Center for
Technology in Government

Developing Public Value Metrics for Returns to Government ICT Investments

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A report to the Microsoft Corporation*

By

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Contents

Purpose

This report presents a new approach to assessing public value returns as part of an overall return on investment analysis for government information and communication technologies (ICT). The approach addresses one basic question about public value assessment: What constitutes good evidence of public value impacts? The answers provided here are intended to augment the return on investment analysis methods found in the *E-Gov Economics Model: Real Impact for Better Government,* developed by Microsoft. However, the approach here has potential uses beyond connection with that *Model*, and can be more generally useful in the assessment of public value returns to government programs and investments. The approach consists of a way to identify, collect, and interpret a variety of evidence, both quantitative and qualitative, that can be used to assess public value. The paper includes recommended methods to collect and analyze these forms of evidence and a summary of the research basis for their use. The approach is designed for use by government practitioners and analysts in connection with return on investment (ROI) analyses using the *E-Gov Economics Model* to examine ICT investments by national and sub-national governments.

Public Value and Return on Investment

Collecting and interpreting evidence of public value as return on investment requires a clear description of what public value means, not a simple task. There are at present many possible ways to conceptualize public value, an even larger number of potential kinds of evidence of public value impacts, and an unfortunately limited amount of research and established practice to call on for guidance. In this circumstance, and given the diversity of possible government ICT investments, it is not feasible to catalog all the ways public value returns can be observed or measured. Instead, the strategy of this report is to approach the problem in two ways that reduce the scope of the tesk. One is to present a general approach, consisting of concepts and an analytical framework for assessing public value returns from government ICT investment. The other is to use the general approach to identify examples of specific public value impacts and ways to document and measure them for particular ICT investments. This latter section includes a sufficient range of public value impact measures to fit a wide variety of government ICT investments. It also provides guidance for how the approach can be expanded for use for other government investments and initiatives.

The approach is based on prior work of the Center for Technology in Government and a thorough review of available research and professional writing on the subject of measuring public value. That review includes research in the related scientific literature and a survey of best practices reported in literature about national and local governments. A draft version of this report was shared with a sample of knowledgeable government officials and analysts for review and comments, which are reflected in the final version.

To deal adequately with the diversity of possible impacts that fall within the scope of public value, this approach includes evidence of all kinds. Where appropriate, we present metrics in the conventional sense, i.e., quantitative data that represents variation along well-understood and empirically accessible dimensions of value. However, this kind of evidence alone is too narrow to represent many of the important impacts and public value outcomes of government ICT investments. An investment to increase access to program performance data, for example, may mobilize citizens to communicate demands and opinions more frequently with officials. An

easily available metric, such as an increased volume of communication transactions, cannot by itself capture evidence of changes in program administration, longer term effectiveness, or shifting citizen satisfaction. That would require collecting evidence directly from customers, or from program operations, or outcome assessments, among others. Many outcomes in social or political terms are typically only accessible as qualitative impacts, often removed in time and space from specific government activities, particularly in the human services areas. Therefore the approach emphasizes the use of qualitative evidence of impacts as central to a comprehensive public value assessment.

Public Value and Measurement

Such a comprehensive treatment of impacts and evidence as we attempt here requires attention to some basic concepts of value and measurement. What constitutes a valid measure of public value depends in large part by what is meant by *public*. In this analysis we use *public* in a way that differs substantially from that in much of traditional financial and economic analysis. In those terms, the adjective *public* is used in contrast to *private* returns to government activity. Private returns, or goods, are returns that are captured by and belong to individuals, such as payments of money or the benefits of a direct service like health care. The consumption of a private good by one person makes it unavailable to anyone else. The value of public goods, by contrast, is not diminished by the consumption by one individual versus another. Samuelson (1954) coined these characteristics as the “non-rivalry” and “non-exclusivity” of public goods to contrast with the characteristics of private goods. Public goods include such government generated returns as enhanced public safety, safety and security as a result of national defense, cleaner air due to pollution controls, safer driving due to highway safety rules, etc. The scope of public value encompasses the identification of social needs that can not be fully satisfied by substituting private for state provision (Benington, 2011). Public value as used here should not be seen as an alternative of private value or vise-versa (Crouch, 2011).

Some government activities produce a mix of public and private goods. Public education, for example, provides direct benefits to students and parents, but also promotes a more educated populace that is generally more productive and less prone to criminal activity (see (Batina & Ihori, 2005). Public health provides another example where the users benefit directly from better health, while families, employers, and the state indirectly benefit from the prevention of possible disruptions in family life, productivity reduction, or decrease in tax base due to disease and premature mortality (see Tritter, 2011).

For the analysis in this report, however, *public* is used more broadly to describe value propositions that represent the interests of various publics or stakeholders. Defining public value more broadly is necessary considering the changing context for public services where the demand for government to be “doing more for less” is increasing (Benington & Moore, 2011) and “wicked” and cross-cutting issues in public domain (Stewart, 1998) are becoming more inherent. The high levels of complexity, volatility, and uncertainty in the current governmental environment need to be recognized and considered in the approaches to a public value framework. Accommodating the changing context for public services, the approach of public value in this paper includes the interests of stakeholders both in and outside of government, and can encompass goods or returns that are both *public* and *private* in the sense used in finance and economics.

The utility of this latter way of talking about public value lies primarily in opening up a much wider range of ways to identify and account for outcomes from government investment. This wider range can include outcomes and impacts that cannot be assessed in financial or economic terms, but are nonetheless important goals of government investments and the powerful interests of many stakeholders. The analysis and use of this wider range is central to the public value metrics approach presented in more detail below.

This approach to assessing the public value of government ICT investments is based on a substantial body of both practice oriented and theoretical literature. The literature on practice includes work on developing methods of assessment, for example, Cresswell, Burke, & Pardo, (2006); van Gestel, Koppenjan, Schrijver, van de Ven, & Veeneman, (2008), examinations of how to increase public value as a consequence of government actions and administration (Moore, 1995; Moore, Mark H. & Khgram, Sanjeev, 2004), and examinations of the underlying theoretical bases of the concept of public value (Bozeman, 2007; Brams, 2006; Meynhardt & Bartholomes, 2011). Of particular interest is the importance of stakeholders and the way value propositions can vary across diverse stakeholder environments (Cresswell et al., 2006; van der Wal & van Hout, 2009). This report emphasizes the practical application of metrics that take into account the variations in interests and value propositions across stakeholders while basing the metrics in an analysis framework that can be applied to many forms of government ICT investments.

An Analytical Framework for Public Value Assessment

As used here, the concept of public value is multilayered. It takes multiple layers to make the framework general enough to fit both the broad scope of possible ICT investments and the many value objectives of government. Although it was developed originally for use in relation to these ICT investment decisions, the framework can have more general application. It is appropriate to look for the public value returns for any investment of resources by governments. In use, however, the application of the methods described below must be tailored to the particulars of individual investments. Thus we focus here primarily on government ICT.

Even when limited to ICT investments, the scope of analysis must be compatible with the need to gather meaningful evidence relevant to many kinds of investments. The framework deals with this requirement first by describing a foundation layer consisting of seven basic types of public value (listed below) that can cover the range of most government program goals. Within each basic value type we then identify another layer consisting of several dimensions that represent ways value can vary within the basic type. Then for each dimension there can be multiple ways to measure or document variation along that dimension. Finally, each variable can be expressed in multiple ways or data types and different ways the variable can be operationalized. The elements in that framework are laid out below.

Public Value Types

The framework is based on the seven basic types of public value listed below. This set of high-level value types defines the overall scope of possible public value propositions of interest. The set is intended to be sufficiently broad to include virtually all of the value impacts that might be relevant for an ICT investment or other government investment or programmatic activity. The set is only a rough typology, since it is possible to identify interactions or overlaps in impacts across types. For example, an increase in a person's wealth, a financial impact, is likely to be

accompanied by an increase in social status and possibly general well-being. This overlap is a necessary consequence of a multi-disciplinary list such as this and allows for expressing the value proposition in ways that match the expressed interests of stakeholders in qualitative and quantitative terms.

The basic value types are:

- **Financial** – impacts on current or future income, asset values, liabilities, entitlements, or other aspects of wealth or risks to any of the above.
- **Political** – impacts on a person's or group's influence on government actions or policy, on their role in political affairs, influence in political parties or prospects for public office.
- **Social** – impacts on family or community relationships, social mobility, status, and identity.
- **Strategic** – impacts on person's or group's economic or political advantage or opportunities, goals, and resources for innovation or planning.
- **Ideological** – impacts on beliefs, moral or ethical commitments, alignment of government actions or policies or social outcomes with beliefs, or moral or ethical positions.
- **Quality of Life** – impacts on individual and household health, security, satisfaction, and general well-being.
- **Stewardship** – impacts on the public's view of government officials as faithful stewards or guardians of the value of the government in terms of public trust, integrity, and legitimacy.

This list is taken from the previous work of CTG on public value assessment, which is in turn based on field research, literature, and expert opinion.

This broad approach to identifying value impacts requires a framework that is not limited to a single discipline or body of theory. We begin instead with this high level description of basic value types that can encompass multiple value propositions and stakeholder interests. This value typology is intended to be sufficiently general to support a comprehensive search for possible value impacts yet specific enough to guide the definition of more specific variables and metrics.

The general framework identifies four levels of analysis:

- Value Type 1
    a. Dimension *a* of value type 1
        i. Variable to express changes in Dimension 1.*a*.
            1. Data definitions and properties of variable 1.*a*.i.
    b. Dimension *b* of value type 1

  etc.

- Value Type 2
    a. Dimension a of value type 2
        i. Variable to express changes in Dimension 2.*a*.
            1. Data definitions and properties of variable 2.*a*.i.

  etc.

Each of the general value types listed above can include a large number of value dimensions. For example, the *financial* value type includes possible impacts on wealth of individuals, groups, organizations, or a society as whole. The wealth of individuals can be represented by many variables, which include assets held as money, tangible or real property, securities, or even human resources such as education and professional qualifications. Actual measurements on a particular dimension would require an operational data definition, such as average cash deposits in certain financial institutions over a particular time span, such as a year. The same logic can apply to value types with less standardized or conventional impacts, such as stewardship.

