International Conference on the Localization of the SDGs and the Co-Construction of the Means of Implementation

Digital Fabrication Labs (FabLabs) for Implementing Sustainable Development Goals (SDGs) in Solidarity and Social Economy (SSE) in Sri Lanka

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Introduction: Socio-Economic Development of Sri Lanka

- Post-Independent Sri Lanka followed a mixed economic model with very high emphasis on human welfare from as early 1948.
- "A model crown colony" of the British Empire, SL continued with high spending on education, health and other sectors of public expenditure.
- Sri Lanka became one of the earliest countries in Asia to adopt open market liberal economic policies starting from 1977.
- However, Sri Lanka as an early starter could not reach its full economic potential due
  - **30-years long civil war which erupted in the early 80s**
  - **Poor implementation of open economic policies**
  - **Unstable governments.**

Introduction: History of SSE in Sri Lanka

- "The Socialist Democratic Republic of Sri Lanka" has a long-tradition of high welfare orientation, strong public sector and long history of sharing economy.
- Some Reasons,
  - Strong affiliations to Theravada Buddhism,
  - Economic policies of the post-independent governments.
  - "A Small Island nation"
- Examples,
  - Well established co-operative movement
  - Successful national economic and social movements such as *Sarvodaya* based on Buddhist Economics.
- Sri Lanka also ranks high internationally on philanthropy and donations according to the World Giving Index 2017.

"Therefore, the inheritance and background for SSE remain sound in Sri Lanka even though it is not formally recognized"

The Need for Systemizing SSE in Sri Lanka

- **Sri Lanka has not been able to realize its full economic potential even it has practised open economic policies for more than 40 years.**
- **The policy makers and political leaders of Sri Lanka are looking for alternative economical ideas which focus on "human wellbeing" rather than just "maximizing the economic value"**
- **Sri Lanka has adopted the UN's Sustainable Development Goals (SDGs) into its policymaking and currently in the process of adopting them locally**
- **In this context, the Sri Lankan government has also introduced a national co-operative policy.**
- **The country with long-traditions of Buddhist values of economics is now trying to adopt them in more modernized ways.**

"In this context, the significance of defining the concepts and systemizing the Solidarity and Social Economy (SSE) is very relevant and significant."

A Venture of Using Industry 4.0 Technologies for Socio-Economic Development in Sri Lanka

www.Fablanka.org

SETTING UP OF FABLABS IN SRI LANKA

FabLanka Team

Greshan Fernando, Boeing Corporation, United States

Sandun Ranaweera, Crane Aerospace & Electronics, United States

Thivanka Samaranayake, B/E Aerospace, United States

Buddika Jayasena, Georgia Institute of Technology, United States

Pubudu Senaratne, Sri Lanka Foundation Institute, Sri Lanka

Chaminda Hettiarachchi – Dil Consultancy (Pvt) LTD, & University of Moratuwa, Sri Lanka

Priyantha Palapathwala , George Steuart Optimize (Pvt) Ltd and MEASA Consulting (Pvt) Ltd, Sri Lanka

Gayan Srinath, University of Colombo, Sri Lanka

Why Digital Fabrication/3D Printing Technologies for Sri Lanka

- Sri Lanka has not been able to capitalize on previous industrial revolutions, specially due to knowledge gaps and required level of high capital expenditure of old manufacturing technologies
- Sri Lanka does have a well educated workforce who can grasp onto the digital fabrication technology easily which in turn will provide greatly enhanced opportunities to innovate locally

Context

- Rebuild Sri Lanka
  - Promote ICT for development
  - Transform Sri Lanka to a manufacturing based economy
  - Promote reconciliation
- FabLabs - an alternative model of ICT for development
  - FabLabs – an initiative to transform Sri Lanka to a manufacturing based economy
  - FabLabs – Use Digital Fabrication technology to transform people from Consumers to Producers
  - FabLabs – an initiative to reconcile communities
  - FabLabs - a framework for reconceptualization of ICT and Digital Divide






