

# Motivating stakeholders to deliver change

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## Abstract

**External stakeholders, such as civic associations, international organisations and media, are typically perceived as foot-draggers preventing “good” sustainable solutions in the design, construction and operation of structures or as being responsible for significant time delays of projects and thus for financial losses.**

**The paper aims to propose a framework for motivating the many different stakeholders involved in building design and construction to implement the changes necessary to transform the processes associated with the life cycle of the built environment so that the goals of sustainable development can be achieved in a timely manner. Requirements from a theoretical perspective, such as new ways of decision-making, the invention of a new sustainability paradigm and the appropriate mix of policies are outlined. In the framework of the workshop, we want to learn from six different case studies in order to complement the theoretical findings and to discuss the approaches proposed.**

## 1 Introduction

This paper explicitly addresses the theme of the 3<sup>rd</sup> Holcim Forum for Sustainable Construction: “Re-inventing construction”, focusing on the workshop-specific topic: “Stimulate stakeholders – with incentives to implementation”. In recent years, the contribution of both internal and external stakeholders to the development and implementation of a sustainable built environment has emerged as crucial to the delivery of meaningful change. The development of patterns, structures and buildings that prove to be sustainable in the social, ecological and economic dimensions can only be achieved by including all parties affected. However, the inclusion of stakeholders remains difficult for various reasons. Besides the highly fragmented nature of the building sector, the complexity of stakeholder interactions, different professional approaches of actors, varying interests and the frightening challenge to the status quo by the new sustainability requirements, it is difficult to motivate stakeholders to take part in the process of change given the exclusion of stakeholders by market mechanisms and unsupportive management strategies, as well as deficient vehicles for participation. This paper aims to propose a framework for motivating the many different stakeholders involved in building design and construction to implement the changes necessary to transform the processes associated with the life cycle of the built environment so that the goals of sustainable development can be achieved in a timely manner.

The built environment and its construction play a significant role in sustainable development. The built environment can be seen as totality of infrastructure and buildings supporting human life. It includes both the physical objects of construction as well as the processes of construction, operation, maintenance and demolition. The construction sector is that sector responsible for the physical construction of the built environment. The building sector refers to that part of the built environment concerned with construction, operation and maintenance of buildings. Not only is construction a major economic sector that accounts for approximately 10% of the global GDP and employs millions of people (CICA 2002), but over its life-cycle the built environment also directly and indirectly contributes to a number of ecological problems. Apart from indirect impacts such as deforestation and the concomitant desertification and soil erosion, eutrophication and acidification of water sources, biodiversity loss, as well as the generation/release of toxic substances and endocrine disruptors (Kibert 2008, p.38-44), the built environment makes a significant contribution to

consumption of energy and natural resources, greenhouse gas emissions, and the generation of liquid and solid wastes. Figure 1 and 2 show the average proportion of global resource consumption and of emissions associated with the built environment – up to a staggering 40%.

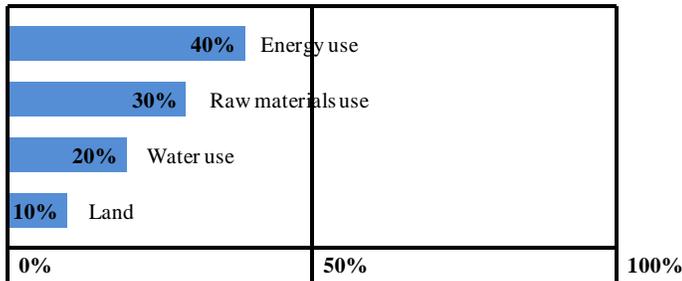


Figure 1: Share of the built environment in resource use (UNEP SBCI 2006)

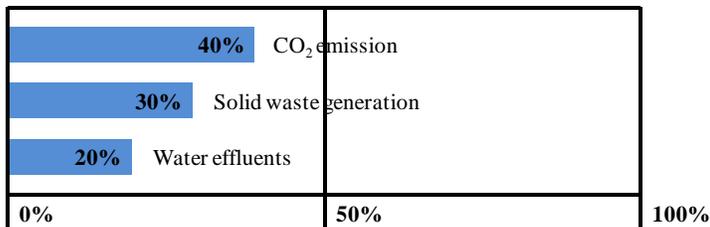


Figure 2: Share of the built environment in pollution emission (UNEP SBCI 2006)

A UNEP preparatory report for the IPCC 4<sup>th</sup> Assessment (Levine et al. 2007) suggests that worldwide building related CO<sub>2</sub> emissions (including electricity usage) are expected to grow from 8.6 billion tonnes in 2004 to 11.4 billion tons (low-growth scenario), or as high as 15.6 billion tons (high-growth scenario) by 2030. This represents approximately 30% of global anthropogenic emissions. The report further suggests that the building sector not only has the largest potential for significantly reducing greenhouse gas emissions (compared to other major industries), but also that this potential is relatively independent of the cost per ton of CO<sub>2</sub> equivalencies achieved. With proven and commercially available technologies, the energy consumption in both new and existing buildings can be reduced by an estimated 30-50% without significantly increasing investment costs (Cheng et al. 2008).

