

# SEED Framework<sup>®</sup>

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*A Framework for Collaborative Social, Economic and Environmental Development*

*A Concept Paper for Discussion*

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# SEED Framework

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## *A Framework for Collaborative Social, Economic and Environmental Development*

**Abstract**— Traditional approaches to Social, Economic and Environmental Development (SEED) have historically employed a closed, top-down model in which problems are viewed narrowly and the input of local stakeholders is rarely sought. More recent efforts to address development from a holistic, multidisciplinary perspective—while a major step in the right direction—have been hindered by a lack of appropriate tools and well-defined processes to enable disparate resources to work effectively together towards common goals. The proposed SEED Framework leverages and expands the mandate of Digital Agenda set forth by several nations, and the resulting technology development with additional design patterns for the purpose of building a collaborative SEED Digital Ecosystem. The framework aims to effectively support self-organizing, multidisciplinary collaborations and, most importantly, to translate concepts and ideas into actions for holistic and sustained social, economic and environmental development with a deep awareness of the local culture.

**Keywords**— *community development; sustainable development; sustainability science; value networks; Semantic knowledgebase; governance; impact investment*

## **Introduction**

In late 1980s, the report of *Our Common Future*, also known as the Brundtland Report, set the vision of sustainable development as the ultimate balance of three dimensions namely: Economic growth, Social inclusion and Environmental conservation [1]. Culture, a subsequent domain of human nature, is also an asset and inspiration for development. It was recognized as the fourth pillar of development at the Earth Summit at Johannesburg in 2002.

The Universal Declaration on Cultural Diversity further elaborates by stating that "...cultural diversity is as necessary for humankind as biodiversity is for nature"; it becomes "one of the roots of development understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence" [2].

## **The SEED Framework**

The mission of the International Free and Open Source Solutions Foundation (iFOSSF) is to promote locally and culturally fit research, development and the utilization of Open Technologies and Open Standards for sustained Social, Economic and Environmental Development.

To define the causes of problems such as poverty and social exclusion seems insurmountable due to their sheer size, complexity, and diverse interpretations. The open source community has demonstrated that equally large, dynamic and collective efforts of collaboration can be harnessed to fill identified opportunities to aid in addressing such issues. iFOSSF is centered around an Open Source philosophy and therefore the primary objective is to co-ordinate research and work programs intended to extend and replicate this effect towards a broader set of goals.

The SEED (Social, Economic and Environmental Development) Framework is an ICT (Information and Communications Technology) enabled digital ecosystem blueprint which aims to facilitate collaborative sustainable development through an emphasis on locally-led innovation. It utilizes a systematic collective intelligence approach,

focused on value-based partnership strategy, building long term social equity and the efficient use of resources through shared knowledge and process automation.

“Digital Ecosystem” is defined as: an open, loosely coupled, demand-driven, domain clustered, agent-based self-organized collaborative environment where species/agents form a temporary (or longer term) coalition for specific purposes or goals, and everyone is proactive and responsive for its own benefit or profit. The essence of digital ecosystems is to create value by making connections through collective intelligence [3].

The SEED Framework defines six (6) locally-led innovation lifecycle phases that can be continuously adapted and refined by other similar projects via four (4) technology enablers. The remainder of this document explains this framework concept in details.

### Community Focused Innovation Lifecycle

Traditional approaches to development have employed a closed, top-down model in which problems are viewed narrowly and the input of local stakeholders is rarely sought.

Quoting from World Bank Mozambique innovation framework, “Innovation should be undertaken not only by those such as technological entrepreneurs but also by those who themselves are caught in the web of poverty. *The challenge is to help foster an environment that channels the creativity of the community members to exploit opportunities for development. In short: Innovation for the community, by the community.*” [4]. A more desirable investment and citizen engagement model should make use of an Open and “Coopetition” development strategy.

The SEED Framework is designed to create and foster an environment that channels the creativity of the community towards discovering opportunities for development.

The ideal open and “coopetition” multi/interdisciplinary development model can be implemented with the following six fundamental steps; using shared tools and shared knowledge it represents a more effective use of resources.

