EIGHT

The Political Logic of Sustainability

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Introduction

CONTEXT AND CHALLENGE As often noted, if one is embarking on a difficult journey, it is important to have a useful map. The right kind of map is one that utilizes familiar symbols and signals of direction. It should also provide alternative routes for reaching the destination. But when the destination is unclear (or ambiguous, for one reason or another), even the right kind of map is not sufficient. What might also be needed is a sense of the alternatives, both to the routes and to the destinations.

Visions of the future are many. But realistic images of, and viable paths to, these futures are scarce indeed. This chapter puts forward some of the key tasks undertaken for constructing a preliminary 'map' of sustainability, taking into account the multiple ways in which the concept is used and the multiple inputs from the social sciences to broaden knowledge-building, as well as theoretical innovations, and the need for practical application.

This contribution proposes key elements for a useful 'map' and its conceptual, technical and computational features. Given the ambiguities surrounding the 'destination', the nature of the journey and the means available, the challenges appear more daunting as we examine the systems of relevance here – the natural and the social environments. Focusing mainly on contributions from the field of political science, this chapter recognizes that the complexities at hand require an interdisciplinary perspective – both within the social sciences and between the natural and the social sciences.

THE PROBLEM With regard to the subject of sustainable development, there is not a single problem, but several; not one notable challenge, but many; and not one viable perspective, but alternative ones. With regard to the definition of sustainability, there is not one single definition, but a whole host of views and approaches, as well as definitions.[1]

Differences in perspectives and definitions aside, at its core sustainable development means *meeting the needs and demands of human populations without*

undermining the resilience of life-supporting properties. The international community has generated more ideas than effective action, and more policy interventions than viable strategies. There is a need to take stock of what we have done, why, and with what implications. At least five types of obstacles impede effective analysis and policy responses. These are:

1. *Conceptual ambiguities:* reflecting uncertainties and disagreements with regard to the idea(s) of sustainability, the underlying theories, the processes, and actions required and the outcomes expected;
2. *Explosion of information:* illustrated by the proliferation of numbers, data, documents, assessments, events, organizations, networks etc. addressing aspects of the sustainability dilemmas;
3. *Obstacles in tracking:* creating uneven content and quality of information, evaluation and assessments etc. in different parts of the world;
4. *Absence of knowledge networking:* evidenced by limited Internet conferencing facilities for information sharing and knowledge exchange, consensus building and reality-checking, involving participants from different parts of the world;
5. *Disconnects and limited feedback:* reflected by weak interaction among critical stakeholders, most notably between (a) science and technology, (b) business and industry, and (c) governance and governments.

Jointly, these features constitute powerful impediments to intellectual development. This last feature is of particular significance, given the respective roles of these groups of stakeholders. Business and industry engage in the commercialization of new ideas, in the bankability of innovations, and in the enhancement of effective market responses. Governments provide the social rules and legal context within which business operates, and within which the enterprise of science and technology operates. It is the existence of disconnects among these three types of institutions that is fraught with social costs – both within and across national boundaries.

POLITICAL SCIENCE CONCERNS Central to the underlying realities at hand as well as to the concerns of sustainability are the fundamentally political features of social orders, namely 'who gets what, when, and how'.[2] These are the core concerns in political science, which is anchored in the view that politics is the 'authoritative allocation of values' in a society. It is also agreed that the discipline is anchored in the notion of 'power'.[3] Power, defined as a relationship and as an attribute, has its essence in the exercise of influence in order to persuade others to behave in ways they may not have wished. With the notion of 'authoritative allocation of values' comes the operational mechanism for 'allocation', namely the political process and the institutions of governance.

To extend this simplification of core elements in the field, we may refer

to the equally simplified analogy drawn between the role of the government in politics and the bank in the economy. The bank operates under the assumption that not all depositors will withdraw all of their deposits at the same time. Similarly, the government operates on the assumption that not all citizens will withdraw their support from the government at the same time. When either of these assumptions is violated, then radical change is likely to follow. When there is a 'run on the bank', the outcome is collapse of the banking system. When citizens withdraw their support, and act on their withdrawal, a 'revolution' is likely to follow.

From this logic, then, we derive the (equally simplified) 'ratios of politics', namely the relationship between *demand* and *support* for the political system, and between 'loads' on the system and its capabilities to respond to (or withstand) these loads. The glue holding these multiple logics together (or, to vary metaphors, the 'cement' of politics) is generated through processes of bargaining and negotiation.[4] This stipulation draws attention to the distinction between bargaining, on the one hand, and the use of force, on the other. Politics and political science are about interactions, bargaining, negotiations, influence and the exercise of power. In this calculus, force and the use of instruments of coercion are part of the overall arsenal, and often not the most critical part. Indeed, the overt use of coercive mechanisms tends to occur when other forms of persuasion fail. The use of force is usually the last, not the first, resort.

