, for which SEKEM has focussed on individual development – particularly the capacity to innovate and social responsibility – realised through a holistic cultural approach. Education is likewise employed to ensure the attainment of sustainable development, particularly among the youth of Egypt. Finally is the environmental aspect. SEKEM has become a pioneer in overcoming scorched land issues, as it has successfully repurposed much desert land as productive agricultural land. This has been done by practicing sustainable biodynamic agriculture and reclaiming desert land in a sustainable manner, thus allowing it to be used for organic and biodynamic agriculture.

To indicate possible linkages between the roles of social entrepreneurs and social innovation in promoting inclusive and sustainable development, the writer combines the UNDP (2012) framework with the operational model used by Seelos and Mair (2005) (Figure 2). According to the UNDP (2012), sustainable development can be realised through two nexuses: inclusive growth and green growth. Green growth emphasises both economic and environmental aspects (UNDP, 2012) and calls for the implementation of developmental policies which promote the importance of environmental-friendly, sustainable and low-carbon economic development as well as inclusive social development (UN, 2009). Inclusive growth, meanwhile, emphasises the social and economic aspects of development (UNDP, 2012) from a growth perspective (growth itself generally being judged solely from an economic aspect, namely the distribution of income), as well as the equal distribution of opportunities (Rauniyar and Kanbur, 2009). Inclusive growth, which is also known as inclusive development, is realised by ensuring that all members of society, with their varied backgrounds that are able to participate in and contribute to growth (Rauniyar and Kanbur, 2009). Johnson and Andersen (2012) have found

that inclusive development can promote innovation. Inclusive efforts, such as the granting of rights, voice, capacity and incentive to people previously excluded because of their ethnicity, gender, and so on, will support greater participation and innovation in development by increasing the amount of resources available.

The three dimensions of sustainable development shown in Figure 2 can be connected with the definitions and roles of social entrepreneurship and social innovation to indicate the relationship patterns in which social entrepreneurs, through social innovation, are able to: (i) promote individual abilities to realise their needs, be they economic or social, by using creative ideas and strategies and without being hindered by social or economic status (i.e., inclusive growth); and (ii) balance the use of resources to

fulfil the current generation's needs with the conservation of resources needed to provide for future generations. Through social innovation, social entrepreneurs can creatively and innovatively manage resources and use an inclusive knowledge system (Kerkhoff, 2013). Social entrepreneurs can not only do these things through activities which are entrepreneurial in nature but also recognise social commitments (i.e., through social business). This means developing a business from one which is considered unprofitable and overly risky by most entrepreneurs and conventional business into a commercial business which is financially independent and profitable, thus allowing it to expand its reach and realise the social goals which are its primary business drivers (Humberg and Kleemann, 2014).

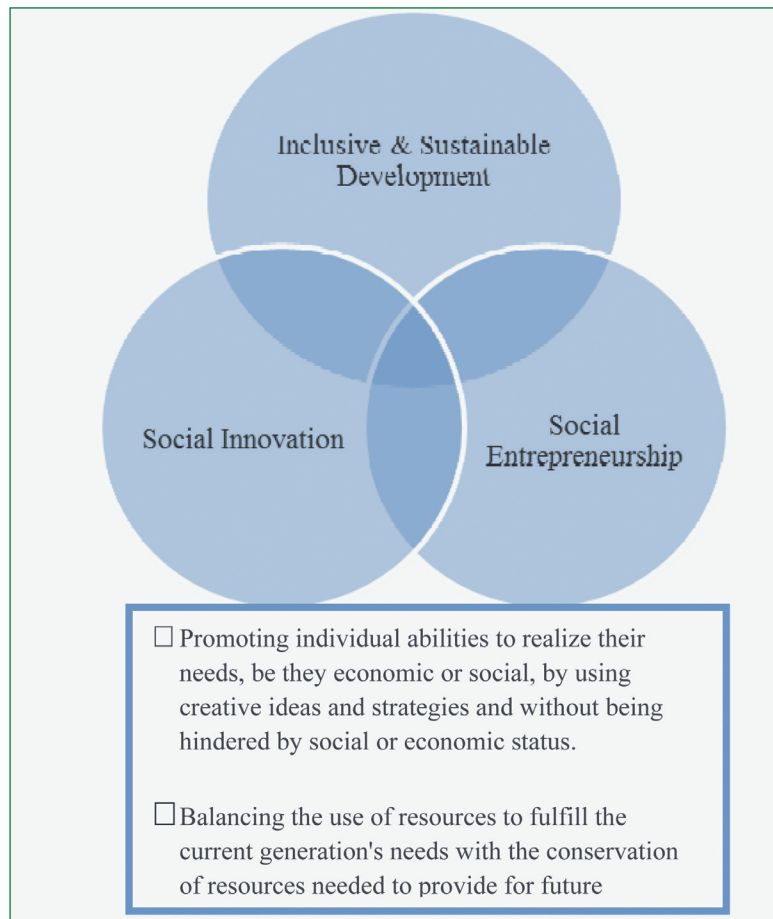
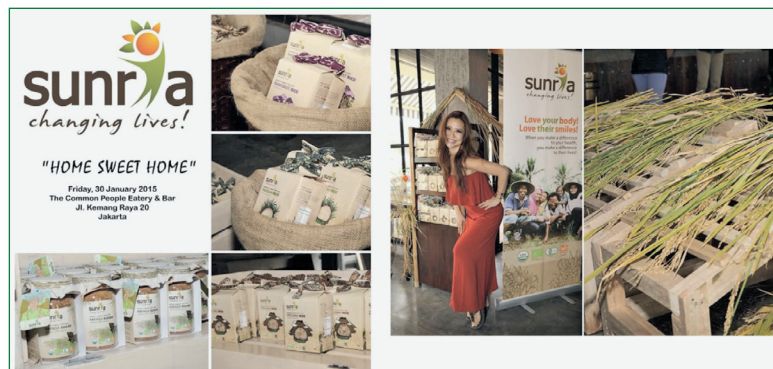


Figure 2: Linkage between social innovation and social entrepreneurship in promoting inclusive and sustainable development



Source: www.sunria.com, retrieved on 10/08/2016

Case study findings: Sunria

Bridging farmers

Emily Sutanto is the founder of PT. Bloom Agro, an Indonesian social business. From the age of nine, Emily lived and studied abroad. She received a masters' degree in International Management and Mass Communications from Pepperdine University, Los Angeles, California, and Bond University, Australia. Emily had no previous technical experience or education in the field of agriculture. She also had little interest in environmental or ecosystem issues. While living abroad, she heard of rice farmers in Indonesia, specifically in Tasikmalaya, who had begun growing and selling organic rice. Uncertain of the veracity of this news, Emily returned to Indonesia and saw that it was true: farmers had begun planting organic rice using the System of Rice Intensification¹⁰ (SRI) method. However, these farmers were not receiving good prices for their rice, and the market was extremely limited.

Emily thought that the global market would support organic rice agriculture, and thus decided that she had to find a way for the global market to know and support organic rice agriculture efforts in Tasikmalaya. She saw that the farmers needed a 'bridge' to help them realise their need for good prices and a market for their organic rice.

Emily then established PT. Bloom Agro, a company intended to promote sustainable agriculture and thus positively impact the environment and humanity. Emily established this agriculture-based social business to realise the social motive which she termed the 'humanity factor': assisting rice farmers in obtaining certification for their organic products and in finding an international market. These efforts were also intended to help the farmers of Tasikmalaya escape the vicious cycle of poverty. She recognised her unique ability to address the issues faced by these rice farmers; not only did she have the capacity to support international sales and build an international market, but she also had a good understanding of Indonesian culture.

The farmers had been growing organic rice, but this had not made them prosperous. Emily wanted to help these farmers because she recognised their dedication. When Emily first visited them in Tasikmalaya, the farmers served her *rengginang*, a type of rice cracker, and gave her more *rengginang* to bring home. Emily was touched; though the farmers were poor, they sincerely gave her the food that they had produced themselves. Emily says that this experience marked the beginning of her calling and commitment to aid the organic rice farmers of Tasikmalaya. At first,

Emily did not promise the farmers anything, and indeed she did not know what she could do to help them. When Emily did voice her intention to aid the farmers, they seemed uncertain of her sincerity; many companies had offered aid beforehand, but none had produced results. The farmers, perhaps, doubted that Emily could do anything to help them, as they may have considered her as a young woman who came from 'who knows where'.¹¹

Changing farmers' lives

The relationship between Bloom Agro and the farmers is termed as a partnership, and this term which is used in their Memorandum of Understanding (MoU). The MoU stipulates that Bloom Agro assists farmers in obtaining organic rice certification and in allocating funds. Though the rice farmers in Tasikmalaya had already received certification, they remained unable to obtain greater value for their products. Emily investigated the issue and realised that the certification the farmers had received was not for organic rice. She saw that the farmers needed genuine certification for their organic rice, and thus began researching the procedures and methods for acquiring organic rice certification. Using her resources, Emily gathered information on organic agriculture techniques and brought in organic farming experts from the internationally renowned Institute of Marketecology¹² (IMO) in Switzerland, an organisation which certifies organic products, to train the Tasikmalaya farmers in proper organic agricultural techniques. Initially, the farmers considered the certification process to be extremely difficult. However, Emily continued to motivate the farmers and remind them that, if they wanted to break into the (international) market, they had to first ensure the quality of their products.

The process continued and, at the end of 2009, the organic rice farmers who part-

¹⁰ SRI is an agro ecological approach intended to increase rice production by transforming the management of plants, soil, water, and nutrients. It is based in four principles: (1) early, quick and healthy plant establishment; (2) reduced plant density, (3) improved soil conditions through enrichment with organic matter, and (4) reduced and controlled water application (<http://sri.cals.cornell.edu/aboutsri/methods/index.html>, 29/05/2016). The SRI method as first introduced to Indonesian farmers in 1998 as part of the "farmers' revolution" www.indonesiaorganic.com, 14/04/2016).

¹¹ Here Emily is referring to her background. She was raised outside of Indonesia, and has spent most of her life abroad.

¹² More information is available at <http://www.imo.ch>

nered with PT. Bloom Agro were certified by the IMO. Bloom Agro thus became the first Indonesian company to have its organic agricultural products certified by an international organisation. Farmers partnered with Bloom Agro also received organic certification from the United States Department of Agriculture's National Organic Programme, the European Union and the Japanese Agricultural Standard. This allowed the organic rice produced by Bloom Agro's partners to break into the international market, even in countries with the most stringent food safety legislation.

Emily was determined to ensure that 1,000 farmers received organic rice certification, as these 1,000 farmers would certainly have a positive impact on their own families (children and husbands/wives); in other words, the values created by Emily would benefit more than 1,000 people. Today, Bloom Agro has partnered with ~1,000 farmers and operates some 100 hectares of organic rice fields. Though Bloom Agro's fields represent only ~1% of the total land used for rice agriculture in Tasikmalaya, it has impacted the lives of its partner farmers. Emily's target is to have an impact on at least 5,000 lives. This mission to change lives has been manifested through the Sunria line of organic rice products. The brand name, Sunria, is derived from the English word 'sun' and the Indonesian word 'ria' (meaning 'joy'); the brand is thus intended to introduce sunshine and smiles to the lives of the farmers partnered with Bloom Agro.

In Tasikmalaya, the rice farmers had been trapped in a cycle of poverty by the bonded labour system used in their villages. The farmers received funds from loan sharks (*tengkulak*) during the planting season at high rates of interest. During the harvest season, the price of rice drops. Rice farmers generally sold their rice through two channels: *Bulog* and the *tengkulak*. If the farmers sold their rice to *Bulog*, then they were given a much lower price, often 20% less than the market price. Selling rice to the *tengkulak* was likewise unbeneficial, as the farmers were still required to repay their loans following the harvest. As a result, farmers were frequently only able to break

even; some even went into greater debt when their rice was bought at too low of a price and they were incapable of repaying the loans they received from the *tengkulak*.

Emily concluded that the farmers had to be helped out of this vicious cycle of poverty through organic agriculture. Because the farmers have already practiced rice agriculture, she decided to focus on organising them, providing them with a good working structure, helping them meet standards of organic production (beginning with planting) and helping them produce products other than rice. Farmers would no longer simply be producers of rice (as a raw material), but also be able to create additional value for their rice. Bloom Agro, through its Sunria brand and use of SRI, wanted to create additional value for the organic rice produced by its partners. This additional value could be realised because SRI, at its core, is based on the principle of using less input to realise a greater output. Many (mostly non-Indonesian) companies purchase organic rice from farmers and then process it into other products, thus creating additional value. This was Emily's intention with Sunria. As such, she did not only assist farmers in producing and marketing organic rice, but also built their capacity so that they would be better able to produce and market products derived from their organic rice. Emily built farmers' capacity in various aspects of rice process-

ing, including storing, drying, vacuuming and packing.

When first establishing PT. Bloom Agro, Emily worked to assist the organic rice farmers of Tasikmalaya in obtaining organic rice certification and in breaking into the international market because she believed that the best way to ensure greater income for them was to sell organic rice in foreign markets. However, she faced a significant challenge: the Indonesian government did not permit foreign export of rice. Emily saw the risk to her project: she was helping the farmers obtain certification, but she realised that, once that certification was in hand, the farmers would be unable to sell their rice abroad owing to this export ban. Emily thus attempted to convince the Indonesian government, through the Ministry of Agriculture, the Ministry of Trade, the Ministry of Finance and *BULOG* to grant organic rice export licenses to Indonesian farmers. At the end of 2009, Emily was able to export her partners' organic rice – this was the first time that Indonesia exported organic rice. Although Bloom Agro exported rice to foreign markets, Emily did not want to be deemed an exporter. Exporters, she argued, are primarily motivated by money and simply buy rice from farmers and then sell it. The vision of Bloom Agro, meanwhile, was not entirely an economic one. It gave farmers



Source: www.sunria.com, retrieved on 10/08/2016

guidance, established a relationship like that between a parent and child. Emily was not a trader, a person who buys whatever can be bought without making any improvements. She empowered her partner farmers.

Sustainable farming

Bloom Agro emphasises business processes and value chain, focussing on sustainability. This can be seen from the tagline used by Sunria: 'make a difference to the lives of humans, animals and plants'. According to Emily, sometimes humans place greater emphasis on humanity's role in life. However, the truth is that all things are connected with all other living things and the environment. So by practicing organic agriculture, Bloom Agro is thinking of other living beings and our environment. Organic rice, for example, is grown without using flood irrigation. Without flood irrigation, the bio-organisms in the soil can live better. With non-organic rice, which requires flood irrigation, the lives of worms and other bio organisms are threatened. So, by planting organic rice, human let the animals live. This affects the soil and ensures more fertile land, because organic rice brings more oxygen into the soil, whereas non-organic rice produces methane gas. Methane gas is the second largest greenhouse gas emission in the world. Organic agriculture does not produce methane gas. That is Bloom Agro's impact on the environment. To better protect animals' lives and the environment, humanity must take action. The root of all is the human. This is Bloom Agro's role, what Bloom Agro will contribute: humanity acting for the sustainability of animals and plants. Bloom Agro also have a significant impact on the environment by reducing water use in agriculture. Only 1% of the water on earth is fresh water, and that is divided among household, industrial and agricultural uses. By planting organic rice, the land need not be flooded, and thus water usage can be reduced for rice agriculture by almost 50%. In the long term, organic

rice agriculture will ensure sustainable production of foodstuffs, because the land is made more productive through organic rice farming. The governments of different countries around the world are concerned about food security. By using SRI to grow organic rice, Bloom Agro can take part in creating that food security. Organic rice agriculture ensures environmental sustainability by avoiding the use of pesticides.

Aside from organic rice, Bloom Agro also produces palm sugar, which has the effect of preserving the rainforests. Palm sugar is produced from the sap of the sugar palm, which can only grow properly after passing through the digestive system of an Asian palm civet. If these seeds are taken by a human, sugar palms can still grow, but they will not produce the sap needed to produce palm sugar. By producing palm sugar, Emily hopes to help reduce the high level of deforestation in Indonesia. Bloom Agro teaches farmers to not destroy the rainforests by helping them create sustainable income through the production of palm sugar. This shows that Emily's main motivation is not to sell palm sugar, but rather to protect the rainforests. That is the bigger mission of all Bloom Agro products. Bloom Agro also produces salt in the hopes of providing a sustainable income to coastal families.

In selling rice, Bloom Agro emphasises the need for farmers to first see a profit. Once the farmers have made a profit, then Bloom Agro will turn a profit. The efforts to ensure profit for farmers are reinforced by the fair trade scheme used by Bloom Agro. By ensuring that its business benefits farmers, Bloom Agro is able to present itself as a fair trade company, which is recognised through fair trade certification – the first granted to a company in Indonesia. With the company's fair trade status, Emily's intent to ensure the prosperity of farmers can be clearly seen. Fair-trade International periodically audits the prices paid to farmers; if Bloom Agro deals unfairly with the farmers, then its export contracts may be terminated. This has

ensured that Bloom Agro treats its partner farmers fairly, though it has also limited the company's profit margin. Bloom Agro also has a fair trade fund, in which part of its profits are allocated to promote the interests of the community, such as by building public toilets.

Impact of the social business

Before Bloom Agro was established, no organic rice farmers in Indonesia had been certified by an international organic product certification body. Today, ~2,333 farmers coming from 7 subdistricts and 28 farmers' groups are involved in the organic rice farming programme spearheaded by Emily.¹³ The greatest challenge that will be faced by future governments around the globe is producing and providing an increasing amount of foodstuffs to feed the increasing world population. Through organic farming using the SRI method, Bloom Agro's partner farmers have been able to produce ~6 tons per hectare, and even 7–8 tons per hectare during good harvests. This is greater than the amount of non-organic rice produced in Indonesian fields, which averages only about 4–6 tons per hectare.

These organic rice farmers have also produced rice with better nutritional value than non-organic rice. This is attributable to their use of compost as fertiliser. This compost is broken down by worms and other organisms within the earth, and plants' roots must work hard to absorb and distribute the nutrients from this compost throughout the plants. Similar to how a young child is given healthy food and regular exercise, this gives organic rice considerable nutritional value, including a low (nearly non-existent) sugar content. Non-organic rice, meanwhile, tends to use urea or NPK fertiliser. If the organic rice is similar to a young child being given healthy food and regular exercise, non-organic rice is similar to a young child being fed nothing but fast food; it is an instant food which causes the rice's sugar content to increase. Organic rice farming requires that the soil be tilled and weeded three or four times. This tillage and weeding

¹³ <http://www.indonesiaorganic.com>, 10/05/2016.

increases the productivity of the land; each time the soil is tilled and weeded, rice production increases by 1 ton per hectare. This is because the tillage introduces new oxygen to the soil, thereby increasing the land's productivity.

Bloom Agro has received national and international recognition for its work, including the Sustainability Award from the Embassy of Republic of Indonesia, in Brussels (2015), Special Appreciation from the Ministry of Agriculture of the Republic of Indonesia for Excellent Partnership with Farmers, Indonesia (2015), the SOFI Silver Award for Best USDA Organic Product, USA (2012), the Cornell University USA Certificate of Excellence for Farmers, Consumers, and the Environment, USA (2011), the Presidential Award for Best Organic Farmer, Indonesia (2011) and the Presidential Award for Best Farmer for Food Security, Indonesia (2010).

Social innovation and inclusiveness

As mentioned above, in operating Bloom Agro, Emily has established relations with organic farmers, whom she terms her partners. Partner relationships are based on the principle of equality, and this holds true with Bloom Agro and the organic farmers, who are working together towards shared goals. With Bloom Agro, farmers are benefitted by the ability to sell their rice at a profit. The process of obtaining an organic rice certificate is a process claim, not a product claim. As such, the rice production process must be evaluated and well-documented. This includes registering farmers, registering land, preparing an organic mill, preparing organic storage facilities and so on. This process has been able to develop a strong sense of appreciation and bonding, as the process of obtaining organic certification feels as if it is a journey undertaken by farmers together with Bloom Agro. Furthermore, with the capacity building programmes instituted by Bloom Agro, farmers are able to create additional value for their rice in creative ways, such as by producing new products out of organic rice. Here their sense of confidence, a belief that the farmers are creative and thus capable of creating innovative products, is developed. Bloom

Agro, for its part, works towards producing products made of organic rice which can meet the needs of the market. Farmers are thus not simply sellers of rice as a raw material, but capable of creating unique products out of organic rice which meet the demands of the foreign market.

Bloom Agro also provides non-economic value. For instance, when distributors of organic products come from abroad (as purchasers) to see Sunria's production process, they are shown precisely how the farmers cultivate their organic rice and are asked to directly participate in this process. For foreign purchasers of organic rice, this is an important and valuable lesson about agriculture in Indonesia and the country's farmers. Emily considers these experiences to be part of a co-learning process, not only in innovation but also in culture, as the rice farmers in Tasikmalaya also participate in cross-cultural communications by interacting directly with the foreign purchasers of their products. These experiences are of great value to the farmers. Though, in terms of money, the value provided is not as high as that produced by larger companies, the non-economic value is significant. According to Emily, the key to Bloom Agro's success is its business ethics. The application of these business ethics have allowed the company to build partnership relationships with farmers based on the mutual openness and honesty. For Emily, business ethics – particularly honesty with one's partners – are paramount, particularly in social entrepreneurship.

Conclusions

The goal of this article was to explore how social innovation and social entrepreneurship play a role in supporting inclusive and sustainable development. 'Social innovation' refers to innovative activities that include tools, methods, ideas or strategies used by individuals and the public to fulfil social needs and overcome social issues. Meanwhile, 'social entrepreneurship' refers to individual or organisational activities which use a business model to realise social goals and values and thus have social effects on society. 'Inclusive and sustainable' emphasises the importance of

harmonising the goals of development and equity based on sustainable development with principles which prioritise economic growth, social inclusion and environmental protection. For social innovation and social entrepreneurship to support the attainment of inclusive and sustainable development, policy – be it public or private/corporate – must be made to promote increased social activities integrating the three types of sustainability: economic, social and environmental. These three types of sustainability must be realised together.

The literature survey indicates that social innovation and social entrepreneurship play a role in supporting inclusive and sustainable development in two ways: (i) developing individuals' abilities to fulfil their needs (both economic and social) using creative ideas and strategies, without being limited by social or economic status (i.e., inclusive growth); and (ii) balancing the use of resources to fulfil the current generation's economic needs with the availability of resources for future generations. The case study indicates that the social business (Bloom Agro) established by Emily Sutanto, a social entrepreneur, used social innovation in the form of partnerships with farmers to develop these farmers' capacity for organic rice farming. This partnership supported the farmers in their efforts to escape their social and economic problems, the vicious cycle of poverty caused by involvement of *tengkulak* in the rural bonded labour system. This partnership with farmers was also capable of developing a culture of mutual trust and appreciation between the farmers and Emily, which enabled their agricultural products to become relevant on the international market. The organic agriculture system they developed also gained international recognition when its organic agricultural products were certified by international organisations; such recognition was hitherto unprecedented among Indonesian farmers. From the beginning of her social business activities, Emily, as a social entrepreneur, recognised that her business was a very risky one, as she had no permit to export rice from Indonesia. However, through the efforts of Emily and

the farmers, Bloom Agro was ultimately able to export the organic rice it grew. This showed social entrepreneurship's ability to develop capacity, access and markets for farmers and their products.

Limitations and future research

The findings of this article cannot be used as generalisations of the population of social entrepreneurs. Another limitation of this research is related to the qualitative research approach used, which is explorative and based on case study. More extensive interviews, using more analytical tools for analysis, would be able to improve the quality of research. Similar research could be made more useful by including further case studies of social entrepreneurs from various regions and sectors in Indonesia, or social entrepreneurs in other countries.

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United Nations Social Development Network

The United Nations Social Development Network (UNSDN) serves as a global platform for sharing experiences and good practices in social development that aim to assist Governments, UN agencies and Civil Society in the development of social development policies and practices. UNSDN was launched in August 2012 by the Division for Social Policy and Development of the United Nations Department of Economic and Social Affairs. UNSDN aims to contribute to raising awareness of social development initiatives among stakeholders, including academia, civil society and the private sector, creating a dynamic social development network, and reaching out to the public by sharing knowledge, skills, and tools. In pursuit of an inclusive society that ensures no one is left behind, UNSDN focuses on thematic areas such as poverty eradication, employment and decent work, social inclusion, ageing, youth, family, disability, cooperatives, innovation & technology and indigenous peoples

UNSDN simplifies the dissemination of information and knowledge produced by the United Nations system and its stakeholders in the area of social policy and development with particular attention to the three core issues of poverty eradication, employment generation and social integration in order to assist UN Member States in the development of policies and practices that promote the goals of the 1995 World Summit for Social Development and the Copenhagen Declaration.

