SUSTAINABLE DEVELOPMENT, STAKEHOLDERS' PARTNERSHIP, STATE-OWNED ASSETS IN A SYSTEM THINKING MODEL

Luana LA BARA
Tor Vergata University of Rome
Via Columbia 2, 00133 Roma, IT
luana.labara@uniroma2.it

Gloria FIORANI
Tor Vergata University of Rome
Via Columbia 2, 00133 Roma, IT
luana.labara@uniroma2.it

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Abstract
Enhancing State-owned assets could be an excellent strategy for the policymakers to converge on the goals promoted by the 2030 Agenda. State-owned assets play a critical role in a nation's socioeconomic progress. To achieve sustainable development, governments must adopt a multifaceted approach. This involves optimizing asset management by reducing waste, improving efficiency, and enhancing accountability. Furthermore, investment in eco-friendly technologies and sustainable practices can reduce environmental impact. Leveraging state assets to foster economic growth, create employment opportunities, and address social needs aligns with sustainability principles, ultimately contributing to a more equitable and environmentally responsible future for current and future generations. This approach considers the interconnectedness of economic, social, and environmental factors, enabling holistic strategies that optimize resource allocation, promote innovation, and ensure long-term viability, thereby advancing both economic growth and environmental stewardship. The purpose of this study is to demonstrate (with a System Thinking Model) that the public policy maker (State, Region, Municipality, etc.-owned asset) can incentivize the local economy towards sustainable development (SDGs-Agenda 2030) using systemic managerial logic (System Thinking and System Dynamics). The model proposed systematically represents the virtuous circle created by the Valorisation policy of State-owned assets. It is based on the project of Valorisation of Frascati-owned assets, promoted by a Public-Public Partnership (Municipality of Frascati, University of Rome "Tor Vergata" - Master II Level-Reporting Innovation Sustainability- Maris, State Property Agency). This model proposes a simple and intuitive multidimensional tool for the policy maker (Government, Municipality, Region, etc.). The because highlights the virtuous circles which, based on the 5P-NSDSS, lead to the creation of local (National) sustainable development, co-operating towards the SDGs (Agenda 2030).

Keywords
partnership; policy makers; SDGs; stakeholder; state-owned assets; sustainable development; sustainable redevelopment; system thinking.

Introduction

Enhancing state-owned assets could be an excellent strategy for policymakers to converge on the goals promoted by the 2030 Agenda (La Bara et al., 2018). These assets are often abandoned or endangered, constituting only the cost of maintenance and safety for the State. The study demonstrates that the enhancement of these assets must be based on a systemic logic based on the model of the 5Ps – People, Planet Prosperity, Peace, and Partnership promoted by NSDS. This policy promotes the sustainable development SDGs' National (and consequently International) achievement (Agenda 2030).

This article explores two specific research questions: Can policymakers create innovation and growth from abandoned state-owned real estate? Is it possible with limited financial resources and lack of know-how? Can this policy stimulate the sustainable development economy by redeveloping and meeting the territory's needs? If so, how? The research proposes a System Thinking Model (STM) to answer these questions. It is designed as a simple, practical, generic, and intuitive tool to understand the relationships and interconnections derived from public-owned real estate valuation policy. The objective is to give the policymaker a systemic vision for the socioeconomic enhancement of the territory. That is possible through multi-stakeholder partnerships and only through implementing sustainable actions.

The last part proposes an STM for the enhancement of State-owned assets. The STM starts from the concession of the public assets, making a virtuous circle that pushes the local community (and consequently the national community) towards sustainable growth and the pursuit of SDGs (Sustainable Development Solution Network Report, 2016). In particular, it promotes the following SDGs: 11-Sustainable cities and communities, 17-Partnerships for objectives, 8-Decent work and economic growth, 9-Enterprises, innovation and infrastructure, and 15-Life on Earth.

Literature review

Starting almost 50 years ago, in the early ’70s, the United Nations (UN) organized the Stockholm conference where, for the first time, the importance of the environment and, therefore, sustainability for human development was highlighted. In those same years, the Limits To Grow (Meadows et al., 1972) came to light – a report that marked the path of System Dynamics over time. It was an essential work that defined the concept of sustainability and the limit to development. System Dynamics (SD) is an approach for studying and managing complex systems characterized by feedback mechanisms, in which the role of the network between policies, decision-making structures, and time delays is emphasized. It is based on an integrated evaluation strategy, in which centrality is given to the evaluation user represented by the decision-making, political, managerial, and street-level autocracy roles of the Public administration on an intra-organizational level and especially inter-organizational level (Weitz, 2018).

