Reversing a relationship spiral: From vicious to virtuous cycles in IT outsourcing

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Abstract
IT outsourcing (ITO) remains a popular business practice, but many buyers and suppliers of IT services are caught in a vicious relationship spiral of low trust, bad collaboration and mediocre performance. This paper describes a novel process understanding of how vicious cycles work and suggests a new method for how they can be reversed into virtuous cycles. Based on the action research and complementary system dynamics simulation, this paper demonstrates how an ineffective ITO relationship between a European Harbour Authority and its main IT supplier ITCo was formed and, later, transformed. The method, involving collaborative redesign of service workflows, applied in this action research triggered the reversal of an otherwise downward relationship spiral. Both the empirical facts from the action research data and the system dynamics simulation data are provided as evidence. We conclude the paper with conceptual and methodological contributions as well as scope for future research.

Keywords
action research, collaborative service design (CSD), combined-method approach, IT outsourcing (ITO), relationship dynamics, system dynamics
INTRODUCTION

Outsourcing of IT processes is a common business practice in contemporary businesses (Gonzalez, Gasco, & Llopis, 2006; Lacity, Khan, Yan, & Willcocks, 2010; Oshri, Henfridsson, & Kotlarsky, 2018; Ravindran, Susarla, Mani, & Gurbaxani, 2015), but many of these outsourced IT relationships are not functioning well (Delen, Peters, Verhoef, & van Vlijmen, 2016; Overby, 2014). IT service providers and their clients appear to be caught in a vicious cycle of low trust, mediocre performance, and high costs on both sides (Akkermans & van Helden, 2002; Jap & Anderson, 2007). Such a vicious cycle in the context of buyer–supplier relationships is also called a relationship spiral (Autry & Golicic, 2010).

Sometimes, this relationship spiral is initiated by a price-driven initial contractual arrangement, after which the IT provider finds itself with very little financial room to manoeuvre. As a result, its service level is bound to deteriorate, which leads to even more cost-driven and detailed supplier management from the customer. This concept is known in the IT outsourcing (ITO) literature as the "Winner's Curse" (Kern, Willcocks, & van Heck, 2002). Both IT service providers and their clients would, in principle, prefer to escape out of this downward relationship spiral but cannot see any other option than changing the contract (eg, Devos, Van Landeghem, & Deschoolmeester, 2012; Kern et al., 2002). Often, even terminating the ITO contract appears to be the only effective one-time solution to end the client–supplier conflict and, hence, the deteriorating relationship (Lacity & Willcocks, 2017). However, before reaching this conclusion, there may exist possible mechanisms to reverse such a vicious relationship spiral.

In fact, significant research efforts have been made to keep ITO relationships manageable and healthy by examining the success factors involved or by solving the outsourcing conflicts. For instance, based on an intensive literature review of 73 empirical studies that used transaction cost economics and 741 earlier empirical studies on ITO in general, Lacity et al. (2011) summarised an endogenous theory on ITO decisions, outcomes and the associated constructs. In a later project, Lacity and Willcocks (2017) outlined five types of conflict resolution in the context of business services outsourcing.

We applaud the research development in the field of ITO. Meanwhile, we observed a strong reliance on cross-sectional research designs in the extant literature, and studies that, due to the inherent limitation of methodology setting, often omit the fact that buyer–supplier relationships are dynamic and can change over time (Chandrasekaran, Linderman, & Sting, 2018). A static view of ITO relationships limits our understanding of how these relationships evolve into a spiral, what are the potential mechanisms to reverse this downward spiral and what are the boundary conditions of the reversal mechanisms. Some process-based theories like social and structural governance models (eg, Choudhury & Sabherwal, 2003; Huber, Fischer, Dibbern, & Hirschheim, 2013) capture the complementarity and substitution dynamics of controls in ITO projects. These studies provide a springboard to reach a process model that describes ITO relationship spirals. However, details of the mechanisms to reverse vicious relationship spirals, the elements, sequences and boundary conditions of these mechanisms are still underexplored.

In order to address these lacunae, we build upon the existing research works by using a dynamic approach to address the problem of vicious relationship spirals. Our aim was to establish a process theory (Fang et al., 2018; Markus & Robey, 1988) that could answer the research question: how can companies engaged in ITO find a way out of the gridlock situation of a vicious relationship spiral setting?

