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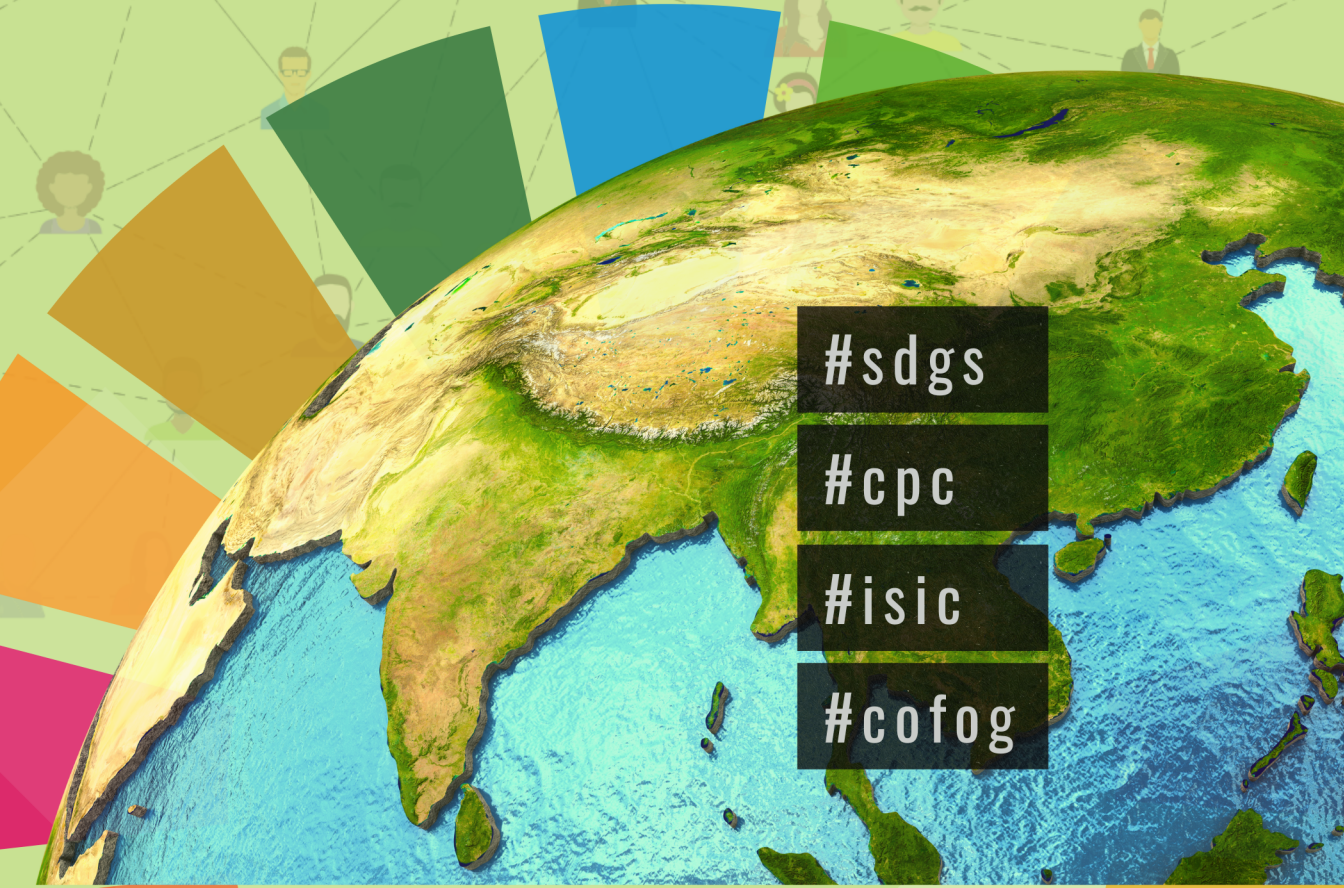
SOCIETAL ARCHITECTURE AND COLLABORATIVE DECISION MAKING

TOWARDS A TALENT EXPLOSION FOR SUSTAINABLE DEVELOPMENT

JAN GOOSSENAERTS



Societal Architecture and Collaborative Decision Making

Towards a talent explosion for sustainable development

Jan Goossenaerts

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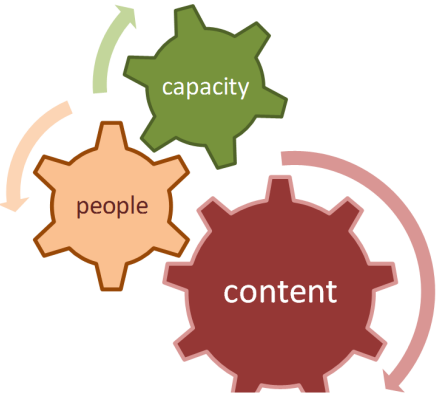

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enablers of lean growth

Acknowledgments

The idea for this book was conceived many years ago. At the time, however, the proposal of a societal architecture seemed purely academic, with unclear prospects for large-scale practical application of a society-wide approach to information system architecture.

Fortunately, significant progress has been made in a number of areas in recent years.

In international development, the post-2015 process in particular has triggered a much more inclusive global discourse on development challenges. Today, the 2030 Agenda for Sustainable Development and the accompanying Addis Ababa Action Agenda require portfolio thinking and an enterprise architect's perspective. The proposed Collaborative Planning and Investment Methodology and the society-wide Enterprise Architecture approach aim to meet this need.

Enterprise Architects have to deal with many concepts and views that come from different disciplines. The ArchiMate standard, the Archi modelling tool, and the Common Approach to US Federal Enterprise Architecture have been very helpful in structuring and supporting the enterprise architecture discourse. ArchiMate provides a fairly complete set of concepts and views for representing the enterprise architecture models and ideas that I wanted to share with the reader. ArchiMate 2.1 has added Motivation and Implementation and Migration extensions. The Common Approach to Federal Enterprise Architecture has shown awareness and introduced jargon for dealing with multiple levels of scope, it has expressed general principles for dealing with enterprise architecture in "partnerships", and it has defined a concise collaborative planning methodology that has influenced the methodology presented in this e-book.

A third area I must acknowledge is the availability of open source tools and software. We know that the majority of the target beneficiaries of the 2030 Agenda for Sustainable Development are resource-constrained, but they also need online content and tools to clarify their own needs and launch their own digital initiatives. Open source and tool support for such work is invaluable. In terms of wikis, I would like to mention wikidot.com and wiki.js. Mastodon is an open source alternative to X (earlier Twitter). In addition, the ability to add actionable models to an e-book adds a lot of value to the reader. Archi is a free tool that supports the rapid creation of coherent and consistent ArchiMate models. Modelio is an open source ArchiMate, UML and BPMN modeller that also supports integration specifications, and Leanpub is the publishing platform through which this e-book is offered. To the creators

of Wikidot.com, Wiki.js, Mastodon, Archi, Modelio, Leanpub and Notepad++: you have all done a great job!

Digital commons activism, scholarship and policy proposals are a fourth area. A societal architecture is a digital commons where the resources are data, information, culture and knowledge created and/or maintained online. Societal architecture supports an ecology of interoperable portfolios, programs and projects.

My thanks go to everyone who has contributed to the above initiatives in an official, contractual or voluntary capacity. Without their enthusiasm, insight and commitment, this book would have been impossible to write.

Finally, I would like to express my gratitude to my wife and our daughter for their love and patience.

the author, August 21, 2024

The ‘untrapped mind’ is open enough to see many possibilities, humble enough to learn from anyone and everything, perceptive enough to see things as they really are, and wise enough to judge their true value.

Komusuke Matsushita

Preface

This book focuses on digital enablers for the human side of these "big three" business topics: Leadership (Humanity), Decision Making and Communication.

John Adair's three circles of business are accomplishing the task, building the team and developing the individual.

Consider as the task the **2030 Agenda**, as a team the living members of **humanity**, and as individuals each of us, but as you read this book, especially **you**.

At first glance, decision making seems to be relevant only to that first circle, "getting the job done" at the top, whatever that may be.

But, as Adair reminds us in his books, in the context of leadership, (human) decision making (which here includes problem solving and creative thinking) necessarily involves the team (collaboration) and individual (skills) circles, and these circles are always interactive.

In the age of digital interdependence, these circles are also connected globally to locally, and the teams include a wide variety of (ICT) professionals who provide and operate the digital platforms that empower the human side in an increasing number of today's enterprises. These digital platforms and the digital artefacts flowing through them have been created over decades and after much analysis.

Currently, these circles are plagued by a variety of divisions, including those of content versus ICT, those with access to externalized knowledge versus those without, rich versus poor, center versus periphery, informed versus misinformed, and constructive versus destructive attitudes.

The #tagcoding handbook and the #xy2wiki portfolio have made it their mission to bridge the 'digital' divide between those who have access to externalized knowledge and those who do not, between the center and the periphery of learning and communication.

In recent years, I have made the #tagcoding manual and online tools a priority because the contradictions of access and center versus periphery are most salient. However, the slow uptake of #tagcoding and #xy2wiki has led me to conclude that the separation between content and ICT also needs urgent attention.

This book's message is clear: semi-formal models, delivered through and evolving in a societal architecture, can dramatically improve communication between content and ICT professionals. In fact, they can lead to a talent explosion for sustainable development.

With a little effort and smart use of methods, models, and tools, everyone in the "content and ICT ecosystem" can "free their mind from all kinds of traps" and dramatically improve understanding of issues, decision-making effectiveness and efficiency, and collaboration when deploying digital skills in society and contributing to the 2030 Agenda.

After reading this book, you will be able to apply Societal Architecture and CPIM in the stakeholder role and for the partnership episode that fits your context, using the Archi or Modelio models that accompany this e-book. As you apply the proposed activities for one episode of the partner journey, you will build the skills to move to the next episode with the recruited partnership. Value creation and value erosion prevention will create virtuous and viral cycles in support of high-priority sustainable development goals and objectives. The additional resources gained will enable the partnership to take on new and bold goals and targets.

You will find that the comprehensive, organized online content that accompanies this book is instrumental in fostering virtuous and viral knowledge creation for development.

It will undoubtedly require more effort, practice, and experience to overcome all kinds of habitual traps if the deep mind is deeply entrenched in some levels of social and organizational roles.

Apply the principles, models, and tools described here. Free your depth mind and reflect on the collective experience—both successes and failures. Contribute to the progress of humanity as envisioned in the 2030 Agenda.

One day, more and more members of humanity will acquire the quality that the ancient Greeks valued so highly in their leaders. They called it phronesis, which is best translated as "practical wisdom." It is the product of a rare combination of keen intelligence, a wide range of experience, and a deep sense of goodness.

What you need to look for elsewhere

This book is the definitive guide to the subject matter. However, some information is beyond the scope of this book and must be sought elsewhere.

This book uses a lot of jargon. To keep it manageable, we assume the reader is familiar with enterprise architecture jargon, such as that defined in the Common Approach to the U.S. Federal Enterprise Architecture, the TOGAF® 9.1 Architecture Development Method (ADM), or the ArchiMate® 3.1 Specification.

The key service of Enterprise and Societal Architecture is the lean implementation of change in complex environments—organizations or other technotopes. Therefore, the jargon of portfolio, program, and project management is also relied upon. We use the terms and meanings consolidated in the open PM² Project Management Methodology and the Portfolio and Program Management Guides, published by the Publications Office of the European Union. These are freely accessible and usable.

Unless otherwise stated, terms from these standards are used according to their definition. If you're not already familiar with these standards, you'll find key definitions, their interrelationships, and examples in the techno-order chapter of the ens.wiki.

Societal architecture employs methods and components from enterprise architecture frameworks such as TOGAF and the architecture description standard ArchiMate. However, in the societal landscape, we can expect participants in the "social enterprise" to bring their domain knowledge, their own devices, and applications. We anticipate the application of Societal Architecture in three domains: public services, industry, and households.

This book focuses on the preliminary, vision, and business architecture phases. It provides guidance on how to define the scope, requirements, and architecture. These phases of societal architecture development do not have a chief executive. This book will support many autonomous stakeholders in finding common ground and discovering what they can contribute to the societal architecture as a cognitive infrastructure.

On a positive note, the United Nations system is revolutionizing its approach to development and communication. The Sustainable Development Knowledge Platform (https://sdgs.un.org/) is evidence of this, with global consultations and a more open approach to initiatives. The notion of societal portfolios from global to local is gaining ground.

We refuse to be deterred by the extreme right's attempts to equate the 2030 Agenda with a global deep state power grab. We see the Sustainable Development Goals, Targets and Indicators as a fair framework of societal values and goals. This framework provides direction for societal portfolios, and we will not be dissuaded from pursuing it.

This e-book is a work in progress.

Not all chapters are ready. This is indicated in the remarks following the table of contents of these chapters.

Also, while the open source tools Archi for ArchiMate and Modelio for UML and BPMN would be sufficient to do all the modeling needed for this e-book, I have not yet had the time to migrate some older material to these tools. As a result, you will find some older material that was modeled in other tools, some of which, such as UML in Visio, are no longer available.

Fortunately, the Leanpub Publish Early, Publish Often[1] model allows me to publish this e-book early to get reader feedback, and to publish new versions as often as needed.

If you are reading the sample text: In a number of chapters the original text has been replaced with the phrase: "This content is not available in the sample book. The book and its extras can be purchased from LeanPub[2]". Note that the minimum price for the e-book is currently $4.99. Once you have purchased your copy, you will receive all upgrades for free. The minimum price may increase in the future.

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[1] https://leanpub.com/authors
[2] https://leanpub.com/socarch

Part I - Expanding Technotope Circles

Chapter 1 - Introduction

Chapter 2 - The Technotope Individual

Chapter 3 - The Technotope Team

Chapter 4 - Sustainable Development Tasks in the Technotope

To **Part I** - II - III - IV - V-Annexes - VI-References

Chapter 1 - Introduction

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1.2 - Towards Digitally Empowered People
1.3 - Unparalleled capabilities in Partner Journeys, built on the achievements of a generation
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1.6 - Tools and Resources

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1.1 - Global Challenges in a Planetary Context

The global 2030 Agenda for Sustainable Development, and the national and local action plans that will be launched in relation to it, will need to influence the decisions, investments and operational choices of many partners: governments, businesses and households. Successful implementation of the agenda will require improved services for decision making, investment, technology adoption and data and information sharing at all levels and in all parts of society.

In order to reduce the perceived complexity of the global problem space, and to compare values that people will refer to when making decisions, it is useful to distinguish three orders:

- The natural order: the natural environment in which humanity lives. It includes aspects such as time, land, climate, biotope and people. It includes material, those material resources that humanity exchanges with the natural environment.
- Social order: the institutional arrangements and socio-cultural networks that humanity has developed to govern relationships and interactions with each other and with the natural order. It is the order in which *produced assets* and *content* come into play. Produced assets are non-financial and non-content assets created as outputs of production processes and as inputs of consumption processes and services. Produced assets consist of fixed assets, inventories and valuables. Contents are non-tangible resources such as those that could be protected by intellectual property rights, authored works (in the public domain), data, etc.
- Techno-order: institutional arrangements and actor networks related to constellations and interactions involving complex produced assets, complex content collections and multiple institutional arrangements.

In these orders, entelechy proceeds through interactions in biotope, sociotope and technotope.

Biological and physical systems come together in the biotope, which is an area of uniform environmental conditions that provides a living space for a particular assemblage of plants and animals. Biotope is almost synonymous with habitat, but whereas the subject of a habitat is a species or population, the subject of a biotope is a biological community.

Physical, chemical and biophysical interactions in the natural order. These are studied in dedicated sciences and are not specifically addressed here. However, the findings of these sciences should be taken into account when making decisions.

Climate change, which is a global process of the natural order, threatens humanity's biosphere.

Humanity's response to challenges such as climate change involves socio-technical interactions in the social order and the techno-order.

The patterns of these interactions affect how effectively and efficiently we deal with the challenges.

More generally, entelechy or becoming in sociotope and technotope is based on biological and physical systems, but involves additional systems such as legal systems, businesses and agencies and the products and services they provide to society.

A *sociotope* is a defined space that is uniform in its use values and social meanings. It can be described as the collective life-world of a place, its uses and meanings, in a particular culture or group of people. The sociotope is defined in the real world, where it is shaped by a variety of lifestyles, trades, regulations and services associated with a specific place, which may be local, national, regional or global.

For the group of social actors, the sociotope typically includes a number of regimes and a *public sphere*.

A *technotope* is an external space that is uniform in its use values, social meanings and technological uses. It can be described as the collective life-world of a sociotope **enhanced by cyberspace**, its uses and meanings, in a specific culture or group of people. The technotope exists simultaneously in the real world and in cyberspace, where it is shaped by a variety of lifestyles, trades, rules and services associated with a specific place, which may be local, national, regional or global, and which involve technical artefacts such as smart phones, computers, digital service platforms, and so on.
Note that the term sociotope, as defined in Wikipedia, also covers the term technotope. This book introduces a distinction to reflect the digital revolution we have been experiencing since the 1960s.

Thus, three interrelated systems are of interest for our decision making:

- the natural system in the biotope,
- actors in the sociotope, and
- digitally empowered actors in the technotope.

Improved use of modelling and modelling tools is proposed as an essential skill for people to participate as decision makers in the technotope, and as a key skill for participation in the social order.

For the social actors, the technotope typically includes regimes that also include elements of the techno-order.

To the chapter

1.2 - Towards Digitally Empowered People

As a wide range of actors learn about the Agenda and commit to making a contribution to improving society's resilience, they will embark on a partnership journey that will take years, involve diverse teams and include episodes of awareness, advocacy, analysis, design, conflict, implementation and monitoring Global Task Force of Local and Regional Governments[3].

These journeys will take place in a society with a complexity that no one can comprehend alone, with multiple interdependencies for all, and with multiple initiatives running simultaneously.

Peace, in spirit and in reality, requires a fragile equilibrium that includes both some control over our natural environment, oversight of actions that affect everyone, and trust in others, both near and far. Trust is needed both in people who speak our language and share our culture, and in people who speak different languages and hold different views.

In this book we refer to an open portfolio, program and project management method and use modelling techniques to present key ideas about public and private initiatives, resource use and their interdependencies.

The purpose of these methods and models is to break out of the rigidities that limit our ability to individually and collectively deal with contemporary problems, from climate change, conflict and poverty to failures of democratic governance and justice.

The challenge in presenting this is that both the subject, the methods and the modelling approach are quite complex and multifaceted.

On the one hand, one can present and explain each of a number of content slices with a limited number of different concepts, and on the other hand, one can establish relationships between the slices, from a small number to the public-private chains that are typical of contemporary society.

[3] https://habitat3.org/engagement/global-taskforce-of-local-and-regional-governments/

To bring to life the interactions between concepts in a small number of slices (or dimensions), we will use a number of cases and describe them, first in each of the slices, and then use elements from different slices in the analyses.

Mapping the partner journeys for the partners at different socio-technical levels helps us to develop content sharing services and resources that better manage the interdependencies and complementarities between initiatives worx.wiki/Initiative Management[4] than conventional approaches to communication, decision-making, development and conflict resolution.

We aim to provide partners with model- and data-driven decision making, capacity building, analysis and design, and negotiation techniques, even in the face of frequent environmental change and where many actors are involved.

A first starting point for shared services and shared capabilities for partners is the Common Approach to the US Federal Enterprise Architecture[5], which emphasises a set of general principles and a collaborative planning methodology to explicitly look outside the agency to address new requirements. In our case, it is partners looking to the partnership for solutions and shared capabilities.

The launch of the 2030 Agenda for Sustainable Development in 2015 provided an important opportunity to promote and explain collaborative approaches to partnership as the basis for effective sustainable development, from global to local scale.

As the requirements for successful initiatives become more challenging in each successive stage of the Partner Journey - from awareness, advocacy, analysis, design, implementation and monitoring â€“ we present the touch points, tools and resources that will strengthen partnership:

- by raising awareness of sustainable development and each other;
- by advocating for local ownership and change;
- by facilitating synergy in the analysis of information ecosystems;
- by designing interoperable digital solutions;
- by enabling joint implementation; and by
- by jointly operating and monitoring systems.

The partnership is enabled by a practical model-based approach to decision-making. We use the decision-making framework described by John Adair (2009) and rely on open source tools Archi and Modelio for sharing models in ArchiMate, BPMN, and UML, the three most popular modeling standards.

[4] http://www.worx.wiki/initiative-management
[5] http://www.ens.wiki/item:feaf

To the chapter

1.3 - Unparalleled capabilities in Partner Journeys, built on the achievements of a generation

Today, we have the advantage of unparalleled capabilities that build on the achievements of a generation.

There are a number of open source modeling tools covering various dimensions of public and private decision making. These are available to all.

There are also Open PMÂ² guides on portfolio, program, project and agile management and principles of digital capability. These are also available to all.

We will also look at Administration, Commerce and Transport messages and the UN/CEFACT modeling methodology (UMM) to support Electronic Data Interchange (EDI) between trading partners in administration, commerce and transport.

We will also look at John Adair's presentation of an important yet simple decision-making framework. There are five steps. Define the goal, gather information, develop options, evaluate and decide, and implement. And there are three circles: accomplish the task, build the team, and develop the individual.

We have the methods, tools, and modeling concepts to support each step in the framework and transform work in each of the three circles. We will achieve the SDGs and related United Nations initiatives, despite a wide range of opinions, both informed and uninformed, as shared via Twitter (now X) and other social media.

The Common Approach to US Federal Enterprise Architecture clearly recognizes the relationship between the level of scope and the mission impact and planning detail of enterprise architecture.

The steps of joint planning and investment using the Societal Architecture will vary according to the demands on resources typical of the actors at each of these levels. By clearly defining the principles and constraints that guide these claims, we will achieve balanced reuse practices and services that empower actors to construct sustainable and equitable futures that align with resource endowments and societal values at the individual, community, national, and global levels.

Enterprise architecture as it is practiced in organizations, this is at the micro level, is transferred and elaborated as a multi-level knowledge infrastructure, with the reference levels of pico, micro, meso, and macro. The generic term “technotope” is used to describe the object system at the various levels, from the techno-globe, as coined by Hiroyuki Yoshikawa, to the techno-house that implements domotics.

Within the operational unit’s journey, strategic investment planning utilises practical thinking, the functions of the mind, the five-point plan and decision drivers as described by Adair (2009). These themes and their relationships are modelled in the figure below.

In the figure, note Adair’s three interactive circles (C1 - building the team in the lower part of the figure, C2 - developing the individual in the middle, and C3 - achieving the task in the upper part), the five-point plan for achieving tasks, the functions of the mind and practical thinking that individuals bring to the process, and the (public sector) decision drivers that influence the building of the team.

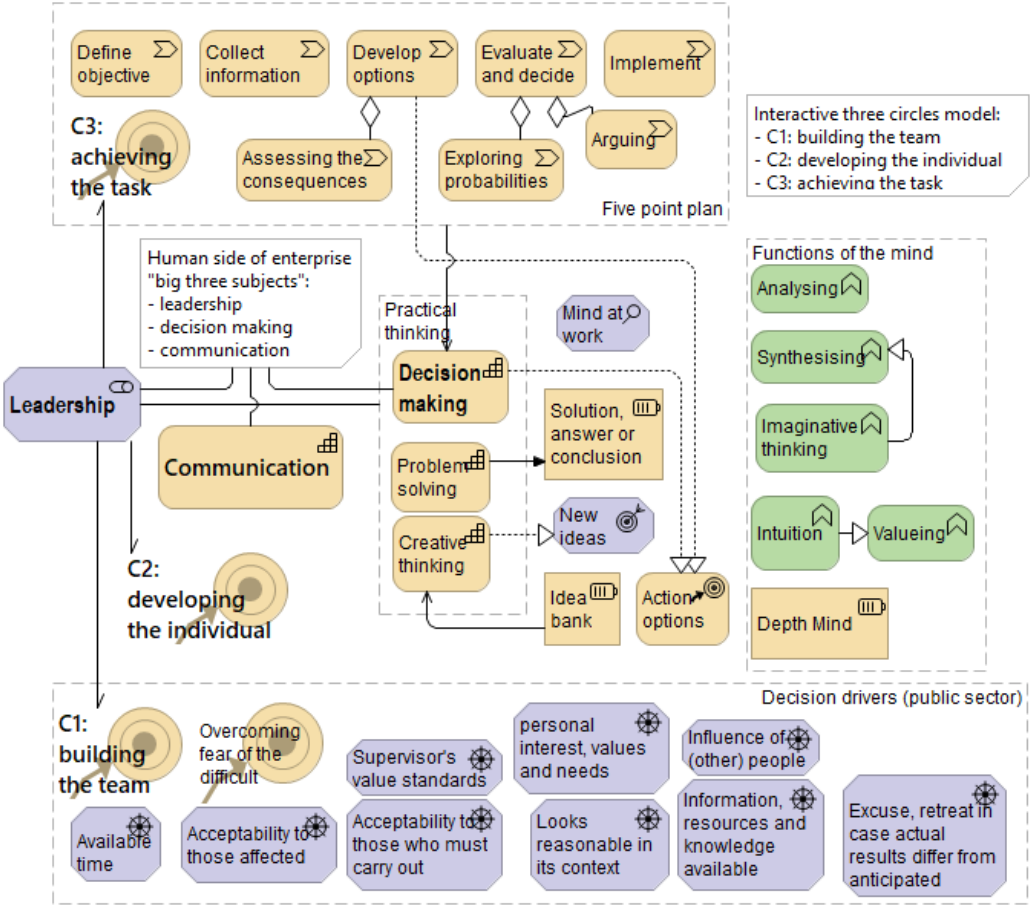

Figure 1.1: The context for leadership, decision making and communication (Adair,2009)

To the chapter

1.4 - Awareness of the Assets and Gaps that underpin the Theory of Change

Figure 1.2 distinguishes three fundamentally different types of assets in society:

- Intellectual assets that serve *semiotic flows*,
- Financial assets that enable the *financial flows*, for instance for investing and "pay for use" of "delivered services"
- The planet and its biosphere that provide a context for *material flows*, such as ecosystem, infrastructure and commercial services (biotope, sociotope and technotope)

Each kind of flow is home to specific drivers, gaps, barriers, goals and outcomes.

While a comprehensive macro-level problem analysis for "humanity on planet earth" is beyond the scope of this e-book, awareness of the three flows and the positioning of drivers, gaps, barriers, goals and outcomes in specific flows will help to assess the utility of a societal architecture.

In the material flows domain, mankind has to cope with drivers such as pollution, erosion, and climate, and the UN has proposed Sustainable Development Goals. Greed is an important driver affecting financial flows and contributing to financing gaps for many. Semiotic paralysis and mind traps contribute to local know-how gaps.

To implement and deliver materially inclusive capabilities and services in the material flows domain, we must use intellectual and financial assets and will create financial liabilities.

Societal architecture must address flow-specific gaps: the solutions gap in material flows, the financing gap in financial flows, and the local know-how gaps in the semiotic flows.

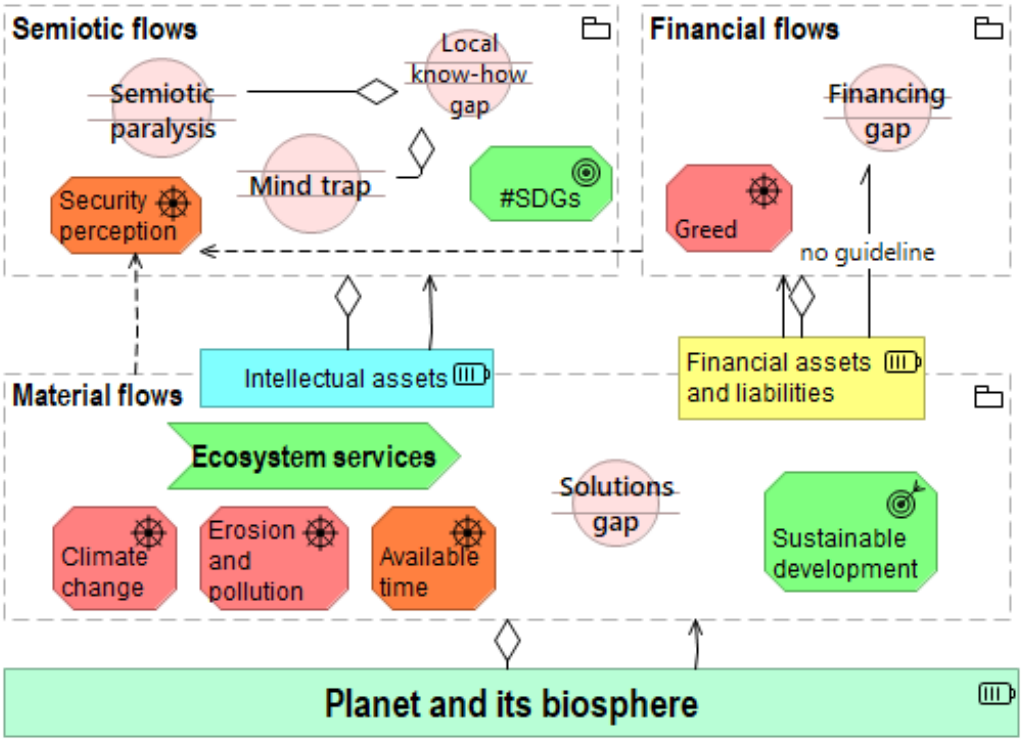

Figure 1.2: Asset and Gap awareness in a three-flow Society

The strategy level narrative of the Theory of Change is that societal architecture will directly address key barriers and gaps in semiotic flows, which will then reduce financing needs and greed. Reduced barriers and gaps in semiotic and financial flows together will enable us to reduce the gap in sustainable development solutions.

To the chapter

1.5 - Outline of the Book

The second chapter explains the role of conceptual modeling in the development of the technotope individual. Here, the focus here is on new languages and tools of human cognition.

The third chapter explains how technotope individuals will build teams. New ways of forming teams, and the expansion of these teams will have implications for funding gaps.

The fourth chapter describes how these teams will collaborate to accomplish tasks at various levels of scale. Humanity will be empowered to address the solution gap.

The fourth chapter lists the building blocks for accomplishing sustainable development tasks in the technotope and also introduces the cases used to illustrate the application of collaborative planning and societal architecture.

Part II, comprising chapters 5 through 7, explains how collaborative planning and societal architecture support the four "semiotic" points in Adair's five-point plan for practical thinking.

- Chapter 5 on An Asset-Aware Collaborative Planning and Investment Methodology (CPIM)
- Chapter 6 on A Societal Architecture for the Techno Globe
- Chapter 7 on A Societal Architecture Repository enabling CPIM Phases

Part III, comprising chapters 8 through 12 elaborates for each phase in CPIM, how societal architecture will be shaping them in the technotope. In each of these chapters, we link one of Adair's five points to a step in the Collaborative Planning and Investment Methodology (CPIM) or to a step in conceptual modeling. Using the running cases, the cognitive means that can be reused for each CPIM step are illustrated. The general principles, as well as the characteristics and constraints of the resources being used, have implications for how the various stakeholders can best engage with the resources, including the use of appropriate tools.

- Chapter 8 on Identify and Validate in the Technotope
- Chapter 9 on Research and Leverage in the Technotope
- Chapter 10 on Define and Plan in the Technotope
- Chapter 11 on Invest and Execute in the Technotope
- Chapter 12 on Perform and Measure in the Technotope

Part IV looks at stakeholders and global portfolios in more detail, elaborating on the implications of using a societal architecture for actors, members of the global partnership, at each of the socio-technical levels, for pico, micro, meso and macro journeys:

- Chapter 14 on Agents

- Chapter 15 on The Global Tax Cooperation Portfolio
- Chapter 16 on The Global Content Portfolio will be added in a later version of this e-book.

In this part, the material is presented in an accessible, step-by-step, low-hurdle manner that allows stakeholders to extend the architecture documentation for their own initiatives.

Part V Annexes and Part VI References conclude the book. Annex 13 - Not an ordinary e-Book explains some navigational features that are used extensively in this book and in the #tagcoding manuals and wikis.

Given that the 2030 Societal Architecture is a first attempt (to my knowledge) to translate and extend enterprise architecture practices and lessons to a global partnership, I am aware of numerous shortcomings in this book. I intend to correct these. Feedback from readers is very welcome and will be acknowledged.

To the chapter

1.6 - Tools and Resources

After reading this book, you will be able to apply Societal Architecture and CPIM in the stakeholder role and for the partnership episodes you are familiar with, using the Archi or Modelio models that accompany this e-book. By applying the suggested activities for one episode of the partnership journey, you will build the skills to move to the next episode with the partnership you have recruited. Value creation and the prevention of value erosion will create virtuous and viral cycles in support of high-priority sustainable development goals.

You will be able to apply Societal Architecture and CPIM effectively if you master the tools and have the resources you need, including the extensive systematized online content that accompanies this book.

Before I conclude this introductory chapter, I want to draw your attention to some resources and tools that will be useful throughout the book.

If you familiarize yourself with these tools and resources as you read this e-book, you will learn the skills faster.

Hashtags that digitally support local discourse

Hashtags that support a local development discourse in social media and web use are listed on the country initiative pages as part of the Actor Atlas: Enabling the Sustainable Development Debate in the Digital Public Sphere[6]. The hashtags are also introduced in the #tagcoding handbook.

Open source modeling tools

- Archi[7] for ArchiMate.
- Modelio[8] for ArchiMate, BPMN and UML.

Repositories

To be completed

To the chapter

[6] http://www.actor-atlas.info/en:pivot
[7] https://www.archimatetool.com/download/
[8] https://github.com/ModelioOpenSource/Modelio/releases

Chapter 2 - Develop the Technotope Individual

2.1 - Skills to be developed by individuals
2.2 - Modeling and Conceptual Modeling
2.3 - Modeling as an Enabler for Change by Design
2.4 - Conceptual Models in a Learning Society
2.5 - System, Ecosystem and Social Totalities
2.6 - Models and Model Layers
2.7 - The technotope individual

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

2.1 - Skills to be developed by individuals

In the following pages you will find guidance, tools and models for the development of practical wisdom, wisdom that can be applied in different roles in society, as it evolves towards a Technotope.

It is a journey on which this e-book can be your companion.

In Adair's five-point plan of decision making, four of the points involve semiosis.

Four of the five steps in Adair's five point plan can be considered specializations of the value chains that are part of the semiotic flows.

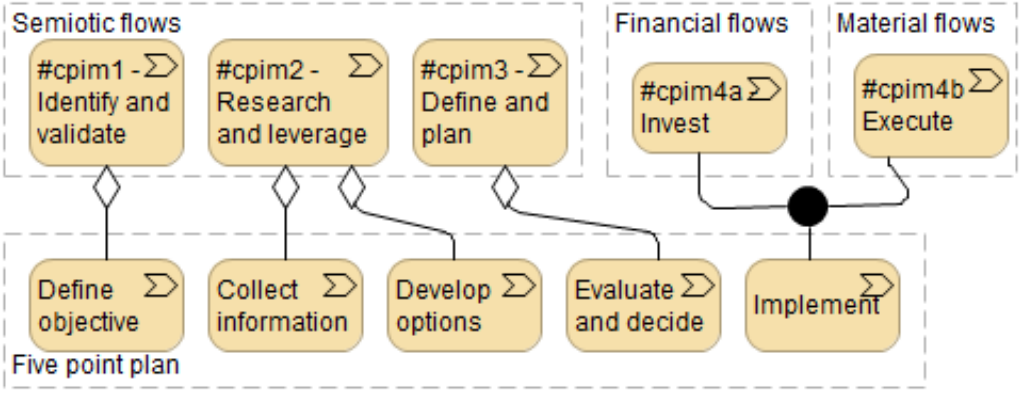

Figure 2.1: The Five point plan of decision making and the Collaborative Planning Methodology (CPIM)

These interactions involve the taking in as content (i.e. words, drawings, numbers, models) by an interpretant (e.g. a person or a computer with a sensor) of (properties of) real-world phenomena and situations, or the interpretation of content as (current, future or past) real-world phenomena or situations.

A semiotic interaction involves a person or a sensing/actuating system (the interpretant), a sign (often content on an information carrier, from simple signs to complex models with thousands of elements and relationships), and a referent (what is denoted by the sign), again as a sign. Open source modeling tools help to make complex models understandable to ordinary people like you and me.

Elementary semiotic interactions are joined into socio-semiotic interactions, as studied for instance in Feez (2007) and the knowledge conversions of Nonaka (Nonaka et al., 2000), and as denoted by the term industrial semiosis (Goossenaerts, 2000).

Industrial semiosis illustrates for each of Adair's four points that new tools and models open up unseen possibilities for the mind, individually and as stepping stones to collaborative or collective intelligence.

Modern open source tools also allow us to create and browse models, so making sense of such tools and the models and the possible meanings they convey is a key area for the development of the individual.

A second skill relates to understanding the nature of social entities and learning in society. Tony Lawson's Social Positioning Theory is used to explain a theory of the social domain that supports the social constitution that would result from adopting a societal architecture.

To the chapter

2.2 - Modeling and Conceptual Modeling

Modeling is a technique for representing situations or systems (economic, military, mechanical etc.) by means of something else, usually at a smaller scale. Modeling is helpful because it allows us to take a good look at something that is too big or impractical to see otherwise.

Conceptual modeling is the development and use of representations to capture the features of both:

- the real-world domain, or work system, that an information system is intended to support (Wand and Weber, 2002)
- the context in which the information system will be created, and within which it will operate and evolve.

Conceptual modeling offers significant advantages throughout the information system lifecycle (ISLC), from initial requirements gathering to system development and ongoing maintenance. Here are some key benefits (summary generated by Gemini for prompt "what are the key benefits of conceptual modeling in the information system lifecycle" , but scope of use enlarged to ecosystem rather than a business or system, and to portfolios rather than projects):

- **Improved Communication and Understanding**: A conceptual model acts as a shared language between stakeholders (work and eco-system users, analysts, developers) by

visually representing the work system's entities, relationships, attributes, and processes. This clarity fosters better communication, reduces misunderstandings, and ensures everyone is on the same page about information and work system functionality.

- **Early Identification of Issues**: During conceptual modeling, potential problems or inconsistencies in requirements can be surfaced and addressed early in the development or change process. This is much more efficient and cost-effective than discovering issues later in the development or change cycle, when modifications become more expensive to implement.
- **Reduced Development Time and Costs**: A well-defined conceptual model serves as a blueprint for system development and planning. It provides a clear roadmap for decision-makers and developers, minimizing the need for rework or last-minute changes due to unclear requirements. This can lead to faster decision and development times and reduced overall portfolio, program, project and iteration costs.
- **Stronger Ecosystem Foundation**: A robust conceptual model lays the groundwork for a more robust work system and maintainable information system. It ensures the system is designed to handle the core functionalities and data structures required by the work system. This makes the work system more adaptable to future changes and the information system easier to maintain over time.
- **Enhanced Data Quality**: The process of defining entities, attributes, and relationships in the conceptual model helps to identify and address data quality issues. This can lead to cleaner, more consistent data within the system, which ultimately improves the accuracy and reliability of information used for decision-making in the work system.
- **Documentation and Training**: The conceptual model serves as valuable documentation both for the information system and its role in the work system. It provides a clear understanding of the system's functionality for future reference and can be used for training purposes, helping users understand how to interact with the system effectively, and helping other stakeholders to plan engagements.

Here's a table summarizing the key benefits:

Benefit	Description
Improved Communication	Shared language for stakeholders, reduces misunderstandings
Early Issue Identification	Proactive problem discovery and resolution
Reduced Development Time/Costs	Clear roadmap minimizes rework and delays
Stronger System Foundation	Solid foundation for a maintainable system

Benefit	Description
Enhanced Data Quality	Promotes cleaner and more consistent data
Documentation and Training	Valuable reference and training tool

In conclusion, conceptual modeling is a crucial aspect of the (information) system lifecycle. By investing time and effort in creating well-defined conceptual models, stakeholders can reap significant benefits throughout the development process and ensure the resulting and evolving systems meets their joint and specific needs effectively.