Public Value: Interconnected and Multidisciplinary

A central part of this approach is treating the public value impacts of government ICT investments as interconnected and multidisciplinary. That is, these impacts are not simply isolated events; they are imbedded in a context of social and economic activity. They are likely to have secondary effects and can be analyzed from multiple disciplinary perspectives. That makes the task of impact assessment complex and challenging; a kind of multidisciplinary accounting method. The result, however, can also be a much richer source of insight and understanding of the full benefits of the investment.

Our concern for interconnectedness is based on recognizing the possibility for interactions across the levels of social and economic relationships linked to the immediate targets of the investment. Those levels are illustrated in Figure 1 below.

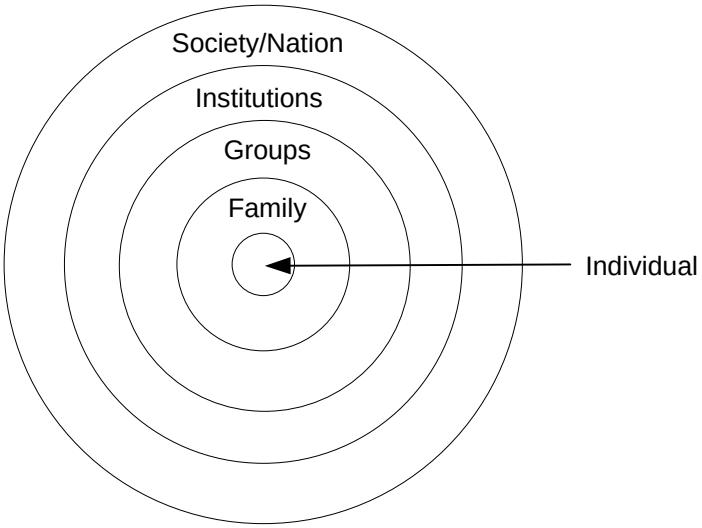


Figure 1 - Levels of Social and Economic Relationships

The primary target of the investment may be at any one level, but the full range of value impacts may extend across other levels. For example, the primary goal of providing online renewals of driving licenses may be to save citizens the time and expense of visiting a government office. That saving can be estimated from survey data and administrative data about the volume of transactions. The estimates of direct travel expense saving would be relatively straightforward, depending on the number of transactions shifted to online and estimates of the travel distances involved. The value of the time saved is much more problematic and will depend on assumptions

about how much of the time saved is devoted to economic productivity and the social and cultural value of additional leisure time.

The total value to individuals can be considered as one public value impact, but is not the full story. The licensing agency will achieve efficiencies and resulting lower expenses per renewal over time. Some motor vehicle offices may close, resulting in greater agency-level savings, but also resulting in negative impacts on employees who lose their jobs or suffer the disruptions or reassignment. As a result, estimating impacts on the overall efficiency of the agency may be difficult.

Taking into account second and higher order impacts can add to the accounting. Local businesses in the vicinity of closed offices may experience loss of revenue or even go out of business. Lower levels of traffic near the licensing agency offices will mean less noise, congestion, and air pollution for the immediate areas. Experience with using the online renewal process may increase acceptance of and demand for other online services. The agency's experience with one new online service can increase efficiency and quality of subsequent initiatives.

Much of the value attributed to ICT investment is linked to making transactions more efficient from the point of view of the citizen side of the transaction. The efficiency gain can be initially shown as time saved by the individual or organization. However in assessing this outcome in terms other than time—e.g., the money value of time—it is critical to distinguish among possible uses of that "saved" time. For example, time saved can be thought of as an asset in its own right, or translated into productive effort contributing to income, or as allowing substitution of effort from the "as is" transaction activity to some other activity or effort in the "to be" state. The value calculation in this instance depends on the nature of the substitution and the assumptions associated with it.

Linking Public Value and Government ICT Investment

The framework for public value analysis can be considered a kind of map of the overall collection of interests that can be affected by government ICT investments. A particular ICT investment by a government will be aimed at only part of that area. To identify the expected public value impacts of that investment it is necessary to look at how it links to the interests of stakeholders. Stakeholders in this sense are individuals or organizations (both formal and informal) that see the investment as having a potential impact on something of value to themselves—money, status, ideology, etc. Those potential impacts are the connection between the specifics of the ICT investment and its uses with the value propositions that characterize the stakeholders.

Stakeholder Analysis

The stakeholder perspective is the cornerstone of public value assessment. Applying this perspective starts with describing a government ICT initiative in terms of the value, if any, that accrues to each possible stakeholder as a result of that initiative. A comprehensive list of the initiative's stakeholders is central to determining the overall public value of each initiative.

While the term *stakeholder* is commonly used by government professionals, it is often used to generate an overly generic result, for example, identifying "the public" or "businesses" as stakeholders. Thinking of the public, for example, as a stakeholder creates a category too large

for making meaningful distinctions about how value might be created for various segments of the public, such as, the elderly, truck drivers, parents, or business owners. Good stakeholder analysis identifies specific stakeholders, not vague groups, including those both negatively and positively affected, as well as internal and external stakeholders. Freeman (1984) conceptualizes stakeholders as “any group of individual who is affected by or can affect the achievement of an organization’s objectives” (Freeman, 1984, p.46). Every project needs a careful assessment of stakeholders in order to understand who cares about it, how they can affect it, and how they will be impacted by it.

Structured examination of who cares. Stakeholder analyses are structured examinations of the relationships between a proposed project and key players in the environment. These analyses are ways of answering the question, "Who cares about this project and why?" Any person or group that has an interest (a "stake") is considered a stakeholder. A comprehensive list will increase the opportunity to make useful assessments about the relative value of each initiative. In some cases, there may be an existing stakeholder list. If so, the list development step should focus on whether the stakeholders on the list are identified at a specific enough level for public value assessments to be meaningful. A complete list of initiative stakeholders for each initiative may be lengthy. In those cases, stakeholders should be ranked according to agreed upon criteria. An example of criteria to assess the potential influence of stakeholders is outlined in Mitchell et al. (1997) in which they propose three criteria: power, legitimacy and urgency.

The following list provides a starting point for identifying stakeholders:

- Program participants
- Contract service providers
- Vendors and related industries
- Program staff
- Program managers
- Field office managers
- Program agency executives
- Local governments
- Interagency councils
- National or state agency partners
- Program advocates in government
- Good government groups
- Program advocates in civil society
- Communication media
- Budget analysts and examiners
- Educational institutions
- Elected officials
- Staff of elected officials
- Legislative budget committees
- Auditors and financial control officials

Stakeholders can be examined in terms of their roles, degree of support for the initiative, influence over decisions or resources, or the ways in which the project will affect them in both positive and negative ways. A variety of tools can be used for this analysis -- two (positioning charts and partisan analysis) are described in the sections below.

Positioning charts

Positioning charts show the relationships among people, groups, or other elements of a problem in terms of their positions, usually a two dimensional conceptual space. A positioning chart is a good first stakeholder analysis tool. The chart usually shows two factors important to the problem, with the people or alternatives arranged in the chart according to where they fit along the two dimensions.

As shown below, placing stakeholders on a positioning chart helps identify what different approaches or strategies will be most effective for the different positions. For the sample chart, different strategies can be chosen for dealing with different stakeholders according to whether they support or oppose the proposal and by their importance to its success. This kind of analysis can show that resources could be wasted on trying to generate greater support from those with low ability to help, or failing to recognize antagonistic stakeholders who could damage prospects for success.

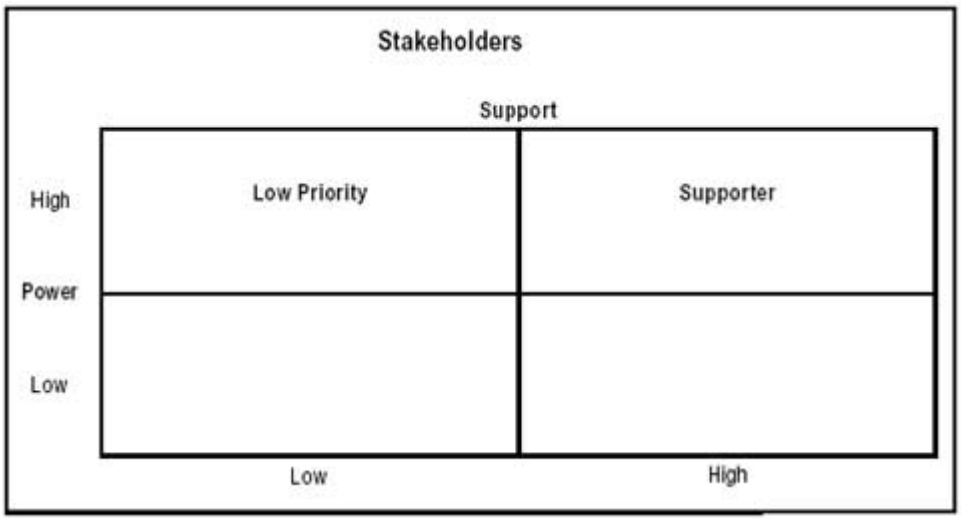


Figure 2 - Stakeholder Positioning Chart

Uses of positioning charts in stakeholder analysis:

- **To classify stakeholders along key dimensions.** Positioning charts can be useful in mapping where particular stakeholders fit into the project. Knowing who has the inclination to champion the project and who has power and/or inclination to bring it to a halt can be helpful as you develop a project management plan.
- **To better understand potential influences.** This type of chart allows you to better understand how various stakeholders can influence your initiative and gives you a start on developing strategies that take those influences into account.
- **To communicate with participants in planning and design.** Representing this kind of analysis in a positioning chart is not only a good planning exercise; it is also an effective device for communicating the results to others.

Some limitations and considerations apply to using this kind of chart analysis:

- Placements can be somewhat arbitrary, since positioning stakeholders can be a difficult judgment that relies on substantial experience. Wrong assumptions and lack of confirming information can lead to errors in positioning, which can lead to flawed conclusions.
- The analysis can oversimplify relationships. A chart may gloss over important nuances in relationships in a complex setting, especially when more than two dimensions are involved or the relationships are not stable over time.