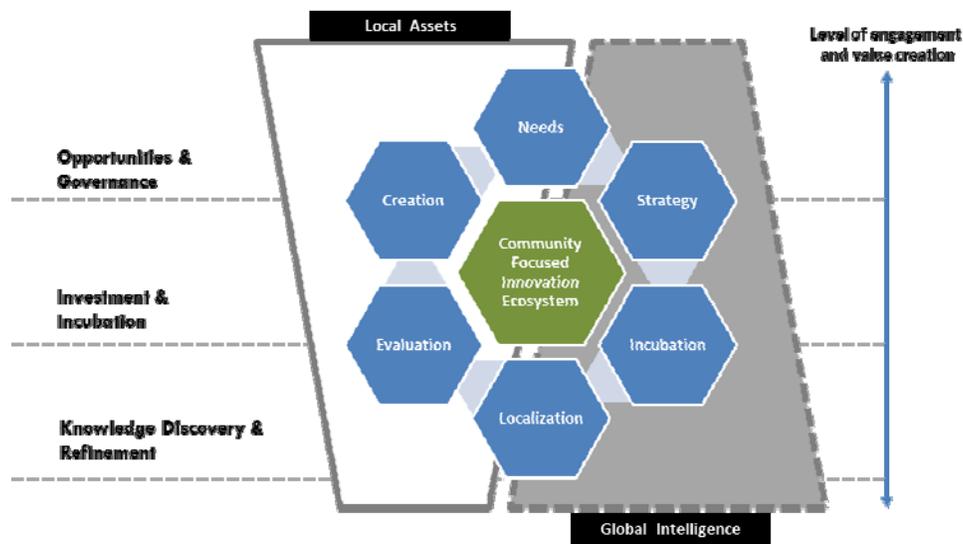


Figure 1 A “Coopetitive” and Community Focused Innovation Ecosystem

The 6 phases of locally-led innovation lifecycle include:

### **Needs: Identify Needs and Opportunities**

The “needs” of a community can be identified through an inventory of “concerns” labeled by the local community. This information must be collected and connected in a semantically rich knowledgebase. The resulting information will assist in the identification of new development opportunities and ongoing project evaluation purposes. Common needs that are found in other communities will be indicators of implementation priorities and highlight opportunities to reduce redundant investments.

### **Strategy: Identify Stakeholders and Partnership Strategy**

To leverage and build upon this knowledgebase, governments, NGOs, businesses, trustees and research organizations can assemble multi and interdisciplinary teams to identify and organize targeted business cases. In this phase, partners and key stakeholders step forward to define project scopes and execution strategies (see more details in the Value Delivery Modeling and Ecosystem Governance & Operations sections).

### **Incubation: Project Incubation and Crowdsourced Innovation**

The initial implementation and investment strategy can be carried out using a process similar to venture capital or angel fund investments. The UK Social Impact Bond is a paradigmatic strategy for government investment based on project performance. It is the incubation phase where research, appropriate technology and best practices are identified for a given problem space. Investment and execution strategy should be based on evidence of data as well as stakeholder input (both at the global and local level). Successful incubation projects will be captured and connected in a knowledgebase, providing insight for the investors, and industry as a whole. In turn, data from unsuccessful projects assist in cross-referencing common obstacles and recurring issues across the local/global spectrum.

### **Localization: Customization and Knowledgebase Refinement**

An open and “coopetition” development strategy is similar to an open source approach in that it encourages creativity and promotes re-use and local customization. It is now easier than ever to update information from field workers and others in the community by using location data, mobile technologies and social media. This allows participants to localize the knowledgebase by uploading data specific to their communities. In addition, the data contributes to the overall global refinement of the knowledgebase where information can be shared with similar communities in order to replicate solutions and reduce redundant investment.

### **Evaluation: Project Evaluation and Impact Investment**

Benchmarks and metrics must be defined and standardized to help measure and determine the impact-based investment strategy. The inclusion of reports and indicators will also help in the refinement of the knowledgebase.

### **Creation: Technology Transfer, Business and Job Creation**

Successful incubation projects not only lead to new technology implementations and deployment, they also link to new businesses, job creation and curriculum development for education. The SEED knowledge base should be continuously enriched with local instantiations and be leveraged (adapted, transferred, extended) for similar community development efforts.

## ICT Enabled Innovation Ecosystem

The SEED Framework is envisioned as a standards-based, technology-enabled system, with processes that facilitate the operation and flow of information from the 6 Phases of Locally-led Innovation Lifecycle. Specifically, the framework is designed to support self-organizing, multidisciplinary collaborations and, most importantly, to translate concepts and ideas into actions.

Existing tools, standards, and organizational processes, currently found in traditional enterprises or developed nations, especially technologies that are developed to support the mandates of Digital Agenda such as Cloud, Big Data, and Business Intelligence etc. may be refined and re-purposed for SEED framework implementation.

