

Chapter 7

No mechanism without context: strengthening the analysis of context in realist evaluations using causal loop diagramming

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Abstract

Realist evaluation is an approach with a strong emphasis on causal mechanisms and the context in which they are triggered. However, recent reviews of published realist evaluations show that context is often understudied. This is problematic, as a thorough understanding of the relationship between context and causal mechanisms is crucial in assisting policymakers to make appropriate and targeted decisions that improve the intervention. Therefore, we set out to test whether combining realist evaluation with the ‘systems thinking’ approach and, more specifically, causal loop diagramming, could help strengthen the analysis of context. We did this through a study of a performance-based financing (PBF) intervention in the Ugandan health care sector by the Belgian development agency, Enabel. PBF allocates funds to health workers and/or health facilities based on their performance, and introduces additional management support tools, provides extra monitoring and supervision, and promotes community participation in management issues, among other activities. In this case, we found that the proposed combined methodological approach indeed adds value to the analysis, as it leads to insights into the role played by the underlying system that otherwise may have been overlooked. Moreover, such information may provide clear directions to policymakers on how to improve the intervention in a sustainable way.

Finally, causal loop diagrams help to visualize complex causal interactions and to communicate them to policymakers.

Introduction

Realist evaluation (Pawson & Tilley, 1997) is an approach that aims to understand which mechanisms caused certain outcomes of an intervention and, most importantly, in what circumstances. Indeed, a thorough analysis of the context is vital in realist research (Westthorp, 2018) and is one of the main drivers behind the first part of the ‘causal mechanism claim’ proposed in the introductory chapter to this special issue (Schmitt, this issue): ‘focussing on mechanisms increases policy relevance of evaluations because they can provide a better understanding of the inner workings of complex programs’. It is by knowing the context in which a mechanism is or is not triggered that we can more thoroughly understand how it works, and better equip policymakers for targeted action.

However, recent reviews of realist evaluations (Lemire et al., this issue; Marchal et al., 2012) show that, in practice, the analysis of the context is found to be problematic and often neglected. A promising way of thinking that may help us to strengthen the analysis of the context within a realist evaluation is ‘systems thinking’ and, more specifically, causal loop diagramming. Systems thinking originates from the fields of engineering (Forrester, 1961) and management (Senge, 1990), but has spread to other disciplines, such as health systems research (de Savigny & Adam, 2009) and evaluation (Williams & Imam, 2007). It enables us to analyse interlinkages between the intervention, the context, and the causal mechanisms in a more systematic way (Meadows & Wright, 2008). Causal loop diagramming is a tool used within systems thinking to visualize and analyse the interlinkages within a system (Meadows & Wright, 2008).

In this chapter, we thus set out to study whether combining causal loop diagramming with realist evaluation improves the policy relevance of realist evaluations. We will test this combined methodology through an evaluation of a performance-based financing (PBF) intervention by the Belgian development agency, Enabel, in the Ugandan health care sector. PBF in the health care sectors of low- and middle-income countries provide funds to health workers and/or facilities based on their performance. Additionally, PBF introduces management support tools, extra monitoring and supervision, and encourages the participation of the community in management, among other activities (Renmans, Holvoet, Criel, et al., 2017). Despite a plethora of studies of PBF, a conclusive causal theory is still lacking (Borghi et al., 2018; Renmans, Holvoet, Criel, et al., 2017). The main reasons for this are the variety of contexts in which PBF is implemented, the many components it entails, and their different modalities and the diverging outcomes (see Renmans, Holvoet, Criel, et al., 2017).