Central to the study of political science is the notion of 'sovereignty', and, by extension, attendant implications for differences in actions and interactions across levels of analysis.[5] Conventionally, the field tends to address matters of 'national politics', 'comparative politics', and 'international politics', and their linkages to 'local' and 'regional' politics. It is implied, of course, that the decision-systems and the political systems at each 'level' share some generic features, over and above their idiosyncratic elements.

The absence of central authority at the international level generates some special problems for political inquiry not present at the national level. This situation shapes the intellectual agenda of the field of international relations in major ways, and has led to various lines of thinking about how to produce co-ordinated behaviours among sovereign states in the absence of agreed-upon modes of enforcement, compliance and sanction.

Connected to the concept of sovereignty is that of 'security', and both are contingent, clearly, on prior 'survival'. If there is a key element that cuts across all of these concepts (and considerations), it is that of decision and decision-making as it affects sovereignty, security and survival. The strategic elements of political science as a discipline are anchored in strategic considerations, whereby matters of choice, options, costs and benefits are all balanced by 'actors', within some agreed-upon 'political process', to yield some 'decision'. While politics is about decision and decision-systems, it is also about 'authoritative' decisions shaped by legitimate institutional contexts.

Even when the precept of 'legitimacy' is violated in practice, it still remains an important point of reference – in theory as well as in reality.

TWO TASKS Recognizing the multidimensional nature of sustainability, this contribution undertakes the following tasks: (1) To articulate *New Thinking on Sustainability*, by presenting an integrative approach to theory policy interface and implementation issues related to sustainability strategies based on conceptual developments central to the political science discipline and profession. (2) To define the *Political Logic of Sustainability*, by formulating 'basic equations', and derivative relationships, functions and linkages, as well as some historical and empirical illustrations of 'development' processes.

Both tasks are fundamentally interdisciplinary in nature; and both are anchored in the political science core. And each represents new challenges in the social sciences engendered by concerns for sustainability and sustainable development.

New Thinking on Sustainability

For the most part, the interdisciplinarity of sustainability-related concerns is centred on linkages between ecological and economic variables. 'Ecological economics', an addition to the knowledge strategies of the social sciences, emerged as an outcome of this 'demand' for interdisciplinarity. 'Other' aspects of the issue – within the social sciences frames or beyond – remain marginal to systematic inquiry, and at best serve as a descriptive appendage to the basic ecology–economy linkages. Important as these new thrusts might be, they are not sufficient to enhance our understanding of (and contribution to) sustainability issues, in theory or in practice. What is needed is a more comprehensive view of sustainability, one that recognizes both the conditions for, and the process of, sustainability.

Referring to Thomas Kuhn's vision of 'normal' science versus 'paradigm shift', we suggest below key elements of an 'emergent paradigm' that seeks to extend the notion of sustainability beyond ecology and economy. Table 8.1 asks: what are the major components of the sustainability question? The left-hand side of the table identifies the key elements (or components) of interest here; and the right-hand side lists the corresponding question that needs to be answered. This table is largely for schematic purposes, to help articulate an internally consistent and more dynamic conception of sustainability. It also helps us appreciate the importance of contextual variations and socio-economic differences that generate both the answers to these questions and their more specific (or customized) manifestations.

By extending this logic somewhat, we depict in Figure 8.1 derivative logic embedded in Table 8.1 as a process. The basic presumption in Figure 8.1 – representing sustainability as a process – is that of 'decomposibility'; key concepts can be assessed and examined empirically in their own right, as can

TABLE 8.1 New thinking on sustainability

Elements	Question
Key dimensions	What is it that must become sustainable?
Core processes	How is it that sustainability might proceed?
Behaviour principle	Which norms (computational and conceptual) could facilitate transitions towards sustainability?
Performance goals	What would be the alternative, generic, society-wide outcomes desired?
Implementation conditions	Which conditions facilitate implementation of sustainability strategies?
Decisions and policy choices	What are the decisions that must be addressed?

the linkages among them. The logic in Figure 8.1, while essentially derivative, is not necessarily time-dependent. This means that the arrows and relationships in Figure 8.1 can be read as a methodology for defining and measuring the basic parameters of sustainability – in terms of process and condition. The task of 'unbundling' the 'whole' into 'parts' involves keeping track of the factors that require a decision conducive to sustainability, and for evaluating performance on factors relevant to the making of such decisions. This means that we consider below the what and the how to of sustainability for decision-making – as well as decision-making conducive to sustainability.

The logic of Figure 8.1 represents the processes at hand at a macro-level, namely, for entire economies or countries, or for the global system as whole. However, that logic holds at other levels of analysis (such as firms, sectors or regions, for example), given appropriate conceptual and measurement adjustments. If and only if the basic elements in Figure 8.1 hold would systems (actors and/or aggregate entities) approximate conditions of sustainability.

The operational linkages or connectivities between macro- and micro-processes can be viewed in the following terms: if we consider 'production' as a key process for the economics of sustainability, then we need to recognize its constituent elements. Thus behind the production dimension (as labelled in Figure 8.1) is a whole set of derivative processes and conditions at more micro-levels.