The idea that inspires the SD methodology is to use elementary circuits as basic concepts to generate complex systemic representations. The emphasis of SD is not so much on the ability to predict particular states of the system or on the rigor with which the hypotheses of the model have been empirically tested, the possibility that the

model offers to understand the logic with which the relevant variables interact, the role that each plays, the points where the system is sensitive to interventions and the scenarios that emerge as a result of alternative assumptions about the initial State of the system (Fiorani, 2010) System Thinking (ST) is the basis of SD. ST, divulged by Peter Senge (1990), is considered the fifth discipline since it allows the observation of reality from a systemic perspective and provides models to describe and represent reality. ST analyzes dynamic systems, building models capable of representing reality in incessant movement, transformation, and evolution (Mella, 2007). Jacobson (2001) affirmed that complex systems are formed by numerous different components organized within a multi-level structure. These components interact not linearly but dynamically. The interactions are simultaneous, within, or across levels, but their indirect causality is often deducible with ST (Hmelo-Silver & Azevedo, 2006). In fact, the literature (Hmelo-Silver & Pfeffer, 2004; Jacobson, 2001; Kaneko & Tsuda, 2001) observes that a system's self-organization is unpredictable and at a non-intuitive macroscopic level because it is derived by processes occurring in its subsystems and shows other and complex properties not explained by individual components (Eilam, 2012).

Richmond (1993) says that ST needs many cognitive abilities for performing general structural analysis based on dynamic, fluent, closed-loop, and scientific thinking modes. ST is a common concept for understanding how causal relationships and feedbacks work in an everyday problem. Understanding a cause and effect enables us to analyze, sort out, and explain how changes come about both temporarily and spatially in common problems. This is called mental modeling, i.e., explicitly mapping the understanding of the problem and making it transparent and visible for others through Causal Loop Diagrams (CLDs) (Haraldsson, 2004).

Methodology

As Wolstenholme (1997) defined, the steps listed above are grouped into three phases according to the logical path shown in Figure 1.

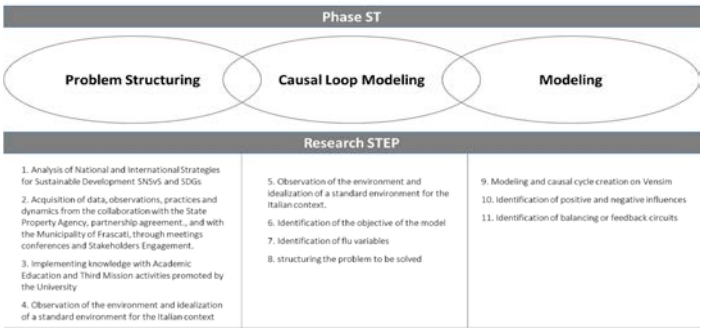

Figure 1. Research, phases, and steps
(Source: Author's own research results)

Problem Structuring (steps 1-4) is a common first step in many troubleshooting methods. In these steps, the problem or situation being analyzed is defined, and the scope and boundaries of the study are identified. Wolstenholme (1997) stresses the

importance of not underestimating this phase as managers and decision-makers often assume that they know the real problem promptly, while in reality, they can think about the symptom problem. In particular, it was considered important to define an accurate identification of the problematic sector or the political issues concerning the management and identification of the stakeholders (Freeman, 1984), as shown by the stakeholder analysis for ST applications conducted by Elias et al. (2002) and Cavana (2004). The objectives must be clearly defined, considering the multiple stakeholders and perspectives.

