

Using COBIT 5 to Get and Give Board Support for Revolutionizing Cities

Most people, including many readers of this article, live in cities. Revolutionizing cities may seem like it is not an IT or technical issue, but smart sustainable cities are important for IT professionals. Why is revolutionizing cities relevant to IT communities and society as a whole? Because information technology has been and can be a strategic resource not only to transform a city into a smart city or a smart sustainable city, but also to transform citizens' lives.

As the body responsible for city IT governance, the city board must include this new model as part of the city's context and the stakeholders' needs. But the city board is a stakeholder, too. It needs adequate information about the extent to which IT can help to achieve city goals to support its governance activities of evaluating, setting direction and monitoring. So, goals and metrics for IT in the unique city context are required. This need can be satisfied by selecting, connecting and aligning goals and metrics from COBIT® 5 and other relevant publications and producing a single, useful matrix of IT-related goals for smart sustainable cities.

Cities, Smart Cities and Smart Sustainable Cities

The definition of "city" has evolved and IT has been an enabler for that evolution. A city is defined as an urban geographical area with one (or several) local government and planning authorities.¹

A smart sustainable city (SSC) is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation, and services and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental and cultural aspects.² A smart city applies the new generation of information technologies, such as the Internet of Things (IoT), cloud computing, big data and space/geographical information integration, to facilitate the planning, construction, management and smart services of the city.³

A city's stakeholders are city inhabitants, government and regulators, the private sector, IT manufacturers and vendors, the international and national investment community, and other cities and nations and their boards and executive managers.

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Customizing COBIT 5's IT-Related Goals and Metrics for Smart Sustainable Cities

The COBIT 5 goals cascade is the mechanism to translate stakeholder needs into specific, actionable and customized organizational goals, IT-related goals and enabler goals.⁴ It also includes a list of sample metrics for each IT-related goal. Boards and executive managers should review the list, decide on relevant and achievable metrics for their own environments, and design their own scorecard systems.⁵

Cities establish their goals and metrics with different parameters. For example, according to the United Nations Habitat's City Prosperity Index, there are five dimensions of prosperity that could be considered: productivity, infrastructure development, quality of life, equity and social inclusion, and environmental sustainability.⁶ Like ISACA® and COBIT 5, some important international organizations considered it desirable for cities to be able to quantify their achievement according to their goals and have published very useful publications. For example:

- The Key Performance Indicators Related to the Use of Information and Communication Technology in Smart Sustainable Cities standard by the International Telecommunication Union (ITU)⁷

- The Organisation for Economic Co-operation and Development (OECD) *Science Technology and Industry Scoreboard 2017: The Digital Transformation* publication⁸
- Global Indicator Framework for the Sustainable Development Goals and Targets of the 2030 Agenda for Sustainable Development⁹
- The New Urban Agenda, which represents a shared vision for a better and more sustainable future, one in which all people have equal rights and access to the benefits and opportunities that cities can offer and in which the international community reconsiders the urban systems and physical form of urban spaces to achieve this¹⁰

It is worthwhile to try to connect and merge these different resources to obtain a list of IT-related goals and metrics for SSCs, considering the balanced scorecard (BSC)¹¹ dimension as COBIT 5 does. Some metrics are the same for cities as they are for businesses and can, therefore, be taken from COBIT 5. In other cases, a broader or different perspective is required because SSCs include social, economic and environmental aspects.

By connecting and integrating COBIT 5 with these different resources, a sample version of COBIT 5's IT-related goals for smart sustainable cities, as shown in **figure 1**, can be obtained.

Figure 1—COBIT 5's IT-Related Goals for Smart Sustainable Cities

IT BSC Dimension	City IT-Related Goal	Metrics
Financial	01 Alignment of IT and city strategy	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Percent of strategic goals and requirements supported by IT strategic goals • Level of stakeholder satisfaction with scope of the planned portfolio of programs and services • Percent of IT value drivers mapped to value drivers <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Level of adoption of a smart-city approach according to the New Urban Agenda, including use of opportunities from digitalization, clean energy and technologies, innovative transport technologies, and smart grid • Level of adoption of the Sustainable Development Goals (SDGs)¹² related to making cities and human settlements inclusive, safe, resilient and sustainable, and regarding the use of ICT

Figure 1—COBIT 5's IT-Related Goals for Smart Sustainable Cities (cont.)

