

New Designs for Modeling Sustainable Capacity Development: Concepts, Methods and Contexts

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Key words: Capacity Development, Agent-Based Model, Spatial Asset Mapping, Sustainable Capacity Development

SUMMARY

The discussion about capacity development (CD) has been spotlighted as significant drivers for sustainable development in recent years. Multi-dimensional natures of capacities would lead to various definitions of CD in international institutes and organizations. CD is perceived as an endogeneous process to improve actionable learning and knowledge, but most of core capacities still remain abstract notion and might be unreliable in sustainable development (SD).

The paper first explicates international perspectives of CD in association with SD. An agent-based model is especially proposed to portray more details of CD. It illuminates the role of assets (or capitals, resources) impacting on ingredients of CDs that are drivers or enablers for improvement of SD. A conceptual framework of sustainable capacity development is creatively designed to assist concerned international organizations. The paper concludes by proposing practical spatial asset mapping linking to agent-based organizational capacity as a tool for measuring sustainable capacity development.

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1. INTRODUCTION

Improvements of human well-being and ensurances of better quality of life for everyone through capacity development (CD) are recently challenging issues in association with the hearts of sustainable development (SD). Capacity building or CD is conceived as an enabler for enhancement of sustainability, but most recent approaches to CD might have a serious difficulty in describing as to what CD implies in practical usages and applications pertaining to operationalization of capacity, capacity assessment and identification of capacity indicators.

This paper first examines international concerns and issues of CD. It scrutinizes the main goals and objectives of UNDP document and other major organization's reports as to what CD means and how CD could improve organization's abilities and cope with development challenges in a sustainable manner.

Being different from existing researches on CD, this paper explicates how CD could be related with SD and what kinds of interactive relationships between CD and SD could give rise to sustainable capacity development (SCD). SD is regarded as creating capacities for improving each person's well-being, living standards, and better quality of life. Capacities determined by the stocks of assets or capitals can be converted to goods and services that may influence upon most part of quality of well beings.

In this paper, an agent-based model is especially proposed to describe the pathway of CD as to how individual agents could reach to CD. This model is creatively designed for clarifying key elements of CD and the discourses of capacity and performance impacted by agent's interactions and communications through the role of developments, agent's missions and use of assets. A conceptual framework for SCD is newly created based on combinations between agent-based model for CD and assets (or capitals) approach to SD.

Existing international reports and documents have not yet suggested practical use of CD concept for human well-being and better quality of life in sustainable communities. Linking spatial asset mapping (Liou, 2004a) to an agent-based model, an integrated tool for measuring SCD is created for not only explicating multilateral characteristics of CD indicators, but also portaying spatial agent's capacities.

2. CAPACITY DEVELOPMENT FOR SUSTAINABLE DEVELOPMENT IN TRANSITION

2.1 International Perspectives of Capacity Development

Many international organizations and institutes have made efforts to elucidate the concept of capacity building and CD at the individual to systemic level. In particular, more than three major international organizations have long played a major role in definition and implementation of CD initiatives and indicators (UNDP-GEF, 2003a; UNEMG, 2004; UNFPA, 2003; WBI, 2004). Most of them have concentrated on the identification of capacity's needs, assessment of national capabilities and the establishment of mechanisms of capacity building at policy or project level.

CD, including capacity assessment, has been one of UNDP's core business areas since the early 1990s. At the global level, UNDP plays a key role as a forum for facilitating discussion and advancing the international understanding of CD. At the country level, UNDP is also supporting thousands of projects developing and assessing national capacity (UNDP-GEF, 2003b). A few other international research institutes (DFID, 2003; GTZ, 2003; ISNAR, 2003) have also contributed to serious efforts for institutional and organizational capacities and performances.

In fact, a serious difficulty remains in describing as to what CD implies in practical usages and applications since there are many different interpretations of CD depending on abstract notions that might be hard to translate into actions and objectives. This may be due to the fact that the discussion of CD could not directly meet current requests of our well-being. Their conceptual views of international CD also seem to be separated from present needs of our sustainability. In addition, organizational capacity assessment tools for testing CD would

partly adopt a method of business performances that balance scorecards are applying to many commercial domains.

In these circumstances, there might be critical argues for the goals and initiatives of CD if international organizations and institutes could not invent the feasible way for a new paradigm of development. As the most leading international organization, UNDP significantly contributes to improvements of CD and defines a confident capacity assessment framework and CD indicators, there are, however, lacks of international consensus on their view and questions about the possibility of practical applications. Additionally, there might be no yet acceptable models and frameworks to portray real applications of CD in the context of SCD.