There are four key enabling technology aspects that allow for open replication of the SEED Framework lifecycle:

**Semantic Knowledge Management:** This will be the corner stone for collaborative development framework that holds and connects the knowledgebase created among projects and people throughout the development life cycle.

**Value-based Partnership Modeling:** This component assists the strategy development. It determines the composition of a “value network ecosystem” for the use of partnership risk analysis and risk management. The model is based on partners’ roles and values creation, including intangible values, such as trust, customer experience, knowledge, etc.

**Ecosystem Governance & Operation:** These are critical business processes and governance that enable a transparent and resource efficient value network among partners.

**Benchmarks and Metrics:** These refine the value-based partnership and delivery model, and define the critical data set for impact analysis and Impact Investment

The following sub-sections provide more detail and rationale for each of the aspects. In the Technology Scan section, at least one of the existing technologies is recommended to illustrate the type of tools that can be used for SEED framework realization.



Figure 2 The SEED Framework

## Semantic-based Knowledge Management

Sustainable development requires knowledge from multiple domains, interdisciplinary policy and decision-making, and a deep, connected understanding with locals. However, due to the depth and breadth of knowledge required to produce positive long term impact, it is often difficult to identify not only which problem to solve, but how to solve the problems themselves [5].

The SEED Framework seeks to solve community problems and address local needs with the strengths of the community itself. Asset-Based Community Development (ABCD) is a growing movement that considers local assets to be the primary building blocks of sustainable community development [6]. Building on the skills of local residents, the power of local associations, and the supportive functions of local institutions, ABCD draws upon existing community strengths to build stronger, more sustainable communities for the future. Such community assets may include:

- The skills of local residents
- The capacity of local associations
- The resources of public, private and non-profit institutions
- The physical and financial resources of local communities
- Local culture that indirectly affects the adoption of or resistance to change

A shift to promoting the local assets of the community has the potential to form a system that will facilitate interdisciplinary problem solving and creative solution development in the field of Sustainability Science. Its knowledge base would be formed by incorporating user-inspired research aimed at producing solutions and implementations that are tailored to local needs, creating a field that is defined by the problem it addresses. This presupposes the need for a new scientific discipline and ontology framework, which takes into account all elements of local culture including social, environmental, and economic considerations.

Since the problems addressed through Sustainability Science (SS) relate to various stakeholders and players from many different fields, the problem-solving process naturally requires the collaboration and partnership of these players. Thus, structuring knowledge is itself an important task for SS, and that alone cannot result in comprehensiveness when addressing complex and evolving problems. Understanding requires consistent exploratory inquiry into a multitude of relevant domains, and networking those concepts, in order to flexibly adapt to dynamic changes both within and between domains. In other words, we cannot meet the challenges of ‘what to solve’ and ‘how to solve’ only by structuring knowledge. Knowledge structuring must include the support of thinking processes as well [7].

## Technology Scan

The Global System for Sustainable Development (GSSD), developed at the MIT, is a system that addresses ‘What to solve’, it focuses on the content architecture levels, linkages, and complexities that characterize the domain of ‘sustainability’.

In the Kumazawa et al. 2009 paper [5], they propose an ontology based reference model for knowledge structuring in Sustainability Science (SS). The paper argues that for SS knowledge structuring it needs to incorporate the human thinking process in order to address the challenges of "How to solve".

We believe a role-based and consensus building tool, as described in the Kozaki paper [7], is essential to effectively facilitate the concept and action of consensus in a highly dynamic partnership environment.

## Value-based Partnership Modeling

SEED initiatives often go through two phases of development: 1) research – this often involves domain experts globally; 2) local implementation – this phase must involve community leaders and stakeholders. Community leaders and stakeholders may or may not need to be local authorities; they are individuals or organizations who have deep knowledge about the local issue(s) at hand. Ideally, the implementation should be based on synergy of existing global best practices and their specialization or customization for local needs.

SWOT (strengths, weaknesses, opportunities and threats) is a common method used to analyze a new product or service strategy by either large or small organizations. This is an important step to provide key inputs to the strategy development, when multiple organizations are coming together as described in "Strategy" phase of the Local-led Innovation Lifecycle.

During local implementation, the emphasis should be on local asset development; this is an often overlooked factor when a top-down investment approach is used. The decision and valuation of tangible and intangible deliverables should be adjusted accordingly during the project life cycle. We infer that the intangible deliverable of locals will be extremely valuable during the implementation and deployment phases.