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FUNDING FRUGAL INNOVATIONS

LESSONS ON DESIGN AND IMPLEMENTATION OF PUBLIC FUNDING SCHEMES FOR FRUGAL INNOVATIONS

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Abstract

This article discusses on the role of frugal innovations in fostering inclusive and sustainable growth. Frugal innovations can be defined as cost-efficient innovations with a social aim, targeting developing or emerging economies. As they can link the aspirations related to business-driven, social and inclusive innovations, they have captured the attention of businesses and policy makers. This article studies the public and charitable funding schemes for frugal innovations, and draws lessons on their design and implementation. It is based on three case studies of funding schemes, which focus on India. There are three types of funding schemes: supporting frugal businesses, supporting grassroots innovations and addressing global development challenges. All these schemes need to address the peculiarities of frugal innovation processes to be successful.

Introduction

After a cataract surgery and 1 month of recovery, a patient looks around amused – he can see his family and surroundings clearly for the first time in years. The patient is 1 of the 32 million treated since 2012 by the Aravind Eye Care hospitals, the world's largest and most productive eye-care service group. The hospitals provide world-class eye care at radical low cost by applying the philosophies of mass production and lean manufacturing. In addition to a low cost, the business model allows offering free surgeries for poor patients. About 70% of eye surgeries are performed for free or below cost, whereas 30% are performed for above cost without compromising quality of care on either side of the price range. The highly efficient operations coupled with this pricing structure allow the hospitals to maintain a 50% profit margin. Profits are then reinvested into growth and expansion of the hospitals, as well as funding ventures like the Aravind Research Foundation (North Eastern University 2011).

Aravind Eye Care hospitals' story is a striking example of a frugal innovation. Frugal innovations can be defined as cost-

efficient innovations with a social aim, originating from or targeting developing or emerging economies (Bhatti 2012). Frugal innovations are distinctive in both their means and their ends (Bound and Thornton 2012). They are distinctive in their means because they respond to limitations in resources, whether financial, material or institutional, and turn these constraints into an advantage. The ends are also distinctive (Bound and Thornton 2012). Successful frugal services, products and processes are not only lower in cost but also surpass or maintain performance dimensions, can be made available at large scale, are compatible with the unique circumstances of the poorest population groups and create considerable social impacts (Bound and Thornton 2012, Nakata and Weidner 2011, Van Beers, *et al.* 2014). Looking back to the example of Aravind Eye Care hospitals, it can be seen that frugality is not limited to product design but spans to new innovative business models and service delivery approaches.

Frugal innovations and business models do not only embrace the distinctive indigenous innovation potential of emerging economies but also entail a promise of a more inclusive and resource conscious

growth globally. Therefore, frugal innovations have captured the attention of policy makers, which in emerging markets face the ever increasing pressure of more inclusive growth and in developed markets economic and environmental constraints. In addition, the international charitable organisations have recently emphasised the role of innovation in poverty eradication (Ramalingam and Bound 2016). For example, this is exemplified by the United Nation's sustainable development goals which mention innovation 17 times.

The promises of simultaneous economic, social and environmental benefits have inspired a growing number of public financing schemes for frugal innovations by national governments and international charitable organisations (Pralhad 2012). This article looks at these schemes with the aim of shedding light on the current practices in providing support for frugal innovations. More precisely, the article studies the objectives and target groups, and draws lessons on the design and implementation of the schemes.

The article will illustrate the current practices by taking three current governmental and charitable funding schemes in the field of health, relevant to SMEs and with a focus on India as case study examples: (1) Tech-Emerge Programme by World Bank; (2) SPARSH Programme by BIRAC; and (3) Affordable Healthcare in India Programme by Wellcome Trust and the Department of Biotechnology, Government of India. The article takes a special focus on India because it has a strong tradition in innovating frugally (Prabhu, *et al.* 2012) and on health sector because it can be considered as one of the most fruitful sector for frugal innovations (Bhatti 2016). The case study is based on desk research and interviews with the programme owners.

Frugal Innovations – a link among business-driven, social and inclusive innovation?

The OECD (2005) defines innovation as 'the implementation of a new or signifi-

cantly improved product (good or service) or process, a new marketing method or a new organisational method in business practices, workplace organisation or external relations'.

Innovations are seen not only as a key driver for economic growth and competitiveness (Schumpeter 1934) but also as a tool for poverty alleviation through inclusive growth (Schumacher 1973). To better understand different types of innovations, this article classifies them as: (1) business-driven innovation for boosting competitiveness; (2) social innovation covering societal challenges and needs; and (3) inclusive innovation targeting the (Indian) social challenges and poverty alleviation.

Typically, business-driven innovations are oriented towards new processes and products, which are expected to increase productivity and create profit. They are often based on incremental product development and resource intensive R&D process, to create new demand rather than to satisfy existing needs of the customers (Basu, *et al.* 2013).

If profit generation is the main motive for business-driven innovations, social innovations are critically driven by a social mission. The social innovations are social in both their ends and their means (Howald, *et al.* 2015); a financial return is often equally balanced or outpaced with the desire to achieve social impact and the value created accrues primarily to society as a whole rather than private individuals (Phills, *et al.* 2008).

Inclusive innovation is correspondingly directed towards, and arising from, vulner-

able groups in the society. Although social innovation responds to social demands of vulnerable groups, tackles common social challenges and targets systemic change, inclusive innovation 'creates or enhances opportunities to improve the well-being of those at the bottom of the pyramid' (George, *et al.* 2012; OECD 2015). Furthermore, in the heart of the idea of inclusive innovation is that it enfranchises individuals and communities in the process of innovation (George, *et al.* 2012).

Although in its narrow meaning, frugal innovation could be defined as the stripping of attributes of technologically sophisticated products, systems and services to make them cheaper without losing technical functionalities, and therewith make them affordable for low-income customers, many scholars (Bhatti 2012) have stressed that frugality goes beyond costs reduction. Indeed, this article argues that frugal innovations can bridge the aspirations and characteristics associated with business-driven, social and inclusive innovation. A fruitful ground for frugal innovations can be found in their intersections (Figure 1):

Frugal innovations in the intersection of business-driven and social innovation:

Frugal innovations in the intersection of business-driven and social innovation aim to address the problems of the poor and simultaneously create profit for a business by developing new (frugal) products to low-income markets in developed and developing economies. With the new products and services to low-income

markets, the innovators aim to achieve the cost leadership as a competitive advantage by generating high profits through low cost and high scalability (Nakata and Weidner 2012). As the new products and services improve the well-being of the poor, they are simultaneously socially relevant (Prahalad 2012). Following this, the social business-driven frugal innovations are ideational to achieve social improvement with aspiration for high scalability (Bhatti 2014).

Frugal innovations in the intersection of business-driven and inclusive innovation:

Frugal innovations in the intersection of business-driven and inclusive innovations put forth the needs of the citizens at the bottom of the pyramid to develop appropriate, adaptable, affordable and accessible services and products to respond their needs. To do this, conventional views to empower the poorest population groups are inverted. According to Prahalad (2012), this gives rise to new kinds of partnerships, which allow poor people to partner with entrepreneurs for win-win situations and to actively be engaged in the innovation processes (Prahalad 2012). Indeed, frugal innovations that respond to a specific challenge of the poor are ideational on proving inclusive outreach by exhibiting proof of concept for a challenging concern (Bhatti 2014).

Frugal innovations in the intersection of inclusive and social innovation:

The intersection of inclusive and social innovations occurs non-profit or local activities by the civil society to address the needs of the low-income groups. These innovations solve the personal needs of users with little or no aspiration to profit or scale from the innovation (Bhatti 2014). However, they can create local employment benefits because of enabling entrepreneurship. These kinds of frugal innovations route to social movements, institutional entrepreneurship, non-profit activities and new collaboration arrangements between actors and have been largely addressed by organisations from international development actors to local NGOs (Mair and Marti 2009).

In addition to bridge the more traditional types of innovations, frugal innovations

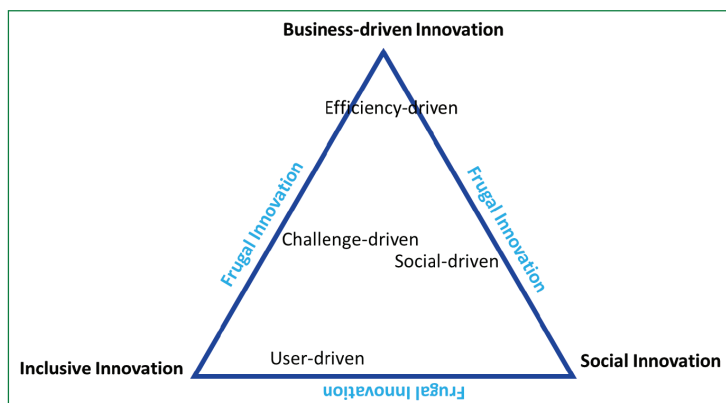


Figure 1: Relation of frugal innovation to business-driven, inclusive and social innovation as well as the motivations to innovate frugally (Bhatti 2012)

entail technology transfer to unconventional directions. First, technology transfer occurs from developed economies to emerging markets, when businesses access new markets with adapting their existing technologies and knowledge. Second, technology transfer occurs from emerging to developed markets because globally relevant innovations initially developed for or at the emerging economies flow upstream to developed countries. Third, technology transfer occurs between emerging economies, when businesses expand to countries facing the same conditions or problems.

Innovating frugally – frugal innovation actors and processes

As the previous chapter shows, frugal innovations bridge essentially different types of innovations and entail technology transfer to unconventional directions. This chapter shows that the bridging character and different motivations behind frugal innovations lead essentially to different kinds of frugal innovation processes by the main frugal innovators: businesses (multinational and small and medium-sized enterprises), civil society, universities and public R&D institutions.

Businesses

There are examples of Western and Indian origin multinational enterprises (MNEs), which have successfully adopted frugal innovation as a strategy, such as General Electric, Siemens, Tata and Godrej (Chataway, *et al.* 2013). Adoption of frugal innovation as a strategy confronts these large multinational enterprises with regard to their traditional innovation processes and business models. Their innovation processes have taken place in centralised corporate R&D laboratories, often located in vicinity of the headquarters, and their business model has based on serving consumers in high-income countries and creating profits through economies of scale (Radjou and Prabhu 2015). Overall, successful adoption of frugal innovation strategy entails the following:

- **Satisfying needs of customers:** Many MNEs have a 'glocalisation' strategy to tailor their existing products to local

needs, implying a compromise between global scale and local responsiveness to achieve new markets in the emerging countries (Zeschky, *et al.* 2011). This is not often enough to create successful frugal products and processes because they need to be as appropriate as possible to customer needs. Instead, adoption of frugal strategy may require developing a new product, complete re-engineering of an existing product or a more iterative R&D process involving users (Radjou and Prabhu 2015).

- **Localised process of innovation:** Organisationally placing customer needs in fore means that the centralised and product-focussed (innovation) structure has to change to a more decentralised and local market-focused structure (Bhatti 2014). This means proximity to the local markets throughout the entire value chain from conceptualisation of the product to designing, commercialisation and delivery.
- **Low-unit costs and utilisation of economies of scale in profit generation:** As the unit costs of frugal products and services need to be low, profits can be only generated through scale. This means finding new means to distribute products and reach customers (Nakata and Weidner, *et al.* 2012; Zeschky, *et al.* 2011) as well as lean, flexible and highly networked R&D (Radjou and Prabhu 2015).
- **Categories of products:** Products aimed at high uptake need to reflect lower income groups' consumption preferences and conditions. The types of products that will matter most for those with small budgets relate to health and food as well as agriculture production. Other categories are products aimed at improving basic living conditions and education. For middle-income groups, cheap cars and laptops will also be a part of the consumption priority lists (OECD 2015).

Compared to the large multinational enterprises, SMEs face additional hurdles when innovating frugally because of lack of resources, networks and internal R&D capaci-

ties. Yet, although largely undocumented, it has been found that SMEs located in emerging economies play a key role in producing 'below the radar frugal innovation' (George, *et al.* 2012). There are also some Western SMEs seeking to enter into new markets in a similar manner to their larger counterparts. Many of these SMEs seek to enter the emerging markets by exporting (Hollenstein 2005), utilising government support to overcome trade barriers, becoming subordinate partners to a MNE or becoming a part of production networks (Miranda, *et al.* 2013). Miranda, *et al.* (2013) argue that entry to emerging markets and successful operation can also be achieved by altering their innovation process, which are as follows:

- **Satisfying needs of customers:** Similarly to MNEs, the products and services of SMEs need to be designed or re-engineered to satisfy the existing needs of the customers at emerging markets.
- **Low-unit costs and utilisation of economies of scale in profit generation:** As MNEs, SMEs aim at creating profits through scale.
- **Utilisation of open innovation networks in conception and implementation:** Open innovation is a paradigm that assumes that firms can use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology (Chesbrough, *et al.* 2008). At the conception state, SMEs can take advantage on open innovation networks by using external ideas to substitute the lack of R&D resources. Later, the international networks can be utilised in product testing and delivery (Hollenstein 2005).
- **Exploitation of local markets and resources:** The local SMEs can successfully develop frugal innovations by exploiting local markets and locally available resources. The products need to be more accessible to the poor and utilise new technologies which are more inclusive of poor producers (Chataway, *et al.* 2013).

Civil society

Individuals in emerging economies are important frugal innovators at a local scale,

Funding frugal innovations

where innovations are often developed by a chance or through experimentation (Gupta 2013). The ideas emerge from a variety of situations, often from a problem either the innovator or a family member suffers and the process often utilises bricolage – individuals improvise by recombining existing, but individually less useful, resources to create value through creative reconstruction (Gupta 2013). The products either involve traditional knowledge or an adapted use of modern technology that most people can afford (OECD 2015).

The grassroots innovations are commercialised or scaled up only rarely as the innovators experience lack of tangible and intangible resources. However, scaling up is not an absolute necessity – the very process of designing local innovations to serve local needs may support the innovating individual and an inherently small-scale market, while also contributing to poverty alleviation (Chataway, *et al.* 2013).

Yet, NGOs can play an important role in promoting the development and adoption of more inclusive local innovations.

Universities and Public R&D institutions

In the previous studies, universities and public R&D institutions are rarely mentioned as a source of frugal innovations. However, there are two kinds of processes in universities leading to frugal innovations: specific research activities targeting for developing frugal solution, and basic and applied research, which can be commercialised in a frugal manner. An example of the former are university programmes such as Frugal Innovation Laboratory at Santa Barbara University and Entrepreneurial Design for Extreme Affordability programme at Stanford University. An example of the latter are initiatives at the Indian CSIR laboratories conducting applied research, which have developed technology applications for rural India (Utz and Dahlman 2007).

Public funding instruments for frugal innovations

As the previous chapter shows, the frugal innovators range from large MNEs

wanting to enter new markets to poor individuals searching solutions for everyday problems. The multitude of frugal innovation actors and processes has also spawned different kind of public or charitable funding schemes for the support of frugal innovation.

In a mapping, implemented as a part of this study, together 17 funding schemes for frugal innovations were found, 11 with a particular focus on India (Table 1). On the basis of their objectives and target groups, they can be classified into:

- **Support to frugal innovations at grassroots:** Means to encourage local grassroots innovation include technical assistance to support scouting and documentation, rewarding individuals behind innovations (e.g., IPR protection), prototype development, and diffusion through networks (Gupta 2013). Therefore in India, based on idea of finding and documenting grassroots innovations and disseminating them, a series of initiatives have been emerged, including the National Innovation Foundation, the Grassroots Innovations Augmentation Network and the Honeybee Network.
- **Support to frugal businesses:** The recent years have seen a rise of impact investments funds, that is venture capital funds, which produce social benefit to the society and finance, and social and frugal enterprises with a viable business plan (Dutt and Ganesh 2014). Yet, most social enterprises are too early stage and high risk to be attractive to investors and rely mostly on bootstrapping to acquire sufficient working capital. This has inspired funding incubators to support early stage social enterprises to improve their chances of survival and growth. One example of such an incubator programme is INVENT by the DfID. In addition, there are initiatives aiming to bring together Western and Indian companies to jointly produce innovations and catalyse technology transfer. Such initiatives include TechEmerge Programme by the World Bank, the Finnish Innovation Foundation's India Cooperation and CEFIPRA Industry

Academia Research and Development Programme. Common to all these business support instruments is that their main objective is to bring up viable profit generating businesses, which also generates some social impact.

- **Innovations to tackle global challenges:** These schemes aim to address the global challenges or benefit the population at the bottom of the pyramid. They are either funded by foreign aid or national governments, and the main impacts are expected to occur in India. Examples include Affordable Healthcare in India Programme, SPARSH Programme by BIRAC, and Millennium Alliance and Newton Fund – DST/DBT Cooperation.

From these three groups of schemes, the latter two have particular relevance to Western and Indian SMEs. We illustrate that the current practices through three case studies on frugal innovation funding schemes in the field of health with relevance to SMEs: (1) TechEmerge, (2) SPRASH, and (3) Affordable Healthcare in India.

TechEmerge

The TechEmerge Programme was launched by the International Finance Corporation (a part of the World Bank) in 2015. It is a matchmaking programme for proven technology companies around the world that are looking to grow their business in emerging markets, namely in India. The inaugural programme connects innovators globally to health care providers in India to accomplish the dual goals of improving health care delivery and patient outcomes in India (World Bank 2015).

The establishment of the programme was motivated by the World Bank's notion of companies not entering new markets despite of market ready technologies because of lack of awareness of market potential, funding for technology adaptation and business networks. Therefore, the programme sources innovations worldwide and gives the innovators a boost to accessing Indian markets. Contrary to many other schemes, the programme is open to companies with already a

Table 1: Funding schemes for frugal innovations, with a focus on India

Scheme	Initiator
Support to frugal innovations at grassroots	
Honeybee Network and the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI)	Development Voluntary Organisation (India)
National Innovation Foundation	Department of Science and Technology, Government of India
Grassroots Innovation Augmentation Network	National Innovation Foundation, India
Support to frugal businesses	
INVENT Programme	UK Government's Department for International Development, The German agency for International Cooperation (GIZ), Technology Development Board (TDB), India
Tech-Emerge-Health	World Bank (International Finance Corporation)
Tekes-India Collaboration	Finnish Funding Agency for Innovation (Tekes), Department of Biotechnology, Department of Science and Technology, Government of India
Industry Academia Research and Development Programme	CEFIPRA, France
Support to frugal innovations to tackle global challenges	
SPARSH Programme	BIRAC, India
Newton Fund competitions	UK Government's Department for International Development and Innovate
Millennium Alliance	USAid, Department of Biotechnology of Government of India and Federation of Indian Chambers of Commerce & Industry
Affordable Healthcare in India scheme	Wellcome Trust

proven technology. These companies are selected through a competitive application process, in which their technologies are judged against the criteria of usability, sustainability, affordability and relevance to the needs of the health providers in India (Barisik 2016).

Selected innovators will be invited to meet with senior executives from health care providers in India, and discuss the potential of conducting a pilot together. In preparation for these meetings, the innovators are offered background information on the Indian market and help to better understand how their technologies can be applied to the Indian context. Up to \$1 million are available in a funding pool to support pilot implementations. The joint pilots will be provided with a grant (6–9 months) aimed at technology adaptation, testing and piloting. In addition, innovators will be able to join educational workshops, receive pilot implementation support from the programme as well as present their pilot results at major health events and conferences (World Bank 2015).

SPARSH programme

The SPARSH Programme was initiated by Biotechnology Industry Research Assistance Council (BIRAC) under the aegis of Department of Biotechnology, Ministry of Science and Technology, Government of India in 2013.

The programme aims at promoting the development of innovative solutions to (India's) society's most pressing social problems. The scheme aims to invest in ideas and innovations that improve health care of all Indians and encourage affordable product development in the social sector (BIRAC 2013). The programme has three main objectives: (1) identify and provide support to cutting edge innovations towards affordable product development that can bring significant social impact and address challenges of inclusive growth; (2) provide support in the form of impact funding of biotech product innovations (with social goals) that can be scaled and; (3) create and foster a pool of social innovators in biotech and provide a platform to share best practices and

understand intricacies of business models in social innovation and network.

The programme launches annually calls for proposals, which address unmet national needs, which need special attention and have large societal implications. Till date, the programme has launched three calls for proposals 'Maternal & Child Health', 'Healthy Mother, Healthy Child' and 'Innovative Technology Solutions for Waste to Value', which are open for Indian applicants. The calls aim at affordable product development and fund projects, which are at different stages:

- **Idea to Proof of Concept:** Proposals are invited for taking an idea to proof of concept, which is at an ideation or nascent stage and that would aim to bridge significant challenges in the social innovation arena.
- **Proof of concept to validation:** Proposals are invited to social innovation arena, which have crossed the ideation and PoC stage and are in the stage of need for validation.

Funding frugal innovations

- Innovative pilot scale delivery models: Proposals are invited for demonstration of delivery models of innovative health care products and services pertaining to social innovation that can show positive social impact, sustainability of operations and potential for scale up.

Depending on the innovation stage, the funding takes the form of a grant or loan, complemented with mentoring support. In addition to the annual calls for proposals, SPARSH implements a fellowship scheme 'Social Innovation Immersion Programme', which intends to create a pool of social innovators in the biotech arena who can identify specific needs and gaps (BIRAC 2013).

Affordable health care in India

The Affordable Health Care in India scheme was initiated in 2008 in a partnership between the Wellcome Trust, a charitable foundation aiming at improving health, and the Department of Biotechnology, Government of India. The \$64 million scheme was set to run for 5 years, and is currently ongoing a scheduled review (Wellcome Trust 2010, 2016).

The objective of the scheme is to fund translational research projects to deliver safe and effective health care products for India – and potentially other markets – on a large scale at affordable costs (Wellcome Trust 2016). The idea behind the programme is that the most promising research results are found and handed through the whole process of commercialising and scaling (Mukherjee 2016).

A key feature of the scheme is to encourage innovations that bring together researchers from both the public and private sectors to extend access of such innovations to the greatest numbers of beneficiaries, without compromising on quality. The scheme is open to applications from for-profit or not-for-profit institutions, governmental or non-governmental organisations and international organisations operating within the territory of India. Projects must take into account the criteria for affordability, and

that the development path proposed maximises wide-spread adoption and has a realistic possibility for downstream uptake by a follow-on partner (Wellcome Trust 2016).

The support is provided in the form of a grant and mentoring. It is also possible to apply for smaller amounts of funding for the proof of concept and validation of the technology to reach an adequate level of readiness to be eligible for full-scale funding. Awareness raising and training activities have also been available for eligible institutions (Mukherjee 2016).

Lessons learned

The case studies introduced three different types of funding schemes for frugal innovations with relevance to SMEs. Despite their different set-up, common lessons can be learned with regard to their design and implementation.

Call theme and description create the pathway to frugal outcomes. Certain thematic areas, including health, are more fruitful for frugal innovations. The call text should include a clear problem statement and draw applicants' attention to the requirement of affordability and social impact. The project selection criteria, on the other hand, ensure that projects responding best to the call will be selected. Common to the three case study schemes was that affordability and social impact were part of the core project selection criteria.

Understanding the needs of the target group is elemental for innovating frugally. Therefore, the schemes should encourage acquiring knowledge on the needs, and piloting and testing at the target markets. Attainment of local knowledge to understand the operating environment is particularly relevant for international collaborations and it can be ensured through involvement or relevant partners in the projects, for example, TechEmerge-partnered global innovators with Indian care providers. As frugal principles or target groups may be new to the businesses, awareness raising, training and mentoring have also proved to be useful. Indeed, all the case study schemes provided advisory services in

addition to financial support.

The case study schemes focussed on supporting different stages of innovation process. However, common for them was placing emphasis on scalability of the innovations and implementation of the innovation process in a partnership. Although the frugal innovation projects might involve above average risk, the schemes should include a risk aversion mechanism. This could take a form of staged funding or a provision of soft loans as in the SPARSH programme.

Conclusions

Frugal innovations can bridge the aspirations and characteristics associated with business-driven, social and inclusive innovations. Frugal innovations and business models do not only embrace the indigenous innovation potential of emerging economies but also entail a promise of a more inclusive and resource efficient economic growth globally.

Although a relative new phenomenon, frugal innovations have captured the attention of policy makers and a number of schemes for their support have emerged in recent years. Many of the schemes are relevant for SMEs, which are one of the most relevant frugal innovators alongside MNEs and the civil society. To be successful, the schemes need to address the peculiarities of frugal innovation processes of the most important frugal innovators.