In general then, the construction sector has far-reaching social, economic and ecological consequences. However, these consequences are context specific and their specific weight is determined by geographic, social, cultural and economic conditions. For example, in developing countries, social concerns such as the provision of adequate housing for all play a major role. By contrast, the preference of industrialized countries for a higher standard of living and the resulting high resource consumption focus more on environmental concerns. In order to reduce resource consumption and meet the other needs in the social, economic and ecological dimensions of the built environment, four distinct controlling levers of the building industry can be changed:

- the *demand* of housing, retail and service zones, industrial areas and infrastructures
- the *supply* of construction products
- the *management* of existing buildings and structures; and
- the *stakeholder behaviour and understanding* in specific socio-cultural contexts.

The demand for buildings and related infrastructure is increasing in almost all regions worldwide. This is especially the case in the Southern hemisphere with its high population growth rates, where ongoing urbanization and fast-paced economic development require new construction of housing, retail zones, industrial areas and infrastructure. In some countries experiencing rapid economic growth, such as India and China, significant increases in construction activity are already evident. It is unlikely that this demand would

be reduced. Rather, the more likely change would be in how the demand is satisfied through the kind of construction product that is offered. In industrialized countries, renovation and reconstruction of the existing built environment offers a much more significant opportunity for intervention than the provision of new building stock. A study in the German context, for example, estimates that shifting the construction sector's focus towards renovating buildings for energy efficiency would "secure and create on a long-term basis approximately 430,000 jobs" (Hanke et al. 1999, p.5). In addition, the implementation of building renovation policies in Germany could decrease energy costs by 50% as well as achieving considerable savings of material resources. However, the ways and extent that renovation policies can be applied varies from location to location and from project to project. In general, whether dealing with the provision of new buildings in the developing world, or the renovation of the existing building stock in the developed world, the issues of supply and demand require a balanced strategy between new construction, reconstruction and renovation based on local conditions, feasibility and the use of appropriate design strategies and technologies to reduce resource consumption and environmental pollution/degradation.

There are undoubtedly costs involved in sustainable construction. For example, so-called MINERGIE-buildings in Switzerland, providing a significantly better energy performance than non-certified buildings, require on average approximately 3-10% higher investment costs (Minergie 2010). However, the cost of inaction may prove considerably greater in the middle and long-term (Stern et al. 2007). In addition, sustainable choices such as implementing energy efficient technologies may have a positive economic long-term effect, since they significantly reduce the operational costs of a building and add value to real estate investments, as well as contributing to the creation of green jobs. Although the costs, affordability and benefits vary from country to country, a number of country-specific studies indicate that the additional initial investment required would produce considerable economic returns over the full lifecycle.

Changes in the management of existing buildings and structures to improve their operational resource efficiency further contribute to the possible positive impact. However, to bring about the necessary changes in supply, demand and management, a change in stakeholder behaviour is required.

Social, economic and environmental benefits can be achieved within sustainable construction if key stakeholders involved in the building processes are able to harmonize conflicting interests, and manage to achieve a balance between the collective and individual, the local and global, the present and future, and the risks and benefits. Experts, scholars, planners, suppliers, public authorities and business related people throughout the world are tackling the challenges of sustainable construction from different vantage points. Their task consists mainly in redefining concepts, rules, priorities, markets and construction processes. Construction is being redefined, for example, in terms of buildings that are flexible enough to be adapted to unknown future needs, buildings whose environmental systems operate synergistically with neighbouring ones, and those developed to be much more responsive to natural systems and flows.

This paper deals specifically with the challenge of bringing about stakeholder transformation. In Section 2, a brief review is provided of the concept of stakeholder and the barriers to their acceptance and contribution to sustainable construction, and the instruments that prompt and support its implementation by key stakeholder groups in all building life cycle phases - planning, tender, construction, use, eventual refurbishment, retrofitting or renovation, as well as the final demolishing and recycling processes.

Section 3 discusses three key concepts that are currently being redefined. The first is the sustainability paradigm to which the construction sector must realign itself; the second is the understanding of what constitutes a stakeholder and the third is the roles of different types of stakeholders in the construction sector. Section 4 aims to stimulate thoughts on the reinvention of the way stakeholders are encouraged to support, enable and practice sustainable construction, as well as the instruments and incentives required to achieve this goal. The questions raised in this section will form the basis of the workshop at the 3<sup>rd</sup> Holcim Forum for Sustainable Construction to be held in Mexico City.

## 2 Re-View

This section reviews the current perceptions about who the stakeholders in sustainable construction are and what particular concerns drive decisions in each of the stakeholder groups, as well as the barriers and opportunities these concerns create. It also looks at the available instruments that could be used to influence decision-making processes to support the goals of sustainable construction.

### 2.1 Stakeholders in sustainable construction

*Stakeholder* is a relatively recent term coined originally for the corporate sector. There are various interpretations of who (or what) can be seen as stakeholders in an organisation. The simplest definition is that of Frederick (1998, p.361): “[e]veryone in the community who has a ‘stake’ in what the [community] does”. Freeman defines a stakeholder as a person or an entity that “can affect or is affected by the achievement of the organization’s objectives”, a definition that emphasizes the interdependence between stakeholders and organisations, and organisations and their environments (Freeman 1984, p.46). Since relationships cannot be simply reduced to contractual or economic relations, stakeholders are, in fact, moral actors (Hendry 2001), and have a direct influence on organisational performance and survival (Scott and Lane 2000). Friedman and Miles (2006) offer a model of stakeholder definitions based on two principles: normative and strategic (figure 3).

