



Dynamics model of the flow management of construction projects: study of case

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Introduction



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This research reviews the issues associated with the obstruction of the workflow in the management of infrastructure construction projects in a public university in Colombia.

Case study



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The case study is about the production process of construction projects planned for a year in a public university

- The university plans investment in infrastructure for each fiscal year according to a strategic plan.
- Financing for these projects is from the collection of a specific tax of Regional Government (RG) order, and it's transferred monthly to the university.
- The contracting of the construction is carried out when the financial resource has been transferred, and it has been confirmed the construction project has the highest level of constructability possible.
- After contracting, the construction of the project is carried out.
- Construction production process originate relations and flows into functional areas in the organization

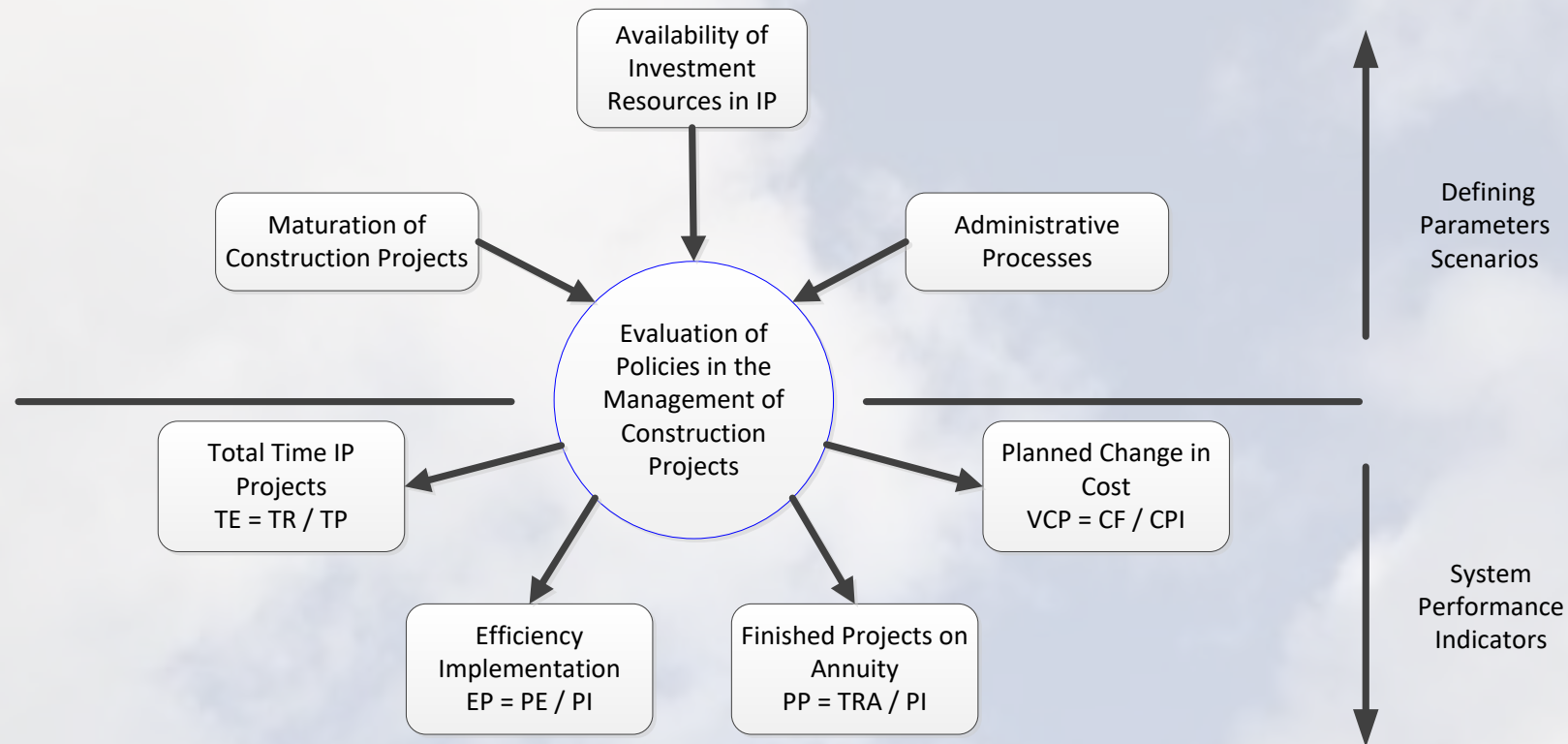
Case study: Problem map



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System Dynamics



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- The fundamental objective of Systems Dynamics is to understand the structural causes that cause the behavior of the system.
- Understanding the structural causes implies increasing knowledge about each element of the system's role, and seeing how different actions, carried out on parts of the system, accentuate or attenuate the behavioral trends implicit in it.
- System Dynamics finds its main applications in these complex and poorly defined environments, where human decisions are usually guided by logic intervene.