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SOCIAL INNOVATION AND SOME JAPANESE CASES

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Abstract

There have emerged new types of social problems and issues that were too complicated to solve by simple solutions. Social innovation has been a concept and an approach to try to deal with these complex issues. There have been many definitions on the concept of social innovation. Even though there would be difference and contradictions among them, they have shared the same characteristics that were to think of problems and issues as social agendas, invent new ideas and adapt them to resolve through making new systems. If we try to find some theoretical basis of social innovation, it would be possible to figure out several theories like 'social aspects of innovation', 'social entrepreneur' and 'social capital'. There have been also several activities of social innovation in Japan. Although they have varieties, they have shared same type of characteristics that were to deal with issues at the fundamental levels and would be equivalent to what Muhammad Yunus had tried to do. It would be necessary to get empirical researches about social innovation due to demands for new solutions to complicated problems all over the world.

Introduction

A lot of new social issues have emerged since 1990s. These were problems, such as social exclusion of minorities, serious environment disruption, corrupts of education systems, disparities of living conditions and so on. In many developed countries, widening of globalisation, decreasing birth rates and aging populations provide a backdrop for these issues and huge efforts have been exercised to find solutions to them. Social innovation has been thought to be one of the approaches and/or ways of thinking for managing these issues.

The term 'social innovation' has been widely discussed by a few scholars, such as Mumford (2002), Mulgan (2007) and Phills Jr., Deiglmeier and Miller (2008), who tried to clarify the concept of social inno-

vation in different ways of thinking (Table 1). For example, Mumford has thought of social innovation as the generation and implementation of new ideas regarding how people should organise their interpersonal activities, or social interactions, to meet one or more common goals. Mulgan has suggested that social innovations were social activities and services motivated by the goal of meeting social needs, and were predominantly developed and diffused through organisations whose primary purposes were social. According to Phills Jr. and colleagues, social innovation could create new, unprecedented approaches and processes for advancing social demands and issues.

Although there were several differences among their definitions and notions,

they shared a common perspective of social innovation. They tried to identify social issues and needs and place them on the social agenda for resolutions. Furthermore, they proposed 'new' ideas and plans to address these issues and needs. They also pointed out the importance of realising these ideas and plans by setting up the institutes and organisations to initiate practical activities.

It was noteworthy that social innovation has been applied to many areas, including political and governmental areas (new models of public health systems), commercial markets (open source software and organic foods), social movements (fair trade), academic areas (pedagogical models of childcare) and social enterprises (microcredit and new type of magazines; Mulgan, 2007). The most famous example of social innovation would be the Grameen Bank, a micro-finance banking system that provided unsecured credit at low interest to poor people in Bangladesh. Muhammad Yunus (2009), the founder of the Grameen Bank, who has received much favourable press coverage over the years and was awarded the Nobel Peace Prize in 2006 for his pioneering activities in microfinance, asserted that poverty has not been self-imposed, but rather it has been imposed by our institutionalised practices and policies toward poverty. He emphasised that we should redefine our established ideas, policies and current practices to better combat poverty.

It will not be enough for us to just concentrate on the phenomena of issues or problems to be resolved in our society. We should call into account their root causes, if we really wish to resolve problems such as poverty. Yunus' activities, and specifically setting up the Grameen Bank based on a new idea of microfinance, were not only just about renting money to the poor but were also about empowering poor people to tackle their living conditions—one of the fundamental social issues in poor countries.

Table 1: Several definitions of social innovation

Source	Definitions of Social Innovation
Mumford (2002)	The generation and implementation of new ideas regarding the organization of interpersonal activities or social interactions in order to meet one or more common goals.
Mulgan (2007)	The development and distribution of new ideas that serve the social objective in the form of new, revolutionary activities and services through organizations whose primary motives are to meet social needs.
Phills Jr. et al. (2008)	Processes that create new, unprecedented solutions for addressing social demands and issues.

Source: Mumford (2002), Mulgan (2007), Phills Jr. et al. (2008)

Concepts of innovation¹

As Schumpeter (1934) has pointed out, the concept of innovation was not limited to the technological sphere, but encompassed much more than technology. Schumpeter has considered entrepreneurship and innovation as being essential to economic development, and clearly distinguished them from invention. As following his view on the concept of innovation, new products and services were generated through the combination of available/existing resources/goods and powers. He observed that one phenomenon that characterises innovation is the discontinuous occurrence of 'new combination[s] (neue Kombination)'; through which radical new products and methods of production could be introduced. He listed five kinds of 'new combinations'. First, the introduction of unknown/unfamiliar 'new goods', or goods having a new quality, and yet unknown to the consumer; Second, the development of a new method of production; Third, the opening of a new market; Fourth, the acquisition of a new source of supply of raw materials and intermediate goods/half-manufactured goods; and Fifth, the creation of a new organisation.

Therefore, effects of innovation could reach over reforming or revising organisations and social systems which used to work ineffectively with something new.

For example, the Dutch East India Company, which was established in 1602, has evolved into a new organisational form, namely a corporation (as a business construct), in which innovation was institutionalised. In this sense, the innovative adaptations of business organisations into modern corporations were a driving force behind the industrial revolution in Europe, and was an institutional or social innovation, rather than technological ones.

Heiskala (2007) has also defined innovation as being comprised of the following three steps: First, an idea or action that is defined as 'new' emerges; Second, an idea or action that influences changes in social practices begins to take root; and Third, an idea or action that has an effect of improving social and/or economic performance is implemented.

The first step is based on the notion that if something is novel, it could be innovative. However, the most crucial point in this stage is that 'novelty' will be recognised in a particular context/environment. Therefore, even a well-known, well-established invention or finding that we have already recognised could have a possibility to foster 'innovation', if it was put in a specific context/environment where it could be recognised as novel (Swedberg, 1991). Thinking about innovation as in this way would offer a wide variety of perspectives/definitions of innovation. Several recent discussions in policy areas have shown that when rec-

ognising the contexts as very important to innovation, entity of innovation would be multi-dimensional and much broader than what we have thought of. For example, the Department for Innovation, Universities and Skills (DIUS) in the United Kingdom has tried to widen the concept of innovation to the state-/nation-wide level through discussions of policy directions on several specific policy issues. One crucial point of these discussions was not only just changing the concept and definition of innovation in a given framework, but also changing the whole perspectives about innovation (Department for Innovation, Universities and Skills, 2008).

Traditionally, the United Kingdom has dealt with innovation in several policy areas, especially in science and technology, which were similar to those of other developed countries including Japan. Currently, the United Kingdom has extended its focus and interests to much broader concepts of innovation, which have sometimes been called as 'hidden innovation'. Although this type of innovation has not been clearly recognised, it has been said that it should be used to inform policy to effect innovations in many fields (NESTA, 2007a), and so could be called as 'total innovation' (NESTA, 2008a, 2008b). Changing the concept of innovation to be more comprehensive would encourage the development of specific indicators for innovation in the United Kingdom, and therefore go beyond policy discourses

¹The concept of "innovation" has a long history, so the focus of this article is limited to the concept and the history of innovation that would be directly related to social innovations.

about innovation of technology and sciences (NESTA, 2008c).

Unlike Japan, the United Kingdom has tried to broaden the concept of innovation, specifically into policy areas that might lead to change or improve society. This occurred because the United Kingdom has recognised that the environment in developed countries had changed, and that technology, which was the focus of private companies for example, had lost the potential to create innovations. It would be also necessary, therefore, for policy makers in other mature countries to expand the concept of innovation to encompass the social sphere.

Theoretical concepts based on social innovation

Social aspects of innovation

Since 1970s, several studies have given attention to the social aspects of innovation, although the mainstream has remained entrenched in its conviction of the importance of technology (Williams and Edge, 1996). The notion supporting the traditional concept of innovation has based on a 'linear model', in which changes that made by technological innovations could occur in a linear fashion. In addition, this model supposes that innovation processes commence with basic researches, which are followed by applied researches. And then, a new technology that results in applied researches would happen and be diffused by the market, as a consequence of a kind of innovation processes.

On the other hand, some researchers have become interested in the social aspects of innovation and they have been known as advocates of 'the social construction of technology'. According to their theory, it would not be necessary that innovation process be subject to the preceding linear developments of technology. Rather, innovation would be open to multiple directions (Pinch and Bijker, 1987). As both the creators and the beneficiaries of innovation are human beings, so innovation is not only the consequences of the outputs of linear technological developments, but also the results of interactions among many fac-

tors, including technological, economic, political, social and/or geological.

This way of thinking about innovation has emphasised especially that innovation would result from interactions between innovation seeds like a technology and environment around innovation, that is society, and interactions themselves would have the potential to be changed. Therefore, both society and technology would be equivalent. This notion of innovation is complicated in comparison to that preoccupied by technology, but it could be a reflection of the dynamic and complex processes that characterise innovation. Furthermore, it reminds us that if we would think about innovation, we cannot avoid thinking of social aspects.

Mumford (2002) has focused on contextual factors of technology, and thought of them as creative and structural factors to innovation. He emphasised contextual factors as having an effect on the acceptance and implementation of new ideas and suggested the following four hypotheses: First, (social) innovation needs to sophisticate ideas through information exchanges with others in a communicative environment. Second, ideas must show their benefits clearly and be able to be implemented at low cost within given systems. Third, the support of the elite must be acquired in accordance with existing support circles. And Fourth, effective communication is necessary for the acceptance of innovation.

Several studies have focused on social interactions to create innovations through combinations of related stakeholders in multi-stage processes. They have been interested in connectedness, or networks among stakeholders and other factors. For example, in a modern complex society, it would be hard to imagine that only one stakeholder and/or factor could stimulate innovation. Therefore, several researchers have explored the possibility of openness in innovation process. For example, Chesbrough (2003) has used International Business Machines Corporation and Procter & Gamble to showcase the advantage of 'open innovation', in which alliances or networks of different

companies could allow merging internal and external ideas to create innovations. Alliances and networks could also have an advantage in which a service or product would acquire de facto standards in a market, because the connectedness such as alliances and networks could give companies efficiency with same infrastructures to make services and products. In addition, this type of innovation might have an impact on society as a result of the associated networking among various types of organisations, which would be different from the present so-called division of labour among companies.

The concept of this type of innovation has gradually been introduced into the discussion of industrial policies, to promote small and medium firms. At the same time, several studies have tried to assess the effectiveness of open innovation systems by reviewing cases focusing on industrial policies and theories of industrial clusters. For example, Doi (2005) has called the accumulation of networked conditions as a cluster and examined its effectiveness in terms of developing standards of creativity for new methods, social values for dealing with actual social problems, and the incubations needed for social enterprises and social businesses.

These notions have shared characteristics in which social factor is essential to invoke innovations. That is, social aspects were needed to create innovations. However, the concept of social innovation has a much broader focus than emphasising importance of social aspects of innovation in which it could put social phenomena on the agenda where they could be tackled and generalised into more universal phenomena. Mainstream or ordinal concepts of innovation have only been dealing with subjects that technology should be able to overcome. Therefore, the main foci of the 'mainstream innovation' concept have been on very specific issues that mainly technology would be related, and this type of innovation could have impacts on society indirectly, as a consequence of its technological outcomes. On the other hand, social issues and problems themselves would be much broader and more complex than technology. Therefore, if we deal with

them through changing world, we have to make them social agendas to which society as a whole should react. In this sense, social innovation would have a potential to make impacts directly on societies.

Social entrepreneur

It has been said that 'entrepreneur' is a kind of actor, who is likely to evoke innovation. In Japanese, it has been called as 'Kigyouka', which sometimes has two meanings. One is business enterprise and the other is an entrepreneur. However, it would be hard to call everyone who started something new as an entrepreneur. In addition, the meaning of entrepreneurship would be trivialised if we were to label every business as entrepreneurship. Entrepreneurs might have the potential to destroy existing regimes and create new values. In other words, entrepreneurs could initiate a revolution from which something new and valued could be created. In this sense, it is necessary to distinguish 'entrepreneur' from 'manager' who pursues efficiencies within the existing structures.

Schumpeter (1934) has proposed a wider definition of 'entrepreneur', which was not limited within people who set up their own businesses and manage them, but included those who belonged to corporate enterprises, such as corporate executives and engineers. Since 1990s, some entrepreneurs have successfully demonstrated unprecedented solutions for emerging social problems and issues. These types of entrepreneurs are the so-called social entrepreneurs, such as Charles E. McJilton (CEO of Second Harvest Japan) and Anshu K. Gupta (founder of GOONJ) (Bornstein, 2004). In addition, as Christensen (1997) and Christensen and Raynor (2003) have shown, social entrepreneurs could embark on their businesses without relying on scarce resources, and create 'disruptive innovation'. As a result, they could have a great social impact (Watanabe, 2009).

Several studies have focused on key players of social innovations, and specifically on their characteristics, abilities, competencies and life histories. For example, Martin and Osberg (2007) have compared some cases of social entrepre-

neurs and portrayed them as individuals who grasped business opportunities and brought results. Simonton (1984, 1999) has analysed the life histories of social entrepreneurs and showed that entrepreneurship was closely related to premature intellectual development, a peripheral family environment and non-traditional training and experiences. Csikszentmihalyi (2000) has argued that the characteristics of social entrepreneurs would come from interactions between individuals and society, and these interactions themselves could form the quality of timing and potential for innovation.

To some extent, social entrepreneurs would have the ability to identify and raise social issues as well as move them forward as social agenda adaptable to business or organisational activities. At the same time, it is necessary to pay attention to social contexts, in which social issues are re-assessed. As such, social entrepreneurs are an important factor in social innovation. However, social issues are depending on contexts in which innovative activities are embedded and even entrepreneur would be embedded in the same context. Therefore, it would be necessary to take into account the importance of social contexts in which entrepreneur would be put when we think of social innovation.

Social capital

The concept of social capital expanded rapidly in the late 1990s. According to Putnam (1995, 2000), who was one of the main scholars to raise the profile of this concept, social capital pertains to the characteristics of social structure that enhance social productivity, such as 'trust', 'norms' and 'networks' through the increase of social cooperative behaviour. Therefore, social capital includes the human relationships surrounding an individual, such as certain social networks.

There were numerous empirical studies on effectiveness of social capital in Japan (the National Life Bureau, Cabinet Office, Government of Japan, 2003; Fujisawa, Hamano & Koyabu, 2007; Tatsuki, 2008; Fujisawa, Hamano & Takegawa, 2009; Fujisawa, Nagatomi, Ishida, & Iwasaki, 2010; Ishida, 2009; Nagatomi & Fujisawa,

2009). Results of these studies suggest that prosperous/high social capital could have positive effects on many social and economic spheres.

One line of study on social innovation has focused on the relationship between social capital and innovation. Landry, Amara and Mokhtar (2002) investigated whether or not social capital could promote innovation and suggested that it was necessary to have adequate governance structure that social capital could promote for making innovation successfully. The Institute of Policy Sciences in Japan (2008) assessed businesses activities related to Research & Development in Japanese regional area and found that the more scholars have cooperated, the more innovation has occurred.

Putnam (2000) has distinguished between two frequently acknowledged concepts of social capital. 'Bonding' social capital is characterised as inward-looking ties within similar organisations and 'bridging' social capital as outward-looking networks of different kinds of people and organisations. The former is regarded as more exclusive but with a stronger unity, whereas the latter is more open but with lower levels of unity. Much current research states that 'bridging' social capital is more likely to facilitate innovation than 'bonding' social capital (Woolcock, 2000; Hämäläinen, 2007).

Other studies have conducted empirical researches on Japanese contexts and found that 'bridging' social capital has a greater positive impact than 'bonding', for creativities in regional innovation (Nagatomi and Fujisawa, 2009; Fujisawa, Nagatomi, Ishida, and Fujisawa, 2009). These findings are in line with the concept of 'open innovation', in that the interactions and/or interconnecting ideas among stakeholders could enhance values as a consequence of their openness. And an important emerging point about this approach to social innovation is how to approach it at a policy level (Schienstock and Hämäläinen, 2001; NESTA, 2007b).

A social issue or problem that would be valued more universal should be given attention from different perspectives. A specific agenda could be recognised as

common to several different contexts, through any information flow or communication, such as bridging social capital. Therefore, it would be necessary for social innovation to detect certain phenomena as social issues and to generalise them as agenda items that need to be tackled in society. For the latter, social capital plays a very important role for evoking social innovation.

Several cases of social innovation in Japanese

According to a report of the Japanese Ministry of Economy, Trade and Industry (2009), the most common type of major organisations in the social innovation area in Japan was non-profit organisations (NPOs) and its percentage of whole organisations working at social innovation area was 46.7%. And profit-making organisations (joint stock companies or limited liability companies) followed and that was 20.5%.

NPOs play a crucial role of social innovation activities and businesses in Japanese settings. Omuro (2004) has showed three types of organisations that led social innovation activities in Japan: First category of NPOs, most of whose benefits came from business activities in markets; Second, profit-oriented businesses whose missions were strongly social; and Third, affiliated companies that were subsidised by their controlling corporate parents' company to deliver special social missions. All three types of organisations were private, and therefore it has been said that Japan's main players have voluntarily committed to leading social innovation activities.

There are many cases exemplifying social innovation in Japan. They have varieties and it would be hard to choose a case as a typical image of Japanese social innovations. However, each of Japanese social innovation would share affinities in which they have found generalities in each issue or problem, and tried to find social solutions to these issues or problems, even though their history, structure, background, business and future direction are completely different.

For example, NPO Hokkaido Green Fund has commenced activities under the auspices of the Seikatsu Club Hokkaido (consumers' cooperative society) and was established in July 1999. Since then, it has been committed to advocate clean energies and provide information about them. Through its activities, it established two affiliated companies—the Hokkaido Citizens' Wind Power Co. Ltd and the Natural Energy Citizen Fund Co. Ltd—that support citizen-organised businesses maintaining wind force power generation systems in Hokkaido, Aomori, Akita, Chiba and Ibaraki.

The Daichi Wo Mamoru Kai Co. Ltd has begun its activities in 1970s, when environmental pollution caused by agricultural chemicals, such as pesticides were recognised as a serious social issue. Founded in 1975 and registered as Daichi Co. Ltd in 1976, which was one of the first successful enterprises to establish a specific distribution system—the home delivery system—for selling organic products. In 2009, it was engaged with 2,500 registered farm producers, 91,000 registered customers and 5 corporate members.

THE BIG ISSUE JAPAN was the Japanese version of THE BIG ISSUE, a social business founded in London in 1991. Its mission is not only to just supporting homeless people, but also helping them to achieve independence. Its activities are more than just simple charitable activities in that homeless people are given the opportunity to support themselves financially by selling 'The Big Issue' magazine on the streets. This way of thinking of BIG ISSUES was important because they focused on fundamental issues of homeless people and have tried to set up systems in which they manage to their lives.

This initiative was first developed in Osaka and Kyoto, and has now expanded to other cities, including Sapporo, Sendai, Funabashi, Yokohama, Nagoya, Kobe, Kyoto, Hiroshima, Fukuoka and Kagoshima.

The Japan Sun Industries, based on Beppu City, Oita, and Kyushu, has been established in 1965 as a Japanese social welfare corporation. It has a mission that 'No one is so disable as to be unable to work at all. No charity, but a chance!' and

has employed over several thousands of people with disabilities since its starting. Many organisations involving in social welfare areas in Japan have tried to expand their focus not only just on supporting their clients but also creating life chances for them. The Sun Industries has succeeded to create life chances for their clients with setting up their own unique system to be able to give them opportunities to work for life.

For example, The OMRON Taiyo Home Co. Ltd. is a unique private company founded in 1972 through the joint investments of a Japanese electric equipment manufacturer, OMRON Co. Ltd and The Japan Sun Industries. It is based in Beppu City, Oita and Kyushu. Its main purpose was to create jobs for people with disabilities. People working at the OMRON Taiyo Home Co. Ltd have produced high-quality industrial sockets. The Japan Sun Industries has developed other types of joint investments and established other corporate organisations, such as Honda Taiyo Home Co. Ltd and Mitsubishi Taiyo Home Co. Ltd to expand employment opportunities for individuals with disabilities.

Conclusion

These organisations and companies that we picked up above have dealt with different themes and from different backgrounds. However, they have same type of characteristics, which was not only to focus just on specific issues for specific people, but also to deal with these issues from a much broader perspective. In addition, they have tried to invent new ways and form organisational structures that facilitate coping with these issues effectively. They have also tried to influence society 'directly'. These objectives are comparable to those that motivated the founder of the Grameen Bank, Muhammad Yunus.

As Mumford and Moerti (2003) and Mulgan (2006) have pointed out, it would be hard to say that there have been enough researches about social innovation. The reason for the scarcity of social innovation researches was that there have been too many strategies and policy promoting (social) innovations in many areas of busi-

ness and technology, and, as a result, there have not been any comprehensive directions focusing on social innovation itself (Mulgan, 2006). To tackle these problems, a new policy and strategies are required like what United Kingdom has tried. The type of new policy would emphasise comprehensiveness of innovation and expand its concepts into many areas.

It is anticipated that researches about social innovation will become more fertile in the future, both theoretically and empirically, because social issues and problems have become very complicated at the global level and it will be difficult to solve them using traditional approaches and ideas. Therefore, we need to develop evidenced-based discourse about social innovations. More specifically, it will be necessary to create a more detailed framework for policy contexts.

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Social Innovation in Health Initiative

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SOCIAL INNOVATION IN THE PHILIPPINES

PURSUING SDGs THROUGH CROSS-SECTOR PARTNERSHIPS

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Abstract

Cross-sector partnerships can be a viable model for addressing complex social problems (e.g., education, employment, health and environment) and for scaling initiatives for greater impact. This emerging social development model takes on special significance, given the recent adoption by the United Nations of the Sustainable Development Goals (SDGs). In this article, we describe two private-sector initiated cross-sector partnerships in the Philippines, one that significantly reduced malaria incidence in the country and another that empowered women by enhancing their entrepreneurial skills. These two cases show that players from different sectors, by working together at the grassroots, not only overcome their resource constraints but also generate synergies that would not have otherwise been possible by working independently of each other.

Introduction

Cross-sector social partnerships are a commitment by organisations coming from different sectors (i.e., private, public and non-profit) to work together to tackle problems that extend beyond their respective organisational boundaries. These partnerships primarily seek to address social issues (e.g., education, employment, health and environment) by combining organisational resources to offer solutions that benefit both the partners and society at large (Waddock, 1988). This emerging social development model takes on special significance, given the recent adoption by the United Nations of the Sustainable Development Goals (SDGs).

The collaboration across sectors is a result of the shortcomings of individual sectors in their attempts to address the needs of the poor and the marginalised segments of society. For example, the government sector, especially in developing countries, is typically constrained by scarce resources and bureaucratic

processes in its delivery of various public services. Non-government organisations, on the other hand, often struggle in terms of effective management and control of their resources. Finally, businesses usually undertake symbolic social initiatives that are limited in scale, especially since they focus their resources and energies in fulfilling their economic role. By working together, players from different sectors not only overcome their resource constraints but also generate synergies that would not have otherwise been possible by working independently of each other.

In the Philippines, some cross-sector social partnerships (CSSPs) evolve from philanthropic activities of large and small corporations. Needless to say, scaling up their social initiatives is a big challenge for private firms, who have to contend with limited resources and, sometimes, modest ambitions. Most companies are content with undertaking social programmes for an adopted community or for a small number of beneficiaries. Other companies, however, recognise the potential

for more meaningful and more impactful social development programmes.

By establishing partnerships with government agencies, local government units (LGUs), non-government organisations (NGOs) and even other private firms, several forward-looking business organisations (or their corporate foundations) have expanded the scope of their social initiatives, as exemplified in the illustrative cases below.

Private-sector initiated cross-sector partnerships – Illustrative cases

Case 1: Shell Philippines: Combating malaria in the Philippines

In 2001, Shell Philippines Exploration B.V. (SPEX), together with joint venture partners Chevron Malampaya LLC and the PNOC Exploration Corporation, has inaugurated the Malampaya Deep Water Gas-to-Power Project, after more than a decade of exploration activities. By extracting natural gas that fuels gas-fired power stations with a combined capacity of 2,700 MW, the Malampaya Project has reduced the Philippines' oil imports, has provided a stable supply of clean energy, and has generated billions of pesos in revenues for government (Habaradas, 2013). Without a doubt, its economic impact is immense.

Keen on being a good corporate citizen, SPEX has introduced a comprehensive set of programmes in Palawan province, the major site of the project and the main source of the deep water gas. It did this through the Pilipinas Shell Foundation, Inc. (PSFI), the social development arm of the Shell companies in the Philippines (SciP), which undertakes activities that 'respond directly to the needs of Shell host communities' (PSFI web site, undated).