This aggregate, 'top-down' perspective views sustainability as a 'whole process' that is contingent on the robustness of its constituent parts. In other words, the sustainability *whole* consists of linkages among the constituent *parts*, and each part itself needs also to be sustainable. *How* systems move from a less sustainable to a more sustainable situation depends on the

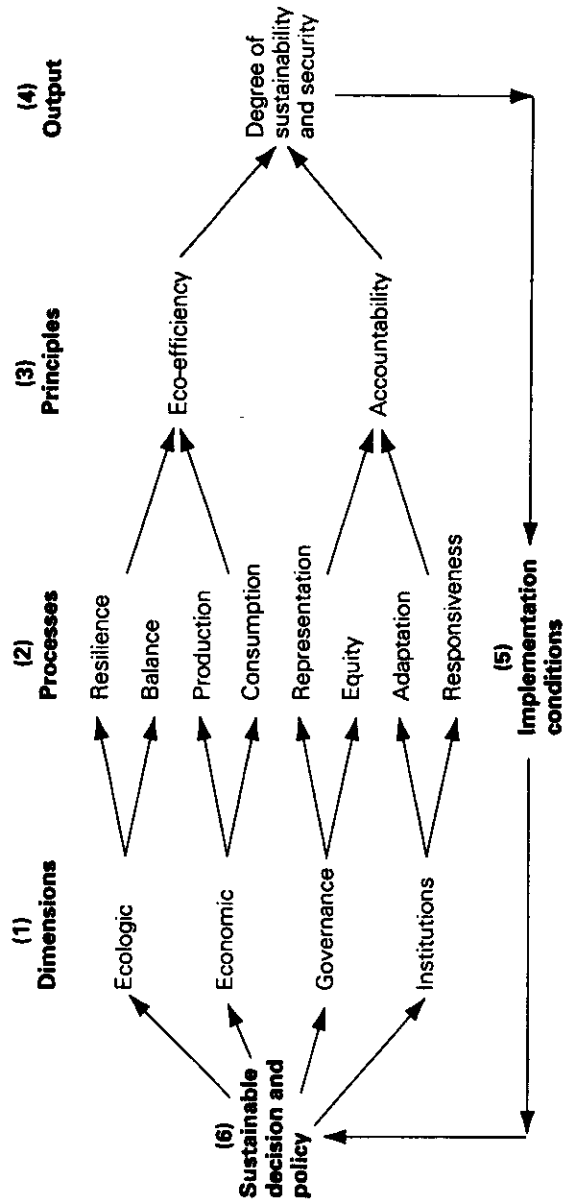

FIGURE 8.1 Sustainable development as an integrated dynamic process

disposition of each of the constituent parts. Accordingly, we now turn to a closer look at the parts – namely the basic dimensions or elements that make up these parts.

SUSTAINABILITY DIMENSIONS Consistent with Figure 8.1, then, we argue that the key *dimensions* of sustainability before us include:

- ecological configuration;
- economic activity;
- political behaviour and governance;
- institutional performance.

From a political science perspective, the third and fourth elements listed above shape and/or constrain social activities that impinge on, impact upon, ecological balances; and economic performance is often thought to be a key contextual factor, or a domain within which political contentions are undertaken. Political scientists generally argue that it is political decisions that shape economic ones rather than being always the other way around.

Conventionally, the social sciences ignore ecological factors; these remain beyond the pale of systematic inquiry. By contrast, the new thinking approach explicitly incorporates ecological factors. In technical parlance, they are 'endogenized' within the overall system of political inquiry. This fourfold logic thus suggests broadening the scope of politics to incorporate natural environments as well as social environments.

SUSTAINABILITY PROCESSES Following the logic of Figure 8.1, we note that each of the four dimensions in the section above is derived from some basic dynamic processes. The sustainability of these processes is affected by the decisions we make and the actions we take. These processes are endemic to each of the dimensions at hand. In contingent and propositional terms, this means that *if* the underlying processes are in place, *then* the underlying dimensions necessary for system sustainability will hold; otherwise, the constituent dimensions would themselves not be sustainable. This means that each of the four dimensions must be predicated on robust foundations.

With respect to *ecology*, the generic processes that require attention (or protection) are *resilience* and *balance*. We cannot talk of viable ecological systems in the absence of their resilience or their balance. Substantial differences exist, clearly, across types of ecosystems in terms of structure, functions and relevant time-frames for resilience and balance, but an ecosystem can survive (or be sustainable) if, and only if, both of these prerequisites are in place.

The basic processes of *economic performance* defined in terms of *production* and *consumption* must be sustainable. All other critical variables (investments, savings, imports, exports etc.) are derivative of these basic processes. With respect to *political behaviour and governance*, the corresponding constituent elements are *participation* and *responsiveness*, irrespective of the specific type of

political system, both being necessary prerequisites, but this proposition is neutral with respect to type of political system. Finally, we consider *adaptation* and *feedback* to be two critical prerequisites for *institutional performance*. Institutions that accommodate to changing conditions or respond to new (or desired) circumstances are more likely to be effective than those that do not or cannot. The ability to obtain information from both the internal and the external contexts (or environments) and to process that information accordingly is necessary for facilitating institutional effectiveness.

