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FTA and the City: Imagineering Sustainable Urban Development

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Abstract

This paper argues that urban planners and policy-makers lack an effective future-oriented approach enabling them to comprehend current complexity, anticipate impending change and shape a preferred future condition. In doing so it:

- reviews the performance of contemporary city planning;
- examines the need to chart and navigate the city technosphere by reference to city capital;
- explores ways in which planning can benefit from a futures studies approach;
- describes generally how futures-oriented thinking can produce effective city prospective; and,
- poses specifically a number of questions regarding the concept of the 'intelligent city'.

The paper concludes by calling for the formulation of a Unified Theory for Sustainable Cities by reference to Gaia and the application of futures-oriented technology assessment.

Keywords: cities, Future-Oriented Technology Analysis (FTA), futures research, sustainability

Title: FTA and the City

INTRODUCTION

The earths' two most complex systems are the biosphere (land, sea and air) and the technosphere (cities, industry, commerce and government). Manifestly, the interaction between city systems in the technosphere and ecosystems in the biosphere is causing an unprecedented breakdown and degeneration of both. All living systems worldwide, it is argued, are in decline, and the world's largest cities face exceptional challenges with regard to health, welfare, education, poverty, crime and pollution (Hawken, 2005). Cities across the globe are truly in a state of profound transition. Within a generation, most of the world's population will live in urban areas, and the number of urban dwellers in developing countries will increase by 2.5 billion – the current urban population of the entire world. This rapid pace of urbanisation is unstoppable and irreversible. Cities of the 21st century, while embodying the comfort, culture and cosmopolitan sophistication of a global economy, have largely ignored the harsh realities confronting them. This accelerating process of urbanisation has outpaced the competence and capacity of city politicians, planners and administrators to provide adequate services. The result is an infinite strain on the finite resources of the earth, which has led to overcrowding, congestion, housing shortages, escalating land prices, slums,

squatter settlements, diminishing quality of life, environmental hazards, and the like (Satyanarayanan, 2002).

Most of the tribulations that tax current city governance are the product of an inability to cope proficiently with the consequences of both global and local change and confront the extreme complexity of urban and regional systems. Above all, it is increasingly recognised that urban planners and policy-makers lack an effective future-oriented approach enabling them to anticipate with acuity impending transformations, efficiently prepare for ensuing ramifications and tackle the inherent and labyrinthine complexity. These planners and decision-makers desperately need to become more 'visionary' in: cultivating community awareness, building constituency support and creating collaborative alliances; taking a strategic long-term view and adopting best practice; embracing both diversity and authenticity; committing to social equity and pride of place; and in planning for liveability and espousing sustainability. This paper argues that these challenges can only be met by 'imagineering' the future of cities though the application of methods and techniques drawn from the futures field in a systematic rigorous and holistic way. In doing so, the authors recognise that venturing projections or postulating visions about urban futures is a notoriously fraught terrain, littered with the Ozymandius – like wreckage of previous attempts to solve the continuing conundrum of sustaining cities.

CONTEMPORARY CITY PLANNING

Cities today are extremely dynamic and complex multidimensional systems that are increasingly interconnected as a result of globalisation and advances in

communications technology. Change is faster and less predictable than ever, and its interacting dimensions – social, economic, cultural, political, environmental and physical – are often simultaneous and chaotic in nature. Present and future needs for effective city planning must be based on an understanding of past failures.

Past Planning Failures

Somewhat simplistically, and certainly pejoratively, particular failures in city planning and development can be selectively summarised as follows.

1. *The Failure of the Planning Profession*
   - The profession has lost its visionary qualities.
   - Complexity, uncertainty and the speed of change has defeated it.
   - Real community participation and collaboration has all too often been replaced by a camouflage of public relations.
   - Refuge has frequently been taken behind a subterfuge of regulation and technology.
   - Whilst the spatial dimension has been respected there has been a gross neglect of the time dimension.
2. *The Failure of Governance*
   - There remains growing and threatening social exclusion.
   - An inability to provide 'joined-up' policy frameworks persists.
   - Innovation and enterprise in the public sector is lacking.
   - Short-term demands force out long-term needs.
   - There is a dearth of leadership and 'champions'.
3. *The Failure of Business*

- Abuse of dominant market positions and predatory behaviour.
- Lack of economic transparency and low corporate accountability.
- Little respect for local traditions, cultural diversity and environmental quality.
- Limited social involvement, corporate responsibility and civic engagement.
- Low levels of local knowledge transfers.

Present Planning Problems

A key function of urban planning is to make decisions in the present that will direct future activities in a way that will create cities that are economically thriving, culturally vibrant, socially cohesive, clean, green and safe, and in which all citizens are able to live happy and productive lives (Hall and Pfeiffer, 2000; Myers, 2001). The scale and intensity of prevailing urban problems across the worlds cities implies that existing planning processes and practices fail to fulfil effectively their primary purpose. Some of the main reasons for this are suggested below.