Recently two important trends have emerged in conversations about value creation in business. The first trend, arising in the mid-1990s, considers both financial and non-financial forms of value. A focus on intangible assets, gives rise to the concern of sustainability in terms of positive or negative value-impact a business has on the society, industries and environment. The second trend is the increasing importance of business networks and collaborations across enterprise boundaries and a desire to show the resulting value creation dynamics.

Value modeling brings a focus to the delivery of value to beneficiaries and the capabilities that produce those values. Therefore, an important element to value delivery is the identification of capabilities; this includes the identification of shared capabilities to achieve economies of scale or improving control in multiple lines of operations.

Along with the interest in value modeling there is a growing concern with how both formal and informal collaborations can be modeled to better show the human dynamics involved in value creation. Collaboration should also be modeled to show how people work together in various situations when applying their capabilities to create value. It is the basis for defining responsibility and accountability for the management of resources and operational performance as part of the evaluation and impact investment process [8].

## Technology Scan

The Value Delivery Modeling Language (VDML) specification that is currently a work in progress at the Object Management Group, applies the concept of a value stream to link end product/service value along with the activities and capabilities that create the values. It is believed that a robust computer based modeling tool is needed to

manage the complexity and intricacy of relationships in capabilities, activities, value creation, roles and responsibilities in a dynamic partnership ecosystem.

The concept of VDML looks at both tangible and intangible deliverables and aims to provide a holistic ecosystem partnership valuation based on the following fundamental models:

- Value creation - Value delivery, value propositions and intangible deliverables.
- Sharable capabilities - Potential consolidations, investment priorities, outsourcing.
- Collaborations - Extended organization model, ad-hoc relationships.
- Enterprise optimization - Value focus, capabilities in multiple value streams, agility, risk.
- Risk abatement - Key roles, impact of operating disruptions.
- Regulatory compliance - Targeted enforcement, value impact.

It is important to note that VDML is a "language" to define inter-operable models to support the analysis outlined above. Therefore it is possible, for example, that we define one model for a collaborative Sustainability Science study of clean water among academia and field workers. This model would intend to collect empirical data for evidence-based research, while another model is defined using the VDML for a different set of collaborators. These two activities can be done as independent activities initially, then merged with reusable artifacts (such as a repository of capabilities, measurements etc.) at a later stage.

It is worth noting that the VDML is a deliverable from the Networked Enterprise transFormation and resource management in Future internet enabled Innovation CloudS (NEFFICS) EU Framework 7 project which envision *"By 2015 Enterprise (in particular SME) Networks will be able to dynamically operate in cloud-based environments, independent of geographic location, with collaborative networked business operations support for knowledge workers and business services, integrated with real-time resource management for Internet of Services, Internet of Things/RFID and Internet of People from different partners, and linked directly to Innovation Community services."*

The SEED framework is directly aligned with this vision.

## Ecosystem Governance and Operations

The VDML tools will assist the analysis and identification of stakeholders and the most effective partnership composition for the given project, governance framework is still required after the coalition is formed to support the decision making process and group transparency.

It is important to remember that the definition of Digital Ecosystem is *"a temporary (or long term) coalition for a specific purpose or goal, where everyone is proactive and responsive for their own benefit or profit."* Therefore, it must not be a command and control type of governance structure, but one that would incentivize all stakeholders to pursue their own benefit/profit while working cooperatively towards a common goal.

## Technology Scan

The most cited work in the area of collaborative community projects is the social model published by the Canadian Centre for Social Innovation, "Constellation Collaboration: A model for multi-organizational partnership" [9]. The

paper contains detailed step by step descriptions on how this model can be built. The key concept is that a few different disciplines (a constellation) may come together to fulfill a set of needs/opportunities, and an individual/partner is appointed as the lead of a given domain/discipline (e.g. Marketing activities, IT development etc.). Collectively, the leads from each discipline form the stewardship of the target project, while the stewardship committee provides the governance function for the stakeholders of the project.

The constellation model proposed a solution for stewardship, but it needs to be operationalized with processes and tools to ensure the transparency of a “virtual organization”. We can reuse and draw inspiration from many IT operations and processes here, such as the TOGAF framework (<http://www.opengroup.org/togaf/>), the ITIL framework (<http://www.itil-officialsite.com/>) and the TM Forum Frameworks (<http://www.tmforum.org>).