Parenthetically, 'citizen' is often used somewhat loosely, to cover the entire population within a sovereign jurisdiction. However, the term citizen implies a legal status, with attendant rights and obligations – of individuals towards the state and each other, and of the state towards individuals, single as well as collectively. Indeed, one of the most pressing challenges for the international community is how to deal with non-citizens, given the large-scale movements of people across countries, and the challenges posed by growing numbers of people across the world who do not have the status of citizen. Far from being an issue of simple semantics, the status of citizen is relevant to power relations, with potentially powerful implications for sustainability.

BEHAVIOUR AND POLICY PRINCIPLES Having addressed the 'what' and the 'how' of sustainability, we now turn to the matter of 'behaviour'. In the last analysis, it is what people do – the decisions they make, the way they act, the choices they select – that is critical to the reality as well as the theory of sustainability. Following Figure 8.1, we highlight the two key principles that emerge from an extension of the logic of sustainability dimensions and processes, namely eco-efficiency[6] and accountability. Each principle is derived from the logic presented so far.

The notion of *eco-efficiency* is derived from the conjunction of resilience and balance, and from production and consumption (meaning from the underlying processes of ecology and economics). By the same token, *representation* is derived from governance and institutional dimensions. And *accountability* is derived from the processes of participation and responsiveness as well as adaptation and feedback (based on the generic dimensions of governance and institutional performance).

These behaviour principles are generic, in that they are endemic to sustainability; however, the particular manifestations of these principles may take on different forms. In other words, there may be many ways to ensure eco-efficiency, or to show representation, or to demonstrate accountability. It is the principles that matter.

SUSTAINABILITY AND SECURITY Extending this general logic further, we now identify the 'dependent variables', so to speak, or the critical 'output', at issue. We define the 'dependent variable(s)' as the propensity for security and sustainability. By 'propensity' we mean the ability of societies – in their whole and in their parts – to behave in a contextually sensitive manner, to be responsive to the 'needs' of natural as well as social environments, and in effect to take responsibility for ensuring the well-being of present and future generations.

The feedback proposition embedded in Figure 8.1 is this: *the more effective the decision-making strategies are, the greater a society's overall propensities for sustainability will be.* Conversely, the greater the propensity for sustainability, the more conducive to greater sustainability decisions will be. This is dual logic conveyed by the feedback relationship connecting 'sustainability' and 'decision' through the intervening effects of specific implementation conditions. Thus, the 'propensity for sustainability' differs from the notion of 'efficiency' in economic discourse, as it implies meeting social needs that are defined in a variety of modes, only some (not all) of which are material in nature and are related to consumption of goods and resources.

IMPLEMENTING SUSTAINABILITY Referring back to Figure 8.1, we consider implementation conditions to be the most necessary element, as they enable movement along sustainability trajectories. Implementation refers to 'making things happen' – in a state (country), or firm (enterprise), or other decision-contexts. For eco-efficiency and representation to be operative behaviour principles for investment decisions, such principles must be accepted as *legitimate* by the relevant actors. There also needs to be a *voluntary* acceptance of such principles, without the need to resort to undue coercion or pressure. Furthermore, there is the contingency related to *levelling* in the sense of wide coverage and (almost) everyone playing by (almost) the same and/or agreed-upon rules. This is another way of addressing the challenges of policy harmonization. Stated thus, we view these conditions as empirical ones rather than normative ones.

In short, the implementation proposition is this: *if* sustainability strategies are to 'work', and *if* decision-systems are to be rendered conducive to sustainable development, *then* these three conditions must hold. This means that without legitimacy, volition and levelling, propensities for sustainability would be seriously compromised. In this connection, it is obvious that the entries in Figure 8.1 labelled 'decision', 'institutions' and 'governance' are central to the political science field. These are core elements as we develop the political meaning of sustainability – the task in the following section.

Political Logic of Sustainability

We now turn to a discussion of the politics of sustainability by constructing a conceptual system of six complex relationships (i.e. equations), which together represent that overall logic. The conceptual system explains the following six jointly dependent variables:

- Sustainability of Political System (SPS)
- Potential for Sustainability (POT)
- Total National Security (TNS)
- Institutional Capacity (IC)
- Sustainability Strategy (SS)
- Propensity for Sustainability (PROP)

SUSTAINABILITY AND ITS POTENTIALS In a simplified but robust way, we can formulate the sustainability of a political system (SPS) as a function of two sets of variables (or conditions): first, the basic potentials or underlying conditions (POT); and second, the pursuit of sustainability strategies (SS) to transform potentials into effective outcomes; hence,

(1) Sustainability of Political System (SPS)
is a *function* of:
Potential for Sustainability (POT)
and
Sustainability Strategy (SS)

The potentials for political sustainability (POT) can then be viewed as composed of several interconnected elements, including total national security (TNS), and institutional capacity (IC), thus:

(2) Potential for Sustainability (POT)
is a *function* of:
Total National Security (TNS)
and
Institutional Capacity (IC)

The proposition here is that a state is able to sustain itself and its society over time *if* and *only if* it can ensure conditions for its total national security as well as the capability for institutional performance. Each of these, in turn, is contingent on constituent elements, all of which are necessary, yet none alone sufficient. To provide a sense of 'sufficiency', the ensuing equations yield some basic guidelines. Also critical, of course, is the task of decomposing the elements of security and those of institutional capacity.

