

# From integrated planning and systems thinking to Urban NEXUS design

This brief background paper to the project study "Operationalizing the Urban NEXUS" outlines the movement towards integrated planning and management in the public and private sectors since the early 1990s, leading to the Urban NEXUS approach.

Operationalizing the Urban NEXUS

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## Abstract

Although a systemic understanding of cities is accepted in scientific domains, it has not yet been sufficiently translated, in practicable ways, into the fields of urban planning, management, and governance. It is often even less applied in real-world projects, designs, and operations.

This short paper outlines the movement towards more integrated planning and management in both the public and private sectors since the early 1990s. Reflecting the need for a "NEXUS" approach, integrated management has long been a pursuit in various sectors, such as integrated water resource management (IWRM) and Integrated Solid Waste Management (ISWIM), which each reflected the growing recognition of the fragility of ecosystem services and ineffective fragmented administrative structures. However, integrated planning has not proven sufficient. Planning alone does not trigger the design of integrated, financially viable solutions. Established local government operations therefore often fail to respond fully to new integrated planning directives.

The search for a way to counter the modernist legacy of siloed disciplines and operations management, so as to make "integration" a deeper, more systemic form of practice, is being addressed in the emerging Urban NEXUS approach.

## From integrated planning and systems thinking to the Urban NEXUS design

Today's interest in the Urban NEXUS reflects more than two decades of planning innovation, project experiments and best practices research in the area of "integration." These efforts mark a continuous evolution of the understanding of cities and urban regions as complex systems of systems—as agglomerations of political, market, infrastructure, resource, legal and institutional, ecological, community and cultural systems that are connected and connecting on a worldwide basis.

The effort to understand cities systemically can be traced to the emergence of systems engineering and ecosystem theory as two influential new scientific disciplines in the mid-1960s. In parallel, urban geography and urban sociology, considering the dynamics of political-economic systems, emerged in the late '60s and '70s as new sub-disciplines in the social

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### Urban NEXUS Definition

The Urban NEXUS is an approach to the design of sustainable urban development solutions. The approach guides stakeholders to identify and pursue possible synergies between sectors, jurisdictions, and technical domains, so as to increase institutional performance, optimize resource management, and service quality.

It counters traditional sectoral thinking, trade-offs, and divided responsibilities that often result in poorly coordinated investments, increased costs, and underutilized infrastructures and facilities. The ultimate goal of the Urban NEXUS approach is to accelerate access to services, and to increase service quality and the quality of life within our planetary boundaries.

GIZ and ICLEI, 2014

sciences. Other disciplines followed in the 1980-90s with the establishment of “systems approaches” in areas such as public health, which now considers the interplay between socio-economic status, environment, ethnicity, and health in the urban context. Influenced by these and other disciplines, the cross-disciplinary study of urban dynamics increasingly has focused on cities as whole systems, not as separated, mechanistic parts as they were conventionally approached in modernist urban theory and practice.

From a scientific perspective we now understand cities to be both complex and chaotic.<sup>i</sup> Urban development outcomes are determined by interactions between the designs, technologies, enterprises, institutions, behaviors, cultures, and events of different agents operating at many scales – household, neighborhood, district, city, metropolitan, regional, and global. Conditions within the majority of the world’s cities – often undignified, unjust, insufficiently serviced and ultimately unsustainable – are in large part indicators of our lack of understanding of how to steer the development of urban systems within such complexity.

## **A Modernist perspective on Urban Planning**

The systemic understanding of cities has been widely accepted, but it has not been widely applied in the day-to-day operations of government institutions, utilities, and the development industry. The institutions responsible for urban governance, planning, engineering, and management remain largely guided by the procedures, standards, and solutions of 20th century modernist city-building.