Based on a case study involving a European Harbour Authority and its ITO partner, we report on a combined-method approach, using action research complemented by system dynamics simulation, to arrive at a novel process understanding of vicious ITO relationship spirals and how to overcome them. This process theory consists of three interlocking reinforcing feedback loops that together generate the behaviour observed. We then go on to show how an action-research intervention using collaborative service (re-)design (CSD) on workflows was effective in reversing the direction of the vicious spirals. We then synthesise the observed dynamics in the three interlocked cycles and the reversed mechanism in a system dynamics simulation model in order to further elucidate the boundary conditions of the proposed theory established in the action research (Chandrasekaran et al., 2018; Fang et al., 2018; Sting, Stevens, & Tarakci, 2019).
This paper is structured as follows. We first review the literature on ITO to identify the research gaps that led to our action research design. We then explain the empirical background of this research: IT-enabled harbour management operations. In our description of this case, we present our synthesis of a wide array of empirical data into three interlocking casual loop diagrams that collectively capture the spiral dynamics of the ITO relationship in this case. We also describe the main element of the intervention, called collaborative service re-design (hereafter CSD), which is centred on interorganisational collaborative process mapping, service workflow redesign and the development of collaborative key performance indicators (KPIs). Then, we complement the theoretical process model and the associated empirical findings with system dynamics simulation in order to explain the boundary conditions of the process theory. We conclude the paper by discussing the theoretical and practical implications as well as future research opportunities.

2 | LITERATURE REVIEW

As this study emphasises the process and dynamic perspective of ITO relationship management, we first reviewed the literature related to relationship spirals in general and then focussed on the process perspective of the ITO literature. The purpose of this literature review section is not to build a theoretical framework or hypotheses about ITO relationship spirals based on past studies. Rather, we refer to the literature to provide a fundamental understanding of ITO relationship spirals and to tackle the research gaps in literature (cf. Okoli et al., 2010; Paré, Trudel, Jaana, & Kitsiou, 2015).

2.1 | Relationship spirals and vicious cycles in general

The chicken-and-egg nature of business performance and relationship quality in buyer–supplier relationships has been known for a long time in the organisational alliance literature (Ariño & de la Torró, 1998). The notion that the mutually reinforcing nature of this relationship can lead to spirals of behaviour is also well established in the organisational trust literature: “When offered trust, people may reciprocate ... and there is a possibility of an upward spiral of trust. However, the converse may also apply, where trust engenders mistrust, and then there may be a downward spiral of suspicion. Which is the case can depend on minor events or misunderstandings” (Nooteboom, 2002, p. 94). In a similar vein to relationship spiral, in the information systems (IS) literature, Keil and Robey (1999) describe the de-escalation of commitment to failing courses of action in software project teams.

More specifically to the notion of spirals or vicious cycles, Akkermans, Bogerd, and van Doremalen (2004) have provided a detailed discussion in the context of international supply chain management. They used causal loop diagrams from the field of system dynamics (Sterman, 2000) to explain structures of reinforcing feedback loops between business performance and collaboration that do indeed lead to spiralling behaviour, either towards improvement or towards continued deterioration. To explain these important concepts, we borrow a figure from Akkermans et al. (2004) to show some of the key feedback loops involved in the dynamics of a buyer–seller relationship (Figure 1).

Loop R1 shows that the more parties trust each other, the less opportunistic they will behave, the better business performance will become and the more trust will arise from that. The opposite is also true: the lower the trust between partners, the less information will be shared and the more the business will be hurt. Loop R2 adds the effect of information transparency to Loop R1: the more information partners will share, the better performance will become. Loop R3 gives a potential solution to overcome a situation of adverse collaboration with a great deal of hard honest work or “travail” (in terms of Akkermans et al., 2004) in Loop R4. This travail will facilitate the communication that engenders understanding and trust between the two sides. In the context of ITO, this notion of “travail” was
later termed as “sheer hard work,” referring to the efforts needed to make outsourcing a success (Lacity, Khan, & Willcocks, 2009, p. 142).

The fact that it is very difficult to break out of vicious cycles is what their character. This is confirmed in the purchasing literature by Jap and Anderson (2007), who state that many buyer–supplier relationships remain stuck in “spirals of suspicion.” When one of the two parties attempts to make a major change for the better, with full sincerity or otherwise, the other party will always be inclined to interpret this effort of improvement as yet another trick, which leads to increased suspicion rather than to a positive reaction. There are clear elements of an iterated prisoner’s dilemma in this problem (Axelrod, 1984): the risk that the other party will not reciprocate trusting behaviour remains too great for both parties with every new exchange, although both would benefit greatly from a situation of mutual trust and resulting collaboration.