Partisan Analysis

Partisan analysis recognizes that competing interests and conflicts are natural and unavoidable in any significant government action. Any new project requires careful attention to the partisan or political nature of the process. It is important to remember, however, that this method is not an exact science. Partisan analysis uses a number of different approaches and ways of thinking about interactions and is more a craft than an exact science. However, some basic questions can guide the analysis. When used correctly, it can lead to a better understanding of what stakeholders and other participants want in general, or what they stand to gain or lose. Those who speak for a group or organization do not necessarily share all the group's desires and objectives.

Central to understanding stakeholder relationships is how they are linked to the ability to influence action. A partisan analysis considers what power resources the parties bring to the table. These include: official status or authority; ability to punish or reward other participants; special expertise, status, skills, or reputation; and access to information. It's useful to know participants' preferences for different kinds of power and how they have acted in the past.

Partisan analysis can enhance the ability to identify so-called “wild cards,” i.e., those stakeholders that are poorly understood but who can have an unanticipated impact on decisions and actions. Uncertainty plays a part in any environment. One major element of uncertainty is whether any outside actor or force will affect plans. Partisan analysis often involves scanning the environment for possible external players that may become involved. This scanning can also include analysis of the risks.

Some limitations and considerations do apply to the use of this form of analysis. The value of the partisan analysis depends in large part on the quality and amount of information available about the people and groups involved in the initiative. In most environments, people tend not to announce their true objectives and strategies. In fact, there can be substantial incentives to mask or deliberately misrepresent their true goals and interests. Judgments based on inferences about other people's goals and interests should be evaluated and tested against actions and other evidence. However assessing the goals and interests of others involves a lot of uncertainty. There may be discord within groups about their goals and interests. It is often difficult to evaluate the accuracy and stability of statements and actions expressed by all groups involved in the project. Where there is little or no historical information, judgments about partisanship may be flawed. In new initiatives, histories may be absent. Information about past actions and events may be unavailable, unreliable, inconsistent, or badly distorted by selective memory or interpretation. Despite the caveats, some degree of partisan analysis is needed for any investment of public resources and can be highly valuable if done carefully and used with discretion.

Example Public Value Dimensions and Variables

Use of the public value framework requires the choice of the value types and variables that are relevant to the specific project. Identification of variables by value dimension will necessarily vary by the chosen level of observation. What is a useful variable for expressing impacts on personal wealth, for example, may be inappropriate for a corporation. This is illustrated in the top row of Table 1 below. Some of the metrics may be the same or closely similar. However the wealth of individuals and the wealth of a nation cannot use the same variables, even if some of the underlying data is the same. The similarities and differences in available variables by level of observation are described in more detail in Appendix A.

Table 1 -Example Public Value Variables by Level of Observation

Value Types & Dimensions	Individual Point of View	Group Point of View	Institutional Point of View	Society/National Point of View
Financial				
Wealth	changes in value of financial, intellectual, & physical assets, property, changes in education level, qualifications, health status, entitlements	changes in value of financial, intellectual, & physical assets, reputation, entitlements	changes in value of financial, intellectual, & physical assets, reputation & brand legitimacy	changes in productivity, natural resources, education & skill levels, infrastructure, built environment, & other physical assets, intellectual property

Value Metrics and Evidence Issues

The main purpose of this report is to expand the methods available for public value assessment, in particularly to add qualitative evidence that goes beyond the usual financial metrics. The basic question at the core of the assessment is what public value impacts have occurred or are expected to occur. Where easily obtained and valid metrics are available for all desired outcomes, the broader approach outlined here is unnecessary. However such a situation is highly unlikely. Evidence of many of the most important public value outcomes is often outside the range of usual government record keeping, reporting, and assessment metrics. The goal of this report is to add a wider range of evidence to understanding public value returns to an ICT investment.

That goal involves dealing to some extent with the issues that often arise regarding the validity and legitimacy of using qualitative evidence. This approach rests on the assumption that assessment of the full range of public value outcomes that are relevant to ICT investment decisions requires multiple methods. The validity and legitimacy of any particular kind of evidence should be judged not on whether it is quantitative or qualitative, but whether the evidence is valid and useful in the relevant context of measurement. This section discusses the kinds of considerations that should go into that judgment.

That discussion begins with basic ideas from measurement theory. In the most general terms, detecting and measuring a public value return has three basic requirements:

1. specification of what kind of evidence validly represents a change in value
2. the ability to obtain that kind of evidence, i.e., to detect the change in value

3. the ability to interpret and communicate the nature of the change in meaningful terms to the relevant audience.

Note that these specifications about evidence make no distinction between quantitative and qualitative. This is deliberate. The usual distinctions based on only these two kinds of evidence are too simplistic to be useful in this approach. Instead we will describe a range of different types of evidence for public value impacts.

The value impacts can be described as falling along a continuum that runs from true ratio scale numeric data[1] at one end to strictly qualitative differences, i.e., that cannot be validly represented numerically, at the other. Different locations along this continuum represent evidence of impacts on scales with a variety of properties and assumptions. These include assumptions about the cost of acquiring the data, as in the cost accounting concept of "economical feasibility," whether it is possible within cost constraints to obtain or create the numerical representation.

Despite these differences, most evidence forms can be useful for assessing public value impacts, if used with the necessary qualifications and caveats. For this approach, we will consider five kinds of data distributed along the continuum: true ratio scale data, pseudo-ratio scale data, interval data, ranking, and qualitative/descriptive data. For true ratio scale data, the scale represented by the numbers has the same characteristics as the underlying theoretical scale, such as the number read off a scale in a butcher shop as a representation of the downward force exerted by gravity on the contents of the scale. For pseudo-ratio scale data, the relationships between the numbers and the underlying theoretical scale are problematic. The value of an asset represented in, say dollars, does not necessarily represent the full value of that asset to its owner or to the larger society. Important differences among these evidence forms are shown in the table below.

Table 2 - Description of Evidence Types and Characteristics

Evidence Type	Example	Scale Properties	Statistical use	Detecting quantity changes	Detecting qualitative changes
pure ratio scale	elapsed time	linear, continuous, zero	parametric methods	yes, amount & direction	no
pseudo-ratio scale	amount of currency	possibly non-linear, continuous, zero	parametric methods with qualifiers	yes, amount & direction	no
interval	agree-disagree scale	non-linear, dis-continuous, no zero	non-parametric	yes, direction	no
ranking	preference orders, Q-sorts	non-linear, dis-continuous, no zero	non-parametric	direction	uncertain
qualitative distinctions, categories	ethnicity, disease types	not scaled, may be used for tallies	some cluster analyses	frequency only	yes

[1] Ratio scale data represents measurements that fall along a scale that is continuous, linear, and has a true zero point, such as the length of an object or elapsed time between events.

The search for public value impacts is necessarily eclectic, and may involve evidence of any or all types. Therefore the differences outlined in Table 2 are of more than technical importance. The choice of the best evidence, as well as how it is collected and interpreted will depend in part on these characteristics. In many cases, it is likely that several variables will be possible for a single value type or dimension. For example, providing new social media channels for political participation may have multiple impacts. Survey data (usually interval scales) can show increases in citizen confidence in government. Qualitative analysis of government decisions can show shifts in policy direction on ideological dimensions, as can shifts in officials' stated policy preferences. Changes in voter behavior provide data for statistical analyses. Any or all of these forms of evidence could be a valid indicator of public value impacts.

The validity and utility of any form of evidence also depend on the context, particularly any applicable standards for measuring particular variables. Such standards are common for many kinds of public value impact evidence, such as public budget and financial data where strict accounting standards and practices may apply. The same is true for data standards written into policy for use in implementation and decision making, such as school attendance accounting for educational policy uses, census data for allocating public funds, or air quality measures for enforcing environmental regulations. In other cases, past practice may have produced informal standards that can have a strong influence on the legitimacy of assessment using such data.

Variables and Data Collection Issues

Linking value data with stakeholders raises the question of how to deal with both positive and negative impacts. Different stakeholders often have diametrically opposed interests, such that the impact of an ICT investment may be positive for one and negative for the other. In some instances the value changes may be close to zero-sum for some combinations of stakeholders, i.e., the sum of all the value impacts across the stakeholders is zero. This is especially true in cases when efficiency gains produced by ICT investments result in layoffs of employees and lower expenditures with some vendors. A comprehensive public value assessment would necessarily acknowledge and report positive and negative impacts as completely as possible.

Other forms of variables raise questions both of collection and interpretation. One of the most complex is the distinction between investments in technologies that deliver direct substantive benefits versus those that create capabilities that have the potential to deliver multiple streams of benefits. Consider the difference between a major efficiency increase in online tax paying technology versus technologies that open up opportunities for participation in government decision making. The first delivers a direct specific benefit in terms of reduced time and effort to comply with a government mandate. The second delivers the potential to affect a long stream of government actions that may or may not result in benefits to various stakeholders. The first is relatively straightforward to estimate, the second much more remote and problematic.

Review of Current and Best Practices

This section briefly reviews several extant approaches to assessing government ICT investments. These are the IT/IM investment management/guide and related evaluation policies in use in the US (US), Canada (CAN), Australia (AUS), and European Union (EU). These are useful to contrast the current best practices for IT/IM investment; the similarities and differences among these practices are summarized briefly in Table 3 below. The practices differ in several important ways linked to public value assessment shown in the table. The national-level practices are

control- and evaluation-oriented, while the EU version is more analytical, as befits the different levels of authority between national and multinational governance. All four examples employ a wide mix of indicators, as befits the diversity of government objectives. However the EU version is the only one employing an explicit public value reference. Otherwise they differ in the review processes and governance mechanisms that characterize the implementation of the methods. The section following the table describes some of the details of each approach.