2.2 A new Shape for Capacity Development in Sustainable Development

Like the concept of capacity building, CD is a process by which individuals, groups, organizations and societies improve their abilities to identify and meet development challenges in a sustainable manner. CD is associated with increased ability, capability and competency to improve effective uses of existing resources, capitals and some valuable things in sustainable way. CD is the process whereby individuals, groups, organizations and societies enhance their capacities in terms of human, organizational, institutional and social capital (Lavergne, 2004). While the concept of capacity building often aims to build capacity or increase existing capacities by imported other capacity, CD is considered as an endogenous course of actions and long-term process of knowledge learning and adaptation to change, to begin with existing capacities and assets (Lopes and Theisohn, 2003).

CD is also linked to various policies and strategies and objectives which seek to improve performance at different levels of organization and society. Thus, numerous aspects of CD would also lead to dynamic interpretations of capacity ranging from tangible things such as assets, materials, manpowers to intangible objects like skills, values, motivations, methods etc based on individual circumstances, organizational environments, and social policies and systems.

While there are several different types of capacity building model and framework, CD remains an initial stage of abstract notions because many aspects of capacities are concerned

about simply qualitative discrepancies about policy, strategy, participation, and monitoring & evaluation (UNDP-GEF, 2003a). It means that CD has more multi-dimensional scopes and contents of capacities that are required for a practical model and feasible framework to meet demands of sustainable human development.

Although increasing concerns and awarenesses of CD are perceived as a new paradigm of capacity building, it could presumably follow similar circumstances of capacity building. Therefore, it might need a new concept or design of CD associated with developments of assets and capitals. In this paper, a narrower definition of CD is hinged on assets or capitals that enable us to understand functions of assets and achieve importances of human capacity benefitting from uses and applications of several assets or capitals.

Various types of assets or capitals could play a major role in developments of human, economic, socio-cultural, natural, digital, physical, institutional and political factors. As long as investments of tangible capitals are still considered as the primary engine of CD, institutional and political approach to CD could be perceived as root cause of capacity. Meanwhile, social, environmental and economic capitals approach to SD might need to be reconsidered in accordance with a new design of CD. Especially, capital selection theory applied to community capacity building (Liou, 2004b) and capital theory for SD (Pearce and Atkinson, 1993) give birth to a new perspective on present-day issues and challenges of SD, and could bring about a better appreciation of the multi-natural aspects of CD in SD.

SD is about creating capacities for raising each person's well being, living standards, and quality of life. Capacities determined by the stocks of assets or capitals at individual and organizational level can be converted to goods and services which contribute to human well being. From the perspectives of asset or capital developments, CD approach to the triple bottom line of capitals might not be compatible. In other words, SD's concept might have nothing to do with CD. SD indicators do not agree with most indicators of CD. Thus, existing models and frameworks of SD approach to CD might need to be reshaped in the context of SCD.

3. AGENT-BASED MODEL FOR CAPACITY DEVELOPMENT

Various models and frameworks for capacity building have been highlighted in recent years.

Regarding as the comprehensive term of capacity building, CD is often conceived as an establishment of individual capacity and achievement of organizational performance by ownerships of capital factors and forces of enabling environments. Being different from existing models of CD, the model proposed is hinged on the concept of agent that has capabilities to hold or maintain ownerships of assets and capitals shown in Fig. 1. It shows the process of CD that begins with individual agent's motivations of asset capacity leading to increase of existing capacities.

This diagram shows that capacity is increased and developed during the course of an iterative and long-term learning process and adaption to change (UNFPA, 2003) that individual agent could understand the discourses of his capacity and how to cope with CD change over time. A building capacity often requires a number of linked learning process for individual agents and even organizations to continuously adapt to change. Individual agents reconize that knowledge learning and sharing makes it possible to modify their behavior and keep up with adaptation to the world. CD is also concerned with a dynamic and endogenous process that builds upon existing individual capacity with the help of actionable knowledge learning.