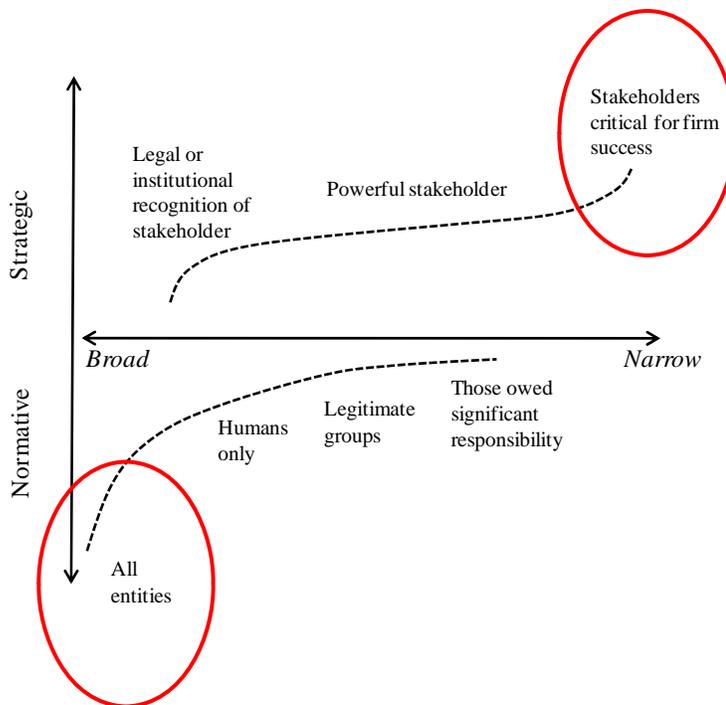


Figure 3: Normative and strategic stakeholders (Friedman and Miles 2006, p.11; red circles added)

Normative definitions of stakeholders differ in their scope – either because they embrace all possible things that might be considered as stakeholders, such as future generations and the natural environment or because they restrict the scope of stakeholders to reflect societal norms. In normative definitions, stakeholders are both moral actors and the subject of moral action. On the other hand, strategic definitions of stakeholders are based on the degree of influence that a stakeholder may exert within a certain organisational context, and how critical for the survival of such an organisation the actions performed by them are (Friedman and Miles 2006).

Different stakeholders are involved in different stages of the built environment’s life cycle, are highly diverse, have diverging perceptions and interests, and play different roles. The various concerns, as well as the barriers to overcome and the instruments that may prompt sustainable construction, can be approached from the perspective of each key stakeholder in the different building life cycle phases such as planning, tender, construction, use, eventual refurbishment, retrofitting or renovation, as well as the final demolition and recycling processes.

Table 1: Key stakeholders and their concerns in the building life cycle

	KEY-STAKEHOLDERS	MAIN CONCERNS
INTERNAL, STRATEGIC STAKEHOLDERS	Investor	Return of investment; Economic feasibility
	Manufacturer / Supplier	Energy supply; Availability of natural resources
	Banks / Financial Institutions	Return of investment
	Contractors	Materials and Energy supply; Workforce
	Planners/designers	Knowledge; Creative and efficient application of technologies
	End User / Owner	Well being; Economic feasibility; Life style
	Public Authorities	Regulations and Control
EXTERNAL, NORMATIVE STAKEHOLDERS	NGO & Civil Society	Social equity; Access to information
	Research & Education	Technology and knowledge
	Media	Democratic share of information

Table 1 shows key stakeholders and their concerns in the building life cycle. These stakeholders tend to be either internal or mainly strategic, or external and mainly normative, with public authorities playing both a strategic and a normative role.

Some of the key stakeholders appear in the role of clients (e.g. public authorities for strategic planning projects, investors as clients of designers, end-users as clients of apartments or shops), depending on the scale and phase of a project. Other stakeholders, such as media or non-governmental organisations, are “external” stakeholders who play an oversight role.

The different stakeholders typically focus on specific priorities: for clients, financial feasibility is a key issue of sustainable development. Other sustainability criteria, e.g. an environmentally or socially friendly development, may often be less relevant for them if they cannot see the return on investment associated with environmental and social measures (Hoffman and Henn 2008). However, for many clients other aspects also play a role, such as the achievement of social justice and a high level of quality of life for public authorities and a healthy, comfortable environment for end-users (Tseng et al. 2009, p.131, Steemers and Manchanda 2010). External stakeholders have a broad range of individual interests, often perceiving risks in terms of impending uncertain or catastrophic futures (Baum 2003, p.276; Cullingworth and Caves 2003; p.291).

The complex set of actors involved with the design, construction and maintenance of the built environment, set within the understanding of sustainability as “a value-laden and context-sensitive concept” (Maclaren 1996, p.188), requires that the definition of stakeholders in sustainable construction be both normative and strategic. How wide the definition of ‘stakeholder’ is to be set, is therefore one of the key aspects of current construction practice that have to be redefined. For example, would the natural environment be considered as a stakeholder? What about future generations?

