ADDRESSING THE CHALLENGE OF BEING 'DATA RICH BUT INSIGHT POOR' IN BOSTON, MASSACHUSETTS

Charlotte Kahn and Holly St Clair

As is true for the Republic of Ireland and Northern Ireland, significant trends in the United States increasingly reflect the impact of global forces. These include rapid global population growth and movement, economic globalisation, the ascendance of emerging economies, technological innovation, globalised security issues and global climate change. Indeed, the decade now coming to a close has proven to be one of one of the most volatile – demographically, economically, technologically and environmentally – in human history.

Now, more than ever, we need well developed systems of measurement to track rapid change at the micro- and macro-levels and to navigate and assess patterns of relationships among them. The current economic crisis – as well as coming challenges such as climate change – open our communities to what some have called 'the utility of trouble', the notion that in a time of severe challenge, given sufficient goodwill, good data and effective collaboration, communities can draw on heretofore untapped creativity; resulting not only in cost savings but even better service provision and breakthroughs in regional planning and economic development to support more just, prosperous and sustainable societies in the 21st century. However, the recent global economic shock revealed the degree to which most nations have failed to create such systems, despite access to the necessary data and technological capacities.

In this context, communities at the forefront of developing and using comprehensive measurement frameworks to track, presage and navigate change may have lessons to offer. The growing number of community, municipal and regional-scale indicator projects attest to the presence of an emerging field that has developed in response to new technological capacities at the community level. The field is also evolving in response to a deeply felt need to ground policy and practice in community knowledge, in more rigorous data-driven strategies and in greater organisational and government transparency and accountability.

A number of new organisations have formed to advance this emerging field. The Community Indicators Consortium (CIC, http://www. communityindicators.net), incorporated in 2006, is a global community of practice that brings together practitioners, academic experts and public officials to share and build knowledge about the art and science of using data and indicators to drive and track change at the community and regional levels as well as the integration of community indicators and performance measurement. Another is the National Neighbourhood Indicators Partnership (NNIP, http://www2.urban.org/nnip), coordinated by the Urban Institute in Washington DC, which is now embarking on a plan to track a comprehensive set of indicators of neighbourhood well-being across 40 American cities. The Public Performance and Measurement Reporting Network (PPMRN, http://www.ppmrn.net), based at Rutgers University, brings together experts and practitioners seeking to increase government effectiveness and transparency through performance measures, and offers an archive of relevant research.

At the national scale in the United States, the General Accountability Office (GAO, http://www.gao.gov) – at the request of Congress – has researched best

practices in the US and worldwide in order to inform a new public-private partnership between Congress and the National Academies of Science, *the State of the USA* (SUSA, http://www.stateoftheusa.org), which will compile and disseminate key indicators in 12 or so major categories.

At the global level, the OECD's Global Project (http://www.oecd.org) has built a best practices knowledge base on how best to measure human progress over the course of three biennial World Forums on Statistics, Knowledge and Policy (held in Palermo, Italy in 2005, Istanbul, Turkey in 2007 and in Busan, Korea in 2009, with the next World Forum planned for India in 2011). Also in 2009, President Nicholas Sarkozy's Commission on the Measurement of Economic Performance and Social Progress, co-chaired by Nobel Prize winning economists Amartya Sen of Harvard University and Joseph Stiglitz of Columbia University, released its field-defining report.

For most of these initiatives, a major shared challenge is to create a comprehensive system of measurement that speaks to, and reflects upon, local conditions and jurisdictions, while accounting for environmental and economic forces that transcend neat political boundaries. Another is the cross-cutting and complex nature of concepts such as 'environmental sustainability' and 'social equity' and the challenge of expressing them fully within a framework, detailing data and indicators in specific domains such as health, housing and education.

This paper focuses on how two institutions in Greater Boston, the Boston Foundation and the Metropolitan Area Planning Council (MAPC), have partnered over the past decade, along with the City of Boston, to create a nested system of measurement that can also accommodate complexity. They operate from the sub-neighbourhood level within Boston and neighbouring communities to the Greater Boston region, state, multi-state and, as relevant, national and global levels. This paper covers four major components of their shared work in developing a nested system of data access, indicators and data visualization:

The Boston Indicators Project and Emerging Civic Agenda
MetroBoston DataCommon Website, Data Day and User Support
MetroFuture Regional Plan and Indicators (with examples of impact)
Next Phase: The WEAVE Data Visualization Platform.

1. **The Institutional and Local Context**
    Before detailing the results of this work, we begin with a brief overview of the two institutions and the City of Boston in a regional context.

The Boston Foundation
The Boston Foundation (http://www.tbf.org), Greater Boston's community foundation, is one of the oldest and largest community foundations in the United States, with assets of about $750 million. The Foundation is made up of some 900 separate charitable funds established by donors either for the general benefit of the community or for special purposes. In 2009 the Foundation and its donors made more than $95 million in grants to non-profit organisations. The Boston Foundation also serves as a neutral convener and civic leader, provider of information, and sponsor of special initiatives designed to address the community's and region's most pressing challenges. Its mission statement is as follows:

As Greater Boston's community foundation, the Boston Foundation devotes its resources to building and sustaining a vital, prosperous city and region, where justice and opportunity are extended to everyone. We fulfill this mission in 3 principal ways: making grants to non-profit organisations and designing special funding initiatives to address this community's critical challenges; working in partnership with donors and other funders to achieve high-impact philanthropy; and serving as a civic hub and centre of information, where ideas are shared, levers for change are identified, and common agendas for the future are developed.

The Boston Foundation is committed to issuing a biennial Boston Indicators Report through 2030, Boston's 400th anniversary.