A fundamental premise of modernist city building and city management has been that urban regions can be organized and controlled in orderly ways to achieve predictable, desired outcomes, much like large industrial facilities. The modus operandi of modernist urbanism involved three key imperatives: achieving economies of scale; asserting standards in development; and managing urban systems and society through top-down, often centralized institutional mechanisms. The imperatives of scale, standards, and technocratic administration provided clear development achievements and societal benefits. Among these are the efficiencies and predictability gained through specialization and scaled operations. However, in an effort to control and manage cities, modern urban institutions and practices divided urban regions into component parts: jurisdictions, departments, single purpose zones, infrastructures, service delivery silos, and their related legal categories and technical disciplines.

Then, beginning in the 1980s, precisely when resource efficiency, demand-side strategies, community-based and distributed approaches were proving viable, many countries divested their municipal utilities and often re-centralized urban service functions through their privatization. These new arrangements prolonged the dedication to siloed approaches, supply driven strategies, and standardized technologies.

The sustained dis-integration of urban areas and processes has resulted in the under-development of opportunities to further increase efficiencies, effectiveness, suitability, and resilience in the ‘nexus’ between historically and institutionally siloed, component parts of urban regions.

Critics of modernist urban planning in the 1950s and ‘60s, such as Louis Mumford and Jane Jacobs, bemoaned the resulting disconnection between the “physical plant” of the city (i.e., its infrastructure and built environment) and the city’s essential social function as a platform for community and economic self-empowerment. Critics of modernist international development practices<sup>ii</sup> lamented the modern state’s often violent undermining of marginalized urban communities as they advanced economically and sought political power through their self-built settlements. The standards, regularization and improvements of modernist “urban renewal” often left the poor more marginalized.

From a different angle, the first environmentalists of the 1950s and ‘60s highlighted the ecological ills arising from the separation of functions and flows in the city. In the early 1970’s, UNESCO’s Man and the Biosphere Programme introduced resource balancing studies as a way to track resource flows, conversion processes, and wastes across urban regions. Interdisciplinary urbanists, such as

the biochemist and cyberneticist Frederic Vester<sup>iii</sup>, introduced concepts of complexity, feedback and closed loop design into urban theory. One outcome was the search for solutions beyond linear resources-in/wastes-out designs of urban infrastructures and processes, identifying opportunities to further optimize resource productivity and reducing environmental ills by cascading and cycling resource use, mimicking ecological energy and nutrient cycles.

The need for an Urban NEXUS approach, therefore, has been long recognized. During the 1990s the term “integrated” became a leitmotif in the fields of resource management, transportation and business planning, and urban planning. The mega-trends demanding NEXUS thinking in the urban sector are clear. The spread of market liberalization policies and associated global market integration seemed to provide the final, necessary impetus for experiments in more integrated planning and management.

## **Integrated Resource Management**

During the mid-1970s and until the 2000s, electricity markets experienced significant changes on both the supply and demand side, caused by longer construction times, higher interest rates, increasing construction costs, greater volatility of fuel prices, uncertainties in load growth and recognition of the importance of conservation. These outcomes sparked an interest in non-conventional approaches to utility provision, integrating traditional supply management with new demand management strategies to relieve supply-side pressures. The systemic coordination of supply and demand side strategies led to the creation of integrated resource planning (IRP) as way to establish a more optimal combination of solutions to meet energy needs within a service territory.<sup>iv</sup>

Within the area of water resource management, there has been a growing recognition of the fragility of ecosystem services and the ineffectiveness of relying on fragmented administrative structures (e.g., multiple municipalities, regional and national policy bodies, water agencies etc.) to manage the planning, governance, and development control of large watershed areas. Integrated Water Resource Management (IWRM) and Integrated Solid Waste Management (ISWM) emerged as an initial response. The Global Water Partnership defines IWRM as the “coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without comprising the sustainability of vital ecosystems.”<sup>v</sup> IWRM recognizes the “complex interaction between natural and human systems and the need for the integration of management mechanisms within and between these to support sustainable water management objectives”.<sup>vi</sup>

## **Integration in the Context of Business**

At the same time, the policy-driven liberalization of markets and privatization of previously public sector functions catalyzed global corporate mergers and acquisitions. Research has shown that less than half of all mergers and acquisitions (M&A) ever fulfilled their promised strategic and financial goals, because insufficient resources were applied to handle the integration of merged companies across business cultures, operations, human resources, and performance. Companies were spending huge amounts of money on M&A strategies, but despite the large investment there remained no specific role within business organizations to manage the post-acquisition merger process.<sup>vii</sup> The outcome was the establishment of integrated business planning (IBP) and the related new executive function of the integration manager (IM).