## **2.2 Challenges associated with the inclusion of stakeholders in sustainable construction processes**

Improving the decision-making processes within sustainable construction remains a difficult, but not insurmountable, challenge. Given the conflicting interests, different professional approaches, lack of information, and poor managerial strategies, it is difficult to integrate the highly diverse stakeholders into a single process. The innovations engendered by the new requirements of sustainability create further challenges for the established practices and criteria for decision-making within professions and public and professional institutions at all stages of the construction process. (Henry and Paris 2009). The effective and meaningful inclusion of stakeholders in the processes of sustainable construction is therefore difficult for various reasons, some of which are described below:

### **(1) High fragmentation of the building sector**

Buildings typically have a long life-cycle with only limited interaction between stakeholders involved in different phases. Besides the time component, the different aspects of the construction process and building life-cycle (e.g. architecture, engineering, building management, building function, and occupant behaviour) are often poorly or not at all coordinated. A decade ago, van Bueren and Priemus reported that “usually, there is no director coordinating these relationships and interactions. [...] As a consequence, the players perceive dependence only on those players with whom they come into direct contact, and they are mostly unaware of any dependence on other players at other points in the planning process” (Van Bueren and Priemus 2002, p.80). As such, there are no currently apparent natural incentives or even processes for stakeholders to cooperate to maximize the overall long-term energy efficiency of the building (UNEP SBCI 2007). Knowing that the construction sector embraces a great variety of actors and activities, the integration of decision-making processes within sustainable construction is challenging but, again, not insurmountable.

### **(2) Different professional approaches**

The fragmented process of decision making in construction creates a decentralized system which is strongly influenced by professional codes (Van Bueren and Priemus 2002, p.83) and an incapacity of working within a multi-disciplinary team from an early stage of design (Tirone et al. 2003). The rules set by institutions are interpreted as ground rules that strongly influence the perception of the roles, tasks and responsibilities of players in the process of construction and management. Since every niche of the construction sector has its own dynamics, regulations, interests and possibilities, a key challenge is to combine them in ways that, when well articulated, achieve neither competition nor conflict, but rather a win-win result. Recent years, however, have seen an increase in expertise in working in interdisciplinary and cross-disciplinary processes on sustainability-related issues.

### **(3) Sustainability requirements challenge the status quo**

According to Henry and Paris (2009), the innovations engendered by the new requirements of sustainability question public and professional institutions, their established practices and several criteria of decision making at all the stages of the construction process. The growing drive toward sustainable construction practices is changing the rules governing planners, design consultants and builders, the rules of setting up a project, the rules of cooperation between actors and the rules of contracting. More and more specifically educated experts in sustainable construction are included in planning and construction processes and a growing appreciation of, and engagement with, integrated design processes can be perceived. The introduction of new specialists in the process challenges existing norms and conventions and promotes changes to the habits of professionals of the building sector. (Henry and Paris 2009). It also increases the complexity of construction processes.

### **(4) Complexity and interconnectedness of stakeholders' interactions**

Risks and impacts associated with construction activities are often difficult to determine and measure due to the interactions between many different variables, such as geographic, cultural and economic factors. Considering the complexity of global social and ecosystems, it becomes difficult for managers [as well as other stakeholders] to determine specific impacts on these systems (Driscoll and Starik 2004, p.69). There is also no one-size-fits-all solution, method, tool or model to determine the social, environmental and economic impact of construction activities due to the complexity and interconnectedness of different activities and stakeholders involved.

**(5) Interests and values of stakeholders vary**

In every decision-making phase, sustainable construction raises a set of issues that should be shared by all stakeholders: natural resources; energy supply; social equity, knowledge; democracy; ecological balance; well-being and lifestyle, among others. However, the interests of stakeholders often vary significantly and can be highly conflicting. Numerous conflicts have been reported in literature (Cullingworth and Caves 2003; Brearley and Curry 2006; Kassab et al. 2006; Tam et al. 2009). Cordano et al., for example, describe some of the barriers that corporations are facing in developing a common vision of stakeholder environmental policies, suggesting that “researchers assumed that stakeholder group members shared a common set of values and these value differences were the principal source of stakeholder conflict” (Cordano et al. 2004, p.28).

**(6) Some stakeholders are excluded by market mechanisms**

Economic feasibility and inclusion of stakeholders are key issues to the implementation of sustainability. Nevertheless, there are considerable challenges and barriers to overcome before competitive economic opportunities within the built environment can be created. For example, the parties typically making decisions about the building design (designers and investors) are seldom those benefitting from environmental performance improvement and their reduced associated costs (owners and users). Similarly, market mechanisms exclude voiceless stakeholders such as future generations and those currently excluded by the real estate and construction market forces.

**(7) Adequate managerial strategies and vehicles for participation required**

The *Agenda 21 on Sustainable Construction* of the International Council for Research and Innovation in Building and Construction (CIB) lists a number of barriers for sustainable construction, amongst them inadequate or unfit vehicles for participation by stakeholders (CIB 1999). Standards, regulations and building labels do not (yet) claim the inclusion of stakeholders in the process. Deficient human resources, both in terms of adequately educated managers and in terms of a sensitized, aware public constitute further constraints. Only recently managers started becoming aware of the importance of including stakeholders in building processes. However, integrated design and building processes are still rare.

### **2.3 Instruments for a sustainable built environment**

A number of instruments and tools have been developed to drive transformation in the behaviour of stakeholders and encourage or support sustainable construction. These instruments either drive behaviour through providing financial, fiscal and psychological incentives and disincentives (e.g. subsidies, funding schemes, stars, awards, taxes) or by setting specific requirements (e.g. regulations, quotas and targets, voluntary agreements) or assist decision-making processes by providing design and planning tools, guidelines and knowledge sharing.