The Metropolitan Area Planning Council

A quasi-public agency whose existence was mandated by the Massachusetts Legislature in the 1960s, the Metropolitan Area Planning Council (MAPC, http://www.mapc.org), is Greater Boston's planning organisation. It provides planning, technical assistance and data to the people who live and work in Greater Boston's 101 cities and towns. With a mission to achieve smart growth and regional collaboration, MAPC is governed by a council comprising municipal representatives, government appointees, and state and regional agency members. MAPC's 45 staff members have extensive expertise in land use, housing, transportation, environmental issues, public health, public safety, data analysis, legislative affairs, and municipal collaboration. MAPC conducts the annual Comprehensive Economic Development Strategy (CEDS) for the Economic Development Administration (EDA), and is a member of the Boston Metropolitan Planning Organisation (MPO) and vice-chair of the MPO's Transportation Planning and Programming Committee. MAPC is a founding board member of the Massachusetts Smart Growth Alliance, and the principal author of *MetroFuture*, the region's smart growth plan. MAPC will administer the region's Sustainable Communities Programme and facilitate its work. Its data analysis, tool building and capacity building are coordinated by its seven member Data Services Department, of which Holly St Clair is the Director.

Boston in a Regional and Global Context

Given the closely woven histories of the USA and Ireland, many readers will be familiar with Boston. For those who are not, Boston is an old city by US standards, founded in 1630. With a population of about 600,000 – spread out over fewer than 50 square miles – Boston contains less than one-tenth of the population of the Commonwealth of Massachusetts and just a fifth of its metropolitan region of about three and a half million. However, it is a 'large' small city, with a reach well beyond its size. Boston and its environs combined contain one of the highest concentrations of colleges, universities, cultural and medical institutions in the world, with more than 300,000 students enrolled in the region each year.

Moreover, it is one of the most job-rich and beautiful cities in the United States, nearly doubling its working population each day as commuters flow into the city from across the region. Having made the shift in recent decades from a manufacturing to Information Age hub, Boston is also a global centre of innovation, the engine of the multi-state Greater Boston economy encompassing about five million and the principal driver of the six-state New England economy of about 14 million.

As a result of its unusual assets and scope, Greater Boston is one of the few regions with almost inexhaustible innovative capacity – even in the current downturn – and the potential to address its own and the world's most intractable challenges. For that reason, Greater Boston's measurement frameworks, practices and technological platforms both reflect the wealth of local intellectual capital and have implications for impact well beyond the boundaries of Boston and the Greater Boston Region.

2. Developing a Nested System of Data, Indicators and Data Visualization

The Boston Indicators Project and an Emerging Civic Agenda

A partnership among the Boston Foundation, MAPC and City of Boston, the Boston Indicators Project (http://www.bostonindicators.org) is largely coordinated and funded by the Boston Foundation, Greater Boston's community foundation. Its goals are:
to democratise access to high quality data;
to foster informed public discourse; and
to track progress on shared civic goals.

The Boston Indicators Project was conceptualised in 1997 as a 'one-stop shop' or portal for understanding conditions and trends in Boston in a regional context. It was born of the desire to respond to a related set of unmet needs, namely:

• the limited accuracy of the US Census and annual American Community Survey;

• the lack of consistent access to high quality data in a comprehensible and easy-to-use format on the part of residents and people working at the community level;

• the lack of tools to support cross-sectoral analysis, planning and policy-making based on patterns within and across sectors, while the achievement of large societal goals such as equity and sustainability require such tools;

• the great distance between irrefutable academic research findings and their application in community-based settings; and

• the lack in Boston of opportunities for informed, sustained civic discourse of the quality that could lead to shifts in shared understanding and to a broadly supported civic agenda.

The Boston Indicators Project's theory of change is that broad access to well organised data and information – combined with opportunities for civic dialogue across the boundaries of sector, geography, race, age, and income – will result in more collaborative, strategic, and effective policies and civic action than would otherwise occur. In this sense, the Project uses data and information to create the civic common ground on which new relationships can form and new thinking can occur. At its core, the Project aims to expand Bostonians' capacity to make wise choices in order to create a more just, prosperous and sustainable future for all residents of the city and region.

In addition to its major partners, MAPC and the City of Boston, the Project collaborates with many community-based organisations, universities and research institutes, public agencies and civic institutions, providing a well organised and accessible container for the excellent research and data produced in and about the city and region. City,

state and federal agency staff, community-based organisations, civic institutions, university-centred research institutes, and independent think-tanks have all contributed their research and data, and all have participated in a range of gatherings designed to provide opportunities for dialogue, deliberation and reflection about current trends and effective strategies to attain long-term goals. The Boston Indicators Project's tag line is 'Measuring what we value – a project of Greater Boston's civic community.'

Measurement and Goal Setting

The Boston Indicators Project operates on two distinct but related tracks: a data track and a deliberative, or Civic Agenda, track. While functionally distinct, they each play a role within the Project's two-year cycle leading up to, and following, the release of a biennial report. Both are expressed in the Project's work on a continual basis, as well as in the design of its website. For example, a summary report highlights key issues drawn from data from updated indicators, sectoral convenings, and other forms of civic deliberation to 'tell a story' to a broad audience, reaching across sector 'silos' and highly bounded geographies to connect the statistical dots in ways that the broad public, as well as the media, can grasp as worthy of their attention.

On the data side, the Project tracks change and progress in 10 sectors through approximately 70 asset-oriented goals and 150 measures that emerged through the deliberations of Project participants over several years. This framework includes both conventional categories for which administrative data are regularly collected at the local, state and national levels, and sectors idiosyncratic to the Boston Indicators Project. Together, they make up a comprehensive indicators framework including: Civic Vitality; Cultural Life and the Arts; Economy; Education; Environment; Health; Housing; Public Safety; Technology; and Transportation.