Lean principles and the mapping of the value stream



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The five lean principles described by Jones and Womack (2002) in the improvement of the efficiency in value flows, they are:

1. To specify the value of the client from the point of view,
2. To identify the flow of value, including the activities that add value or do not add value for the client,
3. Allow that the project flows quickly without problems and through all the sub-processes,
4. To synchronize sub-processes capacity and demand, so that the work is realized in agreement with the scheme of pull production,
5. Reach perfection through continuous value flow improvement.

Lean principles and the mapping of the value stream



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“To identify the flow of value, including the activities that add value or do not add value for the client,”

Value Stream Mapping



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- It is a graphical tool that integrates material and information flows used for the standardized icons in a graph, showing a “Mapping Big Picture” of the value flow.
- Jones and Womack (2002) define the VSM as the process of the map the flow of materials and information.
- This map is used to present the current processed state and after a map of the future state is proposed.



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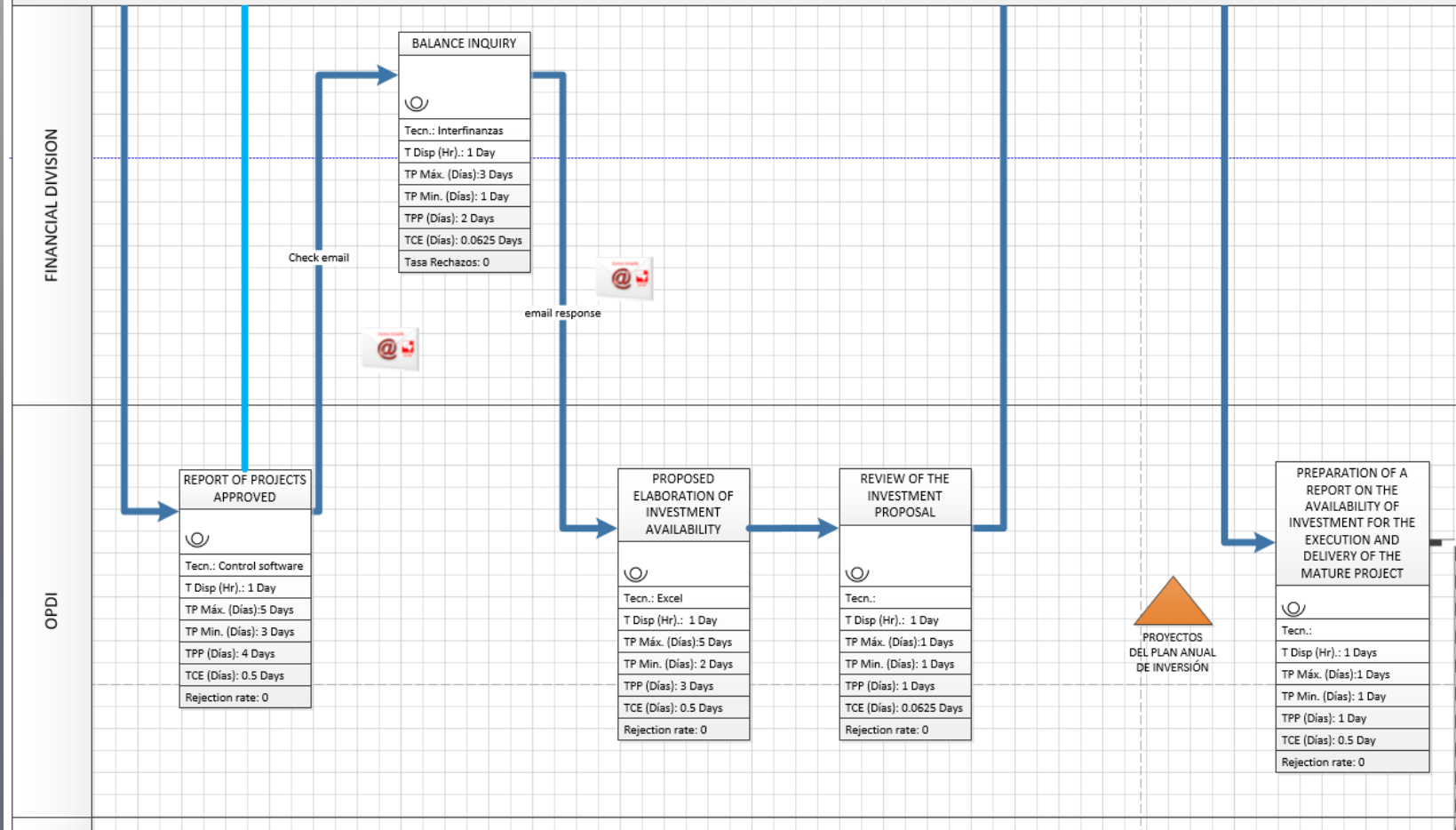
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Mapping with SIPOC Z