Table 3 - Points of Comparison of National and International Assessment Schemes

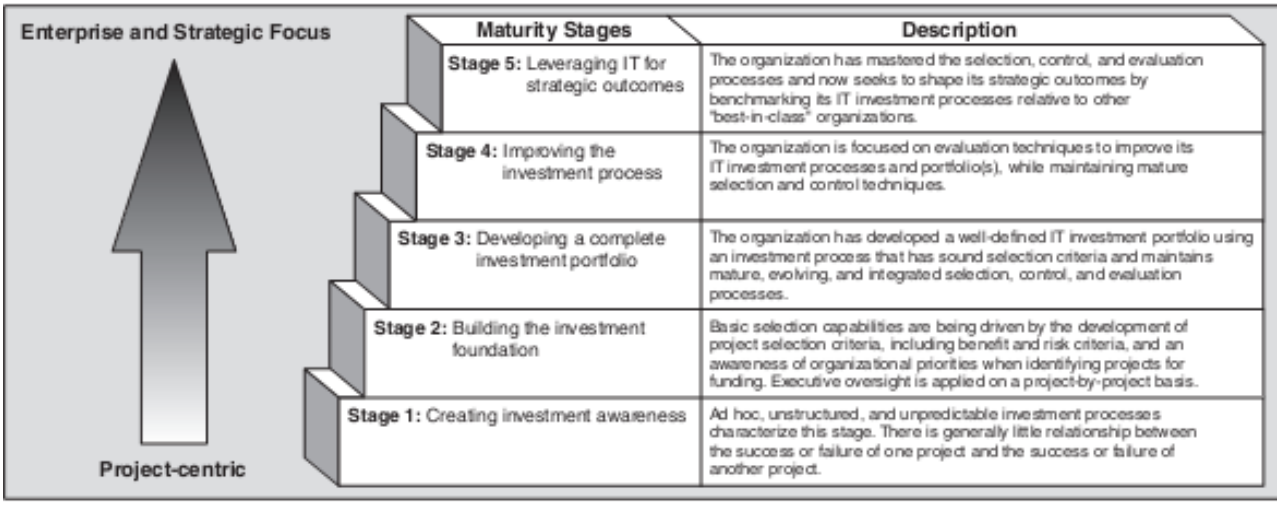
	US	**AUS**	**CAN**	**EU**
The Central Tenet: Select/Control/Evaluate	X	X	X	n.d.
Cost/Benefit/Risks Analysis as key analysis	X	X	X	n.d.
Quantitative Indicators	X	X	X	X
Qualitative Indicators	X	X	X	X
Non-Financial Indicators	X	X	X	X
Public Value consideration	n.d.	n.d.	n.d.	X
Investment Board & Senior Management Involvement	X	X	X	n.d.
Maturity / Cascading Review	X	X	n.d.	n.d.

n.d.: not defined

Country Level: United States

The US Government of Accountability Office (GAO) developed the Information Technology Investment Management (ITIM) as a framework for assessing and improving process maturity in e-government initiatives. The ITIM expanded the *IT Evaluation Guide* (GAO/AIMD-10.1.13) (http://www.gao.gov/special.pubs/ai10113.pdf) enacted in 1997. ITIM is framed on the same tenets of selection, control, and evaluation for ICT investment. The GAO reports that since its release in May 2000 the ITIM is the primary tool for evaluating an organization's investment management processes and its level of maturity. ITIM use aligns investment management with the complexity and maturity of an ICT initiative and the Federal Enterprise Architecture framework. As result, ITIM specifies investment management based on the maturity of the investment as depicted in Figure 3 below.

Figure 3 - ITM Investment Maturity Levels



Source: GAO.

The characteristics of each maturity stage are as follow:

- Stage 1 is characterized by ad hoc, unstructured, and unpredictable investment processes.
- Stage 2 processes employ certain basic selection considerations, such as benefit and risk criteria and awareness of organizational priorities.
- Stage 3 builds on stage 2 by establishing a consistent, well-defined ICT investment portfolio and maintaining mature selection, control, and evaluation processes.
- Stage 4 focuses on maintaining mature control and selection processes while improving ICT investment processes and portfolios.
- Stage 5 processes shape strategic outcomes by continuously benchmarking to “best practices.”

Each stage is characterized by certain critical processes.

- Stage 2 requires developing and instituting an investment board for defining and creating guiding policies, operations, roles, responsibilities, and authorities.
- Stage 3 critical processes focus on creating and developing portfolios based on quantitative and qualitative factors.
- Stage 4 critical process is improving portfolio performance through evaluation.
- Stage 5 critical process is optimizing improvement and strategic decision making.

Based on the critical processes involved in each stage, there are two key components, namely: involvement of senior management in the investment board and portfolio criteria for selecting and assessing the investments.

The development of criteria for selecting portfolio investment is based on the *IT Evaluation Guide* (GAO/AIMD-10.1.13). The key analysis for project proposals is cost/benefit analysis. The ICT evaluation guide specifies four elements constituting a complete cost/benefit analysis:

- Identify and quantify benefits and costs.
- Identify assumptions and constraints.

- Evaluate alternatives using NPV (net present value).
- Perform risk and sensitivity analysis.

In addition, the decision to complete a cost/benefit analysis is also based on the economic feasibility of conducting the analysis. For instance, conducting complete cost/benefit analysis for low cost, small scope and low risk projects might be economically infeasible.

According to the ITIM, there are three aspects to consider in conducting cost/benefit analysis:

1) **Cost.** Identifying and classifying cost into recurring and non-recurring categories.
2) **Risk.** There are three categories of risk:
    a. Project risks
    b. Organizational risks
    c. Technical risks
3) **Benefits.** The guideline categorizes benefits into two types:
    a. *Tangible* - These benefits are identifiable and quantifiable. Examples of these benefits are cost reduction, productivity increase, and service quality improvement.
    b. *Intangible* - These benefits are identifiable but may be impossible or infeasible to quantify. Examples of these benefits are: more efficient decision making, greater data accuracy, improved data security, and reduction of customer burden.

The ITIM also directs agencies to create a system to weight their criteria and a composite measure for comparing different investments. The weighting schema should account for the uniqueness in mission, capabilities, and limitations of different agencies. Different weighting schema could also be created for different types of investment initiatives.

ITIM is useful in the level of detail and attention to process, but is limited in at least two important ways. The maturity level model suggests that attention to strategic outcomes, many of them falling in the public value area, is only attainable if the lower levels have been accomplished. This approach unnecessarily constrains when and how agencies can pay attention to the public value outcomes. The approach is also largely agency-centric and does not emphasize attention to a larger scope of stakeholders, interests, and potential outcomes.

European Union - eGEP

The eGovernment Measurement Framework (eGEP) provides ways to assess the impact of e-government. This framework is general and flexible, hence adaptable to particular measurement objectives. The eGEP focuses on three different areas of impact:

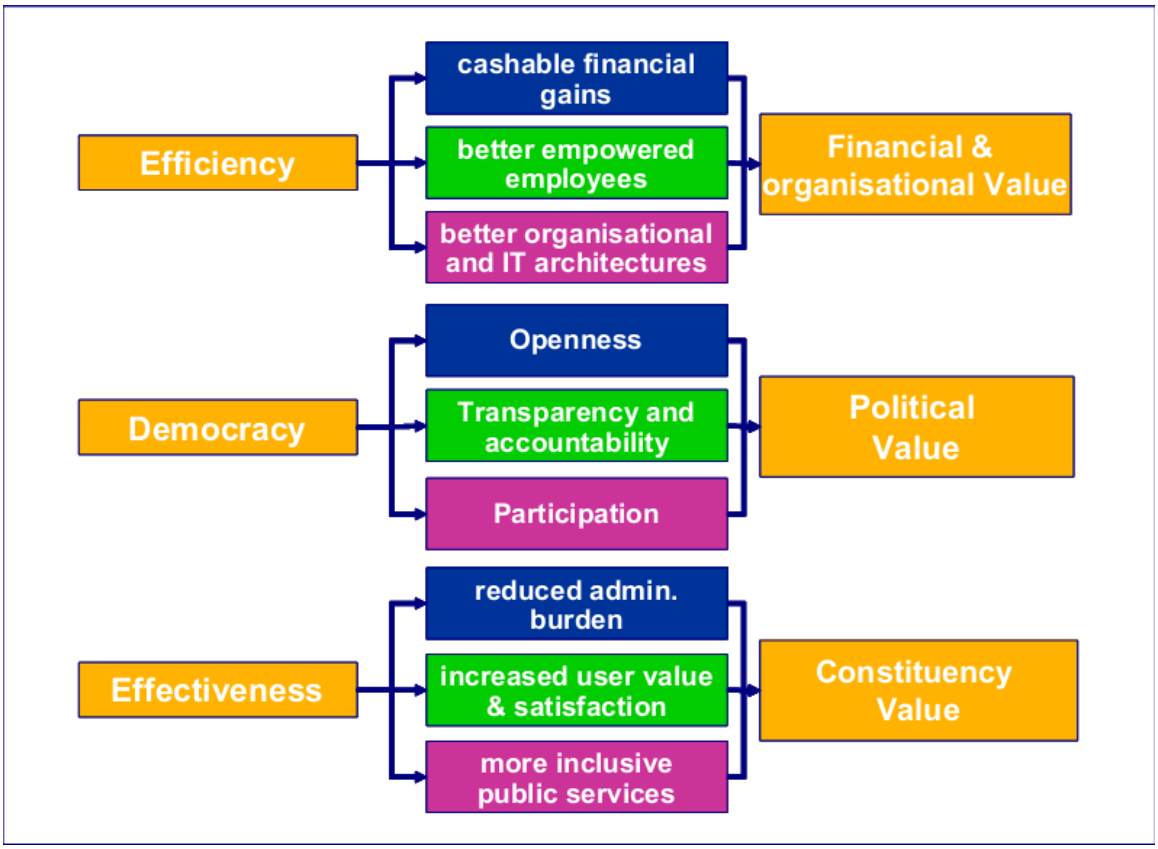
- efficiency,
- effectiveness, and
- democracy (openness, transparency, accountability and participation).

In accordance to the impact, the eGEP specifies three different types of public values:

- financial and internal organization value,
- constituency value, and
- political value.

Each impact contributes to different gains and subsequently public values (Figure 4 below).