This sector-specific framework is augmented by a web-based 'cross-cut filter' feature that pulls

Percent Change in Massachusetts Family Median Income by Quintile, 1979-2006
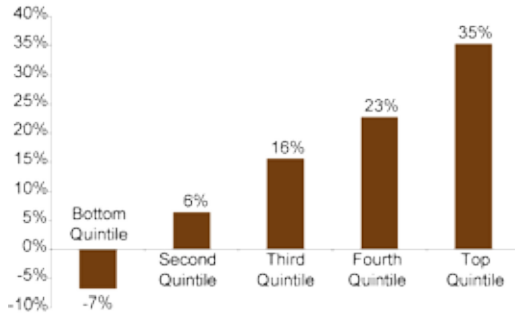
Source: Donahue Institue analysis of US Census Public Use Microdata Series

measures from each sector to support cross-sectoral categories: Boston Neighbourhoods; Children and Youth; Race and Ethnicity; Sustainable Development; Competitive Edge; and Fiscal Health. This cross-cutting mechanism encourages users to think about data and community conditions holistically, expressing linkages across sectors, and supports more systemic analyses and collaborative strategies.

In addition, the Boston Indicators Project website contains features that reflect its commitment to broadening participation, simplifying the use of data and information, and stimulating new thinking about Greater Boston's key challenges and opportunities. These include statistical profiles, A Hub of Innovation and An Emerging Civic Agenda.

An Emerging Civic Agenda

Released in 2004 for the first time, the Civic Agenda reflects the ideas and aspirations of thousands of participants over the life of the project, as well as a confluence of recent research findings, and lays out a small number of measurable goals in four overarching categories: **An Effective, Inclusive Civic Culture; World Class Human Capital; 21st Century Jobs and Economic Strategies**; and **21st Century Infrastructure**. The Project is now engaged in moving this agenda forward by seeking to identify and encourage action on high-leverage points that cut across these major areas.

In that spirit, the Project seeks to build consensus, or at least broad support, for a set of goals, or an agenda, against which progress can be methodically tracked through 2030. It convenes participants such as business, civic and community leaders, academic experts and community stakeholders to elicit trends, issuing a provocative bi-annual summary report that garners media attention and stimulates discourse and debate about where we are, where we're going, where we need to be. Its findings are also used to inform strategic briefings and civic forums. The goals for the civic agenda are to create shared understanding, the alignment of resources, and action on key challenges and opportunities.

Percent of Boston Families with Income Less than $25,000 / Greater than $100,000 by Race/Ethnicity, 2008
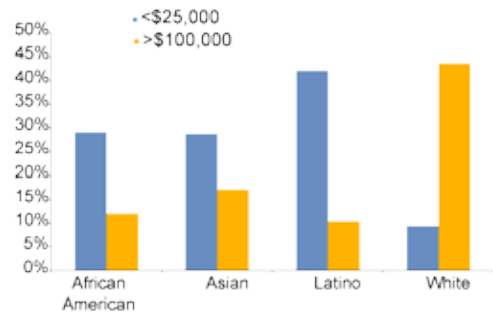
Source: US Census Bureau, American Community Survey

This approach encourages stakeholders to imagine a shared future beyond traditional time constraints such as election cycles, and to venture across traditional boundaries, whether geographic, socio-economic, racial/ethnic or generational. In these ways, the Project is laying a foundation for collaborative action that may have to be sustained for a generation to fully attain desired outcomes. Within this biennial rhythm and consistent framework of indicators, the Project continues to evolve. With leadership at the Boston Foundation willing to take tough data-driven stands on key issues and an excellent communications staff, the Boston Foundation has used the presence and capabilities of

the Boston Indicators Project to increase its visibility and impact as a major civic leader in Greater Boston and nationally.

A Biennial Indicators Report

The biennial Boston Indicators Reports, released since 2000, combine the data and Civic Agenda tracks. Both data-driven and somewhat provocative, these reports are designed to get the attention of Greater Boston's civic community and to spark informed dialogue and debate.

For example, the Project's latest report *A Great Reckoning: Healing a Growing Divide* took on the issue of income inequality. A spatial analysis of income and equality by all US counties showed that Suffolk County in Massachusetts is one of only 47 counties in the nation with this level of inequality – more like counties in the deep American South than most parts of the country. This finding was a blow to a place that thinks of itself as 'enlightened'. Analysis also showed that in Boston in 2008, the top 5 per cent held 25 per cent of total aggregate


household income while the bottom 20 per cent only 2 per cent.

Moreover, the same analysis, using the Organisation for Economic Co-operation and Development (OECD) data for the year 2007, showed that the United States is now an outlier among its peers in income inequality. The second and third largest economies in the OECD, Germany and Japan, are among the least unequal while Ireland, the UK, France and Canada are in the middle, so there is nothing about the size of an economy that favours income inequality.

Because of this, we concluded that in Boston, as in the US as a whole, we are becoming a society of extremes. Why? In part, this is a reflection of the two-tiered knowledge economy, which rewards those with a good education and harshly punishes those without. For example, in Greater Boston one part of the region shows a very high level of educational attainment (more than 60%), while other parts of Boston, and several nearby older industrial cities, have very low educational attainment levels of 20% or lower. This is the part of Boston that contains about half of the city's children, mostly African Americans and a high concentration of Latino residents, with comparatively low household income, high food insecurity, a higher concentration of violent crime and so on. In our report and briefings, we refer to this concentration as the 'geography of inequality.'

This is also the part of Boston that experienced the greatest rates of predatory and sub-prime lending and subsequent housing foreclosures. In other words, the people who could least afford it were marketed to, and their sub-prime mortgages bundled, securitised and sold on world markets. As is now well known, these practices, which were widespread in the US, almost brought down the world economy.