- **Change, complexity and uncertainty**. Commonly, cities today are characterised by the rapid pace of change in society and the growing complexity of its operation. The combination of the two increases the level of uncertainty of future consequences and events flowing from current decisions, and the planning profession presently lacks adequate methods to help decrease such uncertainty (Krawczyk, 2006).
- **Lack of an integrated approach.** There has been a tendency in comprehending, evaluating and managing the urban system to separate the physical elements from the social, economic and environmental dimensions,

rather than assessing and addressing all aspects of urban form and function in a holistic and integrated manner.

- **Short-term orientation**. The search for political relevance, necessary to respond to present needs and the crises on the ground, when taken together with those restrictions imposed by social science that directs attention to policy formulation only where data exist – from the past, not the future – have shifted city planning professions towards short-term approaches and speedy solutions (Isserman, 1985; APAJ, 2001).
- **Obsolescence of the 'predict and provide' model**. Traditional planning practices invariably follow a process producing plans and proposals based on evidence most usually collected through the observation of historical trends and their subsequent projection forward. This approach inevitably leads to the reinforcement of the present state, making it more difficult to consider alternative future options.
- **Limited collaboration of stakeholders**. Determining the future of a city is not an exclusive function of local government, but requires the involvement of many other public and private sector stakeholders, often holding contrary views and representing conflicting interests. It is now widely recognised that sustainable urban development demands true partnership across sectors, agencies, actors and communities.

Generally, the authors contend that the various professions engaged in city planning have lost confidence, and competence, in thinking meaningfully about urban futures and demonstrating their capacity to shape and influence change, being (Cole, 2001):

".... institutionally caged in a cautious and conservative role they do not wish to appear too off-the-wall to policymakers who want concrete answers."

What is needed to sustain the vitality and viability of cities, therefore, is a major shift in the way we think, plan and act, creatively and differently, together in imagining the prospects for cities – a futures-oriented approach.

CHARTING AND NAVIGATING THE CITY TECHNOSPHERE

To establish a suitable context within which some form of futures-oriented assessment can be made of the technosphere framing the form and functioning of cities it is first necessary to identify the various assets or capitals comprising the portfolio of the city estate. Unashamedly, the authors have adopted the classification constructed by Pricewaterhouse Coopers (PwC, 2005) in its report Cities of the Future which is founded on the premise that:

"We need new perspectives on cities, their dreams, knowledge, creativity and motivation in order to find new ways to develop strategic city management."

Following a global research study aimed at discovering the principle challenges and trends that are influencing city leaders in their strategies for delivering economically prosperous and socially harmonious environments for their

citizens, PwC identified a number of different asset groups, or capitals, that form the basis for developing a strategic agenda that will take a city forward. These capitals cover the people, knowledge, natural resources, technical infrastructure, finances, democratic and political aspects and cultural values that a city embodies. Ultimately, six separate, but interacting, type of capital were distinguished and described.

1. **Intellectual and Social Capital** – people and knowledge.
2. **Democratic Capital** – participation and consultation.
3. **Cultural Capital** – values, behaviours and public expressions.
4. **Environmental Capital** – natural resources.
5. **Technical Capital** – manmade capital and infrastructure.
6. **Financial Capital** – money and assets.

A brief description of the key challenges facing cities regarding each of these capitals follows, drawn directly and distilled from the PwC report (*ibid*) Is shown below. Throughout, however, it must be appreciated that an holistic approach is required in formulating a policy for stewardship since each of the capitals intrinsically depends on all the others.

Intellectual and Social Capital

Competing in the international knowledge economy means ensuring that the appropriate people, skills and capabilities are developed, with city leaders demonstrating that they understand how these qualities can be captured and allowed to prosper. City administrations, in turn, need to become facilitators of change and provide leadership.

Democratic Capital

To create public trust and enhance their accountability, cities need to encourage dialogue between citizens and leaders, and to find new forums for collaboration between city leaders, city employees and citizens. Greater transparency of this dialogue is also needed in order to achieve the commitment of the whole city on its journey into the future.

Cultural and Leisure Capital

Cities are competing at a regional, national and international level with one another to attract investors, visitors and new residents. This competition is intense, and a strong city brand is a potent weapon to maximise the visibility of a city's qualities and allow it to differentiate itself from its competitors.

Environmental Capital

Environmental issues are near the top of all cities' agendas. As quality of life becomes an important function of competitive advantage, cities have to provide a clean, green and safe environment and deal with pollution in all its forms, manage waste and conserve water resources.

Technical Capital

All cities face the problem of ensuring that their infrastructure can support the rapidly developing needs of their citizens and businesses in the city. Transport and affordable housing are pressing issues in many cities. Building appropriate technological infrastructure, such as broadband, is also vital in terms of serving citizens more effectively and efficiently.

Financial Capital

Growing demands on cities' budgets, combined with diminishing revenue bases mean that cities need to be creative and flexible in their financial strategies. They have to do more with less, and find new sources of income. Partnerships with the private sector and outsourcing are becoming more common, and cities need to find ways to capture the risk-sharing and financial benefits that working with the private sector can deliver. Again, they are under pressure to be more transparent and to implement accounting models that equip them with this ability.