The various model elements and model layers of ArchiMate®, and the tool support for it, offer a very good starting point for appreciating the diversity and versatility of conceptual models. Key stakeholder benefits of using ArchiMate® in a portfolio, program or project include:

- **Improved Understanding**: Visual representation of the complex relationships between different components of the domain and the context.
- **Enhanced Decision Making**: Better-informed decisions about investments, resource allocation, prioritization, and risk management.
- **Increased Transparency**: Clearer communication of the tax convention's architecture to stakeholders.
- **Facilitated Change Management**: Easier identification of the impact of changes on the overall architecture.

At present most professional modeling literature targets a specific specialized professional group, for instance architects, engineers or programmers.

In this book we want to demonstrate the usefulness of conceptual models and their tool support for a much broader group of mindful users, the technotope individual, who can be anyone who seeks an "untrapped" mind in journeys at any of the socio-technical levels macro, meso, micro, and pico.

To the chapter

2.3 - Modeling as an Enabler for “Change by Design”

For analysts and designers in a wide variety of decision making situations, the use of modeling often is related to the design or improvement of a product, a service or of the operational processes executed by service or manufacturing systems.

In policy making, modeling can be used with the purpose to improve regulations, or to enact new regulations.

But why change the operations of an existing work system? And in the “work system” of the democratic society, why change or add new regulations?

In general terms change “by design” in a work system or a stakeholder constellation can be due to three different causes: problems, directives and opportunities (Whitten et al, 2004)(Figure 2.2):

- **Problems**: undesirable situations that prevent a system or constellation from fully achieving its purpose, goals, and/or objectives.
- **Opportunities**: chances or possibilities to improve the system or constellation even in the absence of identified problems.
- **Directives**: new requirements or constraints that are imposed by management, government, or some external driver.

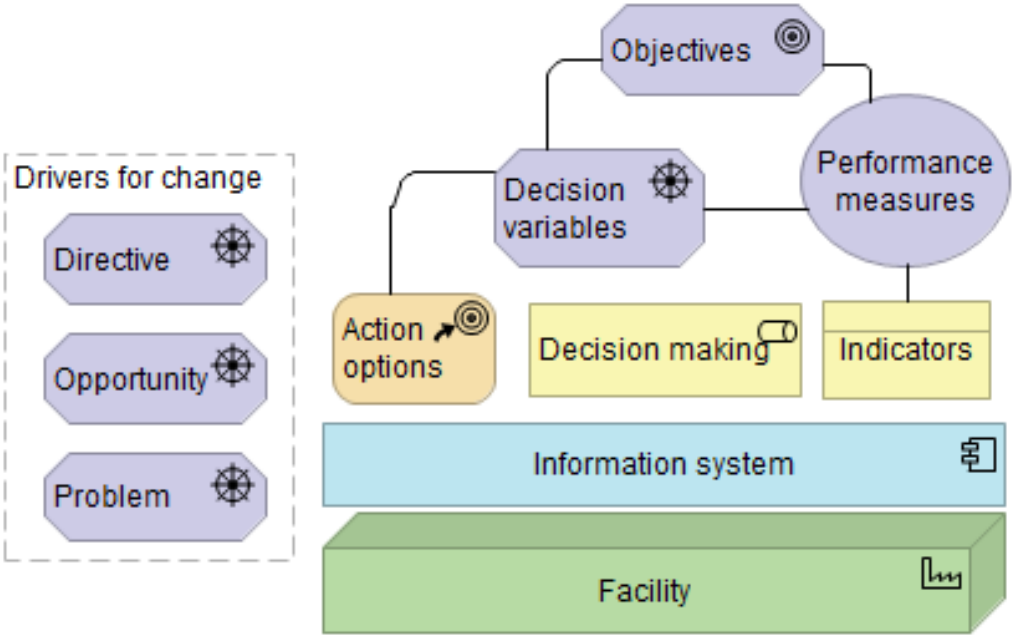

Figure 2.2: A Work System and its Drivers of Change

Emerging technologies, such as information and communication technologies (ICT) can offer a wide range of opportunities. Work systems for which one seizes these opportunities may become ICT-reliant work systems.

In many cases, problems occur or are perceived as a consequence of (implicit) objectives, which often also indicate desirable solutions for the problem.

Some problems can be solved directly by many people (with suitable tools available) (left hand side arrow in Figure 2.2). An example is repairing a flat tire of a bicycle.

Other problems appear new, or are indeed new. Problem analysis, root cause analysis and solution search may involve the use of models (i.e. simplified representations) of both elements of the systems and the factors that influence the problems and possible solutions. By using models it becomes possible to study some reality and possible changes to it, without actually intervening in, or disturbing that reality.

For instance in the case of production systems (assembly systems, job shops, warehouses, supply chains,…) computer models make experimental examinations possible which otherwise would have a high time and money expense. Furthermore simulation models allow quick and extensive parameter changes which are not possible using physical models.

Mathematical models are usually used in those cases where the behaviour of a system with respect to a problem can be fairly well described by means of mathematical equations that can be solved exactly or by using approximation techniques.

In many situations in which mathematical solutions are not (yet) possible it is still possible to make other models. In addition to mathematical models many other models exist (right hand branch in Figure 2.3).

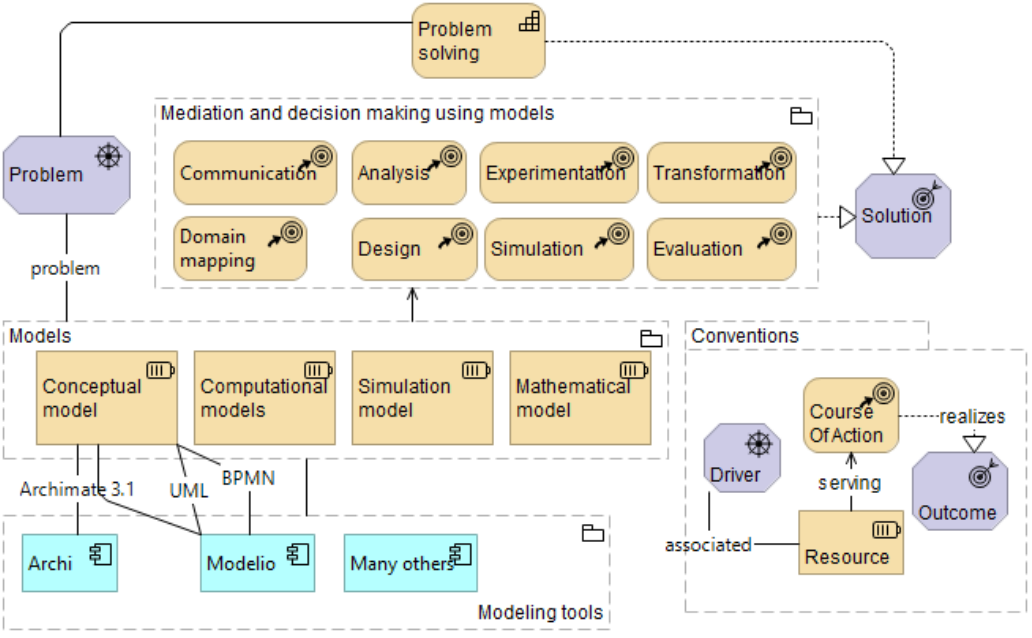

Figure 2.3: Solving problems in different ways

Modeling is used to describe and analyze the behaviour of systems or products, ask "what if" questions about the real system, and aid in the design of real systems and products. Both existing and anticipated systems can be modelled.

Modeling is indispensable in problem-solving methodologies for many real-world problems. It is a highly interdisciplinary field since it is widely used in all aspects of industry, government and academia. One can find the teaching of modeling in almost every academic department from economics and social science to engineering and computer science (Fishwick, 1994).

To the chapter

2.4 - Conceptual Models in a Learning Society

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

2.5. - System, Ecosystem and Social Totality

2.5.1 - Social Totality
2.5.2 - Social Positioning Theory as a Social Ontology
2.5.3 - Biotope, Sociotope and Technotope
2.5.4 - Types and Tokens
2.5.5 - Classes of Agents
2.5.6 - The Range of possible Collaborations

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

2.5.1 - Social Totality

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2.5.2 - Social Positioning Theory as a Social Ontology

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

In Annex 12 - Conceptual Models of the Social Positioning Theory the principles and concepts of the SPT are depicted by means of conceptual models.

2.5.3 - Biotope, Sociotope and Technotope

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2.5.4 - Types and Tokens

The distinction between types and tokens is fundamental in conceptual modeling.

Types are abstract entities representing a category or class. They are universal in the sense that they exist independently of their instances. Types are shared by multiple instances. A single type can be instantiated multiple times.

In contrast, tokens are concrete instances of a type. They are particular and individual. Each token is unique. In an epistemic commitment, tokens belong to a specific type.

Example: Someones pet cat is a token of the type “cat”.

Understanding the type-token distinction is crucial for building conceptual models and using them in describing life-world situations and creating prescriptive norms for them. It helps define the structure of knowledge and how to represent it computationally. By clearly differentiating between general categories and specific instances, we can create more accurate and precise models.

2.5.5 - Classes of Agents

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

2.5.6 - The Range of possible Collaborations

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

2.6 - Models and Model Layers

Figure 2.7 and Figure 2.8 are examples of a conceptual model. Before using more complex conceptual models, let's explore the utility of models in general.

A model is an abstract representation of reality in any form (including mathematical, physical, symbolic, graphical, or descriptive form) to present a certain aspect of that reality for answering the questions studied (ISO 15704).

Depending on the kind of questions studied, we can use different kinds of models. Law & Kelton (2000) mention the question of model validity: does the model accurately reflect the system for the purposes of the decisions to be made?

A (geographic) map is one kind of model that helps us in finding the road from one place to another place. If the map pretends to show the roads in the covered geographic area, then validity means that the existing roads are indeed included in the map.

A map without a directions service (calculating the optimal or feasible roads between any two points on the map) is useful, as at least one can figure out a feasible route from one point to another, for any combination of (reachable) points (in the geographic area). But in combination with a geographic positioning system (GPS) a road planner service can be offered that supports driving decisions as we progress in a trip. A distinctive feature of a map in combination with a GPS and a road planner is that it supports decision making for all possible travel needs of people within the geographic area, if they have access to the services.

Also professional disciplines are characterized by their own culture, their own viewpoint including an approach to knowledge, a range of concerns, and a way of thinking and problem solving. These are supported by specific modeling and problem solving techniques.

The need for system models of operational processes is driven by questions on the performance and behaviour of alternative designs of the relevant processes. The modeling techniques are then used to predict and analyse performance and costs.

For instance, when studying an elevator, we may be interested in the possible states of this elevator or in the possible state changes. For the first question we might define a UML class diagram to characterize the state variables, and an instance diagram to describe the different states of the elevator that is studied. A process model might then be used to describe the possible state changes.

Model Driven Architecture: Model Layers

For businesses, during the past fifty years several modeling languages and techniques have been applied as organizations have externalized their structure and operating procedures, especially with a focus on computer support for improved operations. These trends have already given rise to the large-scale use of enterprise models and the use of several dimensions to manage the complexity of enterprises applying ICT.

As consolidated models are available for the operational processes, any project or decision option will deliver a "delta-specification" to realize a particular new scenario (stylistic objective) in a given operational process (or socio-technical context). The models at the three OMG MDA layers (Miller and Mukerji, 2003) (computation independent, platform independent and platform specific) result from different development phases, each of which offers its own contribution to the reduction of risks (Dick and Chard, 2003) and to the system design (Figure 2.11).

The **Computation Independent Model (CIM)** shows the system in the environment in which it will operate, and thus helps in presenting exactly what the system is expected to do. Useful as an aid to understanding a problem and for communication with the stakeholders, it is essential to mitigate the risks of addressing the wrong problem, or disregarding needs. Domain models are solution-independent descriptions of a problem domain produced in the analysis phase.

Often the term "conceptual model" is used as a synonym of "domain model". However, in the modeling literature there are diverging proposals how to define the term "conceptual model", contrast for instance (Guizzardi & Wagner, 2012) and (Robinson, 2011). A domain model may include both descriptions of the domain's interacting entities and exchanged objects and descriptions of its events and processes.

Domain or conceptual models are "computation-independent models" in the sense that they are not concerned with making any target system choices (for instance, simulation, electronic document interchange, shop floor operations, database management) or with other computational issues. Rather, they focus on the perspective and problem solving attitudes of the subject matter experts for the domain under consideration, and on solution choices that they can make independent of the target implementations. The idea is that one redesigns the process prior to automating (certain steps in) it.

The **Platform Independent Model (PIM)** describes the system in reference to a particular architectural style (e.g., agent based, micro-services or client/server) but does not show details of platform use. The structure of this model might be quite different from the structure of a CIM layer model of the same system. In this book we will not use platform independent

models. In specific cases, such as distributed supply chain simulations in which the links want to participate in the (federate) simulation without disclosing their decision criteria or data to the other simulation participants, a PIM model offers a valuable common model for all participants. Each participant must refine the PIM model to reflect own choices, and then implement it by mapping it to a Platform Specific Model for its IT platform.

Various Platform Independent Models can be created for a single CIM. For instance both the tables in a database system and the messages that trading partners will exchange.

The **Platform Specific Model (PSM)** is produced from the PIM by further transformation. It specifies how the system makes use of the chosen platform and technologies. A PSM may provide more or less detail, depending on its purpose. A PSM will be an implementation, if it provides all the information needed to construct a system and to put it into operation, or it may act as a PIM that is used for further refinement to a PSM that can be directly implemented. The PSM is coded in the programming language and artefacts of the target platform. After testing and debugging, the implemented solution is then deployed in a target environment.

Each model layer has its own role in the life cycle of project results as depicted in the figure 2.11. In this book we will articulate CIM layer domain and process models as a means to scope initiatives and to ensure the validity and credibility of the project work. We use Archimate, UML class diagrams and BPMN to express information and process models and their integration for simulation and system processing.

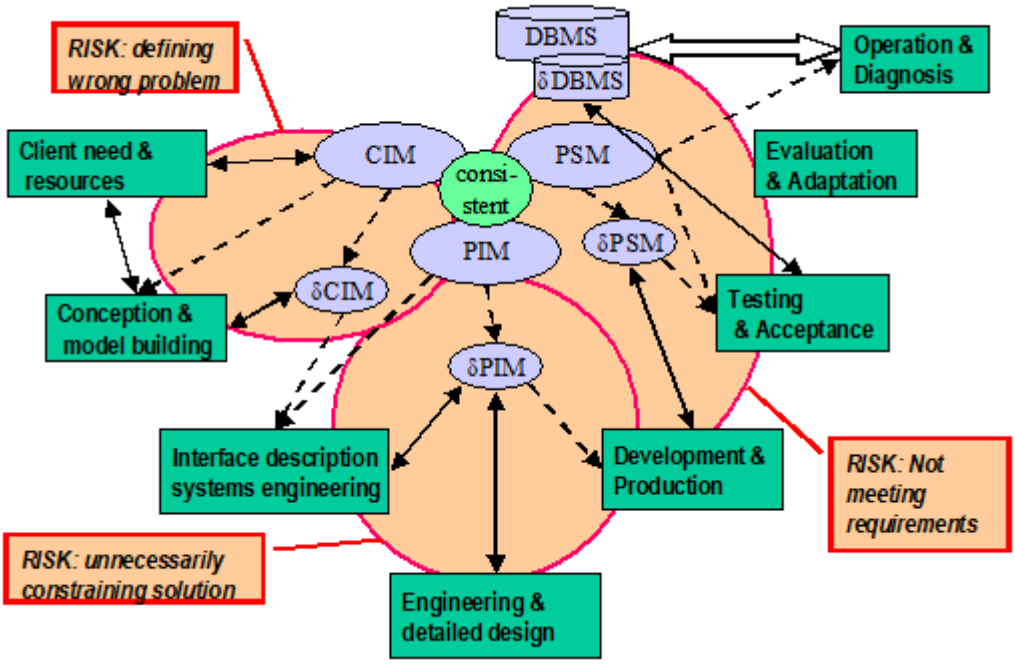

Figure 2.11: Project Activities, Models (and Data) and Risks (Goossenaerts, 2004)

Models in a project, versus those of a portfolio

Models are used a lot, yet in many initiatives as CIM and PIM are not maintained after the systems have been implemented, deltaCIM and deltaPIM are made for a specific request, and after a solution has been delivered, they are forgotten, while the PSM + deltaPSM models remain as code. The CIM and PIM models that correspond to the PSM+deltaPSM models are not or poorly maintained.

One outcome of this situation is that subject matter "experts" often know less about the legacy systems than the experienced functional and technical analysts and software developers working at the system.

Another risk is that the subject matter experts don't know what the CIM level equivalents are of "out-of-the-box" technical artefacts such as the EDIFACT messages. As a result poor re-use is made of those artefacts, even though a lot of analysis has gone into their definition.

A poor use of CIM modeling in analysis exposes organizations to risks such as poor decision making, poor re-use and high costs that are avoidable.

Further in the book this point will be illustrated for some EDIFACT messages, but in general terms one could expect that in a Portfolio aware Collaborative Planning and Investment Methodology the CIM and PIM models of the ecosystem, sociotope or technotope would be maintained and made available at the landscape portfolio level, for instance as digital commons.

See Annex 13 - Types of Systems, Models, Representations and Simulation for further possibilities of using models.

To the chapter

2.7 - The Technotope Individual

The technotope individual is someone who can use modeling tools to read, interpret, and manipulate conceptual models and use them in complex decision-making situations. He or she is aware that the creation of such models is a collaborative effort and brings social savings.

To the chapter

Chapter 3 - Building the Technotope Team

Because decisions often involve multiple elements, architecture is a key factor in structuring the shared problem space and organizing the drivers and decision alternatives of multiple stakeholders working as a team.

Architecture is a discipline that is closely related to innovation. Construction, product development, enterprise and information systems development have each seen the emergence of an architecture discipline, and these disciplines have been key to the creation and evolution of increasingly valuable products, services, systems and infrastructures: houses and community buildings, transportation infrastructure, vehicles, aircraft, telecommunication networks, computers and communication devices, software, digital service platforms, and so on.

Following the emergence and consolidation of Enterprise Architecture as a discipline that supports the creation and evolution of business and IT systems "within organizations", Societal Architecture is proposed as an extended discipline to support collaborative socio-economic development in any territory, from local to global, and by any team in society, including small businesses and households.

Today, the ArchiMate modeling elements and layers are widely used within organizations, and this book illustrates how they can be scaled out. In essence, such scaling out is a collaboration of minds in teams, for which open access to digital content is a key and fair prerequisite (see also Goossenaerts et al, 2007a).

In the societal architecture, we extend the 'intra-enterprise' use of elements to 'society at large'. The 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly in September 2015, provides an appropriate outcome framework for the articulation of the societal architecture. In support of this global agenda, we propose the 2030 Societal Architecture.

Sustainable development is knowledge-intensive. Applying and expanding a societal architecture as part of a collaborative planning and investment methodology for sustainable development is a way to improve open access to increasingly complex economic and political

institutions to promote both political and economic competition and development within the limits of the Earth, our collective resource endowment.

3.1 - Societal Capabilities for Team building
3.2 - Enterprise Capabilities and Team building in the Technotope
3.3 - Partnership Interactions
3.4 - Implications for the decision making
3.5 - Operations
3.6 - Monitoring and evaluation
3.7 - Change
3.8 - Partnership and capability development
3.9 - Towards a Talent Explosion

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

3.1 - Societal Capabilities and Team building

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

3.2 - Enterprise Capabilities and Team building in the Technotope

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

3.3 - The Potential of the Digital Commons

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

3.4 - Partnership Interactions

The partnership interactions in the framework of the Addis Ababa Action Agenda involve actors at the four "socio-technical" levels of the societal architecture:

- pico[9], individuals who are members of households,
- micro[10], organizations, including companies,
- meso[11], associations of organizations in the same sector or with similar interests, and
- macro[12], institutions with cross-cutting, landscape-wide responsibility;

Each of the three following sections is dedicated to one three interaction areas that are relevant to all actor journeys:

- 3.5 - Operations

[9] http://www.ens.wiki/item:pico-level
[10] http://www.ens.wiki/item:micro-level
[11] http://www.ens.wiki/item:meso-level
[12] http://www.ens.wiki/item:macro-level

- 3.6 - Monitoring & Evaluation
- 3.7 - Change

In each section we take a look at these aspects for the interaction area:

- their material and substantive scope, covering many economic activities and government functions,
- the economies of scale, scope, and quality that they imply, and
- the desirability of collective action.

When challenges are complex or involve the communication with many stakeholders these are some of the approaches that could be adopted:

- the use (for instance in the blueprint description or "TO BE") of wiki-based durable content (as explained in Durable Content Actants (Actant Dictionary)[13];
- the provision of systematized digital commons[14];
- the use of structured hashtags (Actor Atlas Tag Pivot[15]) when sharing content via social media, in order to achieve a discourse that is both inclusive, convergent and resistant to disinformation;
- low barrier access to open data, such as for instance provided by the World Data Atlas[16](Knoema).

To the chapter

3.5 - Operations

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[13] http://actants.ens.wiki/mr-item-overview
[14] http://www.worx.wiki/systematized
[15] http://www.actor-atlas.info/en:pivot
[16] https://knoema.com/atlas

3.6 - Monitoring and evaluation

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3.7 - Change

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

3.8 - Partnership and Capability Development

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

3.9 - Towards a Talent Explosion

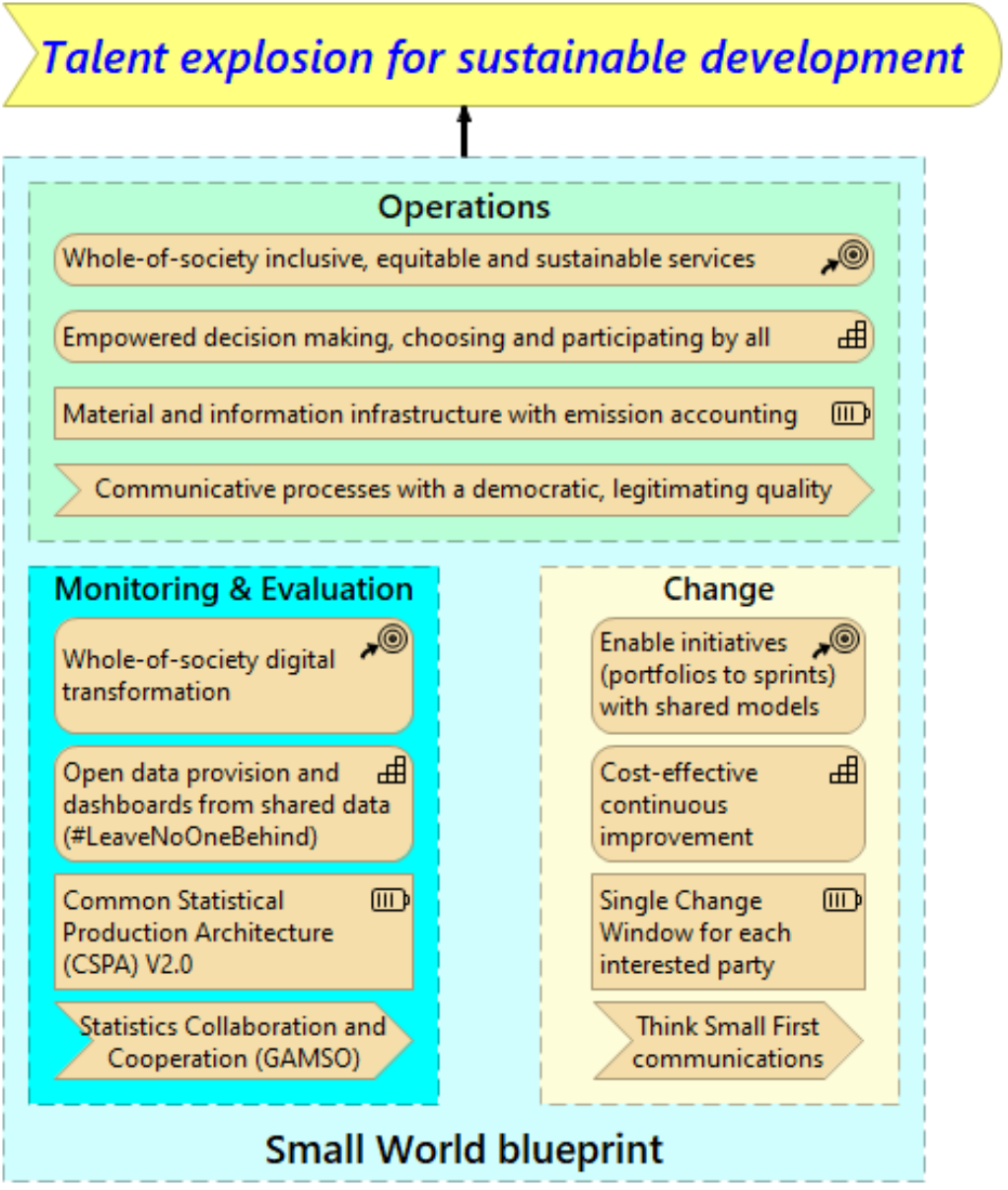

Figure 3.10: Talent Explosion and Small World Blueprint

To the chapter

Chapter 4 - Accomplishing Sustainable Development Tasks in the Technotope

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4.1 - What next in Societal Portfolios: Transition Planning?
4.2 - An abstract Partner Journey
4.3 - Values for a Societal Agenda
4.4 - Stakeholders, Initiatives & Reporting
4.5 - Access characteristics of resources
4.6 - Digital Principles
4.7 - The Principles of Doing Development Differently
4.8 - Work systems and drivers for change
4.9 - Case materials

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

4.1 - What next in Societal Portfolios: Transition Planning?

It is the author's hope that the United Nations will sooner or later adopt and endorse the Societal Architecture as an Unsollicited Proposal (USP)[17], (this is an exception to the public initiation of infrastructure public-private partnerships[18]). Such an adoption would facilitate and accelerate the growth of the Societal Architecture and its subsequent phases: Opportunities and Solutions, Transition Planning, Implementation Governance, and Architecture Change Management.

While this book is aimed at professionals involved in portfolios, programs and projects in both the public and private sectors, I have also produced reference works for the general public in which #tagcoding hashtags are defined for all topics in relation to which public or private portfolios, programs and projects might seek change or communication.

The #tagcoding guide is available in e-book versions in English, French, Spanish and Tagalog, and online versions in several other languages, including Arabic, Simplified Chinese, Swahili, Russian, Japanese, Hindi, Telugu, German, Ilonggo and Dutch. #tagcoding supports communications in social media platforms for all kinds of initiatives in global to local social portfolios.

When it comes to communication in the public sphere, the principles of Societal Architecture lead to the creation of distinctive communication channels where everyone can publish and everyone can consult. A channel is needed for every important topic at every level of scope and in every language. To create such a communication infrastructure, #tagcoding hashtags play a key role.

One of the purposes of this book is to recruit practitioners in a *Societal Architecture Infrastructure Public-Private Partnership.*

To the chapter

4.2 - An Abstract Partner Journey

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

[17] https://ppp.worldbank.org/public-private-partnership/library/guide-implementing-unsolicited-proposals
[18] https://ppp.worldbank.org/public-private-partnership/tools/toolkits-for-public-private-partnerships

4.3 - Values for a Societal Agenda

But what problems might a (democratic) society or one of its members want to solve?

To answer this question, one must first consider what a society values.

The road to dignity by 2030: ending poverty, transforming all lives and protecting the planet[19] (Synthesis report of the Secretary General on the post-2015 sustainable development agenda, December 4, 2014) proposes six values as essential elements for delivering on the sustainable development goals:

- **Dignity**: to end poverty and fight inequalities
- **People**: to ensure healthy lives, knowledge and the inclusion of women and children
- **Prosperity**: to grow a strong, inclusive and transformative economy
- **Planet**: to protect our ecosystems for all societies and our children
- **Justice**: to promote safe and peaceful societies and strong institutions
- **Partnership**: to catalyse global solidarity for sustainable development

The figure below shows these values in their "official" graphical form.

[19] http://www.un.org/ga/search/view_doc.asp?symbol=A/69/700&Lang=E

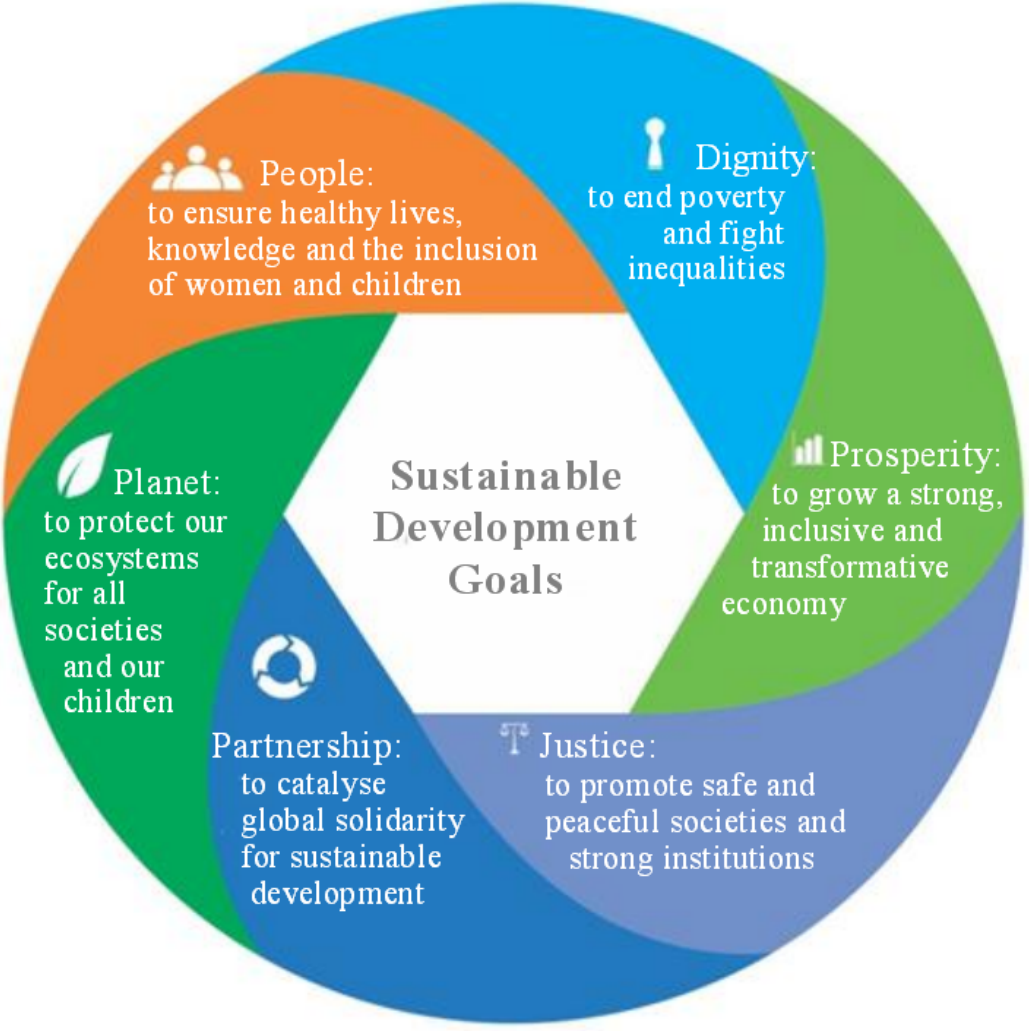

Figure 4.5: Values in "The road to dignity by 2030"

A second figure shows the values using the Archimate value model element.

This second figure is less attractive to the eye, but the advantage of it is that the model elements are captured in an Archimate modeling tool that allows us to use the element in many more views.

Figure 4.6: Values in The road to dignity by 2030 (Using the value model element)

One of those other views is the one in which the association between the values and the sustainable development goals are depicted.

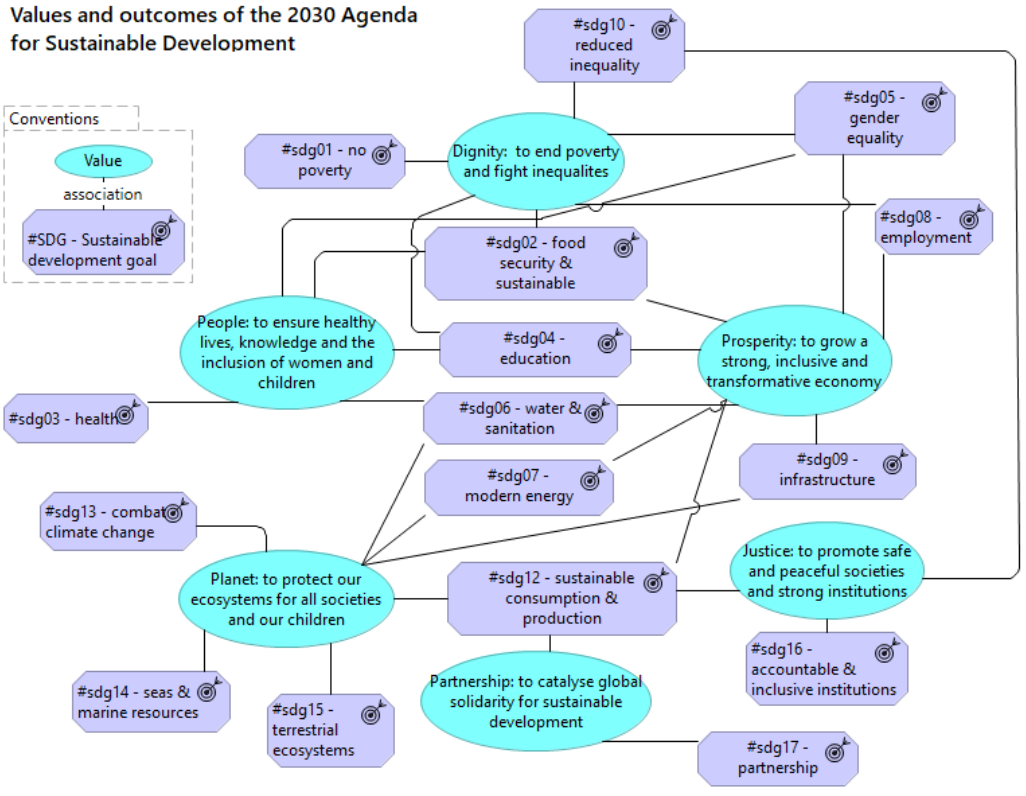

Figure 4.7: Values and associated sustainable development goals

To the chapter

4.4 - Stakeholders, Initiatives & Reporting

The organizational or external roles that take responsibility for object system operations and reflective activities and assets are also called stakeholders. In portfolios, programs, and project studies, specific tasks are performed to support communication with these stakeholders. In addition, these stakeholders will have specific interests regarding the study; they may have a say in the go/no go decision regarding the initiative and study.

In an enterprise architecture described according to the ArchiMate framework, the stakeholders (for the enterprise architecture against which the service solution will be positioned)

are included in the motivation extension. The rationale for their involvement will often be related to their role in the business collaboration to be supported by the service solution.

Hands-on users (of the product for which requirements are being collected) are addressed as part of the Active Structure aspect: the Business Actor would include the Stakeholder descriptive elements and the Business Role would include the User Role.

Stakeholders of the stakeholder class "Interfacing Technology" are called "Application Components" and are described as part of the Application layer of the framework; the rationale for their involvement will often be related to their role in an application collaboration between "Services".

In Chapter 14 - Agents we gather insights on these stakeholders from global to local societal portfolios, stakeholders that will drive the talent explosion for sustainable development.

- Citizens and households
- Global Partnership
- Firms
- National Government
- Local Authorities
- Schools
- UN Country Teams
- Publishers and right holders
- Libraries
- Aid and international organizations

The global societal portfolios considered in detail are:

- The Global Tax Portfolio
- The Global Content Portfolio (to be added)

Since both portfolios are relevant for all listed stakeholders, we pay special attention to stakeholders who are beneficiaries of several initiatives at the same time.

The governance activity determines the outcomes of the object system (of projects) that need to be monitored and evaluated. Whenever a redesign or change is proposed, it must be evaluated in terms of its impact on system outcomes as well as its fit with other initiatives.

You cannot set indicators before you set outcomes, because it is the outcomes-not the indicators-that will ultimately produce the benefits.

Corporate triple bottom line reporting is being harmonized through the Global Reporting Initiative (GRI). The GRI distinguishes between three categories of indicators to achieve more aligned reporting for companies on results in the context of global challenges:

- **economic**: The economic dimension of sustainability addresses an organization's direct and indirect impacts on the economic circumstances of its stakeholders and on economic systems at local, national and global levels.
- **environmental**: The environmental dimension of sustainability concerns an organization's impacts on living and non-living natural systems, including ecosystems, land, air and water.
- **social**: The social dimension of sustainability concerns an organization's impact on the social systems in which it operates. Social performance can be measured by analyzing the organization's impact on stakeholders at the local, national, and global levels. In some cases, social indicators affect the organization's intangible assets, such as its human capital and reputation.

Indicators are only relevant if they measure against a goal. Thus, the measurement of indicators will show the progress made towards achieving the intended goals. Decision makers and stakeholders are in a position to make the intended outcomes of the object system as explicit as possible. Articulating outcomes is critical to achieving stakeholder ownership.

Indicators are the quantitative or qualitative variables that provide a simple and reliable means of measuring achievement, reflecting changes associated with an intervention, or helping to assess the performance of an organization or object system in relation to the stated outcome. Indicators are needed to monitor progress with respect to inputs, activities, outputs, outcomes, and goals. In complex systems, progress needs to be monitored at all levels of the system to provide feedback on areas of success and areas that may need improvement.

For each of the stakeholders affected by the expected outcome of a portfolio, progress reports should identify the relevant aspects.

For each of the organization's asset components (see "Assets" in Figure 1.4), progress reports should identify the changes in the component. For example, consider the job descriptions for employees, performance measurement requirements, reporting activities, etc.

To the chapter

4.5 - Access characteristics of resources

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

4.6 - Digital Principles

The principles of digital capability have had little visibility in the description of the decision-making context and activities.

Yet digital capabilities are among the defining characteristics of our time. So what is their impact?

To understand this impact, we look briefly at the *Principles for Digital Development*, which have been coined by an international consortium and are widely applied.

A Societal Architecture is proposed as a coherent way to apply these digital principles across a wide range of initiatives.

Figure 4.9 illustrates how the Digital Capability Principles relate to the value streams of CPIM and to the resources that make up the Business Model Sustainability Toolkit[20].

[20] https://sustainabilitytoolkit.digitalprinciples.org/

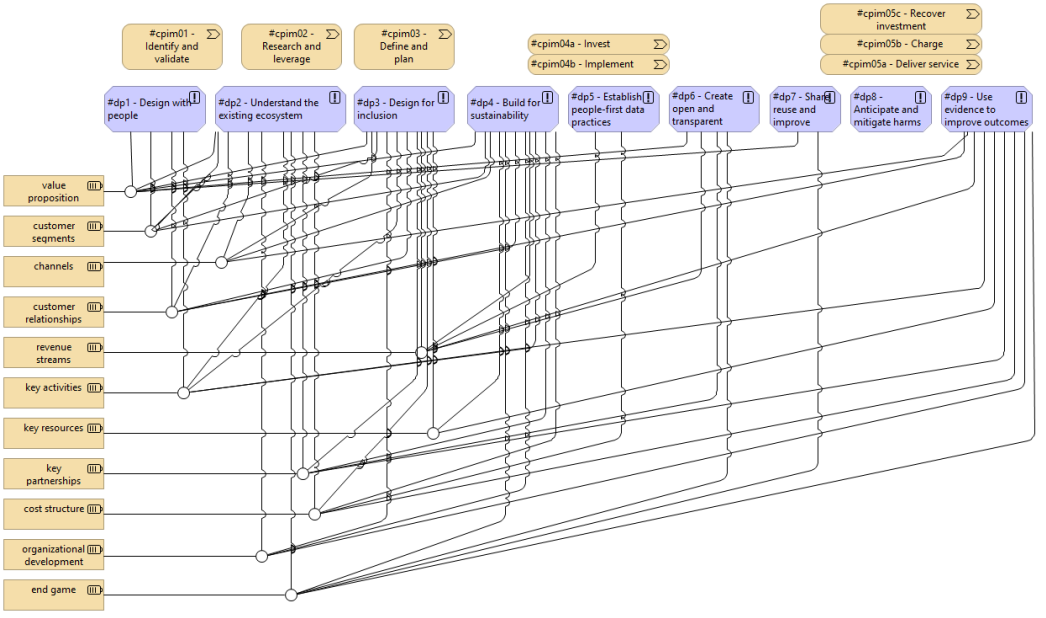

Figure 4.9: Digital capability principles

A key aspect of using the Principles for Digital Development[21] is working with models and data:

- #dp1 - Design with people
- #dp2 - Understand the existing ecosystem
- #dp3 - Design for inclusion
- #dp4 - Build for sustainability
- #dp5 - Establish people-first data practices
- #dp6 - Create open and transparent practices
- #dp7 - Share, reuse, and improve
- #dp8 - Anticipate and mitigate harms
- #dp9 - Use evidence to improve outcomes

Specifically for the public sector, the European Interoperability Framework (EIF) proposes the principles shown in Figure 4.10.