This stark fact brings us full circle in our understanding of the importance of nested data and indicator systems. If it had been able to track mortgage loan data at the local level, scaled up to
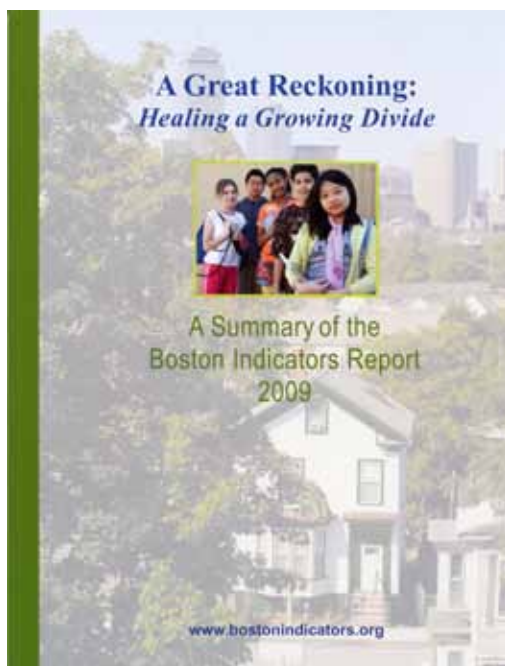
larger geographies, the Project might have been able to sound an alert and prevent the scope of the recent housing market debacle. In this case, the smallest scale data was in fact the most important in terms of presaging trends.

Core Principles and Lessons Learned

Early on, participants agreed to use **an asset-oriented framework** to encourage users of the system to work toward progress on attaining explicit high-leverage goals and increasing assets (such as 'third graders reading at the third grade level'; 'swimmable days in Boston Harbour', and 'a diverse economy'). This was a reaction to the measurement frameworks then in use to describe most urban communities, most of which included measures of unemployment, school drop outs, teen pregnancy, substance abuse and crime. Worse, there was no apparent way in these deficit-oriented frameworks to acknowledge a community's unique strengths or assets. Even a community doing fairly well would be painted in negative tones ('juvenile crime was reduced from x to y'), and the impetus to community improvement was a reduction in deficits, which for individuals and communities is not an inspiring or empowering goal.

The Boston Indicators Project framework is designed to express and stimulate action in attaining valued community goals. For example, in public health, one stated broad goal is 'healthy children,' in contrast to a goal-neutral category such as child health. Progress on this broad goal is measured by standard metrics such as 'adequate prenatal care', 'infant mortality rates' and 'birth weight by race', 'chronic preventable disease rates', and so on. In other words, placing standard metrics within a framework of goals serves to remind a community of its own expressed values and about where it is trying to go – making indicators doubly useful.

As the first indicators report went to the printer, Project staff realised that they had not been able to 'handle' – in the linear format of ten sectors – the important goal of expressing linkages across sectors. They turned to **systems-thinking** for help, working

with two graduate students from the Massachusetts Institute of Technology (MIT) to better understand systems dynamics, and then to create a series of workshops for participants. They later also worked with a national foundation to co-sponsor a scenario planning workshop for participants, and were able by the next report to use data more effectively to 'tell a story' with data. The systemic nature of the Boston Indicators Project is also captured on the Project's website through its 'cross-cut filter' feature. Systems-thinking allows for deeper analysis based on the basic principles of:

• Today's problems come from yesterday's solutions.
• The harder you push, the harder the system pushes back.
• The cure can make the situation worse before it gets better.
• Cause and effect are not necessarily close together in space or time.
• There are very few effective, high-leverage policies.

Indicators development processes can get mired in trying to decide between two approaches to a number of key issues: Should the system be neighbourhood-based, citywide or regional? Should it be organised by sector-specific categories or cross-cutting fields like Children and Families? Should it be expert-driven or the result of a broadly participatory process? The Boston Indicators Project reflects **a strong 'both/and' orientation**. In addition to 10 sectors, its framework includes a set of broad categories (the 'cross-cut filters' described earlier) such as sustainable development that, by their nature, cannot 'live' within a particular sector but rather draw from a number of sectors and help to highlight the importance of cross-sectoral thinking, policies, and action.

Each stage of the Boston Indicators Project, then, has involved large numbers of participants. To frame and follow-up on its biennial findings, the Project engages residents, civic, business and community leaders, government officials and academics in dialogue about the city and region's

key challenges and opportunities. Opportunities for dialogue and deliberation are created within and across sectors through small working sessions, as well as major civic events. The Project works specifically to attract a **diverse constituency**, and to build an intergenerational network of emerging and established leaders. The working sessions of the Boston Indicators Project are often the only time that a sector comes together, across its own myriad fractures and levels, to explore long-term trends, recent accomplishments and key challenges; or to explore issues across sectors, where the most powerful, high-leverage solutions are most often located.

MetroBoston DataCommon: Website, Data Day and User Support

Most people would agree that one cannot understand what is happening on one block without understanding the wider community and citywide context as well as the regional and national economic contexts, and perhaps the global environmental context as well. Our shared goal is to organise data within a 'nesting' geographic framework – at the sub-neighbourhood, neighbourhood, citywide, metropolitan, regional, state-wide, national, and in a few cases, even global levels.

In this context, one of MAPC's goals is to help cities and towns collaborate. One way to do that is to help residents of the Boston region's 101 cities and towns to identify themselves as members of one region, and to break down barriers by analysing and visualising data in nested geographies.

To that end, in 2007, the MAPC and Boston Indicators Project jointly released the MetroBoston DataCommon, an interactive on-line mapping tool and regional data repository that allows people access to multiple datasets and online analysis and mapping, without the constraints of a predetermined indicators framework. This platform contains data about the region and each of its cities and towns from a variety of largely public sources, organised in 11 categories, that help people in the region to

get access to data without the constraint of seeing everything through the lens of political boundaries alone. For example, the MetroBoston DataCommon website shows data within environmental boundaries such as watersheds. It is a resource for all those wishing to better understand how the region and its communities are changing, and helps residents, planners, city and town officials, educators, and journalists explore options and make informed decisions.