This notion of relationship spiralling was confirmed in a later study by Autry and Golicic (2010). Their so-called relationship strength – performance spiral – is built on two iterative patterns: (a) a downward or upward deviation-amplifying spiral and (b) a deviation-counteracting spiral. The first spiral resembles the causal loops shown in Figure 1. The second spiral represents efforts to counter less-favourable effects resulting from a mismatch between explanation and outcomes. Autry and Golicic (2010), based on a longitudinal sample of over 300 buyer–supplier relationships in the construction industry, provided empirical evidence for the existence of these spirals. Still, their research does not really uncover the mechanisms behind these spirals. Related to the first spiral, it remains hidden what factors actually cause an upward or downward amplification effect. As for the second spiral, Autry and Golicic (2010) do not explicitly address how an amplifying loop can actually be turned around. It is precisely these unknown mechanisms that are relevant in the ITO context, given the often-reported disappointing results of such efforts, thereby creating opportunities for the current study and the necessity to move to a more process-based and dynamics-oriented research design.
2.2 | Relationship spirals and vicious cycles in the ITO context

After reviewing the most relevant research on relationship spirals in a general context, we extend our understanding of this topic to the ITO setting. Other than internal IT projects, ITO undertakings can be characterised as “experiential learning and sheer hard work” for both clients and vendors in the relationship (Lacity et al., 2009, p. 142). To review the extant literature about ITO undertakings from a process perspective, we used the keywords “IT outsourcing,” “process” and “relationship” to search for related papers in the AIS Basket Eight Journals between 2010 and 2020. This search returned over 400 papers. We scrutinised all the papers and identified 85 more relevant papers. After this, however, only very few papers were found that used either a process theory or described ITO relationships from a dynamic perspective pertinent to the discussion in the current study. As a result, we broadened the literature review to other journals and focussed on relationship spirals; we found a few more articles to advance our understanding of the topic. We summarise the theoretical grounds, methodologies used and key findings of these papers in Appendix 2 in Data S1.

The common themes in ITO relationship spirals, as shown in Appendix 2 in Data S1, can be characterised as the dynamics of trust/distrust, governance, cooperation, incentive, transparency, service quality and performance in the ITO relationship. More specifically, the interdependence between trust (distrust), governance and service quality appears to accurately capture the dynamics of relationship spirals, in which high service quality leads to a virtuous cycle of increasing client's trust in the vendor, whereas low service quality leads to a cycle of distrust (e.g., Beimborn, Schlosser, & Weitzel, 2008).

Consistently, client actions have been described as oscillating between trust and control in the three areas of performance, price level and observed behaviour (Heiskanen, Newman, & Eklin, 2008). The dynamic process model of expectation, service quality, service satisfaction and relationship dynamics established by Rajamani, Mani, Mehta, and Chebiyyam (2010) suggests that if a long-term-relationship–based business service between client and provider starts out on a wrong footing, the dynamics played out will lead to a downward spiralling effect. In order to reverse a downward relationship, control (Radkevitch, Van Heck, & Koppius, 2006) and improvements in quality delivery (Rajamani et al., 2010) were mentioned as key aspects that can help firms escape the downward spiral and move towards profitable growth.

These studies showed us both a theoretical foundation and a research opportunity to address how companies engaged in ITO can find a way out of the gridlock situation of a relationship spiral setting, as further explained in the following sections.

2.3 | Governance in ITO relationships: need for a process perspective

When referring the potential way out of the relationship spiral, our literature search led us to consider the ITO governance aspect as well. In the ITO literature (formal, structural), contractual governance and (informal, social) relational governance have been extensively studied but again mostly from a static snapshot of governance in ITO projects, with a few exceptions discussing the dynamic relationship processes involved.

For instance, the evolutionary process of achieving ambidexterity in the ITO context has been captured by Cao, Mohan, Ramesh, and Sarkar (2013): from relational during the pre-outsourcing phase, to contractual and then relational governance in the post-outsourcing phase, eventually achieving ambidexterity over time. Their study highlighted that contractual governance and relational governance are causally connected over time. Similarly, the social mechanisms and structural mechanisms were integrated in a process framework that illustrated how vendor silence may be mitigated in offshore outsourcing through these various silence mitigation mechanisms.