For this reason, through stakeholder engagement actions, they were defined in consultation with other interested parties, i.e., the State Property Agency, the Municipality of Frascati, and the local community, to encourage openness to new ideas and generate commitment and collaboration. The collection of information is based on the study of the indicators on fair and sustainable well-being (BES) and included in the Document of Economy and Finance of the National Strategy for Sustainable Development (NSDS) contextualized within the objectives for sustainable development promoted by Agenda 2030. BES is a multidimensional approach to measuring "equitable and sustainable well-being." Defined by Istat (National Statistical Institute) together with representatives of the third sector and civil society, the objective is to complement the indicators related to production and economic activity with measures of the key dimensions of well-being, together with measures of inequality and sustainability

The next step is to model the causal cycle. During this phase, conceptual models of the problem, known as causal cycle diagrams (CLDs), were created according to the ST approach. Specifically, the modeling of the causal cycle has been developed by:

- Identifying the main (key) variables.
- Drawing the behavior on graphs and/or the methods of reference for the main variables.
- Developing causal cycle diagrams (influence diagrams) to illustrate the relationships between variables.
- Identifying system archetypes that would describe high-level causal patterns.
- Identifying the key leverage points.
- Highlighting the strategic potential of the intervention.

The last phase of the study involves modeling the causal cycle. This phase was defined using VENSIM (Ventana System, 1990), specialized software for defining systemic analyses (Peterson, 1994; Fiorani, 2010; Stave, 2003; Hall, 2016). The output is a systemic map defined as a general model based on the causal cycle diagrams, usable by any P.A. owner of assets. The output is the development of a map or diagram of high-level systems, which indicates the main sectors of a potential simulation model or a rich picture of the main variables and issues involved in the system of interest. The model allows P.A., as a policymaker, to understand the potential of the State-owned property enhancement policy converging on achieving the SDGs. This way, it can develop and test strategies (i.e., combinations of functional policies, for example, operations, marketing, finance, human resources, etc.), contextualizing them to their strategic plans.

System Thinking model for enhancement of state-owned assets

This section proposes a System Thinking Model (STM) applicable to each Public Administration (PA) owner of an asset. The STM highlights the virtuous circles that are triggered by redeveloping State-owned assets. The model has a general character and is intended to be an immediate learning tool for policymakers on the possibilities that can be created starting from the decision to begin a policy to enhance the value of their property. The logic followed for the definition of the model, in particular in identifying the variables and systemic relationships, is illustrated in Figure 2. The model analyses the enhancement policy of a State asset, which represents for the owner only a cost (maintenance and safety), and defines the variables that can be activated with the definition of a concession of enhancement.

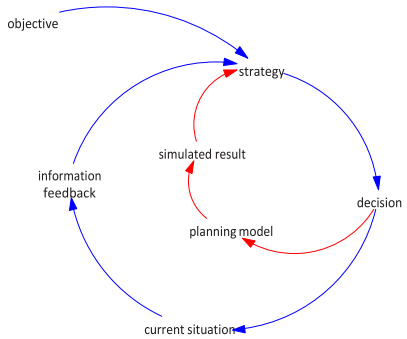

Figure 2. Logic of model
(Source: Author's own research results)

The STM highlights the potential of a corrective policy; it can allow the local economy to be pushed towards sustainable development. This is because the prevalence of public-owned real estate is neglected (La Bara et al., 2018). On the one hand, these assets constitute a mere cost to the PA (State, Regions, Provinces, Municipalities, etc.) and, on the other, a danger to society.

The model starts with the evidence that a number of assets owned by the State are in a state of neglect (Figure 3). The policy goal is to bring the number of these assets to zero through their enhancement, i.e., not to have abandoned but requalified goods. So, the gap between these two variables must be reduced (GAP 1). The enhancement policy of assets produces a positive impact on the 5Ps (Partnership, People, Planet, Prosperity, and Peace) by implementing the reinforcement circuits (respectively R1, R2, R3, R3, R4, and R5) that push Italy to achieve the goals of the National Strategy for Sustainable Development. Consequently, the gap (GAP 2) between the NSDS and the SDGs is reduced. Furthermore, direct reinforcement circuits are created between the 5Ps and the NSDS (i.e., R6, R7, R8, R9, and R10).