The MetroBoston DataCommon offers tools for a variety of user levels, from novice to advanced:

- Community Snapshots: This feature provides quick summary profiles of trends and current conditions for all 101 cities and towns in the MAPC region, and every Boston neighbourhood. Community snapshots are updated quarterly and include information about demographics, employment, housing, education, environment and public safety.
- The Regional Map Gallery: This is a library of maps created by MAPC staff that highlight issues of regional significance. It is often a first stop for users, before they create their own analyses, to get a general understanding of trends in metropolitan Boston. This also exhibits the many analytical and graphic possibilities offered by the online mapping tool.
- The Mapping Tool: This is a powerful tool that enables users to query data and to make their own maps. Users can look up a specific variable, analyse multiple data sets or create a customised map of one census tract, a Boston neighbourhood, a city or town or the entire region. Data can also be exported to other applications, printed, or sent though email.

User Training and Support for the User Community

Over the past five years MAPC has gained extensive experience with user training and testing by conducting training sessions for hundreds of municipal officials, community-based organisations, students, organisers, and others. MetroBoston DataCommon user-trainings are held every month at

Data Common training in Boston, Massachusetts

offices of the MAPC in downtown Boston. Attendees include town planners, government employees, staff from non-profit organisations, private research organisations, and others. Participants receive an orientation to the various components of the website and complete a hands-on tutorial of the DataMap Tool, learning to navigate and use all of the website's features and how to create their own customised maps.

Capacity-building through Data Days

Since 1997 the Boston Indicators Project, MAPC and Northeastern University have co-sponsored a 'Data Day: Using Data to Drive Community Change' conference at Northeastern University. Organised in both plenary sessions and 'tracks' by skill level – novice, intermediate and advanced – the Data Day allows all participants to move forward in their own use of data and information, to share their experience and accomplishments with others, and to advance the field as a whole. The conference generally attracts well over 250 participants from Boston's non-profit sector, academia, public agencies and, increasingly, participants from out of state.

This free one-day biennial conference helps to create the community capacity necessary to use technology and data to advance specific goals. The capacity building component of the conference is structured around a series of 'how to' interactive workshops in which people who work with data explain what they do, explore data sources, and guide participants on gathering and using data. Non-profit organisations, civic institutions and municipalities are thereby able to experience the latest in best practice methodologies, technologies and tools, and to learn how other groups are using data to support and

Charlotte Kahn and Holly St Clair present State Representative Jeffrey Sanchez with the Data Champion award at the 2009 Data Day conference.

advance constructive change. This event also serves as the MetroBoston DataCommon user conference, aiming to facilitate learning among participants at all levels of technical proficiency through opportunities to share examples of actual work accomplished, as well as frustrations and aspirations.

Data Day 2009 received an overwhelming response, with over 350 in-person attendees and more than 100 participating in the webcast over the course of the day. Examples of workshops and sessions, which ranged from beginner to intermediate to advanced, included:

• Keynote address by Northeastern University economist and Dean, Dr. Barry Bluestone, on the theme of *The Economic Crisis and Urban Neighbourhoods;*
• Understanding Public Health in Your Community:

Spotlight on Asthma and the MassCHIP Data System;
• Housing and Foreclosure Data – Citizens' Housing and Planning Association's (CHAPA's) New Database;
• Ensuring That All Are Counted in Census 2010: How Minority and Low-Income Communities Can Prepare, US Census Bureau; and
• Free Web Tools to Analyse Data and Create Maps.

The organisers of the Data Day conference also recognise the efforts of local leaders who have helped to advance the use of data to drive community change. Awards highlight data democracy, advocacy and action by public officials, leaders and community advocates. For example, the Data Champion award was presented to State Representative Jeffrey Sánchez for helping to remove

bureaucratic barriers to data-driven advocacy and policy making. The 'Excellence in Information Infrastructure' award recognised the work of Christian Jacqz of MASS GIS, Massachusetts' GIS Department. The 'Excellence in Capturing Local Knowledge' award went to Meridith Levy, a local activist who used data on the ground to harvest local knowledge at the Somerville Community Corporation. Finally, the 'Excellence in Neighbourhood Empowerment' award went to Jeremy Liu, Director of the Asian Community Development Corporation, for his group's creative use of data to help residents in their decision-making about Chinatown's future affordable housing. These awards not only recognise the hard work of the individuals but highlight success stories, and illustrate the many collaborative actions needed to achieve both data democratisation and impact.

The MetroFuture Regional Plan, Indicators and Examples of Impact

MetroFuture is a bold, achievable plan to better the lives of the people who live and work in Metropolitan Boston between today and 2030. Capitalising on the region's assets – its diverse people and landscape, history of innovation, and commitment to education and civic engagement – MetroFuture focuses growth in already densely built areas linked by a more efficient transportation system. This, it is contended, will allow for the conservation of land and natural resources, as well as investments in health and education, regardless of race or ethnicity, with the goal of expanding prosperity to all.

Developed with the participation of thousands of 'plan builders' – residents, municipal officials, state agencies, businesses, community-based organisations, and institutional partners – throughout the region, who shared their visions for the future, the plan rests on alternative scenarios using data and sophisticated computer models, and civic dialogue about priorities. The process concluded with the adoption of the MetroFuture Regional Plan which was then formally adopted by MAPC in 2008. To support this process of deliberation, MAPC's Data Services Centre created demographic and

economic projections and a set of specific goals for the year 2030, as well as objectives and indicators to measure progress; implementation strategies containing recommendations for actions needed to achieve the goals; and a plan to use data and information at the local, regional, and state levels.

Coordinated planning, efficient infrastructure investments and successful development policies all require access to pertinent, accurate and timely data. Expanded access to information will help residents and other stakeholders to participate more fully and effectively in planning efforts. The first step in capacity-building is to align data collection and research to support key policies. Ensuring access to and utility of data also requires a strong information infrastructure – both technical and institutional – and support for the widespread application of advanced tools to support stakeholder engagement.