In navigating change, having charted the territory, the starting point must be the crafting of a vision. The Prospective Through Scenarios Process developed by The Futures Academy at DIT for doing this is described later. Suffice it to state, at this stage, that navigating into the future requires, above all, an open mind and strong leadership. The PwC report (*ibid*) likens governments leading a city towards an uncertain future to the navigators of a ship with the crew and passengers comprising their citizens, employees and customers. In this way, 'navigation' is very similar to the leadership of any large organisation. The first concern is strategic position, where are we right now? The next consideration is destination, where are we going? What are our visions or dreams for the city? Finally, there is route and speed, by what path and how quickly will we reach our destination? All this requires a clear vision linked to committed leadership and a well managed organisation. To achieve this, those responsible have to adopt methodology and employ techniques that analyses both from the outside in and from the inside out, whilst all the time looking around and ahead. In other words, a futures-oriented assessment approach.

CITY PLANNING AND FUTURES STUDIES

City planning and futures studies are both primarily concerned with the future. Each activity deals with ambiguous, multifaceted and contentious issues, for which the outcomes are complex and uncertain. Their common purpose is to provide a 'better future', while avoiding undesirable risks. City planning and futures studies both share ethical dilemmas of representation and manipulation that arise from the way they operate, and the methodological difficulties of balancing a wide range of information, techniques, participants and attitudes (Cole, 2001). Despite these similarities, the way of thinking about and approaching the future by the city planning professions differs greatly from the one practised by futurists.

Planning versus Futures

Futures studies is best seen as a discipline that aims:

> *"to discover or invent, examine and evaluate, and propose possible, probable and preferable futures" (Bell, 2003).*

Planning can best be defined as:

> *"the making of an orderly sequence of action that will lead to the achievement of a stated goal or goals"(Hall, 1992) .*

Perhaps there is an hierarchical difference, or procedural relationship, between futures and planning in that futures studies is a discipline with an intellectual domain and roots to apply it, while planning is first and foremost a method, which can be used in a futures approach to implement the selected future (Serra, 2001). Put another way:

> *"the 'futurists' responsibility is to help people to articulate their beautiful dreams, and the 'planners' responsibility is to help make those dreams come true."(Cole, op cit)*

Maybe the real value of a futures approach in the field of city planning is not in discovering new factual knowledge about sustainable urban development, but in producing perceptions and insights to that body of knowledge and 'imagineering' novel ways of addressing city sustainability.

The Characteristics of Planning and Futures

Some of main differences in character between traditional city planning and a futures approach towards strategic urban foresight are best shown in the table below (Lindgren and Bandhold, 2003).

[Table 1 here]

It can be argued that the link between traditional planning and a futures approach is 'strategic planning' which as been described as:

"methodology, which describes the use of available resources an organisation has at hand so as to obtain a given result." (Ventura, 1998)

In this context, futures studies are integrated with strategic planning in such a way that the former provides the vision of the preferred result and procedurally is present in each phase of the latter.

The Purpose of Futures Studies in City Planning

From an extensive survey of the literature, and the experience of conducting a number of visioning projects over the past few years, The Futures Academy at DIT has produced A Practical Handbook on Futures Workshops: Visioning the Future of Cities (Gannon and Ratcliffe, 2006), in which the main purposes of adopting a futures approach in city planning have been listed as follows.

1. Extending thinking beyond the conventional and fostering more forward thinking as a result.
2. Forcing thoughts and stimulating conversations about the future.
3. Helping identify assumptions about the future that might require examination, testing and subsequent modification.
4. Encouraging people to have regard for the positive possibilities and opportunities that tomorrow might hold, as well as the potential threats and disasters.

5. Making more intelligent decisions today concerning the future by focusing the mind on the most important questions that must be resolved in order to formulate better policy.
6. Inspiring people to 'think outside the box'.
7. Widening perspectives and increasing the number of options available for exercising more deliberate decision-making towards positive change.
8. Preparing for, and managing change better by enhancing the capacity to learn.
9. Making response times to actual future events much shorter and reactions more relevant.
10. Fostering active participation in strategic thinking leading to decision-making.

In an era of accelerating change, growing complexity and heightened uncertainty, the adoption of futures methods into city planning offers a rigorous, comprehensive and integrated approach towards urban stewardship, relying more on intuition, participation and adaptability (Ratcliffe, 2002). Most excitingly, a futures approach can constitute an effective platform for collaborative planning. A collaborative futures process helps to develop successful solutions and ensures that the ownership of those solutions is embedded in the community so that they have a greater chance of implementation (CitiesPLUS, 2004). It also enables the development of preferred visions of urban futures through mobilisation – bringing together and facilitating the networking of key stakeholders and sources of knowledge (FOREN, 2001).

FUTURES - ORIENTED THINKING THROUGH CITY PROSPECTIVE

As a result of a major four year research study (Krawczyk, 2006), and the conduct of half a dozen consultancy projects over the past six years (Ratcliffe, *et al*, 1999-2006), The Futures Academy at DIT have developed a hybrid methodology to 'imagineer' the future of cities and city regions. This attempt to combines the 'proactive' ambition of the French inspired 'prospective' approach with and the more Anglo-Saxon technique of 'scenario thinking'. The product is called City Prospective Through Scenarios, and has the prime aim of developing a futures-oriented methodology that would encourage and facilitate a fundamental shift in the way of thinking and acting about the future of cities.