IT BSC Dimension	City IT-Related Goal	Metrics
Financial (cont.)	02 IT compliance and support for business compliance with external laws and regulations	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Cost of IT noncompliance, including settlements and fines, and the impact of reputational loss • Number of IT-related noncompliance issues reported to the board or causing public comment or embarrassment • Number of noncompliance issues relating to contractual agreements with IT service providers • Coverage of compliance assessments <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Cost of noncompliance, with the principles and commitment set by the New Urban Agenda and the SDGs related to the use of city IT, including both financial and nonfinancial issues and international, regional and national public comment or reputational loss • Cost of noncompliance with social and environmental laws and regulations, including guidelines for clean energy and green technologies in the city, health and labor rights, and for the protection of specific vulnerable groups such as children (cyberbullying national laws and online safety of children around the world). • Proportion of public services, devices and IoT that ensure user privacy protection • Cost of noncompliance with privacy laws
	03 Commitment of executive management for making IT-related decisions	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Percent of executive management roles with clearly defined accountabilities for IT decisions • Number of times IT is on the board agenda in a proactive manner • Frequency of IT strategy (executive) committee meetings • Rate of execution of executive IT-related decisions <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Number of metrics, decisions and policy debates related to smart and sustainable IT and digital inclusiveness that guide IT-related decision-making process and policy debate • Proportion of IT-related decisions that consider the use of enabling technology to promote childhood protection and gender equality and women's empowerment
	04 Managed IT-related city risk	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Percent of critical processes, IT services and IT-enabled programs covered by risk assessment • Number of significant IT-related incidents that were not identified in risk assessment • Percent of enterprise risk assessments including IT-related risk • Frequency of update of risk profile <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Proportion of social and environmental risk covered by risk assessment • Percent of IoT, cloud computing, big data, and space/geographical information and other future smart technologies risk covered by risk assessment • Percent of enterprises in each employment size class with a formally defined security policy

Figure 1—COBIT 5's IT-Related Goals for Smart Sustainable Cities (cont.)

IT BSC Dimension	City IT-Related Goal	Metrics
Financial (cont.)	05 Realized benefits from IT-enabled investments and service portfolio	<p>From COBIT 5:</p> <ul style="list-style-type: none"> Percent of IT-enabled investments where benefit realization is monitored through the full economic life cycle Percent of IT services where expected benefits are realized Percent of IT-enabled investments where claimed benefits are met or exceeded <p>From other specialized sources:</p> <ul style="list-style-type: none"> Proportion of social and environmental benefits covered by monitoring activities Percent of IoT, cloud computing, big data and space/geographical information and other future smart technologies covered by monitoring activities
	06 Transparency of IT costs, benefits and risk	<p>From COBIT 5:</p> <ul style="list-style-type: none"> Percent of investment with clearly defined and approved expected IT-related costs and benefits Percent of IT services with clearly defined and approved operational costs and expected benefits Satisfaction survey of key stakeholders regarding the level of transparency, understanding and accuracy of IT financial information <p>From other specialized sources:</p> <ul style="list-style-type: none"> Scope and frequency of use of social media, website and open data to share information about financial information, social and environmental benefits and risk
Customer	07 Delivery of IT services in line with city requirements	<p>From COBIT 5:</p> <ul style="list-style-type: none"> Number of disruptions due to IT service incidents Percent of stakeholders satisfied that IT service delivery meets agreed-upon service levels Percent of users satisfied with the quality of IT service delivery <p>From other specialized sources, public IT services:</p> <ul style="list-style-type: none"> Proportion of public services in the city that adopt clean and green technologies Proportion of e-waste managed Proportion of public services included in e-government services Proportion of public facilities and buildings that provide ICT-based services and information to support persons with specific needs, and proportion of online public information customized for them Proportion of city area where ICT are applied to monitor environmental resources quality (air, water, pollution and noise) Frequency of adoption of ICT to reduce the impact of natural or man-made disaster and security of a public place <p>From other specialized sources, private IT services:</p> <ul style="list-style-type: none"> Proportion of industries in the city that adopt clean and green technologies Proportion of managed e-waste Proportion of companies that provide network-based services, including e-commerce, e-banking, e-learning, e-health, smart contracts, e-entertainment and other forms of cloud computing to protect the natural environment and improve the quality of life by saving time

Figure 1—COBIT 5's IT-Related Goals for Smart Sustainable Cities (cont.)