Mean net worth of US households headed by a person under 30, by decile, 2007 ($ in 1,000)

Source: Federal Reserve Board of Governors, Survey of Consumer Finances
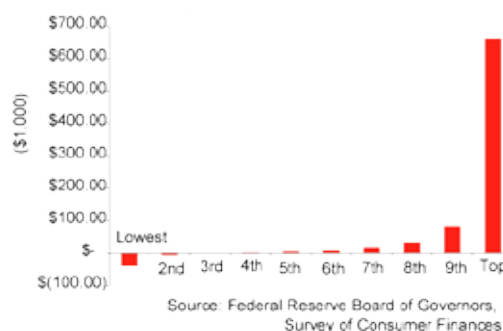
Regional Indicators

A regional indicators framework is necessary to make periodic quantitative assessments of conditions to support policy development as well as accountability. Currently, however, most decision-makers and stakeholders do not have timely access to the data they need. While many public agencies maintain databases rich with information, they are not available to other agencies or to the public due to concerns related to security, technology and bureaucratic inertia and resistance.

Where they are available, data sets often cannot be compared or cross-referenced because common indexes do not exist. More significantly, critical data on pressing policy issues are simply not available because the information is not collected consistently.

Metro Boston is now well-positioned to pilot a new approach to regional data collection that can overcome these obstacles, and local, regional, and state actors can act now to create a 'federated' system of data sources and services. A strong framework of consistent standards and protocols will create flexibility, save money, enhance access, and foster collaboration across state agencies and the public. This new approach will require several steps:

- Policy-makers and the organisations involved in collecting and analysing data must work together to ensure the necessary information is available to craft effective policy and better understand the region.
- To connect information to decisions and support civic engagement, investments must be made to improve state and local capacity to utilise planning and decision support tools.
- State and regional data intermediaries – organisations that collect, analyse, and disseminate data - will need both new strategies and new resources;
- Finally, these intermediaries must take the strategic step to build and maintain a comprehensive information infrastructure.

Regional Indicators will help the region to assess progress toward the MetroFuture goals, to inform policy and foster greater collaboration across municipalities. The development of regional indicators also supports the accountability of public agencies and officials, and enables cities and towns and public policy-makers to identify trends and conditions in neighbourhoods. This will strengthen regional identity by highlighting shared trends throughout the region.

Moreover, only by looking at the distribution of the 'whole pie' can issues of equity be identified and addressed. To that end, MAPC is now working on

an 'Equity Report Card' as a companion to regional indicators.

Certain data sets are not widely available, but are particularly important to MetroFuture implementation. The 'top ten most wanted data sets' are missing pieces critical to more informed planning and public policy decisions, such as data on water and sewer lines. While there is currently no such comprehensive regional information system, much of this information is already collected by the state for administrative reasons. However administrative data sets, even those lacking personal data, are often inaccessible to planners and policy-makers due to confidentiality concerns and lack of consistent funding. Filling these identified needs would not necessarily involve expensive data collection efforts if standards institutionalising data-sharing could be part of a federated data-sharing infrastructure. Furthermore, new technologies are transforming the nature of data collection. New urban sensing and data collection technologies are making possible entirely new types of data that can be updated on a regular or ongoing basis, stored in an easy-to-maintain manner, and be formatted to facilitate analysis and cross-referencing.

Examples of Impact: The Metro Mayors' Coalition
Collaboration – informed and guided by access to excellent data and analytical tools – will assist local and state government as revenue streams shrink in response to high unemployment, sluggish retail activity, and declining home prices. Because Massachusetts is a 'Home Rule' State, however, every city and town has its government, its own mayor or manager, its own assessments, its own Board of Health, school department, and Board of Planning. Too often, neighbouring towns can feel like two different countries whose leaders refuse to talk to one another. In this respect, Greater Boston can reflect, on a small scale, the challenges writ large in the Republic of Ireland and Northern Ireland.

Moreover, sharp increases in public employee health insurance and pension payments, coming due with 'baby boomer' retirements, are swelling local budgets, forcing cities and towns to be more strategic. Across

the island of Ireland, as in the US, budgetary challenges translate into the cutting of police officers, firefighters and teachers, public health or some other function, and the range and frequency of services to the citizens of towns and cities suffer.

Data-driven strategies and tools help MAPC to support and inform such collaborative initiatives as the Metro Mayors Coalition, a groundbreaking coalition that includes the Mayor of Boston and the mayor or city manager from twelve surrounding cities and towns, who come together to candidly discuss their challenges. These mayors and managers have worked together for a number of years to address common issues and policies, with significant success. For example:

- The Metro Mayors' Coalition solicited and received funding from state government for a feasibility study to determine the costs and benefits of a regional emergency communication system. Now, instead of 13 disconnected municipalities, these 13 cities and towns have a coordinated emergency preparedness system.
- MAPC's 'Choose Metro Boston', an online mapping service of commercial and industrial sites, helped to promote and facilitate a more collaborative approach to new business development and job growth. Too often, cities and towns compete against each other to attract businesses based on who can give the biggest tax break, lay the most sewer pipe or provide the best roads, without asking the essential question: where is the best place for this particular company to locate within our own particular region? As a result, planning is *helter skelter* and can actually undermine the region's best long-term interests by siting new commercial development, for example, on scarce productive farmland or ignoring the possibilities of an empty, but well-fitted, older industrial park.

The Metro Mayors Coalition has also worked to address regional solutions to gang and youth violence. An analysis showed that youth violence does not conform to political boundaries, but spreads out along subway lines. This is because the youth can get on at a transit stop in one municipal jurisdiction and get off at the next, where local police can't touch them. As a result, local police departments have developed a regional strategy to reduce youth violence.