Prospective and the Preferred Future

Gaston Berger (1957) introduced the term 'Prospective' arguing that the constantly accelerating pace of technological and social change raises the importance of the need to anticipate the future and devise new methods to do this. He described Prospective as "neither a doctrine nor a system" but:

> *"A reflection on the future which seeks to describe its most general structures with the aim of bringing out the elements of a method applicable to our accelerating world." (Berger quoted in Cournard, 1974).*

The principles underlying the Prospective approach are now familiar, but worth simply restating as follows (Roubelat, 1997):

- to look far away, as Prospective is a long-term activity;
- to look breadthways, in order to examine interactions;
- to look in-depth, to become aware of the most important trends and issues;
- to take risks, because new possibilities can lead to the change of long-term plans; and,
- to take care of humanity, as Prospective helps to generate understanding of implications for people.

The original concept has been developed over the years, most recently by Michel Godet who describes Strategic Prospective as acting as (Godet, 2001):

> *".... a management tool from anticipation to action through appropriation."*

There is nothing essentially new in this, for the ancient Greeks had conceptualised the idea in the form of a triangle, as shown below (Exhibit 1).

[Exhibit 1 here]

Godet stresses throughout his work the importance of participation. Such participation being structured and organised in as transparent and efficient manner as possible. He also recommends that the techniques used for the exploration of the future should: stimulate the imagination, reduce inconsistency,

build a common language, structure the collective thinking process and enable appropriation (*ibid*).

Above all, however, the ethos of Prospective is about creating a clear vision of what future is desired, as freedom and choice offered to society by technology are virtually unlimited. The generic Prospective process model is shown in Exhibit 2 below.

[Exhibit 2 here]

Strategic Foresight Activity

Whereas most European foresighting seems to lack the convergent and normative dimensions necessary to produce a clear vision for the future of cities, the American approach towards Strategic Foresighting tends to place much more emphasis on visioning – and on action. In a forthcoming publication, which was trailed at the World Futures Society Conference in Toronto in July, Peter Bishop and Andy Hines (2006) produced the chart shown below (Table 2) which outlines the stages of a strategic foresight activity with the relevant objectives for each stage and the intended outcomes.

[Table 2 here]

It should, of course, always be remembered that foresight is, at heart, a human ability that allows people to prepare for the future (Slaughter, 1997). One definition, among many, sees Foresight as follows (Horton, 1999):

"a process of developing a range of views of possible ways in which the future could develop, and understanding these sufficiently well to be able to decide what decisions can be taken today to create the best possible tomorrow."

The Foresight approach arises from a convergence of trends underlying transformations in policy analysis, strategic planning and futures studies. It pulls together key agents of change and different knowledge resources in order to develop strategic visions and anticipatory intelligence. According to FOREN (*op cit*) Foresight involves five essential elements:

- structured anticipation and predictions of long-term changes brought about by social, economic and technological development;
- participation of a wide variety of stakeholders;
- establishment of new social networks;
- development of a strategic vision that would guide actions; and,
- recognition of the consequences of present decisions and actions.

An important role has also been played by the Australian Foresight Institute in advancing the Foresight approach. What it describes as the generic foresight process framework comprises four stages: inputs, foresight, outputs and strategy; and is portrayed in Exhibit 3 below (Voros, 2003).

[Exhibit 3 here]

Scenarios for Cities

One of the most popular and persuasive techniques drawn from the futures tool-kit in the process of city visioning is scenario thinking and planning. Familiar territory to most futurists, scenarios, of course, are like stories built up around carefully constructed plots based on trends and events (Ratcliffe, 2002b). They assist in the selection of strategies and identification of possible futures, making people aware of uncertainties and opening up their imagination and initiating learning processes (Barbanente and Khakee, 2003). The principles, practice and problems of using scenarios in the art and science of producing a city prospective are well documented elsewhere (The Futures Academy, 1999-2006).

Prospective Through Scenarios

Taking the classic Prospective framework and accentuating the role played by scenario thinking, learning and construction, The Futures Academy at DIT have developed an approach termed 'Prospective Through Scenarios'. The standard process is shown in Exhibit 4 below.

[Exhibit 4]