Adopting an integrated approach, PSFI has introduced a variety of programmes, which included technical/vocational training for the youth, an agricultural skills training programme designed to improve farm productivity and management, and an

integrated farming bio-systems training programme for farmers. It also introduced other projects, such as the rehabilitation of a local hospital, rural electrification and a mud crab livelihood project (Habaradas, 2013).

However, what Palawan badly needed was a solution to malaria, a problem that had plagued it for decades. Controlling the disease had been tough, especially in remote areas where there was limited access to basic health care services and facilities, and where there was widespread misconceptions about the disease.

Shell and PSFI had initial doubts about their capability to address health concerns, not having the medical expertise. Nevertheless, they went on to implement a community-based malaria control project known as Kilusan Ligtas Malaria (KLM), which fortunately generated enthusiastic support from practitioners who had the technical and medical expertise needed to address Palawan’s health problems. PSFI has realised that its ability to mobilise resources and organise community leaders, local organisations and private entities to work together towards a common goal – a skill it has honed over more than 2 decades of social development work – was the key to KLM’s initial success (Habaradas, 2013).

Because of KLM, malaria cases in Palawan decreased from 42,394 in 2000 to 8,071 in 2009. Over the same period, deaths due to malaria also went down by 91%. In 2011, the number of cases dropped to an all-time low of 5,623. These were attributed to enhanced early case detection and treatment, very high

mosquito net coverage and intensive indoor residual spraying (IRS). Malaria Awareness Day celebrations, media engagement, multi-media campaigns and continuous advocacy also provided wider opportunities to educate communities on malaria (Dela Cruz, 2010).

KLM’s huge success enabled PSFI to secure a 5-year grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Renamed Movement Against Malaria (MAM), PSFI’s anti-malaria programme expanded its coverage to include four other provinces, namely Apayao, Quirino, Sulu and Tawi-Tawi. By 2009, malarial cases in all five provinces had dropped by 88% over a 6-year period. In 2010, PSFI has received an additional \$31.4 million from GFATM, which allowed it to expand MAM’s coverage to 40 provinces with an estimated at-risk population of 16 million. And just like in the initial four provinces, malaria morbidity and mortality rates throughout the country substantially declined (see Table 1).

To sustain the gains of MAM, a consortium of business, corporate and NGO partners established the Philippine Movement Against Malaria (PhilMAM) coalition, which serves as the centre of information exchange and consolidation of resources among partners from both the public and private sectors.

In 2011, MAM was recognised as the UN Millenium Development Goal Warrior for Goal Number Six for its significant contributions in addressing the scourge of malaria. A year earlier, it was also conferred an Excellence Award in the Concern for Health category of the 9th Asian Corporate

Social Responsibility (CSR) Awards, Asia’s premier CSR awards programme.

Case 2: ECHOstore: Empowering women entrepreneurs

ECHOstore Sustainable Lifestyle is the first green retail store in the Philippines. It was founded by Pacita Juan, Jeannie Javelosa and Reena Francisco (also known as the ECHOtrio), who brought their extensive corporate/entrepreneurial experience to this venture that advocates sustainable living.

In September 2008, the ECHOtrio opened ECHOstore Serendra, which targeted the high-end urban market. The retail store provided space for home care, fashion, personal care products and gift items. It also carried organic, natural and non-toxic goods, ranging from home cleaning products to staples such as organic rice, sugar and other produce.

In 2011, the ECHOtrio opened ECHOmarket Sustainable Farms and ECHOcafe (Culture, Community and Coffee), two related concepts that completed the ECHOstore retail triad. Currently, ECHOstore has branches in major cities in the Philippines, namely Baguio, Cebu, Davao, Iloilo, Makati and Mandaluyong, which expanded the reach of its products. It also has an online store, launched in 2013, which features lifestyle books authored by the ECHOtrio.

ECHOstore fulfils its social mission by serving as an outlet for products of women’s groups, cultural communities and other marginalised groups. But instead of simply sourcing from these groups and paying fair-trade prices for

Table 1: Malaria morbidity and mortality in the Philippines, 2005–2011

	2005	2006	2007	2008	2009	2010	2011
Population (000)	85,472	87,237	89,050	90,917	92,225	94,106	95,546
Cases	46,342	35,405	36,235	23,655	19,955	17,137	9,412
Morbidity rate	54.22	40.58	40.69	26.02	21.64	18.21	9.85
Deaths	150	122	73	56	24	22	6
Mortality rate	0.175	0.140	0.082	0.062	0.026	0.023	0.006

Source: Pilipinas Shell Foundation, Inc. (c/o Marvi Trudeau), as cited in Habaradas (2013)

their products, ECHOstore helps to build the capabilities of these groups in product design, packaging and other important aspects of running a business. Clearly, ECHOstore's business model allows it to address several SDGs, specifically SDG1 (end poverty), SDG5 (women empowerment), SDG8 (decent work and economic growth), SDG10 (reduced inequalities) and SDG12 (responsible consumption and production).

ECHOstore began to attract community-based enterprises that wanted their products displayed for sale in the store. However, the ECHOtrio had to reject majority of the products due to poor design and lack of visual appeal. They eventually worked closely with national NGOs serving poor communities, which requested them to critique the product design and packaging of these small producers. The ECHOtrio volunteered their time and expertise to serve as mentors, and eventually launched the ECHOdesign Lab as a programme.

The ECHOtrio eventually set-up the ECHOsi (Enabling Communities with Hope and Opportunities Sustainable Initiatives) Foundation, which received funds from individuals and institutions that wanted to support their advocacy and social mission. The establishment of the foundation allowed the ECHOtrio to receive support from government, and to work in partnership with various groups, especially NGOs, that are similarly concerned with developing communities. For example, they have worked with the Peace and Equity Foundation (PEF) and the Partnership and Access Center Consortium, Inc. (PACCI) in setting up ECHOVILLAGE stores throughout the country; and also with the Department of Trade and Industry (DTI) and the Philippine Commission of Women (PCW) for the GREAT Women Programme. These are ongoing partnerships that allow ECHOstore to spread its advocacy for sustainable living across the supply chain.

According to the ECHOstore web site, the company carries at least 3,400 products in various distribution points throughout the country. Working with more than 80 organisations and foundations, it has reached at least 131 micro-entrepreneurs,

8,000 households and 34,420 beneficiaries (ECHOstore, 2011).

Insights

Cross-sector partnerships can be a viable model for addressing long-standing social problems and for scaling initiatives for greater impact. Our two illustrative case studies provide some evidence of how these were achieved.

Leveraging resources: Achieving synergies

The success of KLM/MAM is partly due to the synergies derived from the smart utilisation of the collective resources of SPEX and its business partners, PSFI, the provincial government and the Department of Health. At the initial stages of the programme, SPEX has provided financial resources to support various activities, including the blood smearing required to trace the incidence of malaria, the provision of mosquito nets, intensive indoor residual spraying, multi-media awareness campaigns and continuous advocacy among local government officials. SPEX's grant was supplemented by the Palawan provincial government, which agreed to contribute P5 million per year for 20 years to ensure that the project will be sustained even if the grant is exhausted. Needless to say, it would not have been possible to scale the project without utilising the existing health service infrastructure (i.e., hospitals and rural health units) and without the support of municipal health officers.

Moreover, PSFI was able to engage corporate and business partners to support specific malaria control activities, especially when it was scaled up nationwide. For example, Malampaya Foundation, Inc. (MFI) has supported the installation of 500 Solar Home Systems (SHS) in microscopy centres, hospitals and rural health units in Palawan. TeAM Energy (formerly Mirant Corporation), on the other hand, has supported the installation of SHS in far-flung village health centres and microscopy centres in Sulu and Tawi-Tawi. The SHS provide the communities with a reliable source of electricity, which allow microscopists and health workers to conduct diagnostic

activities even at night or during bad weather.

In the case of the ECHOtrio, working with NGOs like PEF and PACCI has allowed them to not only leverage on the resources of these institutions but also to tap their partners' extensive network throughout the country. PEF and PACCI, on the other hand, are able to expand their network of village stores by tapping the technical and marketing expertise of ECHOsi through the ECHOdesign Lab. The partnership empowers village enterprises 'by providing access to suitable markets for innovative, traditional and ethnic products'. Through ECHOVILLAGE stories, local artisans can sell small batches of their products and take comfort in knowing that they don't necessarily have to go large-scale to meet the demands of usual distribution channels (www.echostore.ph/index.php/community/our-communities/).

This same model works in the case of the Great Women Programme, which is funded by government through the DTI and PCW. This means that the ECHOsi Foundation does not have to shoulder the cost of providing the technical training to women entrepreneurs, since government has already allocated funds for this purpose. These government agencies, which are mandated to increase entrepreneurial activity in the countryside to address rural poverty, are served well by tapping ECHOsi Foundation, which provides the business expertise needed by the target beneficiaries. The women entrepreneurs who receive the technical training through the ECHOdesign Lab eventually become suppliers of ECHOstore, who buy their products at fair-trade prices. As a result, the partnership does not only help community enterprises get market access but also feeds into the business model of ECHOstore, which is able to improve the reliability of its network of suppliers for its own retail outlets.

Working at the grassroots: Getting buy-in

Learning from the initial success of KLM in Palawan, PSFI has constantly engaged the officials of LGUs and agencies, community leaders, local associations and NGOs,

media and the residents themselves to develop local ownership of MAM. LGUs have helped to organise activities and coordinate resources, aside from providing staff complements, and financial and logistical counterparts for MAM.

PSFI has worked closely with civil society groups such as New Tribes Mission, Agape Rural Health Programme and Sulu Ulama Council, who help in the timely distribution of MAM commodities. PSFI has also coordinated with the local police and military, even the US Marines, to bring MAM activities (and to hasten the distribution of MAM commodities) to the remotest communities and conflict-stricken areas covered by the project. PSFI has also collaborated with the Department of Health for the integration of MAM with other health programmes through participation in health caravans; and with the Department of Education to integrate malaria topics in the Health and Science subjects of elementary and high school students.

Working with civil society groups is also a strategy being undertaken by ECHOSTORE/ECHOSi. Since they carry goods produced by community-based enterprises, it is important for them to establish a network of contacts at the local level. This is something that their NGO partners have already established in their years of experience at the grassroots. For example, PEF works with local NGO networks in various areas in the country, and provides support for the establishment of Partnership and

Access Centers (PACs) in the poorest communities in identified regions and priority provinces.

Through its partnership with PEF, ECHOSi gains access to major NGO networks such as the Alternative Systems for Community Development Foundation, Inc. (ASCODE), the Cordillera Network of Development NGOs & POs (CORDNET), Multi-sectoral Alliance for Development (MUAD) Negros, Provincial Alliance of NGOs & POs for Development (PANGODPOD) Inc., Palawan NGO Network, Inc. (PNNI), Upland Marketing Foundation, Inc. (UMFI) and Saranggani Province Empowerment and Community Transformation Forum (SPECTRUM) (www.echostore.ph/index.php/community/our-communities/). Getting buy-in is much easier when there are organisations that have already gained the trust and confidence of the people in the target communities.

Conclusion

In the Philippines, businesses and civil society groups have taken an increasingly active role in addressing poverty and its related problems (i.e., joblessness, homelessness, hunger and disease) as a response to 'the limits of the state'. These problems have become so big and complex that individual businesses and non-profit organisations, in spite of their institutional resources and capabilities, will not be able to deal with these on

their own (Austin, 2000). It is interesting to note, however, that national government agencies and local government units (LGUs) have played a key role in cross-sector collaborations, especially in terms of providing counterpart funds and scaling up successful initiatives, as shown in the two cases presented above. Clearly, these social initiatives have benefitted from the synergies that resulted from the complementary capabilities of the organisations that form these collaborative partnerships.

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United Nations Social Impact Fund

The United Nations Social Impact Fund (UNSIF) is a Social Impact or Blended Financing platform in partnership with social responsible public and private sector investors that tie directly into and support the achievement of the newly established SDG priority sectors. Based on the successful UN Multi-Partner Trust Fund (MPTF Office) partnership structure, UNSIF is a partnership between UNEP, UNCDF, UNFPA and UNDP. UNSIF brings together venture philanthropists, foundations, corporations, government and private investors to chart a new course toward creating a collaborative financing model.

Utilizing an innovative, inclusive and sustainable 'blended finance' platform, UNSIF strives to extend the reach, efficiency and impact of international development grants by leveraging and deploying complementary capital market investment from a new breed of development financiers. To meet the investment needs of the SDGs, UNSIF supports the paradigm shift to leverage overseas development assistance (ODA) with investments of all kinds: public and private, national and global, in both capital and capacity.

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INDO-EUROPEAN COOPERATION WITHIN THE FRAMEWORK OF FP7

WHEN INTERNATIONAL RESEARCH COLLABORATION CONTRIBUTES TO THE SUSTAINABLE DEVELOPMENT GOALS

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Abstract

This article will examine whether international collaboration in science is addressing sustainable development goals (SDGs) in the collaboration between the European Union and India¹, within the specific framework of the Seventh Framework Programme (FP7). This framework is one of the most important channels of international research collaboration between India and the EU. We address the international research collaboration from the perspective of project coordinators/participants of the EU-funded projects and we investigate the impacts of those selected projects on the UN SDGs. Our qualitative study presented here was designed to look at the international research collaboration in addressing SDGs in the collaboration between the EU and India, within the specific frameworks of FP7. We have reached the conclusion that international research collaboration plays a pivotal role in achieving the SDGs.

Introduction

The interlinkage between International research collaboration & sustainable development goals

International research collaboration is defined as a joint research activity with a common aim or shared objective (Katz and Martin, 1997; Shrum *et al.*, 2007) among scientists based at public research institutes in different countries and regions. Under this definition lies a concept of 'deep collaboration involving a division of labour and creative contributions from all partners, rather than weaker forms of collaboration'

(Laudel, 2011). Within this article, we will be looking at international research collaboration within the programmes whose *raison d'être* is to 'foster global cooperation in research through project support' (Georghiou, 1998), especially the Seventh Framework Programme (FP7).

The concept of international research collaboration is particularly relevant when applied to our study and it can be defined and operationalised in many different formats, including: researcher exchange, formal intergovernmental agreements on scientific cooperation, meetings and workshops, international large-scale facili-

ties, collaborative projects, publications, international large-scale facilities and the establishment of laboratories (Georghiou, 1998). As identified by Georghiou (1998), international research collaboration can be measured through co-publications and collaborative projects. Co-publications are considered to be the key indicators that help to define strategic international research collaboration, and they are used as one of many proxies for the assessment of the state of collaboration in science. In the case of Indo-European collaboration, the co-publication data is notably meaningful. As regarding, the collaborative project, a testament of India's growing strength as a research and innovation partner to the European Union has been its participation in the EU Framework Programme for Research and Technological Development.

The Seventh Framework Programme (FP7), whose structure and procedures made it accessible to international collaboration, has added new opportunities for international stakeholders in both academic and technological fields and has the potential to contribute to the enhancement of specific Sustainable Development Goals (SDGs)², such as, 'Good Health and Well-being'; 'Clean Water and Sanitation'; 'Affordable and Clean Energy' and 'Partnerships for the Goals.'

Indeed, science, technology and innovation have undoubtedly long been acknowledged as the basis for socio-economic development, and are also currently considered to be the main contributors to meet the SDGs. According to William Colglazier (2016), science, technology and innovation are critical for making progress on every one of the SDGs³. Colglazier notes that 'science can contribute in several ways: by identifying

¹Indigo Policy (FP7 project) is producing a qualitative impact assessment study of FP7 projects connecting Europe and India. Some of the reflections and results presented in this article will be available in the qualitative impact assessment study. For further information: <https://indigoprojects.eu/>

²<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

³<http://www.sciencediplomacy.org/editorial/2016/diplomacy-for-science-and-science-for-sustainable-development>

challenges, advising on actions that can make a difference, identifying indicators for monitoring progress and searching for innovative solutions⁴.

According to the European Commission, Science, Technology and Innovation are a fundamental tool to implement the new Agenda, as it allows improving efficiency in both economic and environmental senses, developing new and more sustainable ways to satisfy human needs and empowering people to drive their own future. The STI policies are thus considered by the European Commission to be the keystones in making the EU the 'global frontrunner of sustainable development'⁵.

The United Nations has called for a 'seat for science' on the High-Level Political Forum that deals with the UN's Sustainable Development agenda, to ensure that 'science is not just an observer but an advisor to policymakers'⁶. Not only have international organisations stressed the pivotal role that STI plays for sustainable development, but also the science policy community has corroborated those statements. The challenge of meeting human development needs while at the same time protecting the Earth's life support systems is one of the most important areas of discussion for scientists, policy makers and communities across the globe. Indeed, the last decade has witnessed the resurgence of many different movements to harness science and technology (S&T) in the quest for a transition towards sustainability (Clark and Dickson, 2003).

This resurgence effectively means bringing S&T to bear the highest priority goals of a sustainability transition, with those goals defined not by scientists alone but rather through a dialogue between scientists and the people engaged in the practice of 'meeting human needs while

conserving the earth's life support systems and reducing hunger and poverty'⁷.

Therefore, within this article, we examine whether international collaboration in science is addressing SDGs in the collaboration between the European Union and India, within the specific framework of FP7. Given the size of its overall budget and its expansive breadth, FP7 is well-suited to test our main research question: to what extent have FP7 projects between India and the EU contributed to the achievement of SDGs in India? How can international research collaboration, such as FP7, contribute to the enhancement of SDGs?

The case of EU–India collaboration surely is one of the most interesting for the field of international research collaboration. Scale and potential are two key reasons. First, Europe is undoubtedly a world leader in research and innovation, boasting 24% of the world's expenditure on research, 32% of high-impact publications and 32% of patent applications despite having only 7% of the world's population⁸.

India's research and innovation system warrants respect in its own right, ranking ninth in the world according to the *SCImago Journal & Country Rank* behind only the United Kingdom, Germany, France and Italy (in terms of Europe)⁹. Still, the expectation is that now as officially the world's fastest growing economy,¹⁰ India's contributions to the global research and innovation ecosystem will grow at a similarly fast pace. A strong case for why the EU collaboration with India is a high priority is well summarised in a 2014 European Commission document titled 'Report on the implementation of the strategy for international cooperation in research and innovation'. It states:

'India's developments, such as those in space technology with capabilities to launch commercial satellites and

*un-manned missions to the moon and to Mars, nuclear technology, pharma research capabilities in drug discovery and commercialization, ICT software, biotechnology in health and agriculture and the emerging capabilities in automotive research and telecommunications, have contributed to the country's recognition as an important knowledge power in the global economy. India is also attracting attention as a vibrant and versatile source of frugal innovation, a cost-effective and inclusive innovation, leading to affordable products and services without compromising on quality and environment protection standards.'*¹¹

Our qualitative study was designed to look at the international research collaboration in addressing SDGs in the collaboration between the EU and India, within the specific framework of FP7. We selected a group of FP7 projects with Indian and European participants, and chose to interview a group of 25 individuals, namely project coordinators from the European side and Indian participants involved in these projects, in different scientific fields of relevance to EU–India cooperation – Water, Health and Energy.

The purpose of this study is to qualitatively examine and monitor the impact of cooperation between India and European Union Member States in FP7. In this article, the chosen research approach within this article is mid-range theory building up from aggregate empirical data, 'aiming at integrating theory and empirical research to explain a specific set of phenomena' (Merton, 1968).

Section 2 presents shortly the scope of the scientific collaboration between India and the EU. Section 3 presents some key results of the qualitative impact

⁴Sustainable development agenda: 2030 Building knowledge-based societies is key to transformative technologies by William Colglazier (2015).

⁵ec.europa.eu/newsroom/horizon2020/document.cfm?doc_id=12065

⁶See the UN policy brief at https://en.unesco.org/un-sab/sites/un-sab/files/Final_SAB_PB_MOI.pdf, and more information at <http://www.asianscientist.com/2015/07/features/unesco-3-5-gdp-sti-spending/>

⁷National Research Council (1999) *Our Common Journey* (Natl. Acad. Press, Washington, DC).

⁸http://europa.eu/rapid/press-release_IP-12-967_en.htm?locale=en

⁹<http://www.scimagojr.com/countryrank.php>

¹⁰<http://www.schwab.com/public/schwab/nn/articles/India-Becomes-World-s-Fastest-Growing-Economy-What-Investors-Need-to-Know>

¹¹http://ec.europa.eu/research/iscp/pdf/policy/annex_roadmaps_sep-2014.pdf (p 28)

assessment study within the framework of the Indo-European collaboration.

India and the European Union: the scope of the scientific collaboration

The collaboration between India and the EU in the field of science, technology and innovation has been steadily gaining with respect to importance and size. In the case of India and the EU, formal collaboration in science and technology started with the signature of the European Community–India Science and Technology Cooperation Agreement (STCA) on 23 November 2001 establishing the EU–India Joint Steering Committee on Science and Technology.

The STCA, which was renewed in 2007, indicated that efforts should aim to create a joint infrastructure for advanced research and funding systems for the promotion of S&T collaboration. In it, leaders also welcomed efforts to strengthen partnership initiatives such as joint projects with co-investment of resources in selected fields of mutual priority.

The scope of EU–India scientific cooperation was further broadened in 2009 with the signature of the bilateral agreement between EURATOM and India in the field of fusion energy research. At the December 2010 EU–India Summit, leaders recognised the importance of a more coordinated approach in research and innovation. The Summit welcomed the new dynamic of the India–EU and Member States Research and Innovation Partnership for more coordinated cooperation in tackling major societal challenges, aligning FP7 and India’s own national science and innovation programmes. These societal challenges were clearly connected with the SDGs and most specifically in the field of water issues. In addition to FP7 open calls, Europe and India also joined forces for coordinated calls in key fields

for India, for instance, Food and Nutrition Research and Water Research.

Another relatively recent advancement was the 2012 Joint Declaration on Research and Innovation. This declaration called for ‘*Moving up a gear in our cooperation towards building an Indo-European Research and Innovation Partnership*’ with (i) larger scale, scope and impact and (ii) focus on common societal challenges.

More recently, under the patronage of the 13th EU–India Summit Brussels in April 2016, both regions showcased some concrete examples of projects in water-related research and innovation. According to the European Commission, ‘These projects were quite concrete and impact-oriented as they included the construction of 20 fully functional pilot installations for the treatment of wastewater in urban, peri-urban as well as rural settings in various parts of India’. It was stated as well that ‘the presence of entrepreneurs, start-ups, SMEs and investors at the conference made it possible to explore options for further partnerships and investments, to translate the projects’ results into full-scale commercial applications’¹². According to the European Commission, this conference had illustrated that ‘international research collaboration can contribute to have impacts on the daily lives of populations across the world, and also contributes to broader policy and diplomatic objectives’¹³.

Looking at the case of India, co-publications are demonstrative indicators of the level of cooperation between certain regions of the world, notably the EU. Again, three main areas were prioritised – Water, Health and Energy – for the implementation of key actions related to the Societal Challenges, as recently presented by INDIGO Policy in 2015¹⁴.

Within the field of Water, the subtopics of focus such as Urban Management,

Water Purification and Water Treatment and Integrated Water Resource Management were all highly cited¹⁵.

With regards to the field of Energy, the subtopics were focussed on Smart Grids, Smart Cities and Solar Energy and finally, on Health issues, the focus was on affordable health care and infectious diseases, which were all equally highly cited¹⁶. According to the analysis of one of the policy papers of INDIGO Policy project published in 2015, ‘from 2003 to 2012, India was involved in 588 co-publications on key topics such as urban management and 430 on waste water’¹⁷.

With regards to the field of Health in terms of volume, the collaboration in this field is increasing ‘much faster than on average across the fields. In particular, diabetes research is an active area of international collaboration, with steadily increasing output’¹⁸.

According to the above-mentioned policy paper (2015), in the period of 2003–2012, Indian involvement in international co-publications on diabetes grew significantly from 68 publications in 2003 to 408 in 2012. The same applies for the subtopic affordable health, with India showing increased growth in terms of co-publications over time with different countries across the world. Not surprisingly, the field of Energy has become an important field of international collaboration for India in the last 10 years¹⁹.

The international co-publications clearly demonstrate that India is growing in strength as a research and innovation partner to the EU in terms of co-publications. The analysis of the three priority thematic areas – Water, Health and Energy – shows that Europe collaborates actively with India²⁰.