Another area is collective procurement: shared services, public highway maintenance, office supplies and municipal fleets. In some cases, cities and towns are not ready to collaborate on public policy, housing policy and public safety, but are willing to start with smaller collaborations first. Often municipalities will start small and collaborate, for example, on the purchase of offices supplies, thus slowly building trust among the communities. Recently, this model has accelerated. Previously each fire truck in the United States was a custom order and very expensive. We are now putting out the first Request For Proposals (RFP) for fire trucks, specifying how they will all be built and asking for a combined bid on the price. Increasingly, cities and towns are exploring shared municipal services such as public health, human resources hiring and back office services; as well as public safety dispatch and equipment, fire inspection and prevention, and mutual aid in a natural disaster.

A final example: A local councilman said, 'We're trying to make capital improvements for our town's fire station and don't have enough money, but there's another station just over the town border. Could you make a map?' MAPC staff talked the councillor through the Metro Boston DataCommon's WebMapper and they constructed a map over the telephone, which he then took to a Town Meeting. As a result, it became clear to all that it made great sense to upgrade the two stations through a shared contract, achieving significant economies of scale. Now his town and the neighbouring municipality are collaborating on other capital investments.

3.   The Next Phase: Data Visualisation and the Weave Platform

For the past several years, the Metropolitan Area Planning Council and the Boston Indicators Project have been working with colleagues at the University

of Massachusetts Lowell and seven other regional teams as founding members of the **Open Indicators Consortium** (OIC, http://www.openindicators.org/portals). The goal of this multi-stakeholder initiative is to develop an open source data visualisation platform that will allow users to freely visualise data at various scales through new software – Web-based Analysis and Visualization Environment, or *Weave* – on which anyone can load their data with compatibility across systems. This is not unlike the All-Island Research Observatory (AIRO)[8] project being undertaken by Justin Gleeson at the National University of Ireland, Maynooth.

Through this high-performance platform, the initiative seeks to transform publicly available nested data into visually compelling, actionable indicators to inform public policy and community decision-making. Founding consortium members provided more than $1 million by combining local fundraising with the highly qualified, under-market technical resources of the University of Massachusetts Lowell to bring *Weave* to this point. In addition to the two partners in Boston, other partners include:

- Arizona: Arizona Indicators includes Arizona State University (Morrison Institute for Public Policy), Arizona Community Foundation, Valley of the Sun United Way, *The Arizona Republic*, and Arizona Department of Commerce;
- Atlanta/Metro Atlanta: a multi-stakeholder partnership, Neighbourhood Nexus, including the Atlanta Metropolitan Commission, Emory University, and the United Way;
- Chicago/Metro Chicago: Chicago Metropolitan Agency for Planning, the official regional planning organisation for the seven Illinois counties;
- Columbus/Central Ohio: Community Research Partners, a regional partnership of the United Way, the City of Columbus and Ohio State University, and the Mid-Ohio Regional Planning Commission (thus serving a 12 county region around Columbus);
- Connecticut: The Connecticut Data Partnership, including Connecticut Economic Resource

Centre, DataHaven, Connecticut Health and Education Facilities Authority and allied organisations;
- Massachusetts: The Massachusetts Department of Early Education and Care;
- Rhode Island: A collaboration of the Rhode Island Department of Education, Providence Public Schools, The Providence Plan, a regional research and data organisation, and the Annie E. Casey Foundation's Making Connections Providence.

With leadership and expertise from a highly qualified team of faculty and doctoral students in computer science at the University of Massachusetts Lowell, OIC brings together technical and academic innovators with public and non-profit data providers and data users from around the nation to collaborate in the development of *Weave*, a highly interactive open source web-based software platform. The fundamental goal in developing *Weave* is 'to enable data visualisation of any available data, anywhere, by anyone under appropriate and state-of-the-art administrative and security controls'.

As it evolves in response to the needs and preferences of a growing community of users, *Weave* will:
- Expand access to, and the use of, high quality data;
- Facilitate data dissemination and distribution;
- Support exploration and comparisons within, and across, geographic scales;
- Provide tools for communication and collaboration;
- Enhance transparency and accountability;
- Encourage innovation and creativity; and
- Solve complex problems requiring multiple people and organisations.

By making available state-of-the-art tools for the analysis and visualisation of economic, social and environmental data in nested geographies, the Open Indicators Consortium aims to spur the democratisation of high quality data and collaborative, data-driven problem-solving within