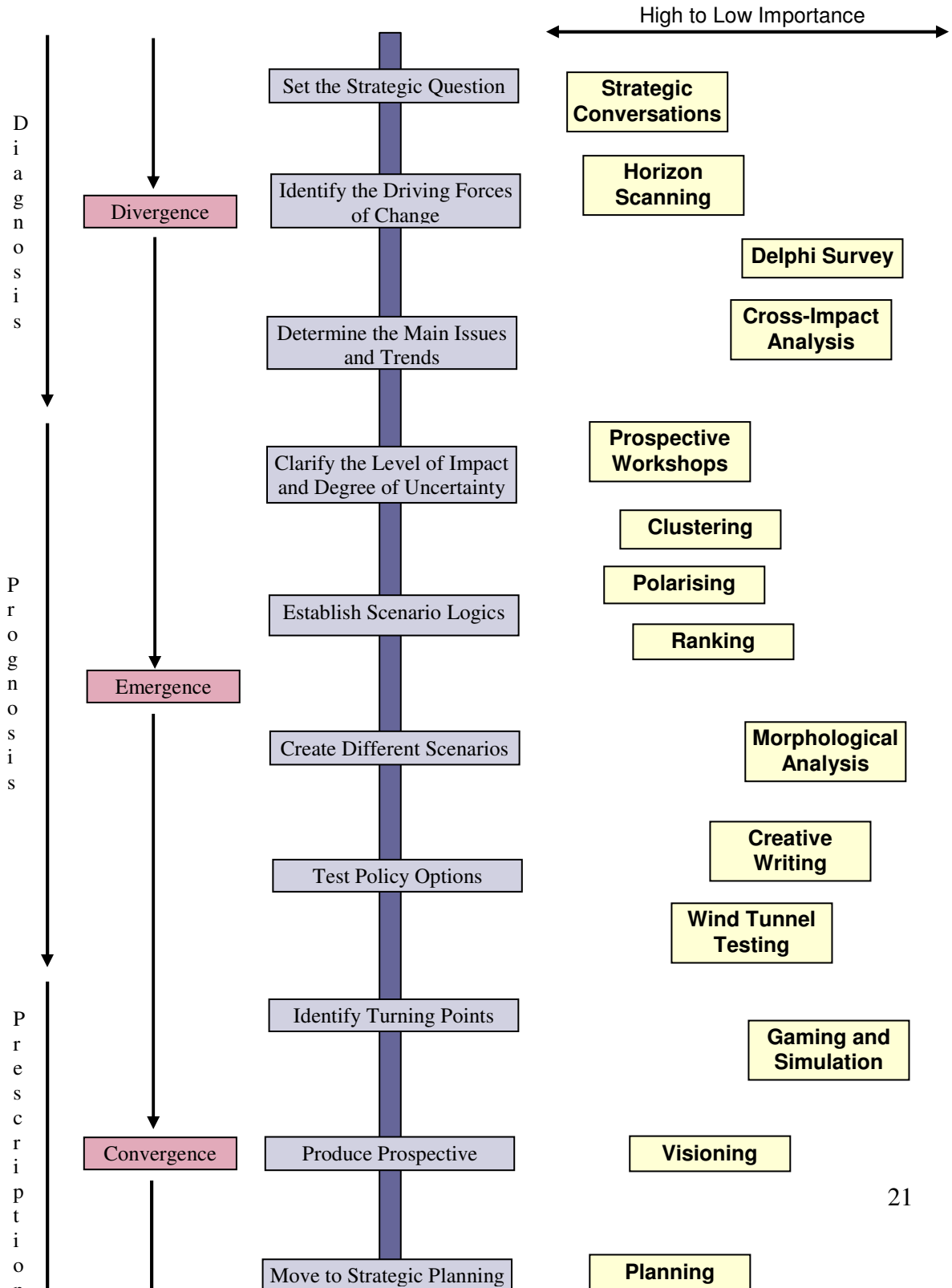
High to Low Importance
Diagnosis
Prognosis
Prescription
Set the Strategic Question
Identify the Driving Forces of Change
Determine the Main Issues and Trends
Clarify the Level of Impact and Degree of Uncertainty
Establish Scenario Logics
Create Different Scenarios
Test Policy Options
Identify Turning Points
Produce Prospective
Move to Strategic Planning
Divergence
Emergence
Convergence
Strategic Conversations
Horizon Scanning
Delphi Survey
Cross-Impact Analysis
Prospective Workshops
Clustering
Polarising
Ranking
Morphological Analysis
Creative Writing
Wind Tunnel Testing
Gaming and Simulation
Visioning
Planning

Fig. 2.9 The ‘Prospective Through Scenarios’ model (Ratcliffe and Sirr 2003)

The collaborative culture of a city, and the way in which it is led, are clearly imperative to the competitive and sustained success of that city and its surrounding region. Community culture and civic leadership are inextricably linked. City leaders are responsible for defining, upholding and evolving the city’s culture. Such leaders must provide direction, reason and motivation. They must also have the ability to prioritise, guide and work within teams, explaining the vision and strategic direction to others, and galvanising their collective and collaborative action towards it. A Prospective approach enables city leaders to use information developed from the process, especially where full and evocative scenarios have been employed, to help identify trends, people and technologies that may impact upon the city’s fruitful functioning. Indeed, the very act of constructing scenarios requires inputs from every sector, organisation and community of the city, which allows the communication and creativity between

people and agencies to flow more freely, and provides vision required for effective leadership. In fact, scenarios, leading to the formulation of a 'prospective', can be the best discipline to help cities gain comfort with change, but the process needs championing, commitment and confidence (Ratcliffe, 2006).

THE INTELLIGENT CITY

Although this paper is primarily concerned with providing a comprehensive and integrated methodology for imagineering the sustainable future of cities there is one dimension of city change worthy of special mention in the context of FTA, and that is the role of information and communications technology (ICT) in city planning and development. In an increasingly globalising, competitive and connected world, cities are facing extraordinary challenges relating to such forces as economic restructuring and fiscal stress, national security, institutional relationships, the changing role of governance, environmental degradation, social and cultural transformation and a growing gap between the 'haves' and 'have nots' in cities. Alongside these driving forces of change, there is the crucial question of how the economic, cultural, social and political aspects of cities act and interact with the global proliferation of ICT.