NATIONAL SECURITY The traditional way of thinking about national security is in military terms, namely, security at the border, and the ability to defend against military incursion. It is essential, however, to transcend this limited way of thinking about security. We must take into account compelling factors that threaten the survival and the security of society as a whole. Accordingly,

(3) Total National Security (TNS)
is a *function* of:

External Security (ES): defence of the borders, i.e. security against military or related threats from outside
and
Regime Security (RS): security of governance against political threats from inside
and
Internal Security (IS): in terms of the viability of basic life-supporting properties at the base

The resulting key proposition is: ***a state is truly secure to the extent that all three dimensions or conditions of security are in place.*** The first two terms, (ES) and (RS), are self-explanatory; the third (IS) refers to the ability to meet the demands of the *population* (P), given its access to *resources* (R) and the level of *technology* (T) in the context of a given *environment* (E).

Stated differently, prevailing ecological balances provide the basic constraints on the viability of (P), (R), and (T) in any natural environment. In practice, however, assuring (IS) is akin to a 'juggling act' if (or when) population growth leads to commensurate resource needs whose accessibility is contingent on prevailing levels of technology. The underlying policy or strategic dilemma is to make sure that the system's overall ecological viability is not seriously compromised by population activities. However, recalling equation (2), we stress that total national security (equation 3) is necessary, but not sufficient, for ensuring sustainability.

INSTITUTIONAL CAPACITIES The institutional capabilities referred to in equation (2) are specified more fully as follows:

(4) Institutional Capacity (IC)
consists of a set of capabilities involving:

Finance	(FC):	taxation and other forms of public levy
Distribution	(DC):	systems of revenue–expense balances
Regulation	(RC):	exercise of 'law and order'
Response	(RC):	accountability in governance
Symbolism	(SC):	identity formation and maintenance

These performance variables are essential in 'normal' conditions, in reconstruction processes (after wars), and in the course of state 'creation' (when a 'new' state is established). While the loss of institutional capacity is one of the most significant indicators of state failure, often the most serious political conflicts are about control (i.e. *who* will manage these institutional capacities) and constitutive principles (*how* will such management be undertaken). In practice, potential conflicts between dimensions of national security and/or between institutional capabilities, or between security and institutional factors, give rise to some important trade-off.

SUSTAINABILITY STRATEGY The question now is this: having established the logic leading to propensities for sustainability, what makes for realization of this potential? How can the gap between potential sustainability and effective sustainability be reduced? In other words:

(5) Sustainability Strategy (SS)
is a *function* of:
Propensity for Sustainability (PROP)
plus
Corrective Policy (CP)

The propensity of sustainability (PROP), in turn, depends on three sets of factors, two of which are noted earlier, namely, national security (TNS) and institutional capacity (IC). The third term, corrective policy (CP), consists of policies to reduce the gap between actual conditions and desired ones. Gap-reducing strategies are often used in simulation analyses to explore alternative outcomes of policy interventions.[7]

(6) Propensity for Sustainability (PROP)
is a *function* of:
Total National Security (TNS)
and
Institutional Capacity (IC)
and
Corrective Policy (CP)

In Table 8.2 we reproduce these equations sequentially in order to show the derivative logic more clearly.

This derivative logic is presented in Figure 8.2 to show the connections and relationships. In terms of methodology, Figure 8.2 can be viewed in several different ways – with different operational implications. These include: (1) a set of identities representing the position of the political logic of sustainability; i.e. only to depict specifically how the pieces fit together conceptually; (2) a set of contingent and probabilistic terms to estimate the relative weight linking the various elements; (3) a predictive tool to help articulate propositions about expected outcomes; (4) a means of understanding the historical record and organizing empirical observations; and (5) a model for estimating overall system behaviour and simulating outcomes.