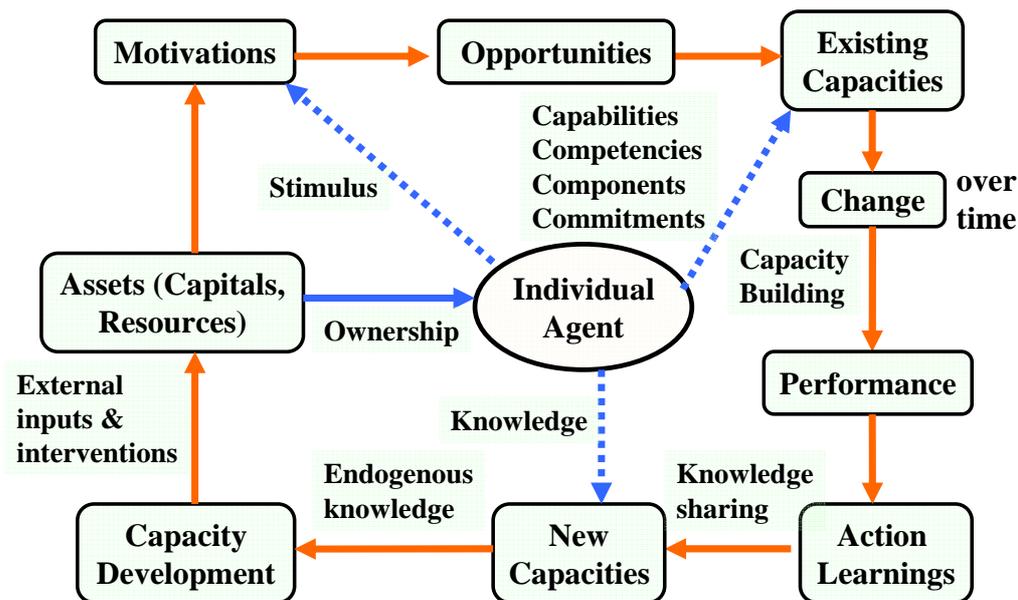


Fig.1 Key elements of capacity development

Since CD has been widely involved with institutional, organizational, economic, political and social issues in different dimensions, it is hard to suggest the holistic form or generic model

to encompass a wide variety of CD characteristics. Thus, an agent-based model is used to portray different natures of person, group, organization and social institution that have various functions and multiple attributes. An agent is considered as people, things, associations, and societies that have goal-oriented properties in association with policy, strategy, objectives, targets shown in Fig.2.

An agent makes use of action to carry out their plan, project and task within the context of the role of economic, environmental and social development. A major potential of agent-based model is to effectively represent diverse types of human and organizational motivations and interactions, and illustrate different attributes and properties of agents.

An agent-based model consists of not only decision-making of agents (human and organization) enclosing entities, entity roles, relationships, associations and role properties, but also environments of agent motivation, capacity, performance, ownerships of assets or capitals, and agent operations and interactions. A role is an abstract mission of agent's behaviors that are naturally goal-driven. It is related with the agent capacity or performance to complete plans, projects, and tasks in connection with some specific developments.

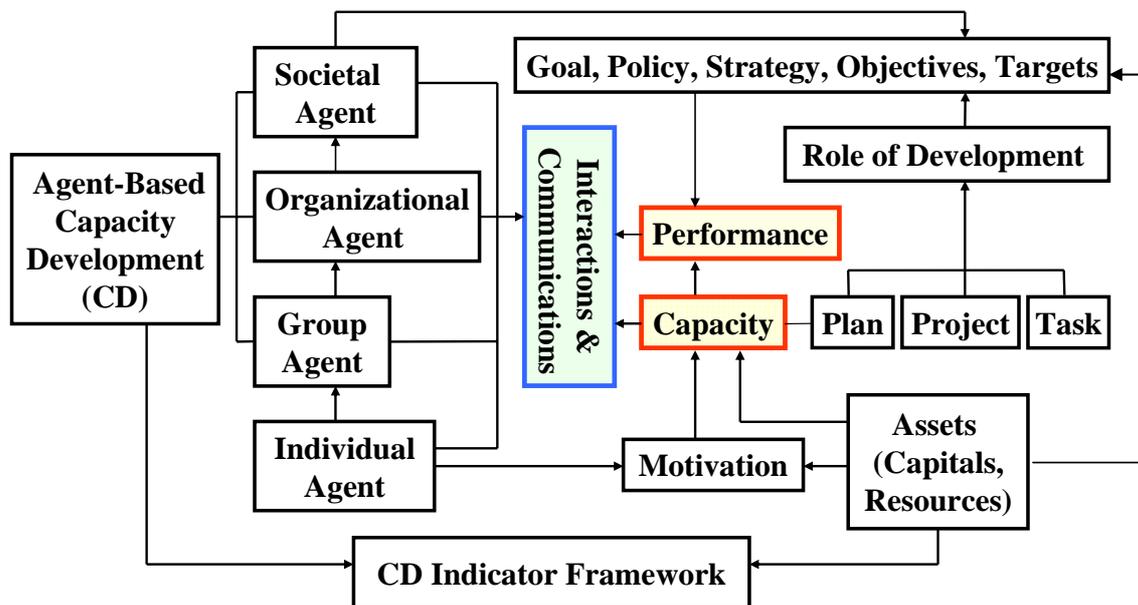


Fig. 2 Agent-based model for capacity development

One of the most significant relationships between agents may be interactions or

communications that are considered as the channels of capacity and performance's learning among agents. The sources of communications and interactions between agents are motivations to adapt to new capacities or to improve existing capacities through uses of assets (or capitals, resources). **sustainable capacity** Especially, an agent-based model is expected to be useful to describe societal agents for depicting intangible characteristics of capacities and performances with regards to policy, strategy, objectives and targets.