[21] https://digitalprinciples.org/principles/

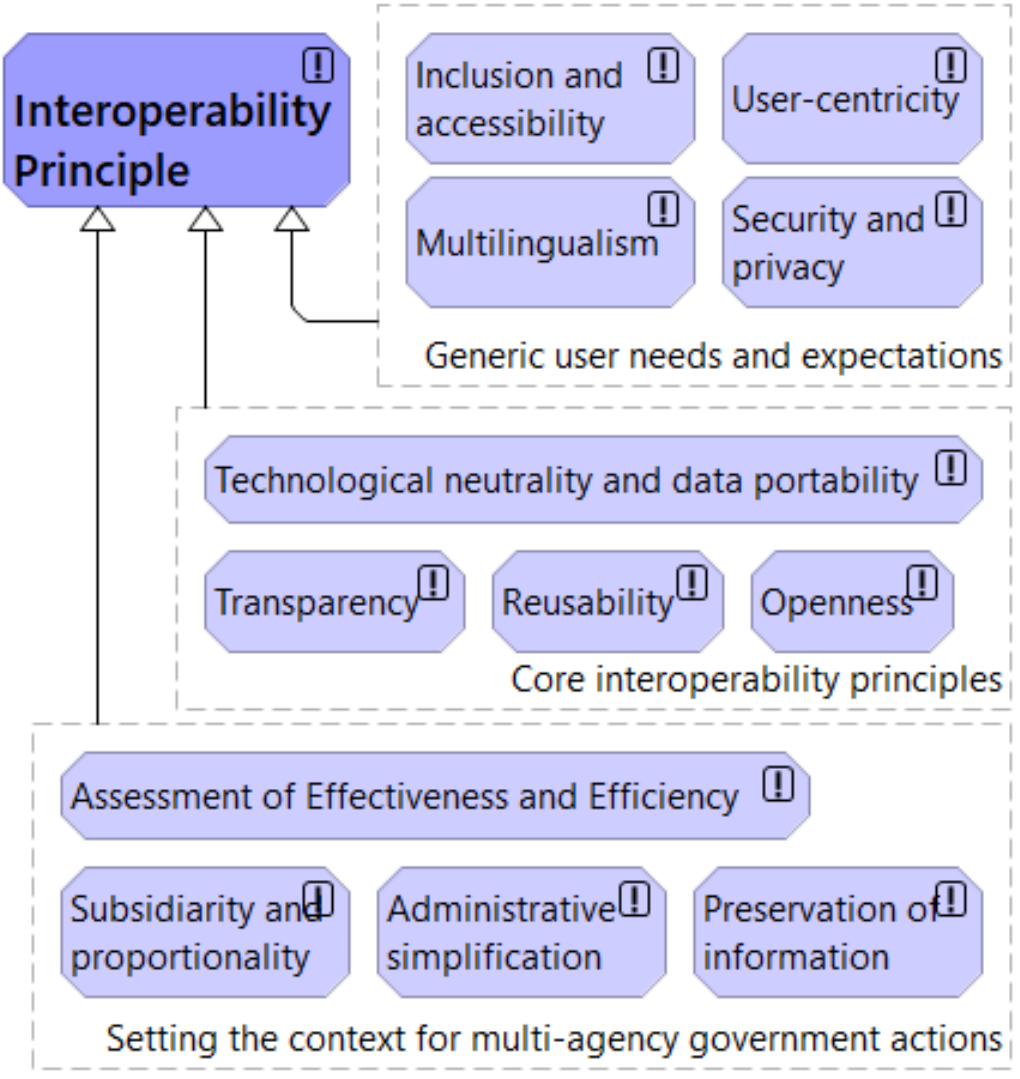

Figure 4.10: The principles of the European Interoperability Framework (EIF)

Design with people

Design with people[22]

[22] https://digitalprinciples.org/principles/design-with-people/

Good design starts and ends with people that will manage, use, and ideally benefit from a given digital initiative.

- To design with people means to invite those who will use or be affected by a given technology policy, solution, or system to lead or otherwise meaningfully participate in the design of those initiatives.
- In all cases, there will be more than one group of relevant stakeholders (including those who ideally benefit from the initiative and those who will maintain/administer the initiative), each of whom need to participate and engage in the initial design phase and in subsequent iterations. The specific stakeholders will need to be defined separately for each initiative.
- Initiatives can encourage meaningful participation by creating opportunities for people to innovate on top of products and services; establishing avenues for feedback and redressal that are regularly monitored and addressed; and committing to agile methods that allow for continual improvement.

Otherwise, initiatives are unlikely to gain trust of and adoption of the communities they seek to reach.

Understand the Existing Ecosystem

Understanding the existing ecosystem[23].

Trust starts with a thorough understanding of the dynamic cultural, social, and economic context in which you are operating.

- Digital ecosystems are defined by the culture, gender and social norms, political environment, economy, technology infrastructure and other factors that can affect an individual's ability to access and use a technology or to participate in an initiative.
- Understanding the existing ecosystem can help determine if and how we should engage, as ecosystems can have both positive and negative dynamics.
- Through this understanding, initiatives should adapt in order to support, to the extent appropriate, existing technology, and local actors who are already working to tackle key challenges. This includes understanding existing government policies, national visions, sector policies/priorities/strategies, and efforts to expand foundational digital public infrastructure.

[23] https://digitalprinciples.org/principles/understand-the-existing-ecosystem/

- This also includes understanding existing access to devices, connectivity, affordability, digital literacy, and capacity strengthening opportunities so that initiatives are designed to accommodate or strengthen these realities.
- When initiatives do not first understand the ecosystem they are operating in, it can hinder uptake, adoption, and trust. It can also lead to unintended consequences, such as exclusion, loss of trust, or reinforcement of harmful power dynamics, and putting the safety and security of stakeholders at risk.
- Digital ecosystems are fluid, multifaceted and ever-changing, requiring that digital development practitioners regularly analyze the context to check their assumptions.

Design for inclusion

Design for inclusion[24].

Consider the full range of human diversity to maximize impact and mitigate harm.

- When leveraged intentionally and to its fullest potential, technology can overcome, rather than exacerbate, existing inequality. To design for inclusion is to seize the opportunity for digital initiatives to drive social progress by dismantling systemic barriers related to gender, disability, income, geography, and other factors.
- Regardless of the size of their intended audience, technology initiatives should be designed to be accessible and usable for a diverse range of people, including those with disabilities, low digital literacy, those who speak different languages, who face obstacles to device access/affordability/connectivity, and those from different cultural backgrounds.
- This can be achieved by adopting iterative methodologies (such as agile) and by leveraging redressal systems to quickly identify – and address – challenges that negatively impact certain groups of people.
- Designing for inclusion can include considering how the benefits of an initiative accrue even to those who are not online.
- Designing for inclusion requires considering the opportunity to strengthen capacity for those who do not have the skills or tools necessary to benefit from a given initiative, as well as the affordability of devices and services (in the short and long-term).

Without following inclusive practices in the design of digital initiatives, we risk amplifying existing inequalities, creating unforeseen harms, and excluding segments of the population from participation and opportunity.

[24] https://digitalprinciples.org/principles/design-for-inclusion/

Build for Sustainability

Build for Sustainability[25].

Build for the long-term by intentionally addressing financial, operational, and ecological sustainability.

- Sustainability here is defined broadly to account for financial, operational, and ecological sustainability, all of which are important to avoid service disruptions for people.
- Building for sustainability means thinking about leveraging the inherent scalability of digital technology solutions early on. Decide on the desired scale of your initiative and prepare accordingly from the start.
- Building for sustainability means presenting the long-term cost of ownership–both technology licenses, operations and maintenance, capacity building, etc.–and clearly indicating how initiatives will be paid for in the future, by donors, host governments, or commercial means.
- Ecological sustainability requires considering an initiative, solution, or system's potential to help people and communities adapt to the changing climate. At the same time, they should seek to minimize the environmental impact of any initiative, solution, or system, particularly the CO2 emissions generated by any hardware or software during the entire lifecycle from production to disposal.

Building for sustainability does not mean that all products, services, or policies will last forever. Optimizing for sustainability may result in consolidating services, transferring knowledge, software, and/or hardware to a new initiative, planning for the secure transfer (or deletion) of data at the end of a project, or helping clients to transition to a new, more relevant product or service.

Establish people-first data practices

Establish people-first data practices[26]

People-first data practices prioritize transparency, consent, and redressal while allowing people and communities to retain control of and derive value from their own data.

[25] https://digitalprinciples.org/principles/build-for-sustainability/
[26] https://digitalprinciples.org/principles/establish-people-first-data-practices/

- Digital services and initiatives generate, rely on, and/or use data derived from people or their assets. This principle emphasizes the need to avoid collecting data that is used to create value (financial or otherwise) for a company or organization, without delivering any direct value back to those people from whom the data is derived.
- It is thus critical to consider people and to put their rights and needs first when collecting, sharing, analyzing, or deleting data. In this context, 'people' includes those who directly interact with a given service, those whose data was obtained through partners, and those whose are impacted by non-personal datasets (such as geospatial data.)
- When collecting data, it is important to consider and follow relevant data standards and guidelines set at the international, regional, national, or local level.
- People-first data practices include ensuring that people can understand and control how their data is being used; obtaining explicit and informed consent from people before collecting, using, or sharing their data; and investing in people's capacity to navigate the tools, redressal systems, and data practices.
- People-first data practices also include sharing data back with people, so that they have agency to use this data as they see fit, and providing access to individual, secure data histories that people can easily move from one service provider to the next.

When this principle is violated, people may be subject to undue and unpredictable harms, stemming from data breaches, exclusion from services, or discrimination based on their digital data trail.

Create open and transparent practices

Create open and transparent practices[27]

Effective digital initiatives establish confidence and good governance through measures that promote open innovation and collaboration.

- To establish and maintain trust in the digital ecosystem, it is necessary for all people—whether or not they are directly impacted by a given initiative—to have confidence in digital policies, services, and systems and the associated data handling. This confidence is nurtured through open and transparent practices, which in turn foster accountability.
- Open and transparent practices can include but are not limited to: clear and accountable governance structures that define roles and responsibilities; open and proactive communication, decisions, policies, and practices; mechanisms that allow stakeholders

[27] https://digitalprinciples.org/principles/create-open-and-transparent-practices/

to provide feedback, ask questions, and raise concerns; and quick and transparent responses to feedback.
- In terms of technical design, open and transparent practices can include the use of agile methodologies, open standards, open data, open source, and open innovation.

When organizations do not prioritize transparency and openness, it results in a lack of or loss of trust. Trust is critical to encourage participation, and without it, people will rationally choose to avoid the risks associated with engaging with digital services and sharing their data – thus foregoing any potential benefits.

Share, reuse, and improve

Share, reuse, and improve[28]

Build on what works, improve what works, and share so that others can do the same.

- Avoid innovation for the sake of innovation
- To share, reuse, and improve is, in essence, to collaborate. Collaboration is essential to achieving our shared vision of a more equitable world. We have the most impact when we share information, insights, strategies, and resources across silos related to geographies, focus areas, and organizations. By sharing, reusing, and improving existing initiatives, we pool our collective resources and expertise, and avoid costly duplication and fragmentation. Ideally, this leads to streamlined services for people.
- This can apply to technology products, services, research, or policies.
- This requires organized and accessible documentation, and is greatly facilitated by adopting open standards, building for interoperability and extensibility; using open source software; and contributing to open source communities.
- Following this principle can save time and money, promote collaboration and the sharing of knowledge, and lead to better products and services through continuous improvement.

Forgoing this principle in favor of do-it-alone approaches leads to wasted resources (particularly problematic in the case of public donor funds), limited innovation and improvement, and undue burden on people that can hinder trust and participation.

[28] https://digitalprinciples.org/principles/share-reuse-and-improve/

Anticipate and mitigate harms

Anticipate and mitigate harms[29]

Harm is always possible when it comes to technology. To avoid negative outcomes, plan for the worst while working to create the best outcomes.

- Technology is now part of our everyday lives: no program or technology solution operates in isolation. Therefore, to live up to the commitment to do no harm, policymakers and practitioners need to anticipate and work to mitigate harms, even those that originate outside of a given initiative.
- There are a number of potential harms that may arise from any given digital initiative, and any list offered here will prove to be insufficient. Examples of harms include enabling digital repression (including illegal surveillance and censorship); exacerbating existing digital divides associated with, for example, disability, income, or geographic location; technology-facilitated gender based violence; undermining local civil society and private sector companies; amplifying existing, harmful, social norms; and creating new inequities.
- While harms are present with all technology, these harms are particularly relevant, and the impacts are less known, when it comes to machine learning and artificial intelligence (AI).
- Harm mitigation is context-specific, and requires a multi-faceted approach that integrates technical, regulatory, policy, and institutional safeguards. Effective harm mitigation takes a long-term approach, considering how current challenges and inequities will be amplified by unknown developments.

Without these types of safeguards, specific groups of people may decide to disengage or systems may be used to intentionally target certain groups of people, undermining all sustainable development goals.

Use evidence to improve outcomes

Use evidence to improve outcomes[30]

Evidence drives impact: continually gather, analyze and use feedback.

[29] https://digitalprinciples.org/principles/anticipate-and-mitigate-harms/
[30] https://digitalprinciples.org/principles/use-evidence-to-improve-outcomes/

- Over time, good practices in understanding monitoring and evaluation of technology initiatives have evolved to emphasize outcomes on people and communities, rather than just access and usage.
- To understand outcomes for people and communities, it is necessary to use a variety of methods – both technology-enabled and analogue – to gather, analyze, and use feedback to get a holistic view of the impact of technology on people and communities.This also includes providing redressal channels for people to submit feedback and complaints, which are regularly monitored, addressed, and analyzed.
- Understanding outcomes is critical to an agile or iterative design approach through which digital policies, systems, and solutions are continually updated and improved.
- Involve people in the design and implementation of the monitoring and measuring of outcomes as well, so that the outcomes being measured are relevant and meaningful to them.

Otherwise, initiatives may meet efficiency and outreach goals, but fail to see lack of impact, harmful impacts, or opportunities to improve positive outcomes on people and communities.

To the chapter

4.7 - The Principles of Doing Development Differently

Source: The Doing Development Differently Manifesto[31]:

- (#ddd1) - Focus on solving local problems: Initiatives focus on solving local problems that are discussed, defined, and refined by local people in an ongoing process.
- (#ddd2) - Legitimized at all levels and locally owned: Initiatives are legitimized at all levels (political, managerial and social), building ownership and momentum throughout the process to be 'locally owned' in reality (not just on paper).
- (#ddd3) - Local conveners mobilize everyone with a stake in progress: Initiatives work through local conveners who mobilize all those with a stake in progress (in both formal and informal coalitions and teams) to tackle common problems and bring about relevant change.

[31] https://buildingstatecapability.com/the-ddd-manifesto/

- (#ddd4) - Rapid cycles of planning, action, reflection, and revision: Initiatives link design and implementation through rapid cycles of planning, action, reflection and revision (drawing on local knowledge, feedback and energy) to promote learning from both success and failure.
- (#ddd5) - Manage risk by making 'small bets': Initiatives manage risk by making "small bets": pursuing activities with promise and dropping others.
- (#ddd6) - Foster real results: Initiatives promote real results - real solutions to real problems that have real impact: they build trust, empower people, and promote sustainability.

These principles suggest the use of multiple iterations in development initiatives.

To the chapter

4.8 - Work system and drivers for change

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

4.9 - Case materials

This book is ambitious and aims to prove that broad principles can indeed be linked to interdependent decision making in a wide range of practical situations. To do this, we provide and apply models that are characteristic of the different levels of planning addressed in the Collaborative Planning and Investment Methodology (CPIM): open portfolios, programs, projects, and iterations.

After introducing the methodology in Chapter 4 and the Societal Architecture in Chapter 6 (Part 2 of the book), we are ready to illustrate the use of models for each of the four planning levels for a number of cases:

- Planning Level 1 - Open Portfolios
- Planning Level 2 - Programs
- Planning Level 3 - Projects

- Planning Level 4 - Iterations
- Case 1 - 2030 Agenda
- Case 2 - Library Services
- Case 3 - The Gas Station Case
- Case 4 - The Port Case

The value framework for driving change in the cases is derived from the 2030 Agenda for Sustainable Development, which is also presented as a model in an open portfolio. The overall methodology includes executable models and experiments that are not elabo- rated in the current version of this e-book. For such models, we refer to simulation and programming courses and manuals, as well as platforms such as Camunda. To the cases - To the chapter

Case 1 - 2030 Agenda

In the 2030 Agenda, models at the four levels of planning are relevant to stakeholders at the different socio-technical levels. Models in portfolios are relevant to the Global Partnership, which includes national governments, local authorities, UN country teams and aid agencies and international organizations. Programs would typically involve multiple members of the Global Partnership setting rules and patterns for the landscape, as well as Schools, Publishers and Rightsholders and Libraries operating within the "regulated" landscape.

- CPIM01 - Identification and Validation in the 2030 Agenda
- CPIM02a - Scope and Variables in the 2030 Agenda
- CPIM02b - Conceptual Models and the 2030 Agenda
- CPIM02c - Executable Models for the 2030 Agenda
- CPIM02d - Experimentation and the 2030 Agenda
- CPIM03 - Define and Plan for the 2030 Agenda
- CPIM04 - Invest and Execute for the 2030 Agenda
- CPIM05 - Perform and Measure for the 2030 Agenda

Case 2 - Library Services

Library services would include works from Publishers and Rightsholders as well as digital public goods, encouraged by the global digital public goods portfolio that the Digital Public Goods Alliance[32] manages and advocates for.

[32] https://digitalpublicgoods.net/

Projects and iterations would involve Citizens and Households, Schools, Publishers and Rightsholders, and Libraries.

Publishers and rightsholders could develop their own portfolio for making copyrighted works available in libraries, especially digital works.

Again, models at the four planning levels are important at the different socio-technical levels, in this case especially from meso (publishing organizations and library organizations) to micro (libraries and publishers) to pico (authors and library users).

- CPIM01 - Identification and Validation for Library Services
- CPIM02a - Scope and Variables of Library Services
- CPIM02b - Conceptual Models and Library Services
- CPIM02c - Executable Models for Library Services
- CPIM02d - Experimentation and Library Services
- CPIM03 - Define and Plan for Library Services
- CPIM04 - Invest and Execute for Library Services
- CPIM05 - Perform and Measure for Library Services

Case 3 - The Petrol Station

The owner of the petrol station has the feeling that some potential clients are leaving the station because there is no place to wait for service. But he doesnâ€™t know to which extend this assumption is true. So he would like to know what is the influence of the capacity size of the pump on the percentage of cars leaving without being served. In the current situation, three cars at most can wait for petrol filling at the petrol pump. The cars in the queue follow a First In First Out Rule (FIFO).

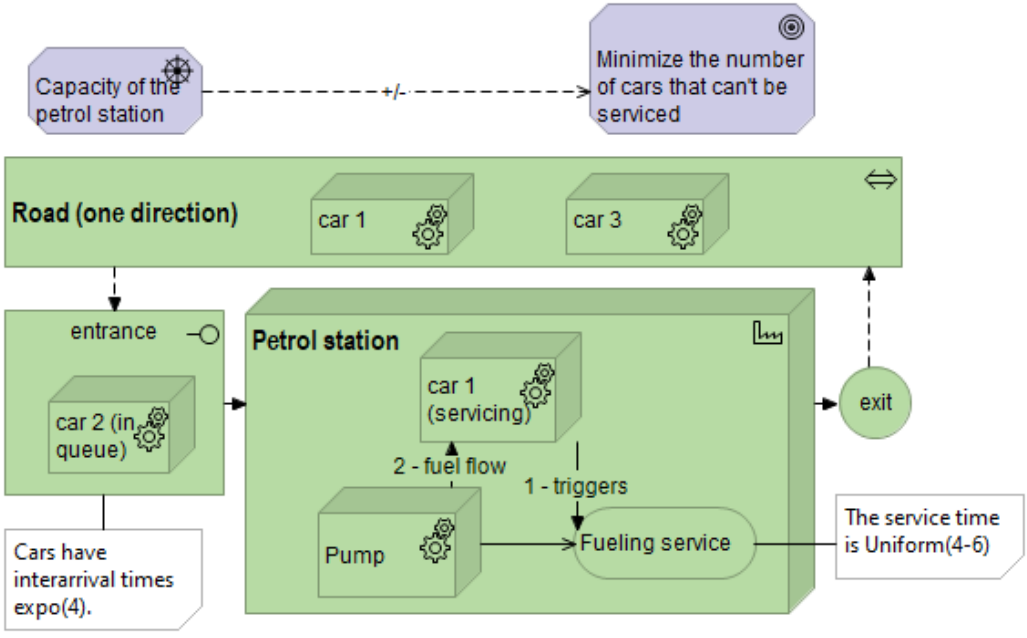

Figure 4.15: Description of the Petrol Station Situation.

This case is situated at the micro level and illustrates the possible scope of a project or iteration.

- CPIM01 - Identification and Validation at a Petrol Station
- CPIM02a - Scope and Variables in the Petrol Station Case
- CPIM02b - Conceptual Model of Petrol Station Operations

This case has been part of a course on the Simulation of Operational Processes that colleagues and me have been teaching between 2004 and 2008.

Case 4 - A Harbour

A harbour can host two types of ships; Small and Big ships. Small ships arrive with an interarrival time exponentially distributed with a mean of 5,5 hours. Big ships arrive with an interarrival time exponentially distributed with a mean of 6,7 hours. There are two docks (dock1 and dock2) at this harbour where ships can be unloaded. Small ships are unloaded at dock1 with a service time uniformly distributed between 3 and 7. Big ships are unloaded

at dock2 with a service time uniformly distributed between 2 and 8. If dock1 is empty and there are Big ships waiting at dock2 then a Big ship can go to dock1 and is served with 1,5*Uniform(2,8). If dock2 is empty and there are Small ships waiting at dock1 then a Small ship can go to dock2 and is served with 2*Uniform(3,7). For both docks the queue discipline is SPT (Shortest processing time first). The management team of the harbour wonders if closing dock1 to Big ships and dock2 to Small ships would improve the mean expected throughput time of ships at the harbour. Another question is if it is better to use simply a FIFO rule (First In First Out) instead of the SPT rule? How can we help the management team to get answers to their questions?

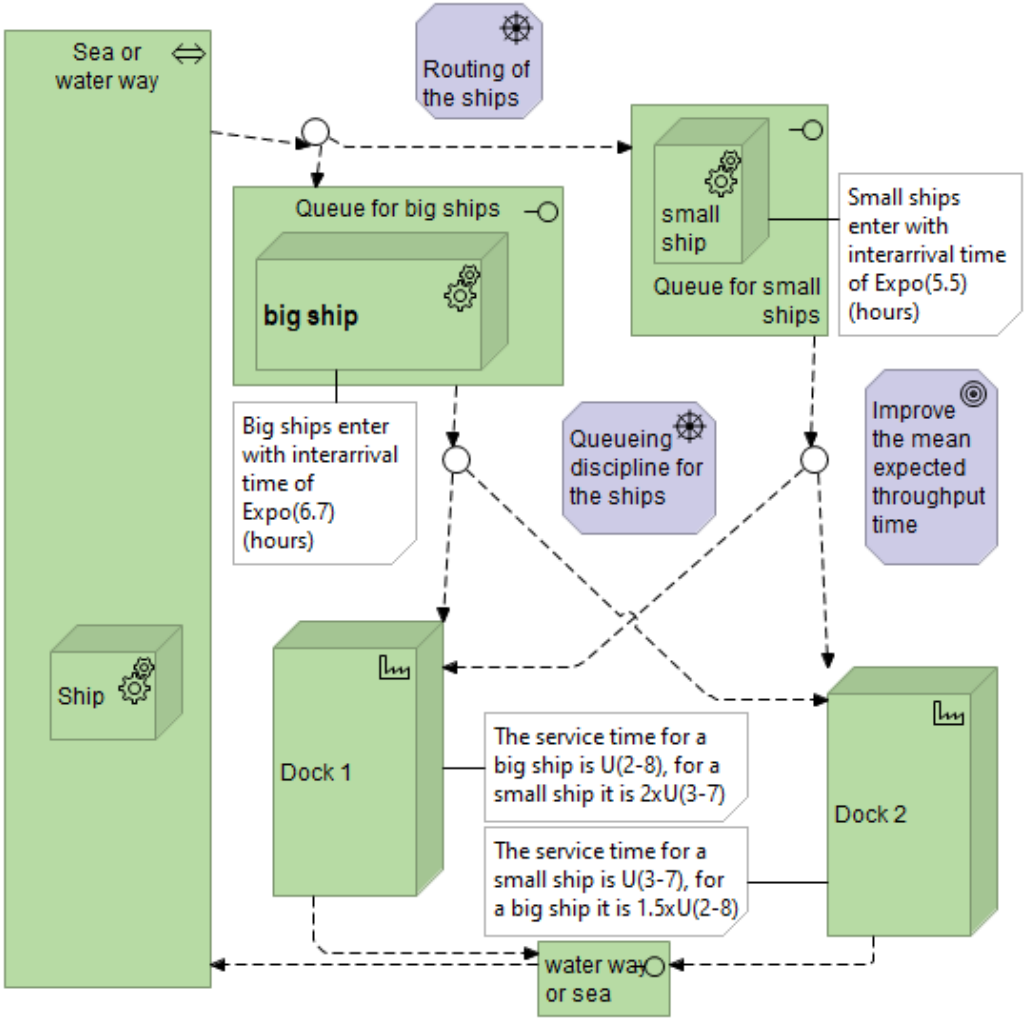

Figure 4.16: Description of the Harbour Situation: SPT

This case is situated at the meso level and illustrates the possible scope of a project or iteration. This is a typical case from a simulation course.

- CPIM01 - Identification and Validation at the Harbour
- CPIM02a - Scope and Variables in the Harbour Case
- CPIM02b - Conceptual Model for the Harbour Case

This case has been part of a course on the Simulation of Operational Processes that colleagues and me have been teaching between 2004 and 2008.

To the chapter

Part II - CPIM - A Collaborative Planning and Investment Methodology

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Chapter 5 - An Asset-Aware Collaborative Planning and Investment Methodology (CPIM)
Chapter 6 - A Societal Architecture for the Techno Globe
Chapter 7 - A Societal Architecture Repository enabling CPIM Phases

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To Part I - **II** - III - IV - V-Annexes - VI-References

Chapter 5 - An Asset-Aware Collaborative Planning and Investment Methodology

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5.1 - A Collaborative Planning and Investment Methodology
5.2 - Re-use of Knowledge Assets in Communication
5.3 - Re-use of Knowledge Assets in a Decision Support Study
5.4 - Capabilities for CPIM
5.5 - Principles that are Realized by the CPIM Capabilities
5.6 - Including Investment Decision Making in CPIM
5.7 - Implications for CPIM of General Requirements and Constraints

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To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

5.1 - A Collaborative Planning and Investment Methodology

- The phases of CPIM
- Levels of Scope
- Portfolio, Program, Project and Iteration
- Portfolio Management
- Program Management
- Project Management
- Agile Management

To the chapter

The Phases of CPIM

The Collaborative Planning Methodology (CPM) defined in the Common Approach to the US Federal Enterprise Architecture offers a simple, repeatable process that consists of integrated, multi-disciplinary analysis and results in recommendations formed in collaboration with leaders, stakeholders, planners, and implementers.

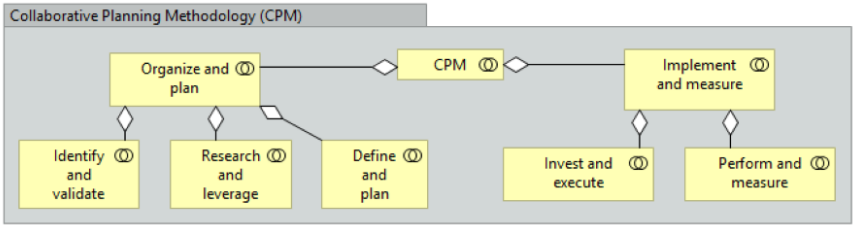

Figure 5.1: Collaborative Planning Methodology

The first release of the CPM includes the master steps and detailed guidance for planners to use throughout the planning process. Enterprise architecture is but one planning discipline included in this methodology. In this e-book some methods and approaches of other planning disciplines are being interwoven into this common methodology.

CPIM01 - Identify and Validate

The purpose of this step is to identify and assess what needs to be achieved in a portfolio, program, project or iteration, understand the major drivers for change, and then define,

validate, and prioritize the operational realities of the mission and goals with leadership, stakeholders, and operational staff.

During this step, the leadership, stakeholder, and customer needs and the operational requirements are validated so that ultimately, all interested parties are working towards the same, well understood, validated outcome.

CPIM02 - Research and Leverage

The purpose of this step is to identify external organizations and service providers that may have already met, or are currently facing needs similar to the ones identified in #CPIM01 - Identify and validate, and then to analyse their experiences and results to determine if they can be applied and leveraged or if a partnership can be formed to address the needs together.

In alignment with "Shared First" principle, it is at this point that the planners consult both internal and external service catalogues for pre-existing services that are relevant to the current needs. In some instances, an entire business model, policy, technology solution, or service may be reusable to address the needs defined in #CPIM01 - Identify and validate. This is an important benefit in these cost-constrained, quickly evolving times.

CPIM03 - Define and Plan

The purpose of this step is to develop the integrated plan for the adjustments to the work system that are necessary to meet the needs identified in Identify and validate, while taking into consideration the insights regarding re-use and the solution resulting from the Research and Leverage phase.

Recommended adjustments could be within any or all of the architecture domains: strategy, business, data, applications, infrastructure, and security.

CPIM04 - Invest and Execute

The purpose of this step is to make the investment decision and implement the changes as defined in the integrated plan. Many groups participate in this step, however, it is important to note that these groups will need to work as a coordinated and collaborative team to achieve the primary purpose of this step: to successfully implement the planned changes within the scope set for a project or program.

- CPIM04a: Invest (Financial flows)
- CPIM04b: Execute (Material flows)

CPIM05 - Perform and measure

The mission is performed and measured at a plateau (target) with the new capabilities planned in Define and plan and implemented in CPIM04a - Invest & CPIM04b - Execute. Prior to the implementation, the mission was performed and measured at a "baseline" plateau.

- CPIM05a: Perform - Service delivery (Material flows)
- CPIM05b: Perform - Charge users (Financial flows)
- CPIM05c: Perform - Repay investment (Financial flows)
- CPIM05d: Measure (Semiotic flows)

Asset awareness

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Levels of Scope

Both CPM and CPIM can serve as a full planning and implementation life cycle for use at all levels of scope[33] described in the common approach:

- International[34] ,
- National[35] ,
- Federal[36] ,
- Sector[37],
- Agency[38],
- Segment[39] ,
- System[40], and
- Application[41].

[33] http://www.ens.wiki/item:level-of-scope
[34] http://www.ens.wiki/item:level-international
[35] http://www.ens.wiki/item:level-national
[36] http://www.ens.wiki/item:level-federal
[37] http://www.ens.wiki/item:level-sector
[38] http://www.ens.wiki/item:level-agency
[39] http://www.ens.wiki/item:level-segment
[40] http://www.ens.wiki/item:level-system
[41] http://www.ens.wiki/item:level-application

Therefore we propose it as a pattern from which we derive methods that are customised for actors in

- macro journeys[42],
- meso journeys[43],
- micro journeys[44] and
- household journeys[45].

Target outcome: Consistent planning and decision making that leverage experiences and results of other agencies and levels of scope as a means to address priority needs in the most efficient way possible, following recommendations formed in collaboration with local beneficiaries, leaders, interested parties, planners, and implementers.

In its most successful form, enterprise architecture is used by organizations to enable consistent planning and decision making beyond the boundaries of a single initiative, agency or business.

The Societal Architecture needs a community of practice and collaborative method that support efforts to leverage experiences, services and capital provided by others in order to achieve more efficient government service delivery and private sector operations, and synergy.

CPM served as the main source of inspiration for the Collaborative Planning and Investment Methodology (CPIM).

CPIM adds these features to CPM:

- Clarifying re-use of models (and data) in the content stratum, from portfolios, through programs to projects and small scale initiatives;
- Clarifying the link to principles;
- Adding attention for investment;
- Positioning of the steps (phases) with respect to the asset strata: content and knowledge, material, finance;
- Splitting of investment in a substeps involving material and financial resources;

[42] http://www.ens.wiki/item:journey-macro
[43] http://www.ens.wiki/item:journey-meso
[44] http://www.ens.wiki/item:journey-micro
[45] http://www.ens.wiki/item:journey-pico

Four of the five steps in Adair's five point plan can be considered specializations of the value chains that are part of the semiotic flows.

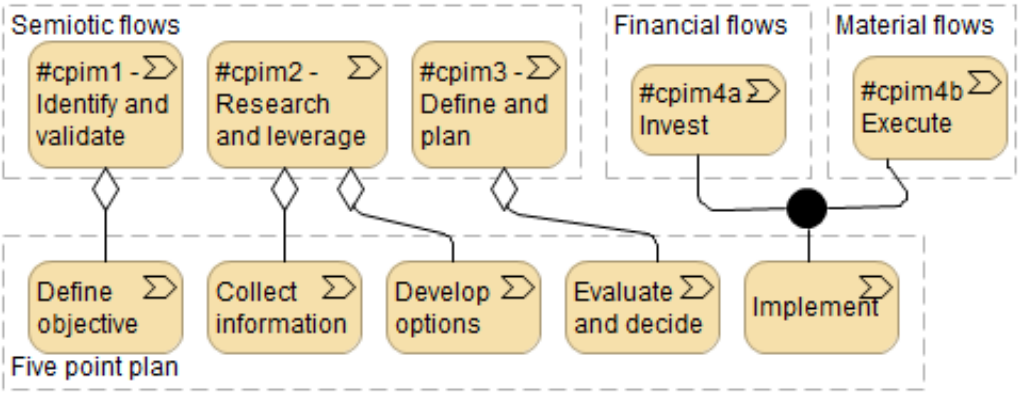

Figure 5.3: The Five point plan of decision making and the Collaborative Planning Methodology (CPIM)

Scaling decision making thus means that generalizations and specializations are performed for those steps, and in these an advanced use is made of Modeling tools.

To the section

Portfolio, Program, Project and Iteration

Figure 5.4 positions several management capabilities and resources and gives an impression of the potential dependencies among the planning levels Strategy, Portfolio, Program, Project and iteration.

In this book, we will focus on "model-based" dependencies among the resources that CPIM leverages:

- the 2030 Agenda Strategy must provide resources upon which the various portfolios can build,
- portfolio resources must support program, project and iteration resources,
- program resources must support project and iteration resources, and
- project resources must support iteration resources, and
- that capability/resource pairs may rest upon one another in the collaborative planning methodology.

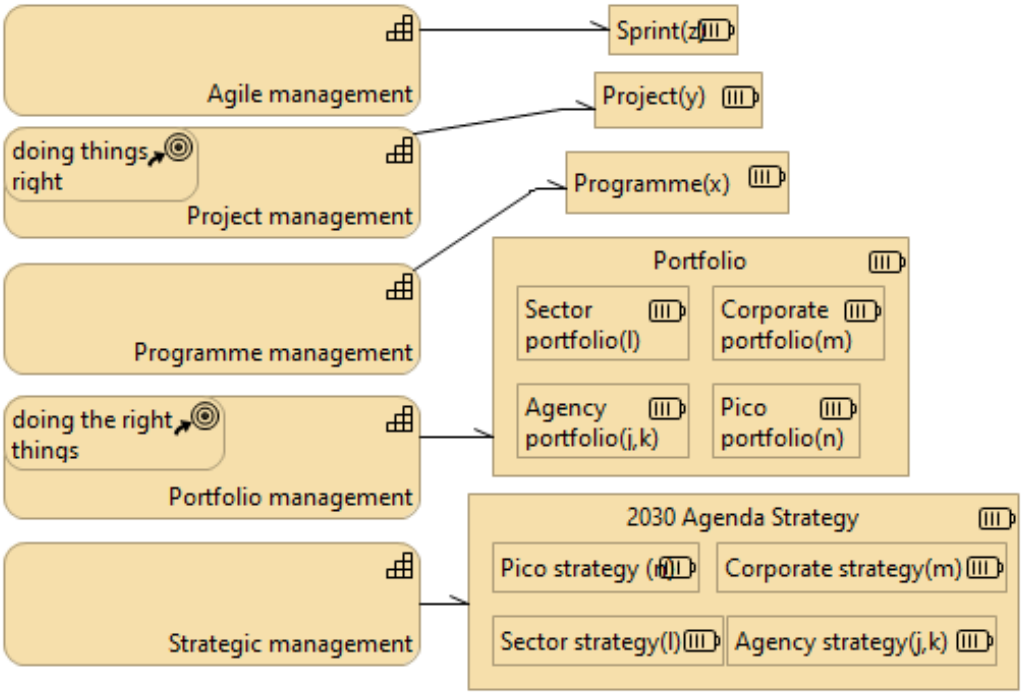

Figure 5.4: Planning levels: Strategy, Portfolio, Program, Project and Iteration

The nature of the dependencies will be explained in the sections introducing each of the steps:

- #CPIM01 - Identify and Validate
- #CPIM02 - Research and Leverage
- #CPIM03 - Define and Plan
- #CPIM04 - Invest and Execute
- #CPIM05 - Perform and Measure

But first lets take a look at key concepts of each of the "planning" levels as defined in the Open Project Management Methodology (PM²) series by the European Commission Centre of Excellence in Project Management (European Commission, 2021 and 2022), pdf versions of which are free from the website of the Publications Office of the European Union:

- PM² Agile - Guide 3.0.1

- PM² Project Management Methodology - Guide 3.0.1.
- PM² Program Management - Guide 1.0
- PM² Portfolio Management 1.5

Note that these concepts cover only the phases *CPIM01 - Identify and Validate* to *CPIM04 - Invest and Execute* and that relatively little attention is given to the quantification of the investment, and its "recuperation" during the *CPIM05 - Perform and Measure* phase.

Concepts from the area of public-private partnerships may be useful for elaborating the financial aspects of the colaborative planning.

To the section

Portfolio Management

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Program Management

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Project Management

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Iterations in Continuous Improvement and Agile Management

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

5.2 - Re-use of Knowledge Assets in Communication

At each planning level, communication with stakeholders is important.

In this section we will explore how communication products of initiatives with narrow scope build upon the communication products of those with a wider scope.

To the section - To the chapter

5.3 - Re-use of Knowledge Assets in Decision Support Studies

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

To the chapter

5.4 - Capabilities for CPIM

The Societal Architecture General Capabilities matter for all members of the 2030 Agenda Partnership, across the public services they provide and consume, and across the initiatives to achieve the sustainable development goals. These society-wide capabilities have been derived from the General Principles of the Common Approach to the US Federal Enterprise Architecture. Each capability is introduced and where possible a link is added to an Actor Atlas page with related principles that stem from the development research.