Finally, the increasing importance of India to European science networks can be measured by its participation in the

¹²<http://ec.europa.eu/research/iscp/index.cfm?pg=india>

¹³<http://ec.europa.eu/research/iscp/index.cfm?pg=india>

¹⁴Granqvist, Kaisa and Büsel, Katharina (2015) Policy Brief: Co-publishing patterns of EU-India—The international dimension of co-publishing in India with special regard to the European Union [Online]. Available: https://indigoprojects.eu/page/31/attach/INDIGO_Policy_Broschuere_Co-publishing_View.pdf

¹⁵Idem

¹⁶Idem

¹⁷Idem

¹⁸Idem

¹⁹Idem

²⁰Idem

Indo-European cooperation within the framework of FP7

EU Framework Programmes for Research and Technological Development: from 36 participating organisations in FP4 (1998–2002) and 39 in FP5 (1998–2002) to 142 participants in FP6 (2002–2006), and more than doubling in FP7 (2007–2013) to 305 participants. Under the most recent FP7, India was the most active third country in terms of participation (305 participants in 181 projects) and fourth in terms of financial contribution (€35.8m) from the

European Commission – behind only Russia, the United States and China.

A very small sampling of other projects has included topics such as: Food security and cultivation of high-yielding grasses; Metal oxides for future nanoelectronics; Drugs for Tuberculosis, Flood resilience techniques and ‘Seismic wallpaper’ to withstand earthquakes; Agroforestry sustainable aquaculture and on the role of multinational companies in addressing

global development challenges; Biomass, a renewable energy and Poverty reduction analysis. It is also striking that how many projects involving at least one Indian partner include ‘India’ in the actual project title.

Using the available quantitative and qualitative data²¹, this review has demonstrated India’s participation in FP7, which was characterised by a vibrant diversity of key scientific areas. Through FP7, Indian researchers investigated grand challenges

S.no.	FP7 collaborative projects including ‘India’ in project title
1	Developing efficient and responsive community-based micro health insurance in India
2	Role of human papillomavirus infection and other co-factors in the aetiology of head and neck cancer in India and Europe
3	EU-India Fostering COOPERation in Computing Systems
4	Euro-India ICT co-operation
5	Modelling and analysing demand response systems
6	Increasing the dialogue between India and Europe by improving EU awareness and access to Indian research and innovation technology programmes
7	Innovative guidelines and tools for vulnerable road users safety in India and Brazil
8	HighNoon: adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern
9	European Union and India Enhanced Cooperation Framework for improved bilateral dialogue in the fields of science and technology
10	Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India
11	Strengthening EU-India collaboration in networked monitoring and control systems technologies
12	Synchronising the research policy dialogue to the Indian dimension
13	Trade, agricultural policies and structural changes in India’s agrifood system; Implications for national and global markets
14	Support for the advancement of policy cooperation between India and Europe in research and innovation
15	New tools for monitoring drug resistance and treatment response in visceral leishmaniasis in the Indian subcontinent
16	Innovation driven initiative for the development and integration of Indian and European research
17	India-EU Joint House for Science & Innovation
18	Large scale innovative pro-poor programmes focussed on reducing maternal mortality in India: a proposal for impact evaluation
19	EU-India platform for the social sciences and humanities
20	Euro-Indo forum for nano-materials research coordination & cooperation of researchers in sustainable energy technologies
21	The antiretroviral roll out for HIV in India – strengthening capacity to promote adherence and patient follow-up in the context
22	Health system stewardship and regulation in Vietnam, India and China
23	The role of governance in the resolution of socioeconomic and political conflict in India and Europe
24	Strengthening networking on BiomAss biotechn and biowaste conversion – biotechnology for Europe India integration
25	India-Europe cooperation to promote Ipv6 adoption
26	Sustainable e-Infrastructures across Europe and India

Source: European Union Open Data Portal

²¹Angiolillo, Sean ; IndoGenius “Policy Paper on Horizon 2020 opportunities for India”, March 2016 .

across all thematic sectors – Health was the sector most represented.

Qualitative impact assessment study within the framework of the Indo-European collaboration

It seems that there is a growing interest in demonstrating the outcomes of collaborative projects for the purpose of monitoring programmes, or simply to demonstrate the value of research investments. Nevertheless, as reported by UN and European Commission, assessing the synergies between programmes/projects and the monitoring of implementation is essential for the achievement of SDGs, notably in the field of STI.

Still, assessing the impact of research projects is challenging, mainly due to the considerable difficulties encountered in obtaining data (both in terms of quantity and quality) for projects' outputs and effects, as well as problems regarding the interpretation of the data gathered.

As a method in our study, we applied semi-structured interviews to gather qualitative information from the projects' coordinators and projects' participants (based in the European Member States and in India). We collected qualitative data by setting up a conversation situation (the interview) that allowed respondents the time and scope to express their opinions and perceptions on scientific collaborations between the EU and India and, more specifically, the impact of those collaborations.

First, the content analysis of the interviews shows that, in general, there was a positive response from the interviewees. The general conclusions are that on the Indian side there was, in general, a very positive response from the project coordinators/members of the consortium being associated with the EU-related projects, as this gave them a good exposure to the EU-based science institutions and researchers; on the European side there was, in general, a positive experience for the European research teams and the possibility to inter-

act with significant research challenges in the field of Water, Energy and Health.

Generally speaking, scientific and cultural experience seems to be one of the most significant features of the EU–India cooperation projects under the framework of FP7 projects. The results of this study suggest that international research collaboration played a crucial role to meet challenges for science and knowledge, by gathering scientific expertise, identifying, clarifying and tackling global challenges such as Water Supply and Water Management for the benefit of both regions²².

Almost all projects involved in our sample may be characterised as applied research projects rather than basic research; Indian scientist participants stated that projects were not so much about advancing a piece of frontier knowledge, but stressed how the project enabled them to address a problem in the Indian context. From the European side, it was mentioned that the fact of partnering with India brought complementarity and a better understanding in some specific challenges. In FP7 project context, advancement of knowledge often allows the acquisition of new perspectives on joint problems and the construction of joint solutions. This is clearly one of the positive findings of this study, in most cases, a win–win relationship was established, as the consortia were designed based on the knowledge sharing; and the Indian and European research teams seemed to benefit from the consortia both scientifically and technically.

One project coordinator from the European side stated clearly that *'this EU project in particular, gave me the possibility to work with Indian scientists in one area that is crucial for India – that is Health, and universal and equitable access to health care and health financing (...), we have put together a very good consortium to tackle and develop a community-based health insurance model'* [European researcher and coordinator of the EU project (FP7)].

Another Indian researcher pointed out the real complementarity of the consortium, as it is stated below:

'I have been learning a lot with this consortium and with this project, [...] and we are here sharing knowledge and techniques that otherwise wouldn't be possible. Sides, European and Indian sides were sharing their expertise on the basis of equal partnership. There is no such thing that Europeans have more knowledge than Indians, and Indians are there to provide specific expertise. Not at all. We exchange, we share and create new knowledge and new technologies.' [European researcher and coordinator of the EU project (FP7)].

For instance, as the member from an FP7-funded project observed, *'In terms of advancement of knowledge, there has been number of fallouts, no doubt, that, this project has improved our own knowledge but has helped to generate a transnational repository of data and facts related to Himalayan rivers of India, Nepal and Bangladesh. The generation and collection of empirical evidences, facts and scientific data, further helps in deployment of knowledge in other areas which are similar to this research and development'*.

Similar responses came out from other projects related to the field of Water. A response from an Indian researcher read: *'In terms of knowledge advancement we learned in an integrated manner. Our expertise was more into engineering and technology, but with help of this project we learned a lot about natural water sciences and more specifically science of natural water purification and filtration'*. For other projects, advancement also meant the exchange of new knowledge. A scientist, from an Indian scientific institution said that the EC-funded project provided an excellent opportunity for learning and acquiring knowledge. We not only learned and acquired knowledge but we also shared.

Many researchers involved in this study clearly stated that this international network allowed a circularity of the knowledge and sharing with not only researchers but also with a pool of different stakeholders as well.

²²De Oliveira, Teresa (15 Oct 2015) Impacts analysis of the FP7 projects connecting Europe and India [Online] EU-India STI Cooperation Days 2015. Available: https://indigoprojects.eu/page/67/attach/6_TDO_FP7_projects.pdf

As one Indian researcher mentioned unequivocally: *'This project was for me as coordinator simply exceptional, as Indian researcher living abroad and having the possibility to tackle challenges not only capital for Indian but as well as for the world. In the framework of this project, we are currently studying the role of technology and innovation to attain the Millennium Development Goals, and the corporate social responsibility of firms with respect to innovation'*.

In addition, another European researcher stressed the importance of an EC project for the advancement of knowledge and more substantial attention to pivotal challenges for India in the field of Maternal Health. According to one European coordinator, *'I believe that with this project we achieve a great deal for India, we are trying to develop strategies for improving reproductive health and this is very beneficial for women and for the communities'*.

The EU Framework Programme was undoubtedly a unique opportunity for Indian participants to leverage all of the European Research Area's research infrastructure and expertise, while it provided European counterparts access to many of the top institutions in an exciting emerging knowledge area. Furthermore, it proved to be, in the case of the Indo-European international research collaboration, an excellent way to address important challenges for India, where certain competencies of the European research teams were required. Indeed, the advancement of knowledge proved to be one of the most positive outcomes of the international research collaboration between India and the European Union.

Nevertheless, the impacts of FP7 projects between India and the EU are generally manifested only after a certain delay in time. Thus, the full implications and impacts of research activities cannot be measured and fully understood immediately after the completion of a Research and Development project since the results need time to materialise and be appreciated. Our study also points out as well that a great range of the impacts are intangible in nature (involving dimensions such as learning, socio-cultural conse-

quences, image and reputation, knowledge domain enlargement, stakeholder value and so on) which are difficult to fully identify or even quantify, as suggested by several studies in the field of science policy.

As pointed out by other major findings from the studies of the EU research programmes (Reger and Kuhlmann, 1995; Georgiou et al., 1993; Moller and Kjeldsen, 1995) as well as from the study of the Japanese Research and Development consortia (Sakakibara, 1997), intangible learning effects are the most often mentioned impact for all parties concerned. Participants of the EU projects linking India and the EU often emphasise the effect of learning new skills and enhancing knowledge. The EC-funded projects have other intangible effects: they stimulate networks among universities, research institutions and companies across national and international boundaries and create impacts at all levels of society.

The analysis of the sample interviews of project's coordinators/participants suggests that enhanced skills in international collaboration learned from the EU projects would rather facilitate future international collaboration efforts and enhance the acquisition of new skills and knowledge, that is, the collective learning processes both beneficial for India and the EU. Another important effect concerns the promotion of collaborative networks between Europe and other regions of the world among new configurations of partners; it means that they help to create a community of professionals sharing basis of knowledge and trusting each other.

The results of our study confirm what has been said by the United Nations about the role of Science for Sustainable Development and the Post-2015 Development Agenda. The main documents of the UN in this regard urge governments and institutional organisations to steadily increase their own investment in science, learning and education. Innovation and Technology are 'needed to transform countries from reliance on the exploitation of natural resources to technological innovation as the basis for development'²³.

Another dimension worthy of highlight is the strength of STI partnerships forged in FP7 projects. The interviewed project leaders/coordinators remarked that the most positive output of the collaboration was the reinforcement of partnerships for global and societal challenges. It seems that FP7 projects were tools for the enhancement of inter-sectorial scientific dialogue between India and Europe. One of the Indian researchers who had participated in a FP7 project stressed the following:

'For us, the project had a very positive impact, this type of insight lead us to point out that international transfer of knowledge is in many ways embedded not only in getting aware of new technologies for their operation but as one of the scientists from the project, sharing of knowledge, association of networks is the best achievements of this project... it has helped for training and capacity development'

Although the international research collaboration in the framework of FP7 had several positive impacts for the enhancement of SDGs, some limitations were pointed out as well. The most cited limitation was the difficulty to engage with the local stakeholders, which is perceived as crucial to maximise project impact. The second weak element mentioned was the lack of policy and economic uptake.

Concerning the first limitation identified – the difficulty to engage with local stakeholders – several project coordinators and project participants interviewed, stated that it was difficult for them to connect a network between local actors. Many of our projects selected in the field of water, energy and health were dealing with key challenges for India, notably in the field of health, and were not able to establish a secure network within the Indian side.

The EU project coordinator interviewed mentioned the following:

'For me as coordinator it was extremely difficult to meet the local communities, I don't know if it was because of the way the project was designed, or

²³http://www.un.org/en/development/desa/policy/untaskteam_undf/thinkpieces/28_thinkpiece_science.pdf

simply because the project was not giving importance to this dimension. As a coordinator I do believe that it is important to share our knowledge with the local in an open and transparent way without intermediaries. In our case, this never happens. For the future, when the project is designed must verify the need to properly engage with the local communities, entrepreneurs, universities, covering the all chain. If we want results with the EU money, we must carefully assess the needs and engage with the right stakeholders'. [European researcher and coordinator of the EU project (FP7)].

Another researcher pointed out the lack of 'high-impact logic' that would allow the prioritisation of the right stakeholders and the promotion of a close dialogue with them:

'The project was implemented for almost 3 years and we did the final conference at the end of project, relevant people were there, but the dialogue was interesting but minimal without the possibility to talk with those they can actually decide and allocate financial resources for it'. [European researcher and coordinator of the EU project (FP7)].

Indeed, this last interview pointed out the lack of policy and economic uptake. A large majority of the projects were not able to deliver concrete results to the market or even establish a network of economic stakeholders. Only a few projects led to the creation of products or new services. It seems that the projects were not naturally business-oriented, and it was very difficult to transfer key scientific results into the market, and most of the projects were not able to establish business opportunities during the implementation process.

Conclusions

Within this article, we have analysed the international research collaboration within the programmes whose *raison d'être* is to 'foster global cooperation in research through project support', especially FP7. Indeed, FP7 has proved to be one excellent

avenue for reinforcing the collaboration between India and Europe, while addressing key societal issues such as water management, water supply and maternity.

The project coordinators and the participants from India and Europe expressed positive views about collaboration in the framework of project level; these frameworks allowed them sharing and advancement of knowledge; improving and forging new skills and techniques, ultimately finding joint solutions for challenging problems.

Nevertheless, challenges and limitations were mentioned as well. Our empirical results suggest that policy and economic uptake should be more closely considered and supported by providers of the grants, either the European Commission or any other entity, this being on way to proper monitoring of implementation of STI initiatives and (re)define the contents of global partnerships contributing to the enhancement of the SDGs. It seems, out of the results of our study, that improving policy coherence and better follow-up is considered necessary for both respective retrospective performance evaluations and forward looking impact assessments.

In conclusion, FP7 deploys the instrument of collaboration in particular international collaboration, even so with unique outcomes. In our case of study, international research collaboration nurtures and plays a pivotal role for the achievement of the SDGs. STI policies can indeed play a key transformational force to change the unsustainable to sustainable path.

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Global program to enhance access to patent system for inventors

The World Intellectual Property Organization (WIPO), in cooperation with the World Economic Forum has launched a global program in which patent attorneys provide pro bono help to inventors in developing countries who want to file a patent for their invention but lack the means to do so. The Inventor Assistance Program aims to help inventors and small enterprises with limited finances to pursue the patent protection that is key to successful commercialization of a product or new solution. Qualified attorneys help by providing free legal advice to inventors who would otherwise be unable to afford the legal costs of obtaining a patent. Research shows many patent applications are rejected on procedural issues that IP lawyers can help avoid.

The Inventor Assistance Program seeks to stimulate an innovative environment where all inventors are able to commercialize their products, bringing economic benefits to them, their families and communities, while ultimately boosting the pool of fee-paying clients for lawyers who helped launch this cycle by foregoing payment.

For more information, contact:

World Intellectual Property Organization
34, chemin des Colombettes
CH-1211 Geneva 20, Switzerland
Tel: (+41 22) - 338 81 61 / 338 72 24
Fax: (+41 22) - 338 81 40
Web: <http://www.wipo.int>

Tech Events

2016

Sep 28–29
Shanghai,
China

Asia Waste to Energy Congress 2016
Contact: Marketing Department, Broaders,
Tel: +86 21 5111 3799
E-mail: info@broadersinc.com
Web: <http://www.broadersinc.com/awtec2016/>

Sep 28–29
Kuala Lumpur,
Malaysia

2nd edition of Pharma+Bio Asia 2016
Contact: Pharma+Bio Asia 2016 Secretariat
No. 38-3 (2nd Floor), Jalan PJU 5/9, Dataran Sunway,
Kota Damansara, 47810 Petaling Jaya, Selangor, Malaysia.
Tel: +603 6140 6666; Fax: +603 6140 8833
E-mail: pharmabioconf@protempgroup.com
Web: <http://www.pharma-bioasia.com>

Oct 10–13
Sapporo,
Japan

AsiaNANO 2016
Contact: Secretariat, Research Institute for Electronic Science,
Hokkaido University, N21 W10, Kita-ku, Sapporo, Hokkaido,
001-0021, Japan. E-mail: secretary@asianano2016.org
Web: <http://asianano2016.org>

OCT 21–24
Beijing,
China

The 11th International Conference on Waste Management and Technology (ICWMT11)
Contact: Dr. Shi Xiong/Ms. Xiao Wenjing
Basel Convention Regional Centre for Asia and the Pacific, School
of Environment, Tsinghua, University, Beijing 100084, China.
Tel: 86-10-82686410; Fax: 86-10-62772048
E-mail: icwmt@tsinghua.edu.cn; Web: <http://2016.icwmt.org>

Oct 26–29
Hong Kong,
China

Eco Expo Asia - International Trade Fair on Environmental Protection
Contact: Exhibitions Department
Hong Kong Trade Development Council, Unit 13, Expo Galleria
Hong Kong Convention & Exhibition Centre
1 Expo Drive, Wanchai, Hong Kong, China
Tel: (852) 1830 668
Fax: (852) 3543 8715
E-mail: exhibitions@hktdc.org

Nov 19–20
Fukuoka,
Japan

7th Asia-Pacific Innovation Conference
Contact: Mitchell Adams,
Centre for Transformative Innovation, Swinburne University
Australia. E-mail: apic@swin.edu.au
Web: <http://ap-ic.org/apic-2016/>

Nov 23–25
Kuala Lumpur,
Malaysia

International Conference of Low Carbon Asia (ICLCA) 2016
Contact: Assoc Prof Dr Lee Chew Tin
Co-chair of ICLCA 2016
Tel: +60 7 5538004; Fax: +60 7 5536847
E-mail: ctlee@utm.my; Web: <http://www.utm.my/iclca/>

Nov 30–Dec 2
Surabaya,
Indonesia

SOLARTECH INDONESIA - SURABAYA 2016
Contact: PT. Global Expo Management (GEM Indonesia)
Perkantoran Mutiara Taman Palembang, Block C5 /28-29
Jl. Kamal Raya Outer Ring Road
Jakarta Barat, 11730, Indonesia.
Tel: +62 - 21 - 5435 8118
Fax: +62 - 21 - 5435 8119
E-mail: info@gem-indonesia.com

Nov 24–26
Bangkok,
Thailand

SOLARTECH ASIA 2016
Contact: N.C.C. Exhibition Organizer Co., Ltd. - NEO
Queen Sirikit National Convention Center
60 New Rachadapisek Road, Klongtoey
Bangkok 10110
Thailand
Tel: +66 2203 4260-2
Fax: +66 2203 4250-1
E-mail: neo@qsncc.com

Dec 3–5
Dubai,
UAE

2016 2nd International Conference on Sustainable Agriculture Technologies (ICSAT 2016)
Contact: Ms. Hou
Cell: +852-3500-0137
E-mail: icsat@cbees.net
Web: <http://www.aconf.org>

Dec 5–8
Phuket,
Thailand

BioProcessing Asia 2016
Contact: Secretariat
B.O. Conference Service, Storskogsvagen 24, SE-756 45
Uppsala, Sweden.
Cell: +46 705 32 04 38; Fax: +46 702 73 36 43
E-mail: info@bo-conf.com
Web: <http://www.bioprocessingasia.net>

Dec 6–8
Hong Kong,
China

Asia-Pacific Conference on Biotechnology for Waste Conversion 2016 (BioWC 2016)
Contact: Conference Secretariat
Sino-Forest Applied Research Centre for Pearl River Delta
Environment (ARCPE), David C. Lam Building DLB 517, Hong Kong
Baptist University, Kowloon Tong, Hong Kong, China
Tel: (852) 3411 2537; Fax: (852) 3411 2095
E-mail: biowchck@project.hkbu.edu.hk
Web: <https://arcpe.hkbu.edu.hk/conf2016/>

2017

Feb 6–8
Hyderabad,
Telengana

BioAsia 2017
Contact: BioAsia Secretariat
301, Gayathri Nest, Telecom Nagar, Gachibowli,
Hyderabad - 500032, Telangana, India.
E-mail: info@bioasia.in; Web: <http://bioasia.in>

Feb 25–27
Hanoi,
Viet Nam

2017 3rd International Conference on Environment and Renewable Energy (ICERE 2017)
Contact: CBEEES Senior Editor, Ms. Mickie Gong
Asia-Pacific Chemical, Biological & Environmental Engineering
Society (APCBEEES)
Tel: +852-3500-0137; E-mail: icere@cbees.net
Web: <http://www.icere.org>

Feb 25–27
Khulna,
Bangladesh

WasteSafe 2017: 5th International Conference on Solid Waste Management in South Asian Countries
Contact: S. M. Tariquul Islam
Lecturer, Institute of Disaster Management, KUET
WasteSafe 2015, Room No. C103, CE Building, Department of Civil
Engineering, Khulna University of Engineering & Technology (KUET)
Khulna-9203, Bangladesh. Tel: +880-41-769468~75 ext. 211;
Fax: +880-41-774780; E-mail: wastesafe.bd@gmail.com
Web: <http://www.wastesafe.info>

Mar 14–15
Tokyo,
Japan

BIO Asia International Conference
Contact: Biotechnology Innovation Organization
1201 Maryland Avenue, SW, Suite 900, Washington, DC 20024
Tel: 202.962.9200; Fax: 202.488.6301; E-mail: info@bio.org
Web: <https://www.bio.org>

Mar 24–26
Manila,
Philippines

2017 2nd International Conference on Renewable Energy and Smart Grid (ICRESG 2017)
Contact: Secretary office of ICRESG 2017; Tel: +852-30697937
E-mail: icsreg@smehk.org; Web: <http://www.icsreg.org>

Apr 11–13
Putrajaya,
Malaysia

6th International Conference on Fuel Cell & Hydrogen Technology 2017
Contact: Conference Secretariat
Fuel Cell Institute
E-mail: icfcht2017publication@gmail.com
Web: <http://www.ukm.my/icfcht2017/>

May 4–6
Dubai,
UAE

14th Global Experts Meeting on Nanomaterials and Nanotechnology
Contact: Contact Desk
Conference Series LLC Conferences, 2360 Corporate Circle
Suite 400 Henderson, NV 89074-7722, USA
Tel: +1-888-843-8169
Fax: +1-650-618-1417
E-mail: nanomaterials@insightconferences.com
Web: <http://nanomaterials.conferenceseries.com>

Sep 13–16
Jakarta,
Indonesia

Electric Power & Renewable Energy Indonesia 2017
Contact: International Expo Management Pte Ltd
10 Kallang Avenue, #09-15 Aperia Tower 2,
Singapore 339510
Tel: +65 6233 6777; Fax: +65 6233 6768
E-mail: fiona@iemallworld.com
Web: <http://electricindonesia.com>

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- Sodium silicate (Viet nam)

Industry–academia partnership and incubation in India



Start-up India Hub, India

<http://startupindia.gov.in>

Showcasing innovation and providing a collaboration platform

A pivotal component for growth of start-ups is regular communication and collaboration within the start-up community, both national and international. An effective start-up ecosystem cannot be created by the start-ups alone. It is dependent on active participation of academia, investors, industry and other stakeholders.

To bolster the start-up ecosystem in India, the Government is proposing to introduce start-ups fests at national and international stages. These fests would provide a platform to start-ups in India to showcase their ideas and work with a larger audience comprising of potential investors, mentors and fellow start-ups.

As part of 'Make in India' initiative, the Government proposes to:

- Hold one fest at the national level annually to enable all the stakeholders of start-ups ecosystem to come together on one platform.
- Hold one fest at the international level annually in an international city known for its start-up ecosystem. The fests shall have activities such as sessions to connect with investors, mentors, incubators and start-ups, showcasing innovations, exhibitions and product launches, pitches by start-ups, mentoring sessions, curated start-ups walks, talks by disruptive innovators, competitions such as Hackathon, Makerspace, and so on, announcements of rewards and recognitions, panels and conferences with industry leaders, and so on.

Self-Employment and Talent Utilization (SETU) Programme

The Government of India has launched Atal Innovation Mission (AIM) with Self-Employment and Talent Utilization (SETU) Programme to serve as a platform for promotion of world-class Innovation Hubs, Grand Challenges, start-ups businesses and other self-employment activities, particularly in technology driven areas.