When ITO is more explicitly linked to performance evaluation, the notion of reinforcing feedback between performance and relationship is further stressed. "The preponderance of evidence" implies a reciprocal relation between
ITO success and its key enablers, that is, sound decisions and strong contractual and relational governance (Lacity et al., 2009). In their terms: “IT outsourcing success fuelled higher levels of trust (relational governance), built stronger client and supplier capabilities, and determined the kinds of ITO decisions and ITO contracts clients made moving forward (...). Conversely, ITO failure fuelled greater need for controls, monitoring mechanisms, tougher contracts, and determined the kinds of ITO decisions clients made moving forward.” (Lacity et al., 2009, p. 138). In a similar vein, Gregory, Beck, and Keil (2013) provided empirical evidence on how coordinated controls are at first used to establish a shared client–vendor understanding, which then evolves to client-driven procedure controls when the vendor performance is not satisfied; while trust and social-based controls are triggered when vendor performance gradually improves and a shared understanding is further fostered.

Hence we can see that control configuration is dynamic, intertwining with the evolution of shared client–vendor understanding. The complementarity and substitution of contractual and relational governance can be triggered by different adaptation events (such as goal fuzziness, goal conflict and major goal misalignment), which then form into a process of governance over time (Huber et al., 2013). These literature descriptions highlight the necessity to include feedback loops in managing ITO projects and also imply the existence of relationship spirals in the ITO context.

2.4 | Critical summary of extant literature

Research on ITO associated with relationship spirals and governance mechanisms provides a dynamic perspective on how supplier–client relationships may evolve over time. Unfortunately, we found that these papers did not document the process steps describing how to break out of a relationship spiral. To our best knowledge, Radkevitch et al. (2006) were identified as the only one to explicitly mention, though not empirically test, that an ITO relationship is dynamic and can develop either through a virtuous or a vicious (distrust) cycle. They only briefly described that Winner’s Curse can negatively influence the relationship between supplier and client, whereas trust, cooperation and joint problem-solving can decide the success of the relationships.

It is well recognised that an ITO relationship is process-based and dynamic (see Appendix 2 in Data S1). Specifically, from a conceptual discussion perspective, Aubert, Kishore, and Iriyama (2015) looked into the tensions between a contractual view of outsourcing and an innovation view of outsourcing, along with the associated dynamic reinforcing cycles. They outlined four mechanisms, which are essentially self-correcting cycles: dual formal reviews, matching governance with level of innovation focus, dynamic decision-making/extreme contracting’ and ambidextrous approach. Our literature review indicates a lack of detail in the dynamic management process that covers both subjective and objective measures, sequences and boundary conditions of different mechanisms. Hence, such research gaps and the associated discussions lead to our potential contribution of a synthesised process theory (Huber et al., 2013) and “dynamic theory” (Fang et al., 2018) in the form of an explanatory causal loop model. Our aim was also to bridge the gaps in available remedial mechanisms to reverse the vicious relationship spiral, as explained in the context of an action research project below.

3 | CASE CONTEXT: IT-ENABLED HARBOUR MANAGEMENT

In this study, we focussed on an ITO arrangement between a major European Port Authority and a medium-sized European IT services provider that appeared to be plagued by a dysfunctional buyer–supplier relationship. The Port Authority (hereafter called “the Authority”) is an autonomous company with two public-sector shareholders. Although publicly owned, it is in practice mostly run as a commercial company: the Authority is an entrepreneurial port developer with a stake in various ports around the globe. Part of its strategy is to have its
home base offer an ideal showcase to attract customers worldwide with its exemplary performance in efficiency, safety and sustainability. The IT service provider (hereafter called “ITCo”) is a medium-sized IT solutions provider for the corporate world. At the time, the Authority was not one of its larger customers but the one with high market visibility nonetheless.

3.1 | ITO in 2007

In the course of 2006, the Authority went to market in order to outsource its generic IT services and IT infrastructure. ITCo won the deal and in the summer of 2007, the contract took effect. This was at a time when ITCo was quite eager to gain new business. The deal was strongly cost-driven. Even at the very final negotiation, the ITCo account manager felt compelled to take about 10% of the original price offering. Not surprising, cost reductions were a key driver for ITCo from the beginning. To give a concrete example, the service-level agreement (SLA) for problem resolution delays was set at a “silver” level of <4 hours for major incidents. The “golden” level of <2 hours was mentioned but not chosen.

To reduce costs, the activities of customer service centre for the Authority were combined with contracts for completely different businesses, such as the local government and insurance companies. Other functional areas under the ITO agreement included “development and subsequent hosting and management of office automation” and “hosting and management of both ERP and maritime applications” – a very diverse portfolio of services indeed, all handled by the same staff.