Opportunity to Boost Social & Economic Value

- Address youth unemployment crisis
  - Employability in both local and global markets
  - Entrepreneurship
- Supporting sustainability and growth of SMM's
  - Education on technology and guidance on transforming
  - Research and prototyping facilities
  - Availability of skilled labour
  - Access to markets through collaborations
  - Access to finance through collaboration for DF technology
- Supporting manufacturers of all scale
- Foreign investments in SL

FabLab will not be "one – size - fits – all" solution

What is Digital Fabrication

- **Digital Fabrication** is a type of manufacturing process where the machine used to fabricate parts is controlled by a computer. The geometry of the object to be fabricated is defined by the Digital Model.
- **3D Printing** is a process where a digital file directs a 3D Printer to create an object by laying down successive layers of material such as molten plastics, powder, cement, glass, resins or metal until the entire object is created.

3D Printing Facts

- Industrial 3D Printing is about to go mainstream in a big way
- Real products are being manufactured unlike models and prototypes at the start
- 3DP is a Disruptive Technology – what internet did for information based products and services, DF is doing for manufacturing
- 3DP can reduce supply lines, inventory and waste while increasing our options
- 3DP will outdate ‘economies of scale’ and enhance ‘economies of scope’

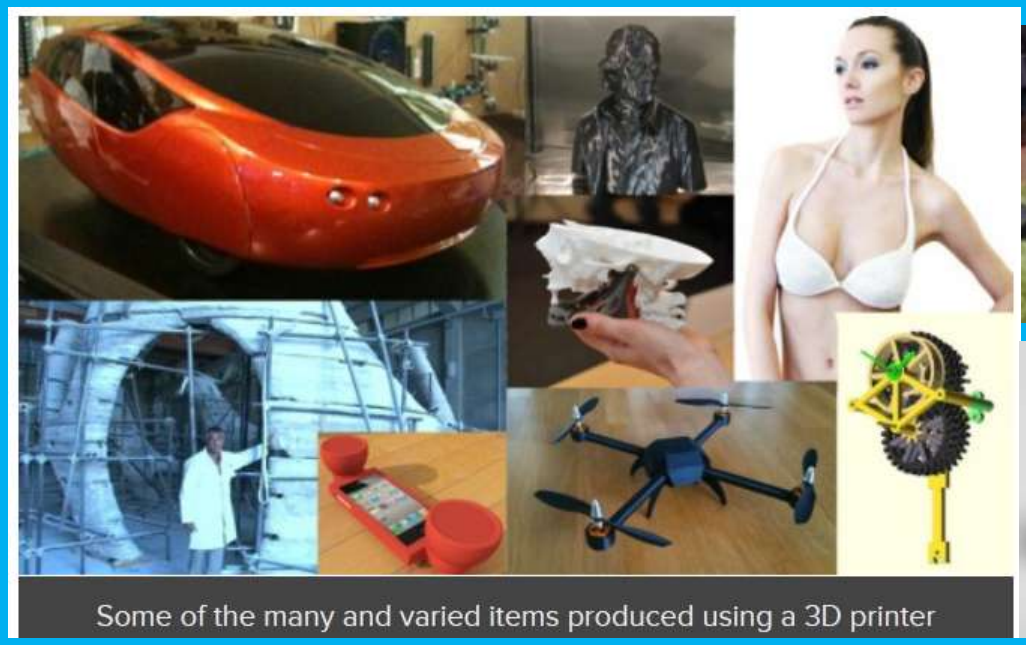
3D Printing Facts (Contd)

- The major components of the 3D Printing ecosystem are Materials, 3D Printers and Software in order of maturity level in innovation and their prices and accessibility are falling
- A paradigm shift in manufacturing and selling is taking place with emerging of 'personal fabrication' leading consumers to become 'pro – summers'
- The manufacturers and sellers will need strategic approaches to transform from 'conventional' to 'digital' manufacturing and selling

Advantages of Additive Manufacturing

- Trigger innovation worldwide
- Provide Opportunities for everybody towards prosperity
- Improve product accuracy
- Eliminate mistakes
- Customize the Products with greater flexibility (Personal Fabrication)
- Accelerate time to Produce
- Reduce product cost
- Improve collaboration globally
- Save this planet and save your Life?