## Benchmark and Metrics

Business value creation must be analyzed. Not only to determine quarterly earnings for the shareholders, but also to consider the investment for social equity returns and community advancement. Somehow the positive impact on community development as a result of economic activity has been omitted in conventional precepts of corporate value creation because there is no straightforward relationship or measurements between profit and good societal outcomes.

In recent years, some progress has been made to encourage tighter linkages of private sector investment and its positive impact on social, economic and environmental returns. These include initiatives such as “Social Impact Bond” pioneered by the UK Government in 2010 (<http://www.socialfinance.org.uk/>), the approved budget by US Government for the implementation of “Pay for Success Bonds” in 2012 (<http://www.whitehouse.gov/omb/factsheet/paying-for-success>) and the “Social Benefit Bonds” trial plan announced by the Australian Government of New South Wales in 2011 ([http://www.treasury.nsw.gov.au/site\\_plan/social\\_benefit\\_bonds](http://www.treasury.nsw.gov.au/site_plan/social_benefit_bonds))

While these are plausible initiatives, it is imperative that a sound governance structure and measurement regime is defined, so that the indicators and means for measurements actually reflect the merit of the program. This requires deep understanding of, the targeted problem areas that the investment is intended to address, including a comprehensive assessment of community needs

The needs for a repository of metrics and indicators for project evaluation ties into the same point made in the knowledge management section, a found opportunity to use “smart tools” as a means of collecting data on the ground to inform decision makers in a most intuitive and effective manner. Fortunately, the process and the tooling required do not differ greatly from today's Service Level Agreement (SLA) management, in the commercial world. Taking as an example the communication services industry, it is evident that SLA deals not only with providers by meeting their product/service requirements, but also reaching a certain level of customer satisfaction in order to retain customer loyalty. The same rigor is needed to measure positive community impact. For instance, within community delivered home Health programs, success can only partially measured by the number of visits a social worker completes a day, or how much data that have been collected remote from the clinics. The true measurements of positive impact depend on how the patient has benefited and improved from the eHealth investment in their community.

## Technology Scan

There are several measurement methodologies that exist for development initiatives, however they are somewhat fragmented and do not present a consistent and cohesive data set for long term decision making across development projects. Therefore the challenge of choosing the right methodology and metrics for the right project and how to exchange data among different initiatives to measure the long term impact while accurately report to the impact investors, is still a field of substantial research and with a need for standardization.

A few examples of measurement methodologies that assist impact-based investment include:

- Benefit Cost Analysis (BCA) is the classical formula in calculating the monetary values associated with social interventions. The technique is comprehensive in examining costs and outcomes, across different stakeholders. The report of “Valuing Benefits in Benefit-Cost Studies of Social Programs” [10] assesses state of the art measurement and use of estimated economic value, or shadow prices, in applying benefit-cost analysis to social program evaluation.
- The Acumen Scorecard developed in 2001, is a software solution designed to appraise the performance of short term investments against its long term impact, using a grading technique of milestones and benchmarks. (<http://www.acumensms.com> )
- Grameen Bank methodology is based on 16 decision points, 10 indicators and a simple five star system that grades financial vehicles on impact investing initiatives in five categories: repayment, earning profit, self-financing, children in school, and moving out of poverty. ( <http://www.grameen.com/>)

As previously noted the methodology and tooling required to bring continuity and cohesive meaning to these measurements are currently employed in the commercial world. By leveraging the recent investments in the fields of data collection and business intelligence, these commercial tools can be used to further an impact-based investment strategy for Sustainable Development.

## Summary

Sustainable development is recognized as a leading global issue, yet solutions to development problems must be adaptable for use in diverse communities.

This paper proposed a simple framework that encourages a cooperation model of a global - local partnership for sustained development. The framework consists of 6 locally-led innovation lifecycle phases that can be facilitated with a digital ecosystem supported by 4 essential technology components. The SEED framework provides a set of simple design principles that can be applied to different scale of projects; from country-wide poverty elevation like in the Mozambique case, or a small local entrepreneurship development program.

The implementation of the SEED Framework should not be a monolithic system; instead it will be a set of standards-based tools and networked systems that facilitate the flow of information and process automation as well as resource identification and reuse.

The significance of the SEED framework is the knowledge base which must accommodate the problem solving process in order to transform diverse viewpoints into actions. The governance and decision making of the digital ecosystem will be supported by value-based analysis tools. Transformative policy changes and positive social

behaviors can be formed with impact-based investment. Together, we can achieve the goal of sustainable development if we can take an iterative and systematic approach such as the one proposed in the SEED Framework.

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