4. A CONCEPTUAL FRAMEWORK FOR DEVELOPMENT

Although SD has a wide variety of objectives and indicators based on the three main areas such as economic, social and environmental issues, there might be little dominant consensus on a particular framework and model linking to CD. In fact, three capital-based framework is perceived as a prior to the concept of SD, but sustainable human society might be required for additional features pertaining to human, cultural, material, legal, political concerns.

Assets are broad objects to symbolize the stock of wealth in a household, community and extra-communities that give rise to economic flows of capital. Assets are conventionally a vital factor to measure degrees of individual capacity or well-being. Basically, an asset may become capital when it is invested to an individual business or household economic areas. Capital is often conceived as the stocks of asset and the quality of resources.

Many organizations often recognize capital as a major part of organizational capacities with regard to human, financial and built investments. In the meantime, capital categories are also regarded as SD indicators, but should not be seen as an attempt to measure all sustainability issues (UNSD, 2005). The right way of natural resource use and capabilities of environmental protection are having major impacts on the life support system of the earth. Regional assets are often considered as resource that are a type of engines of economic capacities in local and central government.

that CD could play an important role as a driver of SD. Moreover, CD can include the way of enhancements for capitals (e.g. human, economic, etc) viewing as core components of organizational capitals (Morgan, 1997).

Agent-based capacity with regional assets (or capitals) could lead to sustainable capacity which endogenous agent knowledge is able to improve the capacity of SD. Here, SCD is defined as sustainable capacity for agent's ability (individuals, groups, organizations, systems) to perform their functions, ensure the better quality of life, and set and achieve objectives of CD through sustainable uses of assets, capitals, and resources.

5. SPATIAL ASSET MAPPING WITH AGENT-BASED CAPACITY AS A TOOL FOR MEASURING SUSTAINABLE CAPACITY DEVELOPMENT

Considering existing studies of SD and ongoing researches on CD in international institutes and organizations, there are some constraints and additional requirements for enhancing their outcomes and even serious questions about clear measures or indicators to be used for SCD. UNDP (2006) depicts a magnificent capacity assessment framework that is composed of three dimensions such as point of entry, core issues and cross-cutting capacities. This conceptual framework explains proper combinations of three elements, but core issues are closely pertinent to organizational capitals of CD. It is, however, required for questionnaire surveys, and monitoring & evaluation techniques that need to be a part of visualization functions in space.

From the international perspectives of CD and SD, there are no yet attempts to suggest an assessment tool for measuring SCD. Linking spatial asset mapping to agent-based model for CD, an integrated approach to SCD shown in Fig. 4 is designed to not only explicate multilateral characteristics of CD indicators, but also make use of spatial agent's concept within the 4 dimensional spatial asset mapping.

Spatial agent has been used for describing diverse agent's behaviors and activities in space. Spatial agent is able to interact with other agents such as humans, institutions and a part of societal actors that complete his missions with specific individual or organizational motivations and approved capacities. Spatial agent acts to realize a set goals and objectives with existing capacities, but external environments of GIS businesses and societies are so

unpredictable that spatial agent is required to adapt to capacity's change over time.

Meanwhile, a number of approaches and tools for capacity analysis and assessment have been developed at the individual, organizational and societal level such as Organizational Capacity Indicator (OCI), Institutional Development Framework (IDF), Organizational Capacity Assessment Tool (OCAT), Discussion Oriented Organizational Self-Assessment (DOSA), Participatory Results-Oriented Self-Evaluation (PROSE). But most of them are used to describe specific knowledges, skills, institutional abilities, and human resource developments etc that would emphasize on organizational capacity and performances by questionnaire surveys.