A further challenge of global market integration has been the need for new organizational approaches to sales and operations planning (S&OP) and global supply chain coordination. S&OP first emerged in the 1970s, as an attempt to better coordinate the supply side and sales sides of

business. As the practice developed in the 1980s, there was a growing focus on balancing supply with demand alongside inventory control measures. In conventional S&OP, however, product management was not integrated into the process, leaving product development as a separate silo in either R&D or marketing departments. In the early 2000s, scenario planning became popular as part of the emerging integrated business planning (IBP) approach. IBP ensures alignment between internal functions of the company across the full range of business functions—from sales, marketing, R&D, operations, logistics, finance, HR and IT—and adds a focus on the external operating environment, including stakeholder management and corporate citizenship.

## **Integration in Urban Planning and Management**

Reflecting the increasing scale, complexity, and resource constraints of cities in a globalizing world, it comes as no surprise therefore that “integration” also became a major theme in urban management. One impetus was the privatization of erstwhile public sector functions in the 1980s, and the associated separation of government policymaking from the operational incentives and objectives of the new private operators. In Europe the response was a so-called “Third Way” governance model whereby public and private entities and civil society negotiated policies via governance networks and implemented policies through strategic partnerships rather than via traditional government hierarchies. As part of the neo-liberal focus on competitiveness, international development finance institutions like the World Bank promoted the collaboration of government, utilities, businesses, and other organized interest groups to establish city development strategies (CDS) to address the function of the city in a globalizing economy. Stakeholder engagement, trust building, and coordination became new management themes.<sup>ix</sup>

The approaches varied from country to country, but the underlying premise of “joined up” governance became a global trend. New forms of statutory planning were established, such as Integrated Development Planning (IDP) in post-Apartheid South Africa, a strategic planning process involving the local, district, and metropolitan municipalities over a five-year period to plan and coordinate their investments in consultation with a wide range of local stakeholders.<sup>x</sup> GIZ played a central role in the elaboration and testing of integrated planning frameworks internationally, including its prominent contributions to IDP in democratic South Africa.

Public sector re-organization also reflected the integration theme. In the late 1990s, for example, new ‘environmental services’ departments were formed out of once separate water, waste water, and solid waste services units. Planning and economic development, once distinct silos, were sometimes joined into single departments. Inter-departmental committees and matrix management approaches became familiar local government mechanisms. Metropolitan planning organizations were formed to coordinate and “integrate” policies and strategies across the municipal jurisdictions of a region.<sup>xi</sup>

The introduction of the concept of sustainable development in the late 1980s instigated further experiments. In the 1990s, the Local Agenda 21 (LA21) process endorsed by the 1992 UN Conference on Environment and Development inculcated another form of multi-stakeholder integrated planning, subsequently called urban sustainability planning. The approach fostered a basic commitment to interdisciplinary planning and urban project design with a view towards systemic solutions that simultaneously addressed economic, social and environmental concerns. A 2002 survey by the UN Department of Economic and Social Affairs and ICLEI-Local Governments for Sustainability documented LA21 planning activities in more than 9,600 communities in 113 countries.<sup>xii</sup>

However, integrated planning and management has not proven sufficient in the pursuit of sustainable development outcomes. In the case of Local Agenda 21 (LA21), for instance, many municipalities failed to integrate their LA21 initiatives within the conventional functions and units of the local governments, confining implementation to a set of one-time projects or general awareness raising rather than a process of systemic reform. In this fashion, thousands of municipalities have

completed integrated planning processes and have officially sanctioned integrated development plans; yet, demonstration projects aside, the modernist legacy of siloed, uncoordinated city planning and development is still dominant in many cities of the world.