In the socio-technical landscape where innovations involve value systems, dashboards, operational processes and supporting information systems of multiple stakeholders, the total number of requirements pertaining to the operations and systems is huge.

Where state-of-the art practices indicate a strong intra-enterprise utility of architectural frameworks, our work indicates important additional gains from the cross-level alignment of requirements captured as models at macro and meso levels and provided to the micro level and to the pico or household levels.

- The Future Ready Capability
- The Investment Support Capability
- The Shared Services Capability
- The Interoperability Standards Capability
- The Information Access Capability
- The Security and Privacy Capability
- The Technology Adoption Capability

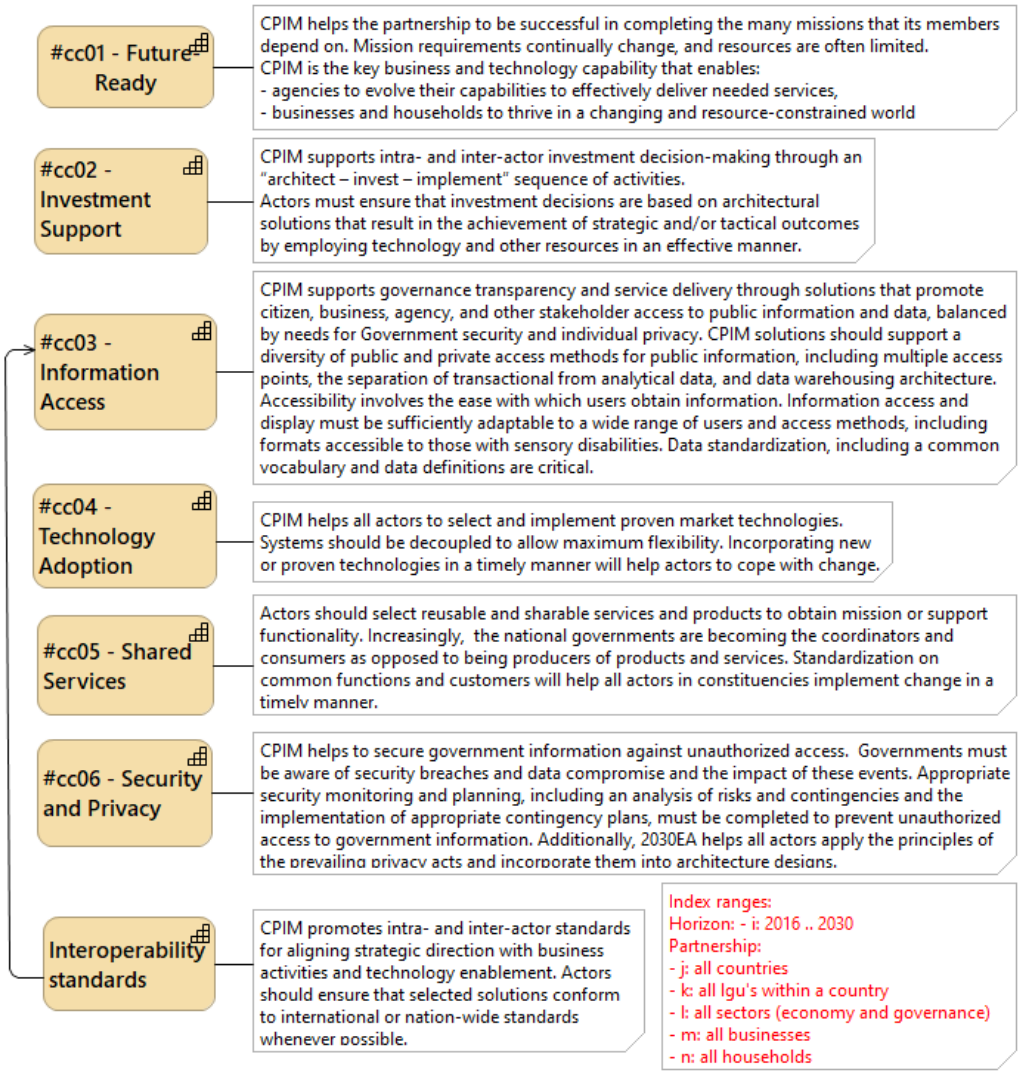

Figure 5.8: Capabilities for CPIM

To the chapter

The Future Ready Capability

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The Investment Support Capability

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

The Shared Services Capability

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The Interoperability Standards Capability

Collaborative Planning and Investment enabled by Societal Architecture promotes intra- and inter-actor standards for aligning strategic direction with business activities and technology enablement.

Actors should ensure that selected solutions conform to international or nation-wide standards whenever possible.

See also: Open Standards Principles[46] and the earlier cited 6th Principle for Digital Development: Create open and transparent practices.

To the section

The Information Access Capability

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The Security and Privacy Capability

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

[46] http://www.actor-atlas.info/global-resource:open-standards-principles

The Technology Adoption Capability

Collaborative Planning and Investment enabled by Societal Architecture helps all actors to select and implement proven market technologies. Systems should be decoupled to allow maximum flexibility. Incorporating new or proven technologies in a timely manner will help actors to cope with change.

To the section

Principles that are Realized by the CPIM Capabilities

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5.6 - Including Investment Decision Making in CPIM

In the context of the 2030 Agenda for Sustainable Development, also access to finance, and impact on material resources - the environment - are critical issues.

Finance for Development is a topic that is addressed in the Addis Ababa Action Agenda[47], and the environmental and social impact are addressed via the sustainable development goals and their targets.

Therefor, to CPIM we added collaborations for capital investments and operational expenses and income, to add the investment aspect.

To the chapter

5.7 - Implications for CPIM of General Requirements and Constraints

The figure below highlights constraints and requirements on the resources that CPIM depends on.

[47] http://www.actor-atlas.info/global-resource:a4

Cognitive, material and financial means are accessed in the collaborations, and for those means we have included some social requirements - these are negotiable - and systemic constraints.

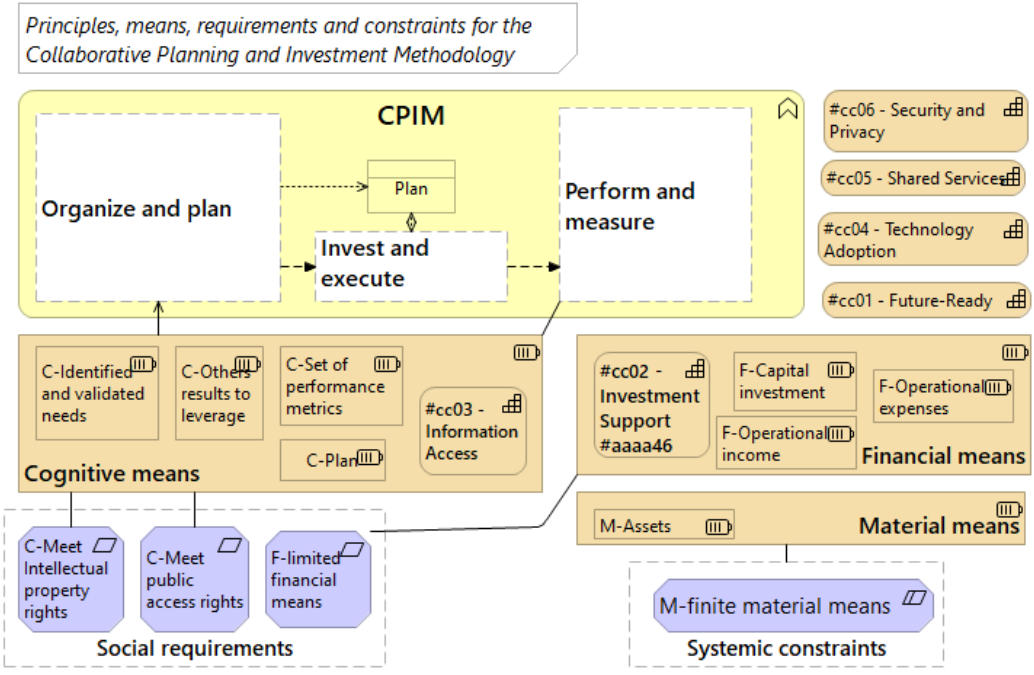

Figure 5.11: Requirements and constraints affecting resources and capabilities for CPIM

To the chapter

Chapter 6 - The Societal Architecture for the Techno Globe

6.1 - Societal Architecture: an Overview
6.2 - Transformation at Multiple Levels
6.3 - Transformation at the Pico level
6.4 - Transformation at the Micro level
6.5 - Transformation at the Meso level
6.6 - Transformation at the Macro level
6.7 - Why Societal Architecture?

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

6.1 - Societal Architecture: an Overview

The societal architecture is a reference architecture[48] that recognizes multiple levels of scope and socio-technology[49] in society and its transformation (SlideShare)[50].

Everyone's path is a composition of journey segments:

- Segments as a curious student, in sports, as a loving mother or father are part of pico-journeys, which are displayed as the highest level in the figure to convey the centrality of the human beings[51] in the social order[52] and as citizen[53].
- Segments *while one is working* in a business[54] or organization[55]. Here it is convenient to further distinguish the organizations in accordance with their mission:
  - private sector, business for profit, livelihood, non-profit, for sports, etc.: the micro level;
  - confederations protecting and representing members with similar interests with respect to the executive and legislative organs in a country, or local government unit: the meso level;
  - executive and legislative organs[56] which set and enforce general norms for society as a whole, at levels of (geographic) scope: local over national to international

Given the common use of *customer journey maps* and in order to support Collaborative Planning (and Investment) at multiple levels in society we introduce terms journey map[57], macro journey, meso journey, micro journey and pico journey.

[48] http://www.ens.wiki/item:reference-architecture
[49] http://www.ens.wiki/item:level-of-socio-technology
[50] http://www.slideshare.net/JanGoossenaerts/dr-shingo-and-the-actor-atlas
[51] http://www.ens.wiki/item:nao-humans
[52] http://www.ens.wiki/order:social-order
[53] http://www.ens.wiki/item:eira-citizen
[54] http://www.ens.wiki/item:eira-business
[55] http://www.ens.wiki/item:eira-organisation
[56] http://www.ens.wiki/item:cofog0111
[57] http://www.ens.wiki/item:journey-map

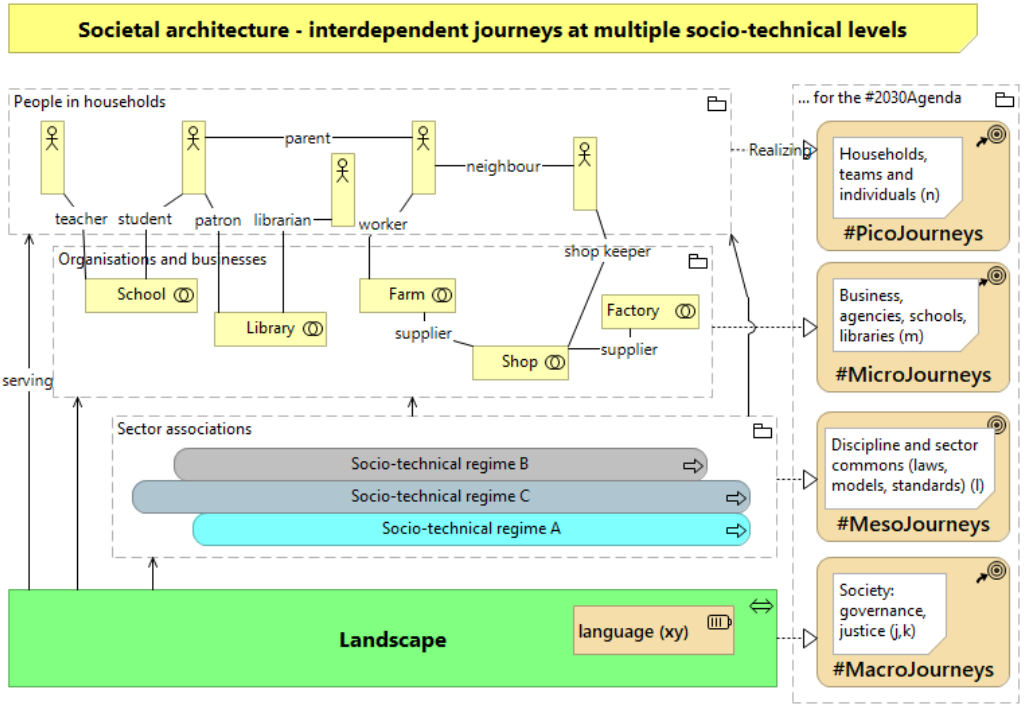

Figure 6.1 - Positioning pico, micro, meso and macro actors in the societal architecture

To the chapter

6.2 - Transformation at Multiple levels

The following sections generically characterizes actors at different levels in a modern society.

Development agendas such as Addis Ababa Action Agenda[58] involve actors at multiple levels in society. A regulative cycle or collective regulative bundle[59] describes one possible way to deal with (required) change by key actors and in key systems or constellations. The socio-technical level of the actors is depicted in the figure “Socio-technical Transition Pathways”.

The level (macro, meso, micro, or pico) of a principal will determine attributes of its interests (e.g., the resources for survival and growth that it must consume, produce or protect). A

[58] http://www.actor-atlas.info/global-resource:a4
[59] http://www.worx.wiki/crb-methodology

Principal is an entity that can own a claim to an object (such as to a piece of land, the right to harvest certain trees in a forest, a liability, the property rights of traditional or new knowledge) and be a party in a contract or agreement.

Also behavioural constraints are determined by the level. For instance:

- within their jurisdictions, macro and meso-level actors should refrain from giving preferential treatment to any of their micro or pico-level "subjects";
- companies compete at the micro-level in their sector of industry;
- persons or teams compete in sports contests (in sports disciplines (meso-level)) or for job promotion (in the micro-context of an organization);
- the institutional instruments that governments can use to promote or protect domestic industries, or attract foreign investors, are constrained by global trade agreements.

In what follows, for each socio-technical level and for the multi-level, we will address:

- Extent and principals
- Domains and systems
- Design
- Cases
- Problems
- Outcomes and values

Extent and principals

Improved livelihood-centrism in knowledge conversions builds upon attitude changes and decisions by actors responsible at multiple levels of socio-technology and scope: macro, meso, micro and pico.

The interaction in a value-constellation of principals and entities of all four levels: pico, micro, meso and macro.

Level	what used to be	with societal architecture guidelines
Pico (person)	little awareness of where the self fits in the whole	be knowledgeable of hashtags[60] for important aspects of life and adopt Household journeys for the #SDGs[61]

[60] http://www.ens.wiki/item:hashtag-systematic
[61] http://www.actor-atlas.info/mr-source-6

Level	what used to be	with societal architecture guidelines
Micro (organization)	little awareness of how business success builds upon meso-level achievements	distinguish between the cooperative and competitive aspects of business success and give both a balanced attention in Business competing & engaging in partner journeys - #b4sdgs[62]
Meso (federation)	in developing countries: little attention for this level	give ''fair'' federations the attention and resources they deserve for Sector journeys - #isicWW & #cofogWW[63]
Macro (society)	little participation by stakeholders due to communicative hurdles	overcome communicative hurdles by using the internet and social media also in a smart and disciplined way for Sustainable landscape, #MacroJourneys and #WWlgu[64]

Domains & systems

What is the domain and what are typical interactions and systems at the different levels?

The ecosystem, including the natural, social and technical environment and the socio-cultural arrangements.

Improved livelihood-centrism in knowledge conversions builds upon these changes in communications:

Level	what used to be	with Wikiworx guidelines
Pico (person)	post the casual, post much, read little, focus on the own reputation ''no matters what''	”research before writing: Before writing and posting to a wide public, check recent contributions in your area of interest; cite your sources; and aim for genuine and reliable contributions, #tag to reach your target readers; engage in discussions with your readers

[62] http://www.actor-atlas.info/mr-source-5
[63] http://www.actor-atlas.info/mr-source-4
[64] http://www.actor-atlas.info/mr-source-1

Level	what used to be	with Wikiworx guidelines
Micro (organization)	marketing, marketing, marketing	reduce the obtrusiveness of your marketing communications, e.g. by ensuring it appears alongside suitably tagged content or pages with closely related content. See the role ''smart online advertiser'' at Fair Glocal Partnership[65].
Meso (federation)	Federations have been created ad hoc and coexist in a partly competitive mode; very wasteful…	guideline: evolve towards "one federation/space per ISIC or CPC class"
Macro (society)	Each agency has its own website and communications channels, without consideration of how the *individual in need* will find up-to-date information that is relevant to his or her situation now	Explain the use of the ISIC/COFOG/CPC classifications alongside wiki functionality in finding and **placing** information; and apply it for all government partnership communications, as well as for supporting governmental initiatives.

Design

What are typical design or development methods? How is change initiated and decided?

Poverty reduction strategies.

See for instance: the Poverty-Wellbeing Shareweb[66].

Cases

Which cases illustrate change factors? What representative cases are there in the literature?

Several cases are included in Geels & Schot (2007).

Problems

Which approaches are used to identify problem messes?

[65] http://www.wikinetix.com/value-relationships
[66] https://www.shareweb.ch/site/Poverty-Wellbeing

- (Economic) Growth Diagnostics[67]
- Benchmarking per level in combination with cross-level causal-chain analysis as illustrated in Goossenaerts (2007).

Outcomes / values

What outcomes are valued, consumed and produced? How are they measured?

Sustainable and equitable socio-economic growth by capable people in rural livelihoods. Chambers and Conway (1991) report on their search for ways in which capability, equity and sustainability can be combined so that in practice conflict is low and mutual support is high.

To the chapter

6.3 - Transformation at level Pico

Extent and principals

Humans are self-conscious, anticipatory, imaginative, creative beings. This means that they are not restricted to act in narrowly confined ways according to fixed rules of behaviour. They can invent new solutionsâ€"or they may not even see the obvious ones (Bossel, 1999, page 5.) Where people fulfil roles in economic activities, as public servants or as participants in institutions, specific skills, knowledge and attitudes are expected from them.

Persons as members of households and in the role of teachers, workers, engineers, managers, librarians, farmers, parents, public servants, politicians. For more details, see: pico-classification[68].

The target actors at the Pico level are all persons that might use and produce externalized knowledge during their life, education and work. The community of person-actors is very heterogeneous, with age, gender, resource endowment, education, health, kinship and family-relationships, employment and livelihood as some of the typical determinants. Yet, the

[67] https://www.ricardohausmann.com/growth-diagnostics
[68] http://www.ens.wiki/mr-source-6

Universal Declaration of Human Rights[69] and the UN Convention on the Rights of the Child[70] confirms the same rights for all human beings, young or aged, rich or poor.

The Actor Atlas lists and describes a range of pico-level actors (and roles)[71].

Domains & systems

Typical interactions take place in the livelihood, the learning and/or work context of the person in which various systems are used.

In addition to the resource endowment, attitude, skills[72] and knowledge matter.

Learning

In the Preface of atria.us[73], four broad competence areas are briefly explained: Communications & Teamwork, Knowledge Translation, Listening Attitude and Skills for Civic Participation.

These competences must be combined with specific knowledge, experience and physical capacities of people as they fulfil the roles of pico actors in the classes of economic activity listed in the International Standard Industrial Classification of All Economic Activities (ISIC)[74]. Without an ambition to be complete, Figure 6.2 depicts some aspects of the persons lifeworld, related goals, capabilities and gaps. The "xy digital content gap in many countries" refers to the lack of digital content in the native languages of many countries, especially developing countries.

[69] http://www.actor-atlas.info/global-resource:un-universal-declaration-of-human-rights
[70] http://www.actor-atlas.info/global-resource:un-convention-rights-of-the-child
[71] http://www.actor-atlas.info/role-list:pico
[72] http://www.ens.wiki/item:competence-area
[73] http://atria.wikidot.com/sect:preface-skills
[74] http://www.ens.wiki/item:hashtag-isic

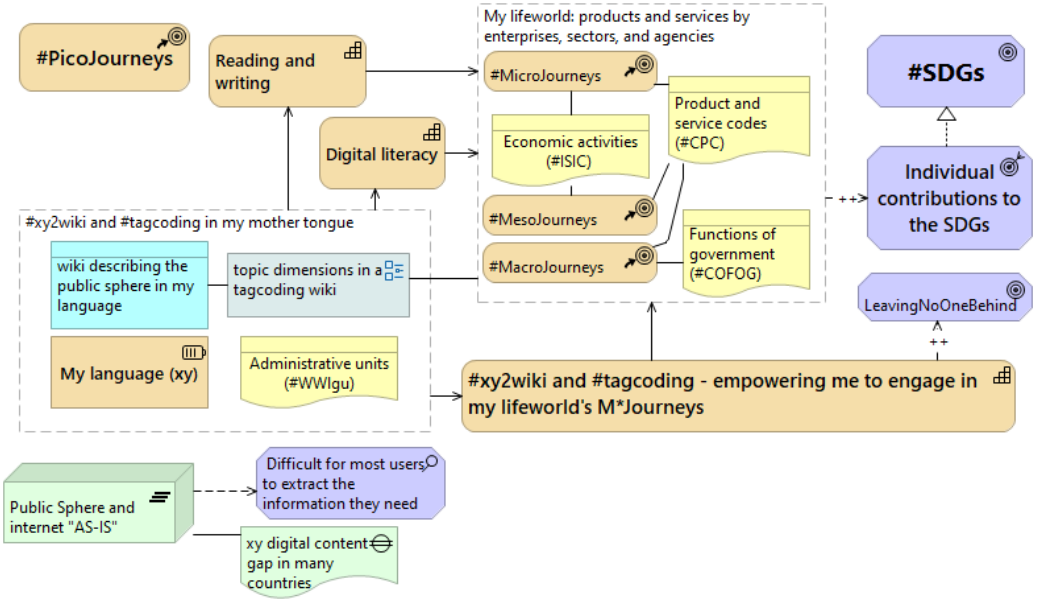

Figure 6.2 - Lifeworld and enablers of pico journeys

Kolb; learning paths.

The article How companies learn your habits[75] by Charles Duhigg (February 16, 2012, New York Times Magazine) explains and illustrates the importance of cue-routine-reward loops for people, and it explains how life-events, such as giving birth, make customers vulnerable to intervention by marketers.

The Max-Neef Model of Human-Scale Development: for a brief summary, see Max-Neef on Human Needs and Human-Scale Development(Rainforestinfo.org)[76], or the full version as part of Human Scale Development - Conception, Application and Further Reflections[77] (Manfred A. Max-Neef, with contributions from Antonio Elizalde, Martin Hopenhayn).

Maslow's hierarchy of needs gives a holistic perspective on a person's needs. These needs must be taken into consideration in change, education and training initiatives (Simons, Irwin and Drinnien, 1987).

- *Physiological Needs* consist of needs for oxygen, food, water, and a relatively constant

[75] http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html
[76] http://www.rainforestinfo.org.au/background/maxneef.htm
[77] https://www.semanticscholar.org/paper/Human-Scale-Development%3A-Conception%2C-Application-Max-Neef/1dc7196f924ab328a17503656ac26bd0fdf71d1a

body temperature. They are the strongest needs because if a person were deprived of all needs, these would come first in the person's search for satisfaction.

- *Safety Needs*. When all physiological needs are satisfied and are no longer controlling thoughts and behaviours, the needs for security can become active. Adults have little awareness of their security needs except in times of emergency or periods of disorganization in the social structure (such as widespread rioting). Children often display the signs of insecurity and the need to be safe.
- *Needs of Love, Affection and Belongingness* can emerge next. Maslow states that people seek to overcome feelings of loneliness and alienation. This involves both giving and receiving love, affection and the sense of belonging.
- *Needs for Esteem* can become dominant next. These involve needs for both self-esteem and for the esteem a person gets from others. When these needs are satisfied, the person feels self-confident and valuable as a person in the world. When these needs are frustrated, the person feels inferior, weak, helpless and worthless.
- *Needs for Self-Actualization* are activated if and only if all of the foregoing needs are satisfied. Maslow describes self-actualization as a person's need to be and do that which the person was "born to do." "A musician must make music, an artist must paint, and a poet must write." These needs make themselves felt in signs of restlessness that cannot be attributed to the non-satisfaction of the foregoing needs

For a person in a high-tech facility, Yamada (2002) explains the issues.

The Person's Context

The *Sustainable Livelihoods Framework* (Chambers and Conway, 1991) offers a comprehensive view of the assets and capacities a person needs to escape poverty on a sustainable basis, and of the interactions between the *vulnerability context* and the poverty of persons and households. Any person needs a critical mass of assets to cope with stresses and shocks, and to maintain and enhance capabilities.

For the person in a high-tech facility, Yamada (2002) explains the issues.

Several proposed education sector initiatives to help overcoming failures in meeting fundamental human rights are listed at (possible) education Initiatives[78].

Cases and problems

The literature on psychology and pedagogy lists many cases and problem analyses and illustrates change factors and their drivers.

[78] http://www.actor-atlas.info/s-initiative-book:education

Outcomes / values

What outcomes are valued and produced? How are they measured?

In methods of sustainable development it must be ascertained that even smallholders, poor and disadvantaged persons can interactively influence the joint generation of options, joint decision making and joint actions. This is *inclusion*.

The use of the mother tongue in education, and the availability of educational content are important enabling conditions for smallholders' participation in socio-economic development. They are even fundamental human rights, as stated in Article 17[79] of the UN Convention on the Rights of the Child. Yet in many languages the offering of educational and other content is very limited, as can be seen for a range of languages[80].

Care of the self and the family. Personal health and wealth.

The backlinks tab of the 2030 Agenda Indicators[81] lists some surveys that include indicators for persons and households:

- Census
- Civil Registration and Vital Statistics System (CRVS)
- Demographic and Health Survey (DHS)
- Global Findex
- Health Facility Data (HFD)
- Household Income and Expenditure Survey (HIES)
- ILO
- Labour Force Survey (LFS)
- Living Standards Measurement Survey (LSMS)
- Programme for International Student Assessment (PISA)

To the chapter

6.4 - Transformation at level Micro

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[79] http://www.actor-atlas.info/article:crc-17
[80] http://www.ens.wiki/item:language
[81] http://www.ens.wiki/item:2030-agenda-indicators

6.5 - Transformation at level Meso

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6.6 - Transformation at level Macro

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

6.7 - Why Societal Architecture?

North, Wallis and Weingast (2009) explain the difference between natural states and modern societies. Modern societies create open access to economic and political organizations, and by doing so they foster political and economic competition, and development.

In the modern society, the balance between open access resources and private property is a subtle one. For knowledge resources, this balance seems to be least understood. Also claims on land, sea and its use are a contentious area.

Vagueness regarding the allocation of resources, be it land, knowledge or material, induces individual risk considerations that hinder development.

By using a multi-level classification of the actors in a “landscape” in which we distinguish biotope, sociotope and technotope we can articulate and vary the rules of interaction and the claims on resources.

By visually representing the claims that exist on contested resources various actors can be allocated better understood and delineated claims on resources, which will be inputs to the construction of sustainable and equitable futures. This construction of a sustainable future must proceed at each of the four socio-technical levels where stakeholders develop or acquire capabilities and interact with resources as mapped or encountered in their journeys.

Both the classification and the visual representations are indispensable instruments in re-architecting the socio-technical fabric of the techno-globe, to enable more inclusive, equitable and sustainable development and clarify what it means to be a *member* of a global partnership for the #2030Agenda for Sustainable Development - #SDGs. #LeaveNoOneBehind.

In the next chapter, we describe each CPIM phase in detail and propose modalities for performing it, taking into consideration the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda and digital public goods.

To the chapter

Chapter 7 - A Societal Architecture Repository enabling CPIM Phases

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7.1 - #CPIM01 - Identify and Validate
7.2 - #CPIM02 - Research and Leverage
7.3 - #CPIM03 - Define and Plan
7.4 - #CPIM04 - Invest and Execute
7.5 - #CPIM05 - Perform and Measure

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

7.1 - #CPIM01 - Identify and Validate

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

7.2 - #CPIM02 - Research and Leverage

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

7.3 - #CPIM03 - Define and Plan

The purpose of this step is to develop the integrated plan for the adjustments to the work system that are necessary to meet the needs identified in **Identify and validate**, while taking into consideration the insights regarding re-use and the solution resulting from the **Research and Leverage** phase.

Recommended adjustments could be within any or all of the architecture domains: strategy, business, data, applications, infrastructure, and security.

The integrated plan, the project plan, defines what will be done, when it will be done, how much it will cost, how to measure success, and the significant risks to be considered. Additionally, the integrated plan includes a timeline highlighting what benefits will be achieved, when their completion can be expected, and how the benefits will be measured. It is during this step that analysis of current capabilities and environments results in recommended adjustments to meet the needs identified in Identify and validate phase.

Also during this step, the formal design and planning of the target capabilities and environment is performed. In addition to the integrated plan, the full complement of architecture, capital planning, security, records, budget, human capital, and performance compliance documents is developed based on analysis.

The end outcome is an integrated set of plans that can be considered and approved by leadership and governance.

Target outcome: At the end of this Step (which is also end of Organize and plan), leadership and stakeholders will possess an integrated set of plans and artefacts. This set of plans should be synthesized into discrete decision-making packages for leadership and governance that are appropriate given financial, political, and organizational constraints.

In (the current version of) this book we will not elaborate much on this phase as it is well-covered in project management literature and practice.

To the chapter

7.4 - #CPIM04 - Invest and Execute

The purpose of this step is to make the investment decision and implement the changes as defined in the integrated plan. Many groups participate in this step, however, it is important to note that these groups will need to work as a coordinated and collaborative team to achieve the primary purpose of this step: to successfully implement the planned changes within the scope set for a project or program.

Target outcome: A decision is made concerning the investment in the changes that were planned in **Define and plan**. At the end of this step the recommendations for addressing the defined needs have been implemented. If the investment is not approved, the architect, leadership, and stakeholders return to previous steps to alter the recommendations and plans for future leadership consideration. It is important to reiterate that the integrated plans and the implementation could consist of a variety of changes to include, but not limited to, policy changes, organizational changes, technology changes, process changes, and skills changes.

In (the current version of) this book we will not elaborate on this phase as it is well-covered in project management literature and practice.

To the chapter

7.5 - #CPIM05 - Perform and measure

The mission is performed and measured at a plateau (target) with the new capabilities planned in Define and plan and implemented in #CPIM04a - Invest & #CPIM04b - Execute. Prior to the implementation, the mission was performed and measured at a “baseline” plateau. The purpose of this interaction is to operate the mission and measure performance outcomes against identified metrics.

Target Outcome: The new capabilities as planned in Define and plan and implemented in #CPIM04a - Invest & #CPIM04b - Execute will be operational. The key outcome of this step is measured performance outcomes against identified metrics.

In (the current version of) this book we will not elaborate on this phase as it is well-covered in project management literature and practice.

To the chapter

Part III - CPIM in the Technotope

Chapter 8 - Identify and Validate in the Technotope

Chapter 9 - Research and Leverage in the Technotope

Chapter 10 - Define and Plan in the Technotope

Chapter 11 - Invest and Execute in the Technotope

Chapter 12 - Perform and Measure in the Technotope

To **Part I** - II - III - IV - V-Annexes - VI-References

Chapter 8 - Identify and validate in the Technotope

8.1 - Introduction
8.2 - The Decision-Making Context
8.3 - Problem Formulation
8.4 - Establish objectives
8.5 - Scope and level of detail
8.6 - For larger initiatives only
8.7 - Identification and Validation in Open Portfolios
8.8 - Identification and Validation in Programs
8.9 - Identification and Validation in Projects
8.10 - Identification and Validation in Iterations
8.11 - Identification and Validation in the 2030 Agenda
8.12 - Identification and Validation for Library Services
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To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

8.1 - Introduction

Performance measures are often about people who receive service. Indicators are proxies for the well-being of whole populations, and necessarily matters of approximation and compromise. Performance measures are about a known group of people who get service and conditions for this group can be precisely measured.

As part of the first step, three activities must always be executed, these are:

- object system problem formulation,
- establishing project objectives/ research questions, and
- determine the scope and level of detail.

Before introducing these steps, we present the concept of a decision frame as a means to unambiguously express both problems with, objectives for and decision options on operational processes (that realize services).

The chapter ends with a list of issues that must be addressed in addition for larger projects.

8.2 - The Decision Making Context

A Results Framework (USAID,2021a) is a portrayal of the development hypotheses through which a Mission expects to achieve the Goal of a Country (or local government unit) Development Cooperation Strategy (CDCS)(USAID,2021b), as part of a Macro journey at the national (or Local) Level of scope.

Visually, a Results Framework brings together several, often quite distinct, streams of results, which function synergistically to produce broad development changes. Thus, an economic growth result in a Results Framework might join with a health (#sdg3 - Ensure healthy lives and promote well-being for all at all ages) and an education (#sdg4 - Ensure inclusive and equitable quality education and promote life-long learning opportunities for all) results to realize CDCS Goal stated in citizen welfare terms.

One example of a macro level results framework is the 2030 Agenda Indicators[82].

[82] http://www.ens.wiki/item:2030-agenda-indicators

Tversky & Kahneman (1981) use the term decision frame to refer to the decision-maker's conception of the acts, outcomes and contingencies associated with a particular choice. The frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits and personal characteristics of the decision-maker.

Decision frames are particularly malleable in contexts where multiple and conflicting objectives are at stake, perceived and technical risks are not well aligned, and difficult tradeoffs must be made in order to implement a particular strategy ((Payne et al, 1992) cited by (Wilson and Bruskotter, 2009)).

Slovic (1995) moreover indicates that people's preferences are often constructed in the process of elicitation.

Decision Frame (ISO FDIS 15704)

A decision frame describes a set of items that constrain the degrees of freedom for the decision-making on the work system operations (see Figure 1.3) as controlled by a decision center (part of the management activity in Figure 1.4). This frame will not be modified by the decision. Its constituents typically are the result of a decision that has already been made (for instance in the governance activity). To avoid conflicts, a decision center should be under the influence of only one decision frame.

The main items influencing the decision-making are:

- the decision objective or set of objectives the process has to meet;
- the decision variables enabling the decision-maker to know what may be acted on and under what constraints;
- the decision criteria guiding the choice of the decision-making.

Decision objective

Objectives indicate which types of performances are targeted. These performances can be the production costs, the delivery lead-time, the level of quality, for example.

Objectives are needed everywhere and every time a decision is made. Global objectives refer to the entire system or supply chain and, according to the principle of coordination, are consistently detailed to give local objectives to all decision centers.

Decision variable

Decision variables are the items upon which a decision center can make decisions that allow it to reach its objectives.

Decision constraint

Constraints are the limitations on possible values of variables. Decision constraints limit the freedom of a decision center to select any arbitrary value for its decision variables.

Performance measure

A performance measure is an aggregated piece of information allowing the comparison of the performance of the system to the system's objectives. A performance measure is defined by its name, a value domain or dimension and a procedure that describes how its value can be calculated.

Consistency

Performance measures should be consistent with objectives because it is necessary to compare performances targeted (objectives) and performances reached (measures). Performance measures should also be consistent with decision variables because those variables will have an effect on the performance monitored (controllability). The main issue is to ensure internal consistency inside a decision center in terms of the triplet presented (see Figure 8.1). This consistency is ensured if the performance measures allow verification of the achievement of the objective and are influenced by actions on decision variables.

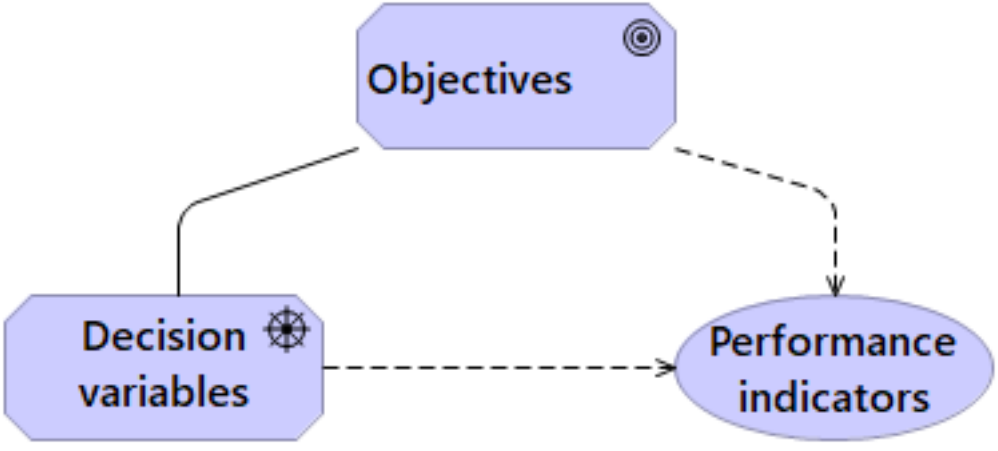

Figure 8.1: Consistency of the "Objectives, Variables, Performance Measures" triplet

Decision Frame and Network Structure

The object system for which decision making is required can have a network structure. Haegele and Klink (1998) state that four basic network structures (mostly used in a IT networking context) can distinguish networks in supply chain relationships. These are

tree, bus, star and ring networks. In both tree and star networks there is a central player (for instance the company dominating the supply chain), which initiates the supply chain initiatives and owns the supply chain information system. This governance activity of this central player provides the top-level decision frame that must be refined by the partners in the network.

The partners who are involved in a network usually have the objective to increase their competitiveness. This implies they have to become more effective/efficient in comparison with other networks (chains) that are supplying products/services that compete in any way (similar products, substitute products etc.).

Performance measures, to be appropriate, should cover such areas as those:

- of critical concern to object system common goals and strategies;
- of inter-influence and of common concern among the network partners;
- and concerned by both internal partners and external customers.

A performance measurement method should be based on the process model of the object system, so measures can be derived from process performance. Any process consumes particular enterprise resources, performs the planned missions and functions, and then adds value to products that are delivered to end customers. The consumed resources, and planned functional operations or expected outcomes are the essential performance of processes. Time, labour, capital, power, facilities, and information are typically the resources that processes consume. Traditionally, they can be measured according to their planned functional operations. For example, purchasing process is mainly responsible for material replenishment, supply base management, etc. Thus it can be measured from such performance as material replenishment reliability and quality, and supplier-buyer relationship. Reliability in delivery and transportation, and flexibility in material supply, production, and order delivery have received more and more attention in performance measurement of supply chains. For each process and its sub-processes that need to be measured, the corresponding measures are identified and grouped into the processes and measures hierarchy as shown in Figure 8.2.

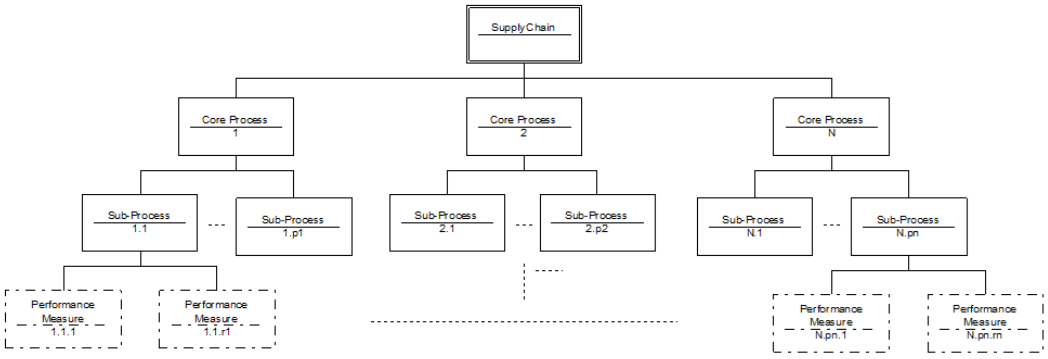

Figure 8.2: Decomposition in Performance Management

An Object System can be divided into a number of Core Processes. A core process refers to a series of planned activities for original suppliers and manufacturers till retailers that add value for the end customer. These core business processes, which are of essential importance to business objectives and strategies, are suggested to identify and confine the decision frame. The core processes identified can be further decomposed into sub-processes and activities to address their detailed performances. For example, the inbound logistics can be decomposed into such sub-processes as purchasing, transport, supply base management, etc. All these core processes and sub-processes compose the framework for a supply chain Performance Measurement System.