THEORY AND POLICY CHALLENGES It would be fair to say that, in modelling terms, sustainability is not as yet central to the professional concerns of political scientists. It would also be fair to say that a great deal of attention has been devoted to understanding development processes nationally and internationally. Theories of political development (and linkages to economic growth) have taken on many forms, associated with various explanations for 'underdevelopment' and the search for 'paths' towards greater

TABLE 8.2 The political logic of sustainability: six basic equations

(1) **Sustainability of Political System (SPS)**
is a *function* of:
Potentials for Sustainability (POT)
and
Sustainability Strategy (SS)

(2) **Potential for Sustainability (POT)**
is a *function* of:
Total National Security (TNS)
and
Institutional Capacity (IC)

(3) **Total National Security (TNS)**
is a *function* of:
External Security (ES): defence of the borders, i.e. security against military or related threats from outside
and
Regime Security (RS): security of governance against political threats from inside
and
Internal Security (IS): in terms of the viability of basic life-supporting properties at the base

(4) **Institutional Capacity (IC)**
consists of a set of capabilities involving:

Finance	(FC):	taxation and other forms of public levy
Distribution	(DC):	systems of revenue–expense balances
Regulation	(RC):	exercise of 'law and order'
Response	(RC):	accountability in governance
Symbolism	(SC):	identity formation and maintenance

(5) **Sustainability Strategy (SS)**
is a *function* of:
Propensity for Sustainability (PROP)
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(6) **Propensity for Sustainability (PROP)**
is a *function* of:
Total National Security (TNS)
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Institutional Capacity (IC)
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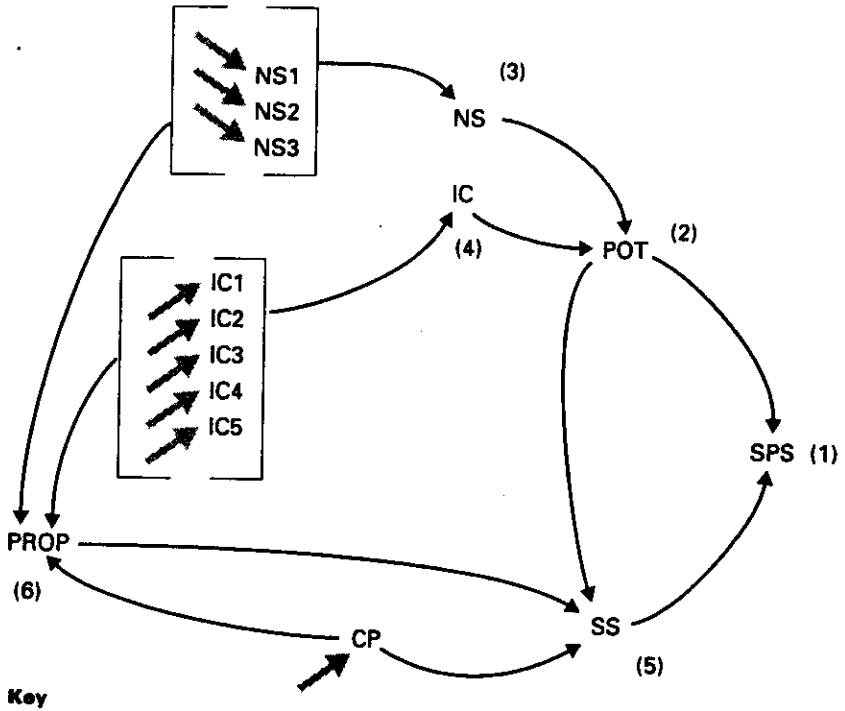

FIGURE 8.2 The political logic of sustainability

development. And one serious weakness in the traditional logic was the (erroneous) presumption of identity between 'growth' and 'development'. It took the environmental crises of the 1970s to force a conceptual wedge and to articulate the distinction between 'growth' and 'development'.

Against this background, the 1987 Brundtland Report – responding to a UN General Assembly request to review global priorities – formally introduced the notion of sustainable development into international political discourse. Over the next several years, this idea emerged as a contending challenger to the dominant model of development during the post-war period, namely that of economic growth. By the United Nations Conference on Environment and Development (UNCED), 1992, the term had become common currency in development debates.

At this point in time, all states are committed to continued economic

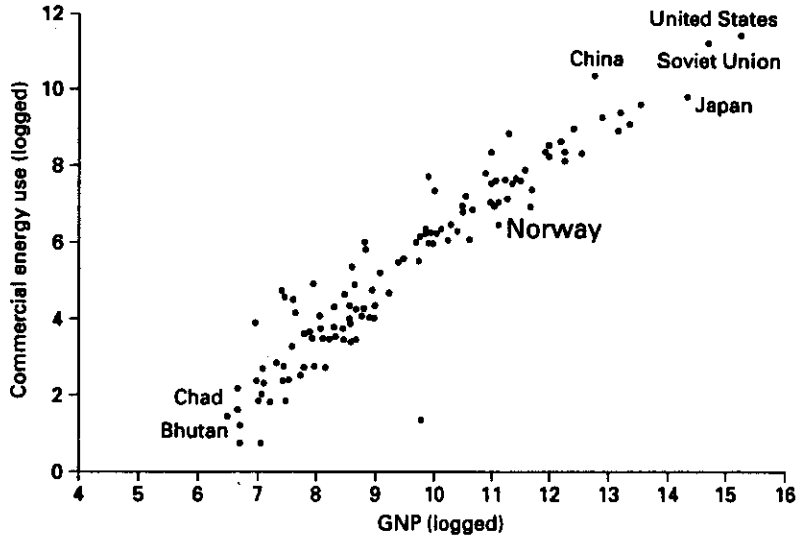

FIGURE 8.3 GNP and commercial energy use (*source*: Choucri and North, 1993: 72)