IT BSC Dimension	City IT-Related Goal	Metrics
Customer (cont.)	08 Adequate use of applications, information and technology solutions	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Percent of process owners satisfied with supporting IT products and services • Level of user understanding of how technology solutions support their processes • Satisfaction level of users with training and user manuals • Net present value (NPV) showing satisfaction level of the quality and usefulness of the technology solutions <p>From other specialized sources, broadband penetration:</p> <ul style="list-style-type: none"> • Number of subscriptions, free access options or access to fixed and mobile broadband services by technology per 100 inhabitants • Percent of small and medium enterprises with broadband access, fixed or mobile <p>From other specialized sources, Internet users, by age group, education and gender:</p> <ul style="list-style-type: none"> • Percent of adult population (16-74 years old) who use the Internet, by gender • Percent of adult population who use a mobile smartphone to connect • Percent of 15-year-old students who first accessed the Internet at the age of 6 or more • Percent of population performing online activity, by age and educational attainment <p>From other specialized sources, e-government:</p> <ul style="list-style-type: none"> • Percent of adult population who used the Internet to interact with public authorities by age • Percent of businesses in each employment size class who use the Internet to send invoices to the public authorities <p>From other specialized sources, business-to-consumer (B2C):</p> <ul style="list-style-type: none"> • Percent of enterprises that undertake e-commerce sales • Percent of individuals who ordered goods or services over the Internet in the last 12 months
Internal	09 IT agility	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Level of satisfaction of executives with IT's responsiveness to new requirements • Number of critical processes supported by up-to-date infrastructure and applications • Average time to turn strategic IT objectives into an agreed-upon and approved initiative
	10 Security of information, processing infrastructure and applications	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Number of security incidents causing financial loss, business disruption or public embarrassment • Number of IT services with outstanding security requirements • Time to grant, change and remove access privileges, compared to agreed-upon service levels • Frequency of security assessment against latest standards and guidelines <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Number of security incidents that result in information disclosure or financial loss • Percent of individuals who chose not to submit official forms online due to privacy and security concerns
	11 Optimization of IT assets, resources and capabilities	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Frequency of capability maturity and cost-optimization assessments • Trend of assessment results • Satisfaction levels of city and IT executives with IT-related costs and capabilities
	12 Enablement and support of city processes by integrating applications and technology into city processes	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Number of processing incidents caused by technology integration errors • Number of process changes that need to be delayed or reworked because of technology integration issues • Number of IT-enabled business programs delayed or incurring additional cost due to technology integration issues • Number of applications or critical infrastructures operating in silos and not integrated

Figure 1—COBIT 5's IT-Related Goals for Smart Sustainable Cities (cont.)

IT BSC Dimension	City IT-Related Goal	Metrics
Internal (cont.)	13 Delivery of programs delivering benefits, on time, on budget, and in meeting with requirements and quality standards	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Number of programs/projects on time and within budget • Percent of stakeholders satisfied with program/project quality • Number of programs needing significant rework due to quality defects • Cost of application maintenance vs. overall IT cost <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Percent of IT budget that considers social and sustainable procurement
	14 Availability of reliable and useful information for decision-making	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Level of user satisfaction with quality and timeliness (or availability) of management information • Number of process incidents caused by nonavailability of information • Ratio and extent of erroneous decisions where erroneous or unavailable information was a key factor
	15 IT compliance with internal policies	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Number of incidents related to noncompliance with policy • Percent of stakeholders who understand policies • Percent of policies supported by effective standards and working practices • Frequency of policies review and update
Learning and growth	16 Competent and motivated city stakeholders and IT personnel	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Percent of staff whose IT-related skills are sufficient for the competency required for their role • Percent of staff satisfied with their IT-related roles • Number of learning/training hours per staff member <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Proportion of youth and adults with information and communications technology skills, by type of skill • Extent to which citizens acquire the knowledge and skills needed to promote sustainable development, including through education for sustainable development and sustainable lifestyles, human rights and gender equality • Among all employees, percent employed in ICT
	17 Knowledge, expertise and initiatives for city innovation	<p>From COBIT 5:</p> <ul style="list-style-type: none"> • Level of executive awareness and understanding of IT innovation possibilities • Level of stakeholder satisfaction with levels of IT innovation expertise and ideas • Number of approved initiatives resulting from innovative IT ideas <p>From other specialized sources:</p> <ul style="list-style-type: none"> • Number of strategies, regulations, voluntary work or special interest organizations to enhance ICT literacy and enable public knowledge and skill development among all city inhabitants • Number of science and/or technology cooperation agreements and programs between cities and countries, by type of cooperation

Conclusion

SSCs, the New Urban Agenda, sustainability and so many other topics are stakeholders' needs and city requirements, but, more than anything, they are human responsibilities.

ICT facilitates the transition from cities to SSCs and city boards and executive managers have an important role in evaluating, directing and monitoring the achievement of this transition. For this, they not only have to give support, they also need tools, such as a customized version of COBIT's IT-related goals and metrics to help them accomplish their activities.

Endnotes

- 1 International Telecommunication Union, "Overview of Key Performance Indicators in Smart Sustainable Cities," ITU-T Recommendations, Rec.ITU-T Y.4900/L.1600 (06/2016), www.itu.int/itu-t/recommendations/rec.aspx?rec=12627
- 2 *Ibid.*
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- 5 ISACA, COBIT® 5: *Enabling Processes*, USA, 2012, www.isaca.org/COBIT
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- 7 *Ibid.*
- 8 Organisation for Economic Co-operation and Development, *OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation*, OECD Publishing, 2017, <http://dx.doi.org/10.1787/9789264268821-en>
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- 11 Kaplan, R.; D. Norton; *The Balanced Scorecard: Translating Strategy Into Action*, Harvard University Press, USA, 1996
- 12 United Nations Sustainable Development Knowledge Platform, "Sustainable Development Goals," <https://sustainabledevelopment.un.org/sdgs>