VALUE FLOW MAP

Zoom: Authorization availability

Current state: Transfer and allocation of money



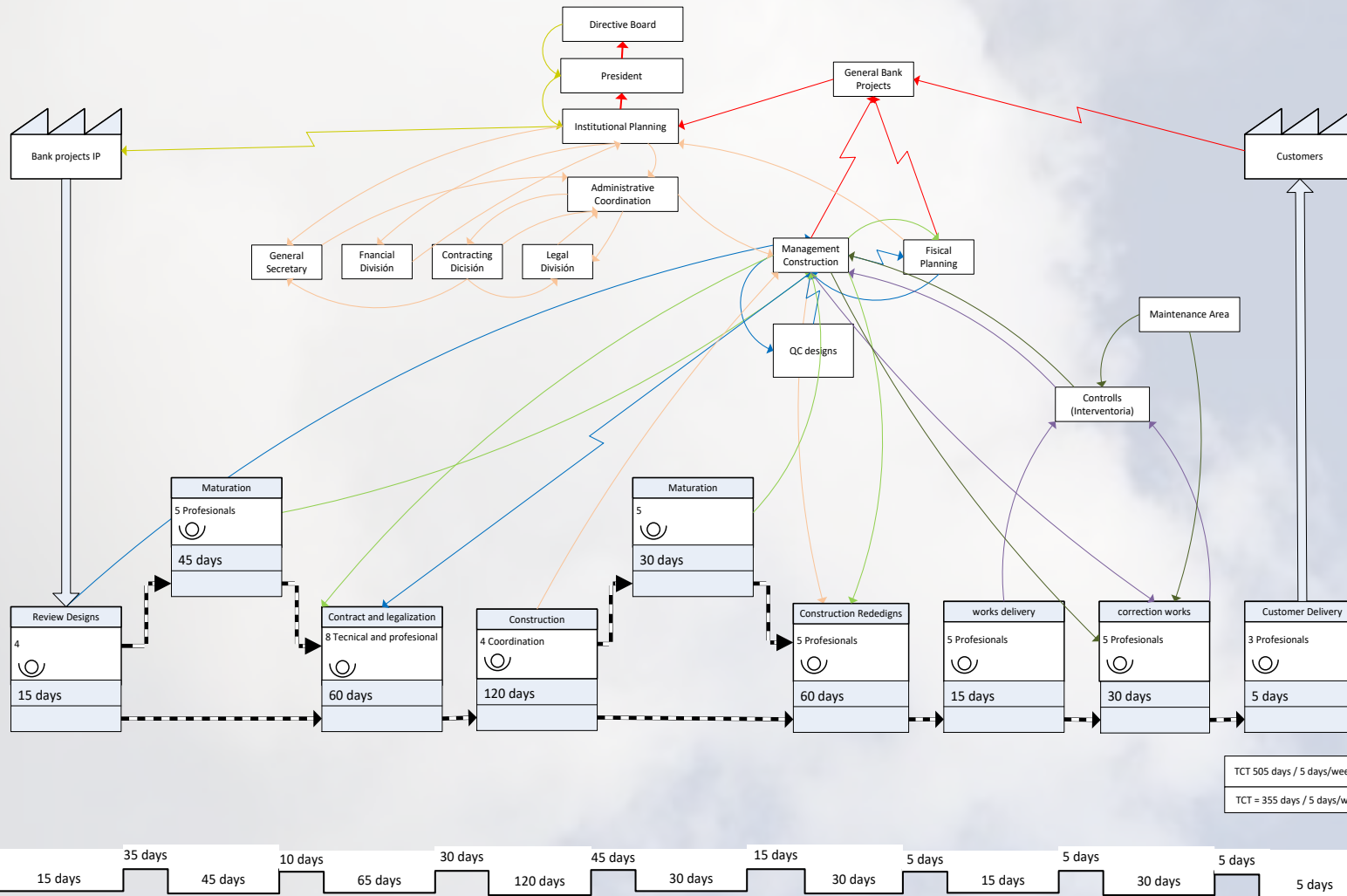


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Current state map



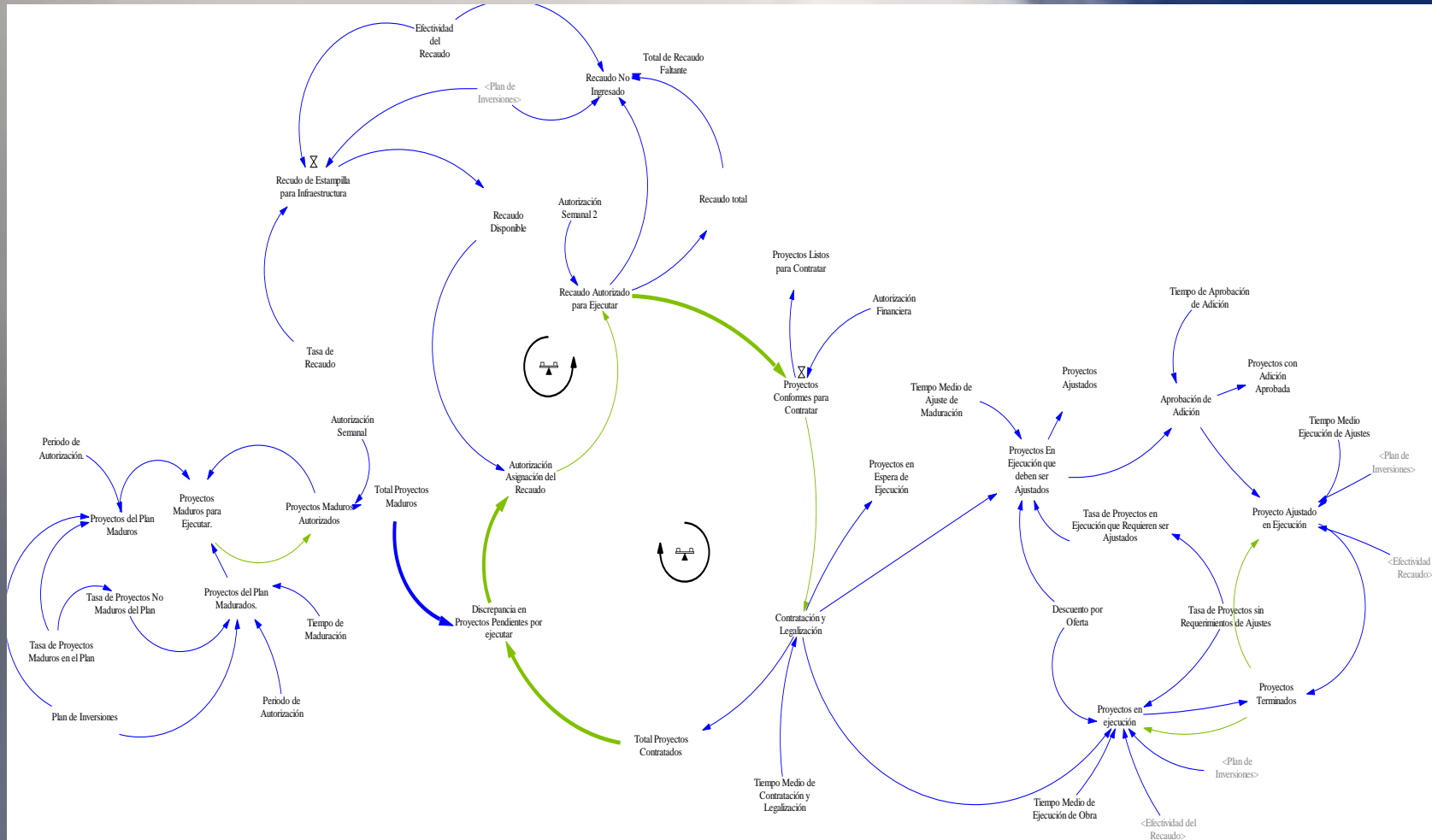


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Causal diagram



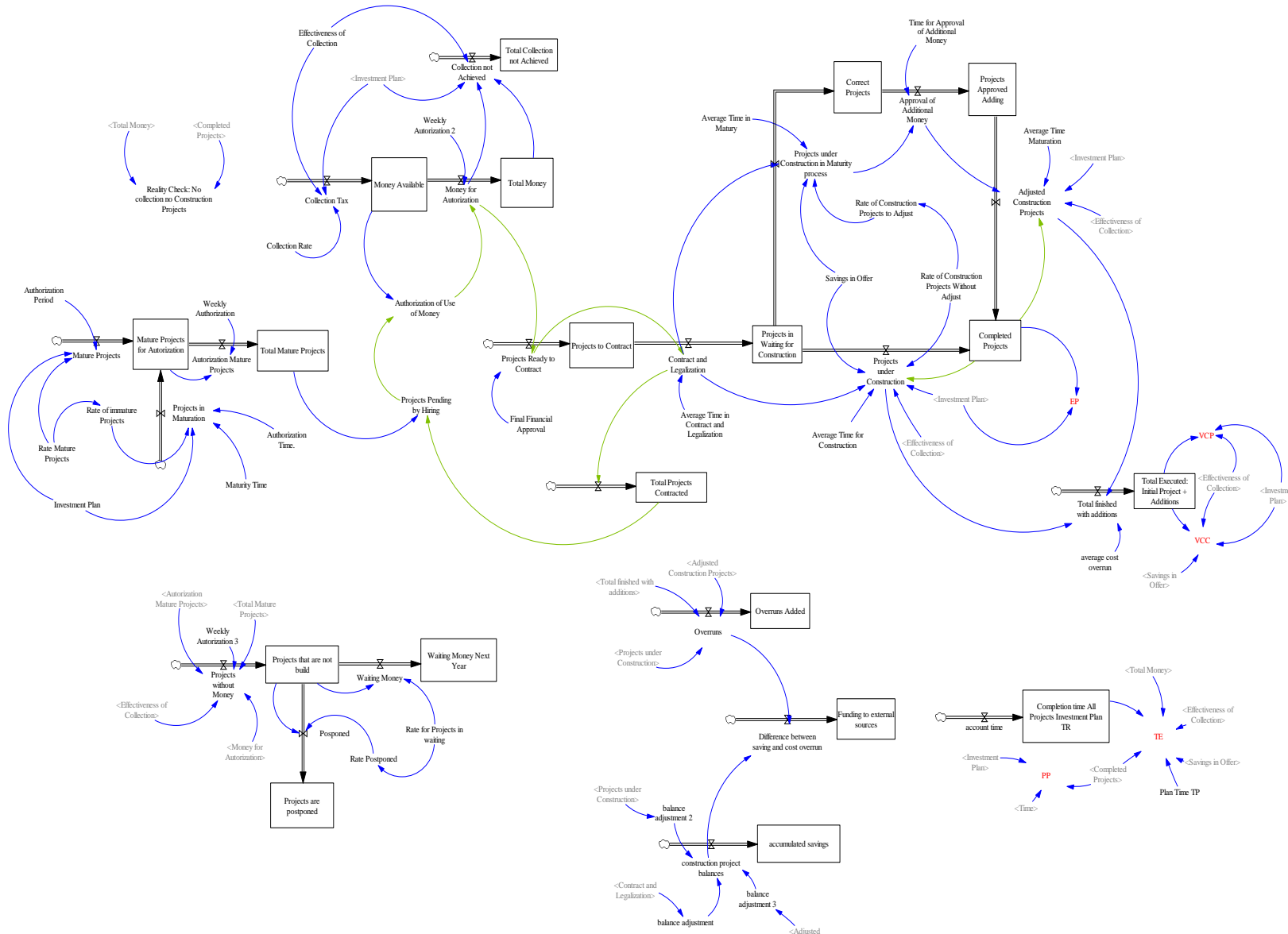