In conclusion, what was missing in the policy and planning pursuit of integration was a design and management methodology for identifying and evaluating new organizational and technical solutions to achieve the objectives of integrated plans; that is, more optimized use of human, financial, and natural resources. Whereas integrated planning may identify the areas of potential integration, the solution itself – the mix of measures that enable the achievement of planning objectives – requires the design of alternative market signals, business models, systems and schemes that would be acceptable to stakeholders and address their diverse interests while also achieving integrated planning goals. Providing such a framework, the Urban NEXUS thus reflects a way to move beyond integrated planning, to a deeper, more systemic form of practice as both a perspective and a practicable approach.

## References

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- <sup>ii</sup> See for instance Turner, J.F.C. and Fichter, R (1972) *Freedom to Build: Dweller Control of the Housing Process*. Macmillan, London. Other origins of the critique of modernist development practice by development practitioners can be found writings of Mary L. Elmendorf, John Habraken, and Arif Hassan.
- <sup>iii</sup> See Vester, F. (1977) *Ballungsgebiete in der Krise (Urban Systems in Crisis)*. DVA, Stuttgart.
- <sup>iv</sup> Yilmaz, Pelin, Hocaoglu M., and Konukman A. (2008) "A pre-feasibility case study on integrated resource planning including renewable," *Energy Policy* 36: 1223-1232 (p. 1223).
- <sup>v</sup> Global Water Partnership 2000 Technical advisory committee background paper no. 4: integrated water resource management. GWP, Stockholm (pg 22). Retrieved May 2014, from [http://www.gwp.org/Global/ToolBox/Publications/Background%20papers/04%20Integrated%20Water%20Resources%20Management%20\(2000\)%20English.pdf](http://www.gwp.org/Global/ToolBox/Publications/Background%20papers/04%20Integrated%20Water%20Resources%20Management%20(2000)%20English.pdf)
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- <sup>vii</sup> Ashkenas R. and Francis, S. (2000) "Integration Managers: Special Leaders for Special Times": *Harvard Business Review* 108-116 (Pg 108).
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- <sup>ix</sup> Harrison, P. (2006). "Integrated Development Plans and Third Way Politics." *Democracy and Delivery: Urban Policy in South Africa*. By Udesch Pillay, Richard Tomlinson, and Jacques Du Toit. Cape Town: HSRC. (Pg 190)
- <sup>x</sup> Ibid. (Pg 186).



<sup>xi</sup> The formation of consolidated inter-municipal bodies for multi-level governance of metropolitan regions, however, generally failed apart from in top-down central government-controlled contexts such as Brazil, or China where municipal limits were simply expanded. The European compromise was sought with other mechanisms for inter-municipal cooperation..

<sup>xii</sup> International Council for Local Environmental Initiatives (2002) Second Local Agenda 21 Survey, Background Paper 15, Commission on Sustainable Development, World Summit on Sustainable Development, Second preparatory session. UN Department of Economic and Social Affairs, New York. Retrieved February 2014, from: <http://www.un.org/jsummit/html/documents/backgrounddocs/icleisurvey2.pdf>.

In the 1990s and early 2000s GIZ played a fundamental role in the establishment and mainstreaming of Local Agenda 21 practice in Asia and Latin American in particular, establishing national training and demonstration programmes and working closely with and providing financial support to ICLEI.

The Urban NEXUS project 2013-2014 was funded by GIZ on behalf of BMZ to develop the "Operationalization of the NEXUS approach in cities and metropolitan regions". The Urban NEXUS project included: a baseline study and report (GIZ and ICLEI, 2014), the identification and preparation of case studies and shorter case stories, and the design and implementation of action-oriented pilot activities with German Development Cooperation.

To learn more about the Urban NEXUS read the full study:

GIZ and ICLEI, 2014, Operationalizing the Urban NEXUS: towards resource efficient and integrated cities and metropolitan regions, available at: [www.iclei.org/urbanexus](http://www.iclei.org/urbanexus)

**ICLEI – Local Governments for Sustainability** is an international association of local governments implementing sustainable development. ICLEI's mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global sustainability with special focus on environmental conditions through cumulative local actions.

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