The Supply Chain Design Decomposition (SCDD), is a toolbox for the measurement and improvement of logistics performance in supply chains, which is the result of the application of axiomatic design to SCM (Schnetzler et al, 2004). This axiomatic design was developed at the Massachusetts Institute of Technology (MIT Boston) as a scientific approach for the generation and selection of good design solution for products, processes, and systems (Suh, 2001). Axiomatic design focuses on the identification of functional requirements and the selection of means for achieving them. Objectives are expressed as functional requirements (FRs) for a solution and the possible means as design parameters (DPs) (Engelhardt and Nordlund, 2000). By decomposing the design into several levels of objectives-means-combinations, a causal model of the design is created showing the connections of an objective and the corresponding solution. Axiomatic design has been successful applied to the design of many products, systems, and software as well as to development of manufacturing systems. Manufacturing System Design Decomposition (Cochran et al., 2001) offers a tool to separate objectives from the means to achieve them, to relate low-level activities and decisions to high-level goals and requirements, to understand the interrelationships among the different elements of a system design, and to effectively communicate this information across the

organization.

The objective/means hierarchy is illustrated in Figure 8.3. This model is used in relation with the designed "The Process – performance Indicators – Value" network. The highest level of SCDD concerns strategic supply chain management and is set up according to the methodology of economic value added (EVA) as an appropriate representative of the success of the enterprise. EVA can be understood as net operating profit after taxes minus a capital charge, which depends on the total invested capital and the capital costs (Ehrbar, 1998).

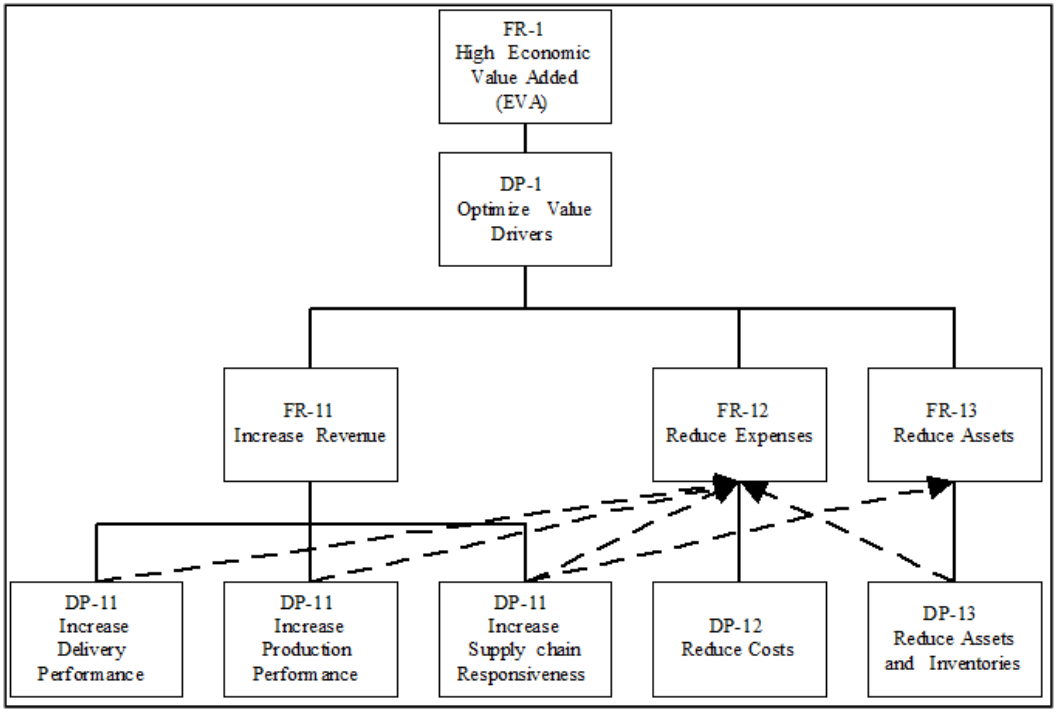

Figure 8.3: Example of an Objective-Means Hierarchy

In an advanced governance system (van Eijnatten and Goossenaerts, 2004) also the decision-object hierarchies for other objectives such as safety, health, security, environment friendliness, and disaster reduction will need to be defined. Safety and health objectives are expressed with respect to human capital. Security and disaster reduction objectives are expressed with respect to several kinds of capital, with action means in the realm of the social capital. Environment friendliness objectives are expressed with respect to natural capital stocks and flow (see also Rudd, 2004).

In the case of a network structure, a decision frame and all reflective activities (governance,

management and analysis and design) may exist for the operations of each sub-system.

Classes of Systems with Analytically Computable Performance

In many change situations it is important to assess the value impact of the proposed change (a setting of a decision variable) on the performance of a system.

For certain classes of systems, for instance M/M/s queues with exponential inter-arrival time distribution and/or service time distribution, certain measures of performance can be analytically computed. These are steady-state average delay, steady state average waiting time, steady-state time-average number in queue, and steady-state time-average number in system (Law & Kelton, 2000, page 97).

The triplet of objectives, decision variables and performance measures for the class of queuing systems looks as follows:

- Objectives: not specified
- Decision Variables:
  - Service mechanism: the number of servers; does each server have its own queue, or is there one queue feeding all servers; the probability distribution of customers' service times.
  - Queue discipline: the rule that the server uses to choose the next customer from the queue (if any) when the server completes the service of the current customer.
- Performance Measures:
  - (steady-state) average delay
  - (steady state) average waiting time
  - (steady-state) time-average number in queue
  - (steady-state) time-average number in system
  - mean service time and service rate

The selection of values for decision variables only becomes meaningful when objectives are stated for a system. If a given object system can be modelled (approximated) by a member of a class of systems for which performance measures can be computed analytically, then design alternatives exist within the same class of systems, where different values have been set for the decision variables in the class of systems. For instance, the number of servers is increased to reduce average delay, or the queue discipline is modified.

When approximating or modeling real life object system operations by classes of systems with analytically computable performance measures, we meet limitations of several kinds:

- the degrees of freedom in the design is limited in comparison to the options that the decision maker or designer has;
- the number of performance measures that can be computed is limited, and may not include performance measures that are consistent with the values and objectives stated for the system;
- for a given object system multiple objectives may be stated (multi-criteria decision making), and there exist decision variables with joint effects for multiple sources of value loss (erosion) (e.g., the study by Lee and Özer (2005) on the effects of misplacement, shrinkage and transaction errors on inventory policies).

In such cases simulation offers an alternative decision supporting technique. It allows the designer to evaluate systems w.r.t. a broad range of decision frames, in which fewer limitations exist for the values, the objectives, the decision variables and the performance measures.

Implications for Simulation

In the study of systems with analytically computable performance, it is common to present the decision frame once and for all, and to further work (= do mathematics) within that decision frame, without revisiting the assumptions that limit their applicability.

When studying the behaviour of operational systems by means of simulation, it is common to adopt the decision frames of well known classes of systems, such as for instance queuing systems or manufacturing systems, and to restrict evaluations to performances that are also analytically computable, or to restrict decision options to those studied analytically.

To really appreciate the value of modeling of operational processes it is important to first define the decision frame that matters for the system studied, and to formulate the problem that initiates the redesign effort, in terms of the decision frame.

Points of attention in the case materials

Open portfolios may emphasize objectives, decision variables and performance measures that are mandatory or recommended for programs, projects and iterations that become part of the portfolio.

- objectives: minimizing environmental impact, or minimizing emissions; maximize the use of shared models;

- decision variables: which portfolio models, or which of their content, to use;
- performance indicator: emission measures.

Programs, projects and iterations may then copy those objectives, decision variables and performance measures into their decision frames and elaborate their business case using them.

To the chapter

8.3 - Problem Formulation

Every decision making engagement begins with a statement of the problem for some operational process or facility that delivers an eco-system, industry or government service.

A problem statement that is provided by the management entity or problem owner (client) is usually informed by immediate ambitions and context of the work-system but may be less aware of all the means that are available for solving the problem, and of constraints.

Very often though, the problem is stated as the absence of something, and the problem owner assumes that the presence of that something is the solution: in other words, the problem owner proposes a solution, or has jumped to a conclusion regarding the solution of his problem, without having done a proper analysis.

By focussing on objectives, performance measures and decision variables one can kick off the path to understanding the problem without such jumping to conclusions.

If a problem statement is prepared, it is important that the client understands and agrees with the formulation.

A problem for an operational process or facility is well understood when it is formulated w.r.t. a decision frame expressing objectives, performance measures and decision variables for the operational process or facility.

Modeling may help in the formulation of the problem.

It is moreover suggested that a set of assumptions is prepared and agreed upon with the client or the interested parties.

Ideally the “scientific” planner would like to have one model that represents and explains the entire system in its environment. Such a model does not exist, but models and data of parts

or aspects of the system (the firm, supply, distribution and sales, consumers, competition and environment) are available.

If such models and data exist and are relevant to the scope of a decision problem, then it is important that they can be deployed early in the decision study.

The various layers of the ArchiMate framework support the use of models in the problem formulation.

The models may also be refined or improved. The decision study may require additional data.

Let us review the problem formulation at the levels of open portfolios, programs, projects and iterations by expressing the decision frame for some typical situations.

Problem formulation in Open Portfolios (Macro and meso journeys)

For instance the problem of climate change caused by mankind.

At country level, not meeting a target defined with respect to 2030 Agenda Indicators[83] signals a problem.

In an open portfolio the range of problems that should be addressed could be very wide, and problems of various facilities could be mutually enforcing.

In such a situation, different decision frames may coexist, one for each facility “l” providing an eco-system, industry or government service for a sociotope. This is depicted in Figure 8.4.

[83] http://www.ens.wiki/item:2030-agenda-indicators

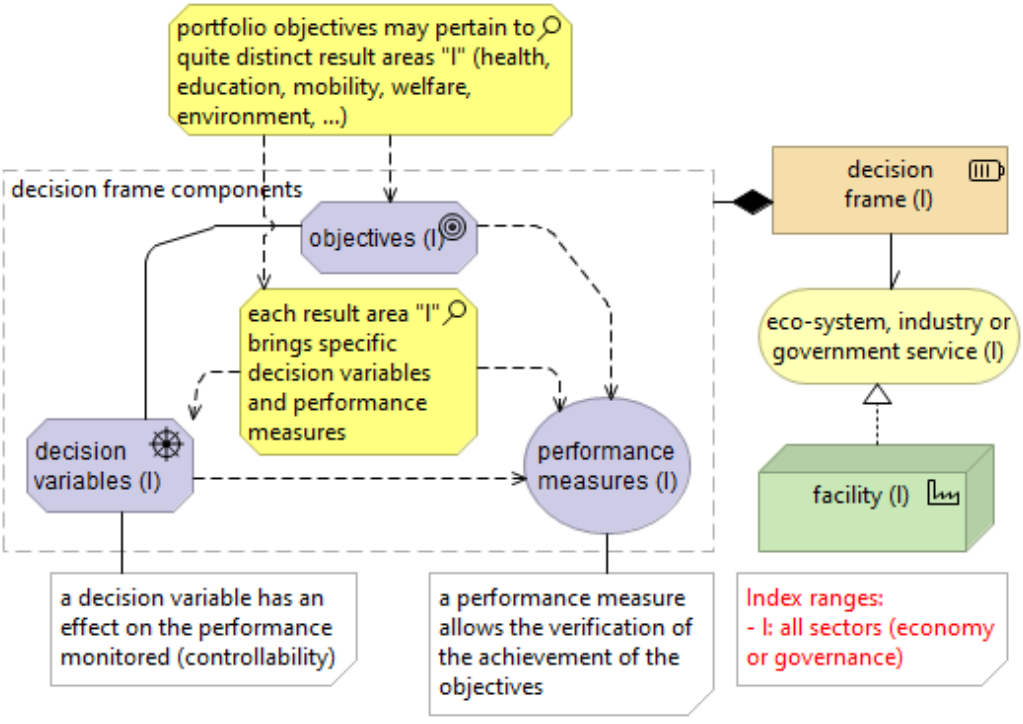

Figure 8.4: Portfolio objectives pertaining to distinct result areas (or facilities)

Problem formulation in Programs (Meso and micro journeys)

For instance the contribution of fossil fuels to climate change caused by mankind.

The contribution to carbon emissions by the use of private jets.

In the context of the "Open" 2030 Agenda which defines development goals for different areas of human activity, each of those areas could be the object system of a program's problem formulation.

Problem formulation in Projects (Micro and pico journeys)

The result framework could be formulated using a balanced scorecard or a similar framework.

Here we give some concrete examples that many may be familiar with. One of the purposes of this e-book is to encourage a similar way of working in meso and macro journeys.

1. Increase plant throughput by 20%

The plant management has been given the directive to increase throughput by 20%, for instance on the basis of a benchmark with competing plants.

The decision frame for the plant operations looks thus:

a. Objective: increase plant throughput by 20 %
b. Performance indicator: plant throughput
c. Decision Variables: not specified

Note that no constraints (operational costs, project budget, on the solution …) are given. It is important that related assumptions are checked with the problem owner. The problem statement is too broad to immediately justify a decision making engagement.

2. Reduce Work in Progress (WIP) by 10%.

The decision frame for the plant operations looks thus:

a. Objective: reduce WIP by 10 %
b. Performance indicator: WIP during the operations
c. Decision Variables: not specified

The problem statement is too broad to immediately justify a decision making engagement.

3. How many AGVs are required?

a. Objective: not specified, but it can be assumed that a certain volume of jobs must be performed within a certain period of time
b. Performance indicator: e.g., average waiting time, time-average in queue,..
c. Decision Variables: the number of AGV's

In the case that performances cannot be computed analytically (approximately), modeling is recommended.

4. What Schedule achieves best throughput?

a. Objective: highest/best throughput
b. Performance indicator: throughput
c. Decision Variables: a number of available schedules (or scheduling algorithms)

In the case that performances cannot be computed analytically (approximately), modeling is recommended.

It is typical to have multiple dependencies among decision variables and performances. Smaller buffer sizes may not help higher throughput rates, though it may imply lower costs and WIP.

Problem formulation in iterations

As problem messes may be complex it is often irrealistic to achieve a solution in one step. By considering the various properties of the facility and dependencies among the decision variables a stepwise approach which may pass over several plateaus[84] between the current situation and the intended future. Each iteration solves some sub-problems of the overall problem mess. As one progresses from one iteration to the next, additional insight into the facility and the operational processes may open up additional solution paths.

To the chapter

8.4 - Establish Objectives/ Research Questions

This step should be accomplished regardless of location of the analyst and client. The portfolio, program or project objectives indicate the performance questions that are to be answered by the decision making engagement.

Objectives in Open Portfolios (Macro and meso journeys)

The sustainable development goals[85] indicate possible objectives for a wide range of macro- and meso-level development portfolios.

Objectives in Programs (Meso and micro journeys)

The sustainable development goals and benchmarking indicate possible objectives for a wide range of meso- and micro-level programs.

[84] http://www.ens.wiki/item:tech-plateau
[85] http://www.ens.wiki/item:sdgs

Objectives in Projects (Micro and pico journeys)

Here we give some concrete examples that many may be familiar with. One of the purposes of this e-book is to encourage a similar way of working in meso and macro journeys, with a considerable sharing of objectives and research questions.

Typical objectives can be to verify the throughput time of a new manufacturing line, identify the bottleneck operations in a system, find the proper buffer capacities to attain certain levels of production, determine the best batch sizes and sequence for a multi-product manufacturing line, etc.

One should remember that the objective of a decision making engagement cannot be just to simulate the system(Ulgen et al., 1994), or to develop a system.

Besides answering performance questions about alternative designs of operational processes, there may be project objectives related to time scale, run speed or visual presentation (Mehta, 2000).

The result of project may also be to provide a training tool or an on-going scheduling tool. These study-objectives may affect the way the model should be created. For example, if there are no training purposes for the study deliverables, then simple animation may be sufficient. On the contrary, in case of training purposes animation may appear to be an important tool, 3-D detailed animation may be required.

After the objectives of the study have been finalized, they should be written and stated as part of the portfolio, program, project or iteration documentation.

It is important for any team to remind itself of the original objectives when proceeding with the remaining steps and phases of a portfolio, program, project or iteration.

To the chapter

8.5 - Scope and Level of Detail

The scope and level of detail determine what should be included in the model and how much detail should be modelled.

The model should have a minimum amount of detail required to achieve the objectives at the level of the initiative. At least enough to get confident answers for the specific questions from the study. In many cases, the availability of data and time, experience of

the modeller, animation requirements, and expectations of the interested parties are more dominant factors in determining the level of detail than the specific issues to be addressed by the study.

In the portfolio-program-project-iteration chain, the modeller should aim to re-use “less specific” lower level models that will satisfy the objectives of the study.

For example, for the information exchanges in a supply chain, the EDIFACT messages can serve as reusable “portfolio models”.

In another example, for the AGV (Automated Guided Vehicle) material handling study, the manufacturing cells that request the AGVs to drop and pick up parts may be modelled as black boxes. Each manufacturing cell can be described with one inter-arrival distribution for AGV pickup requests and another inter arrival distribution for AGV retrieval requests. On the other hand, in a more complex AGV study where there are synchronization issues among the manufacturing cells, one may need to describe in detail the schedule of operations at each cell (Ulgen et al., 1994).

In some cases, lack of time may force the modeller to build a less specific upper level model that satisfies only a subset of the original objectives of the study.

But don’t forget, more detail doesn’t necessarily mean more accuracy!

To the chapter

8.6 - For Larger Initiatives Only

For larger initiatives, additional activities are recommended:

- Estimation of the required resources for the study,
- performing a cost-benefit analysis, and
- the creation of a planning chart.

This e-book doesn’t elaborate these topics in detail. Yet it conjectures that reusing models along the portfolio-program-project-iteration chain, will contribute to substantial economies regarding the required resources, especially if these resources are “open”.

Seen in the perspective of a planet that must achieve the sustainable development goals, any paywalls that hamper the re-use of intellectual resources will harm the cost-benefit equations and complicate the planning of interested parties that should not be left behind.

Estimate the required resources needed to do the study and modeling

Estimating how long an initiative will take and which resources will be used for the study is an important step.

The detailed list of tasks to be performed in the study, the duration of each task, the resources to be used for each task and cost of each resource are needed in order to make a sound estimate of the resource requirements of the initiative. Level of detail and availability of data in the proper form are important factors in determining the time and type of resources required for the study. Availability of historical data from prior initiatives can increase the confidence in the estimates resource levels, timing and cost. A PERT analysis that gives the minimum and maximum duration for each task can be useful in estimating the total initiative time at different levels of confidence.

A special attention should be given to human requirements. Human requirements in a decision making engagement are due to:

- interaction with people familiar in management of the system,
- interaction with people familiar with the engineering details of the system,
- modeller(s) familiar with the modeling tool to be used as well as experience with similar types of systems,
- data collection required by the study.

Perform a Cost-Benefit analysis

This process needs not to be an extended formal process but it should be performed as a check-point in any study.

A simple cost-benefit calculation may also aid the modeller in determining the proper level of detail to include in the model.

For example, for an AGV study, it would be wasteful to spend $20,000 of additional modeling time to decide if faster AGVs are better for the system when the total incremental cost of the faster AGVs is less than $20,000. The team should consider the whole life-cycle of the system and all relevant cost components in the cost-benefit analysis. It is common to observe a cost-benefit ratio of one-hundred to one-thousand from a typical decision making engagement when one looks at the total benefits gained throughout the life of the system (Ulgen et al., 1994).

Create a planning chart of the proposed project

Modeling initiatives can easily get out of hand, especially if the rate of change in the scope of the project exceeds the rate at which the results are available to the interested parties.

A Gantt chart showing the tasks with milestone points can help control an initiative.

Figure 8.5 shows a Gantt chart for the major phases of a decision making project. Typical milestone events in a simulation project may include completion of the project specifications, CIM model results, input data collection and analysis, base model validation, base model final results, alternate model validation, alternate model final results and final report.

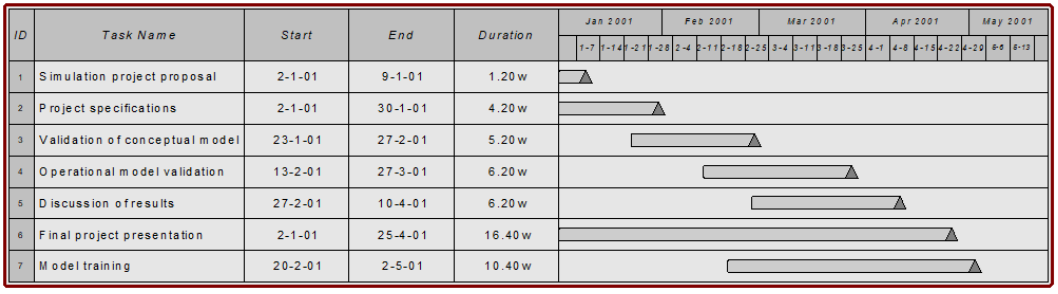

Figure 8.5: A Gantt chart showing the major phases of a decision making engagement

To the chapter

8.7 - Identification and Validation in Open Portfolios

The 2030 Agenda for Sustainable Development - #SDGs

As open portfolios don't have a competitive or "self-enrichment" intention, the notion of Economic Added Value that is key in micro journeys is subordinate to the values that are depicted in Figure 4.5 and have been defined in the 2030 Sustainable Development Agenda.

In Figure 4.7, the sustainable development goals are linked to the values. The Sustainable Development Goals are strategic objectives for the United Nations member states. Each goal

has a number of targets for which also indicators[86] have been defined and data are being collected.

The third component of the 2030 Agenda decision framework are the decision variables. These are not specified in the 2030 Agenda itself, but are addressed in the Addis Ababa Action Agenda[87] and in the national action plans of the UN Member States and the private sector.

One way of describing the decision variables is via variations in the production and consumption of products and services, as classified in the Central Product Classification (CPC)[88], and as produced and delivered by:

- the economic activities as classified in the International Standard Industrial Classification of All Economic Activities, Rev.4[89] and
- the functions of government as classified in the Classification of the Functions of Government (COFOG)[90].

A myriad of problem statements can be created using this generic decision frame, and both government agencies, industry bodies, and private sector players can launch portfolios, programs, projects and iterations to solve the identified problems.

Each interested party can activily work at one or a few problems, where each problem is addressed in a portfolio, program, project or iteration by a dedicated consortium, network or community.

[86] http://www.ens.wiki/item:2030-agenda-indicators
[87] http://www.actor-atlas.info/global-resource:a4
[88] http://www.ens.wiki/item:hashtag-cpc
[89] http://www.ens.wiki/item:hashtag-isic
[90] http://www.ens.wiki/item:hashtag-cofog

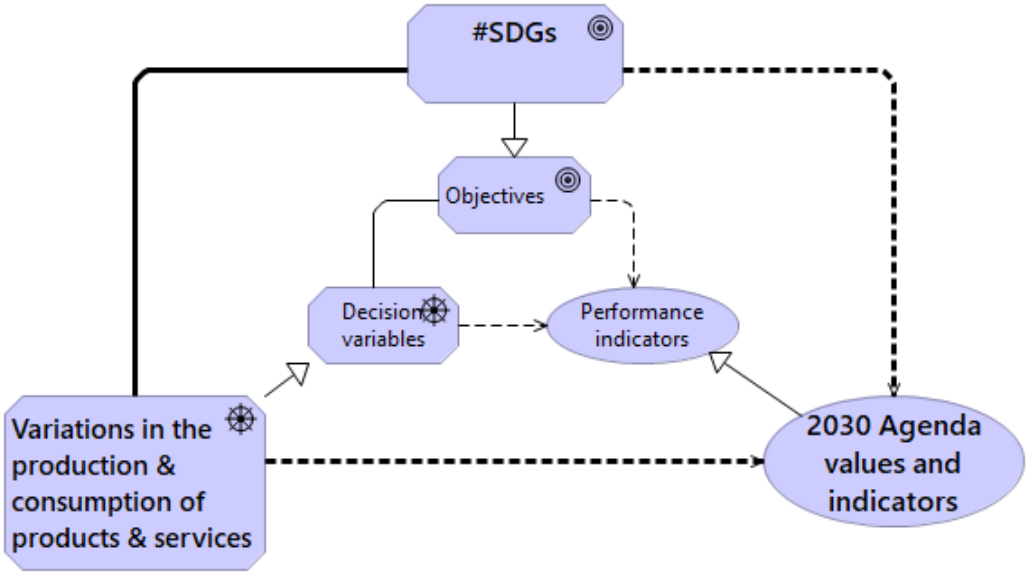

Figure 8.6: The decision frame of the 2030 Agenda

Figure 8.6 shows the decision frame of the 2030 Agenda, and Figure 8.9 shows business, sociological, political and technological trends that should be considered in the planning.

Technology ○ electronic commerce ○ internet ○ mobile communications ○ "death of distance" ○ new media ○ increasing information content	**Policy** ○ inclusion/digital literacy ○ evidence base ○ result focus ○ budget constraints
Competition ○ Imperatives ○ customer orientation ○ learning & growth ○ cost reduction ○ Enablers ○ alliances ○ sub-contracting	**Sociology** ○ demand for better and more convenient solutions ○ added value awareness ○ just-in-time delivery

Figure 8.7: Business, sociological, political and technological trends shaping business/IT planning

That there are many interested parties, many problems as well as many potential solutions, justifies an open communication strategy, for instance as proposed in the #tagcoding handbook[91] and its translations.

It is clear that solving problem messes at this scale involves many parties that otherwise might freely select values and objectives serving either private or public interest, within the constraints of government regulations (and their resource endowments).

The question then rises for whom the decision frame is valid. Corporate objectives such as maximizing shareholder value reflect the believe that the public interest is best served by every individual pursueing private property growth in a free market. Free market then means a market that is not constrained by any but basic rules, such as specified in contracts.

Regarding the 2030 Agenda validation, its adoption at the UN General Assembly of 2015 indicates a willingness to invest across levels of government. Moreover during the 2030 Agenda's preparation and in the Addis Ababa Action Agenda much attention was given to a Global Partnership[92] that should engage National governments of all countries, Local authorities, International institutions, Business, Civil society organizations, Philanthropists, Social impact investors, Scientists and academics, People – all sitting at the table to go beyond aid to discuss a truly international framework of policies to achieve sustainable development.

EDIFACT

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT[93] is a subsidiary, intergovernmental body of the United Nations Economic Commission for Europe (UNECE) which serves as a focal point within the United Nations Economic and Social Council for trade facilitation recommendations and electronic business standards. It has global membership and its members are experts from intergovernmental organizations, individual countries' authorities and also from the business community.

Its key areas of work include Trade Facilitation Recommendations[94]. Over the past 40 years, the United Nations Economic Commission for Europe (UNECE) has developed and maintained a series of recommendations and standards for international trade. These reflect best practices in trade procedures and data and documentary requirements. They are used worldwide to simplify and harmonize international trade procedures and information flows.

[91] https://leanpub.com/tagpedia
[92] http://www.actor-atlas.info/role:global-partnership
[93] https://unece.org/trade/uncefact
[94] https://unece.org/trade/uncefact/tf_recommendations

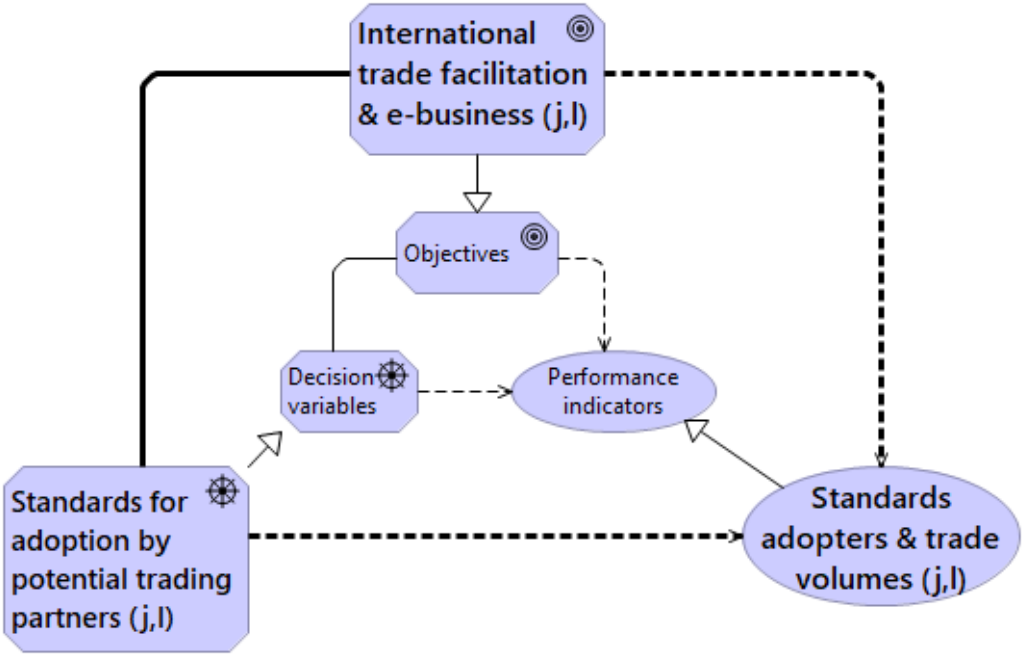

Figure 8.8: The decision frame of UN/CEFACT

The key open portfolio problem is to extend the standard offer to more sectors (index l in Figure 8.8).

8.8 - Identification and Validation in Programs

Limit to programs that are aware of open portfolio and intend to maximally re-use the resources provided (ref. Figures 5.8 and 5.9):

- by including objectives, measures and indicators in their decision frames;
- by adopting the standards in their analysis and solution design.
- ….

To the chapter

8.9 - Identification and Validation in Projects

Limit to projects that are aware of open portfolio and intend to maximally re-use the resources provided (ref. Figures 5.8 and 5.9):

- by including objectives, measures and indicators in their decision frames;
- by adopting the standards in their analysis and solution design.
- ….

To the chapter

8.10 - Identification and Validation in Iterations

Limit to iterations that are aware of open portfolio and intend to maximally re-use the resources provided (ref. Figures 5.8 and 5.9):

- by including objectives, measures and indicators in their decision frames;
- by adopting the standards in their analysis and solution design.
- ….

To the chapter

8.11 - Identification and Validation in the 2030 Agenda

To the case overview - To the chapter

8.12 - Identification and Validation for Library Services

Library services globally must respond to new trends in development and technology.

The local public library must become an (internet-based) capability for all people (citizens), business, and government agencies (local authorities), to easily find and access printed or online content (both creative works and digital public goods) in their native, second or third language. This content will be of interest to their culture, recreation, learning or coping in a sustainable and inclusive manner with the livelihood challenges and opportunities they face.

In the creation of this capability, there is a role for:

- all librarians, as well as for library patrons and many other library stakeholders.
- providers of digital public goods

Figure 8.9 shows critical resources, e.g. “Library collection”, stakeholders, e.g. “Library patron”, alongside the pursued capability and possible courses of action (decision variables) for enhancing the library services.

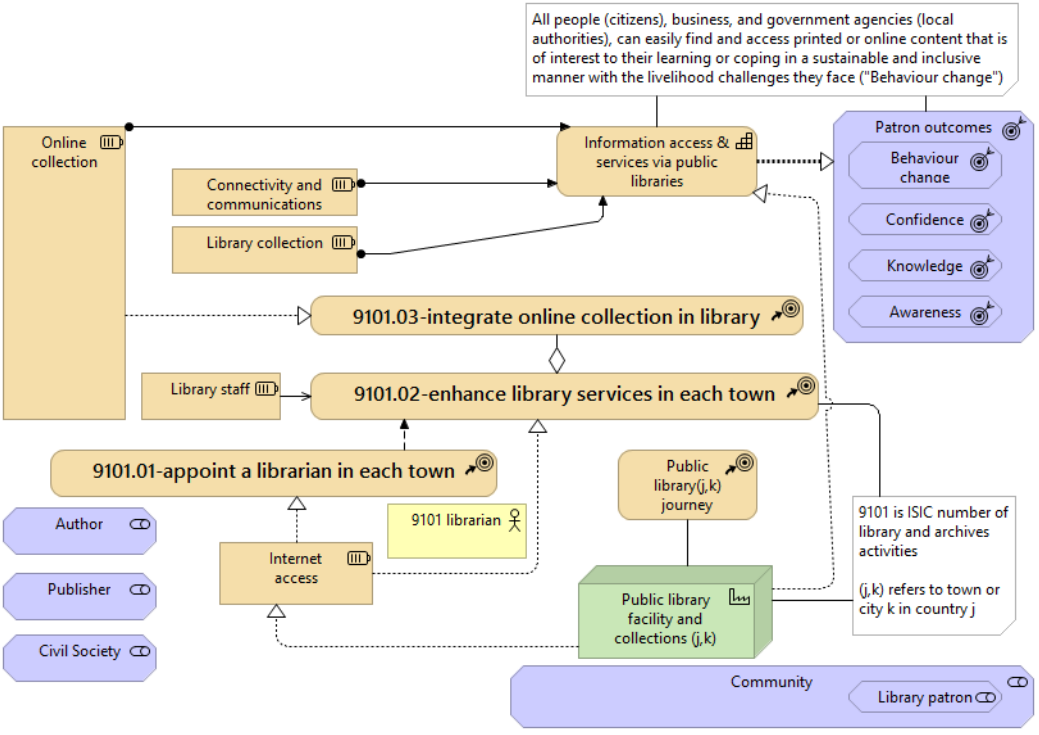

Figure 8.9: Outcomes and Critical Resources for library Services

Regarding the availability of local library services (performance measures), note that the #WWlgu pages of local governments[95] include links to "local" open data provided by Knoema[96] as well as links to LibWeb - Library Servers via WWW[97].

[95] http://www.actor-atlas.info/system:lgu
[96] https://knoema.com/atlas
[97] https://www.lib-web.org/

Nr.	Name	Description	Measure	Target
F1	Balance	Balance income (subsidies, membership and lending fees, lending fines, sales of media that no longer fit in the collection) and expenses (salaries, acquisition of new media products, maintenance and rental fees for the library building, publicity,...)	Quarterly Cashflow	black
F2	Fair Flow	fair –proportionally to usage– division of media-related income over the portfolio of media product families {f_i, i=1..n} (inc = operating income; exp = operating expenses)	$inc(f_i)/exp(f_i)$	For all i, j in [1..n]: $inc(f_i)/exp(f_i) \cong inc(f_j)/exp(f_j)$
C1	Inclusion	be accessible for all citizens of the community, via their preferred channel (visit, internet, mobile phone,...)	percentage of citizens served	100 %
C2	Attractiveness	have a media offer that caters to all groups in the community, such that a higher consumption of the media is afforded for a lower cost to the member	average member budget leverage	factor 5 for 10% of budget
C3	Satisfaction	overall satisfaction of the customer with the services and the media offer by the library	answers to a set of Lickert type & open questions	average 4 out of 5 for 80% of the questions
I1	Efficiency	reducing the system time for all operations in the library, e.g. the lending out of books, the handling of reservations, the handling of lending period extensions,...	per operation, the average system time	(benchmark with other libraries): for each operation, deviate <10% from average
I2	Evaluation & Monitoring	ensure a periodic evaluation and monitoring of the operations, and feedback performance data to the suitable stakeholders	performance per period/operation / stakeholder	per month for internal stakeholder for 3 core processes
L1	Service Extension	Extend services (new media, new titles for the different media, new channels,..)	for different kinds: nr/per period	(benchmark with other libraries): for some kinds, score high; for others: average
L2	Satisfaction Survey Update	Periodic update of the survey (e.g. on the basis of answers to open questions, see I2)	question refresh rate	20% per quarter

Table 8.1: Library scorecard

In the Nr. column these abbreviations are used for the objectives: F: Financial; I: Internal

business processes; C: Customers; and L: Learning and growth.

To the case overview - To the chapter

8.13 - Identification and Validation at a Petrol Station

Problem Formulation

The decision frame is:

- Objective: minimal number of customers driving on because there is no place in the queue area;
- Performance indicator: number of customers driving on without being served;
- Decision variable: the length of the queue area.

Assumptions that may need attention when agreeing the problem formulation include:

- customers will not get fed up with waiting, for instance in a long queue
- all customers that enter the queue will wait until they have been serviced
- sales revenue will be higher when less customers drive on

There is no data about the cost of enlarging the queue area, nor about the revenue increases that could be gained.

Research Questions

1. What is in the current situation the percentage of people that leave without being served?
2. What is the average waiting time of served customers for different capacities of the queue area?
3. What is the influence of the queue capacity on the percentage of cars leaving without being served?

Scope and Level of Detail

The pumps with service start and service end events.

The queue area with arrival, departure, and service start events.

The cars with the events matching the queue area and pump events.

The decision of the car to drive on when it finds the queue area full.

To the case overview - To the chapter

8.14 - Identification and Validation at the Harbour

Problem Formulation

The decision frame is:

- Objective: reduce mean expected throughput time
- Performance indicator: mean expected throughput time;
- Decision variable: queueing discipline; resource allocation strategy

The problem is to evaluate the impact of the decision options on the mean expected throughput time.

Research Questions

1. Does closing Dock1 to Big Ships and Dock2 to Small Ships improve the mean expected throughput time of ships at the harbour?
2. Is it better to use FIFO rule instead of SPT rule?

Scope and Level of Detail

The docks with service start and service end events.

The queue with arrival, change queue and service start events.

The ships with the events matching the queue and dock events.

To the case overview - To the chapter

Chapter 9 - Research & Leverage in the Technotope

9.1 - Identifying external experiences
9.2 - Open portfolios as external experiences
9.3 - Scope and variables in Programs
9.4 - Scope and variables in Projects
9.5 - Scope and variables in Iterations
9.6 - #CPIM02a in Case 1 - 2030 Agenda
9.7 - #CPIM02a in Case 2 - Library services
9.8 - #CPIM02a in Case 3 - The Petrol Station Case
9.9 - #CPIM02a in Case 4 - The Harbour Case

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

Introduction

The activity black box and assumptions must be expressed. In most cases it is necessary to also list the decision options that will be evaluated (number of models and the techniques used to evaluate them). A decision tree is used to organize all the decision options and their order. If modeling or simulation is required, a modeling or simulation tool must be selected as well.

9.1 - Identifying external experiences for a work system

Given a problem formulation by means of a decision framework, and in reference to a results framework, the next step is to clarify the scope of the work system using a black box notation, and assumptions.

Black Box and Assumptions

To simulate the system we need input variables. There are two types of input variables:

- Environmental variables: Variables we can't modify and that are a result of the environment of the system.
- Control variables: Variables we can control or change.

Using these variables, the running simulation and the behaviour of the system can be analyzed considering the output variables.

In this step, the problem and objectives of the decision making engagement are formulated as concretely as possible. The desired reliability and accuracy of the decision making engagement results should also be defined here.

- Reliability is the confidence level at which the results should be displayed. Example: we would like to obtain the average throughput time with a confidence level of 95%.
- Accuracy is the number of decimals at which we would like to display the results. Example: for time measures, we need to know if results will be displayed in hours, minutes, seconds, etc.

These steps must be performed:

- Determine the environmental, control and output variables of a system in its black box representation (Figure 9.1).
- List and finalize the assumptions. Which components of the real system will be excluded, included as a black box, included in moderate detail, or included in fine details is decided at this step.

It is important to keep a formal list of assumptions throughout the study, starting at the design phase, since the scope of work and the micro level assumptions to be made in model building will depend on them. These assumptions should be kept in mind all through the process and included in the final report. A trap which many modellers may fall into is waiting until the end of the study to record their assumptions; by then, they may have forgotten many of them and wasted a lot of time in inadvertently changing the scope of work throughout the process.