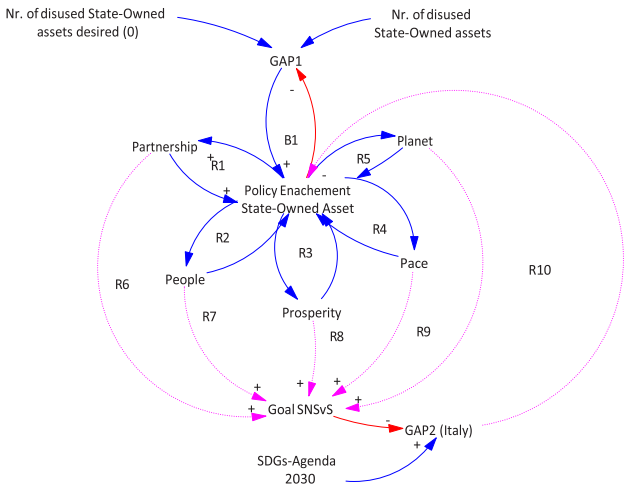

Figure 3. The virtuous circuits of the policy for enhancement of state-owned assets (Source: Author's own research results – VENSIM)

The impact assessment model that can be implemented through the asset enhancement policy is represented in a small model in Figure 4. The STM proposed (Figure 3) could be executed with the connection that the enhancement policy can achieve the SDGs. The circuit (Figure 4) shows the impact of the targets defined in the NSDS to contextualize the valorization policy to the Italian framework. It is based on a systemic logic. It explains the impact of the NSDS's targets created by the valorization policy in the 5Ps (SDGs).

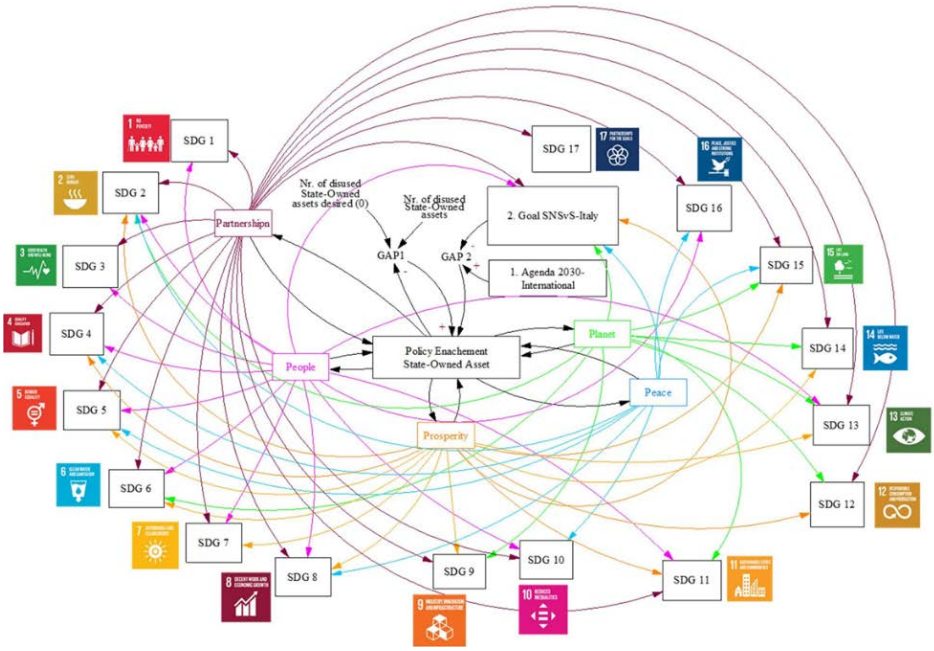

Figure 4. The impact of the sdgs on the policy enhancement of state-owned assets (Source: Author's own research results –VENSIM)

The STM is based on a differential gap between the current situation in Italy-NSDS and achieving the international objectives promoted by the Agenda 2030. The goal is to reduce GAP to converge towards sustainable development. Therefore, having defined the current National NSDS/Local framework and identified an asset, a "corrective policy" is implemented to enhance the assets owned by the State. This policy affects the five strategic areas - People, Planet, Prosperity, Peace, and Partnership - and therefore NSDS, which in turn converges on reducing the gap and achieving the SDGs.

The enhancement policy develops towards NSDS through the direct and positive influence of the variables that can be grouped into the 5Ps, with reinforcement circuits ideally represented by R2, R3, R4, R5, and R6 but with the awareness by nature of the thought of sustainable development that some variables influence different areas (see exploded model). Furthermore, in turn, the development of the five areas considered individually converges to the realization of the NSDS (2) (dashed pink arrows) and consequently to the SDGs (1), reducing the gap (3).