Normative stakeholders generally have a more active role in providing instruments and incentives for the implementation of sustainable construction by the strategic stakeholders. Public authorities for example are, according to a UNEP study, key stakeholders for the implementation of financial incentives that aim at mitigating building effects on climate change through energy efficient technologies (Maclean et al. 2008). Similarly, Public Fund Mechanisms can be implemented by governments with the purpose of overcoming the economic and financial barriers to sustainable energy initiatives. On the other hand, external stakeholders have also been seen as providing major impediments to the creation of sustainable solutions or as being responsible for significant time delays of projects and thus for financial losses.

These mechanisms are seldom effective on their own. Instead they cluster in mutually supportive and interdependent combinations that operate on multiple levels, e.g. strategic policies and voluntary agreements support the development of financial and fiscal incentives. Similarly, rating systems and design tools assist designers and developers in making decisions that will help them access incentives, thus enabling behaviour that contributes to the achievement of strategic goals at local to global levels.

Table 2 gives an overview of different instruments according to the stakeholders the instruments were designed for.

Table 2: Classification of policies and other instruments towards sustainable construction according to the stakeholders they were designed for (own compilation based on Maclean et al. 2008 and UNEP SBCI 2009b)

<b>CLASSIFICATION OF INSTRUMENTS</b>					
<b>Regulatory</b>	<b>Financial Incentives</b>	<b>Fiscal Incentives</b>	<b>Voluntary Agreements</b>	<b>Information</b>	<b>Design/ Planning Support</b>
Building codes	Innovative financial methods	Capital subsidies, grants, subsidized loans	Self-declaration	Rating systems	Design and assessment tools
Mandatory labelling program	Capital subsidies grants, subsidized loans	Taxation (on CO <sub>2</sub> or household fuels)	Energy efficiency certificate schemes/white certificates	Education and information programs	Education of professionals
Energy Efficiency obligations and quotas	Microcredit	Tax exemptions/ reductions	Appliance standards	Media campaigns	Communal resources
Mandatory energy regulations	Creation of a new market	Public benefit charges	Kyoto Protocol flexible mechanisms	Awareness raising	Self-construction
Mandatory audit requirement	Capital subsidies grants, subsidized loans		Labelling and certification programs	Detailed billing and disclosure programs	
	Investment funds for energy efficiency in buildings		Voluntary and negotiated agreements		
	Grants		Public leadership programs, incl. procurement regulations		
	Soft Loans		Cooperative procurement		
	Public/Private Equity Funds		Demand-side management programs		
	Credit Lines		Energy savings performance contracting (EPC/ESCO) support		
	Loan Facilities				
<b>Public authorities Professional associations</b>	<b>Banks, Financial Institutions, Financial market, Public authorities</b>	<b>Public authorities</b>	<b>Multiple stakeholders</b>	<b>Media, Schools, Community, Public authorities</b>	<b>Universities, Research Institutes, Community</b>
<b>STAKEHOLDERS</b>					

### 3 Re-Define

The above section provided a brief review of the status quo on stakeholder involvement and support of sustainable construction and the existing mechanisms to drive behaviour change in the construction sector. This section asks how a number of key concepts and approaches should be re-defined to accommodate the growth in the understanding of sustainable construction, including calls for a new sustainability paradigm, as well as identified shortcomings in current approaches to stakeholder involvement and motivation.

### 3.1 Is the built environment facing a change of paradigm?

Commentators (e.g. Schumacher 1974; Sachs 1995; Capra 1997 and Capra 2002; Bossel 1998; Atkisson 1999; Hawken et al. 1999; Raskin et al. 2002; Adams 2006) highlight that for humanity to transition towards sustainability, it needs to change the paradigm within which it operates. Such a paradigm shift appears to be already occurring and sustainable development can be seen as both a driver and a result of this shift (Du Plessis 2006). This new paradigm is premised on a worldview that recognises “the fundamental interdependence of all phenomena and the fact that, as individuals and societies, we are all embedded in (and ultimately dependent on) the cyclical processes of nature” (Capra 1997, p.6) and will have far-reaching consequences for how sustainable construction is understood, practiced and assessed. Du Plessis (2009a) proposes that key characteristics of this paradigm include:

- An understanding of the world as consisting primarily of dynamic relationships described in complex adaptive systems and multi-level networks in which nature and humans are fundamentally entwined.
- Recognition that the complexity and non-linear nature of these dynamics means a world that is not only impermanent and ever-changing, but also inherently uncertain and unpredictable.
- Awareness of the interconnected and interdependent nature of the socio-techno-ecological system that comprise the built environment.
- Acceptance of sustainability as an interplay between change and persistence, and the need to adapt to and evolve with inevitable changes, while avoiding changes that would move global and local social-ecological systems into stability regimes that would threaten the life-supporting and life-enhancing capacity of these systems.
- Acknowledgement that sustainability initiatives are not goal-driven, but rather reflective responses that allow systems to adapt to changing circumstances, new knowledge and surprise, and learn from experience in order to maintain adaptive capacity and resilience.
- A shift from:
  - fixed/static sustainability strategies that focus on command and control through management and measurement approaches, to flexible and dynamic strategies based on cooperation and participation in decision-making processes that aim to adapt, learn and understand;
  - reductionist approaches that aim to solve individual, tightly scoped problems and add solutions to solve large problems, to holistic approaches that focus on understanding the big picture to solve problems of relationship and emergence in solutions where the whole is more than the sum of the parts.