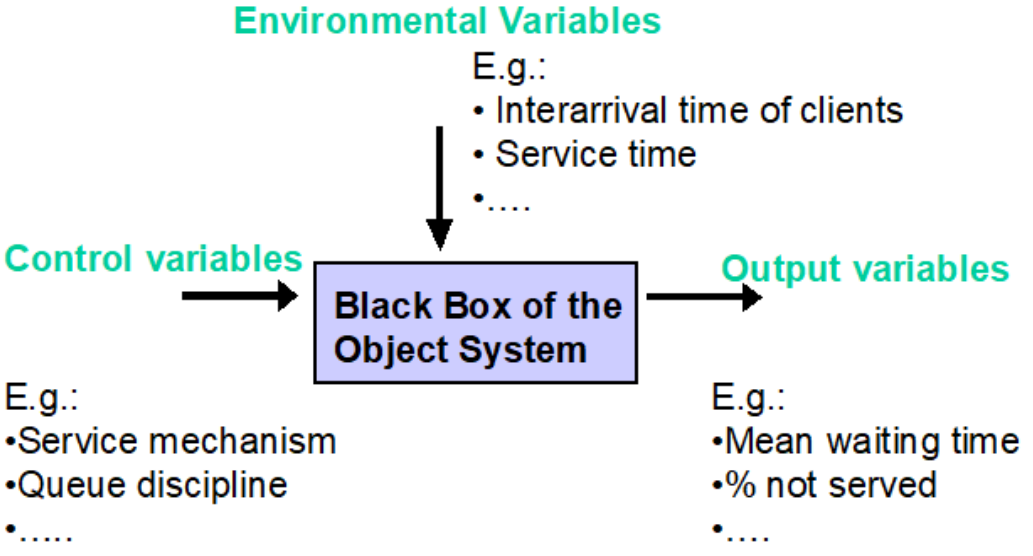

Figure 9.1: The Black Box Notation

Regulative Cycle extended with Reference Models

The research & leverage is focussed at improving a work system under consideration.

Where research should lead to problem-solving or practical interventions (Goossenaerts et al., 2007), there is often a need for the process of multi-methodology, that is, combining together several methods in an intervention (Mingers, 2003). Originating in psychological practice, the regulative cycle (Van Strien, 1997) has been extensively applied also as a methodology of practice, geared towards the "interested" regulation of the behaviour of groups or organizations in the desired direction. Where principals are engaged with the operations and improvement of a work system such as a plant, a hospital or a service system, the cycle includes the following activities:

- evaluation (of system operations with respect to an instrument or via benchmarking),
- problem identification (selection from a problem mess),
- diagnosis (of the problem situation – analysis),
- plan of action (design), and
- intervention (implementation).

This last step is again followed by evaluation to close the cycle.

In the evaluation activity it is convenient to have an instrument to compare the performance or structure of the work system. The reference fab methodology (Plieninger et al., 2001) uses a reference model for systematic target setting on high level performance indicators.

The model obtained from peer intelligence is translated into a site specific reference model with targets for the actual site work system. The translation considers factor costs, volumes and complexity of technologies.

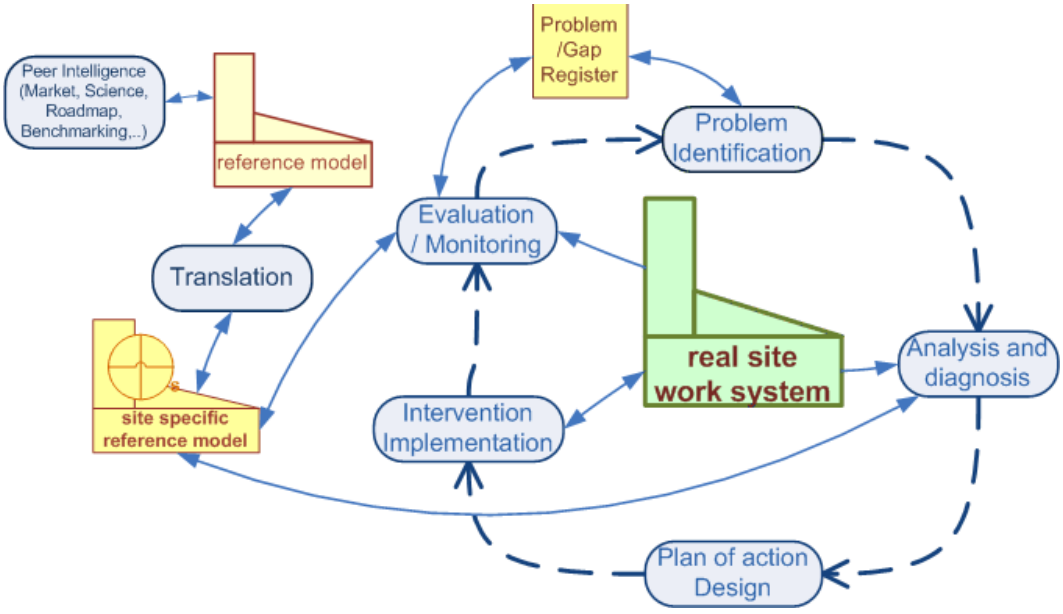

Figure 9.2: Regulative cycle extended with Reference Models (Goossenaerts et al., 2007)

Where open portfolios, programs and projects involve digital components, some form of concertation of the regulative cycles is recommended. Model-based analysis and development (Berre et al, 2004-2007) and the sharing model repositories can help reduce common project risks (Goossenaerts, 2004). Where a trend to many-to-many relationships is observed (Elgarah et al, 2005), lock-in strategies by software vendors, and free-rider attitudes and prisoner's dilemma by OEM and their customers may delay achieving solution flexibility, perpetual service-IT alignment, as well as affordable development and implementation costs. A complicating factor in deciding on investments in the digitally enabled constellations is the imitable nature of the standards, architectures, contracts and services that must be deployed. In economic theory, the relevant game is the public good game, a multi-player variant of the prisoner's dilemma (Fehr and Schmidt, 1999).

In an open portfolio, the purpose of this step is to identify external organizations and service providers that may have already met, or are currently facing needs similar to the ones identified in #CPIM01 - Identify and validate, and then to analyse their experiences and results to determine if they can be applied and leveraged or if a partnership can be formed to address the needs together.

In alignment with "Shared First" principle, it is at this point that the planners consult both internal and external service catalogues for pre-existing services that are relevant to the current needs. In some instances, an entire business model, policy, technology solution, or

service may be reusable to address the needs defined in #CPIM01 - Identify and validate – an important benefit in these cost-constrained, quickly evolving times.

Based on this analysis, leadership and stakeholders determine whether or not they will be able to leverage the experiences and results from other organizations in their projects, programs or portfolios.

9.2 - Open Portfolios as external experiences

The 2030 Agenda for Sustainable Development - #SDGs

The 2030 Agenda decision framework and related performances are to serve as catalyst for sharing experiences and results among diverse partners.

In a sense they provide a decision framework.

Consider a current need, expressed as a gap with respect to a sustainable development goal or target for the system's outcome.

When allocating the goals to sectors of industry and functions of government, and comparing performances of thoses sectors and functions in other countries or constellations with those of the problem owner, options for leveraging those experiences would often exist.

One way of describing the decision variables is via variations in the production and consumption of products and services, as classified in the Central Product Classification (CPC)[98], and as produced and delivered by:

- the economic activities as classified in the International Standard Industrial Classification of All Economic Activities, Rev.4[99] and
- the functions of government as classified in the Classification of the Functions of Government (COFOG)[100].

A myriad of problem statements can be created using this generic decision frame, and both government agencies and private sector players can launch portfolios, programs, projects and iterations to solve the problems.

Each interested party can activily work at one or a few problems, while ensuring that effort is wisely divided over a feasible range of programs, projects and iterations for a selection of

[98] http://www.ens.wiki/item:hashtag-cpc
[99] http://www.ens.wiki/item:hashtag-isic
[100] http://www.ens.wiki/item:hashtag-cofog

economic activities and functions of government such that “landscape wide” progress can be guaranteed.

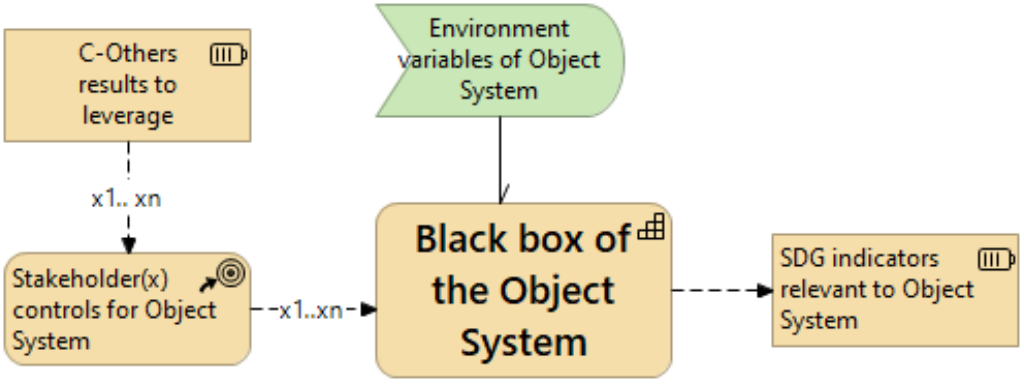

Figure 9.3: The black box of the 2030 Agenda

Figure 9.3 shows the black box of the 2030 Agenda.

The 2030 Agenda for sustainable development faces at least these three systemic challenges, for which the OECD has proposed Principles on Effective Public Investment across Levels of Government[101]:

- Co-ordination across governments and policy areas
  - 01 - Adopt an integrated, place-specific strategy
  - 02 - Co-ordinate across sub-national and national levels
  - 03 - Invest at the relevant scale
- The strengthening of capacities for public investment and the promotion of learning
  - 04 - Understand impacts and risks
  - 05 - Engage stakeholders at every step
  - 06 - Include private actors and institutions
  - 07 - Build expertise in local partners
  - 08 - Focus on results, capture lessons from experience
- Ensure sound framework conditions at all levels of governments
  - 09 - Develop a fiscal framework aligned with objectives
  - 10 - Insist on sound, transparent financial management
  - 11 - Promote strategic use of public procurement

[101] https://www.oecd.org/effective-public-investment-toolkit/theprinciples.htm

– 12 - Strive for consistent, quality regulation

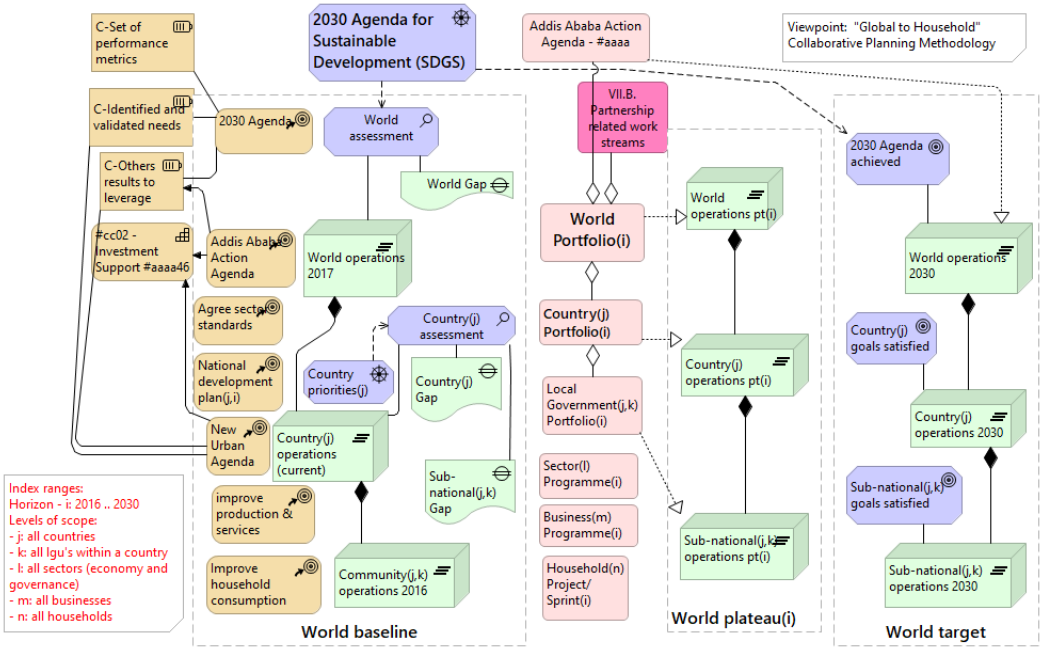

Figure 9.4: Trickle down from open portfolio to programs, projects and iterations

The key open portfolio problem is to convince all the interested parties in investing towards the objectives of the 2030 Agenda.

EDIFACT

To enhance and facilitate international trade UN/CEFACT addresses these topics:

- Code List Recommendations[102]: Codified information is an integral part of data exchange in international business whether this is on paper documents or electronic data exchange. The United Nations Economic Commission for Europe (UNECE), through its UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) develops, maintains and publishes for free of charge a number of code lists used extensively in business transactions.

[102] https://unece.org/trade/uncefact/cl-recommendations

- Standards[103] ranging from general, supply chain management and transport and logistics to environment and covering sectors such as Agriculture, Travel and Tourism and Accounting and Audit. Key standards include:
  - UN/LOCODE[104]: The "United Nations Code for Trade and Transport Locations" is commonly more known as "UN/LOCODE". Currently, UN/LOCODE includes over 103,034 locations in 249 countries and territories. UN/LOCODE is used by most major shipping companies, by freight forwarders and in the manufacturing industry around the world. It is also applied by national governments and in trade related activities, such as statistics where it is used by the European Union, by the UPU for certain postal services, etc.
  - UN/EDIFACT[105]: The United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) comprise a set of internationally agreed standards, directories, and guidelines for the electronic interchange of structured data, between independent computerized information systems.
  - BSP-RDM: The objective of this Buy-Ship-Pay Reference Data Model (BSP-RDM) is to describe the requirements for a generic Reference Data Model (RDM), generalizing the concepts of the Multi-Modal Transport Reference Data Model (MMT-RDM) and the Supply Chain Reference Data Model (SCRDM), leading to the development,publishing and improving the maintenance of a Business Standard, which can be applied by country and regional administrations and industries.

[103] https://unece.org/trade/uncefact/mainstandards
[104] https://unece.org/trade/uncefact/unlocode
[105] https://unece.org/trade/uncefact/introducing-unedifact

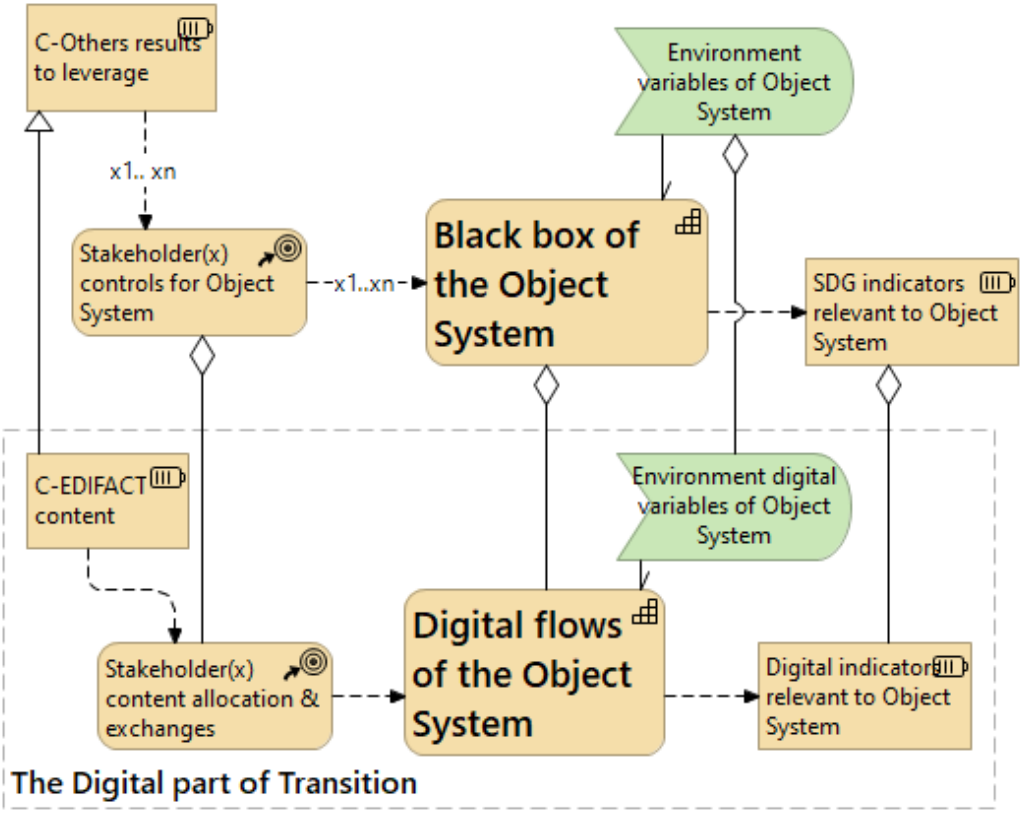

Figure 9.5: The black box of the UN/CEFACT standards

To the chapter

9.3 - Scope and variables in programs

Limit to programs that are aware of open portfolio and intend to maximally re-use the resources provided (ref. Figure 9.3, 9.4 and 9.5):

- by including objectives and indicators in their decision frames;
- by adopting the standards in their analysis and solution design.

- ....

To the chapter

9.4 - Scope and Variables in Projects

To the chapter

9.5 - Scope and Variables in Iterations

To the chapter

9.6 - Scope and Variables in the 2030 Agenda

To the case overview - To the chapter

9.7 - Scope and Variables of Library Services

A library is a large collection of books, and can refer to the place in which the collection is housed. Today, the term can refer to any collection, including digital sources, resources, and services. The collections can be of print, audio, and visual materials in numerous formats, including maps, prints, documents, microform (microfilm/microfiche), CDs, cassettes, videotapes, DVDs, video games, e-books, audiobooks and many other electronic resources.

In the International Standard Industrial Classification of All Economic Activities, Rev.4 the activities of libraries are included in #isic9101 - Library and archives activities, and include:

- documentation and information activities of libraries of all kinds, reading, listening and viewing rooms, public archives providing service to the general public or to a special clientele, such as students, scientists, staff, members as well as operation of government archives:
  - organization of a collection, whether specialized or not
  - cataloguing collections
  - lending and storage of books, maps, periodicals, films, records, tapes, works of art etc.
  - retrieval activities in order to comply with information requests etc.
- stock photo libraries and services

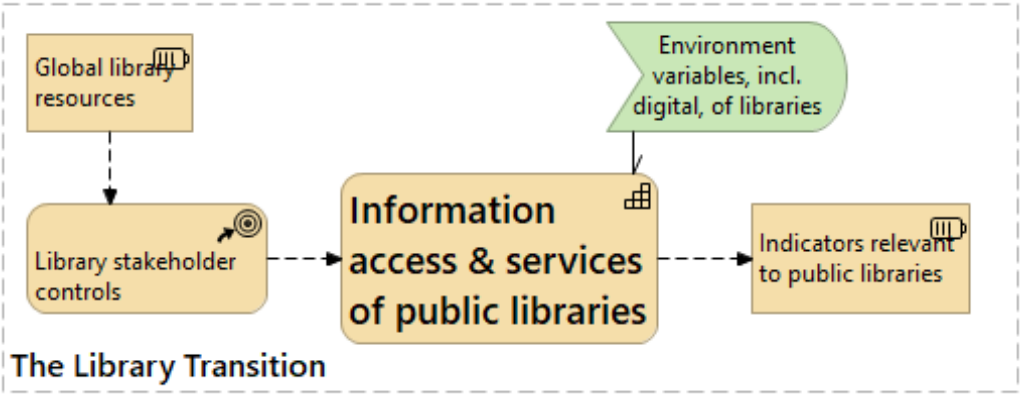

Figure 9.6: The black box of Library Services

The work system pattern in Figure 9.7 illustrates the wide range of control and environmental variables and indicators that may be considered in the transition of public library services.

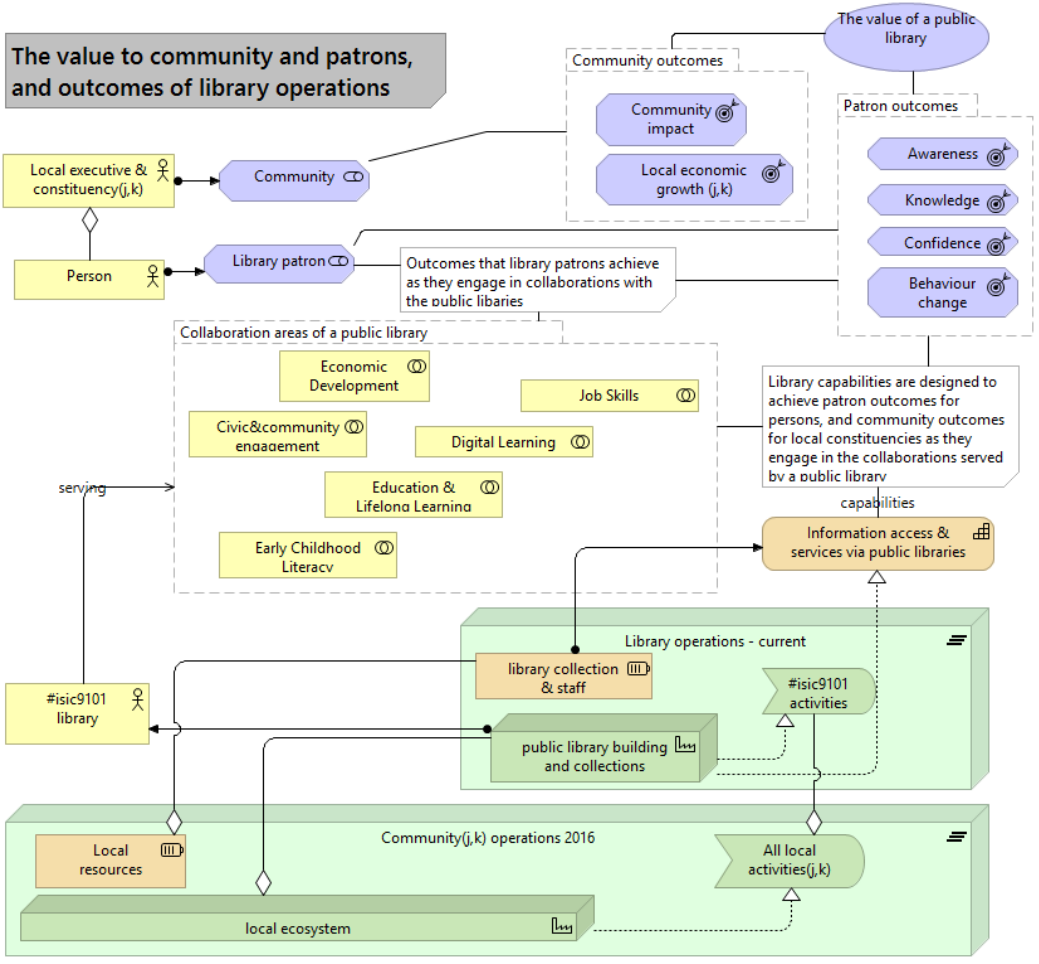

Figure 9.7: The black box of Library Services

To the case overview - To the chapter

9.8 - Scope and Variables in the Petrol Station Case

In this case, we assume no external experiences can be relied upon. We follow the steps explained in chapter 9.1.

The Black Box Representation

The input variables are:

- Environmental variables:
  - the interarrival time of cars
  - the service time of cars
- Control variables:
  - the queue length
  - (the number of pumps)

The output variables are:

- the percentage of cars not served
- the mean waiting time

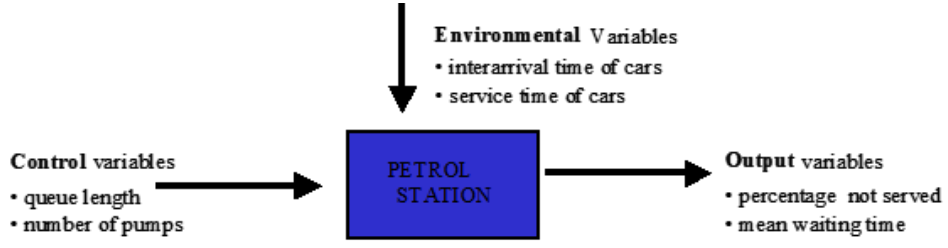

Figure 9.8: Black-Box representation of the Petrol station example

Assumptions and Givens

No data collection is required, as some information is given on the interarrival times and service times.

G1. the interarrival time of cars is expo(4)

G2. the service time of cars is uniform(1,6)

A1. the business operates 24 hours per day; 7 days per week

A2. no defects of the pumps occur

List of assumptions must be maintained as the study (and the Modeling) proceeds, that is why it is convenient to put it in an annex. In real world projects, all assumptions must be approved by the problem owner.

Is Modeling needed?

System:

- Single class system
- No admission control
- One queue (FIFO)
- One server
- in A/B/M/K/N notation: M/G/1/3 system

Are there results available for the M/G/1/3 system? NO!

Can we make any approximation?

Yes: M/M/1/3 system

The Number of Models

There are two models that must be evaluated for the problem owner:

- the current model with queue length 3 (M/G/1/3; by Modeling)
- the situation with longer queue length, e.g. 4, 5 or 6 (M/G/1/4; by Modeling)

In addition, for validating the simulation model, an approximate model will be evaluated by queuing theory, and its results will be compared to a simulation experiment with the same properties.

- the approximate model with queue length 3, and exponentional service times (M/M/1/3; by queuing theory)
- the approximate model with queue length 3, and exponentional service times (M/M/1/3; by Modeling)

To the case overview - To the chapter

9.9 - Scope and Variables in the Harbour Case

In this case, we assume no external experiences can be relied upon. We follow the steps explained in chapter 9.1.

The Black Box Representation

From the objective it is clear that the mean throughput time has to be determined. This is the output variable, which has to be delivered by the observer. In order to deliver this output variable the observer has to record some items within the simulated system.

At the same time attention must be paid to the output variable from the real system: "departing ships". There are two control variables, namely the dock allocation strategy and the queue discipline. The environmental variables are the interarrival time, service time and the size of the ship.

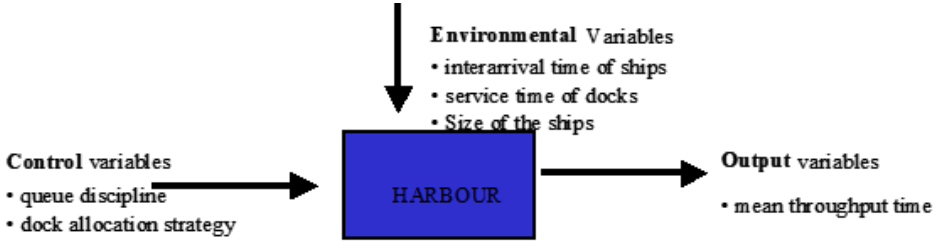

Figure 9.9. The black-box description of the harbour case.

The input variables are:

- Environmental variables:
  - the interarrival time of ships
  - the service time of docks for ships
- Control variables:
  - the queue discipline
  - dock allocation strategy

The output variables are:

- the mean throughput time

Assumptions and Givens

No data collection is required, as some information is given on the interarrival times and service times.

G1 ...Gn: ...

A1. both docks operate 24 hours per day; 7 days per week A2. no maintenance of the docks is required.

List of assumptions must be maintained as the study (and the Modeling) proceeds, that is why it is convenient to put it in an annex.

Is Modeling needed?

Yes, because changing queues cannot be addressed in analytic models.

For validation purposes, and for determining the number of models, lets simplify as follows:

- dock1 closed to Big ships and dock2 closed to Small ships
- Use simply a FIFO rule instead of the SPT rule?

Then we obtain two separate queuing systems at dock 1 and dock 2 that behave like M/G/1 systems:

- Dock 1, with Intearrival times expo(5.5) and Service time time Uniform(3,7)
- Dock 2, with Intearrival times expo(6.7) and Service time Uniform(2,8)

The Number of Models

For the problem owner four models must be evaluated:

- the current situation with both kinds of ships served at both docks and SPT;
- Alternative 1: where ships must be served in the specialized dock, with SPT;
- Alternative 2: where ships must be served in the specialized dock, with FIFO;
- Alternative 3: with both kinds of ships served at both docks and FIFO as queue discipline.

For three of these models (current, Alternative 1 and 3) Modeling is required.

In addition, for validating the simulation model, Alternative 3 will be evaluated by queuing theory, and its results can be compared to a simulation experiment with the same properties.

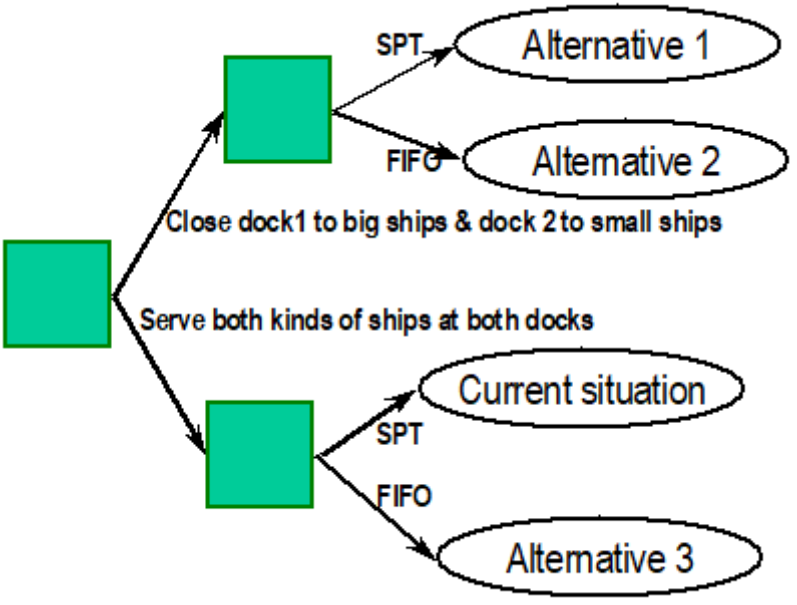

Figure 9.10: The Decision Tree for the Harbour Case

To the case overview - To the chapter

Chapter 10 - Define and plan in the Technotope

This chapter is due for a later version, especially also with reference to portfolio, program, project and iteration definition and planning.

Depending on the level of the defining and planning, at play are a different mix of digital principles (Chapter 4):

- #dp1 - Design with people
- #dp2 - Understand the existing ecosystem
- #dp3 - Design for inclusion
- #dp4 - Build for sustainability
- #dp5 - Establish people-first data practices
- #dp6 - Create open and transparent practices
- #dp7 - re-use and improve
- #dp8 - Anticipate and mitigate harms
- #dp9 - Use evidence to improve outcomes

and capabilities (Chapter 5):

- The Future Ready Capability
- The Investment Support Capability
- The Shared Services Capability
- The Interoperability Standards Capability
- The Information Access Capability
- The Security and Privacy Capability
- The Technology Adoption Capability

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

Chapter 11 - Invest and Execute in the Technotope

This chapter is only an early draft.

11.1 - Joint Implementation by Various Actors and Stakeholders
11.2 - Returns of Collaboration in Portfolios and Programs
11.3 - Returns of Collaboration in the Semiotic CPIM Phases
11.4 - Invest and Execute for the 2030 Agenda for Sustainable Development
11.5 - Invest and Execute for Library Services

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

11.1 - Joint implementation by various actors and stakeholders

In this chapter we describe the tools and resources for implementing the 2030 Agenda for Sustainable Development. In this chapter we elaborate the "Societal Architecture customized views" for each stakeholder group with a focus on the reusable input the Societal Architecture provides for their Invest and Execute activities.

An earlier version of the proposed approach was included in A Multi-level Model-driven Project Environment (MMPE) facilitates systematic society-wide re-use of the architecture descriptions models. Building upon a formal approach to system modeling, we emphasize specific model-resources at different levels and explain their impact on change projects and the risks involved (Goossenaerts et al, 2008).

The elaboration of model dependencies that are cross-phase in the regulative cycle, one such cycle could be the TOGAF Architecture Development Method, cross-level in MLP, and cross-layer in the Enterprise Architecture is an original contribution of our work. The allocation of models to the public and proprietary domains is intended to induce fair and concerted growth-focused attitudes (Goossenaerts, 2007).

Stakeholders to consider:

- Citizens and households
- Global Partnership
- Firms
- National Government
- Local Authorities
- Schools
- UN Country Teams
- Publishers and right holders
- Libraries
- Aid and international organizations

11.2 - Returns of Collaboration in Portfolios and Programs

The need for investment from the global to local macro level is clearly expressed in the finance-related Sustainable Development Targets and article 34 on capacities of the Addis

Ababa Action Agenda.

Finance related Sustainable Development Targets

- 17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection (#sdt171)
- 17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent ODA/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries (#sdt172)
- 17.3 Mobilize additional financial resources for developing countries from multiple sources (#sdt173)
- 17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress (#sdt174)
- 17.5 Adopt and implement investment promotion regimes for least developed countries (#sdt175)

Addis Ababa Action Agenda, Art. 34 "#aaaa34 - Capacities of municipalities and other local authorities"

- We further acknowledge that expenditures and investments in sustainable development are being devolved to the subnational level, which often lacks adequate technical and technological capacity, financing and support (#aaaa34_1)
- We therefore commit to scaling up international cooperation to strengthen capacities of municipalities and other local authorities. We will support cities and local authorities of developing countries, particularly in least developed countries and small island developing States, in implementing resilient and environmentally sound infrastructure, including energy, transport, water and sanitation, and sustainable and resilient buildings using local materials (#aaaa34_2)
- We will strive to support local governments in their efforts to mobilize revenues as appropriate (#aaaa34_3)

- We will enhance inclusive and sustainable urbanization and strengthen economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning, within the context of national sustainable development strategies (#aaaa34_4)
- We will work to strengthen debt management, and where appropriate to establish or strengthen municipal bond markets, to help subnational authorities to finance necessary investments (#aaaa34_5)
- We will also promote lending from financial institutions and development banks, along with risk mitigation mechanisms, such as the Multilateral Investment Guarantee Agency, while managing currency risk (#aaaa34_6)
- In these efforts, we will encourage the participation of local communities in decisions affecting their communities, such as in improving drinking water and sanitation management (#aaaa34_7)
- By 2020, we will increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change and resilience to disasters (#aaaa34_8)
- We will develop and implement holistic disaster risk management at all levels in line with the Sendai Framework (#aaaa34_9)
- In this regard, we will support national and local capacity for prevention, adaptation and mitigation of external shocks and risk management (#aaaa34_10)

Shifting Investments

Considering that in the international development landscape a lot of investments are allocated to (expensive) knowledge work that is focused on the semiotic flows the intended impact of the Societal Architecture is threefold as depicted in Figure 11.1:

- To reduce the cost of semiotic flows;
- To enhance the investment in material solutions; and
- Harness a much wider pool of people and capacities to make sense of the information and contribute to (material) solutions.

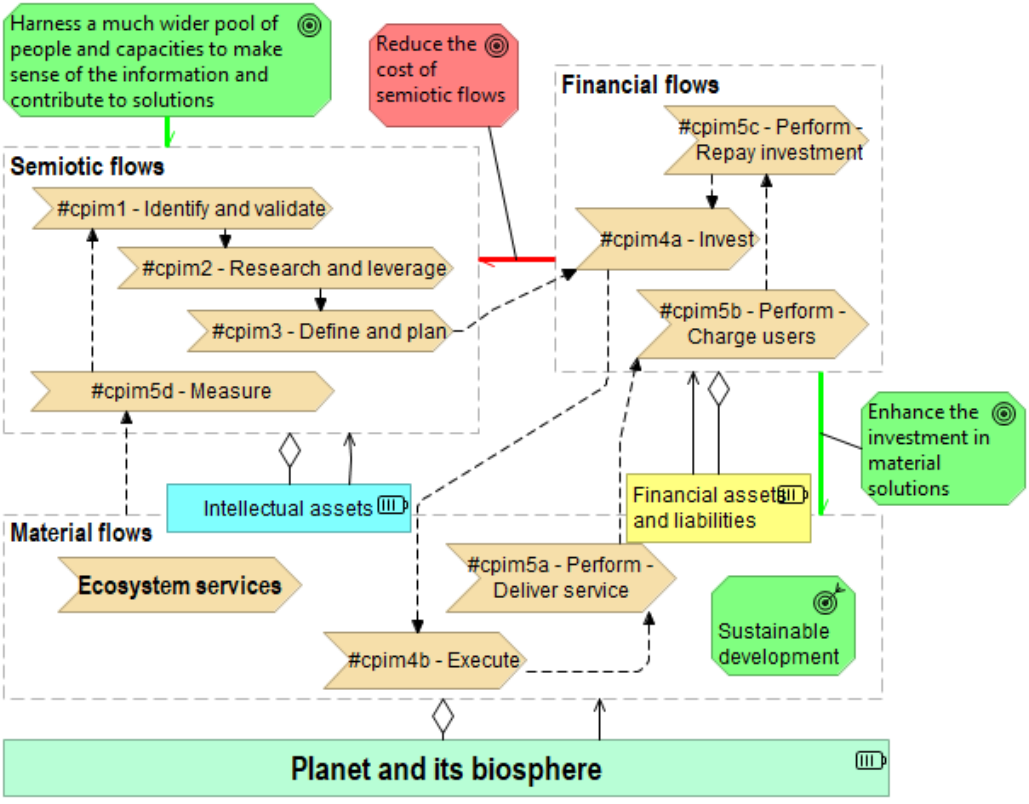

Figure 11.1 - Shifting Investments in Collaborative Planning and Investment

The goal of harnessing a much wider pool of people and capacities to make sense of the information and contribute to (material) solutions is moreover served by #tagcoding and #xy2wiki as depicted in Figure 11.2 that also clarifies the related building up of capabilities.

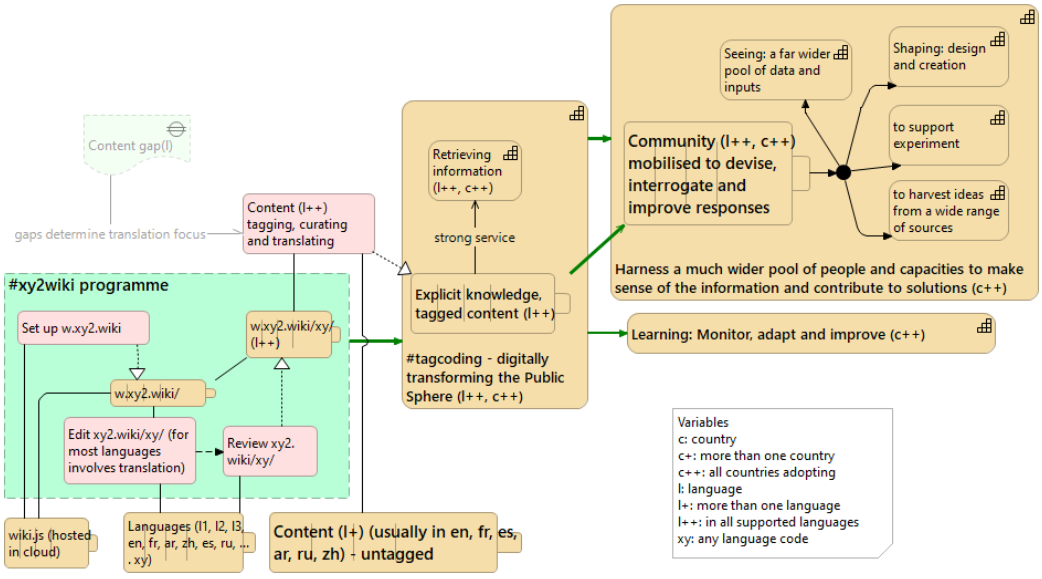

Figure 11.2 - #xy2wiki, #tagcoding and the harnessing of a much wider pool of people and capacities

To the chapter

11.4 - Returns of Collaboration in the Semiotic Phases

For the scope of semiotic phases, see Chapter 4.3 Re-use of Knowledge Assets in Decision Support Studies.