The intervention studied here started in 2015 in the Ugandan Rwenzori and West Nile regions and will end in 2020. It has a total budget of 8 million euros, fully funded by ‘Enabel.’ The intervention started with an accreditation phase, in which the facilities received a self-assessment checklist. If they scored above 85%, they received a one-time investment for equipment and drugs and qualified for the second part of the intervention. In this stage, facilities had to lower the user fees but, in return, received performance-based funds for each of the patients who were treated according to Ugandan clinical guidelines and properly documented. Every three months, the facilities’ equipment and infrastructure were reviewed and scored using a checklist, which again resulted in performance-based funds. Importantly, 25% of the funds received may be used to supplement the salaries of the health workers in a performance-based way. The intervention also introduced additional monitoring/supervision visits, a business plan in

facilities where this was absent, and training for the district health officers and those in charge of the facilities. A more detailed description of the intervention can be found in Renmans (2018) and Renmans, Holvoet, and Criel (2017).

In the remainder of this chapter, we will mainly focus on the evaluation process rather than the intervention or the evaluation findings. In the next section, we will briefly introduce realist evaluation, systems thinking, and causal loop diagramming and discuss how mechanisms and context are operationalized in the combined approach. Subsequently, we will present the four phases of the evaluation of the Ugandan performance-based financing intervention using the combined approach. We will conclude with some reflections on the added value and the limitations of the approach and reflect on our findings in the light of this special issue's 'causal mechanism claim.'

Methodology: Combining Realist Evaluation with Causal Loop Diagramming

Realist evaluation emanates from the work of Pawson and Tilley (1997) and is a theory-driven evaluation approach. This means that every evaluation starts with an explicit programme theory as a hypothesis and ends with an updated programme theory. This theory is used to understand why and how certain outcomes arise. Thus, rather than asking the question, 'What works?', realist evaluation attempts to answer the question: 'What works, when, where, for whom and why?' (Pawson, 2006).

Unlike other theory-driven approaches, realist evaluation is explicitly based on scientific realism and aspects of critical realism as developed by Bhaskar (2008 [1975]) and, therefore, has a generative view of causation (Pawson, 2006). This means that causation 'is not established by

observing the regular succession of events' (Pawson, 2006, p. 66); rather, it is by unraveling the mechanisms that underlie events and observations that we can understand causation (Bhaskar, 2008 [1975]).

While these mechanisms are called generative, the precise definition of such mechanisms is a contentious issue within evaluation, realism, and the social sciences at large. In our methodological approach, we have adopted the following definition based on several authors.

First, Astbury and Leeuw (2010) define generative mechanisms as 'underlying entities, processes, or structures which operate in particular contexts to generate outcomes of interest' (p. 368). Second, Lacouture et al. (2015) add that a mechanism can be 'an element of reasoning and reactions of (an) individual or collective agent(s) in regard of the resources available in a given context' (p. 8) (also emphasized by Dalkin et al., 2015) and that it 'evolves within an open space-time and social system of relationships' (p. 8). Thus, referring to the classification proposed in Chapter 1 (Schmitt, this issue), we conceptualize causal mechanisms as behavioural mechanisms, often occurring at the micro-level, although not restricted to it (see Westhorp, 2018).

Mechanisms are also context-sensitive; hence context is central to realist evaluation, and it is defined as 'those features of the situations into which programmes are introduced that affect the operation of programme mechanisms' (The RAMESES II Project, 2017, p. 1). We add that programme inputs (resources, rules, and components) are also part of the context and, inversely, that 'all of the characteristics of all participants plus all of its institutional, cultural and historical surroundings are part of the programme' (Pawson, 2013, p. XV). Thus, in short, context is everything that may affect the mechanism at hand (see also Westhorp, 2018).

To highlight this close relationship between context and mechanism, realist evaluation makes use of a heuristic: the context-mechanism-outcome configuration (CMOC). The CMOC

should be read as follows: this specific generative mechanism within this specific context leads to this specific outcome. By continuously updating this CMOC, a theory is constructed that may inform policymakers on the workings of this mechanism in contexts other than the current evaluation (Pawson, 2013).