Some interesting applications of 3D Printing



Functional models, prototype components and patterns, visual aid, ….

Some interesting applications of 3D Printing

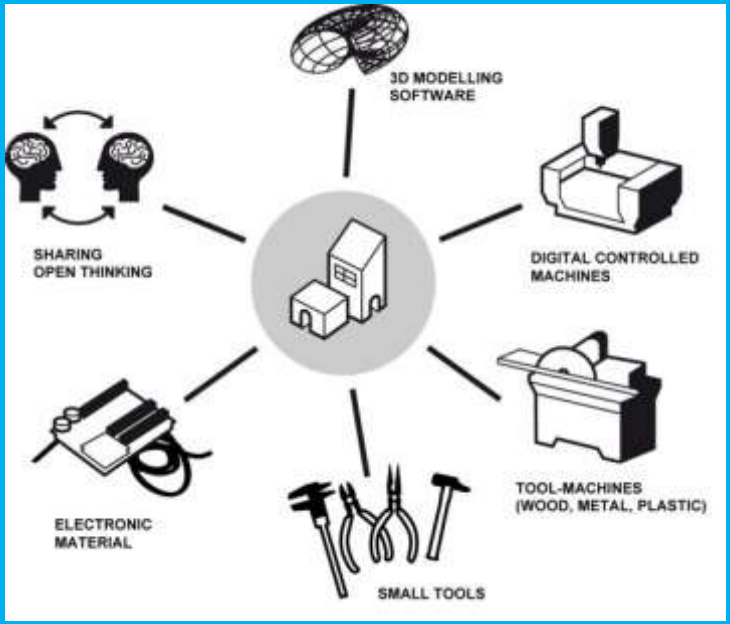
Using 3-D Printing Tech, British Airbus Engineers Aim to Print Out an Entire Aircraft Wing

If you can print an airplane, what can't you print?

Some of the many and varied items produced using a 3D printer

What is a FabLab

FabLab - Fab labs provide widespread access to modern means for innovation.
A Fab Lab is a technical prototyping platform for innovation and invention, providing stimulus for local entrepreneurship



- MIT developed the FabLab concept.
- FabLab now is an international movement in 65 countries.
- FabLab is a technologically advanced local workshop offering digital fabrication.
- **In a Fablab, you can find everything you need to build almost anything.**

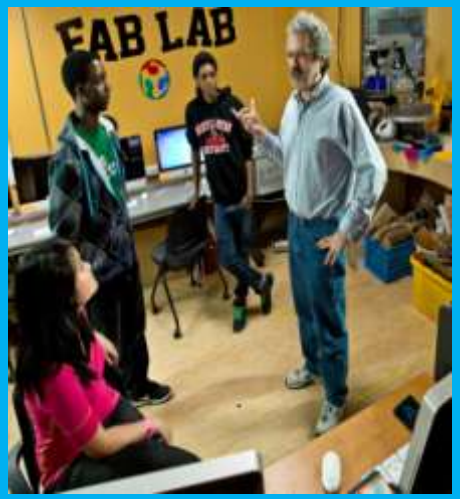
What is a Fabrication Laboratory (FabLab)

A FabLab is a technical prototyping platform for innovation and invention, providing stimulus for local entrepreneurship

Country	Target Activity
Ghana	produce a cassava grinder, jewellery, car parts, agricultural tools and communication equipment
Norway	make radio collarsk and wireless networks to track their animals
Boston	make jewelry, toys and crafts using recycled materials

- Characteristics
  - Public access
  - Subscribe to the FabLab charter
  - Common set of tools and processes
  - Participate in the larger, global FabLab network
- Responsibilities
  - Safety, Operation and knowledge
- How can business use a FabLab
  - Commercial activities can be prototyped and incubated in a FabLab, but they must not conflict with other uses