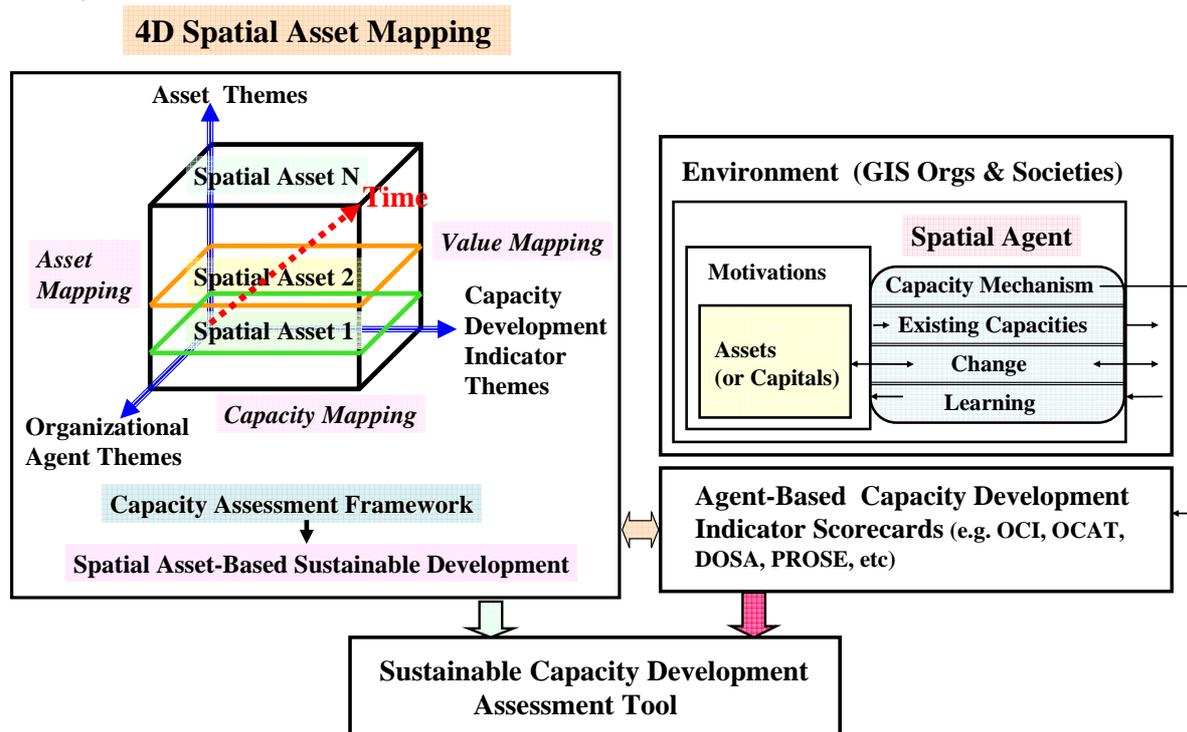


Fig. 4 Measuring sustainable capacity development

However, these assessment tools are not suitable for illuminating a wide feature of SD and the principle of CD indicators is different from that of SD. In terms of CD in space, agent-based capacity might be viewed as a part of spatial attributes that could significantly impact on some developments of economic, environmental and social aspects. Therefore, asset-based SD linking to asset mapping is designed to involve agent-based organizational capacity into SCD.

In fact, asset mapping is a process of identifying and cataloging the inventories of tangible or intangible assets of individuals, of groups, of organizations and even communal societies. Spatial asset mapping provides an analytical tool of asset capacity for an interpretation of individual, organizational and communal sustainability when classifying and analyzing the strength and weakness of social, economic and environmental capitals. In the process of CD, organizational goals, policies and objectives can be changed over time and the capacity for desired knowledge, skill and capital might be updated or transformed. Thus, the 4dimensional spatial asset mapping is useful and expected to facilitate monitoring & evaluation of SCD.

6. CONCLUSIONS

A wide range of issues related to the three pillars of SD has been discussed for over a decade, there are however, very little international consensus on the relationships between CD and SD. The objective of this paper is to design new concept of CD based on ability of assets (or capitals, resources) that are considered to be drivers and enablers for engine of developments. There are, however, serious questions about how CD could be related to SD because two diverse definitions and natures of their original principles might not be compatible.

In addition, 11 capacity dimensions at 3 levels (individual, organization and systems) of UNDP have some serious shortcomings to indicate specific agent's features in terms of their attributes of policy, strategy, mission, role and interaction among agents. Thus, an agent-based model for CD is creatively designed and expanded to a conceptual framework for SCD because most international results of CD model and framework would remain an abstract notion or a little advanced feature of capacity assessment focusing on limited capitals or resources of organizational capacities. However, sustainable community developments and community capacity buildings need more broad scopes and contents which existing CD indicators could not explicate.

Considering international interests and imperative demands for more details of CD and SD, an integrated approach to measuring SCD linking asset-based SD to agent-based model for CD is newly designed for not only expounding multilateral characteristics of CD indicators, but also depicting spatial agent's capacities as a result of experimental research and project.

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