The Atal Innovation Mission (AIM) shall have two core functions:

- Entrepreneurship promotion through Self-Employment and Talent Utilization (SETU), wherein innovators would be supported and mentored to become successful entrepreneurs.
- Innovation promotion to provide a platform where innovative ideas are generated.

The main components proposed to be undertaken as part of the mission include the following:

Entrepreneurship promotion:

- Establishment of sector specific Incubators including in PPP mode (refer #14 of this action plan).
- Establishment of 500 Tinkering Labs.
- Pre-incubation training to potential entrepreneurs in various technology areas in collaboration with various academic institutions having expertise in the field.
- Strengthening of incubation facilities in existing incubators and mentoring of start-ups.
- Seed funding to potentially successful and high growth start-ups.

Innovation promotion:

- Institution of Innovation Awards (three per state/UT) and three National level awards.
- Providing support to State Innovation Councils for awareness creation and organising state level workshops/conferences.
- Launch of Grand Innovation Challenge Awards for finding ultra-low cost solutions to India's pressing and intractable problems.

Harnessing private sector expertise for incubator setup

To ensure professional management of Government sponsored/funded incubators, Government will create a policy and framework for setting-up of incubators across the country in public private partnership.

Currently, India lacks availability of incubation facilities across various parts of the country. Incubation facilities typically include physical infrastructure, provision of mentorship support, access to networks, access to market, and so on. Of all these features, physical infrastructure entails large capital investments which can generally be facilitated by the Government. However, requisite skills for operating an incubator are pivotal as well, for which expertise of the private sector needs to be leveraged. Considering this, Government shall encourage setting up of:

- 35 new incubators in existing institutions. Funding support of 40% (subject to a maximum of INR 10 crore) shall be provided by Central Government for establishment of new incubators for which 40% funding by the respective State Government and

20% funding by the private sector has been committed. The incubator shall be managed and operated by the private sector.

- 35 new private sector incubators. A grant of 50% (subject to a maximum of INR 10 crore) shall be provided by Central Government for incubators established by private sector in existing institutions. The incubator shall be managed and operated by the private sector.

The funding for setting up of the incubators shall be provided by NITI Aayog as part of Atal Innovation Mission (refer #13 of this action plan). Participating departments and agencies for setting-up of new incubators shall be Department of Science and Technology, Department of Biotechnology, Department of Electronics and Information Technology, Ministry of Micro, Small and Medium Enterprises, Department of Higher Education, Department of Industrial Policy and Promotion and NITI Aayog. Each of the above-mentioned departments/agencies would enter into a standard MoU with identified private sector players for creation of academia-industry tie-ups for nurturing innovations in academic institutions.

Building innovation centres at national institutes

To augment the incubation and R&D efforts in the country, the Government will set-up/scale-up 31 centres (to provide facilities for over 1,200 new start-ups) of innovation and entrepreneurship at national institutes, including:

- Setting-up 13 start-up centres: Annual funding support of INR 50 lakhs (shared 50:50 by DST and MHRD) shall be provided for 3 years for encouraging student driven start-ups from the host institute.
- Setting-up/Scaling-up 18 Technology Business Incubators (TBIs) at NITs/IITs/IIMs and so on as per funding model of DST with MHRD providing smooth approvals for TBI to have separate society and built-up space.

Setting up of new research parks

The Government shall set-up seven new Research Parks in institutes indicated below with an initial investment of INR 100 crore each. The Research Parks shall be modelled based on the Research Park set-up at IIT Madras.

The IIT Madras Research Park endeavours to enable companies with a research focus to set up a base in the Park and leverage the expertise of IIT Madras. The Research Park breaks down the traditional, artificial barriers of innovation through its connectivity and collaborative interaction. This helps industry to create, integrate and apply advancements in knowledge. It leverages best practices from successful Research Parks such as those at Stanford, MIT and Cambridge.

The guiding principles behind the park include:

- Creating a collaborative environment between industry and academia through joint research projects and consulting assignments.

- Creating a self-sustaining and technologically fertile environment.
- Encouraging and enabling R&D activities and start-ups that are aligned to potential needs of the industry.
- Providing world class infrastructure for R&D activities and incubation.
- Enabling development of high-quality personnel and motivating professional growth for researchers in companies through part-time Masters and PhD Programmes

Promoting start-ups in the biotechnology sector

The Biotechnology sector in India is on a strong, growth trajectory. Department of Biotechnology endeavours to scale-up the number of start-ups in the sector by nurturing ~300-500 new start-ups each year to have around 2,000 start-ups by 2020. To promote Start-ups in the sector, The Department of Biotechnology shall be implementing the following measures along with its Public Sector Undertaking Biotechnology Research Assistance Council (BIRAC). Bio-incubators, Seed Fund and Equity Funding:

- 5 new Bio-clusters, 50 new Bio-Incubators, 150 technology transfer offices and 20 Bio-Connect offices will be set up in research institutes and universities across India.
- Biotech Equity Fund – BIRAC AcE Fund in partnership with National and Global Equity Funds (Bharat Fund, India Aspiration Fund among others) will provide financial assistance to young Biotech start-ups.

Launching of innovation focussed programmes for students

To promote research and innovation among young students, the Government shall implement the following measures:

- Innovation core: Innovation core programme shall be initiated to target school kids with an outreach to 10 lakh innovations from 5 lakh schools. One lakh innovations would be targeted and the top 10,000 innovations would be provided prototyping support. Of these 10,000 innovations, the best 100 would be shortlisted and showcased at the Annual Festival of Innovations in the Rashtrapati Bhavan.
- NIDHI: A Grand Challenge programme (National Initiative for Developing and Harnessing Innovations) shall be instituted through Innovation and Entrepreneurship Development Centres (IEDCs) to support and award INR 10 lakhs to 20 student innovations from IEDCs.
- Uchhattar Avishkar Yojana: A joint MHRD-DST scheme which has earmarked INR 250 crore per annum towards fostering 'very high quality' research among IIT students. The funding towards this research will be 50% contribution from MHRD, 25% from DST and 25% from industry. This format has been devised to ensure that the research and funding get utilised bearing in mind their relevance to the industry. Each project may amount to INR 5 crore only. This scheme will initially apply to IITs only.

Marketing Strategy



Agency for Enterprise Development Business Portal, Vietnam

<http://en.business.gov.vn>

E-commerce overview

A major change in the global business environment is the increased importance of the internet. The internet is now a part of most modern businesses. The low cost of access has caused many businesses to view the internet as the modern marketplace.

There are several ways to approach e-commerce and the model you choose depends on your strategy. In the following module, we will explain some of the most popular models.

Direct sales

The internet can be used to directly sell to your customers. For companies that sell software or music they actually use the internet for distribution. However, for most businesses, products need to be delivered to the consumer. A key component for a direct sales model is an online payment system, such as PayPal or credit cards. Currently, these payment methods are either not available or not widely used in Vietnam, however, they will be available in the immediate future.

Pre-sales

A pre-sales model is when a business conducts all marketing through their website but directly conducts the actual sale. The businesses' website serves as the business catalogue and showroom and directs customers to the available products. It is important in this model to promote your business by directing visitors or 'traffic' to your site. This is accomplished through online promotion via search engines or advertisements on other websites.

Post-sales support

Many businesses use the internet for post-sales follow-up to address the needs of product owners. Often this is from providing answers to Frequently Asked Questions (FAQs) or providing an online form for customers to submit questions.

It is important to identify the objectives of your business to determine which model fits your business.

This guide will explain how to market your business online instead of the technical aspects of e-commerce. From this guide, small businesses should have the basic tools for studying online consumer behaviour, how to develop an e-marketing plan, selection of an Internet Service Provider (ISP) to host your website and how to build and get customers to visit your website.

Traditional versus online marketing

If you decide to use an online marketing strategy, then there are differences with traditional style advertising. You should decide first how to mix your online and traditional marketing strategies, whether you will use an entirely online advertising strategy or to use both traditional and online marketing. Many components are the same; for example, product brochures carry much of the same information about your products as a website. Online advertising banners can also be used as an alternative to outdoor advertising. Many activities traditionally requiring a physical location can now be accomplished online. For example, a FAQ page or comments/suggestion forms can replace parts of a customer call centre.

A major difference between online and traditional advertising is how a website directs attention. Traditional advertising often relies on bringing individuals into your store. With the internet, websites include hyperlinks or 'links' and advertising banners to attract consumer attention and allow them to directly access your e-business. FAQs can be a major time saver for your staff by providing the answers to the same questions often asked by a large number of customers. This service is available 24 h/day, 7 days/week. Websites can provide 24-h customer service without requiring you to pay 24-h customer service personnel wages. Customers can also browse at their leisure through a wider range of products that would take up too much showroom space.

It is important to decide how to position your business online and how suitable an e-business model is for your enterprise. Having an online presence often provides businesses with increased flexibility, improved customer service and can decrease some costs.

Study behaviours of online customers

Once you have decided to develop your business online, you should then learn how consumers behave on the internet.

Similar to traditional customer studies, you will need to identify your target online customers, their needs and how they browse websites. Typically, younger people tend to shop online and also people with internet access at their homes; however, some consumers do use public internet access points and web cafes. Online shoppers are typically higher educated, have higher incomes, and generally are familiar with English. You should consider these general trends when developing your business website.

If, for example, your target consumer is University students, you should understand how they locate and browse websites. How

customers find a website is very important? Some people use other websites and will find you from hyperlinks and web-banners and others will use search engines and internet directories. It is also important to make sure that your webpage is not too big if your target consumers tend to use slower, dial-up internet connections. These traits of your target consumers should be considered when designing and marketing your e-business.

Researching online customer behaviour can be done through monitoring traffic to your website and by interviewing target customers. In addition, you can conduct e-mail or online surveys.

Develop an e-marketing plan

An e-marketing plan is very similar to a traditional marketing plan and requires many of the same elements. The following provides some advice on developing an e-marketing plan:

External and internal analyses: You should apply the same PEST and SWOT models to evaluate your e-marketing plan. In addition, it is important to assess the digital infrastructure. Are digital signatures official under the law? Can the banking system handle online payment systems? You should also be aware of the technical aspects of maintaining a website and on-going marketing efforts. Are there qualified people to handle your website design and maintenance? In addition, it is important to decide if full-time staff are needed to maintain your website.

Online marketing objectives: E-marketing objectives should be clear and specific. Typical objectives are to obtain a certain number of visitors, for example, 3,000 new visitors per month. Some firms also set online sales goals.

Online marketing strategy: Your online marketing strategy is based on your target consumer. For example, if you want to sell delivered meals online, then you should target office workers that have limited time for dining in a restaurant. You should also make your business different from other firms. For example, if a competitor provides online set lunches, you could provide an online menu for more variety. Your positioning statement could then be 'different dishes for different lunches'. Always make sure that your e-market strategy is consistent with other marketing strategies. The presentation of your business should be uniform.

Online marketing tactics: Consumers have a much easier time to look at different providers to check differences in prices and styles. Some websites have ways to conduct online auctioning, so that the price is negotiated. It is important that your online product information is clear and detailed. There are a number of interactive methods in creating a browse friendly environment. You should match your method to your marketing plan and target consumers.

As online businesses lack a physical presence, it is important to establish credibility and trust with the consumer. Make transparent methods for providing feedback and allow customers to rate your product and services.

Implementation: Your action plan for e-marketing should follow the same scheduled deadline format for your overall marketing plan. If you must hire outside website designers make sure that you are clear and follow-up with the web developer to ensure that the website matches your objectives.

Multilingual Terminology Database

The World Intellectual Property Organization (WIPO) launched a new database providing free access to a wealth of multilingual scientific and technical terminology. Through its web-based interface, WIPO Pearl promotes accurate and consistent use of terms across different languages, and makes it easier to search and share scientific and technical knowledge. The database initially includes terms found in applications filed via WIPO's Patent Cooperation Treaty (PCT) and will eventually include collections from other areas of WIPO, such as trademarks, industrial designs, and terminology found in other treaties administered by WIPO. The 90,000+ terms and 15,000 concepts in 10 languages have all been entered and validated by WIPO-PCT language experts and terminologists, who have experience working with technical documents in multiple languages. Regular additions to the data are planned.

WIPO Pearl offers powerful search features, including the ability to select source and target languages, search by subject field as well as with abbreviations, and "fuzzy," "exact" and Boolean search functions. Users can obtain a quick list of results, which can be expanded, while browsing via "concept maps" that show linkages among related concepts by language and subject field - for example, showing concepts that are broader or narrower in scope than other concepts.

For further information, please contact:

Media Relations Section
 World Intellectual Property Organization (WIPO)
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 Fax: (+41 22) - 338 81 40
<http://www.wipo.int>

Limitations to Patent Rights in Thailand



ASEAN Intellectual Property Association

<http://www.aseanipa.org>

Patent revocation

The Director-General may request for the Board to cancel a patent in the following cases: (1) when 2 years after the issue of the license, the patentee or the licensee under the license has neither manufactured the product nor applied the process under the grant in the Kingdom for no appropriate reason; or for the time being, the product under the patent or the product manufactured by the process thereunder is neither being sold nor imported for sale or it is being sold at an unreasonable price and (2) when the patentee has licensed other persons to exercise the rights in the patent in violation of Section 41, which states that the license contract and the assignment of a patent must be in writing and registered in compliance with the requirements, procedures and conditions prescribed by the Ministerial Regulations.

Prior user's rights

An invention may form a part of the state of the art by its 'prior use', which would result in it lacking novelty for the purpose of a patent. Therefore, the prior user of a technology may often have grounds to oppose a third parties' patent application, to the extent that the claimed invention extends to use/technology practiced by the prior user in advance of the priority date of the application for patent.

However, if the prior use is 'private use', then the invention would not be considered as state of the art, because it would not have been widely known. Thus, a private use would not provide grounds for an effective attack on the validity of a disputed patent.

As mentioned earlier, Thailand's patent system employs an 'absolute novelty standard', meaning that 'prior use' and/or 'prior publication' in any country may be used to determine if the invention is widely known. In Thailand, a prior user would not have the right to attack the validity of a patent by claiming that it had used the underlying technology/process in secret, before the filing date of the patent application, because use of the invention by the prior user did not cause the invention to become widely known.

Compulsory license

In certain instances, the non-use of a patent, subsequent to the granting of a compulsory license, may result in that patent being removed from the register. Accordingly, for this type of invalidity to exist, a compulsory license, in respect to the subject patent, must have already been awarded.

1. At any time after the expiration of 3 years from the granting of a patent, or 4 years from the date of application, whichever

is later, any person may apply to the Director-General for a license, if it appears that at the time when such application is filed, the patent holder has not applied his rights (Section 46 of the Thai Patent Act B.E. 2542).

2. If the exercise of the patent rights of one party (the junior patentee) may infringe another patentee (the senior patentee) provided that:
 - the junior patentee's invention must be a substantial technological advancement which is beneficial to the economy, compared to the invention under the patent for which the license is being sought;
 - the senior patentee receives a cross-license to exploit the junior patentee's patent rights; and the junior patentee shall not assign the legal license to anyone, unless it is as an assignment together with his own patent (Section 47 and Section 47 bis of the Thai Patent Act B.E. 2542).
3. A Ministry or a Department may exploit an exclusive right by itself, or by designating another person in a patent, for the benefit of public utilities or national defence; the preservation or acquisition of natural resources or the environment; the prevention of a severe shortage of food or medicine, or other necessities for living or other public interests (Sections 51 and 52 of the Thai Patent Act B.E. 2542).

However, the applicant for a license must show that he made an effort to obtain a license from the patent holder, by proposing conditions and royalties that are reasonable under the circumstance, but no agreement could be reached within a reasonable period.

Government uses

To carry out any service for public consumption, or which is of vital importance to the defence of the country, or the preservation or acquisition of natural resources or environment, or to prevent or alleviate a severe shortage of food or medicines, consumer goods and other foodstuffs, or for the sake of other public interests, ministries, bureaus and department of the government themselves, or through others, may exploit any invention under any patent. However, in doing so, a royalty must be paid to the patentee or exclusive licensee, and the patentee shall be informed in writing without delay.

In addition, with approval of the cabinet, the prime minister shall have, during a state of war or emergency, the power to order exploitation of any invention under any patent for the defence and security of the country, on paying an appropriate royalty to the patentee, and the patentee shall be notified without delay.

Under these circumstances, the ministry, bureaus or department shall submit its offer, setting forth the amount of royalty and conditions for exploitation, to the Director-General. The patentee is entitled to appeal such an order or the amount of royalty to the court within 60 days from the date of receipt of such order.

Termination of protection

The Director-General may ask the Board to revoke a patent: (1) if 2 years after the issuance of the license, the patentee or licensee has not manufactured the product, or applied the process under the patent in the Kingdom, or for the time being, the product is not being sold or imported for sale, or it is being sold, but at an unreasonable price or (2) if the patentee has licensed other persons to exercise the rights in the patent, without conforming to the prescribed procedures.

Other cases

The following acts are not considered to be an infringement of a patent:

1. Any act in the interest of education, analysis, experimentation or research, provided that it is not contradictory to the patent holder's ordinary course of use, and does not cause damage to the patent holder's rightful benefits beyond appropriate reasons.
2. Manufacture of patented products or application of the patent process wherein the manufacture or the user, in good faith, has engaged in the production, or has acquired the equipment before the date of filing of the application in Thailand, without the knowledge of the registration, or without there being suitable grounds for him to know the same.
3. Compounding of medicines, in accordance with a physician's prescription, by a professional pharmacist or by a medical practitioner, including handling of the said products.
4. Any act connected with an application for drug registration, wherein the applicant intends to produce, sell or import the patented medical products after the expiry of the patent.
5. The use of an instrument, which is a patented invention, with a ship, machinery or other equipment of a ship from a member country of an international convention or treaty for patent protection to which Thailand is a party to when the ship entered the Kingdom, temporarily or by accidentally, and it is necessary that the instrument be used with the ship.
6. The use of an instrument, which is a patent invention, for the building operations relating to an aircraft, or with other equipment of an aircraft, or any vehicle from a member country of an international convention or treaty for patent protection to which Thailand belongs when the aircraft or vehicle enters the Kingdom, temporarily or by accidentally.
7. The use, sale, possession for sale, offer for sale or import of patented products under the consent of the patent holder.

Market Validated Technologies Directory

The Market Validated Technologies Directory is a compendium of a tedious and comprehensive market validation exercise on selected R&D outputs from seven public universities. The universities are Universiti Sains Malaysia (USM); Universiti Malaya (UM); Universiti Kebangsaan Malaysia (UKM); Universiti Putra Malaysia (UPM); Universiti Teknologi Malaysia (UTM); Universiti Islam Antarabangsa Malaysia (UIAM) and Universiti Teknologi MARA (UiTM). The exercise started in July 2012 and completed in September 2013. It involved 358 R&D outputs with a two-fold objective: validate market for and marketability of R&D outputs before the products (R&D Outputs) are offered to industry for commercial undertakings. The Market Validation exercise came about as the result of the introduction of Market Validation Fund (MVF) under Budget 2012 initiatives. The Fund's mandate is to "ensure commercial viability of products (R&D outputs) through market validation". By definition, market validation is the process of objectively evaluating the market for an offering and understanding the target market and required features before making the investment to build it and bring it to the market. The market validation exercise undertakings involve seven steps: Selection of R&D Outputs; Technology assessment; Operational assessment; Capability assessment; Market analysis (both primary & secondary data fieldwork); Model of commercialization including financial modeling, where appropriate and Recommendation for either Market-Go/Conditional Market-Go or No Go. The Market Validated Technologies Directory provides a brief and a snapshot on what the technology is about, the potential users, market; IP status; start-up requirements; ROI/IRR and recommendation for commercialization.

For more information, contact:

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Malaysian Technology Development Corporation
Level 8-9, Menara Yayasan Tun Razak
Jalan Bukit Bintang
55100 Kuala Lumpur, Malaysia
Tel: 603 – 2172 6000 / 6117
Web: <http://www.mtdc.com.my>*

Voluntary licensing of patents in the Philippines



The Intellectual Property Office, Philippines

<http://ipophil.gov.ph>

REPUBLIC ACT NO. 8293

SECTION 85. Voluntary License Contract – To encourage the transfer and dissemination of technology, prevent or control practices and conditions that may, in particular cases, constitute an abuse of intellectual property rights having an adverse effect on competition and trade, all technology transfer arrangements shall comply with the provisions of this Chapter (n).

SECTION 86. Jurisdiction to Settle Disputes on Royalties – The Director of the Documentation, Information and Technology Transfer Bureau shall exercise quasi-judicial jurisdiction in the settlement of disputes between parties to a technology transfer arrangement arising from technology transfer payments, including the fixing of appropriate amount or rate of royalty (n).

SECTION 87. Prohibited Clauses – Except in cases under Section 91, the following provisions shall be deemed prima facie to have an adverse effect on competition and trade:

87.1. Those which impose on the licensee the obligation to acquire from a specific source capital goods, intermediate products, raw materials and other technologies, or of permanently employing personnel indicated by the licensor;

87.2. Those pursuant to which the licensor reserves the right to fix the sale or resale prices of the products manufactured based on the license;

87.3. Those which contain restrictions regarding the volume and structure of production;

87.4. Those which prohibit the use of competitive technologies in a non-exclusive technology transfer agreement;

87.5. Those which establish a full or partial purchase option in favour of the licensor;

87.6. Those which obligate the licensee to transfer for free to the licensor the inventions or improvements that may be obtained through the use of the licensed technology;

87.7. Those which require the payment of royalties to the owners of patents for the patents that are not used;

87.8. Those which prohibit the licensee to export the licensed product unless justified for the protection of the legitimate interest of the licensor such as exports to countries where exclusive licenses to manufacture and/or distribute the licensed product(s) have already been granted;

87.9. Those which restrict the use of the technology supplied after the expiration of the technology transfer arrangement, except in

cases of early termination of the technology transfer arrangement due to reason(s) attributable to the licensee;

87.10. Those which require payments for patents and other industrial property rights after their expiration, termination arrangement;

87.11. Those which require that the technology recipient shall not contest the validity of any of the patents of the technology supplier;

87.12. Those which restrict the research and development (R&D) activities of the licensee designed to absorb and adapt the transferred technology to local conditions or to initiate R&D programmes in connection with new products, processes or equipment;

87.13. Those which prevent the licensee from adapting the imported technology to local conditions, or introducing innovation to it, as long as it does not impair the quality standards prescribed by the licensor;

87.14. Those which exempt the licensor for liability for non-fulfilment of his responsibilities under the technology transfer arrangement and/or liability arising from third party suits brought about by the use of the licensed product or the licensed technology; and

87.15. Other clauses with equivalent effects (Sec. 33-C (2), RA 165a).

SECTION 88. Mandatory Provisions – The following provisions shall be included in voluntary license contracts:

88.1. That the laws of the Philippines shall govern the interpretation of the same and in the event of litigation, the venue shall be the proper court in the place where the licensee has its principal office;

88.2. Continued access to improvements in techniques and processes related to the technology shall be made available during the period of the technology transfer arrangement;

88.3. In the event, the technology transfer arrangement shall provide for arbitration, the Procedure of Arbitration of the Arbitration Law of the Philippines or the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL) or the Rules of Conciliation and Arbitration of the International Chamber of Commerce (ICC) shall apply and the venue of arbitration shall be the Philippines or any neutral country; and

88.4. The Philippine taxes on all payments relating to the technology transfer arrangement shall be borne by the licensor (n) cdt.

SECTION 89. Rights of Licensor – In the absence of any provision to the contrary in the technology transfer arrangement, the grant of a license shall neither prevent the licensor from granting further licenses to third person nor from exploiting the subject matter of the technology transfer arrangement himself (Sec. 33-B, R.A. 165a).

SECTION 90. Rights of Licensee – The licensee shall be entitled to exploit the subject matter of the technology transfer arrangement during the whole term of the technology transfer arrangement (Sec. 33-C (1), R.A. 165a).

SECTION 91. Exceptional Cases – In exceptional or meritorious cases where substantial benefits will accrue to the economy, such as high-technology content, increase in foreign exchange earnings, employment generation, regional dispersal of

industries and/or substitution with or use of local raw materials, or in the case of Board of Investments, registered companies with pioneer status, exemption from any of the above requirements may be allowed by the Documentation, Information and Technology Transfer Bureau after evaluation thereof on a case-by-case basis (n).