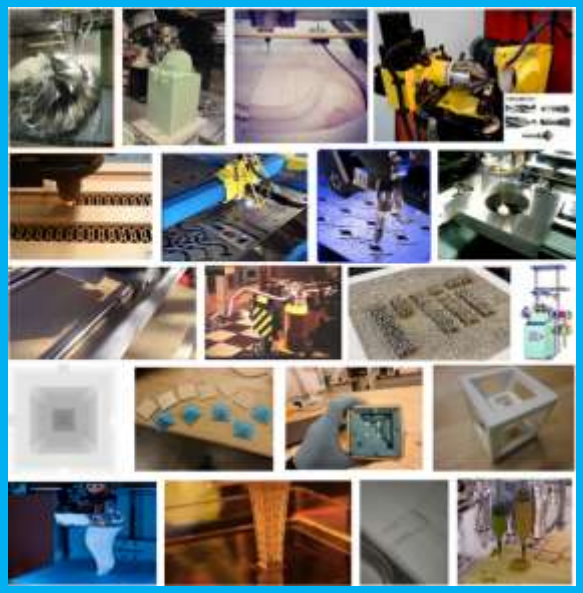
FabLabs have been establish worldwide



FabLab in Boston, United States

How to spark interest and motivate people in Sri Lanka to be a part of the 4th Industrial Revolution ?

- Set up FabLabs (NIC's) in Sri Lanka
  - Fab labs provide widespread access to modern means for innovation.



Fab Lanka Idea - Project Scope & Objectives

- To promote Digital Fabrication technology in Sri Lanka by setting up a **social enterprise** for socio - economic development of post-conflict Sri Lanka
- To set up an island wide network of National Innovation Centers (NICs) - **start** with a single NIC and **expand** nationally and **network** internationally
- To **share knowledge**, **enhance innovation** and **technology transfer** in community development
- To engage **multi- stakeholders** such as Universities, the government, private sector, NGOs, local communities

Fab Lanka Journey and Milestones

- Started as a special project in 2014 and incorporated as Fab Lanka Foundation (GTE) Ltd in 2016
- Achievements -
  - Explored feasibility
  - Networked with Sri Lankan diaspora and international community
  - Created dialog among community – universities, schools and at international forums
  - Visited and networked with similar setups in other parts of the world
  - Assembled our own 3D Printers and have trained some stakeholders
  - Stakeholder engagement

We have come a long journey…





FabLanka USA Team


With Robo 3D

Some of our outreach activities…


ICTD Conference
S'pore 2015


iCMA Conf University of Sri
J'pura 2015


Wickramarachchi College
Gimulla 2015


FabLab Visit Colongne,
Germany Nov 2015


FabLab Variety Show Seatle
WA USA 2015

FabLanka Journey and Milestones (Contd)

- Launching of the pilot Fab Lab in Makandura in May 2017 was the greatest milestone

FabLab Makandura

Activities in FabLab Makandura

How Digital Fabrication Technology can Help in Achieving the Multiple SDGs

- FabLanka as a non-profit social enterprise mainly involves in empowerment of unemployed youth in rural Sri Lanka.
  - **No Poverty (SDG1) & Good Jobs and Economic Growth (SDG8)**
- FabLanka 's project on Food Printing
  - **No Hunger (SGD2).**
- The projects on digital fabrication of healthy drinking water vessels for Chomical Kindly Disease (CKD)
  - **Good Health (SDG3) and Clean Water and Sanitation (SDG6**).
- FabEducation covers,
  - **Quality Education (SDG4), Economic Growth (SDG8) and Industry, Innovation and Infrastructure (SDG9)**
- FabLanka collaborates with SMEs in the community
  - **Industry, Innovation and Infrastructure (SDG9).**
- FabLanka 's application to European Union's SWITCH-Asia II Programme –
  - **Promoting Sustainable Consumption and Production covering the Responsible Consumption (SDG12**)
- FabLanka has been working on using Digital Fabrication as a way of promoting peace and reconciliation particularly among war affected areas **the Peace and Justice goal (SDG 16**).
- FabLanka follows the rules of inclusiveness and non-discrimination in conducting all programs and projects covering the goal of **Reducing Inequalities (SDG 12**).
- FabLanka is a networking organization collaborating with both local and international partners on shared basis without any profit motive. This qualifies the organization **to Partnerships for Goals (SDG 17**).