Motivation for ICT and FTA

Over the past decade, ICT markets have grown at unprecedented rates propelled by indigenous and foreign direct investment, global capital flows and

the flourishing of high-tech entrepreneurship and innovation (Roper and Grimes, 2005). These technologies simultaneously facilitate the instantaneous transmission of information, and the intense concentration of people and movement within extending urban regions, whilst allowing cities to control global business and service networks across international boundaries. The scope, pace and direction of technological change, and the nature and function of the interactive society, are fundamentally transforming the structure, pattern and fabric of urban areas. Indeed, much of the 'new' urban geography has recently focused on urban dynamics under the influence of technological progress. Urban economic spaces are becoming increasingly flexible spaces, marked by adaptable specialisation and knowledge-based production systems. In this context, three emerging perspectives have been identified (Nunes, 2005):

- The digital city perspective. Creatively integrating telecommunications into urban policy and planning practices and strategies, in order to develop more inclusive and sustainable urban futures.
- The global city perspective. The dominant role of a selected group of global cities, such as New York, London, Tokyo, as nodes in the global flows of information that characterise the network society, playing a particular and unique role in the process of global economic restructuring.
- The urban dissolution perspective. As face-to-face interactions decline, cities lose their role as physical centres that allow people to meet and communicate more easily. The basic idea is that the continuing advancements in ICT are creating a 'spaceless world' in which we will all inhabit 'electronic cottages' and teleconference or telecommute.

The information city, as such, will disappear as ICT improves (Gaspar and Glaeser, 1998). This concept, however, is hotly disputed by others who argue that while ICT has major implications for the future of cities, ICT innovations will not lead to the dispersal and disintegration of concentrated urban areas (Robson *et al*, 2000). In fact, ICT could actually reinforce existing concentrations in cities, whereby employment prospects will ultimately be linked to the growth of the new economy, its knowledge industries and their related consumers (Charles *et al*, 1999).

The reality, as so often is the case, will be a combination of these depictions. The essential point, however, is that there is a growing acknowledgment in policy and planning circles of the uncertainties surrounding the implications of technological advance for urban development and the general inadequacies of attempts at devising future strategies on the basis of existing knowledge, short-termism or trend extrapolation. By recognising the urban environment and city development as a complex adaptive system subject to dynamic change, conventional planning approaches are beginning to give way to, or at least be supplemented by, alternative approaches. Approaches, which encourage vision, creativity, strategy, partnership and democracy. Approaches resembling or reflecting the qualities of FTA.

FTA and the Urban Question

ICT is dramatically transfiguring the shape and functioning of cities around the globe and altering the lifestyles of their populations at home, at work and at

leisure. The need for greater foresight in all this is examined in more detail elsewhere (Kelly and Ratcliffe, 2006). Traditional technology foresight exercises, however, over-emphasise scientific and technological developments and tend to overlook the broader picture, such as the long-term impacts of ICT on the urban fabric, the environment, cultural values, societal trends and the implications for sustainable urban development. FTA, or a variant such as Prospective Through Scenarios, offers the opportunity to redress this imbalance by involving a wider cross section of key actors and agencies in building a shared view of the future. It is, for example, the view of the authors that FTA could be used to discern the broader spatial or territorial implications of ICT growth by asking:

1. What are the potential social and spatial implications of ICT, and what possible models for future city living will accommodate them?
2. What potential transformative technologies are coming to fruition in the next decade, and what impact will they have on the evolution of the global city?
3. What are the key R&D priority areas for complex urban systems undergoing technological innovation?
4. How effective could FTA be as a catalyst in the city visioning, planning and management process?
5. How could FTA elucidate potential challenges and opportunities for development of (a) the digital or electronic city, and (b) the global city?
6. Who are the key actors in the urban development process, and how can FTA maximise representation in building a shared vision for the future?
7. How can FTA contribute to the overarching goal of achieving sustainable urban development?

By imbuing FTA exercises with a greater territorial or spatial emphasis, it would be possible to provide a more flexible response to an increasingly uncertain urban future. The rise in ICT over recent decades has undeniably added to the complexity of the urban milieu and raised a number of questions, such as those above, about the consequences of technological proliferation for the city of tomorrow. Municipal leaders and city administrators could benefit greatly from applying and broadening FTA in their city visioning and strategic planning programmes.

Sustainability is the watchword of our age; cities are the engines of change; and futures-oriented thinking the only effective way of understanding and managing the complexity of the technosphere. Having wrestled with the imperatives of sustainability, the nature and challenges of city planning and development and the concepts, methods and techniques offered by the discipline of futures studies, individually and collaboratively, over the past few years, the authors have arrived at the belief that there needs to be some kind of 'Unified Theory of Sustainable Cities' devised to help and succour policy formulation and implementation in this field.