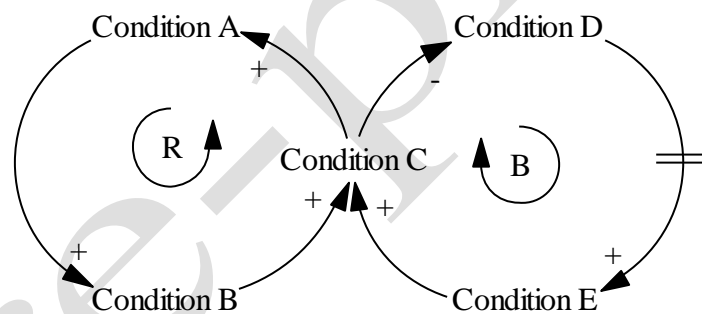
However, recent reviews (Lemire et al., this issue; Marchal et al., 2012) show that the analysis of the context is deemed problematic. Context is often restricted to a program component which fails to explain why the mechanism got triggered. Moreover, interactions between mechanisms are rarely discussed (see (Jagosh et al. 2015) for one of the exceptions). However, realist investigation should ‘seek to identify what it is within the setting [context²] that affects whether and how the programme works’ (The RAMESES II Project, 2017, p. 1). We assume that this discrepancy between theory and practice is often due to a lack of appropriate tools to integrate context into our realist evaluations.

We propose to overcome this by introducing ‘systems thinking’ and, more specifically, causal loop diagramming (de Savigny & Adam, 2009; Meadows & Wright, 2008; Senge, 1990). First, ‘systems thinking’ defines a system as ‘a set of elements or parts that is coherently organised and interconnected in a pattern or structure that produces a characteristic set of behaviours, often classified as its “function” or “purpose”’ (Meadows & Wright, 2008, p. 188). Second, it looks at the system as a whole and is interested in the relationships between the different elements rather than only two specific variables. Third, the interrelationships and feedback loops between the different elements generate outcomes. These outcomes are dynamic and may change over time due to feedback loops and delays of effects within the system.

One of the tools that is used in ‘systems thinking’ to grasp these interrelationships is causal loop diagramming. A causal loop diagram is a ‘visual representation of a dynamic

hypothesis and consists of causal linkages among elements of a system' (Tomoaia-Cotisel et al., 2017, p. 97). As shown in Figure 7.1, it consists of elements that are part of a system, arrows that causally link these elements to each other, '+' and '-' signs that denote the polarity of the causal arrows ('+' if the second condition increases/decreases when the first condition increases/decreases; '-' if the second condition increases/decreases when the first condition decreases/increases). Circular arrows denote feedback loops that are either balancing (B), which means that the values revolve around an equilibrium, or reinforcing (R), which means a vicious or virtuous cycle occurs.

Figure 7.1. Example of a causal loop diagram



Source: Renmans (2018)

Note: + = positive polarity/relationship; - = negative polarity/relationship; B = balancing feedback loop; R = reinforcing feedback loop; // = delay in the process

Thus, systems thinking and causal loop diagramming strongly emphasize the system or context in which an intervention is embedded. However, the idea of generative mechanisms is absent. This is the exact opposite of what was discussed in relation to realist evaluation (see Table 7.1.). This complementarity opens up opportunities for cross-fertilizations between the two

approaches. This has been acknowledged by Prashanth et al. (2014), Dalkin et al. (2018), and Kwamie et al. (2014), who combine realist evaluation with systems thinking, soft systems methodology, and causal loop diagramming, respectively.

Table 7.1. Comparison of the two approaches and the combined approach

	Realist evaluation	Causal loop diagramming	The combined approach
Focus on causal mechanism	✓		✓
Focus on context	Mainly in theory	✓	✓
Clear visualization		✓	✓
Feedback loops		✓	✓
Generative view of causation	✓		✓
Interaction between elements		✓	✓
Interaction between mechanisms			✓