In the light of this paradigm, a number of key questions can be asked about the project of transforming the behaviour of stakeholders in support of sustainable construction. Some of these questions are discussed below.

### 3.2 Can we assess sustainable construction?

Critiques of current sustainability assessment and evaluation methods (e.g. Bossel 1998; Cole 2005; Birkeland 2005; Brandon and Lombardi 2005) call for ‘holistic’ assessment and evaluation approaches that would integrate all related impacts, take into account multiple viewpoints and objectives, and address the significant linkages in the system, including ecological, technical and institutional systems (Du Plessis 2009a, p.9).

Complex systems, be they corporations, cities, buildings or ecosystems, are ever-changing and continually being reconstructed. Indeed “[b]eing constantly created through the interactions engendered by these relationships, the world is dynamic, ever-changing, and therefore impermanent” (Du Plessis 2009b, p.3). In order to assess sustainable construction, therefore, it is necessary to consider the dynamics of complex systems and the values that inform them. However, the notion of assessment is closely related to analysis and valuation, which is mainly intended to achieve prediction and control. The contradiction is therefore raised: one cannot predict and control a complex system, as one predicts and controls a machine. The notion that it is possible to predict and control the natural and the built environment is one of the main barriers to overcome in the process of shifting the paradigm that informs interventions in complex systems.

If change and uncertainty are, according to the notion of complex systems, the only certainty we may have, then it is clearly necessary to make this much more explicit in assessment tools. Meadows, however, offers the strategic direction that while complex systems cannot be controlled, “they can be designed and redesigned” and that “[w]e can’t surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them.” (Meadows 2002, p.2). In terms of stakeholder interrelationships,

merging the notions of system and uncertainty, would suggest that “it is necessary to move from being ‘experts’ to being ‘co-learners’ and that the basis of a systems approach is the establishment of a network of mutual learning” (Reed 2005, p.26).

Systems theory may function as a tool to assess sustainability, but it will require a new approach of problem analysis and interpretation. It requires a multi-dimensional perspective and the identification of patterns among various systems and subsystems.

### 3.3 How do we change a complex system?

According to Meadows (1999), interaction within a system can be made through intervention at leverage points. She identified a number of places to intervene, which may affect the whole system, such as constants, parameters, numbers (subsidies, taxes, standards); material flows and nodes of material intersections; information flows, the rules of the system (incentives, punishments, constraints); the goals of the system; driving positive feedback loops; and the mindset or paradigm out of which the system arises, among others (Meadows 1999; Figure 4).

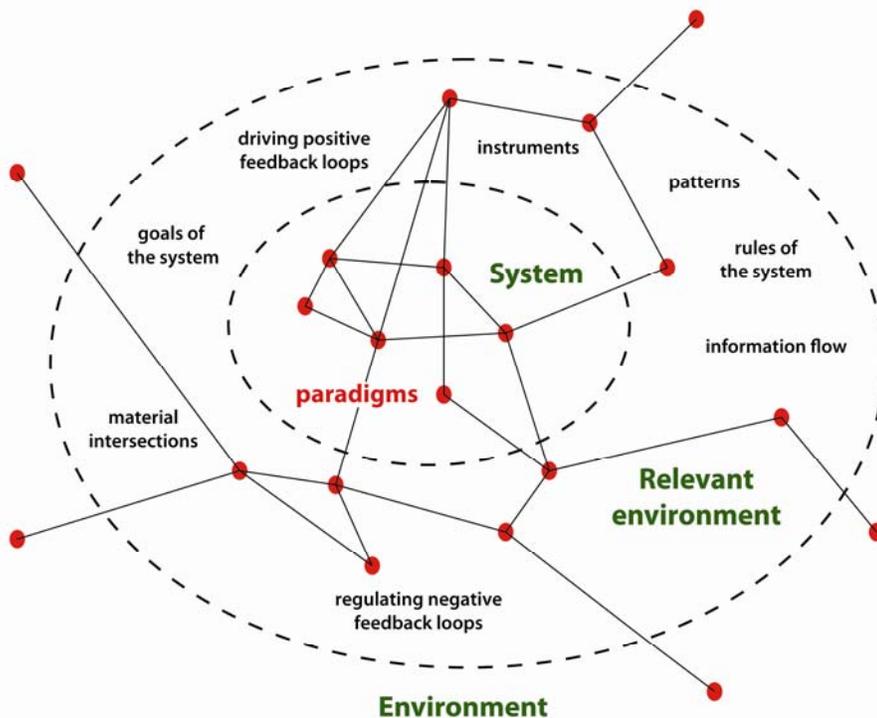


Figure 4: Nodes, Leverage Points or Places to Intervene in a System (adapted from Schalcher, 2009, p-2-4)

But what are the leverage points or places to intervene in a system such as the built environment? How is it made to respond according to the mindset or paradigms that inform it? Jaime Lerner, architect and former mayor of Curitiba, Brazil, developed the concept of “urban acupuncture”, according to which pinpointed interventions in strategic places would release energy and spread positive effects in the whole urban-system (Landry 2005).