Cities are clearly complex adaptive systems. Ones in which public and private sector agencies of all forms are content to make interventions, almost at will, without having much comprehension of, or concern about the strategic consequences of their actions. What then should a Unified Theory seek to achieve? First and foremost, it must demonstrate how the individual agents and

actors within the city technosphere contribute to collective action within the city, and how that process leads to the structuring and institutionalisation of the city milieu and the deployment of its resources. Second, it must identify and assess the impact of these civic and institutional structures on wider social and natural systems. Last, like any good theory, it must be capable of making productive propositions that can be further explored and tested – or, more realistically, that it provides a lucid explanation of both intended and unintended consequences that should be a guide to further enquiry.

Returning, therefore, to where this paper commenced, with the interaction between city systems in the technosphere and ecosystems in the biosphere, there is a need to look for some way of reflecting the systemic nature of the relationship between human agency and physical resources that allows the construction of 'prospectives' that can be tracked back in a rich and meaningful way to communities and organisations. Perhaps the Gaia Theory could offer a way forward? As Professor Phil Roberts (2006) has pointed out in correspondence with one of the authors, Gaia, unlike its popular image, is a precise statement of the systematic interaction of the organic and inorganic elements of our biosphere. It tolerates free agency, assumes an adaptive relationship between agents and their environment, yet allows the limits to adaptation to be calculated and forecast. Arguably then, basis for a wide-ranging theory of sustainable urban development is available to us. The grand challenge, therefore, is: can a Unified Theory for Sustainable Cities be formulated using Futures-Oriented Technology Assessment, thereby, 'imagineering' the future of sustainable urban development?

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	Traditional Planning	Futures Approach
Perspective	Partial, 'everything else being equal'.	Overall, 'nothing else being equal'.
Variables	Quantitative, objective, known.	Qualitative, subjective, hidden.
Relationships	Statistical, stable structures.	Dynamic, emerging structures.
Explanation	The past explains the present.	The future is the raison d'etre of the present.
Picture of Future	Simple and certain.	Multiple and uncertain.
Method	Deterministic and quantitative models.	Qualitative, behavioural and stochastic models.
Attitude to the future	Passive or adaptive (the future will be).	Active and creative (the future is shaped).

Table 1 Traditional planning versus futures approach

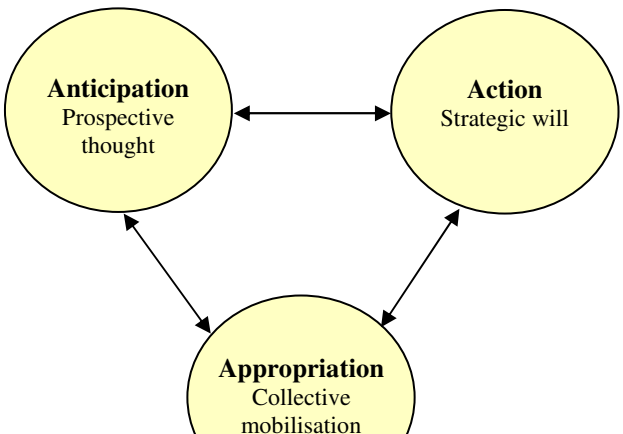

Exhibit 1: The Greek Triangle: Anticipation, Appropriation and Action (Godet, 2001)