Content in this chapter will be based on Knowledge conversion[106].

- Landscape models for public-private monitoring, review and validation and sectoral partial models that are aligned with the Sustainable Development Goals and open domain models.
- Reduced risks of stranded resources.
- Identifying commonalities across countries, municipalities and languages as illustrated in Invest and Execute for Library Services.

[106] http://www.worx.wiki/knowledge-conversion

11.4 - Invest and Execute for the 2030 Agenda

Content in this chapter will be based on Initiative Management - Use evidence to improve outcomes - #dp9[107]

To the case overview - To the chapter

11.5 - Invest and Execute for Library Services

It is important that each town (k) in each country (j) of the world has a local public library (j,k) journey[108] towards providing #cpc8451 - Library services[109] in the languages spoken in the town.

Each language has an ISO-639 code, and this code is used to distinguish the (online) library activities, for instance *#cpc8451hi* for library services providing content in Hindi.

Depending on the current status of the library services in a language or town, priority initiatives can be selected from below tasks[110]:

- #isic910101 - appoint a librarian for each language or in each town[111]
- #isic910102 - enhance library services in each town[112]
- #isic910103 - integrate the world's online collection in the local library[113]
- #isic910104 - ensure local content is discoverable in the world's online collection[114]

Google Translate[115] is an important enabler for the integration of the world's online collection in local libraries. The languages that are supported in Google Translate are

[107] http://www.worx.wiki/initiative-management
[108] http://www.wikinetix.com/lib:isic9101jk
[109] http://www.ens.wiki/cpc:8451
[110] http://www.wikinetix.com/lib:pi21
[111] http://www.wikinetix.com/lib:isic910101
[112] http://www.wikinetix.com/lib:isic910102
[113] http://www.wikinetix.com/lib:isic910103
[114] http://www.wikinetix.com/lib:isic910104
[115] http://www.ens.wiki/item:google-translate

depicted in Figure 11.3. For each language, the linked page contains information such as the number of speakers and the countries where the language is spoken.

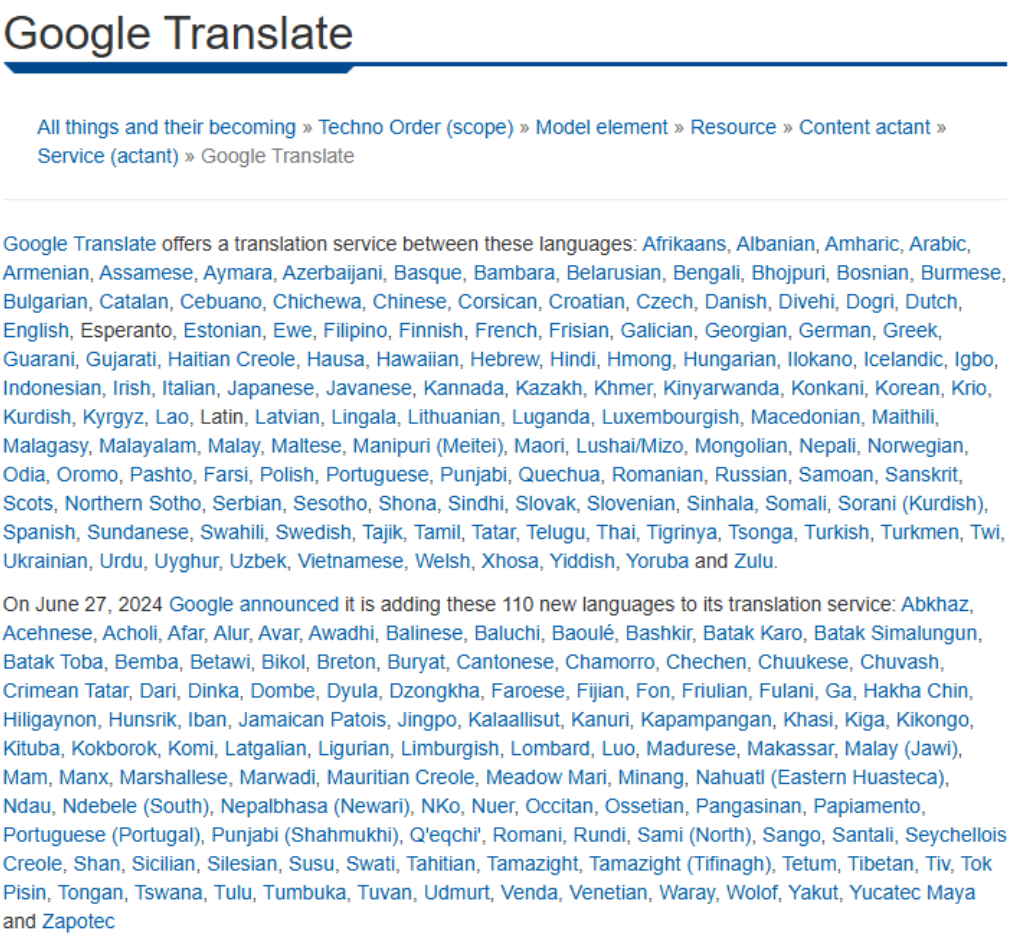

Figure 11.3 - Languages supported by Google Translate

Figure 11.4 shows some constraints for beneficiaries and systems[116] that have to be taken into consideration.

[116] http://www.wikinetix.com/lib:lib03

Budget constraints are most severe for people living in poverty, for poor communities and for the world's poorest countries.

<< #lib03 - Constraints for beneficiaries and systems >>

In below table we explore to what extent budget constraints will be hurdles for performing the #isic9101jk - the local public library journey.

#isic910101 - appoint a librarian for each language or in each town	It is very likely that a town without a library also doesn't have a budget to pay a librarian, even a part-time librarian. In this case it is recommended that a volunteer is appointed. Another option is that a librarian is appointed for several towns, and pays weekly visits to all towns where he or she is appointed. As travel and a considerable period of time may be involved, this option is less suitable for volunteer librarians.
#isic910102 - enhance library services in each town	In poor communities, library services demand a minimum of physical facilities. For instance print books, internet connectivity, devices for accessing online content. (Check #SDT09c - significantly increase access to ICT and strive to provide universal & affordable access to internet in LDCs for the evolving status regarding access to mobile internet.) In some cases a mobile library might offer a cost effective solution for a district or region. Also other options for "rural access to online content" exist, such as the 'Info ladies' who go biking to bring remote Bangladeshi villages online.
#isic910103 - integrate the world's online collection in the local library	Once an affordable access to the internet can be established, the world wide web brings a enormous content collection within reach of the internet users. Some considerations: • For users in developing countries, it is not evident to discover content that is relevant for their livelihood challenges. One reason could be it is not in the right language, another that it is too complex. • Content that requires low bandwidth use will be cheaper to access, and reduce the risk of the network being the bottleneck, than high volume content. • The lack of content in local languages is a reason why the added value of internet access is less in developing countries. In this case, we speak of a **cost-benefit constraint** in stead of a *budget constraint*.

Figure 11.4 - Budget and cost-benefit constraints for xy2jk library services

To the case overview - To the chapter

Chapter 12 - Perform and Measure in the Technotope

This chapter must still be written. This area of work is well covered in operations management and by the work of international organizations and national statistics organizations.

Emphasis on general Principles for collaborative performance and measurement in the 2030 Agenda Partnership and the role of National Statistics Organizations.

12.1 - Performance and Joint Measurement for the various Actors and Stakeholders
12.2 - Returns of Collaboration in Operations and Measurement
12.3 - Perform and Measure in Open Portfolios
12.4 - Perform and Measure in Programs
12.5 - Perform and Measure in Projects
12.6 - Perform and Measure for the 2030 Agenda
12.7 - Perform and Measure for Library Services

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12.1 - Performance and Joint Measurement for the Various Actors and Stakeholders

In this chapter we describe the "Societal Architecture customized views" for Joint performance and measurement for each stakeholder group with reference to the reusable input the Societal Architecture provided for their Identify and validate, Research and leverage, and Define and plan activities.

An earlier version of the proposed approach was included in A Multi-level Model-driven Project Environment (MMPE) which facilitates systematic society-wide re-use of the architecture descriptions models (Goossenaerts et al., 2009). Building upon a formal approach to domain modeling, we emphasize specific model-resources at different levels and explain their impact on change projects and the risks involved.

The elaboration of model dependencies that are cross-phase in the regulative cycle (van Strien, 1997), one such cycle could be the TOGAF Architecture Development Method, cross-level in multi-level planning, and cross-layer in the Enterprise Architecture is an original contribution of our work. The allocation of models to the public and proprietary domains is intended to induce fair and concerted growth-focused attitudes (Goossenaerts, 2007).

To the chapter

12.2 - Returns of Collaboration in Operations and Measurement

What are the benefits of cross-level collaboration in operations and measurement?

12.3 - Perform and Measure in Open Portfolios

This chapter will source from work on the 2030 Agenda Review Framework[117].

[117] http://www.interaction-dictionary.info/interaction:se-2030agenda-review

The framework defines several types of reviews and building blocks of national reviews:

- Global Review
- #NFUR00 - National follow up and review - #asd79
- #NFUR01 - Preparation of a national SDG Report
- #NFUR02 - Fostering mutual accountability
- #NFUR03 - Coordination and collaboration among government agencies and ministries
- #NFUR04 - Inclusive national policy dialogue
- #NFUR05 - Coordination by the national statistical office
- #NFUR06 - Facilitating comparability
- #NFUR07 - Capacity development
- Regional Review
- Thematic Review
- Voluntary National Review
- Voluntary Stakeholder Reporting - #2030VSR

Figure 12.1 - National follow up and review

12.4 - Perform and Measure in Programs

To the chapter

12.5 - Perform and Measure in Projects

This chapter will source from work on the UN Global Compact Strategy 2021-2023[118] and the UN Global Compact's reporting framework[119].

Over 66,000 *Communications on Progress* (COP) are available from the international Global Compact database[120].

To the chapter

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[118] https://www.unglobalcompact.org/what-is-gc/strategy
[119] https://www.unglobalcompact.org/participation/report
[120] https://www.unglobalcompact.org/participation/report/cop/create-and-submit/active

12.6 - Perform and Measure for the 2030 Agenda

See Perform and Measure in Open Portfolios.

To the case overview - To the chapter

12.7 - Perform and Measure for Library Services

To the case overview - To the chapter

Part IV - Agents and Global Portfolios

Chapter 14 - Agents in a Techno Globe

Chapter 15 - The Global Tax Portfolio

Chapter 16 - The Global Content Portfolio

To Part I - II - III - **IV** - V-Annexes - VI-References

Chapter 14 - Agents

14.1 - Raising Awareness for Sustainable Development
14.2 - About the Agent Template
14.3 - Citizens and Households
14.4 - Global Partnership
14.5 - National Government
14.6 - Local Authorities
14.7 - Schools
14.8 - UN Country Teams
14.9 - Publishers and Right Holders
14.10 - Libraries
14.11 - Aid Organizations
14.12 - Firms

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14.1 - Raising Awareness for Sustainable Development

One of the first concerns in the communication plans of open portfolios and the programmes, projects and iterations they enable is the raising of awareness.

Awareness-raising activities aim to increase the engagement of citizens and local communities in order to promote their sense of ownership of the 2030 Agenda and their participation in the achievement of the SDGs at local level.

The raising of awareness is about:

- letting people know about the existence of the SDGs and its targets,
- empowering people to participate in the achievement in their daily lives of localised targets,
- empowering people to hold to account their governments and businesses for their localised development performance.

The raising of awareness is part of a localization process of taking into account subnational and local contexts in the achievement of the 2030 Agenda. Beyond the awareness the localizing will also involve the setting of local goals and targets, determining the local means of implementation and using indicators to measure and monitor local progress.

Supporting Principles

Awareness-raising campaigns should be carried out at international, national and subnational levels, and those campaigns should be mutually enforcing in order to emphasize local spaces "of everyone" (lifeworlds) as the ultimate sites of delivery and development.

National and subnational governments, civil society organizations, the private sector, academia and individual citizens should all be involved in the end-to-end partner journeys for the local implementation of the SDGs.

Supporting principles (#rio or Digital capability Principles - #dp):

- #rio04 - Environmental protection as integral part[121]: In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

[121] http://www.actor-atlas.info/article:rp4

- #rio06 - Special priority for the least developed, most vulnerable[122]: The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.
- #rio07 - Common but differentiated responsibilities[123]: States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit to sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.
- #rio09 - Cooperate to strengthen endogenous capacity-building[124]: States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.
- #rio10 - Participation of all concerned citizens[125]: Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.
- #rio20 - The full participation of women is essential[126]: Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.
- #rio21 - Mobilize the creativity, ideals and courage of the youth[127]: The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.
- #rio22 - Indigenous people and local communities have a vital role[128]: Indigenous people and their communities and other local communities have a vital role in envi-

[122] http://www.actor-atlas.info/article:rp6
[123] http://www.actor-atlas.info/article:rp7
[124] http://www.actor-atlas.info/article:rp9
[125] http://www.actor-atlas.info/article:rp10
[126] http://www.actor-atlas.info/article:rp20
[127] http://www.actor-atlas.info/article:rp21
[128] http://www.actor-atlas.info/article:rp22

ronmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.
- #dp9 - Use evidence to improve outcomes.

The agent information is shared in a template that is introduced next.

To the chapter

14.2 - About the agent template

In digital media, the agent template would look as in the figure below in which a number of tab-structures contain a large set of content that is consulted and modified as new initiatives develop and deliver.

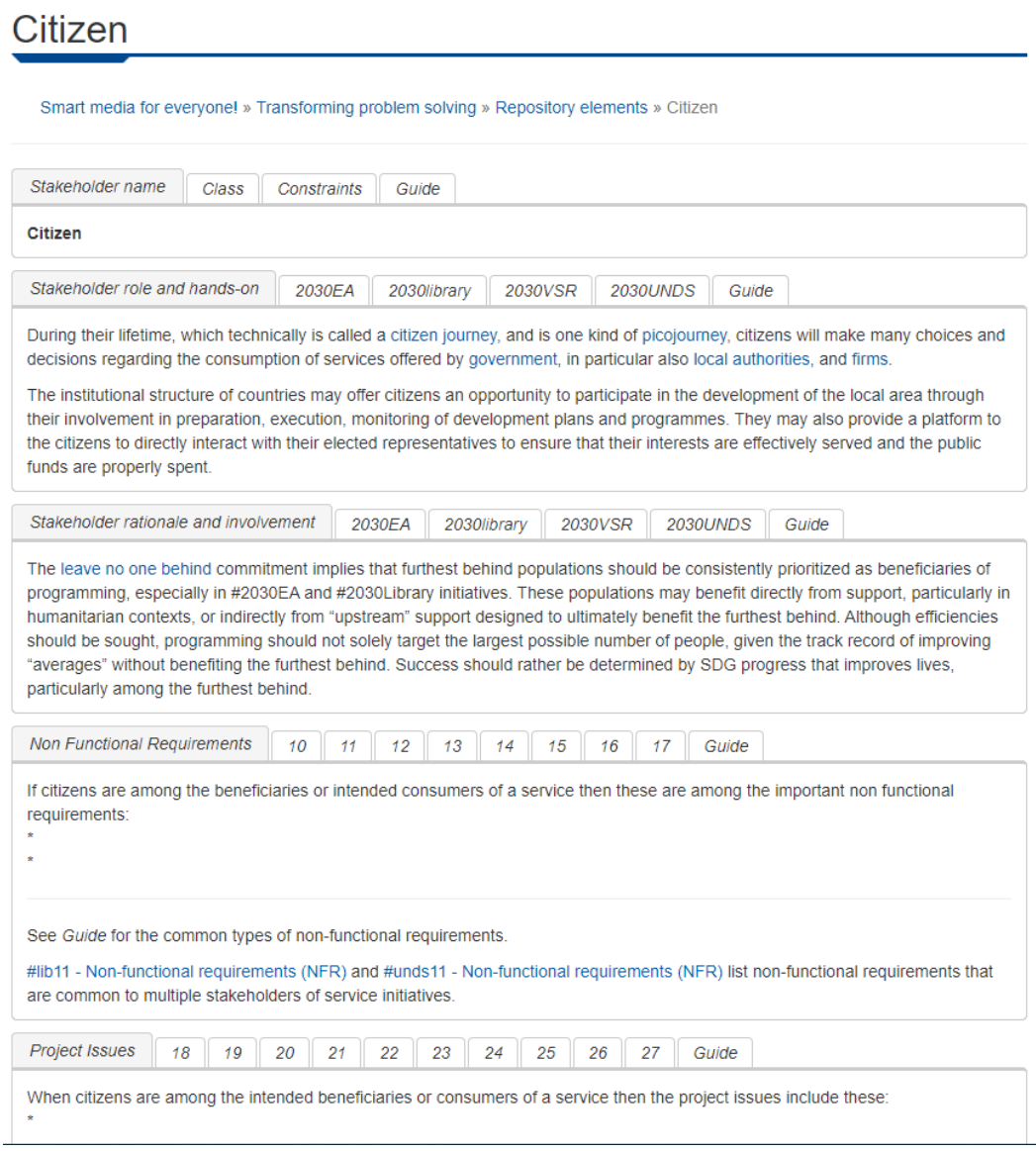

Figure 14.1: The Citizen's agent template wiki-page

Online open shared agent descriptions support the society-wide re-use of the architecture descriptions. Building upon a formal approach to system modeling, we emphasize specific model-resources at different levels and (will) explain their impact on change projects and the risks involved.

Contextual factors

The availability of a **societal architecture** - preferably as part of a society repository[129] - will impact the amount of work that must be invested in extending agent descriptions as a portfolio, programme or project is launched.

In a societal architecture described in accordance with the ArchiMate framework[130]:

- *agents* (for the portfolio that will aim for a service solution) are included in the motivation extension[131]. The rationale for their involvement will often be related to their role in the Business collaboration[132] that must be supported by the service solution;
- *hands-on users* (of the products for which requirements are collected and shared) are addressed as part of the active structure aspect[133]:
  - the Business actor[134] would include the "agent" descriptive elements and Business role[135] would include the "user role".
  - *agents* of agent-class "Interfacing technology" are named application components[136] and are described as part of the framework's Application layer[137]. The rationale for their involvement will often be related to their role in Application collaborations[138] among "services".

To the chapter - to the introduction on agents

14.3 - Citizens and households

For background and examples, see Household journeys for the #SDGs[139].

[129] http://www.ens.wiki/item:repository
[130] http://www.ens.wiki/item:archimate-af
[131] http://www.ens.wiki/item:motivation-extension
[132] http://www.ens.wiki/item:business-collaboration
[133] http://www.ens.wiki/item:active-structure-aspect
[134] http://www.ens.wiki/item:business-actor
[135] http://www.ens.wiki/item:business-role
[136] http://www.ens.wiki/item:application-component
[137] http://www.ens.wiki/item:application-layer
[138] http://www.ens.wiki/item:application-collaboration
[139] http://www.actor-atlas.info/mr-source-6

For innovation matters, see citizen (template)[140].

To the chapter

14.4 - Global Partnership

For background, see Global Partnership[141].

For innovation matters, see Global Partnership (template)[142].

To the chapter - to Joint implementation - to the introduction on agents

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14.5 - National Government

For background, see National government[143].

For innovation matters, see National government[144].

In a contemporary national government one must distinguish different classes of public legal entities in accordance with their leading of governance, management or analysis & design processes.

To the chapter

14.6 - Local Authorities

For background, see Local Authorities[145].

[140] http://www.wikinetix.com/stk:citizen
[141] http://www.actor-atlas.info/role:global-partnership
[142] http://www.wikinetix.com/stk:global-partnership
[143] http://www.actor-atlas.info/role:national-government
[144] http://www.wikinetix.com/stk:national-government
[145] http://www.actor-atlas.info/role:local-authority

For innovation matters, see Local Authorities (template)[146].

To the chapter - to Joint implementation - to the introduction on agents

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14.7 - Schools

For background, see School[147].

For innovation matters, see School (template)[148].

To the chapter

14.8 - UN Country Teams

For background and tasks, see UN Country Team[149].

For innovation matters, see UN Country Team (template)[150].

To the chapter

14.9 - Publishers and right holders

For background, see Reproduction rights organizations[151].

For innovation matters, see Publishers and right holders (template)[152].

To the chapter - to Joint implementation - to the introduction on agents

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[146] http://www.wikinetix.com/stk:local-authority
[147] http://www.actor-atlas.info/role:school
[148] http://www.wikinetix.com/stk:school
[149] http://www.actor-atlas.info/role:unct
[150] http://www.wikinetix.com/stk:unct
[151] http://www.actor-atlas.info/role:rro
[152] http://www.wikinetix.com/stk:publishers-rh

14.10 - Libraries

For background, see Library[153].

For innovation matters, see Towards a #2030library[154] and the global partnership online agent template[155] where Figure 14.2 can be found.

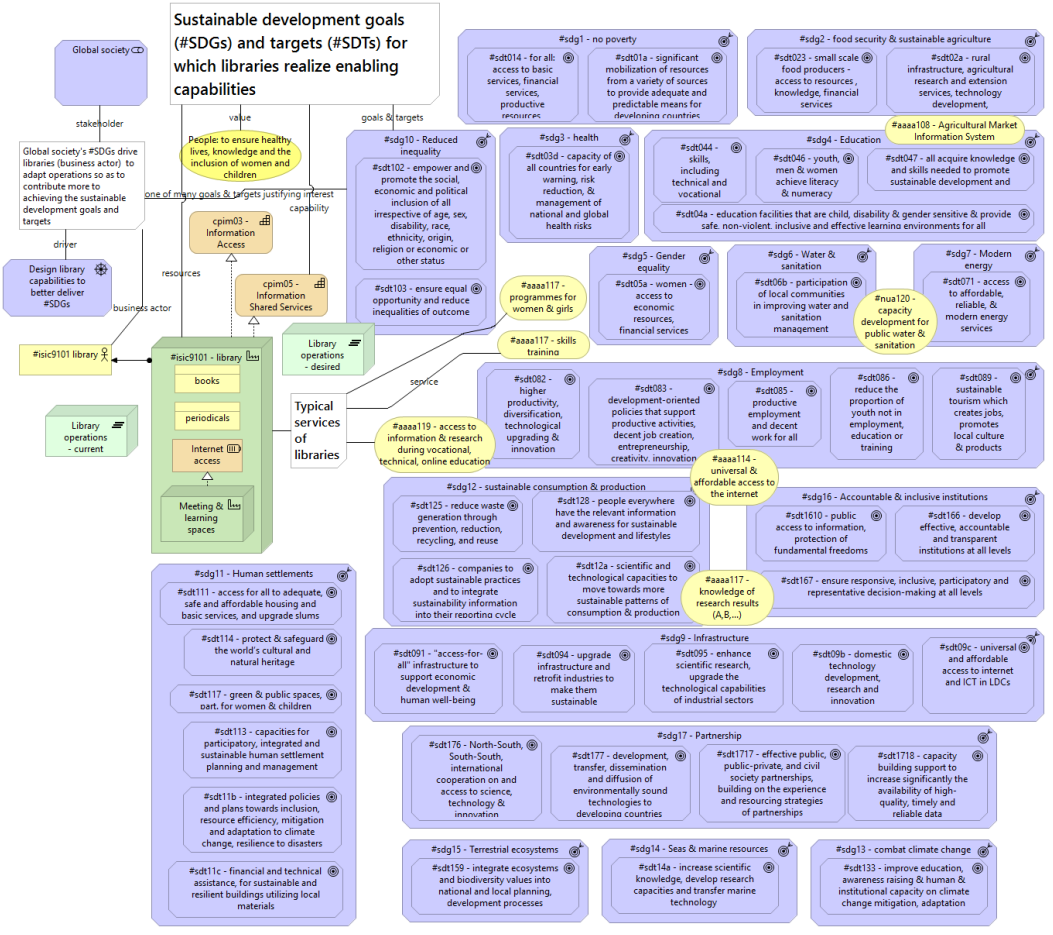

Figure 14.2: Capabilities for the #SDGs enabled by libraries

To the chapter - to Joint implementation - to the introduction on agents

[153] http://www.actor-atlas.info/role:library
[154] http://www.wikinetix.com/lib:2030library
[155] http://wikinetix.wikidot.com/stk:global-partnership

14.11 - Aid and international organizations

For background on International Organizations, see United Nations[156].

For background on aid Organizations, see aid organizations[157].

For innovation matters in international organizations, see Towards an Agenda 2030 United Nations Development System[158] and Figure 14.3.

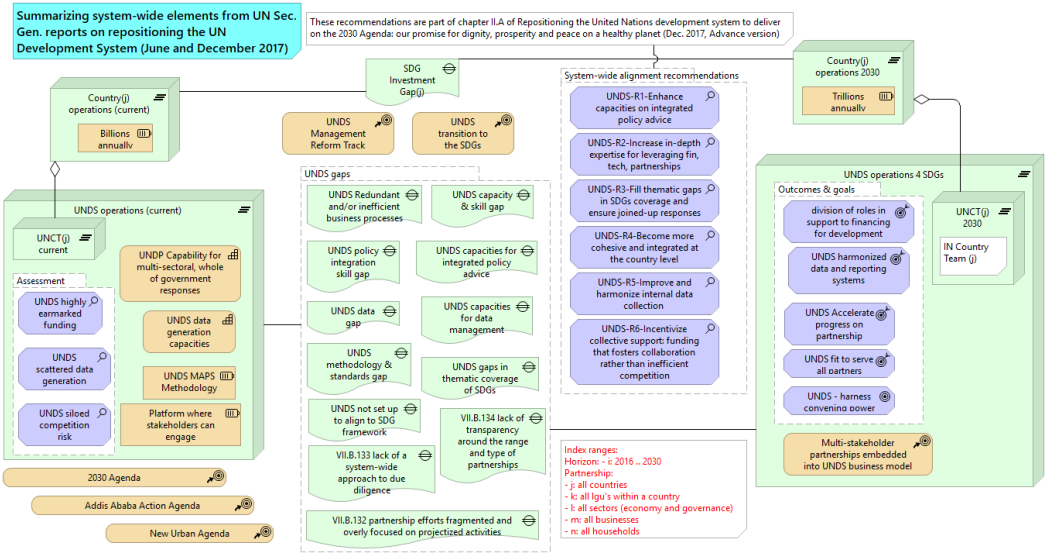

Figure 14.3: Gaps of the United Nations Development System

For innovation matters in aid organizations, see the Aid organization template[159] of which a screenshot is included in figure 14.4.

[156] http://www.actor-atlas.info/map:united-nations
[157] http://www.actor-atlas.info/role:aid-organisation
[158] http://www.wikinetix.com/unds:2030unds
[159] http://www.wikinetix.com/stk:aid-organisation

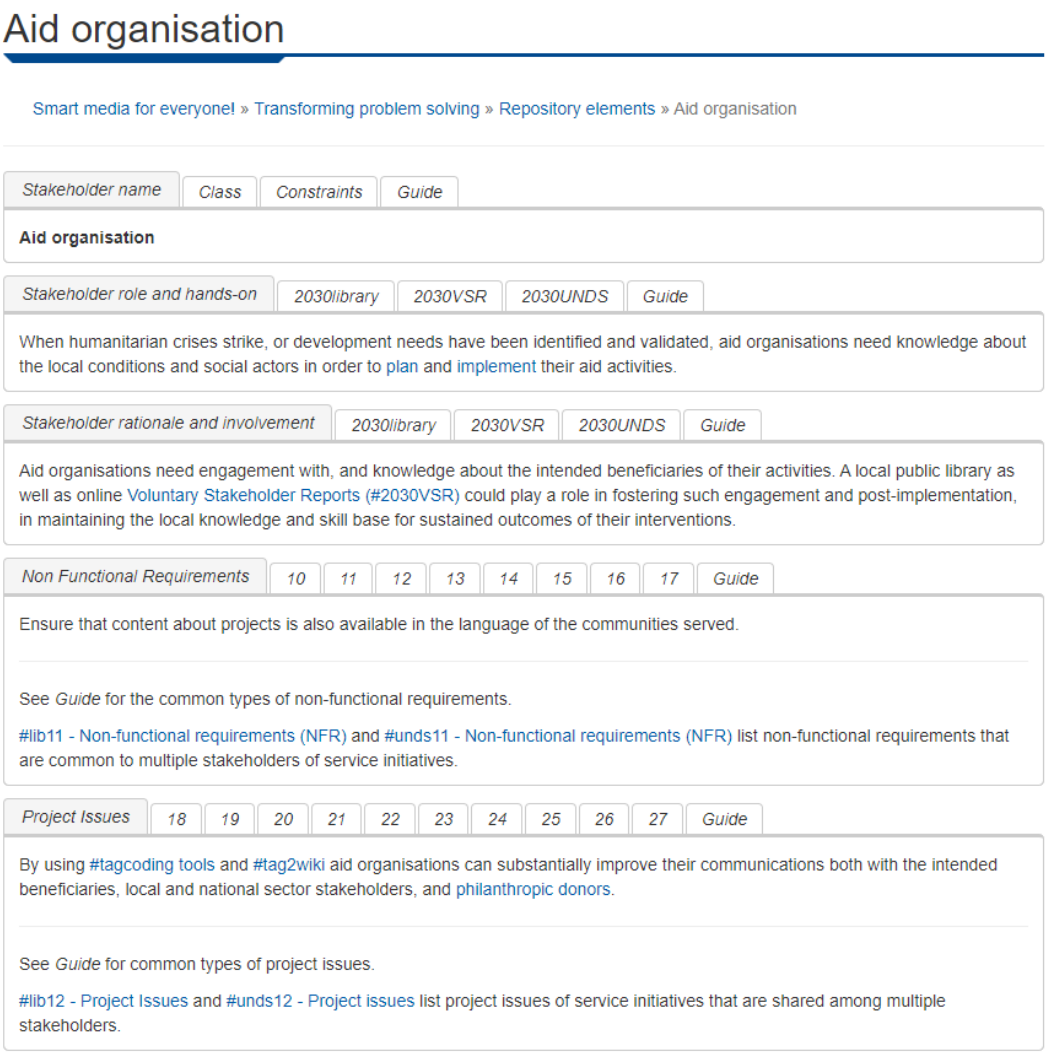

Figure 14.4: The Aid Organization's agent template wiki-page

14.12 - Firms

For background, see Firm[160] and other micro-level entities[161].

For innovation matters, see firm (template)[162].

To the chapter - to Joint implementation - to the introduction on agents

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[160] http://www.actor-atlas.info/map:united-nations
[161] http://www.actor-atlas.info/role-list:micro
[162] http://www.wikinetix.com/stk:firm

Chapter 15 - The Global Tax Portfolio

15.1 - The Purpose of the Portfolio
15.2 - The Stakeholders
15.3 - Mandated Constraints
15.4 - Naming Conventions and Terminology
15.5 - Relevant Facts and Assumptions
15.6 - The Scope of the Work
15.7 - Domain Data Model and Data Dictionary
15.8 - The Scope of the Products
15.9 - Functional Requirements
15.10 - Non-Functional Requirements
15.11 - Portfolio Issues

To Part I (Chapter 1 - 2 - 3 - 4) _ II (5 - 6 - 7) _ III (8 - 9 - 10 - 11 - 12 - (no 13)) _ IV (14 - 15) _ V (Annexes) _ VI (References)

Introductory Remarks

For an ICT initiative of significant size, that seizes all potential benefits of an information exchange architecture (as part of a Societal Architecture) it is recommended that a business requirements document be created as part of the portfolio communications plan.

In this example we apply chapters of the Volère template[163].

Explanations for the completion of each section can be found at the template pages. In this chapter the sections are applied at different levels in the chain from portfolio to program, project or iteration.

The second version of this e-book was published short after the Ad Hoc Committee accepted the draft Terms of Reference for a United Nations Framework Convention on International Tax Cooperation (#UNTaxConvention). For that occassion, I also created the LinkedIn Group Friends of the #UNTaxConvention[164] (by renaming an older group). I hope to raise awareness for the use of societal architecture in the International Tax Cooperation portfolio. The current version of this chapter serves to illustrate the potential of such a portfolio.

15.1 - The Purpose of the Portfolio

- 15.1a - The User Business or Background of the Portfolio Effort
- 15.1b - Goals of the Portfolio
- 15.1c - Goals of a Domestic Tax Administration Program
- 15.1d - Goals of the MNE tax director tax compliance program
- 15.1e - Goals of the MNE branch tax division
- 15.1f - Goals of a business tax division
- 15.1g - Goals of an income tax payer

To the chapter

[163] https://www.volere.org/templates/volere-requirements-specification-template/
[164] https://www.linkedin.com/groups/2358420

15.1a - The User Business and Background of the Portfolio Effort

Inefficiencies in the international tax landscape, dominated by thousands of bilateral treaties, have been described by Thuronyi (2001):

"It has become apparent, however, that the bilateral nature of this treaty network involves inherent flaws which have become more serious as the network has grown. The treaty network has become cumbersome and inflexible and, in many instances, has spawned opportunities for tax avoidance."

The perspective of national tax administrations is covered in great detail in Borja et al (eds, 2020).

Slowly, the international community is adopting multilateral elements in international treaties. One example of these is the Two-Pillar Solution to Address the Tax Challenges of the Digitalisation of the Economy.

These as well as other changes to the international tax landscape over the last ten years, make it timely to consider what implications these developments may have for the way international tax rules are administered by national tax administrations.

While international tax policy design has resulted in many common and co-ordinated rules, the tax administration framework is still more inward looking.

In the international corporate tax landscape there is a need for simple, collaborative, and digital administration of common rules and an international tax information exchange architecture.

National tax administrations and corporations must improve timeliness through real-time data availability and incorporating compliance by design.

The changing tax landscape matters also for developing countries and for the UN initiatives in this area. Witness of this is the recent resolution on the Promotion of inclusive and effective international tax cooperation at the United Nations[165]. The topics of this resolution and the immediate intended deliverable are shown in Figure 15.1.

[165] https://documents-dds-ny.un.org/doc/UNDOC/LTD/N22/697/88/PDF/N2269788.pdf?OpenElement

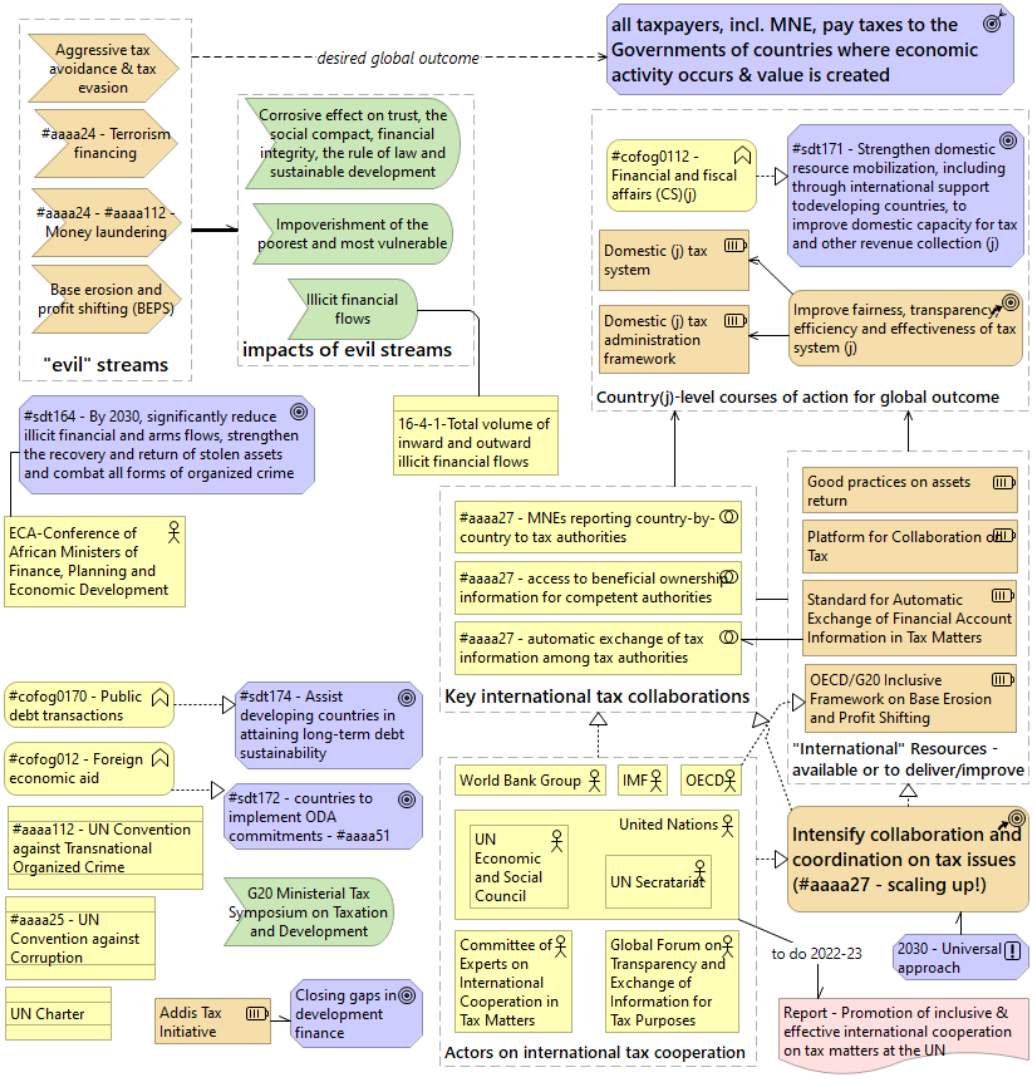

Figure 15.1: Topics in the international tax cooperation resolution

In a report to the G7 Finance Ministers and Central Bank Governors, the OECD (2022) upon request of the German G7 Presidency, has focussed on the further strengthening of international tax-cooperation, and recommendations for further action.

This report aims to assist developing countries in implementing the Two-Pillar Solution and builds upon a set of recommendations from the report Tax Co-operation for the 21st Century,

OECD Report for the G7 Finance Ministers and Central Bank Governors.

Seen from the perspective of the CPIM, the ArchiMate implementation and migration viewpoint may look as in the figure below.

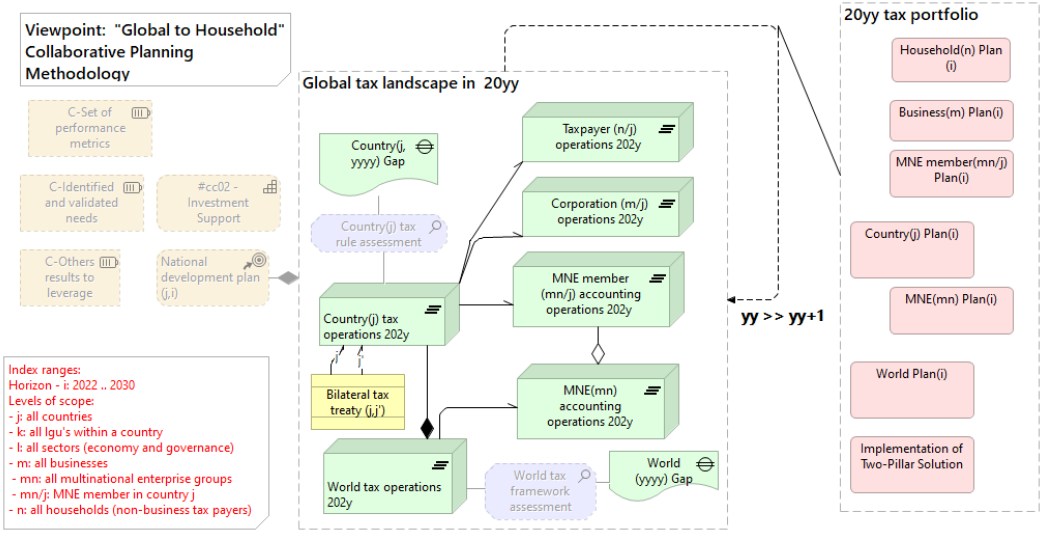

Figure 15.2: The Global tax portfolio

A wide range of taxes exist already as can be seen in enumeration *5153 - Duty or tax or fee type name code* in the next figure.