Decision-making processes deal closely with interventions within this system at leverage or ‘acupunctural’ points. “Decision-making for sustainability is a reflective process that guides decisions about proposed actions, not by measuring these actions against predetermined and negotiated criteria and indicators, but by questioning whether the proposed actions uphold the values of the ecological worldview and what the possible consequences of an intended action would be across system scales and levels. Sustainability initiatives are not goal-driven, but rather reflective responses that allow systems to adapt to changing circumstances, new knowledge and surprise, and learn from experience in order to maintain adaptive capacity and resilience.” (Du Plessis 2009b, p.6)

How can sustainable construction respond to this main challenge? How can building design, construction, use and recycling materialize a systemic paradigm? In the field of architecture, Kwiter (1993) risked an answer. According to him, “there is a new theory of nature emerging today – one based on dynamics, complexity, discontinuities and events – and a new (though still inchoate) architecture that embraces these same fundamental rhythms of fundamental becoming...Oscillation...will be a veritable engine driving a morphogenetic machine in a new non-linear world in which nothing is predictable save transformation” (Kwiter 1993, p.91).

The question could be extended to the relationship among the multitude of stakeholders within the construction sector: How can they shift their perceptions to a level that embraces interdependencies, complexity and non-linearity?

### **3.4 Is the natural environment a major stakeholder?**

The Actor-Network Theory shares some common ideas with increasingly important stakeholder definitions that are not human centred. As much as actors are not exclusively human, stakeholders might also not be. Starik (1993) defines a stakeholder as any naturally occurring entity that affects or is affected by organisational performance and, by including all living organisms (also animals and plants), as well as landscape elements (rocks, water) and the cosmos in general, significantly extends the definition of stakeholders far beyond currently acknowledged limits.

The natural environment has a strong political and economic voice. Environmental sustainability and economy are, for many reasons, closely interrelated areas. Since climate change and a shortage of natural resources are affecting the world's economy, and both affect society, their mutual interdependence comes to the foreground, urging for the establishment of new business models that accept the natural environment as a crucial business partner (see also WRF 2009).

Starik (1995) states nature has and will continue to have significant economic value to all business. He argues that the Financial Times, The Wall Street Journal, Business Magazines, among others, have regular environmental features. These publications have recognized for some years that the natural environment is a relevant, perhaps the relevant, business environment for many organisations.

The fields of ecology and natural resource management (amongst others) have revived the notion of a closely coupled relationship between humans and nature, giving rise to the concept of social-ecological systems (SESs). Anderies et al. (2006) describe SESs as integrated living systems consisting of agents (human or otherwise), their actions and behavioural patterns, and “a physical substrate (chemicals, energy, water)”, with the interactions amongst these agents and their interactions with the substrate generating the dynamics of SESs. As Haberl et al. (2004) point out, a consensus seems to be forming that sustainability is a problem of the dynamics in SESs and this offers a different perspective to “the simplistic idea that sustainability can be achieved by adding a third, ‘environmental’ dimension to the classical policy goals of improving economic performance and social well-being” (Haberl et al. 2004, p.200).

Such a perspective begins to ask how humans can use the regenerative strategies of nature (Lyle 1994) to reverse the degeneration caused by industrial development (Eisenberg and Reed 2003) and have a net positive impact on nature (McDonough and Braungart 2002). This perspective further sees a shift in our definition of development from the successful domination of nature (forcing it to follow ideas of order that ignore its inherent systemic properties) to embracing nature and participating in and co-evolving through its processes, i.e. development through cooperative regeneration, with people working with nature to restore and maintain ecosystem health and communities working together to restore the social fabric (Du Plessis 2006).

### **3.5 What is the role of stakeholders within sustainable construction?**

The important role of stakeholders for the development and implementation of sustainable construction is increasingly obvious. The obstacles to the widespread adoption of sustainable construction practices interact in ways that reinforce each other to create a formidable net within which efforts at moving forward are trapped at various stages of the process by various stakeholders. Yet academics, analysts and numerous committees continue to offer simple linear solutions to the problem, solutions that are mainly aimed at one stakeholder

sector, namely the one controlling costs. However, the complexity of the construction sector, and the even greater complexity of the social-ecological system within which it operates, limit the effect of currently framed policies, regulations, labelling schemes, subsidies or preferential financing mechanisms put forward as incentives to change. This often results in good intentions having unintended consequences and driving perverse behaviour, as has been found, for example, by reviews of the LEED assessment and label system (Shendler and Udall 2005; Humbert et al. 2007) as well as assessment schemes in general (Birkeland 2005).

While some studies made by industrialized nations contend that barriers to sustainable construction are more institutional than technical, in developing countries, institutions are ruled by long cultural traditions, which encourage social segregation and uneven land distribution, among others. In the latter case, the role of stakeholders seems to be even weaker.

If the role of stakeholders is redefined and expanded, the inclusion of stakeholders is perceived positively as solutions commonly agreed upon often constitute sustainable solutions. The key role of stakeholders for the development and implementation of sustainable construction has been emphasized in a variety of publications (UNEP SBCI 2007; Pitt et al. 2009; Pinkse and Dommisse 2009). Potential roles of stakeholders range from regulating activities (government), the provision of financial sources (investor), project, asset, risk and firm management (developer, owner, commercial tenant, regulator), knowledge gaining (research), design (planner, architect, designer), construction (builder, manufacturer, supplier), marketing (real estate broker), facility management (facility managers) and use of the structure (occupant) to the observation and evaluation of a design and construction process (professional association, regulator, media, public) (UNEP SBCI 2007, p.55). The expansion of the stakeholder definition including the natural environment entails new roles, such as the provision of physical resources and of strategies (e.g. regeneration), additional economic value, as well as a means for the application of political or civic pressure.