performance, expansion and growth. The traditional development path is one contingent on, and interconnected with, environmental degradation. Some empirical realities that enable us to address the 'sustainability' challenge are well captured in Figure 8.3, in both national and global terms. This figure reveals two general patterns which provide significant insights into the historical record. One pertains to the *cross-sectional* distribution of states of GNP/emission at one point (i.e. comparative statics, for example Chad vs. the US). The other is the *longitudinal* distribution of growth process over *time* (i.e. comparative dynamics, for example 'beginning' at the Chad position and 'travelling' to the US position). The patterns in Figure 8.3 suggest that if Chad were to 'grow' and become as powerful and strong as the United States, it would generate environmental impacts that are commensurate with this trend.

There are no precedents for environmentally benign growth, and no precedents for designing 'corrective policies' (see the equation above). In the best of all possible worlds, a developing state would seek to attain the GDP of the US without the attendant carbon emissions, or with the emission level of Chad. Such an outcome remains beyond the realm of the possible, given present patterns of population, technology and energy use. However unlikely that outcome might be at the present time, it does constitute an excellent reference point for defining the stark nature of the growth/environment linkages.

CONCEPTUAL INNOVATION The added purpose of Figure 8.3 is to draw

TABLE 8.3 Profile definition

Group I	Resources	>	Population	>	Technology
Group II	Population	>	Resources	>	Technology
Group III	Population	>	Technology	>	Resources
Group IV	Resources	>	Technology	>	Population
Group V	Technology	>	Resources	>	Population
Group VI	Technology	>	Population	>	Resources

attention to implications of aggregate outcomes generated by individual actions (or, alternatively, the sum totals of individual statistics). In political science, the fact that aggregation and its theoretical implications have been further developed in terms of the theory of state profiles is due initially to Robert C. North. The basic theory states that *differential levels and rates of change in any society's population, technology and resource access tend to shape the 'profile' of a country.* Population is viewed as an aggregate of individuals in diverse organizational contexts. Technology gives people capabilities and provides access to resources. Technology here is viewed in both organizational and mechanical terms, and resources are critical inputs (of various kinds) for human existence.

In this context, the term 'profile' refers to *the basic three-dimensional structure and the behavioural relations with other states that are 'possible' or 'probable', given its structure.*[8] To extend an earlier comparison further, a Chad is structured in ways that are different from a United States (its profile is different), and its patterns of international behaviour are also different. The basic theory further postulates a set of generic profiles of nations and attendant patterns of international behaviour and inter-state relations; and fundamental to the definition of profile is the disposition of three sets of variables: population, resources and technology.

Although it is easier to present the simplified form in static terms, the basic theory is framed as essentially dynamic. The argument is based on the view that it is the *changes* in and *differentials* among core variables that shape developmental trajectories and generate the diversity of development experiences. Clearly, some developmental experiences are more sustainable than others. The question is which ones? how? and why? What are the implications for dynamic modelling of sustainability and the diversity of development?

In large part the tasks of (a) undertaking empirical analysis and (b) defining concept and system are rooted in the definition of 'national profiles'. The formal definition consists of schematic interactions between population, resources and technology, namely the core (or master) variables. As presented in Table 8.3, the key purpose of profile definition is to provide an internally consistent point of departure for differentiating between countries in theoretical and empirical terms. This view is static, in the sense that it captures

TABLE 8.4 Country profiles

Group I	Group II	Group III	Group IV	Group V	Group VI
Brazil	China	South Korea	Soviet Union	United States	Japan
Iran	India	Poland	Canada	Sweden	West Germany
Argentina	Mexico	Yugoslavia	Australia	Norway	France
South Africa	Indonesia	Portugal	Saudi Arabia	Finland	Untd Kingdom
Algeria	Nigeria	Hungary	New Zealand	Arab Emir.	Italy
Venezuela	Turkey	North Korea	Libya	Iceland	Spain
Colombia	Thailand	Cuba	Oman		East Germany
Peru	Iraq	El Salvador			Netherlands
Chile	Egypt	Jamaica			Czechoslovakia
Ecuador	Pakistan	Lebanon			Romania
Cameroon	Philippines	Mauritius			Switzerland
Côte d'Ivoire	Malaysia				Belgium
Sudan	Syria				Austria
Kenya	Bangladesh				Denmark
Tanzania	Morocco				Bulgaria
Uruguay	Vietnam				Hong Kong
Jordan	Tunisia				Greece
Zimbabwe	Guatemala				Israel
Ethiopia	Burma				Kuwait
Panama	Sri Lanka				Singapore
Zaire	Ghana				Ireland
Angola	Dominic. Rep.				Trinidad and Tobago
Bolivia	Yemen				
Paraguay	Costa Rica				
Gabon	Uganda				
Afghanistan	Honduras				
Mozambique	Albania				
Senegal	Nepal				
Nicaragua	Haiti				
Papua New Guinea	Rwanda				
	Malawi				
Madagascar	Sierra Leone				
Zambia	Burundi				
Congo	Benin				
Niger	Togo				
Guinea	Lesotho				
Mongolia					
Somalia					
Mali					
Burkina Faso					
Liberia					
Yemen					
Botswana					
Chad					
Central African Republic					
Mauritania					
Laos					
Bhutan					