Figure 4 - EU eGovernment Measurement Framework



Source: http://www.epractice.eu/en/library/281756

The description of the connection is as follows:

a. **Efficiency**. Efficiency gains supported by the necessary organizational changes will generate "financial and organizational value." There are three different gains that could be derived from the efficiency value drivers.

   1) *Cashable financial gains.* Efficiency could bring improved revenue by increasing the speed and quantity of processes to generate revenue. Efficiency could also provide cheaper services to the citizen due to the reduction in processing costs. Improved efficiency could also generate gains through the avoidance of direct costs or reduction in opportunity costs.

   2) *Better empowered employees.* Efficiency could drive more efficient internal processes by eliminating non-value added and redundant tasks and reducing processing times, errors, and reworks.

   3) Better organizational and ICT architectures.

b. **Effectiveness value driver**.

   Effectiveness drivers aim at reducing administrative burdens. For instance, simplification of administrative processes and requirements could potentially reduce waiting times, which diminishes the burden for constituencies.

c. **Democracy value driver**.

Improved democratic capability due to new information technology initiatives could increase openness, participation, transparency, and accountability.

European Commission - VAST

The European Commission framework for assessing ICT investment projects is called VAST.[2] VAST is a spreadsheet tool that government can use to assess individual ICT projects. There are four elements of qualitative assessment and one element for quantitative assessment.

The qualitative assessment elements are:

- Value for the European Union
- Value for European Commission
- Risks
- Necessity

The quantitative components are costs and benefits.

VAST differentiates between internal and external value:

- **External Value** refers to the benefits generated by the ICT project for others outside of the European Commission, such as European Union.
- **Internal Value** is considered an internal value for EC when the ICT project benefits are intended purely for administrative purposes.

VAST recognize four different value impacts related to the internal value benefits:

- Political value
- Internal users' value
- Administrative value
- ICT governance value

Each criterion scale has four assessment points, 0 to 3. The point value for each criterion scale rating is multiplied with a pre-assigned weight based on the importance of the criterion. The comparability is regarded as one of the strengths of VAST. The VAST tool enables cross-comparison due to the use of the same criteria.

Country Level - Australia

The ICT investment framework in Australia is the work of the Australian Government Information Management Office (AGIMO). The objective of this Office is to improve the Australian Government's return on investment in ICT. AGIMO aims to support government agencies to align the ICT investment with business and policy objectives and whole-of-government strategies (http://www.finance.gov.au/budget/ict-investment-framework/index.html). The ICT investment framework expands and replaces the previous DAM VAM framework.

The Australian government implemented the ICT Two Pass Review processes in 2008. This is a multi-stage assessment process with increasing level of detail and accuracy in the successive tiers. This process requires an iterative development of a business case. The Two Pass Review is

[2] See the VAST framework overview figure in Appendix B.

only applicable to major ICT-enabled projects with the cost of at least $10 million and is regarded as being high-risk in terms of cost, technical complexity, workforce capacity, or schedule. The First Pass Business Case is evaluated by the Expenditure Review Committee of the Cabinet (ERC) to decide whether the major ICT-enabled project proposals will proceed to Pass Two.

The First Pass has high-level requirements include attention to project functionality, security and privacy, performance, reliability, availability and maintainability, policy, strategic, standards and architectural compliance, usability, flexibility, scalability and interoperability with major external interfaces and interdependencies. The proposal should also conform to the Portfolio, Program and Project Management Maturity Model (P3M3), which specifies provisions for management control, benefits management, financial management, stakeholder engagement, organizational governance, and risk and resource management.

The Second Pass Review requires more details related to:

- Detailed project objectives;
- Taking advantage of synergies with other programs, e.g. procurement, development, shared infrastructure, reuse;
- A sound governance model, particularly where multiple agencies are involved;
- Refined cost analysis supported by clearly articulated and robust cost estimates;
- Well-understood scope statements, displaying rigorous planning of scale and features of infrastructures, applications, and supports;
- Descriptions of how security requirements have been identified and would be addressed;
- Detailed risk mitigation strategies for the major risks, such as ICT workforce supply and project management capability; and
- An achievable project schedule, where task granularity is commensurate with task complexity.

The Second Pass Review also requires the refinement of the information on six variables, a) time, b) cost, c) quality, d) scope, e) risk, and d) benefit.[3]

The *ICT Business Case Guide Development and Review* dated November 2008, specifies the benefit categorization processes. This document specifies three methods for evaluating ICT options based on the benefits. The three categorizations (adopted from the guideline) are:

- **End Users** – Refers to any external financial impacts on users, other agencies, and other indirectly affected entities in terms of increased cost savings or increased revenue.

  This category is classified into two elements:

  1. *Increased user benefit* refers to cost savings or increased revenue to external users.
  2. *Increased other agencies benefit* refers to cost savings or increased revenue to other agencies.

- *Agency Costs and Benefits* refers to the internal financial impacts on the agency in terms of capital and operating expenditure, savings, and costs over a project life cycle.

[3] . The summary of the Two Pass Review is available at http://www.finance.gov.au/budget/ict-investment-framework/docs/ICT_Business_Case_Guide.pdf

- *Qualitative* refers to non-financial benefits that can be measured, including strategic and policy results, governance value, and social/service delivery value.

  This category is classified into eight elements:

  a) Social Value refers to the social benefits to the community.
  b) Service Delivery Value refers to any service delivery benefits delivered to the stakeholders, which may include saving time and effort for citizens.
  c) Whole-of-government policy alignment includes compliance with legislation and policy by ICT project.
  d) Whole-of-government strategy alignment.
  e) Agency policy/objective alignment.
  f) Stakeholder support.
  g) Environmental implications and impacts.
  h) Other relevant information.

Country Level - Canada

The information management and technology investment in Canada is managed under the umbrella of the Enhanced Management Framework (EMF) for Information Management and Information Technology (IM/IT). The EMF was initially enacted in 1996 and the current updated version dated in 2007. The EMF was expanded to accommodate current development in ICT. Since 2000, the *IM/IT Investment Evaluation Guide* has been used for choosing the best IM/IT investments, managing the investments by monitoring results, and evaluating the processes for lesson learned. This guideline is supplemented with the Policy on Management of Information Technology and Policy Framework for Information and Technology, both enacted in 2007.

The Enhanced Management Framework (EMF)

The EMF is an integrated management model consisting of principles, best practices, methodologies, tools, and templates for managing IM/IT investment. There are four principles underlying EMF, namely: a) alignment of IM/IT investment with business strategies, b) clear accountabilities in managing the investment, c) corporate project management, and d) identification and management of risks. The EMF focuses on two elements, portfolio management and project management. Portfolio management deals with alignment with business strategies, including selecting IM/IT investments that will deliver optimal value.

One of the tools within the EMF is the Outcome Management Tool (OM), which focuses on the processes to ensure the achievement of benefits of each of the investments/initiatives. The Outcome Management Tool was initially published in 2005. The guideline uses the term “outcome” instead of “benefit,” with the assumption that outcome has a neutral disposition. The guideline also follows a results chain model to illuminate immediate, intermediate, and ultimate outcomes.

The types of measurement are:

- Qualitative indicators – identifiable but non-quantifiable outcomes
- Quantitative indicators – identifiable and quantifiable outcomes

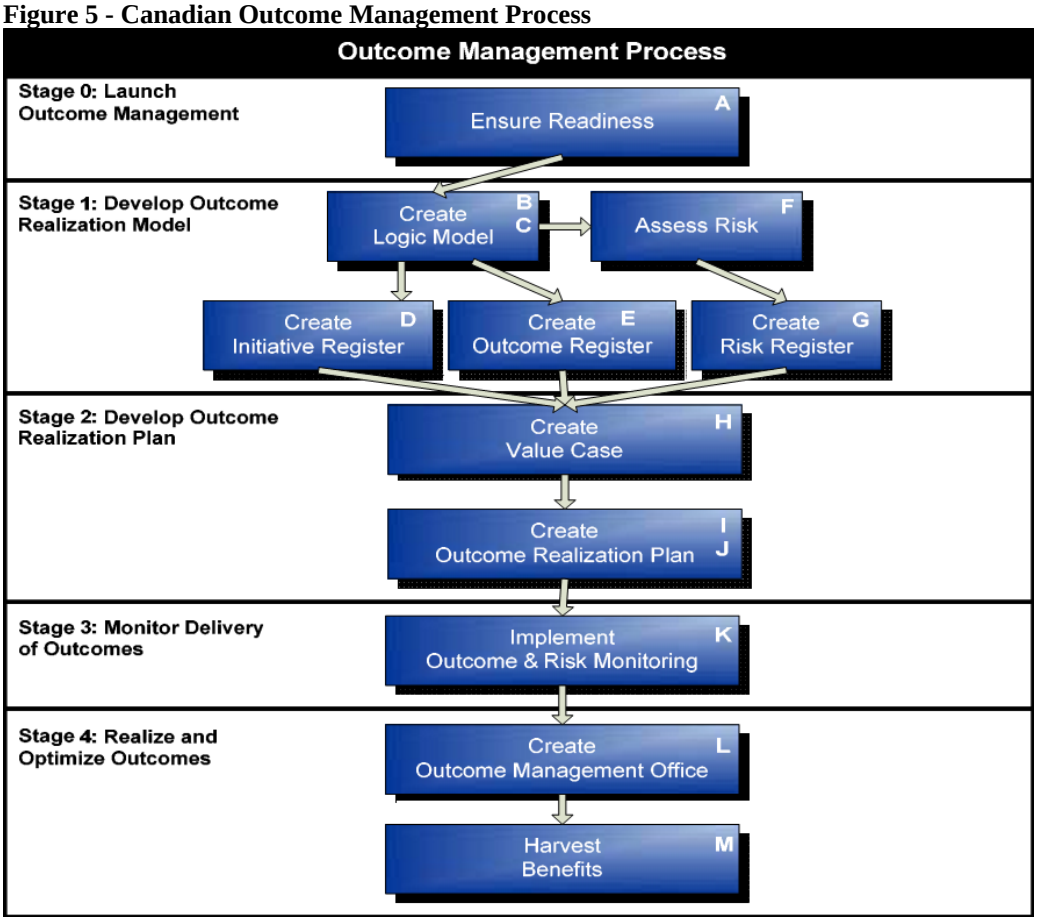
- The financial outcomes are measured in dollar terms and can include the use of cost-benefit analysis tools, such as NPV, PVR, IRR and ROI.
- Non-financial outcomes are measured in non-dollar terms, such as, reduced complaints, employee satisfaction, and others.