In spite of the existing conflicts of interests among different stakeholders, the construction sector is gradually advancing towards the development of new forms of interaction among actors, although these “dynamics are not [yet] sufficient to break down the numerous institutional barriers which contribute to professional identities, to decision making and to the organisation of everyday life” (Henry and Paris 2009, p.171). How to deal with diverging interests, e.g. diverging priorities in the field of sustainability? How can a cooperation of all stakeholders as equal partners be achieved, considering that not all partners have equal stakes in the built environment?

## **4 Re-Invent**

In light of the above questions, it has become necessary to re-invent not only the practices of decision-making, but perhaps also the very assumptions and values on which decisions are based in the design, construction and operation of the built environment. This section brings to light some of the practices and concepts that may need to be reinvented.

### **4.1 Cooperation and new ways of making decisions**

New ways of decision-making and achieving cooperation between all parties need to be explored. This includes a reinvention of the way stakeholders are encouraged to support, enable and practice sustainable design, construction, operation, maintenance and deconstruction. If actors are all treated as equal partners, a vision on potential actions and solutions based on common interests can be developed (Cordano et al. 2004, p.37; Onkila 2009, p.294).

As one such new approach to decision-making in the design and construction of the built environment, Reed (2006, p.677-678) suggests the idea of regenerative design as offering “a conscious process of learning and participation through action, reflection and dialogue that engages [...] all the key stakeholders and processes of the place – humans, other biotic systems, earth systems, and the consciousness that connects them – [to build] the capability of people and the ‘more than human’ participants to engage in continuous and healthy relationship through co-evolution”.

Another example for the inclusion of stakeholders is provided by UNEP’s Sustainable Buildings & Climate Initiative (SBCI). The initiative strives for a cross-sectional, multi-stakeholder consensus, which aims at the

provision of a platform shared by all relevant building and construction stakeholders to address sustainability issues, such as climate change, on the global level (UNEP SBCI 2009a). Such a platform might show the ability to advance the development and implementation of tools and strategies including all stakeholders, as well as the establishment of guidelines. Key success factors then are the personal commitment of key stakeholders and the promotion within their networks.

## **4.2 Cultural preconditions and a shift in values**

The rate and extent of the adoption of sustainable construction practices, as well as the inclusion of a broader range of stakeholders into the process, is highly dependent on specific cultural preconditions. A shift in values towards the sustainability paradigm is a necessary initial step, one that will require a deeper understanding of business-nature relationships (Onkila 2009, p.287).

What values will form the basis of sustainable construction practices? Du Plessis (2009a, p.226) proposes that these will be founded on an understanding of:

- an interconnected, interdependent and integrated (whole) world and, with that, the non-duality of self and non-self, with non-self instead seen as an extension of the self, leading to the values of mutuality, positive reciprocity, inclusivity, integrity, harmony and respect;
- the importance of relationships and the idea that the world is co-created through those relationships, leading to the values of fellowship and responsibility; and
- the world as constantly changing, inherently unpredictable and ultimately impermanent, leading to the values of humility and non-attachment.

Questions such as how this shift of values can take place in different cultural settings begin to assume considerable importance and will invariably involve knowledge transfer between scientific and professional disciplines and other sources of knowledge.

## **4.3 The appropriate mix of policies, incentives and other instruments**

The new appreciation of stakeholders must be accompanied by appropriate policies, incentives and other instruments to motivate them to take part. While the new paradigm is the driver of the system, incentives and policy instruments, when introduced at appropriate leverage points, are able to initiate changes that could lead to sustainable actions within the system. Reinventing stakeholder incentives requires a more complete understanding of the system within which incentives are to be introduced and the key leverage points where effective change could be achieved, as well as understanding how to engage with complex systems.

## **4.4 Learning lessons from case studies**

The factors contributing to successes and failures of completed projects that have aspired to and achieved demanding sustainability goals, need to be evaluated in order to learn from their experience. Political decision-making processes, for example, are key elements for the analysis of how societies can achieve sustainability.

In our workshop, we want to present, discuss and learn from six different case studies. The examples, which are taken from both developed and developing countries, will allow for discussions on differences and similarities in contexts with diverging priorities. These case studies will examine a range of situations including: how the informal sector has to be recognized as a major stakeholder in sustainable construction; how the inclusion of broad community representation into the design process leads to successful sustainable construction and strengthening its identity; and how stakeholders, claiming their stake in sustainable construction in the form of cooperative housing initiatives, can be marginalized if ecological aspects of sustainability gain priority. The question of the effectiveness of instruments for the pursuit of sustainable construction is explored within the context of current financial structures. Finally, the scope, emphasis and key requirements of a reinvention of the building design process are discussed. The insights provided from these case studies will add further arguments to the reinvention of decision-making, the reinvention of a sustainability paradigm and the reinvention of instruments of sustainable construction.

## 5 Conclusion

This paper is intended to prompt a debate on the current and future challenges of stakeholders within sustainable construction. It aims at presenting a multi-level and systemic approach that embraces the natural environment as a major stakeholder, followed by a new conception of problem analysis and interpretation based upon the notion of interrelations and interdependencies. This paper proposes a multi-dimensional perspective of assessment parameters and instruments that can be converted into the notion of leverage points or ways to intervene in a system. Last, but not least, it also intends to prompt a debate on the new mindset or paradigm that has been informing and continuously re-inventing stakeholder systems within sustainable construction

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