SECTION 92. Non-Registration with the Documentation, Information and Technology Transfer Bureau – Technology transfer arrangements that conform with the provisions of Sections 86 and 87 need not be registered with the Documentation, Information and Technology Transfer Bureau. Non-conformance with any of the provisions of Sections 87 and 88, however, shall automatically render the technology transfer arrangement unenforceable, unless said technology transfer arrangement is approved and registered with the Documentation, Information and Technology Transfer Bureau under the provisions of Section 91 on exceptional cases (n).

Creative Productivity Index: Analysing Creativity and Innovation in Asia

This report presents the results and analysis of the Creative Productivity Index (CPI) for a select number of Asian economies. The CPI was built by The Economist Intelligence Unit. The Asian Development Bank (ADB) commissioned the work on developing the CPI as part of an overall study on Asia's knowledge economies. The report provides a benchmarking of a number of economies in Asia on creative productivity, an important attribute for strengthening knowledge-based economic development. This index gives policy makers a unique tool to assess how to foster creativity and innovation in Asia. Innovation-led growth is crucial for developing Asia to maintain and accelerate the pace of growth of its economies.

Following are the key findings of the CPI:

- Japan leads the CPI, followed by Finland and the Republic of Korea;
- Cambodia and Pakistan, with much room for improvement, are ranked lowest in the CPI;
- Singapore leads the CPI for innovation inputs;
- Finland and Hong Kong, China are best in the CPI for innovation outputs;
- Low- and middle-income economies will benefit most from policies to increase creative inputs; and
- There are many different dimensions of creativity that are captured in this report.

Many Asian developing economies face a challenge to avoid being stuck in the middle-income trap. They need to transition from an imitation-driven economy to an innovation-based growth model more commonly found in developed countries. Richer economies are clearly able to invest more in physical infrastructure such as transport networks, communications, and power generation, which are key underlying factors in economic creativity and innovation. However, some differences are a result of the enabling environment that facilitates the generation of creative outputs from creative inputs. A poorer country may not be able to muster the same level of creative inputs as a richer country, but can still benefit by using what resources it does have efficiently. While the precise policy recommendations will differ for each economy, the results of this report highlight a number of important policy areas where an increased emphasis would be beneficial for many Asian economies.

For more information, contact:

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Funding support for Start-ups in India



Start-up India Hub, India

<http://startupindia.gov.in>

One of the key challenges faced by Start-ups in India has been accessed to finance. Often Start-ups, due to lack of collaterals or existing cash flows, fail to justify the loans. Besides, the high-risk nature of Start-ups wherein a significant percentage fails to take-off, hampers their investment attractiveness.

Fund of funds

In order to provide funding support to Start-ups, Government will set up a fund with an initial corpus of INR 2,500 crore and a total corpus of INR 10,000 crore over a period 4 years (i.e., INR 2,500 crore per year). The fund will be in the nature of 'Fund of Funds', which means that it will not invest directly into Start-ups, but shall participate in the capital of SEBI-registered Venture Funds.

Key features of the 'Fund of Funds' are highlighted below:

- The 'Fund of Funds' shall be managed by a Board with private professionals drawn from industry bodies, academia and successful Start-ups.
- Life Insurance Corporation (LIC) shall be a co-investor in the 'Fund of Funds'.
- The 'Fund of Funds' shall contribute to a maximum of 50% of the stated daughter fund size. To be able to receive the contribution, the daughter fund should have already raised the balance 50% or more of the stated fund size as the case maybe. The 'Fund of Funds' shall have representation on the governance structure/board of the venture fund based on the contribution made.
- The fund shall ensure support to a broad mix of sectors such as manufacturing, agriculture, health, education and so on.

Credit guarantee fund for start-ups

To overcome traditional Indian stigma associated with failure of Start-up enterprises in general and to encourage experimentation among Start-up entrepreneurs through disruptive business models, credit guarantee comfort would help flow of Venture Debt from the formal Banking System.

Debt funding to Start-ups is also perceived as a high-risk area and to encourage Banks and other Lenders to provide Venture Debts to Start-ups, Credit guarantee mechanism through National Credit Guarantee Trust Company (NCGTC)/SIDBI is being envisaged with a budgetary Corpus of INR 500 crore per year for the next 4 years.

Tax exemption on capital gains

Due to their high-risk nature, Start-ups are not able to attract investment in their initial stage. It is therefore important that

suitable incentives are provided to investors for investing in the Start-up ecosystem. With this objective, exemption shall be given to people who have capital gains during the year, if they have invested such capital gains in the 'Fund of Funds' recognised by the Government. This will augment the funds available to various VCs/AIFs for investment in Start-ups.

In addition, existing capital gain tax exemption for investment in newly formed manufacturing MSMEs by individuals shall be extended to all Start-ups. Currently, such an entity needs to purchase 'new assets' with the capital gain received to avail such an exemption. Investment in 'computer or computer software' (as used in core business activity) shall also be considered as purchase of 'new assets' to promote technology driven Start-ups.

Tax exemption to start-ups

Innovation is the essence of every Start-up. Young minds kindle new ideas every day to think beyond conventional strategies of the existing corporate world. During the initial years, budding entrepreneurs struggle to evaluate the feasibility of their business idea. Significant capital investment is made in embracing ever-changing technology, fighting rising competition and navigating through the unique challenges arising from their venture. In addition, there are limited alternative sources of finance available to the small and growing entrepreneurs, leading to constrained cash funds.

With a view to stimulate the development of Start-ups in India and provide them a competitive platform, it is imperative that the profits of Start-up initiatives are exempted from income tax for a period of 3 years. This fiscal exemption shall facilitate growth of business and meet the working capital requirements during the initial years of operations. The exemption shall be available subject to non-distribution of dividend by the Start-up.

Tax exemption on investments

Under The Income Tax Act (1961), where a Start-up (company) receives any consideration for issue of shares which exceeds the Fair Market Value (FMV) of such shares, such excess consideration is taxable in the hands of recipient as income from other sources. In the context of Start-ups, where the idea is at a conceptualisation or development stage, it is often difficult to determine the FMV of such shares. In majority of the cases, FMV is also significantly lower than the value at which the capital investment is made. This results into the tax being levied under section 56(2) (viib).

Currently, investment by venture capital funds in Start-ups is exempted from operations of this provision. The same shall be extended to investment made by incubators in the Start-ups.



Raising Finance for Business in Viet Nam

Agency for Enterprise Development Business Portal, Viet Nam

<http://en.business.gov.vn>

Finding the capital you need will always be your most basic business activity throughout the entire life of your business. If you are just starting up or even if you have a well-established enterprise, your own savings and soft loans from family and friends are likely to play a significant role in your sources of finance. When you are trying to raise finance from formal financial institutions, you need to know how to approach them, what they would expect from you and how they would assess your proposals.

For example, Banks and People's Credit Funds will require you to have a well-prepared business plan, show concrete evidence that you are willing to invest your own funds in your proposed business activity as well as provide considerable amounts of collateral (e.g., land and house that you or your family owns) to secure your loan. Learn more on the overall requirements of formal financial institutions in the next sections: How to work with banks and 5C's of Credit?

How basic financial statements help you to run your business

Balance sheet

- The balance sheet is used to evaluate how the business is progressing. You can use the balance sheet to assess the financial position and the liquidity of your business.
- The balance sheet is useful when looked at alongside the profit and loss figures, because then you will get the whole picture.
- Use the balance sheet to secure a loan: when you apply for a loan, the bank usually requests that you provide the balance sheet to assess your ability to repay the loan. Having a strong balance sheet helps when it comes to borrowing.

Income statement (profit and loss statement)

The income or profit and loss statement shows as how much money your business will make after all expenses are accounted for. Income statements are read from top to bottom and represent earnings and expenses over a period of time. An income statement does not reveal hidden problems such as insufficient cash flow problems. You should prepare a cash flow statement to see if you have a problem with insufficient cash flow during your operations.

Cash flow statement/a cash flow forecast

A cash flow forecast can be an important business tool if it is used effectively. Bear in mind that it is dynamic – you will need to change and adjust it frequently depending on business activity, payment patterns and supplier demands.

It is helpful to set up a regular review of the cash flow forecast, changing the figures in light of your sales, purchases and staff costs. Legislation, interest rates and tax changes will also impact on the forecast.

Having a regular review of your cash flow forecast will enable you to:

- see when problems are likely to occur and sort them out in advance;
- identify any potential cash shortfalls and take appropriate action and
- ensure you to have sufficient cash flow before you take on any major financial commitment.

Having an accurate cash flow forecast will help ensure that you can achieve *steady growth* without overtrading. You will know when you have sufficient assets to take on additional business – and, just as importantly, when you need to consolidate. This will enable you to keep staff, customers and suppliers happy. It is important that you incorporate *warning signals* into your cash flow forecast. For example, if predicted cash levels come close to your short-term credit limits, then this should sound an alarm and trigger an action to bring cash back to an acceptable level.

Managing your accounts payable

Accounts payable are money your companies owe to vendors and suppliers for products and services purchased on credit. These are items that your company has already received but must pay for in the future. Managing accounts payable is very important, since inability to pay your debts can cause serious problems for your business, including bankruptcy. It is, therefore, essential to record in detail all purchases made, the date of payment is required and the resources available to pay when due.

Managing your accounts receivable

Accounts receivable are money owed to your company by other companies who have purchased goods or services from you on credit. These are items you have already provided to customers but are awaiting for payment in the future. Purchases on credit are considered to be accounts receivable when you send the customer an invoice. Managing accounts receivable is very important. If customers do not pay, then your company will lose money. In addition, the timing of payment is important as this will affect your ability to pay your own debts and costs of production. Recording in detail all sales and the due dates of payments is essential to ensure that your company receives the money that are on due.

Multiplying social impact through innovating the social sector in Malaysia



Agensi Inovasi Malaysia

<http://innovation.my>

Multiplying social impact through Innovating Social Sector is one of the many initiatives under Agensi Inovasi Malaysia. The vision is to foster Malaysia that is socially advanced and balanced in tandem with economic progress and developed nation status. To achieve this vision, the initiative is working on projects that would enable ecosystem where social sector becomes innovative and more professionalised to create greater impact to the society.

Social Public–Private Partnership (Social PPP) is the second project under the initiative. The Social Impact Innovation Challenge, held in 2014 was the first project under the BB initiative and it looked into building the demand side of the ecosystem.

Social Public–Private Partnership (Social PPP)

Why do we need Social PPP?

Although the country is developing economically, social development is not growing at the same pace resulting in sections of society that are marginalised. Rapid progress has also caused the social environment to evolve and Malaysia, like many other countries, is finding its societal dynamics becoming increasingly complex.

Despite of various efforts, Government alone cannot address all social issues. Traditional ways of delivering social services are not fully effective, and consume a huge portion of public expenditure. In addition, although the role that private corporations play through their Corporate Social Responsibilities (CSR) is commendable, they are unable to address systemic social ills. In addition, social purpose organisations continue to combat social struggles faced by the Rakyat but they often lack the resources and professionalism to scale and achieve wide impact.

What is Social PPP?

Social PPP is an initiative under the National Blue Ocean Strategy (NBOS). Social PPP taps into the strengths of the government, the private sector and the social sector to address social disparities by looking at new ways of delivering social service. Social PPP strives towards 'strengthening collaboration through a whole-society approach', as part of strategies for 'Translating Innovation to Wealth', which is one of the six game changers put forth in the 11th Malaysia Plan.

What is the NBOS?

NBOS initiatives provide a creative and systematic way to create high-value impact at low cost, with various ministries and agencies collaborating towards developing and implementing numerous

programmes to help stimulate rapid and sustained growth, develop communities and create harmony. Professor Chan Kim, business theorist and co-author of the book Blue Ocean Strategy, has announced Social PPP at the NBOS summit on 26th February 2015.

Who are the partners in Social PPP?

The partnership consists of the government and the private sector as follows:

Government:

- a) Agensi Inovasi Malaysia
- b) Unit Kerjasama Awam Swasta

Private sector:

- a) Credit Suisse
- b) Hap Seng Consolidated Berhad
- c) Hong Leong Foundation
- d) IOI Group
- e) Prudential
- f) Westports Malaysia Sdn Bhd
- g) Yayasan Siti Sapura Husin
- h) YTL Foundation

About eight companies are working together as a grouping known as the 'collective impact'. These companies are Credit Suisse, Hap Seng Consolidated Sdn Bhd, Hong Leong Foundation, IOI Group, Prudential, Westports Malaysia Sdn Bhd, Yayasan Siti Sapura Husin and YTL Foundation.

What other government ministries or agencies are involved?

This initiative is also to be carried out in collaboration with other government ministries and agencies such as the Malaysian Global Innovation & Creativity Centre (MaGIC), the Ministry of Women, Family and Community Development (MWFCD), Ministry of Youth and Sports (MYS), National Strategic Unit (NSU), 1M4U and the Registry of Societies (ROS).

How does Social PPP works?

In Social PPP, the government and the private sector will be aligning resources to support the social sector to come up with creative and effective interventions on three social issues. Social-purpose organisations (SPOs) such as non-governmental organisations and social enterprises will be supported as follows:

- Funding: a grant will be provided which will be managed by a leading SPO and shared with other SPOs working on the same project.
- Professional development: MaGIC's Social Entrepreneurship unit will provide capacity-building to SPOs to ensure that the projects are professionally managed and administered.
- Collaboration networks: leading SPOs will need to work with other SPOs so that interventions are scaled-up more effectively to deliver better impact to their target beneficiaries.
- Impact measurement: SPOs will use an impact measurement toolkit to track their performance and report on it.

What are the initial projects for Social PPP?

There are four initial projects for Social PPP and they relate to education and capability development for youth and disadvantaged people. Three projects under the 'collective impact' will be looking at improving education holistically in Klang. Digi Telecommunications Sdn Bhd is looking at community impact projects that use internet-enabled technology services.

What is the intended impact of Social PPP?

With the Social PPP, the goal is that specific needs of disadvantaged people are met through innovative and engaging inter-

vention by localised SPOs with better skills and stronger support network.

What does the future hold for Social PPP?

As the outcomes from interventions are evaluated through impact measurement, having data on the effectiveness of a project towards the beneficiaries will be pivotal. The measurement data will allow for decisions to be made on various projects, being cognisant of its impact, sustainability and innovativeness.

It is hoped that the success of the pilot for Social PPP will encourage larger participation from the government and the private sector as this allows for multiplier effects to be created. Social PPP currently taps on the resources of CSR, but it has the potential to tap into other resources such as venture philanthropy and social impact investing, besides the resources provided by the government. This could pave the way for future social financing models.

Greater participation from all sectors allows for increases in scale, allowing replications of successful projects in other areas and maximisation of impact to the targeted recipients. As more SPOs go through capacity development, this also enables the professionalisation of the sector and leads to greater effectiveness of social service delivery over time.

Asia Pacific Energy Portal

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) recently launched an innovative new online portal that will provide unprecedented access to information on the energy policies of countries in Asia and the Pacific, and advance the sustainable energy agenda in the region. The Asia Pacific Energy Portal offers member States powerful tools, including highly interactive data visualizations that enable rapid trends identification as well as policy tracking and search. The unique combination of data and policy information in one application will help improve analysis of the energy situation, policies and their development impact. Alongside the portal, ESCAP also launched the first annual *Regional Trends Report on Energy for Sustainable Development in Asia and the Pacific*. The Report provides an additional platform for member States to share their experiences through case studies regarding the energy sector and its future development.

Launching the report and the portal Dr. Shamshad Akhtar, United Nations Under-Secretary General and Executive Secretary of ESCAP explained that the report and the portal are part of the three pillars of the Asia Pacific Energy Forum (APEF) Implementation Support Mechanism set up by ESCAP in 2013. "The portal will continue to evolve to further expand the knowledge base supporting both the regional and global agendas such as the Sustainable Energy for All initiative and the sustainable development goals," said Dr. Akhtar. "Future development will include incorporation of more data and the creation of energy resource and infrastructure maps. The portal could also be linked in the future with the regional data repository on Sustainable Energy for All in the Pacific." Dr. Akhtar emphasized that APEF and its outcome documents demonstrate the commitment of ESCAP member States to cooperate on a common energy agenda that seeks a cleaner, more efficient, equitable, and secure energy future. "ESCAP is committed to support member State cooperation on a common energy agenda for shared prosperity, social equity and sustainability," she added.

For more information about the portal, access:

<http://www.asiapacificenergy.org>

Innovation for business in India



Business Portal of India

<http://www.archive.india.gov.in>

Importance or benefits

In the ever-changing world, innovation is the only key which can sustain a long-run growth of the country. More and more firms are realising the importance of innovation to gain competitive advantage. Accordingly, they are engaging themselves in various innovative activities, ranging from manufacturing processes, product improvement, brand building initiatives to customer satisfaction. Today, business environment has become very dynamic with more demanding customers and intense market competition. To meet this, firms are creating new products, solutions and services that provide a radically better experience for the consumers.

Innovation is not only about technology, but is also about understanding and exploring untapped user needs that require to be addressed in an efficient manner. It must occur at every stage of a product or solution development and release cycle. Thus, managing innovation is fast becoming priority in a global business environment.

Firms that innovate tends to survive and grow to a greater extent. The most successful individuals, managers and team leaders in latest business world are the ones who are not only innovative in their own work, but also encourage and assist others to be innovative in every aspect of their work.

Some of the key innovation areas are product development and improvement, manufacturing processes, creating entirely new set of products and so on. In area of supply chain management, innovations help in making the supply chain more responsive, flexible and efficient. Supply chain innovation can be used to reduce costs, offer better assortment of customer centric products, decreasing time to market and driving growth.

Innovation is the main idea in shaping corporate life and helping companies to adopt various strategic options. It helps to reduce total cost of production, increase income avenues, maintain efficient operating systems and so on. It enables to see potential acquisitions not only on cost basis, but also as a means of accelerating profitable top-line revenue growth and enhancing capabilities. It also expands R&D base of the country and brings latest technologies into the country. It also provides an edge in being able to enter new markets faster and deeper.

Thus, the term 'innovation' is rightly referred to as changes to products, services, processes or business models. To continue their growth and to attain newer heights, Indian firms need to recognise the importance of 'innovation' for maintaining their competitive edge and fuelling further growth. Innovation may

be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning, market share and so on.

Problems and challenges

Innovators face problems and challenges mainly in the areas of financial assistance and marketing of their innovation. In other words, it involves the following:

- Securing the right kind of finance is key to delivering innovation. Prevailing asymmetry between inventors and investors is required to be bridged. Financing systems for backing up early-stage innovations with risk capital are required. In addition, provisions for exiting from non-profitable innovations also need to be made.
- Innovations created at the expense of considerable investment of resources, demand a matching Intellectual Property Rights (IPR) regime.
- The legal framework for protecting IPR is in place but the infrastructure for capturing and protecting IPR is still evolving in India.
- New approaches, programmes and policies are essential for unleashing India's innovation potential.
- Competitiveness innovation cluster has emerged as a successful global concept, in which academia, research and industry partner under viable and equitable pattern, are the way forward.

Innovations that fail are often potentially good ideas but have been rejected or postponed due to budgetary constraints, lack of skills or poor fit with current goals. Failures should be identified and screened out in the process as early as possible. Early screening avoids unsuitable ideas devouring scarce resources that are needed to progress more beneficial ones. Although learning is important, high-failure rates throughout the innovation process are wasteful.

The causes of failure have been widely researched and can vary considerably. Some causes will be external and others will be internal. Internal causes of failure relate to those associated with the innovation process itself. Common causes of failure within the innovation process in most organisations can be divided into five types, which are as follows:

- Poor goal definition
- Poor alignment of actions to goals

- Poor participation in teams
- Poor monitoring of results
- Poor communication and access to information

Gaining full benefits of innovation require an effective and efficient framework across a wide range of policy areas, calling for an integrated approach and cooperation among business, governments and society.

Government support

There is a need to make continuous efforts, on the part of both Central and State Governments, so as to develop and promote various innovations and technologies in India as well as to spread these to the worldwide markets. The Central authority responsible for this in India is the 'Ministry of Science and Technology'. The Department of Science and Technology (DST) and Department of Scientific and Industrial Research (DSIR) are its two nodal agencies that are responsible for promoting science and technology (S&T) activities in the country as well as for supporting inventors/entrepreneurs in their pursuits. National Innovation Foundation (NIF) has also been established to encourage Indian innovators by providing them adequate institutional support.

These central agencies, along with efforts of States/Union Territories, have been undertaking many policy initiatives and measures as well as announcing many schemes and programmes with a view to promote innovation and S&T in the country. Some of the prominent ones are Technology Promotion, Development and Utilization (TDPU) Programme, Technology Development and Innovation Programme (TDIP), Science and Technology (S&T) Policy, National Innovation Act (2008) and so on. All such incentives aim to accelerate economic growth of Indian economy and improve the standard of living of the people.

Suggestions and future prospects

There is a vast untapped potential in India for wealth creation by increasing the levels of innovation content in the entire economic development activities of the country. It is a tall call but an essential one, if the current levels of growth of GDP were to be maintained over the next two decades. Innovation will also be a key for sustainability – the ability to meet developmental objectives while ensuring sustainable use of natural resources.

Often missing within discussions of innovation is the role of innovation for directly improving the livelihood or quality of life of the poor. The general assumption is that the market mechanism will take care of this. However, innovation may also be important for the delivery of, and access to, services that are essential for a quality of life; whether it is clean water, modern energy or affordable health care.

Faster growth in a globally competitive market environment demands a national innovation infrastructure that connects knowledge systems to wealth creation efficiently and effectively. In the

Indian social context, there is a need to ensure that innovative growth-linked processes do not bypass the poor and leave them out of developmental choices emanating from the benefits of globally competitive innovations. The innovation infrastructure of India should aim to bridge the internal asymmetries and serve the dual purpose associated with global competitiveness and inclusive growth.

Both pro-poor and global competitiveness objectives should be embedded in the search for innovations. The number of grass-root innovators in the informal sector in India is large. However, grass-root innovations are not able to reap sufficient economic benefits for want of backing with adequate resources. The innovation infrastructure in the formal sector is thin. It requires deepening by referencing to global best practices and market demands. Such an innovation infrastructure would depend strongly on a vibrant and gainful public-private partnership in R&D as well as commercialisation of innovations.

The design and development of a sustainable innovation infrastructure should take into account global best practices, attraction, attachment, retention and renovation of talent within the R&D streams, public private partnerships, venture and angel financing and capacity building. The realisation of Indian Vision 2025 to emerge as a major economic power in the global knowledge economy would call for a sustainable innovation infrastructure.

In order to unleash our full innovative potential, we need to put in place a National Innovation policy, which encourages competition among enterprises, greater diffusion of knowledge and increased support to early stage technology development initiatives and grass-root level innovators. There is a need to foster increased collaboration among R&D institutes, universities and private sector enterprises and leverage on their cumulative strengths in designing and implementing various innovation programmes. There is also a need for an appropriate legislative framework for incentivising the innovators and commercialisation of public funded R&D, where the government, the recipient(s) of funds, the inventor, as well as the public benefit from the protection and commercialisation of intellectual property.

At the root of innovation is invention, which is an essential creative step that cannot really be directed or forced. However, there is much that can be done to facilitate this initial step and the many subsequent steps that will ultimately yield the value to society from the invention. These steps are not isolated or distinct from one another; therefore, it is more appropriate to think of a comprehensive innovation policy, rather than a policy that is aimed at only one of the steps in the process or elements of the innovation system. Innovation policy needs to be placed within the broader social and economic context, informed by goals and aspirations of development and should reflect a fair and effective balance between public and private interests, social and economic goals and inclusiveness versus rapidity.



Vietnam's strategy on cleaner industrial production to 2020

Vietnam Government Portal

<http://www.chinhphu.vn>

Perspective

To realise the 'National Strategy on Environment Protection to 2010 and vision to 2020', the 'Strategic Orientations for Sustainable Development in Vietnam' and orientations for the development of industries.

The State encourages and provides technical supports to the cleaner production voluntarily adopted by industrial production establishments through making use of their own internal forces to fulfil environmental targets and economic interests.

Cleaner industrial production is realised through enhancing State management over environment protection and increasing industrial production establishments' awareness of interests that their cleaner production brings about.

Objectives

Overall objective

Cleaner production must be observed in all industrial production establishments to better the use of natural resources, materials and fuels; minimise emission and curb pollution and protect and improve the quality of environment, human health and secure sustainable development.

Specific objectives

a) From now to 2015:

- 50% of industrial production establishments shall become aware of benefits of cleaner industrial production;
- 25% of industrial production establishments shall adopt cleaner production; these establishments shall save 5%–8% of energies, materials and fuels consumed per product and
- 70% of Departments of Industry and Trade shall have qualified staff specialising in guiding the application of cleaner production in industrial establishments.

b) From 2016 to 2020:

- 90% of industrial production establishments shall become aware of benefits of cleaner industrial production;
- 50% of industrial production establishments shall adopt cleaner production; these establishments shall save 8%–13% of energies, materials and fuels consumed per product; 90% of large- and medium-scale enterprises shall have units specialising in cleaner production and

- 90% of Departments of Industry and Trade shall have qualified staff specialising in guiding the application of cleaner production in industrial establishments.