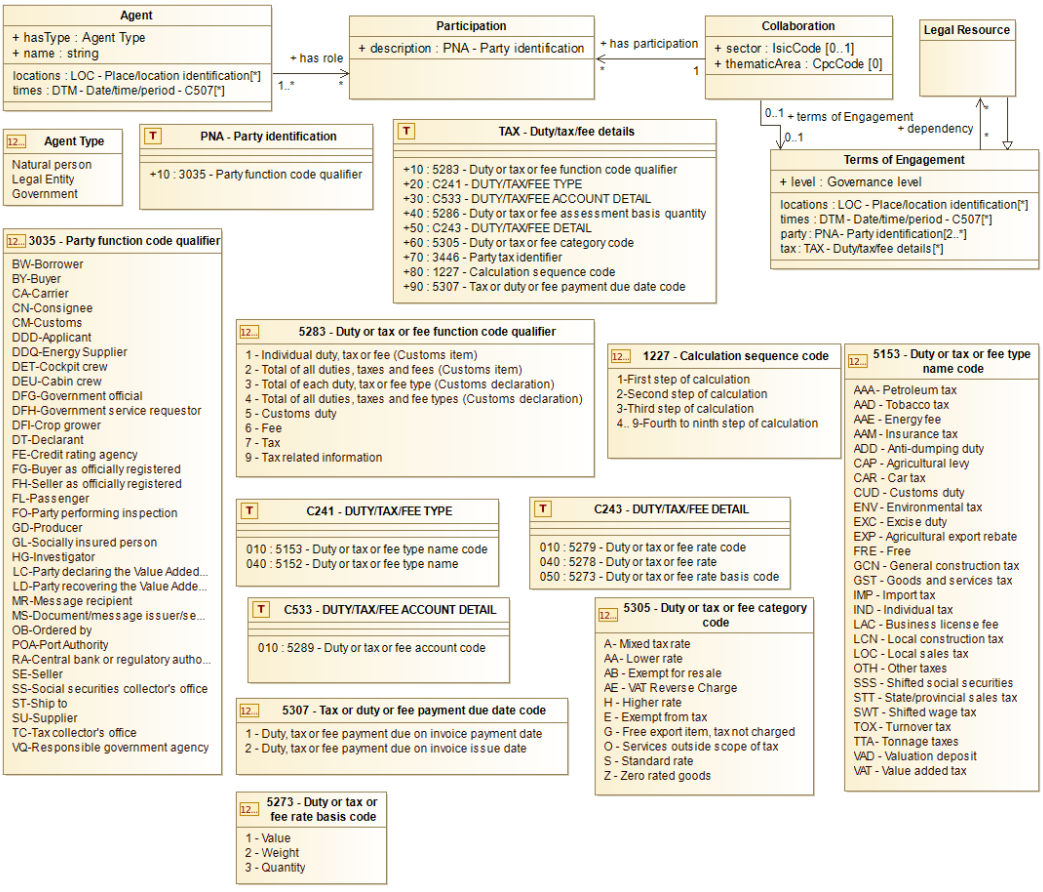

Figure 15.3: The tax landscape as represented using EDIFACT data-elements

The Two-Pillar solution does especially target MNE's, yet we also include other businesses and households in the viewpoint because there are some impacts for them as well. At the same time the approach can be illustrated for all parties, and prepare also for the communication to them.

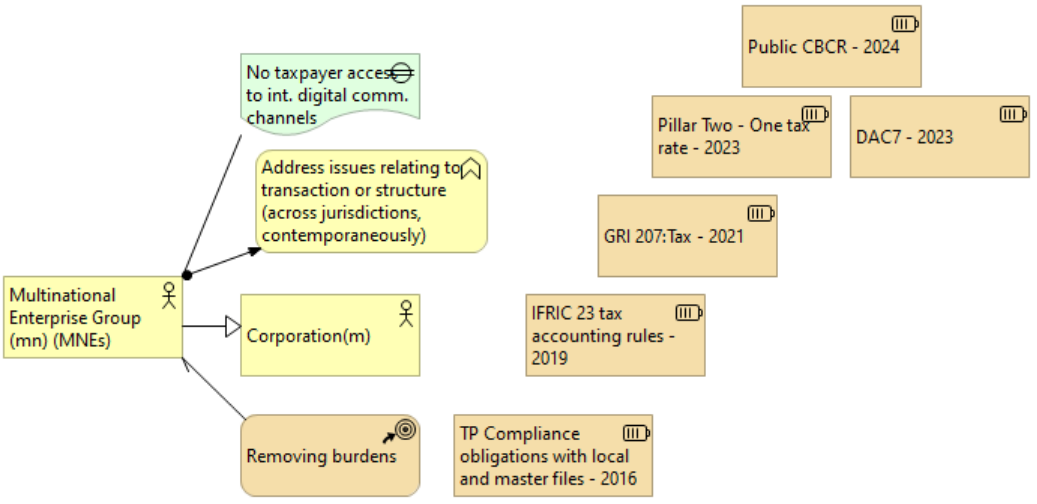

Figure 15.4: Global Tax programs for MNE's

To the section

15.1b - Goals of the Global Tax Steward

The Global Anti-Base Erosion Rules (GloBE) are a key component of a plan to ensure that large multinational enterprise pay a minimum level of tax on the income arising in each of the jurisdictions where they operate.

GloBE can be seen as one program in the global tax portfolio, one that targets at MNE's.

More specifically, the GloBE Rules provide for a co-ordinated system of taxation that imposes a top-up tax on profits arising in a jurisdiction whenever the effective tax rate, determined on a jurisdictional basis, is below the minimum rate.

Broader target: #sdt171

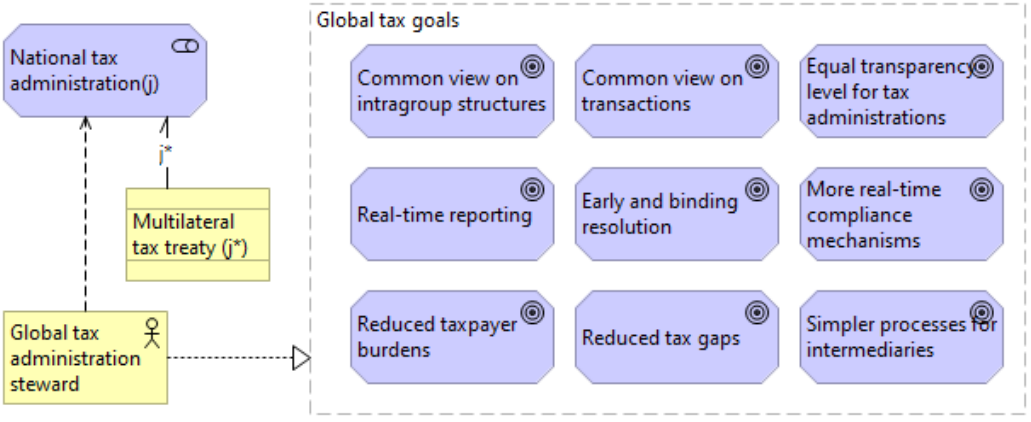

Figure 15.5: Goals of the global tax adminstration steward

To the section

15.1c - Goals of a Domestic Tax Administration Program

Modify the domestic tax rules, filing procedures, systems and processes such that tax administration can fill its role in the Two-Pillar solution and align processes and filing requirements with international resources. Thus making compliance easy and low risk for all taxpayers, from natural persons to MNE's.

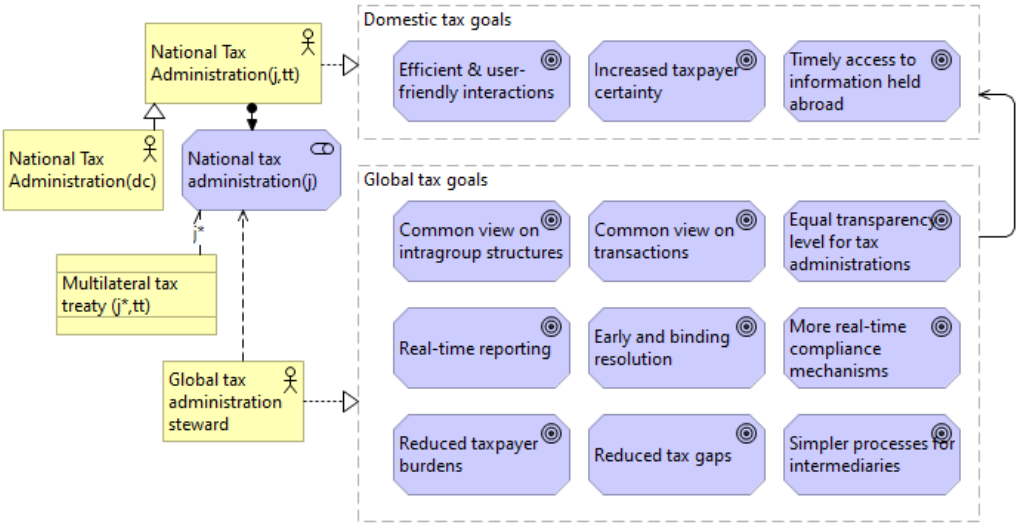

Figure 15.6: Goals of a Domestic Tax Administration

To the section

15.1d - Goals of the MNE tax director tax compliance program

Implement the new rules for compliance with tax rules, filing procedures, systems and processes such that tax administrations of all branches are supported in their tax interactions with the national jurisdictions where they operate, and the mother organization complies with and benefits from international standards in the area.

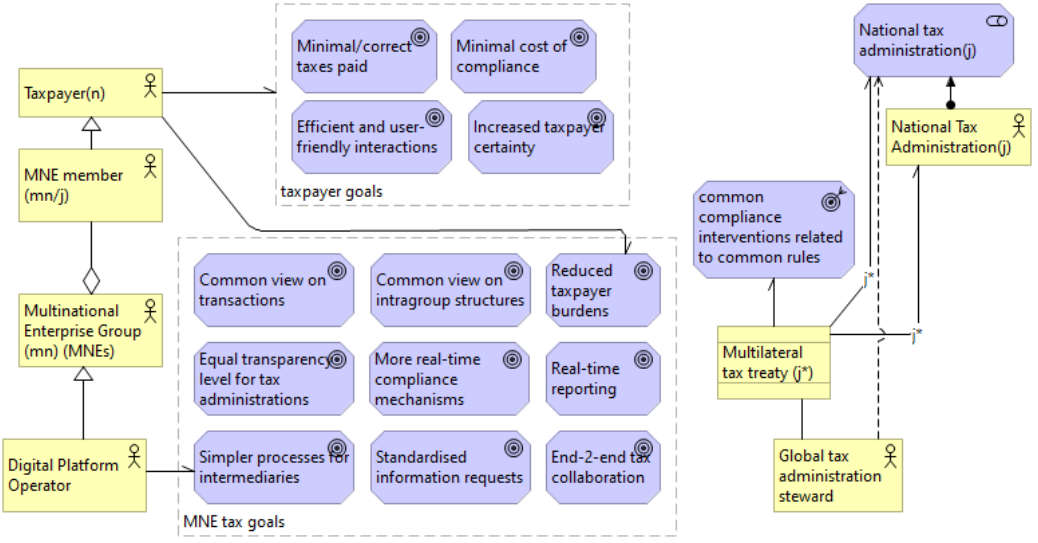

Figure 15.7: Goals of the MNE tax director tax compliance

To the section

15.1e - Goals of the MNE branch tax division

Adapt their processes in support of their tax interactions with the national jurisdictions to the evolving global and domestic tax administration framework. Contribute national reports on transactions and to the MNE tax division.

See also Figure 15.7.

15.1f - Goals of a business tax division

Adapt their processes in support of their tax interactions with the national jurisdictions to the evolving global and domestic tax administration framework.

See also Figure 15.7.

15.1g - Goals of an income tax payer

Adapt their processes in support of their tax interactions with the national jurisdictions to the evolving global and domestic tax administration framework.

See also Figure 15.7.

To the section - To the chapter

15.2 - The Stakeholders

- 15.2a - The Client
- 15.2b - The Customer
- 15.2c - Other Stakeholders
- 15.2d - The Hands-On Users of the Product
- 15.2e - Personas
- 15.2f - Priorities Assigned to Users
- 15.2g - User Participation
- 15.2h - Maintenance Users and Service Technicians

To the chapter

15.2a. The Client

The tax administrations of over 135 jurisdictions which joined the ground breaking plan to update key elements of the international tax system which is no longer fit for purpose in a globalised and digitalised economy.

15.2b. The Customer

Tax administrations, MNE's whose tax filing and payments are affected by the Global Anti-Base Erosion Rules, and all taxpayers.

15.2c. Other Stakeholders

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.2d. The Hands-On Users of the Product

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.2e. Personas

Fraudsters as well as people and companies, including MNE's, that want to avoid paying their fair share of taxes are negative stakeholders that must be taken into consideration.

15.2g. User Participation

(To be completed)

15.2f. Priorities Assigned to Users

Requirements of households, poor households in particular, must always have the highest priority as they have the least capabilities to compensate for poorly designed solutions.

15.2h. Maintenance Users and Service Technicians

(To be completed)

To the section - To the chapter

15.3 Mandated Constraints

- 15.3a - Solution Constraints: make as much as possible use of open-source technologies and public standards. For an indicative list of such technologies, check the DIKSHA Open-Source Softwares and specifications[166]. DIKSHA or *Digital Infrastructure for Knowledge Sharing* is India's national school education platform. EDIFACT is an example of a public standard.

[166] https://diksha.gov.in/help/diksha-oss/index.html

- 15.3b - Implementation Environment of the Current System
- 15.3c - Partner or Collaborative Applications: with which other applications will the solutions interact?
- 15.3d - Off-the-Shelf Software
- 15.3e - Anticipated Workplace Environment
- 15.3f - Schedule Constraints
- 15.3g - Budget Constraints
- 15.3h - Enterprise Constraints

At the portfolio level it is meaningful to list solution constraints, recommended implementation environments, off-the-shelf software and partner or collaborative applications made available publicly, or in the portfolio, schedule and enterprise constraints.

Anticipated workplace environment, schedule, budget and enterprise constraints should typically be elaborated at the program or project level.

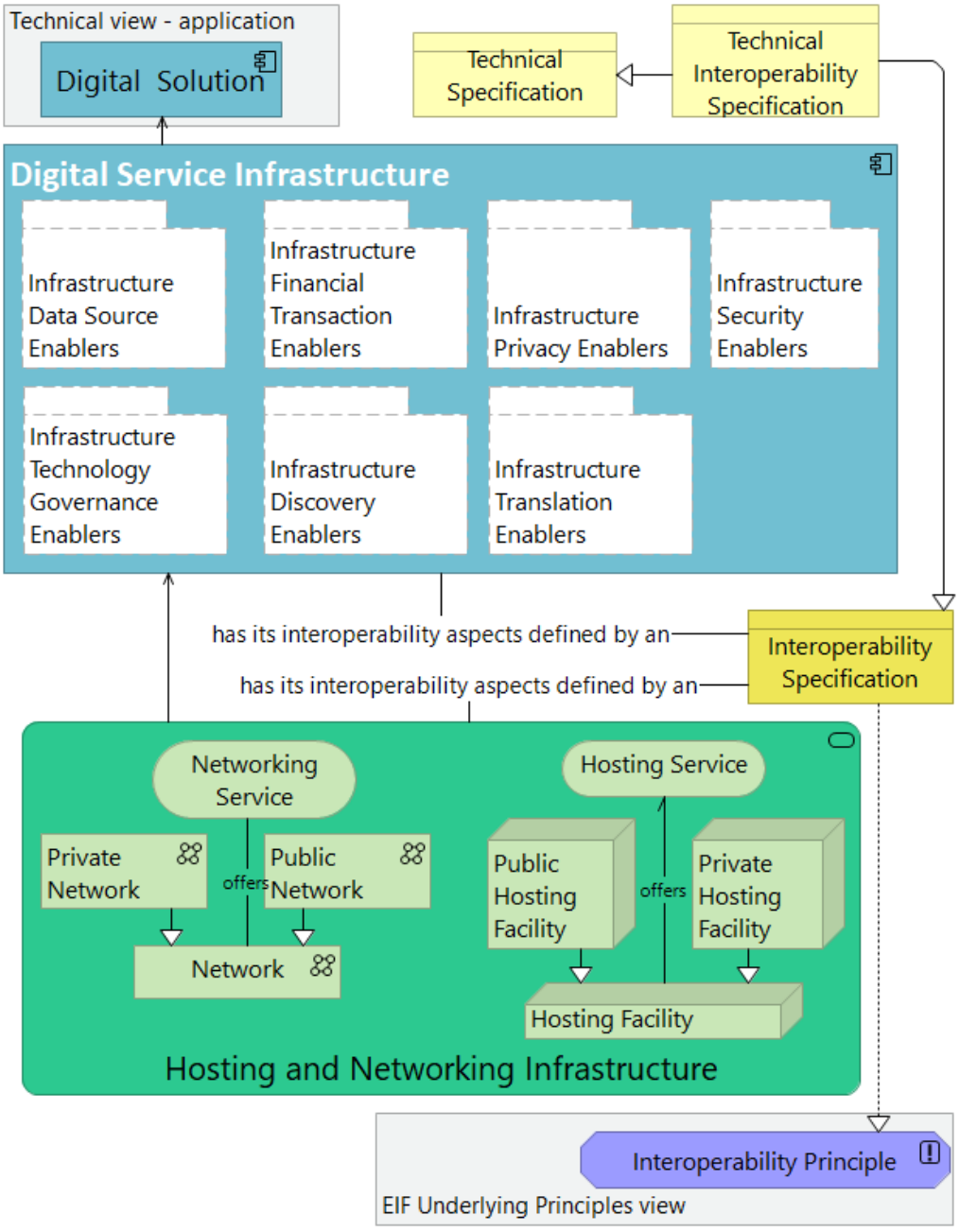

Figure 15.8: EIRA's simplified technical view - infrastructure

Contemporary digital solutions eco-systems involve an extensive technology stack as is illustrated by the simplified technical view - infrastructure[167] and technical view - application[168] of the 3rd version of the European Interoperability Reference Architecture (EIRA)[169] (currently in its 5th version).

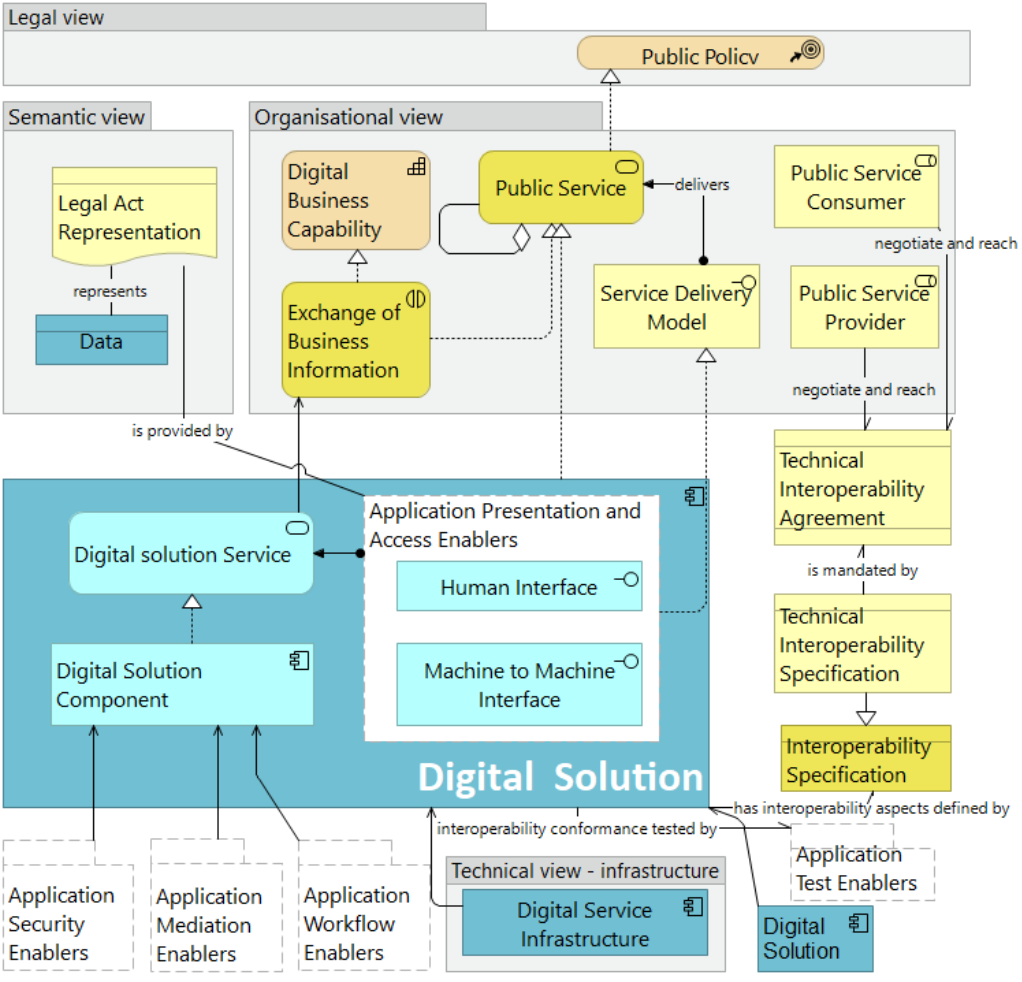

Figure 15.9: EIRA's simplified technical view - application

To the section - To the chapter

[167] http://www.ens.wiki/item:view-tech-i
[168] http://www.ens.wiki/item:view-tech-a
[169] https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira

15.4. Naming Conventions and Terminology

- 15.4a - Glossary of All Terms, Including Acronyms, Used by Stakeholders involved in the Portfolio
- 15.4b - Implementation Environment of the Current System
- 15.4c - Forms and Templates

To the chapter

15.4a - Glossary of All Terms, Including Acronyms, Used by Stakeholders involved in the Portfolio

At the portfolio level this chapter should include all the terms of the (multi- and bi-lateral) treaties with which alignment is pursued.

This glossary is best provided online.

It should also include the names of technical reference materials such as, for instance, those of the EDIFACT standard, the Open PM² Methods, and the European Interoperability Reference Architecture (EIRA):

- Annex 4 - EDIFACT Message Directory
- Annex 5 - EDIFACT Segment Directory
- Annex 6 - EDIFACT Composite Data Elements
- Annex 7 - EDIFACT Data Element Directory
- Annex 8 - Roles and Deliverables in the Open PM² Methods
- Annex 9 - Concepts, viewpoints and views of the European Interoperability Reference Architecture

To the section

15.4b - Abbreviations

Acronym	Meaning
APAs	Advance Pricing Agreements
ATAF	African Tax Administration Forum
BEPS	Base Erosion and Profit Shifting
CRS	Common Reporting Standard
FTA	Forum on Tax Administration
G20	Group of 20
G7	Group of 7
GVS	Government Verification Service
ICAP	International Compliance Assurance Program
IMF	International Monetary Fund
IT	Information Technology
MAP	Mutual Agreement Procedure
MNE	Multinational Enterprise Group
OECD	Organization for Economic Co-operation and Development
PAYE	Pay As You Earn
TADAT	Tax Administration Diagnostic Assessment Tool
TIWB	Tax Inspectors Without Borders
UNDP	United Nations Development Program
VAT	Value Added Tax
WBG	World Bank Group
CE	Constituent Entity
ETR	Effective Tax Rate
GloBE	Global Anti-Base Erosion
IFRS	International Financial Reporting Standards
JV	Joint Venture
MNE	Multinational enterprise
UPE	Ultimate Parent Entity

15.4c - Forms and Templates

Forms used to report events or file taxes.

Templates for frequently used communications.

To the section - To the chapter

15.5 - Relevant Facts and Assumptions

- Relevant Facts
- Business Rules
- Assumptions

The reasoning that is made here is that the portfolio provides conceptual models of a wide range of facts and business rules as captured in a sufficiently expressive conceptual domain model.

Because this document is intended as “portfolio requirements”, those facts, business rules and assumptions are expressed in the following chapters.

The programs and projects seeking support from the portfolio would then list (some of) the portfolio’s initial relevant facts, business rules and assumptions, and they would add facts, business rules and assumptions that are specific to their scope of work.

To the chapter

15.6 - The Scope of the Work

The typical topics in this chapter include:

- 15.6a - The Current Situation
- 15.6b - The Context of the Work
- 15.6c - The Work Partioning
- 15.6d - Specifying the Business Use Cases

To the chapter

15.6a - The Current Situation

Differentiate it for the various portfolio stakeholders.

- 6a.1 - The Current Situation for the international tax steward

- 6a.2 - The Current Situation for a Domestic Tax Administration
- 6a.3 - The Current Situation for the MNE tax director tax compliance
- 6a.4 - The Current Situation for the MNE branch tax division
- 6a.5 - The Current Situation for a business tax division
- 6a.6 - The Current Situation for an income tax payer

To the section - To the chapter

15.6a.1 - The Current Situation for the Global Tax Steward

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6a.2 - The Current Situation for the Domestic Tax Administration

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6a.3 - The Current Situation for the MNE tax director

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6a.4 - The Current Situation the MNE branch tax division

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6a.5 - The Current Situation for the Business Tax Division

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6a.6 - The Current Situation for an income tax payer

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6b - The Context of the Work

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6c - Work Partitioning: Business Events

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.6d - Specifying the Business Use Cases (BUC)

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

15.7 - Domain Models and Data Dictionary

In the domain model we build upon a number of EDIFACT segments, as depicted in Figure 15.20 to capture information about:

- parties as modelled in Figure 2.9 Classes of agents Chapter 2.5.5
- collaborations in Sociotope and Technotope as modelled in Figure 2.10 Chapter 2.5.6

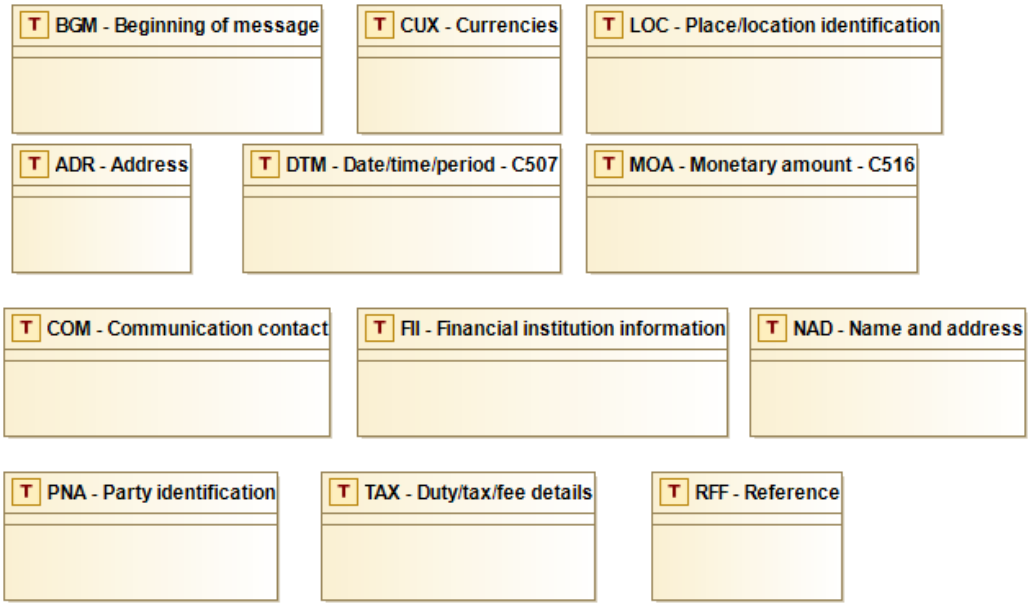

Figure 15.20: Some relevant EDIFACT Segments

Note that the EDIFACT segments can be applied in a much wider range of interactions as already covered by the EDIFACT messages. Moreover, their variability as reflected in the enumerations, supports the application in a very wide range of new situations, as will be illustrated for one very particular case, the PAYED collaboration. The reader is encouraged to explore the use cases he or she is familiar with, by using the techniques illustrated here.

- 15.7a - Conceptual Domain Model
- 15.7b - Domain Data Model
- 15.7c - Data Dictionary

To the chapter

15.7a - Conceptual Domain Model

The conceptual domain model is one of the key assets that a portfolio can share to the participating parties. For the Global Tax Portfolio, it would typically include the classes of agents, the range of possible collaborations, and the tax name codes that are within the portfolio's scope (See EDIFACT enumeration 5153, depicted in Figure 15.3 of section 15.1a - The User Business and Background of the Portfolio).

To the section - To the chapter

15.7b - Domain Data Model

The domain data model is based on the Conceptual Domain Model and is an area where international standards are required.

EDIFACT and the tax initiatives of the OECD pay attention to such standards.

It is recommended that the portfolio provide these standards as shared specifications and as shared models in open source tools.

A header and a table for each relevant domain object, possibly to be supplemented with a UML model of the object and its relations to other key domain objects.

Field name	Description
Name	The name of the business object
Description	The meaning of the BO; relevant characteristics
Business Rules	What rules govern the creation, maintenance and access classification of the business object
Actors	The actors that are interacting with the business object
Non-functional requirements	Description of, or references to relevant non-functional requirements.
Portfolio Issues	Description of, or references to relevant portfolio, program or project issues.

To the section - To the chapter

15.7c - Data Dictionary

A list as part of the chapter, or as a separate excel, or a report based on the UML model.

A lot of content can be included in the models that are published in open source tools, so that they are available to all professionals that could be involved in the programs, projects and iterations of the portfolio.

For examples, see Ag Data Commons: Data Dictionary - Examples[170].

To the section - To the chapter

15.8 - The Scope of the Product

- 15.8a - Product Boundary
- 15.8b - Product Use Case Table
- 15.8c - Individual Product Use Cases (PUC's)

To the chapter

15.8a - Product Boundary

A use case diagram identifies the boundaries between the users (actors) and the product you are about to build (this is sometimes called "the system").

You arrive at the product boundary by inspecting each business use case and determining, together with the appropriate stakeholders, which part of the business use case should be automated (or satisfied by some sort of product) and which part must be done by the user.

This task must take into account:

- the abilities of the intended users (section 15.2d),
- the constraints (section 15.3),
- the goals of the Portfolio (section 15.1),
- knowledge of the work (section 15.6)
- knowledge of the technology that can make the best contribution to the work.

There is a Product Use Case[171] for each part of the business use case that must be automated.

The parts of the business use case that must be done by users must be addressed in the training and user documentation (Issue – Training and User Documentation) by means of narratives and illustrations that explain the sequence of user and system tasks.

[170] https://data.nal.usda.gov/data-dictionary-examples
[171] http://www.wikinetix.com/rr:puc-template

15.8b - Product Use Case Table

A table of all the Product Use Cases that must be developed or modified in the portfolio, program, project or iteration.

15.8c - Individual Product Use Cases (PUC's)

Usually product use cases are explained in more detail in a use case template, or in a UML Use Case diagram. Quite often they are fully specified in a dedicated document.

Include references if available.

The key benefit of having these use cases documented in modeling tool such as Modelio 5.1 is that changes in one of the aspects, for instance the information flows, are easily reflected in all views in which those changes have an impact. Moreover, the entire model can be navigated on the basis of dependencies between aspects.

The Modelio 5.1 use case diagram is illustrated in Annex 11 - The integration of process and information modeling in Modelio 5.1.

To the section - To the chapter

15.9 - Functional Requirements

Functional requirements are the fundamental or essential subject matter of the product. They describe what the product has to do or what processing actions it is to take.

In the CPIM approach, as a major share of functional requirements has been incorporated in the description of the context of the work, the business use cases, the data model and the product use cases, the focus in this chapter is on functional requirements that haven't been captured yet in the previous specifications.

For each functional requirement a heading and a table, with as possible content at least:

- a number #FR001,...
- a name or title,
- a priority (MOSCOW)
- a description (with source and fit criterion)

- references to the impacted business events, business use cases, data elements and product use cases.

Notice that business events, business use cases, data elements and product use cases will also include references to the functional requirements that must be considered during their design and implementation.

Further detail about a specific requirement can be supplemented in function of the “debate around the requirement”, and the degree to which the requirement will be met following the different iterations.

To the chapter

15.10 - Non-Functional Requirements

For each non-functional requirement a heading and a table, with at least for example:

- a number #NFR01,…
- a name or title,
- a type - see Annex 2 - Types of Non Functional Requirements for possibilities
- a description (with source and fit criterion)
- references to the impacted business events, business use cases, data elements and product use cases.

Notice that business events, business use cases, data elements and product use cases will also include references to or information about the non-functional requirements that must be considered during their design and implementation.

One set of NFRs that is very relevant at the portfolio level are the Usability and Humanity Requirements which include the interface languages of a system.

It should be easy to add new languages to an interface that is intended to the public.

There exist specific interface design patterns that centralize the terms used in the interface in one or more tables that include internal codes and map these to terms in the languages for which the interface has been adapted. Such a pattern is illustrated in the elements as illustrated in Figure 15.21.

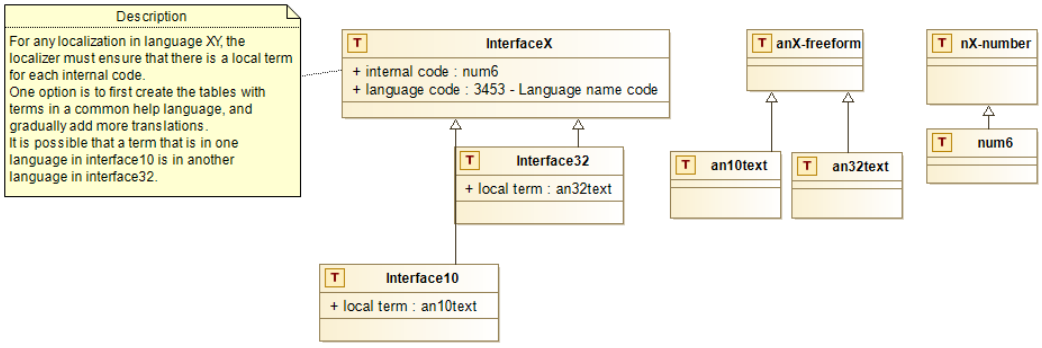

Figure 15.21: A design pattern for a multilingual interface

To the chapter

15.11 - Portfolio Issues

For each portfolio issue a heading and a table, with at least:

- for example, a number PI 01,...
- a name or title,
- a type - see Annex 3 - Types of Issues in Portfolios, Programs, Projects and Iterations for possibilities
- a description
- references to the impacted business events, business use cases, data elements and product use cases: those parts of the requirements specification will also include references to the issues that must be considered during their design and implementation.

Further detail can be supplemented in function of the type and impact of the issue and the degree to which the issue will be resolved in programs, projects or iterations.

A minimal set of issues would include:

- PI 01 – Training and User Documentation
- PI 02 - Step-by-step migration plan

To the chapter

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Annex 1 - Stakeholder Classes

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Annex 2 - Types Non Functional Requirements

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Annex 3 - Types of Issues in Portfolios, programs, Projects and Iterations

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Annex 4 - EDIFACT Message Directory

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Annex 10 - UML Models for some EDIFACT Segments

Annex 11 - The Integration of Process and Information Modeling in Modelio 5.1

Modelio 5.1 is an open source modeling tool that supports the integration between BPMN process models and UML information models in a specification that is at the level of the "Computation Independent Model" (see chapter 3.6 - Models and Model Layers). The utility of such an integration has been described in Goossenaerts (2002) using UML and Hierarchical Petri-Nets. Unhappily, up to now, I don't know of introductory texts explaining a similar integration between process models expressed in BPMN and information models expressed using UML class diagrams.

Annex 11.1 Modelio 5.1 Basics

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Annex 11.2 Support for the Integration Specification

This content is not available in the sample book. The book and its extras can be purchased from Leanpub at https://leanpub.com/socarch.

Annex 12 - Conceptual Models of the Social Positioning Theory

Annex 13 - Not an ordinary e-Book

This e-book is not an ordinary e-book. It is explicitly designed to use *hyperlinks* to online and inline content.

Hyperlinks to online content

Hyperlinks to online content make it a *media enhanced book*.

In the pdf version of the e-book, such hyperlinks appear as footnotes.

A *media enhanced book* offers benefits to participants in the knowledge chain. These benefits are based on the use of hyperlinks and hashtags to extend the story of the book with content that is available on the web and with discourse on social platforms. Content that is in the public domain is called *content commons* and should, in principle, be available to all under the same access regime, free of charge and with no restrictions on re-use. Content that is protected by copyright is called proprietary content. It can be accessed for a fee or for free, and cannot be re-used without permission from the copyright holder. Access conditions should be comparable for all participants in the same market.

Using *hyperlinks* to online content commons and proprietary content has several advantages:

- The author can avoid rewriting and repackaging existing content, and can build on the work of others in a direct and transparent way;
- Content on the web can evolve and improve between the time the e-book is created and the time it is read using the hyperlink;
- If the hyperlinked content is in wikis or blogs that support discussion or commentary, readers can add comments to further improve the state of knowledge in the area covered.

Systematised content commons[172] referenced by hyperlinks alert authors and readers to the possibility of contributing to the wider dissemination of content commons or using them in other situations where they can be of benefit. By using and expanding the systematised content commons, their quality and usefulness will gradually improve.

[172] http://www.worx.wiki/systematized

Inline Hyperlinks

While editing the #tagcoding manuals, which often amounted to putting wiki content into e-book format, I missed the convenience of wiki breadcrumbs to navigate from subsections higher up in the content hierarchy. Markdown and related editing formats support linking within a piece.

This e-book and the #tagcoding manuals make extensive use of inline hyperlinks for tables of contents of chapters, sections, and subsections, for links to return to the next level up in the content hierarchy, and for links between chapters and between sections.

In this way, a thousand-plus page #tagcoding eHandbook can be read with the convenience of a wiki without being online. Within the source text, #tagcoding hashtags are used to tag the sections that define them. And access to the source code for the classifications is (or will be) included in the purchase of the e-book on leanpub. This makes it easy to reuse the source text or parts of it in other electronic publications or websites.

Other uses of hashtags

Using *hashtags* as a means of promoting and tracking a discussion topic also has several advantages, including:

- Anyone with a platform profile that allows tagged posts can contribute to the discussion (or better yet, the platform can allow non-members to read the discussion),
- When systematically defined hashtags are used, it becomes possible to discuss very specific topics, e.g. marine aquaculture in Indonesia via *#isic0312ID*.
- The use of hashtags by authors and readers supports collaborative scoping and avoids information overload,
- Each hashtag supports a "single-version-of-the-truth" search for the discourse on the platform(s) searched, at any point in time, and across languages.

Tagged discourse helps authors and readers update their knowledge about a particular topic.

If necessary, an author can update and republish an e-book, as supported by Leanpub, for example.

Realized as wikis, the systematized content commons can also be easily updated.

The expectation of improved quality provides a reason to return to specific "content commons" or hashtag searches later.

The systematized content commons in the #tagcoding guidelines are intentionally offered for free. Together we can demonstrate the feasibility of content commons and tagged discourse as pillars for development and low barrier access to knowledge that matters to people's livelihoods.

Provide #tagcoding manuals in your language

While the #tagcoding handbook is already available in a few languages, providing systematized content commons in other languages will help reach a wider readership and user base for the Societal Architecture. In this way, we can overcome the digital and knowledge divide globally and achieve more poverty reduction and sustainable development impacts. Cooperatively, we can also make such provision economically viable[173].

A number of conditions mutually reinforce each other as enablers for the translation of this e-book:

- The 2030 Agenda hashtags defined in the Actor Atlas[174] are language independent;
- Google Translate supports page-by-page translation of Content Commons;
- Translating models in modeling tools is efficient as only the elements (and comments) need to be translated to translate all views;
- Leanpub supports royalty sharing according to an agreed split between author and (co-)translator.

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[173] http://convention.worx.wiki/article:economic-sustainability
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Part VI - References

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