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Forrester diagram





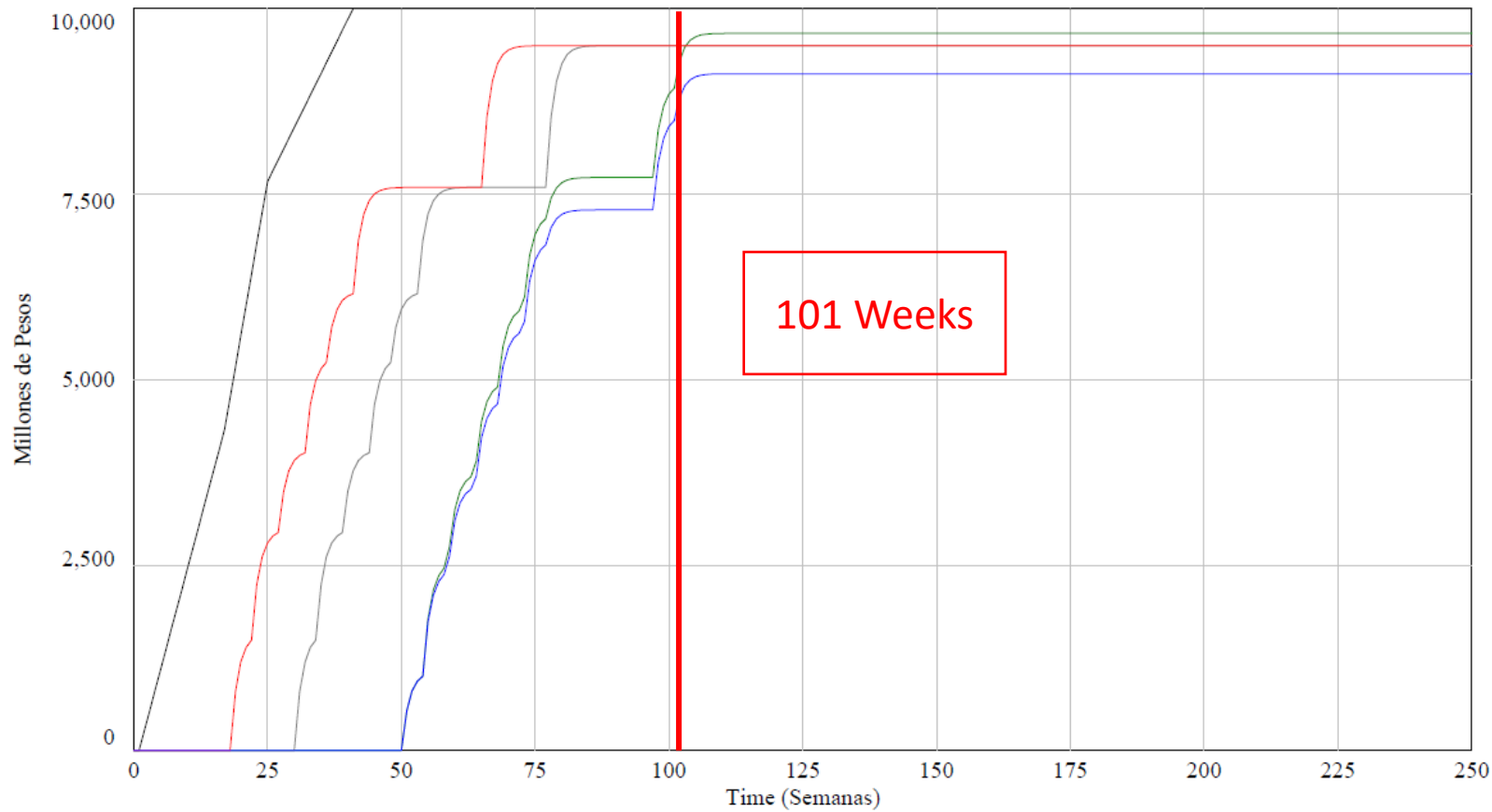
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Current state

Selected Variables



Proyectos Terminados : ESTADOACTUAL —————

Recaudo total : ESTADOACTUAL —————

"Total Ejecutado: Proyecto Inicial + Adiciones" : ESTADOACTUAL —————

Total Proyectos Contratados : ESTADOACTUAL —————

Total Proyectos Maduros : ESTADOACTUAL —————

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The simulated improve contains



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As you can see in the next table

Factor A: Approval of Investment earlier. The transfer of the collected resources faster.

Factor C: Improve Administrative Processes

Behavioral of indicators from analysis scenarios



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SCENARIO	FACTOR	1/TE	PP/0.9120	1/VCP	Global Index	Local Improv
Current	Current	0.52	0.12	0.98	0.530	Reference
1	A	0.89	0.78	0.98	0.937	82.5%
2	B	0.54	0.17	1.04	0.610	15.1%
3	C	0.57	0.42	0.98	0.659	24.3%
4	A,B	0.95	0.83	1.04	0.996	87.9%
5	A,C	1.00	1.00	0.98	1.047	97.5%
6	B,C	0.57	0.42	0.98	0.659	24.3%
7	A,B,C	1.04	1.00	1.04	1.084	104.5%