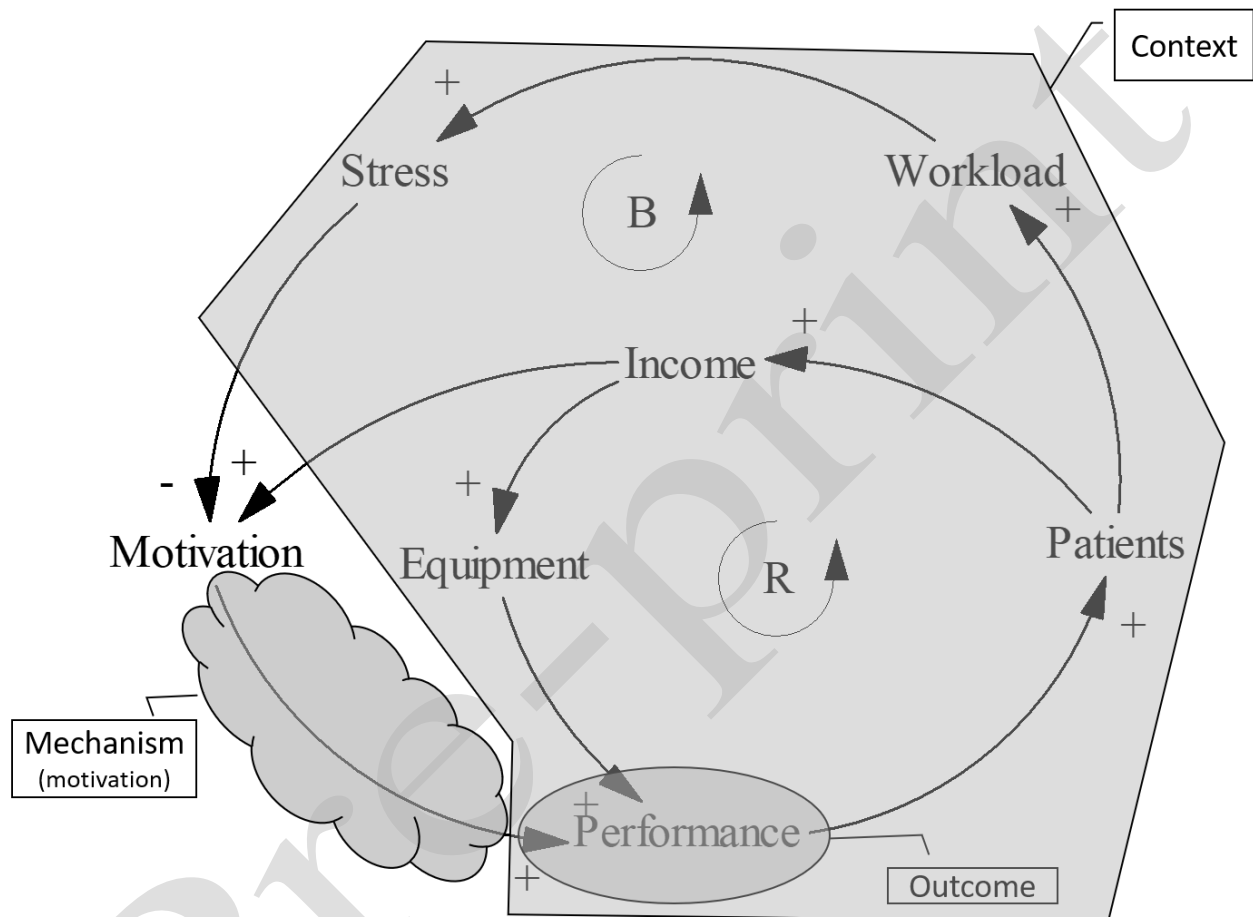
While Kwamie et al. (2014) mainly used causal loop diagramming at the end of their realist evaluation to clarify and visualize the mechanisms found, here we attempt to more strongly integrate the two methodologies throughout the different stages of the process.

The main underlying philosophy of our approach remains realism, which means that the definition of a mechanism remains unchanged. In a causal loop diagram (see Figure 7.3.), the mechanism (e.g., motivation) underlies one of the many arrows.

Context, in turn, is strongly influenced by systems thinking. The ‘context’ part in the CMOC now comprises the whole ‘system’ surrounding the mechanism arrow. The other arrows show non-mechanistic action-response relationships (e.g., higher patient numbers leads to a higher income) or other mechanisms (e.g., feeling of unease due to stress) that operate in the

context of the mechanism under study. Note that due to feedback loops the outcome is also part of the context.