Missions

1. Improve awareness of cleaner industrial production in all sectors, localities, production establishments and communities at all echelons.
2. Perfect the system of mechanisms, policies and laws which boost cleaner industrial production:
 - a) Review, revise, supplement and promulgate mechanisms, policies and laws on cleaner industrial production or submit them to the competent entities for promulgation.
 - b) Insert the content of cleaner production into strategies and plans on development of industries; strategies and plans on socio-economic development and programmes and plans on environment protection of ministries, sectors and localities.
3. Increase capacity of management agencies, consulting organisations and industrial production establishments in applying cleaner production:
 - a) Raise capacity of management agencies in charge of cleaner industrial production so as to enforce legal regulations on environment protection.
 - b) Nurture and develop a pool of experts of cleaner production for consulting organisations and technicians of cleaner production for industrial production establishments.
 - c) Support the experiment and popularisation of cleaner industrial production models in industrial production establishments.
4. Develop the network of organisations supporting cleaner industrial production.

Solutions

1. Communications solutions to improve awareness:
 - a) Promote the propagation and education work to improve awareness of cleaner industrial production in all industrial production establishments at all echelons.
 - b) Build up and popularly introduce the database and websites on cleaner industrial production.
 - c) Boost the popularisation of successful models of cleaner industrial production.

2. Solutions relating to organisation, management, mechanism and policy:
 - a) Enhance the revision, supplementation and completion of mechanisms, policies and laws on cleaner industrial production.
 - b) Include the content of cleaner production in strategies and plans on development of industries; strategies and plans on socio-economic development and programmes and plans on environment protection of ministries, sectors and localities.
 - c) Establish a network of agencies in charge of licensing the certificates on cleaner industrial production for industrial production establishments on a voluntary principle.
 - d) Develop a network of organisations supporting cleaner industrial production within the Ministry of Industry and Trade and in provinces and cities housing many industrial production establishments.
3. Technical support, human resource training and international cooperation:
 - a) Speed up the design and application of technical instructions on cleaner industrial production and assist the application of cleaner production in industrial production establishments.
 - b) Consolidate linkages among research institutes, universities and industrial production establishments in researching, transferring and applying technologies of cleaner industrial production.
 - c) Further train, nurture and raise capacity of managers, specialists and consultants involved in cleaner industrial production.
 - d) Mobilise resources from foreign organisations and individuals to accelerate the application of cleaner industrial production.
4. Investment and financial solutions:
 - a) Expenses for realising the strategy shall be mobilised from different sources: State budget, aid, donations and investments of domestic and foreign organisations and individuals, and other legal sources.
 - b) Approve in principle five projects listed in the enclosure Appendix to implement targets and missions of the strategy. Relevant ministries and sectors shall be responsible for designing projects and submitting them to competent agencies for approval. Expenses for realising these projects shall be allocated from the State budget.
 - c) The State shall provide state credits to cleaner industrial production projects; encourage domestic and foreign organisations and individuals to invest in research, transfer and application of environmental-friendly technologies for cleaner industrial production.
 - d) Investment projects applying cleaner production conducted by production establishments shall receive financial incentives. The Governing Board in charge of the implementation of the strategy shall be responsible for designing supportive mechanisms and incentives and submitting them to the Prime Minister for approval.

Implementation

The Ministry of Industry and Trade shall act as the main implementer, in collaboration with the Ministry of Natural Resources and Environment, relevant ministries, sectors and localities, in fruitfully realising the Strategy on schedule and periodically making reports to the Prime Minister on results. The Minister of Industry and Trade shall establish a Governing Board, headed by the Minister, which is in charge of implementing the Strategy. The membership and operation of the Governing Board and its Office shall be decided by the Minister of Industry and Trade. The Ministry of Planning and Investment and the Ministry of Finance shall allocate funds from the State budget annually and every 5 years and guide the use of these funds to realise component projects of the strategy. The Ministry of Natural Resources and Environment, Ministry of Finance, other ministries, sectors and provincial-level People's Committees, within their competence shall be responsible for working with the Ministry of Industry and Trade to fruitfully realise missions listed in the strategy; make annual reports to the Ministry of Industry and Trade for summary which must be presented to the Prime Minister.

Home-grown innovation

A major initiative to boost the home-grown development of drugs, vaccines, diagnostics and traditional medicine in Southeast Asia is getting underway. Based on a concept developed within TDR, the Network for Drugs, Diagnostics, Vaccines and Traditional Medicines Innovation (ASEAN-NDI) brings together researchers from 10 countries of the Association of Southeast Asian Nations (ASEAN). The countries of Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic (PDR), Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam are working together to create products that combat diseases common in this region of 600 million people, like tuberculosis (TB), malaria, dengue, and parasitic infections.

For more information, contact:

Bernadette Ramirez
World Health Organization
E-mail: ramirez@who.int

Eco-innovation



United Nations Environment Programme

<http://www.unep.org/ecoinnovationproject/>

Eco-innovation provides a win-win solution to improve economic competitiveness and sustainability as it starts at the company strategy level and extends its influence beyond the company gates to the supply chain.

Eco-innovation aims at reducing impacts on the environment, enhancing resilience to environmental pressures or achieving a more efficient and responsible use of natural resources. The growing market, reputational and regulatory pressures in response to rising resource scarcity and environmental degradation, therefore, reinforce the business case for eco-innovation.

Operationally, it works through a new business strategy that incorporates sustainability throughout all business operations, based on life cycle thinking and involves partners across the value chain. By implementing a set of coordinated modifications to products (goods/services), processes, market approaches and organisational structures, eco-innovation enables the creation of novel solutions leading to enhanced sustainability performance and competitiveness.

Harnessing eco-innovation for sustainable development

Alarmingly high levels of resource depletion and environmental pollution from current production and consumption patterns are pushing the limits of sustainability. Multifaceted and profound transformations are required to realign development towards a more resource efficient economy. This implies the creation of new strategies, products, processes and practices as well as shifts in consumption behaviour. Eco-innovation holds the potential for systemic change through creating and meeting a demand for sustainable goods and services.

This is particularly important for developing and transition economies with growing manufacturing sectors. In many of these economies, small and medium-sized enterprises (SMEs) are key to economic activity and growth, thereby providing up to two-thirds of formal employment. Unsustainable production practices and business models, however, hinder company growth. This points to a number of challenges that SMEs in these countries face, such as access to finance and technology, that ultimately make them less competitive in the global market. Eco-innovation breaks this 'business as usual' routine to address these challenges.

What creates an enabling environment for eco-innovation?

For eco-innovation to be viable in the long run, the following will create a conducive environment:

- Business case
- Technical knowledge and expertise
- Enabling policy framework
- Regional and international cooperation

The business case for eco-innovation

- The 'Business Case for Eco-Innovation' publication outlines the key business drivers to implement eco-innovation. It builds on company examples spanning sectors across the globe that generated significant business benefits from eco-innovation.
- In conjunction, a technical 'Eco-innovation Manual' has been developed for implementing partners to identify opportunities and develop strategies to implement eco-innovation. The Manual is complemented by supplements for the agri-food, chemicals and metals sectors.
- The Manual's approach has been validated through a number of regional expert meetings to confirm the eco-innovation approach in different countries and contexts. It is now being piloted through demonstration projects in the countries highlighted on the map above.

The Policy & Technology context

- The 'Mainstreaming SCP Policy' for eco-innovation guideline aims to inform implementing partners about proactive ways to support a policy framework that will stimulate sustainable production and consumption through eco-innovation. National level action planning will be carried out in countries highlighted on the map above, with some initial activities implemented within the project span.
- The technology dimension is also highlighted as part of the conducive framework for eco-innovation. The publication 'Technologies for Eco-Innovation' includes an assessment of the 'enablers' for the uptake of technologies for eco-innovation. In turn, this will support implementing partners in assisting SMEs in the identification, adaptation and development of technology for eco-innovation.

Scaling-up eco-innovation lessons

- A final compendium of best practices and lessons from pilot demonstration projects will be compiled on their conclusion.

The Eco-innovation project

Promoting Resource Efficiency and Eco-innovation in Developing and Transition Economies (REEDTE)

In partnership with the European Commission (EC), UNEP is currently implementing a 4-year project to promote resource efficiency and eco-innovation. The project aims to change consumption and production patterns in developing and transition economies by encouraging businesses to reduce their environmental footprint.

The project targets the global network of Resource Efficient and Cleaner Production (RECP) intermediaries, in particular National Cleaner Production Centres and Programmes (NCPCs) and other providers of RECP services. Intermediaries and business supporting institutions can also include local governments, private corporations, non-profit organisations, business associations and academic institutions. They support particularly SMEs and are facilitators of knowledge, experience, funding sources and business contacts.

National implementation activities

Earlier this year, 'Calls for Proposals' were launched in the regions of Africa, Asia-Pacific and Latin America and the Caribbean for

'Pilot Application of Eco-innovation in SMEs' and 'Mainstreaming of SCP Policy for Eco-innovation'. Service providers and institutions in the fields of Resource Efficient and Cleaner Production (RECP), innovation and other technical areas were invited to submit proposals. UNEP has received a total of 64 project proposals, and 9 countries have been selected after a thorough evaluation process.

The implementing countries are as follows:

- Pilot application of eco-innovation in SMEs: Colombia (Chemicals), Egypt (Chemicals), Malaysia (Chemicals), Peru (Metals), South Africa (Metals), Sri Lanka (Agri-food), Vietnam (Agri-food) and Uganda (Agri-food).
- Mainstreaming SCP Policy for eco-innovation: Colombia, Kenya, Peru and Vietnam.

The REEDTE Project is a partnership between UNEP and the EC.

Selected Renewable/Sustainable Energy Programmes in the Asia Pacific

Asia Sustainable and Alternative Energy (ASTAE) Program

<https://www.astae.net>

The World Bank's Asia Sustainable and Alternative Energy Program (ASTAE) has been helping the East Asia and Pacific (EAP) and South Asia (SAR) regions transition to sustainable, inclusive, and low carbon green growth paths. ASTAE helps to promote regional collaboration by supporting knowledge exchange and study tours between countries as part of its country-specific activities, through dedicated regional programs (such as the East Asia Clean Stove Initiative) and by replication of approaches from one country to another (such as the ASTAE-supported Energizing Green Growth of Da Nang City in Vietnam activity, which led to implementation of the process piloted in Da Nang in Surabaya, Indonesia).

Pacific Regional Data Repository

<http://prdrse4all.spc.int>

The Pacific Regional Data Repository is a Data and Information Revolution for the Pacific Island Countries and Territories (PICTs). It is a web-based one-stop-shop energy portal and database management system intended to support Pacific governments and their development partners working in the energy sector by facilitating access to up-to-date, reliable energy data and project information. The establishment of the PRDR supports the engagement of PICTs in the SE4ALL initiative in terms of significantly cutting down the project development time and costs, avoiding a repeat of past mistakes and efficiently replicating best practices.

Asia Solar Energy Initiative

<http://aric.adb.org/initiative/adb-asia-solar-energy-initiative>

In May 2010, the Asian Development Bank (ADB) announced its Asia Solar Energy Initiative (ASEI) to catalyze generation of about 3,000 megawatts of solar power by 2013. ADB plans to provide \$2.25 billion in finance to the initiative, which is expected to leverage an additional \$6.75 billion in investments from others over the same period. The ASEI makes available a range of projects, and finance and knowledge sharing mechanisms, so as to attract other development banks, commercial banks, and the private sector to invest in these projects. In addition to direct financing, ASEI will set a target of raising \$500 million from donor countries to "buy down" the high up-front capital costs of investing in solar energy, as well as design other innovative ways to attract private-sector investment.

Renewable Energy Support Programme for ASEAN

<http://www.aseanenergy.org>

The Renewable Energy Support Programme for ASEAN (ASEAN-RESP) is jointly implemented by the ASEAN Centre for Energy (ACE) and German Development Cooperation (GIZ) and contributes to improved preconditions for the use of renewable energy in the ASEAN region. By implementing its activities and working towards the overall objective, the project supports the realization of the APAEC and encourages ACE and the ASEAN member states in working towards a greener region. As a regional project ASEAN-RESP implements activities with relevance for all ASEAN member countries, following its guiding principle 'learning from each other'.

Fogger sprayer and high-range sprayer

Description

6HY series fogger sprayers and 6HW series high-range sprayers, which are successfully developed by Nanjing Forestry University in collaboration with Nantong Guangyi Mechanical & Electrical Co. Ltd, are the achievements of the national science and technology projects in the 8th-Five-Year-Plan and the State 948 Project. 6HY series fogger sprayers are mainly used in sanitation and epidemic prevention, pests and diseases control in forests and rubber plants in agriculture. They have the features of high efficiency, low consumption of pesticide, low cost, good droplet penetration. 6HW series high-range sprayers have been widely used in pests and disease control in farmland shelter-forests, plantation along freeways. The vertical range can reach 25-30m, so they are suitable machines for pests and disease control of high trees.

Area of Application

6HY series fogger sprayers are mainly used in sanitation and epidemic prevention, pests and diseases control in forests and rubber plants in agriculture.

Advantages

- 6HY series fogger sprayers have the features of high efficiency, low consumption of pesticide, low cost, good droplet penetration.
- For 6HW series high-range sprayers, the vertical range can reach 25-30m, so they are suitable machines for pests and disease control of high trees.

Environmental aspects

Energy efficiency

Development Status

Fully commercialized

Legal Protection

Patent

Transfer Terms

Equipment supply

Contact:

Nanjing International Technology Transfer Center (NITTC)
No.11 Baochang North Road, Libao Town, Haiyan County, Jiangsu Province
Nantong
China 226631

Glass wool production line

Description

We can offer Glass Wool Production Line / Glass Wool Machine with the following specifications:

- Workshop area: 3,000m²
- Natural gas wastage: 252 x 104Nm
- Compressed air: 20m/h, 0.8MPa
- Product spec:
 - 1) Dia. of fiber: =0.8μm
 - 2) Heat conductivity: 0.042W/mk

3) Working temperature: 400oC (max.)

4) Density: 15-50kg/m³

5) Standard: GB/T13350-2000

6) Product series: glass wool board and glass-wool belt, pipe and so on.

Areas of Application

Construction and Insulation

Advantages

- Good thermal insulation performance
- Incombustible material
- Sound absorption performance and excellent noise reducing effect
- Low aging rate
- Excellent handling characteristics

Environmental aspects

- Cleaner production
- Waste utilization

Development Status

Idea

Legal Protection

Trade Mark

Technical specifications

HIM-GW-3, HIM-GW-5, HIM-GW-6, HIM-GW-8, HIM-GW-10, HIM-GW-15

Transfer Terms

Turnkey

Contact:

HiSuccess International, Room 1909, Aviation Tower,
No.18, Xin Jin Qiao Road, PuDong District
Shanghai, China 201206

Precision blasting packaging equipment

Description

A Hungarian SME is offering a blasting packaging machine. The newly developed automatic blasting packaging machine replaces the highly dangerous and uneconomical method of hand-made blasts. Length, size and weight of blasts can be changed in seconds and the functioning of this technology is economical, safe and precise.

Areas of Application

Mining, Drilling, Alternative Energy - Potential users are companies interested in industrial blasting, mining, construction and building industry, chemical industry.

Advantages

With the automated filling process of offered technology, the length, the size, the weight of blasts can be changed very quickly, just in seconds. A main advantage is that the manufactured blasts in one series have exactly the same features and characteristics, such as the weight and size, which were unfeasible in the case of hand-made blasts. The production in this way is more economical and needs less raw materials, and produces no waste. The manufacturing process is fast, easily variable, economic, the handling of the machine is obvious, and the functioning is safe and precise.

TECHNOLOGY OFFERS

Environmental Aspects

- Energy efficiency
- and produces no waste

Development Status

Commercial prototype

Transfer Terms

- Subcontracting
- Technology licensing
- Others

contact:

Laser Consult Ltd. H-6701 Pf. 1191. Szeged
Hungary

Biofertilizers using industrial waste materials

Description

We can offer the technology to manufacture biofertilizers using waste material available from industries. We are interested in transferring this technology to potential business firms who are keen in the biofertilizer market.

Areas of Application

Agriculture

Advantages

- Waste used is the cheapest source of growth media which has ever been used for production of biofertilizers and biopesticides.
- Effectively controls the pathogens of crops and fruits.
- Increases the growth and yield of the crops.
- Increased shelflife of the product at room temperature.
- Can be used as foliar application, seed treatment or soil treatment.

Environmental Aspects

Waste utilization

Development status

Pilot plant

Legal Protection

Filed

Technical specifications

Trichoderma and bacterial biofertilizers production using industrial waste material. Waste used is the cheapest source of growth media which has ever been used for production of biofertilizers.

Transfer Terms

- Joint venture
- Technical services
- Technology licensing
- Research partnerships

Contact:

Hiran Biotech, Research and Development Division
66 Turner Road Cantt., Kanpur 208004, U.P., India

Biopesticides - microbial and neem based manufacturing

Description

We provide technical assistance in the setting of manufacturing units of the biopesticides. The biopesticides manufactured using this technology are quite efficient and cost-effective.

Areas of Application

Agriculture, Biotech, Fertilizers, Microbiology

Advantages

Cost effective and efficacious products

Environmental aspects

Chemical free organic products

Development Status

Fully commercialized

Technical specifications

Cost effective and efficacious products

Transfer Terms

- Consultancy
- Joint venture
- Technical services
- Research partnerships

contact:

Ishan Biotech, 45 - S, Adarshnagar, Kunaraghat
Gorakhpur 273008, U.P., India

Novel compound with Leishmanicidal activity

Description

One new unsaturated amide named as Piplamide, N-isobutyl-19-(3',4'-methylenedioxyphenyl)-2E,4E-nonadecadienamide, was isolated from the fruits of the Indian medicinal plant *Piper longum* by bioassay guided fractionation and isolation, using an in vitro promastigotes assay against of *Leishmania donovani*. The structure was elucidated on the basis of spectroscopic analysis. a) pipplamide shows a very good antileishmanial activity against *Leishmania donovani* promastigotes.

Area of Application

- Piplamide could be evaluated as prospective enzyme inhibitor and could provide lead structure for further optimization of activity for use in antileishmanial drug development.
- Piperlongimin A and piperlongimin B could provide lead structures for the development of novel anticancer therapeutics.

Advantages

- Piplamide shows a very good antileishmanial activity against *Leishmania donovani* promastigotes.
- piperlongimin A (2E-N-isobutyl-hexadecenamide) and piperlongimin B (2E-octadecenoylpiperidine) inhibited cell proliferation of human leukemia, HL-60 cell lines, and displayed major apoptosis-inducing effects.

Environmental Aspects

Environment friendly

Development Status

Laboratory model

Legal Protection

Patent

Technical specifications

One new unsaturated amide named as Piplamide, N-isobutyl-19-(3',4'-methylenedioxyphenyl)-2E, 4E-nonadecadienamide, was isolated from the fruits of the Indian medicinal plant Piper longum by bioassa.

Transfer Terms

- Consultancy
- Technical services
- Technology licensing
- Research partnerships

Target countries

- Chile
- China
- India
- Malaysia
- Sri Lanka
- Thailand
- United States of America (the)
- United Kingdom

Contact:

Amity University, Sector-125, Noida 201303, Distt Gautam Buddha Nagar, Uttar Pradesh, India

Manufacture of potassium nitrate

Description

Potassium chloride is allowed to react with Nitric acid forming Potassium nitrate & Hydrochloric acid. Potassium nitrate is main product & Hydrochloric acid is by-product.

Areas of Application

Potassium nitrate is used in Fireworks, Glass, Agrochemical, Pharma, R & D, Preservatives etc.

Advantages

Cost advantage

Transfer Terms

Consultancy

Target Countries

India

Contact:

KJ Technologies (P) Ltd, D1/2, Alagaputhur-Vadapakkam, Krishnapuram (Post), Kumbakonam (Taluk), Thanjavur (Dist), Tamilnadu-612401, India.

Variable Diameter Gear

Description

This is a general drive which could obtain a constant-power stepless speed change.

Areas of Application

The stepless speed changers are the general purpose units, which have the application fields covering almost all of the processing industries, covering all of the automotive vehicles and countless of end products. Therefore, it is difficult to cover all of its applicable areas.

Advantages

- High efficiency - transmission maybe 90% or more.
- High power - Transmissible power could reach 100kw or more.
- Low cost - No more than 150 pieces of non-standard parts.

Environmental aspects

Energy efficiency

Legal Protection

Patent

Transfer Terms

- Joint venture
- Equipment supply

Target countries

- United States of America (the)
- United Kingdom

contact:

Multimedia Development Corporation (MDeC).
MSC Malaysia Headquarters. 2360, Persiaran APEC.
Cyberjaya, Malaysia 63000

Irradiation of food and agricultural products

Description

This technology uses Co-60 as the source of irradiation and very effective in insect control and disinfestation, Sprout inhibition, reduces microbial load and destroys pathogenic microorganisms.

Areas of Application

Food and agriculture industry

Environmental aspects

Cleaner production

Development Status

Fully commercialized

Transfer Terms

Technical services

Contact:

MOST Thailand, Public Relation of Thailand Institute of Nuclear Technology (TINT), Bangkok
Thailand 662

MALAYSIA



THAILAND



TECHNOLOGY REQUESTS

INDIA

Magnetized fertilizer from fly ash

Description

An Indian firm is interested in the technology for production of magnetized fertilizer from fly ash. The company wants the technical know-how for this technology and wish to receive technical and price quotes for the same.

Area of Application

Agriculture industry

Project Type

Start-up

Contact:

Biocare India Pvt Ltd.

Biocare House, M. A. 23, Laxminagar, Nagpur - 22,

India, Tel: +91-712 - 2224344; Fax: +91-712 - 5611766

E-mail: info@biocareindia.biz

Manufacture of bio-fertilizers

Description

An Indian Non-Governmental Organization based in Village Thamana, Uttarakhand, would like to start up a venture in Bio-Fertilizer industry. They need more information on the know-how of manufacturing aspects of biofertilizer and also about the cost factor.

Area of Application

Agriculture and Agroindustry, Biotechnology

Project Type

Start-up

Contact:

Mr. Preetam Singh Lingwal

Thamana, Pauri Garhwal, Uttarakhand,

India, E-mail: preetam.lingwal@gmail.com

Technology for glass wool and mineral wool

Description

An Indian Entrepreneur is interested in the technology for glass wool or Mineral wool Plants. He invites consultancy in setting up a Mineral wool plant.

Area of Application

Ceramic industry, Glass industry

Project Type

Start-up

Contact:

Mr. Lokesh, Tel: 91-40-65171415; E-mail: loki8091@gmail.com

Ultrafine powder of tamarind seeds' kernel

Description

We look forward for a plant machinery supplier who can supply us one tonne per hour capacity to grind and pulverize roasted and decorticated tamarind seed's kernel into into ma mesh size of 100 to 350 mesh with minimum power consumption.

Area of Application

Starch for hessian, clothes, thickener

Project Type

New idea

Contact:

Babulal Sarabhai & Co. Pvt Ltd

1, Om Complex Fafadih

Raipur- 492 009 Chhatisgarh State

India

Biotechnology for wastewater treatment system

Description

We are wastewater service provider, we also research and develop the new technology for water, wastewater and waste treatment. We need new idea of technology to develop our strength in this wastewater field, include cleaning canal, remove sediment in waterway, biogas, microbiology detector and treated system quality.

Area of Application

Biotechnology, Engineering, New technology

Studies

Environmental Impact Studies (EIA/EIS)

Project Type

Expansion/Modernisation

Estimated cost (US\$)

86000

Target Countries

World wide

Assistance From Partner

Any kind of new technology to develop on the waste

Contact:

Utility Business Alliance

21 Tst Tower 16th floor., Viphavadee-rangsit rd., Jompol, Jatujak

Bangkok, Thailand 10900

Sodium silicate

Description

We are in need of a technology to set up a solid sodium silicate plant with capacity of 15,000 mtpa in the central area of Viet Nam.

Area of Application

Chemical industry; input material for production of chemical derivatives, Colloidal silica (silica sol)

Studies

Feasibility Report

Project Type

New idea

Additional Information

Production technology: Furnace process - fully automatic production with the most advanced technology

Contact:

VITIS CO.,LTD., 2-4-6 Dong Khoi Street, Dist 1,

Ho Chi Minh, Viet Nam 848

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