The EMF requires the incorporation of four key principles:

1) Begin at the end: focus on outcomes, apply the principle that a project should begin with identifying the business outcomes.
2) Move from a project view to initiative view, which means to see the project in a "bigger picture" to ensure that all activities and capabilities required to achieve the outcomes are identified. The proposed initiative should consider the inclusion of business processes (redesign, restructuring), technology, legislative, policy, regulatory changes, organizational management changes, and intermediate outcomes.
3) Manage at portfolio level to ensure that the project regularly reflects changes in the organization's strategy, priorities, needs, and goals.
4) Employ methodologies, tools, and techniques from various disciplines in defining the portfolio and measurements.

Outcome Management (OM) consists of four stages outlined in Figure 5 (below).

Figure 5 - Canadian Outcome Management Process



Source: http://www.tbs-sct.gc.ca/emf-cag/outcome-resultat/guide-guide/guide-guide-eng.pdf

The similarities and differences between the national level approaches are summarized in Table 3 below. In spite of the differences in language and details, the similarities are many and significant. All the approaches employ a substantial mix of quantitative and qualitative indicators, and have an emphasis on outcome assessment. There is also a consistent attention to holistic views of the investment in the context of overall government policies and programs. These elements are reflected as well in the public value framework discussion presented here.

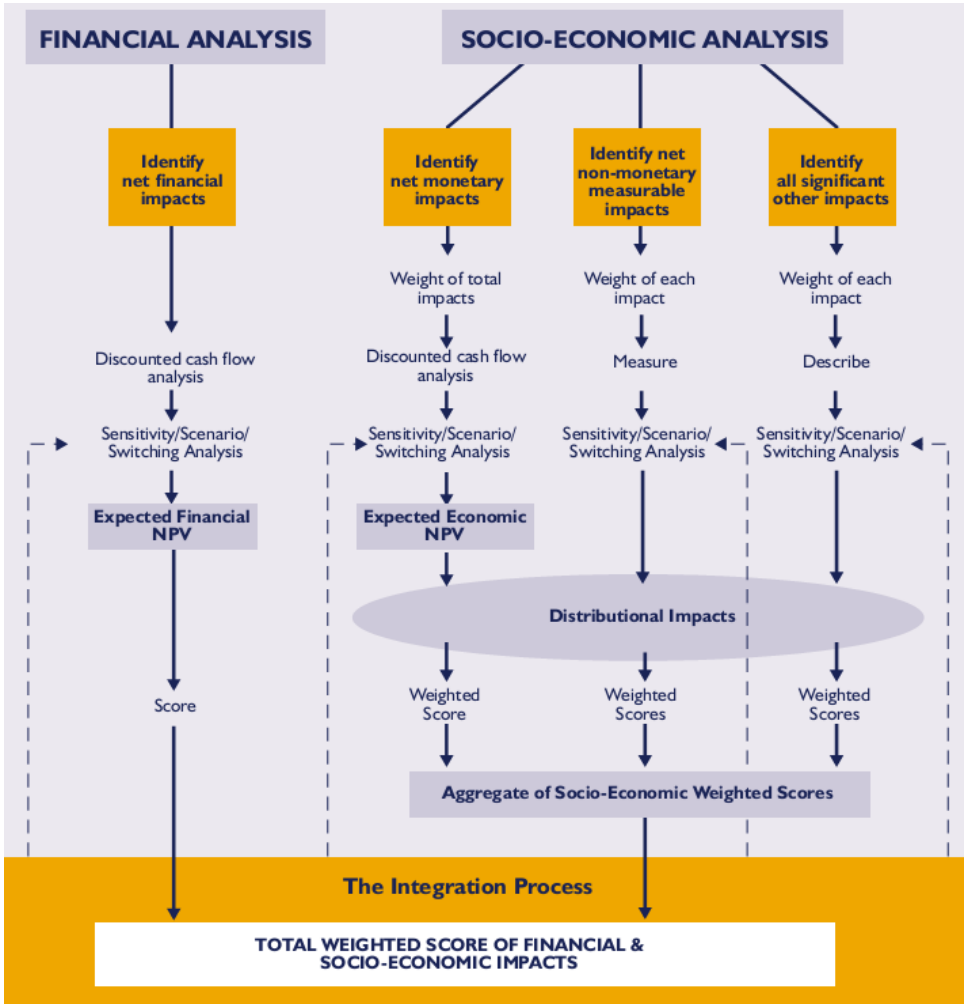
Table 3 - Comparison of ICT Investment Framework (Country Level)

Country	Framework	Principles	Qualitative Indicator	Quantitative Indicator
Canada – Treasury Board of Canada Secretariat	EMF (Enhanced Management Framework) IM/IT Investment Evaluation Guide	• Information • Information Technology • Stewardship • Whole-of-government approach • Access and Privacy • Security • Transparency • Official Languages	• Functional requirements • Project Benefits and Risks • Link of objectives in business or strategic plan • Compliance with organization information technology architecture • Risk and Sensitivity Analysis	• Decreased cost of operations • Decreased energy consumption (costs) • Increased economic development • Maintained program registrations • Decreased bad debt • Decreased loss risk • ROI, Cost/Benefit, NPV • Project life-cycle costs
Australia – AGIMO	ICT Investment Framework, ICT Two Pass Review	• Two pass review for ICT-enabled with large investment or high risk • Three category for impact assessment: end-users, agency cost and benefits, and qualitative	• Social value • Service delivery value • government policy alignment • WOG strategy alignment • Policy/objective alignment • Stakeholder support • Environmental implication • Other relevant information	• Cost saving • Increase revenue • Capital expenditure • Operating expenditure
European Commission	eGEP	Three areas of impact: • Efficiency • Effectiveness • Democracy	• openness • participation • transparency and accountability gains	• Cash financial gains • reduction of task's processing times • reduced errors and reworks • reduction of waiting times
United States	ITIM (GAO-04-394G) & IT Evaluation Guide (GAO/AIMD-10.1.13)	• Investment complexity increases with the maturity of IT initiatives • ITIM used in integration with EA framework	• Efficient decision making • Improved data security • Reduction of Customer burden	• Cost reduction • Productivity increase • Service quality improvement

State Level - Victoria (Australia) Investment Evaluation Guideline

The Victoria's Investment Evaluation Policy and Guidelines was enacted in 1996. The policy and guidelines is intended to assist public officials who have responsibility for appraising and evaluating investment proposals. The Guidelines are summarized in Figure 6 below.

Figure 6 - Victoria Investment Evaluation Policy and Guidelines



Source: http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/InvestmentValuationPolicy/$File/InvestmentValuationPolicy.pdf

The principles in general are as follows:

a. The main tenet of the guideline centers on increasing the net benefit of the initiatives. The greater net benefit is used to determine whether to use a statewide approach or whole-of-government approach. For instance, if the net benefits affects only the state's economy, the evaluation will use the statewide approach.

b. The criteria and their weights depend on the type of investment initiative. The guideline acknowledges the socio-economic values, both for quantifiable and non-quantifiable indicators, in addition to financial values (Figure 6 above).

c. There are three techniques for assessing the investment:

- The preferred principle techniques are cost benefit analysis for investment with quantifiable or financial benefits.
- The cost effectiveness analysis is preferred for investments where the benefits can not adequately be quantified or measured in financial terms.
- The impact analysis is used for non-financial and non-quantifiable impacts.

d. The weighting and scoring of impacts are based on the relative importance and magnitude of the investment.

e. Integration of scoring and weighting across financial and socio-economic impacts is necessary for an integrated basis comparison across different investment initiatives.

State Level – California: Statewide Information Management Manual (SIMM)

The California Technology Agency published SIMM as a manual to guide information technology management. The SIMM contains instructions, forms, and templates that State agencies must use to comply with the Information Technology (IT) policy. Section 20 of SIMM outlines the instructions for Feasibility Study Report (FSR).

The FSR guideline asserted the need for State agencies to have two factors: 1) a solid business case and 2) meaningful business value from the proposed ICT expenditure.

The business case should center on four elements:

- Address the business problems that substantially and adversely impact operations and/or service delivery.
- Address business opportunities that may improve operations and/or service delivery significantly.
- Demonstrate revenue generation and true cost savings
- A legislative mandate.

A substantial business value relates to two elements:

- Operational efficiency – “ability to produce desired effect with minimum expenditure of time, effort, personnel, or money as manifested in cost savings and/or cost avoidances.”
- Service effectiveness – “type, quantity, or quality of services delivered in response to, and aligned with, statutory and policy requirements.”

The FSR also specifies fifteen points of emphasis for reviewing the proposed ICT initiatives. Among others, the FRS requires 1) business objectives must be quantifiable and 2) sensitivity analysis based on diverse alternatives.

Summary of Current Practices

This section briefly reviews the information technology and information management (IT/IM) investment management/guide/evaluation policies. We review and contrast the guidelines from four different countries (US, UK, Australia and Canada) and the European Commission along with examples from two sub-national governments, California and Victoria (Australia). We are

interested in identifying the public value consideration in assessing the proposed IT/IM investment and the use of qualitative indicators as assessment indicators.

The central tenet of IT/IM investment management calls for three consecutive and iterative processes of selection, control and evaluation. The process begins with selecting the proposed IT/IM investment among a range of alternatives in cascading processes, meaning that the ICT investment initiatives are evaluated and assessed on more than one iteration. For instance, Australia uses a Two Pass review process in which the ICT investment is reviewed twice. The First Pass focuses on the high-level business requirements. If the project survives that review, it moves to the Second Pass, which requires assessment of more details and fine grained information from the investment initiative. The US ITIM incorporates the maturity level framework with ICT investment review processes. The complexities of the selection and review processes increase with higher maturity levels of the assessment process.