Figure 7.3. Example of a CMOC in a causal loop diagram



The causal loop diagram thus helps to reveal, make explicit, and analyse the interactions in the context (which includes the intervention) that trigger certain mechanisms and lead to certain outcomes. The tool can be used during the different phases of the realist evaluation (initial theory building, data collection, analysis, final theory building). We will now demonstrate how

we applied this combined approach using the performance-based financing intervention described above as an example.

Applying the combined approach in four phases: an example

We applied the combined approach using four phases, which roughly resonate with the phases suggested by Marchal et al. (2010).

Phase 1: Initial programme theory

The first phase concerns the creation of an initial programme theory. We first created a causal loop diagram based on interviews with local stakeholders (health workers, health officers), depicting the context in which the intervention was implemented. In this diagram, we integrated the programme components based on key informant interviews, the scientific literature, and policy documents. The results of this first phase can be found in Renmans, Holvoet, and Criel (2017) and in Figure 7.4. This diagram constitutes the initial programme theory.

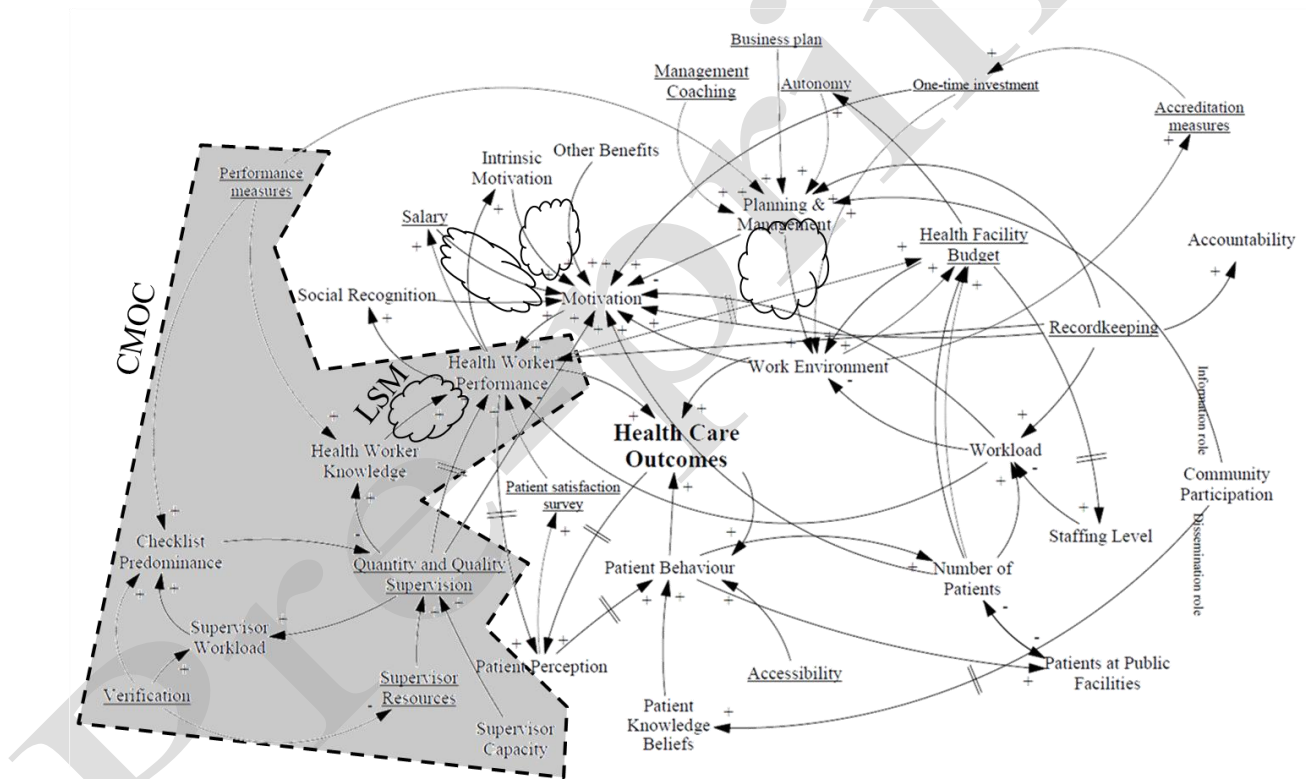
Phase 2: Data collection

In the second phase, we created the data collection tools and collected the data. Based on interviews with key informants from the donor, the Ministry of Health, and the Catholic and Protestant medical bureaus, a document search and our initial programme theory, we hypothesized the most relevant mechanisms that were triggered by the intervention. These were ‘management empowerment’, ‘extrinsic motivation’, ‘intrinsic motivation’, and the ‘learning and signaling’ mechanisms (LSM)ⁱ (see the ‘clouds’ in Figure 7.4). We will discuss the LSM in more detail as an example of the method.

These mechanisms then structured the data collection process, which was mainly qualitative and consisted of semi-structured interviews (29 respondents), unstructured interviews

(11 respondents) and quantitative surveys (94 respondents) with health care workers and an analysis of the minutes of the health unit management committee meetings (16 health facilities). Our analysis focused on the actual triggering of certain mechanisms and the relevant contextual factors.

Figure 7.4. Causal loop diagram depicting the context and the intervention, the initial programme theory



Source: Adapted from Renmans, Holvoet, and Criel (2017) and Renmans (2018)

Note. The underlined elements describe the intervention; the highlighted area is the CMOC of the 'learning and signaling' mechanism (LSM) presented in this chapter; the clouds represent mechanisms.

Phase 3: Data analysis