According to the provisions of the NSDS, each area has a different influence on the SDGs, i.e., not all areas influence the same SDGs. To obtain a vision of the influence that each area has on each SDG, these can be seen in Figure 16a. It is clear that the area that influences all 17 objectives is Partnership; the evidence of the model will demonstrate its relevance in Figure 16b. The People area affects 12 targets, i.e., except SDG 9, SDG 12, SDG 14, SDG 15 and SDG 17. The Planet affects eight targets out of 17, namely SDG 2, SDG 6, SDG 9, SDG 11, SDG 12, SDG 13, SDG 14, and SDG 15. Prosperity plays an important role, influencing 13 goals out of 17: SDG 2, SDG 4, SDG 5, SDG 6, SDG 7, SDG8, SDG 9, SDG 10, SDG 11, SDG 12, SDG 13, SDG 14 and SDG 15. The Peace area influences only a few SDGs, only 7, but it plays an important role in the Public area, influencing SDG 2, SDG 4, SDG 5, SDG 8, SDG 10, SDG 15, and SDG 16.

The Multidimensional impact model for the enhancement of state Assets (Figure 7) provides in detail a systematic key to the possible impact generated by the enhancement of state-owned assets, highlighting the repercussions in the five areas of intervention: Partnership, Prosperity, Planet, People, and Peace, which for ease of reading are represented with colored areas respectively in Purple, Orange, Green, Pink, and Blue. As can be seen, the areas overlap; this is because some variables influence several areas. For example, the "sustainable redevelopment" of the asset takes place in the face of a partnership launched through the concession to a private third party. With the collaboration of public third parties, it generates benefits for the planet, which finds itself with a resilient territory and custodian of the landscape, generates prosperity encouraged by innovation and the search for sustainable redevelopment methods that create a "sustainable community," generates safety for people and therefore well-being.

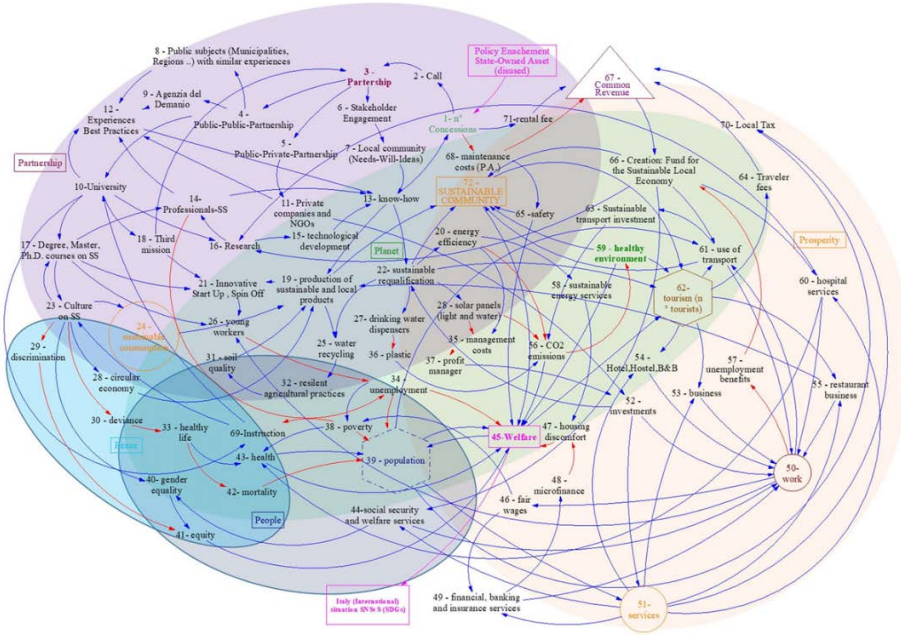

Figure 7. Multidimensional impact model for the enhancement of State Assets (Source: Author's own research results)

In Figure 7, the arrows in blue represent a positive impact, the red ones a negative impact, or instead, it is positive if the variable from which the arrow originates increases the variable at which the arrow arrives (e.g., if partnerships are increased, know-how is also increased); vice versa if the variable from which the arrow originates increases the variable at which the arrow arrives the impact is negative (e.g. by installing solar panels management costs are recouped, or even by increasing healthy life mortality is reduced). The impact can be summarized by area.