Figure 1: Black or African American* Population, Metro Boston's Inner Core, 2000
*Non-Hispanic
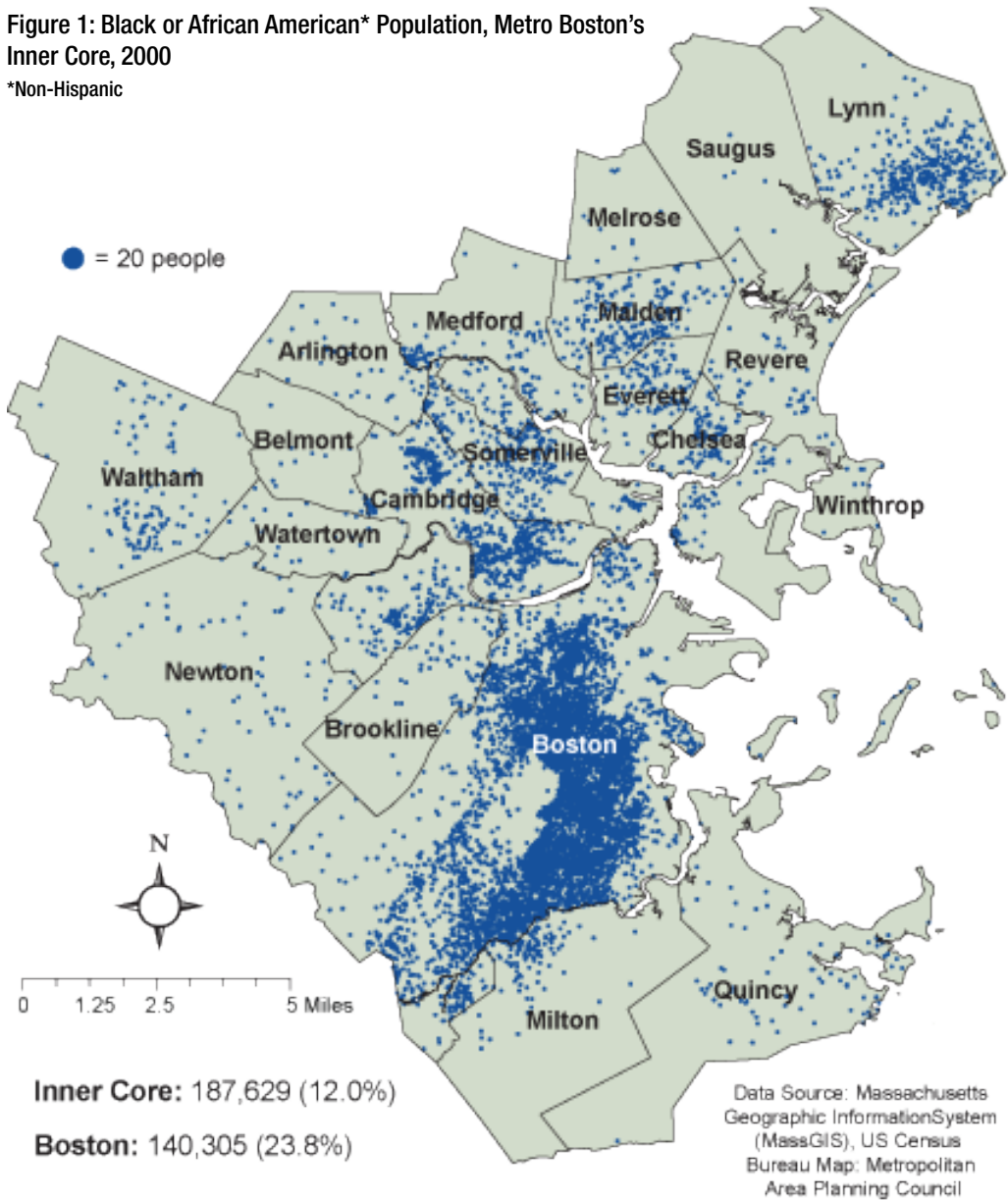
and across neighbourhoods, communities, sectors, regions, states and nations.

Weave allows a range of users to explore, analyse, visualise and disseminate data on-line from any location at any time. The new platform offers multiple levels of user proficiency from novices to advanced researchers, advanced security features, and the ability to integrate, disseminate and visualise data at 'nested' levels of geography – from micro to macro. Through its robust community, and free code for NGOs and government, with a licensing fee only for major commercial use, *Weave* is poised to become the international standard for community

data visualisation and a state-of-the-art web-based data platform of choice for neighbourhood-based, municipal, county, state and federal organisations and agencies and hundreds of community indicator projects across the USA and abroad. The participation of *Weave* developers and users in shaping international data standards and protocols will also drive improvements in data availability, quality, visualisation and collaboration techniques, and interoperability.

A hard launch is planned for the spring of 2011, by which time the founding members will have developed new websites showcasing *Weave's* full capacity as expressed by four states, four U.S regions and many municipal and sub-municipal geographies. When fully developed, *Weave* will address the needs, capabilities and preferences of four levels of users:
1) **Novice users** – The Engaged Public, Busy People, Secondary School Students;
2) **Intermediate-level users** – The Educators, Policy Makers, Non-profit and Foundation Staff, City and Town Planners, Media Professionals;
3) **Advanced users** – Trained Researchers, Analysts, Statisticians; and
4) Innovators, Programmers, Developers

The Open Indicators Consortium is now looking ahead to years 3-5 of continued development, innovation, refinement of the tool itself and its dissemination, as well as to ways to support a growing collaborative community of open source developers and public and non-profit users. To support this next phase, OIC is reaching out to additional primary partners in the public and non-profit sectors, to philanthropic funders, and to social venture investors to join in creating a state-of-the-art, robust, continually improving open source alternative to expensive proprietary systems.

Already a growing community of practice is beginning to serve the shared and disparate needs of researchers, funders, planners, analysts and the engaged public to explore and communicate current conditions and recent trends. In *Weave's* ability to surface complex patterns in nested geographies and to make local, regional, national and global comparisons possible, it is also helping to address the societal

challenge of being 'data rich but insight poor'.

Charlotte Kahn co-founded and is Director of the award-winning Boston Indicators Project at the Boston Foundation, coordinated in partnership with the City of Boston and the Metropolitan Area Planning Council. Charlotte currently serves as president of the Community Indicators Consortium, a global network advancing the use of indicators and data to drive change. She is also co-founder of the National Neighbourhood Indicators Partnership involving 30 American cities and coordinated at the Urban Institute, and a leader of the Open Indicators Consortium at the University of Massachusetts-Lowell through which seven U.S. regions are collaborating to develop a high-performance open source data visualisation platform. She holds a Masters from Antioch University, and was awarded a Loeb Fellowship in Advanced Environmental Studies by the Harvard Graduate School of Design.

Holly St. Clair is the Director of Data Services at the Boston region Metropolitan Area Planning Council (MAPC), overseeing the agency's activities in the fields of data management and analysis, research, and public access to data. Holly has pioneered the use of advanced decision support tools in Metropolitan Boston, managing a variety of projects that use scenarios modelling, 3-D environments, community indicators and innovative meeting formats to engage stakeholders in dialogue about policy choices. She has spearheaded the creation of the MetroBoston DataCommon, an on-line data portal and interactive web mapper that puts hundreds of data layers at the fingertips of residents, public officials and advocates who would not otherwise have access to such information. She holds a Masters of Urban and Environmental Policy from Tufts University.

Endnote

[1] See www.airo.ie for further information.