Source: Nazli Choucri and Robert C. North, 'Growth, Development, and Environmental Sustainability: Profiles and Paradox', in Choucri (ed.), 1993a: 73

Table 8.5 Illustrative profiles at different time periods: 1950–90

Group I (R>P>T)	Group II (P>R>T)	Group III (P>T>R)	Group IV (R>T>P)	Group V (T>R>P)	Group VI (T>P>R)
Somalia 1960–89	China 1968–90	Korea 1948–89	USSR 1968/69–90	USSR 1950–68/69	Yugoslavia 1963–64/65
Saudi Arabia 1950–c.75	Bangladesh 1977–80/81	Bangladesh 1959–77	Saudi Arabia c.1975–90	USA 1967/68–90	Yugoslavia 1976/77–82/83
	Bangladesh 1982–90	Bangladesh 1980/81–82		Sweden 1967/68–90	USA 1950–67/68
		Yugoslavia 1951–63			Sweden 1950–67/68
		Yugoslavia 1964/65–76/77			Japan 1965/66–90
		Yugoslavia 1982/83–90			Germany 1950–90
		Japan 1952–65/66			

Source: Nazli Choucri and Rebecca Berry (1995), 'Sustainability and Diversity of Development: Toward a Generic Model', Proceedings, The 1995 International System Dynamics Conference, July 1995, Tokyo, Japan

differentiation at one point in time. And then, for any particular country (or case), the question is the extent to which developments over time maintain or alter a country's profile positioning.

Using the rule in Table 8.3, some empirical illustrations of countries falling in each of the profile groupings (for the year 1986) are presented in Table 8.4. This serves primarily to provide some 'real world' reference to the challenge of articulating a generic model of developmental paths and possibilities. Table 8.5 illustrates some of the data-based detective work which is based on the rules in Table 8.1 and which must be done better to understand the historical dynamics noted in the first section of this paper.

An extension of the message in Figure 8.3 pertains to the information about comparative statics vs. dynamic process, and this message draws attention to potentials for embarking on alternative paths of historical record. There may be many different ways in which a Chad could enhance the well-being of its population without emulating the historical trajectory of the industrial West, such as that of the United States.

The policy issue boils down to differentiating between what 'is' *versus*

what 'can be' and what 'ought to be'. Further, it entails 'how' and with the use of what instruments or policy interventions – when, how and with what intended effect. Often it is the unintended effects (in terms of outcomes as well as process) that pose added challenges of theory, empirical analysis and policy inquiries.

Notes

1. Indeed, counting the number of definitions of sustainability has become something of a cottage industry. Some analytical efforts have been made to distinguish between 'strong sustainability' and 'weak sustainability', but few empirical analyses have proceeded from these distinctions.

2. This refers to the now classic definition presented initially by Harold Lasswell.

3. Here definitions abound as to contentions. A key contribution in this domain is that of James March, on the 'Power of Power' in the *American Political Science Review*, 1966.

4. This is an important issue, and some of the most innovative contributions in the field have been made in the area of bargaining.

5. The units and levels issue has been a cornerstone of the field since earliest days. See for example, the post-World War II discussions of 'images' (due initially to Kenneth Boulding in economics, and then to Kenneth N. Waltz in political science, with subsequent extensions by Robert C. North in the 1990s).

6. We consider here 'eco-efficiency' to be a critical integrative principle – in the sense of connecting and taking into account the properties of both ecological and economic viability. In this context, notions of industrial ecology are methodological in nature, meaning that they facilitate the determination of *how* economic and industrial performance are to become more conducive to sustainability, rather than analytical, in terms of *what* it is that should be pursued. This is another way of saying that industrial ecology refers to how analysis is to be undertaken, while eco-efficiency refers to the target or objective that is to be attained.

7. The sources for this thinking in political science can be traced to the impacts of Norbert Wiener and cybernetics on the work of scholars such as Karl W. Deutsch, Robert C. North, and a few leaders of the, then, 'behavioural revolution' in political science.

8. Structures change, of course; however, for the purpose of the argument so far, we must articulate the implications of structure at one point in time before we can consider the dynamic elements, namely, the sources and consequences of changes over time.

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SUSTAINABILITY AND THE SOCIAL SCIENCES

A cross-disciplinary approach to integrating environmental considerations into theoretical reorientation

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