Challenges

- **Lack of awareness, fear of new technology, poor skills** and many other obstacles to make Digital Fabrication a streamlined manufacturing technology at national level
- The **challenge of scaling up** the FabLabs to have a national impact by Digital Fabrication Technology for significantly contribute to SSE
- **The current business model of FabLanka as a not for profit social enterprise** remains a main challenge for sustainability.
- The **growing of 3-D printing technology as a profit-oriented industry** can also be seen as a threat to FabLanka as a contributor to SSE in Sri Lanka.
- A broader challenge will be **the success of implementation of localised SDGs** in Sri Lanka.
- **Systemizing SSE and integrating it to formal economic planning** into the Sri Lankan economy.

A Way Forward

- Going forward needs **real patience, long-term orientation and strategic approach** in planning.
- FabLanka should target **short term and small-scale achievements** and they should celebrate such results.
- People should be **informed about their success, power of Digital Fabrication for community building and social change** and engage communities in not only planning but also implementing such programmes and projects.
- **Timing also plays a vital role**. Since Digital Fabrication is an evolving technology, the rapid changes should be studied, updated and included in project planning.
- Policy makers should introduce **the technology as a social solution** to as many domains as possible particularly into school education.

"In brief, Sri Lanka should consider Digital Fabrication as a tool to find solutions to social problems they face and not just to adopt it for the sake of the technology itself. This principle should be reflected on national policy formation. "

Conclusion

- **Sri Lanka has a unique history and a rich culture of early forms of Solidarity and Social Economy** thanks to the acceptance of Buddhist concepts of economic values, early adaptation of welfare policies by post-independent governments and some successful social movements.
- **The failure of liberal economic policies** adopted by recent governments during the last four decades to bring economic prosperity to Sri Lanka have opened a national discussion and an enthusiasm for **new economic models which focus on human well-being of the entire society beyond pure economic value creation for a selected few.**
- This remains a priority policy area for the Sri Lankan policy makers when **rebuilding the nation after a devastating 3-decades long civil war** while facing **other external global challenges.**
- **Sri Lanka's effort in adopting SGDs** and trying to find out ways of implementing them in a localized context is an encouraging trend in that direction.
- Therefore, **well defined and systematically integrated Solidarity and Social Economy (SSE) for Sri Lanka** remains very relevant and effective.

Conclusion

- **FabLanka, a not-for-profit social enterprise is trying to use the latest Digital Fabrication technology as a way of solving some of the urgent socio-economic** issues faced by Sri Lanka.
- Some projects of FabLanka are trying to **use the technology to reach several SDGs as a part of overall SSE in Sri Lanka**. The business model and working principles are also compatible with few other SDGs.
- It has also been discussed that **Digital Fabrication Technology can be used in achieving almost all SDGS** as shown in examples from other countries.
- However, Digital Fabrication is comparatively a new technology and also FabLanka as an organization is relatively a young one. **Therefore, these implementations are still in early stage, small in scale and face several challenges in rolling out to national level.**
- **Limitations of capital for developing a network of FabLabs around the country, Lack of awareness and the expertise of general public** on how Digital Fabrication can solve their social problems and barriers of mainstreaming Digital Fabrication in national planning are some of main challenges.
- **Therefore a long-term approach in implementations, strategic orientation in adaptation, people friendliness in applications and continuous education of the general public** are some of the ways to move forward for the successful adaptation of Digital Fabrication Technology to solving social problems and development challenges faced by Sri Lanka.

More Details on FabLanka

- Web: www.fablanka.org
- FB: www.facebook.com/FabLabSriLanka
- LinkedIn: lk.linkedin.com/pub/fablanka-sri-lanka
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Q&A