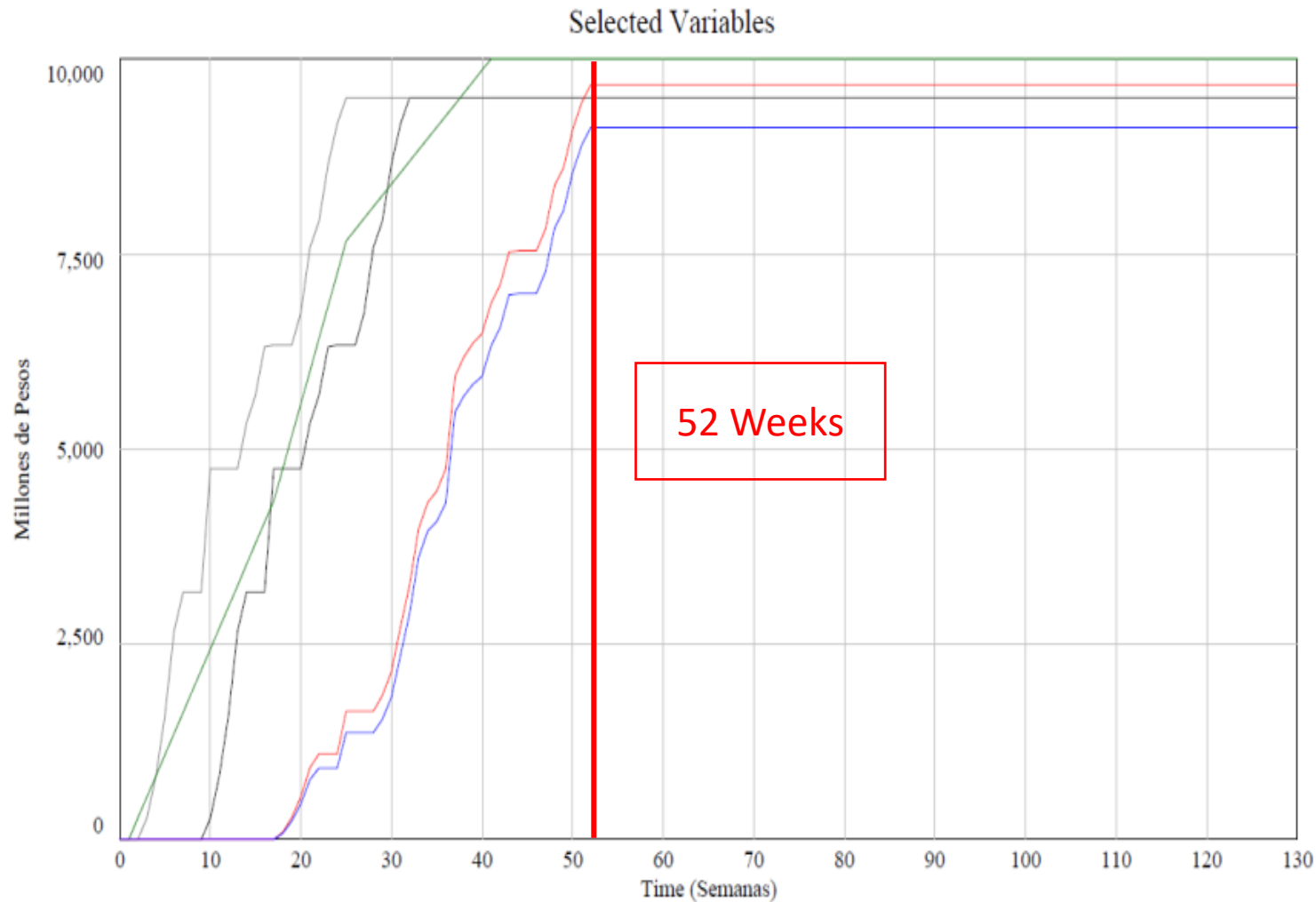


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Future state



Completed Projects : Escenario 5 —————

"Total Executed: Initial Project + Additions" : Escenario 5 —————

Total Mature Projects : Escenario 5 —————

Total Money : Escenario 5 —————

Total Projects Contracted : Escenario 5 —————

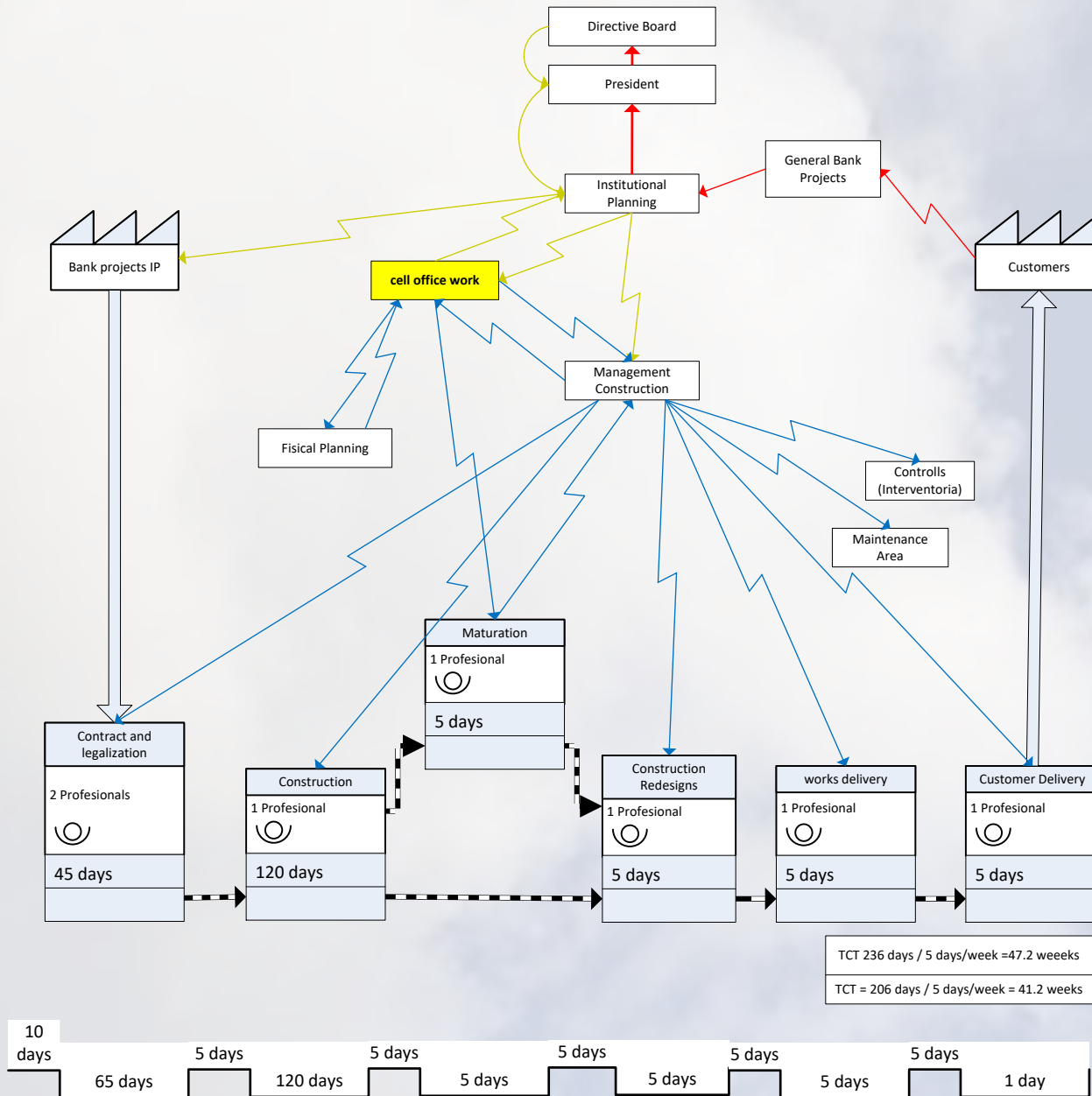


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Future state map



Conclusions



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The application of Lean tools, for this case, contributes to achieving the economical use of personnel involved in the management process, such as an increase in value-added for customers.



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Conclusions

It validates that the symptoms of problems seen in a value flow should be analyzed with a systematic approach to understanding the root of the problems and their consequences, as well as the effectiveness of improvement actions.

Conclusions



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Lean Thinking has been developed by the manufacturers years with good results, especially when a business culture is consolidated around this thought in institutions like the study, parallel to the intervention of the factors you should build this culture removal waste as a common mission to help streamline the flow in this and other business processes.



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Conclusions

Mapping the value stream is essential to identify underlying structures in the value flow, in addition to activities that add no value, to propose formulating structural measures to expedite the flow of the mainstream, and projects to can fulfill planned targets.



And that's all for now I hope you have enjoyed this presentation as I did. If you want to contact me, my email is

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