The core analysis for assessing and reviewing the portfolio of ICT investment in the US, UK, Australia, Canada and EC focuses on the costs, benefits, and risks. Their guidelines for measuring the benefits or outcomes of the ICT initiatives include both qualitative and quantitative measurement, with both financial or non-financial values taken into account. The qualitative benefits specified in the guidelines are either unquantifiable or too costly to transform into quantitative evidence. The latter may be such things as increased quality of decision making, reduction of customer burden, or long term future benefits that can only be estimated.

The assessment guidelines include a number of qualitative impacts and outcomes that can be characterized as indirect rather than direct impacts of ICT projects. The US, UK, Australia and Canada guidelines provide examples of a range of qualitative outcomes such as: efficient decision making, greater data accuracy, and improved data security. The measurement for qualitative benefits mostly focuses on an agency's internal improvement as benefits. Eventually, the internal efficiency enhancement will generate public values through the reduction in administrative burden for the citizens. Only the guideline from Australia and the California (US) specifically mentioned direct benefit of service delivery to the citizen/customer.

Although the majority of the guidelines focus on the financial value expected from the ICT initiatives, some countries recognize other impacts, such as: political, social and strategic values. For instance, the Australia's Two Pass Review recognizes four different types of value, namely: financial, political, social, and strategic value from investment in ICT initiatives. They classified the qualitative benefits in their guideline into eight elements, including social value, strategy alignment value, policy/objective alignment, and environmental impacts. Similarly, at the state level, Victoria recognizes the social-economic analysis as a support to the financial analysis. The eGovernment Measurement Framework (eGEP) from the European Commission also recognizes democracy as one of the areas of impact. The framework connects the democracy impacts with the political value. Democracy as a public value generator will enhance openness, participation, transparency, and accountability. The openness, participation, transparency and accountability can also be seen as promoting forms of political value.

The UK eGovernment strategy recognizes the ICT investment initiative as the "enablement" of public value. The UK 2010 eGov strategy calls attention to transparency, accountability, and openness as one area of impact in addition to efficiency and effectiveness. The strategy emphasizes greater transparency through regular and open reporting, such as publication of government ICT contracts online, publication of estimated and actual procurement time scales,

and open technical standards. The increase in transparency in return will enable public scrutiny that will eventually increase the performance of the government.

Our review shows that governments consider the ability to generate broader public value, such as social, political, and financial impacts, as important issues in the assessment of IT/IM investment initiatives. As a result, the guidelines include attention to attaining indirect impacts from the IT/IM investment initiatives, such as: greater data accuracy and more efficient decision making to reduce the administrative burden for citizens. To account for the indirect impacts of IT/IM investments and acknowledge broader public values, the guidelines recognize the importance of intangible and qualitative measurements in appraising the benefits of the investment. Thus, broader public value assessment and acknowledgment of intangible and qualitative measurements have become integral parts of IT/IM investment assessment.

Discussion and Summary

The public value types and assessment approach presented here are a synthesis of current thinking on government practice with a focus on a broad and eclectic concept of value. The comprehensive value types and attention to stakeholder interests reframe the assessment of value in ways that admits the importance of both qualitative and quantitative data and longer term perspectives. The analytical guidance provides a basis for crafting specific public value variables to use in the assessment of particular ICT investments by governments.

The examples from government practice illustrate the range of value propositions available and approaches to data collection and analysis. This heterogeneous collection illustrates clearly that the assessment of public value generally and for ICT investments in particular is an open ended endeavor with much work remaining to be done. That work will be advanced by creative use of all the available data that can legitimately speak to the impacts of government ICT investments, within government operations and programs as well as in the social and political environment. This kind of effort will help ensure that governments make effective investment decisions and take advantage of the many opportunities presented by new technologies.

The framework proposed here and the review of related practices clearly have promise to improve government decision making and ultimately performance. It is also clear, however, that relatively little is known about how much of that promise is realized. Much of the attention to public value creation in the pre-investment assessment of initiatives has not been accompanied by comparable attention to outcome assessment. It is one thing for decision makers and analysts to ask what public value an initiative is expected to create. It is another thing altogether to assess whether those expected outcomes are ever realized. Similarly, there is not much known about the degree to which these frameworks and assessment schemes are actually used or the costs of putting them into practice. It is clear that such complex and challenging decisions as for many government ICT investments demand comparable investments in analysis and evidence gathering. Given the difficult political and social climate of much government decision making, it is not clear that the results of these value assessments would be determinative of actual investment decisions. The full costs of these assessment efforts can be quite high, without assurance that the cost in time and effort will result in overall better ICT systems and greater public value. These are additional questions worthy of further reflection and research.

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Appendix A – Public Value Dimensions and Variables

Value Types & Dimensions	Individual Point of View	Group Point of View	Institutional Point of View	Society/National Point of View
Financial				
Wealth	changes in value of financial, intellectual, & physical assets, changes in education level, qualifications, health status, entitlements	changes in value of financial, intellectual, & physical assets, reputation, entitlements	changes in value of financial, intellectual, & physical assets, reputation & legitimacy, entitlements	changes in productivity, natural resources, education & skill levels, infrastructure, built environment, & other physical assets, intellectual property
Income	annual revenue, in-kind income, imputed income	annual revenue, in-kind income, imputed income	annual revenue, in-kind income, imputed income, subsidies	changes in national income accounts (GDP, etc.), asset appreciation
Liabilities	debt, payables, poor health, risky or anti-social behavior, deferred maintenance, insecure environment	debt, payables, deferred maintenance, insecure, competitive environment	debt, payables, risky behavior, deferred maintenance, insecure environment, increased competition	debt, deferred maintenance, insecure environment, external threats, global instability
Savings & imputed income	savings, securities, favorable interest rates	savings, securities, human capital	reserves, securities,, favorable interest rates	saving rates, government reserves
Entitlements	pensions, subsidies, service eligibility	subsidies, service eligibility	subsidies, service eligibility	liabilities linked to entitlements
Financial risks	environmental hostility, economic instability, financial information quality, corruption	environmental hostility, economic instability, financial information quality, corruption	environmental hostility, economic instability, poor information, corruption	environmental hostility, economic instability, poor information, corruption
Political				
Voting behavior	voting frequency, barriers to voting, incentives	voting rate; incentives; support for voters, size	voting rate; incentives; support for voters, size	voting barriers & enablers, incentives

Electoral participation	frequency of office-seeking, campaigning, supporting candidates, issue advocacy	promoting office-seeking, campaigning, supporting candidates, issue advocacy	promoting office-seeking, campaigning, supporting candidates, issue advocacy	levels of office-seeking, campaigning, supporting candidates, level & intensity of issue advocacy
Political influence	perception of or actual enhanced efficacy, political status, alignment of policy with preferences	perception of or actual enhanced efficacy, political status, alignment of policy with preferences	perception of or actual enhanced efficacy, political status, alignment of policy with preferences	perception of or actual enhanced efficacy, political status, alignment of policy with preferences
Communication & administrative engagement	access to officials, decision participation, advocacy, influence on service delivery, co-production of services	access to officials, decision participation, advocacy, influence on service delivery, co-production of services	access to officials, decision participation, advocacy, influence on service delivery, co-production of services	improved knowledge of citizen preferences, feedback on service quality & efficiency, higher cost of citizen interaction
Social				
Social network impacts	Membership in social & cultural organizations, participation in civil society activities, diversity of affinity linkages	Number of and membership in social clubs and civil society groups, level of activity, collaboration, policy and economic achievements	growth of and frequency of interorganizational networks, increased collaboration, policy and economic achievements	overall levels of social isolation, alienation, level of civil society groups and activities sponsorship of policy and economic achievements
Status & social mobility	increased perception of higher social status and opportunity, minority and disabled presence in corporate and government leadership & higher education	diversity in group membership, emergence of and activity of minority groups, public recognition & status, reputation for providing opportunity	increased minority & disabled in leadership and top earners, improved morale & motivation of workers	indicators of upward mobility: growing proportions of minority and disabled in elected office, government, executive positions, higher education levels, lower drop-out rates, incentives for in-migration
Equity and tolerance	reduced income disparity, lower levels of intolerance-motivated activity, hate crimes, enhanced social & economic opportunity	more diversity in membership, reduced discrimination, hostility, inter-group conflict, increased opportunity for collaboration	diversity in organizational membership, minority & disabled in leadership and top earners, organizational recognition for diversity & equality	lower levels of conflict, increased social cohesion and collaboration, lower alienation and social unrest, increased in-migration