This phase largely overlapped with phase two, as the preliminary analysis of the data led to new and more precise questions during the interviews. During this phase, each mechanism and its context (including other mechanisms) (i.e., the CMOC) was extracted from the general causal loop diagram (e.g., Figure 7.5). This single CMOC was subsequently studied using the data from the interviews. Relevant contextual conditions and linkages were added to the diagram, while others were deleted or adapted based on a thematic analysis of the data collected.

As an example, we present the ‘learning and signaling mechanism’ⁱⁱ (see Figure 7.5): interventions, regulations, and guidelines implemented by the government signal information to health workers, in this case the government’s priorities in health care. In certain circumstances this leads to a change in the priorities health workers give to certain tasks (signaling) (see also McAdams, 2002). We combined this mechanism with the learning mechanism because it is very difficult to distinguish between a case in which the priorities have changed and one in which new information is added to the list of tasks (learning).

the intervention ‘awakened’ the health workers. This means that their attention was again guided towards the UCG. Hence, the ‘learning and signaling’ mechanism.

Our systems approach to the analysis of the context helped us to identify two kinds of contextual elements: those that influenced the triggering of the mechanism and those that intervened between the mechanism and the outcome. Among those that influenced the triggering of the mechanism was the large salary gap between the private not-for-profit (PNFP) sector in which the intervention took place and the public sector with higher salaries. This led to high staff turnover, with every respondent emphasizing that they would leave for the public sector if they had the opportunity. When new staff arrived, they did not always receive the information on the intervention’s priorities, which meant that the ‘learning and signaling’ mechanism was not triggered. This is a nice example of how an element from the overall health care system may have a direct influence on the triggering of a mechanism: an element that, without the systems perspective, might not have been taken into account in the CMOC. One contextual element that influenced the different performance levels of facilities within the PNFP sector was the capacity of the management team to communicate the measures used by the PBF intervention.

We also found contextual elements that influenced the link between the mechanism and the outcome. For example, when the necessary equipment is not available in a health facility, even if the LSM has been triggered, the health workers are not able to perform. However, when a minimum of equipment is available, the health workers can perform to a certain degree, which will lead to performance bonuses for the facility, which in turn may help to improve the work environment, leading to even better performance and higher bonuses. Hence, a reinforcing feedback loop is triggered.