Partnership

Launching the asset enhancement policy starts with the concession (1) of the asset. The policymaker needs to define PPP - partnerships with private and public entities to acquire knowledge, funding, and public sector weaknesses (Pagoni, 2019)—a system dynamics model for assessing national public–private partnership programs' sustainable performance. Collaboration creates positive feedback circuits that move towards the realization of well-being.

Prosperity

The creation of a fund for sustainable development was hypothesized, idealizing a P.A. owner of the asset as far-sighted, which recognizes that implementing a concession policy does not induce mere revenue from the rent but leads to the creation of a virtuous system that pushes more and more towards the creation of a resilient and sustainable society. The P.A., therefore, achieves the primary purpose of creating a sustainable community, reducing maintenance and safety costs, and simultaneously inducing tourism, which consequently stimulates the production of services and, therefore, more significant revenues for the PA—arising from the taxation of services and tourists. The forward-looking perspective is that the surplus created is poured into

a fund that promotes sustainable development in the specific variables that the territory needs. All this flows into an increase in well-being.

Peace
The partnership, in particular with the university and society, stimulates the creation of an increase in sustainable culture in society, which translates into greater openness and fewer inequalities, improving the well-being of society.

Planet
Launching sustainable asset requalification activities improves the quality of life, both for the safety and enhancement of the asset concerning local culture and for the start of production and sustainable consumption, merging into an increase in well-being.

People
Starting from the collaboration with the universities, there is a decrease in the unemployment of the community, encouraging, on the one hand, entry into the work of young people with traineeships, creation of spin-offs/start-ups, and increasing research, and on the other training professionals and managers of sustainability that help to create a convergent way towards the 2030 Agenda. The increase in employment introduces fair wages and, consequently, the reduction of poverty, an increase in the population, and an increase in health and investments. This translates into increased services, both in number and quality, thus achieving well-being.

All variables, directly or indirectly, converge towards wellness, which represents the variable identifying sustainable development since "Sustainable development is the one that meets the needs of current generations without compromising the ability of future generations to satisfy their own" (World Commission on the Environment and the Development of the UN, 1987). So if, starting from the current situation, "sustainable actions" are applied that lead to the creation of a sustainable society - according to the 5Ps - these create a virtuous circle that flows into a state of sustainable well-being, leaving future generations a sustainable society, with sustainable and resilient values, technologies, production and consumption practices.

Conclusions

The role of the policymaker becomes essential for the achievement of the sustainable development of a territory. The study demonstrates that defining partnerships with the public and private sectors to valorize public assets is a good strategy for achieving the SDGs. This collaboration allows the public to create value in society. The model is an important tool for the public subject because it establishes a multidimensional impact to achieve the SDGs. The model proposes (MIME) that the policymaker identifies the potential to apply sustainable development in partnership with the University or research institutes.

Can develop the causal map of ST in a System Dynamics simulation model, moving from a qualitative to a quantitative approach, identifying which variables it will have to focus on the future objectives that the PA identified. To implement the ST in SD, the modeler must identify the relevant variables, divide them into level, flow, and auxiliary variables, and define their cause-effect relationships. Then 1. enter the initial value of the level variables, 2. define the equation of the flow variables, entering the value of the

exogenous constants, 3. define the logic with which the information is used, and 4. identify any auxiliary variables (Fiorani, 2010).

If the P.A. is not far-sighted enough to encourage sustainable development practices in any sector, the positive feedback circuits could devolve into the negative feedback circuit; it is here that the feedback remains doubtful, increases the gap, and moves away from sustainable development. In this new approach, sustainable development, in particular of the territory, as a common objective, becomes possible thanks to the joint collaboration between different subjects operating in a territory, represented as the petals of a flower; the partnership aims to trigger virtuous circles that stimulate the cross-fertilization of ideas and the subsequent experimentation and prototyping in the real world of the projects created by the actors (European Commission, 2015). Cultural heritage, material and immaterial, is our common wealth: the legacy of the generations that preceded us and our legacy to posterity, a source of inspiration for thinkers and artists and a driving force for our cultural and creative industries. How we preserve and enhance it determines Italy's position in the world and its attractiveness as a place to live, work, and visit: it is a shared resource and a common good (La Bara et al., 2018).

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