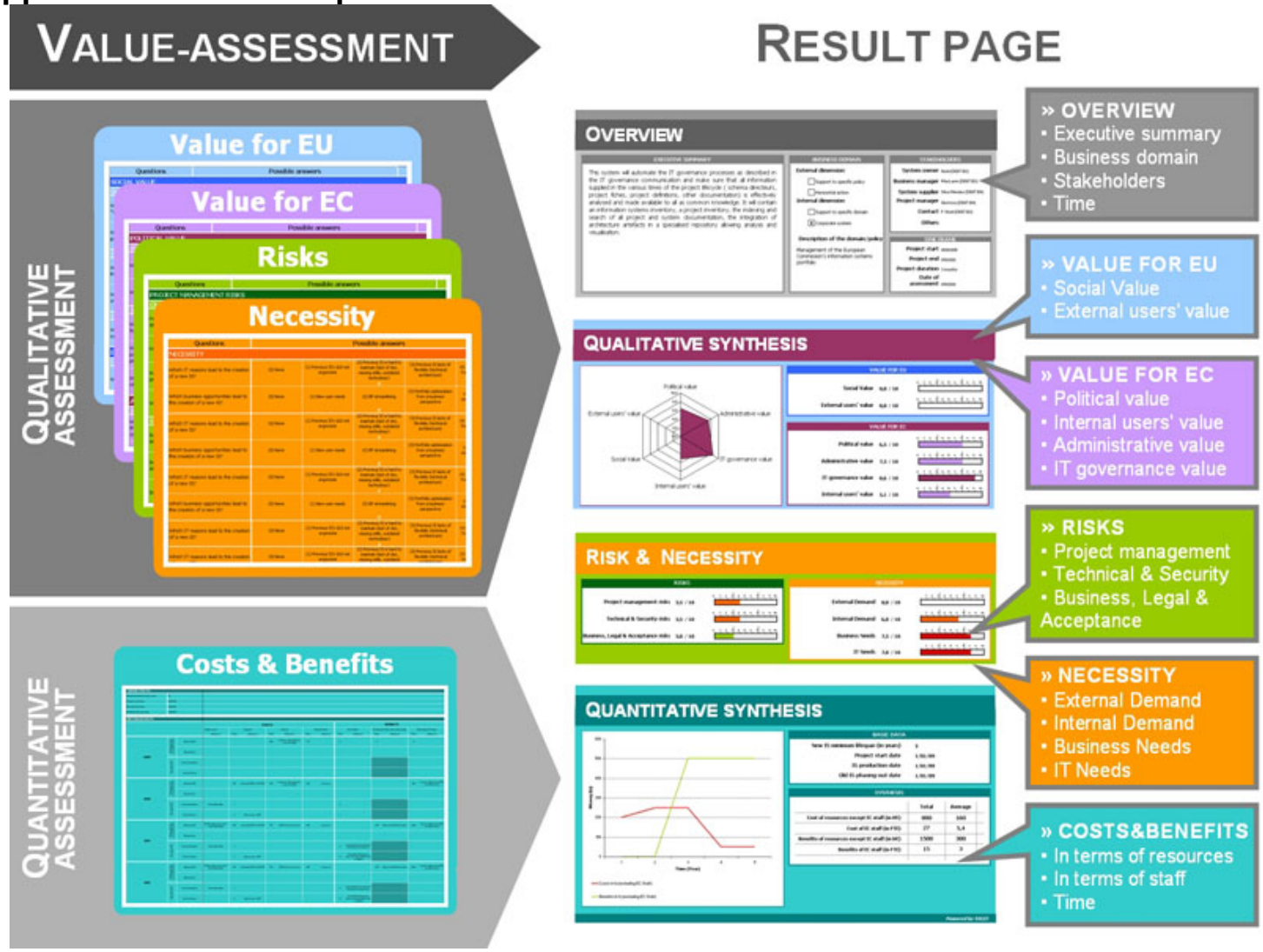
Identity	affirming value of ethnic and other identities, enhanced cultural knowledge and participation, potential for increased inter-personal and group conflict	enhanced status and public recognition of identity groups, growth in size and solidarity of membership & status, potential for increased inter-personal and group conflict	enhanced status and public recognition of organizational or corporate identity, growth in size and internal solidarity	changed potential for increased inter-personal and group conflict, problems of identity and ideologically based political movements
Strategic				
R&D support	eligibility for grants, grant availability, advice & support programs, training, information access, patents	eligibility for grants, grant availability, advice & support programs, training, information access	eligibility for grants, grant availability, advice & support programs, training, information access, patents	grant applications, inventions, patents, research prizes, international recognition
Institutional structures & barriers	lower barriers and more enablers to service eligibility & access, rule of law, limited moral hazard	lower barriers and more enablers to service eligibility & access, rule of law, limited moral hazard	lower barriers and more enablers to service eligibility & access, rule of law, limited moral hazard	more agile organization and service processes, stability of rules and predictability of planning processes
Information & knowledge access	increased eligibility and access to education, broadband, media, government and scientific data	increased eligibility and access to education, broadband, media, government and scientific data	increased eligibility and access to education, broadband, media, government and scientific data	political and social stability, enhanced economic development, attraction of in-migration, scientific advances
Innovation support & collab.	availability of venture capital, tax incentives, incubator resources, technical support & information, facilitation of collaboration and networking, patent & copyright awards	opportunities to participate in and sponsor R&D, collaboration and networking, R&D financing and incentives	availability of venture capital, tax incentives, incubator resources, technical support & information, facilitation of collaboration and networking, patent & copyright awards	robust innovation and invention economy, patent awards, greater economic competitiveness, overall economic growth and in-migration
Ideological				

Conflict & alignment	alignment of policy and programs with value preferences, instances of support or resistance, civil disobedience, open conflict	alignment of policy and programs with group goals, mission, value preferences, instances of group action in support or resistance, civil disobedience, open conflict, changes in number and size of ideologically grounded groups, changes in membership and financial support, alliances	alignment of policy and programs with organizational goals, mission, value preferences, instances of support or resistance, civil disobedience, open conflict, litigation, policy initiatives, changes in number and size, and alliances of ideologically oriented organizations	alignment of policy and programs within government, consistency in mission across agencies, instances of internal support or bureaucratic resistance, open conflict, litigation, numerous policy initiatives
Issue salience in political and legal action	engaging in political or social action in relation to ideology and values driven litigation, legislation, other policy initiatives	engaging in political or social action in relation to ideology and values driven litigation, legislation, other policy initiatives, group action in support or opposition	engaging in political or social action in relation to ideology and values driven litigation, legislation, other policy initiatives, organizational action in support or opposition	instances of polarization and ideologically-driven partisanship in policy development and decision making, barriers to resolving ideologically linked problems or issues
Quality of Life				
General satisfaction	reported satisfaction on surveys, indicators of dissatisfaction: protests, letters to editors, other forms of sentiment analysis	reported satisfaction on surveys, indicators of dissatisfaction: protests, letters to editors, other sentiment analysis, public support of government policies & programs	reported satisfaction on surveys, indicators of dissatisfaction: protests, letters to editors, organizational statements of public support of government policies & programs	voting behavior, tax compliance, public participation in voluntary support activities, sentiment analysis
Social pathologies	rates of suicide, teen pregnancy, substance abuse, domestic violence	within-group rates, group incentives & facilitation, capability to mitigate	organization rates, incentives & facilitation, capability to mitigate	society-level rates, distribution, capability to mitigate
Public Safety	vulnerability to crime, terrorism, war, & natural hazards	vulnerability to crime, terrorism, war, & natural hazards	vulnerability to crime, terrorism, war, & natural hazards	capability to reduce vulnerability to violence & natural hazards

Environmental quality	access to higher air & water quality, lower exposure to toxins, noise, congestion, other stressors, improved support for sustainability, efficiency	access to higher air & water quality, lower exposure to toxins, noise, congestion, and related stressors, improved support for sustainability,	access to higher air & water quality, lower exposure to toxins, noise, congestion, and related stressors, improved support for sustainability, efficiency, new markets for green products and services	capability to maintain & improve air & water quality, reduced overall effects of exposure to harmful conditions, stronger regulation, funding, new environmental policies, more sustainable development, lower carbon emissions
Health & sanitation	health care access, quality, affordability; sanitation level, disease threats, mortality and morbidity levels, behavioral health indicators	sanitation levels, disease threats, health care costs, programs for group issues and vulnerabilities	member health care access, quality, affordability; sanitation level, disease threats, losses due to illness & accidents, cost of compliance with public health & safety requirements	losses due to illness & accident, costs management and regulation of health care systems, public opinion vis. health care policies & programs, morality & morbidity statistics
Housing & built environment	housing, availability, quality, affordability, amenities, reduced homelessness, higher sustainability, fewer abandoned buildings, , neighborhood qualities, higher efficiency	housing, availability, quality, affordability, amenities, sustainability, fewer abandoned buildings, higher efficiency, advocacy for housing issues: lending, financing, zoning	facility availability, quality, affordability, local amenities, sustainability, neighborhood qualities, higher efficiency, advocacy for real estate issues: lending, financing, zoning and land use, tax policies	availability, quality, affordability, & amenities, of the built environment, sustainability, vacancy & abandoned property, efficiency, regulation of: lending, financing, zoning & land use, energy use
Stewardship				
Trust in government	allegiance to government & regime, social survey data, sentiment analysis, tax compliance, public statements, social action, collaboration and participation in government programs	social survey data, sentiment analysis, tax compliance, public statements, social action and collaboration	organizational sentiment analysis, tax compliance, public statements and collaboration	voter behavior, survey statistics, sentiment analysis, levels of participation in government voluntary programs

Integrity & Corruption	allegiance to government & regime, satisfaction with official performance, sentiment analysis, tax compliance, civil protest and disobedience	support actions vis. allegiance to government & regime, expressions of satisfaction with official performance, sentiment analysis, tax compliance	support actions vis. government & regime, formal and informal expressions of satisfaction with official performance, sentiment analysis, tax compliance	frequency of instances of corrupt activity, scandal, changes in tax compliance, lower incidence of civil disobedience, financial loss; sentiment analysis for support of government & regime
Transparency of decision making	allegiance to government & regime, social survey data, sentiment analysis, tax compliance, public statements, social action, collaboration and participation in government programs	social survey data, sentiment analysis, case studies, tax compliance, public statements, social action, collaboration and participation in government programs	aggregated social survey data, case studies, sentiment analysis, tax compliance, public statements, social action, collaboration and participation in government programs, new interorganizational collaborations	better coordination & collaboration across agencies, more integrated information & analysis, higher public participation in programs, sentiment analysis for support of government & regime
Transparency of elections	allegiance to government & regime, satisfaction with election results, voting behavior, sentiment analysis, civil protest and disobedience, increased office seeking and quality of candidates	allegiance to government & regime, satisfaction with election results, voting behavior, sentiment analysis, civil protest and disobedience, increase office seeking and quality of candidates	allegiance to government & regime, satisfaction with election results, voting behavior, sentiment analysis, civil protest and disobedience, increase office seeking and quality of candidates	survey data showing higher legitimacy of government programs and regime, voter turnout, improved candidate pools, lower claims of election fraud and voting irregularities
Transparency of appointments	capability to seek, influence, and challenge appointments, increased trust & confidence in govt., increased access to and knowledge of appointees	capability to seek, influence, and challenge appointments, increased access to and knowledge of appointees.	capability to seek, influence, and challenge appointments, increased access to and knowledge of appointees.	increased trust & confidence in government, improved candidate pools, less opportunity for corruption, malfeasance, waste of resources

Appendix B – The European Commission VAST Framework



Source: http://ec.europa.eu/dgs/informatics/doc/vast_guidelines_v3_11.pdf

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