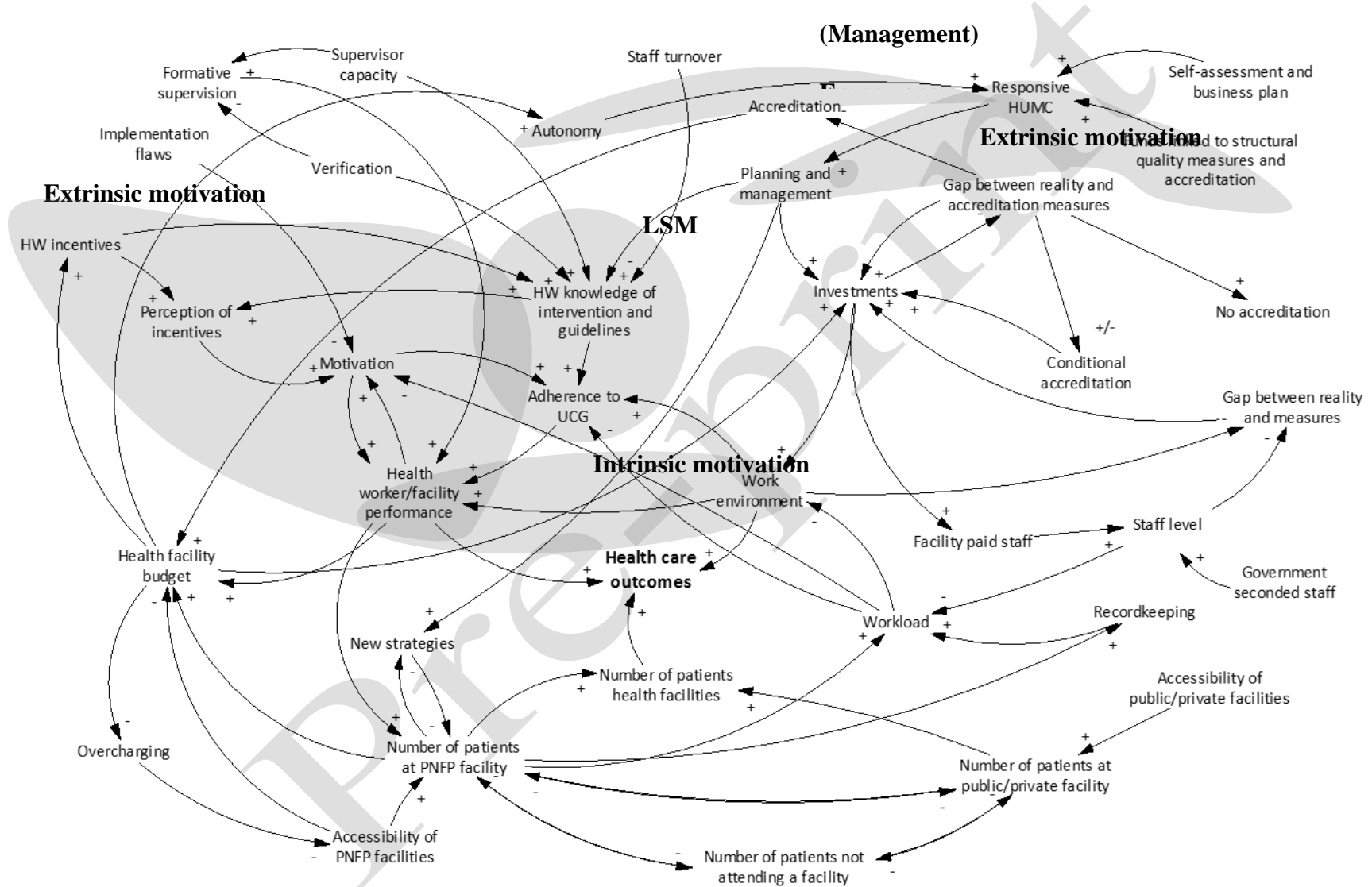
One final, important observation is that the link between a good score and increased funds provided additional incentive to the health workers to follow the guidelines; this was an extra token of recognition; it added value (not only monetary) to the measures; and made the health workers more focused on adhering to the guidelines. Here, the extrinsic motivation mechanism interacted with the LSM. Again, this interaction between mechanisms would not as easily have been found without the systems perspective and the causal loop diagramming.