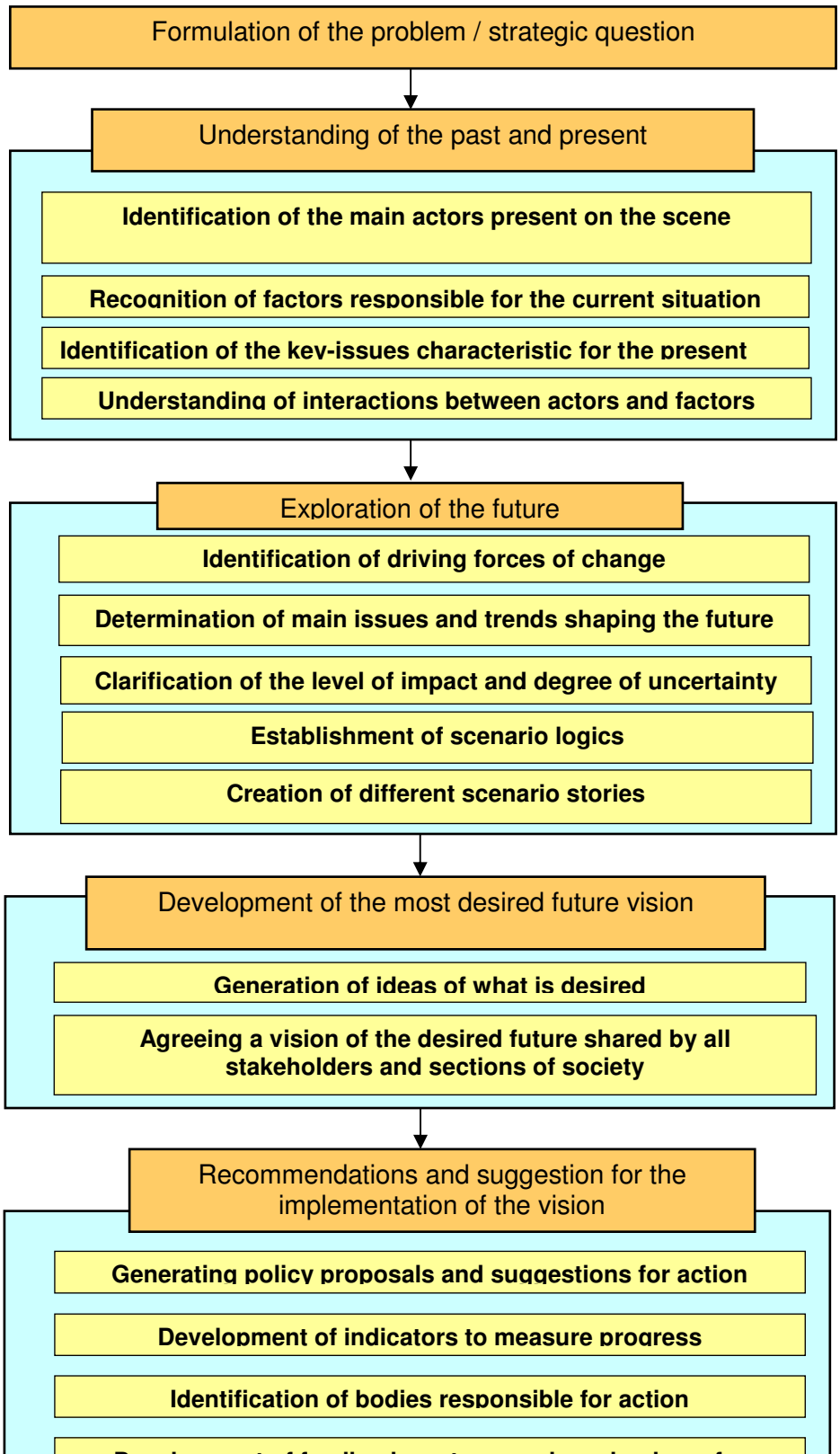

Exhibit 2: The Prospective process (after Godet, 2001)

STAGE	OBJECTIVES	OUTPUT
Framing	Scoping the project: attitude, audience, work environment, rationale and purpose, objectives and teams.	Focal Issue
Scanning	Collecting information: the system, history and context of the issue and how to scan for information regarding the future of the issue.	Information
Forecasting	Describing baseline and alternative futures: drivers and uncertainties, tools, diverging and converging approaches, and alternatives.	Baseline and Alternative Futures
Visioning	Choosing a preferred future: implications of the forecast, and envisioning desired outcomes.	Preferred Future
Planning	Organising to achieve the vision: strategy, options and plans.	Strategy and Plans
Acting	Implementing the plan: communicating the results, developing action agenda and institutionalising strategic thinking and	Actions

intelligence systems.

Tab

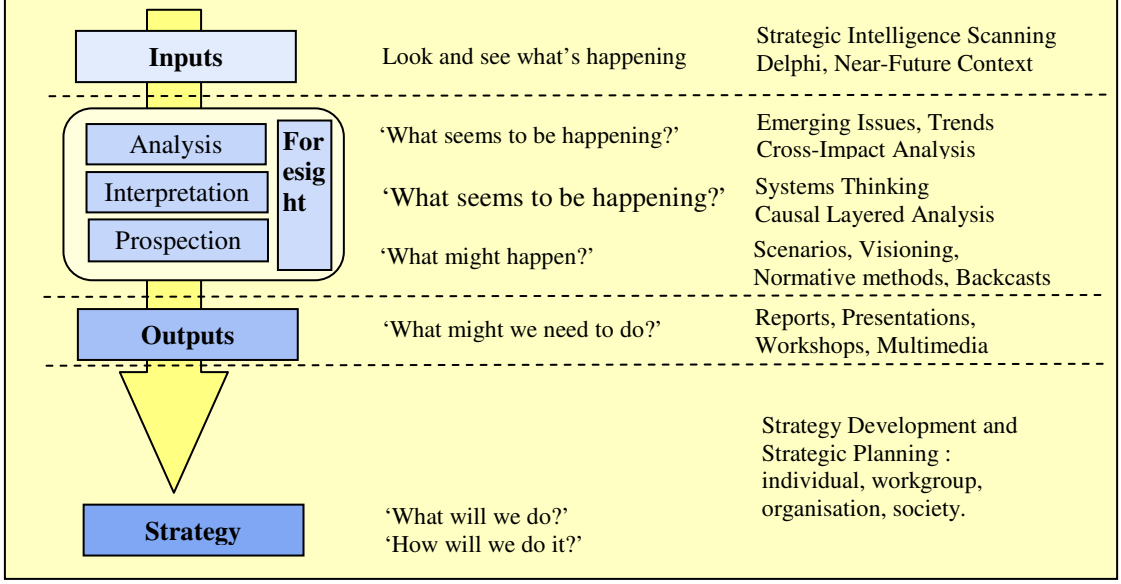

Exhibit 3 The generic Foresight process framework with questions describing activities and methods employed at each stage (Voros 2003)