Phase 4: Refined programme theory

The last phase of the approach consisted of bringing together the causal loop diagrams of the different mechanisms into one general refined programme theory (see Figure 7.6). In this refined programme theory, we abstracted some of the variables to ensure the causal loop diagram was sufficiently comprehensible. While the third phase gave us the opportunity to extensively and explicitly include the context in our CMOC, this phase made it possible to link the different mechanisms. In relation to our LSM example, it became clear that it was closely linked with the ‘management empowerment’ mechanism. This was in turn linked with the ‘intrinsic motivation’ mechanism through the creation of a conducive work environment. The latter was then linked again with the LSM, which was also linked with the extrinsic motivation mechanism.

These findings offer some interesting insights that are relevant to policymakers; for example, that empowering the management team is an essential feature of any PBF intervention; or that the financial incentives should be seen in relation to the wider remuneration structure. In this case, increasing the base salary first may strengthen the intervention.

Figure 7.6. Adapted programme theory of a PBF intervention in Uganda



Source: Adapted from Renmans (2018); Note: Highlighted areas are mechanisms

Discussion and Conclusion

We started this chapter with the observation that, although being theoretically important, a thorough analysis of context is often lacking in realist evaluations. We set out to test whether an approach that combines realist evaluation with systems thinking and causal loop diagramming could strengthen this analysis.

We conclude that this combined approach contributed to a more detailed understanding of how the context influenced the mechanisms, and it led to new insights into how the intervention could be improved. Indeed, causal loop diagrams made it possible to depict a more elaborate, dynamic, and rich picture of the CMOCs. For example, the causal loop diagrams contributed to the identification of the important role of the ‘management empowerment’ mechanism to facilitate the ‘learning and signaling’ mechanism and pointed to the impact of staff turnover due to wage differences between health sub-sectors.

Additionally, causal loop diagrams were found to be a useful visualization tool to communicate complex issues to policymakers without losing sight of the most important nuances. Indeed, while the human mind has limited capacity to think in a non-linear way and a written text is by definition linear, a causal loop diagram immediately shows the many complex feedback loops and essential effects of elements that at first sight appear distant and unrelated. At the same time, the diagram shows where changes to the intervention should be made and its expected effects.

Therefore, we reiterate that a focus on causal mechanisms will be more beneficial to policymakers (the first part of the ‘causal mechanism claim’) if accompanied by a thorough context analysis. We can only act to strengthen an intervention, or learn lessons about other

interventions and other contexts when we understand why a mechanism is triggered and why it led to a particular outcome.

However, our combined approach also raises new challenges. First, looking at an intervention from a systems thinking perspective introduces many possible mechanisms at the same time. This increases the need to be selective and find the most causally relevant mechanisms. In this study, we relied on the interviews with the stakeholders to point to the most relevant mechanisms. Second, while causal loop diagramming is undoubtedly suited to the visualization of the single hypothesized CMOCs, using it for the more abstract updated theory in phase four of our approach was more daunting and less informative. Third, causal loop diagramming in itself does not strengthen realist evaluation in making causal claims, as it is only as strong as the data put into it. However, it does lead to a more elaborate programme theory that can, in turn, be subjected to further research, possibly leading to the establishment of stronger causal claims. Finally, time constraints hampered the integration of the theoretical literature during the first phase. Thus, the necessary time investment required by this approach makes it less suitable for brief or quick evaluations.

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ⁱ These differ slightly from those mentioned in (Renmans, 2018) as we have updated the terminology. Another possible term for the LSM is ‘belief updating’.

ⁱⁱ Data and quotes supporting the claims made here can be found in Renmans (2018).