3.2 | Growing irritations: discontentment with service and a new CIO

Not long after the ITO contract took effect, the Authority felt that the IT service with respect to maritime applications, in particular, fell far short of expectations. The performance with regard to office automation appeared acceptable overall, but poor performance in the maritime domain constituted a major safety and business risk. For instance, a resolution time of 4 hours may be quite acceptable for office automation, but the same can be no less than life-threatening for maritime incidents. When IT is not available for a maritime pilot and for deck officers to steer a ship safely into the harbour, the risks of error increase rapidly and the potential consequences of such errors can be extremely high.

In addition to the potential risks involved, customer service was considered poor and problem resolution time was considered excessive. In addition, a large number of major performance incidents occurred. As a result, the Authority’s Harbour Master Division (the function managing all inbound and outbound traffic in the port) suffered major disruptions in servicing its customers. While many so-called "escalations" towards senior ITCo management took place, the Authority’s dissatisfaction with ITCo only kept growing steadily over time.

In 2010, the Authority appointed a new Chief Information Officer (CIO). One of his key tasks was to improve the effectiveness of the outsourced IT services. A quick scan convinced him of the ineffectiveness of the current IT outsourcing arrangement. The SLAs agreed upon had no direct relation to or impact on the Authority’s business parameters of efficiency, safety, security and sustainability. The CIO was aware that hassle-free IT was conditional to the Authority achieving its business objectives. His question was how do we install business-linked KPIs into the outsourcing relationship? It was clear from the onset that one requirement for such a different way of controlling would be a different nature of buyer–supplier relationship. It was with this question that the CIO approached the authors for help in the form of an action research assignment. Next, we explain the research method, action research, used in this project.
METHODOLOGY: A COMBINED-METHOD APPROACH

4.1 | Action research

For our research questions, it was essential to select a case setting where a dysfunctional buyer–supplier relationship appeared to have been at work for some time. However, we also needed close access to the decision-makers on both sides to observe and ask for their perceptions and inner motivations and how these drove their actions. Moreover, we needed a case setting in which we could use our proposed method of collaborative service design (CSD) and try to improve the relationship. The Authority-ITCo case clearly appeared to be a research setting where it was most appropriate to use "a clinical method that puts IS researchers in a helping role with practitioners" (Baskerville & Myers, 2004, p. 330), in the combination of theory generation (Sein, Henfridsson, Purao, Rossi, & Lindgren, 2011), and in the form of an action research study.

Especially, we made use of Davison, Martinsons, and Ou’s (2012) cyclical approach of canonical action research, which includes (a) diagnosing, (b) action planning, (c) action taking, (d) evaluating and (e) reflecting to guide our research design, as captured in Figure 2. We also followed Davison, Martinsons, and Kock’s (2004) principles in designing and theorising our action research project in this ITO context. With short-term-oriented contracts and relationship spirals as our research lenses, we systematically checked, in our evaluation and reflection phase, the case data for references to possible causal relations among initial conditions, buyer–supplier relationship and business performance.

We gathered qualitative data on the ITO project through multiple means, including interviews, attendance at meetings and archive material. We collected longitudinal, quantitative and qualitative data and organised them into two markedly different episodes in this outsourced buyer–seller relationship: first of deterioration and then, starting with our intervention and continuing for 2 year afterwards, of recovery. Following Eisenhardt (1989), Charmaz (2006) and Mathiassen, Chiasson, and Germonprez (2012), we used an inductive iterative process to examine evidence. We first investigated what underlying causal processes were at play during the vicious relationship cycle and then what processes...
were dominant when this cycle was reversed into a virtuous one. In the final stage of the analysis, we complemented our case data with simulation results from system dynamics analysis to triangulate our empirical findings, as explained below.

4.2 System dynamics analysis

In this study, we complemented the foregrounding action research approach with the system dynamics method (Fang et al., 2018; Sterman, 2000). A single case study faces the inherent challenge of limited generalisability. Adding simulation using the system dynamics method to the empirical case analysis allowed us to explore counterfactuals (Chandrasekaran et al., 2018). Furthermore, the simulation model makes it possible to create variety in critical decisions, boundary conditions and parameters for which cannot be observed in the empirical case data. Hence, the computational simulation model can be used to complement the process theory grounded in our case research and confirm or disconfirm the case findings (Sting et al., 2019). Particularly, we used causal loop diagramming to help us achieve the goal of extending the ITO theory from logical structures into process theory models that build upon reciprocal and temporal causal relationships (Azoulay, Repenning, & Zuckerman, 2010; Fang et al., 2018).

As the transition from a conceptual causal model to a quantified simulation model was needed, we transformed the individual relationships step by step into stocks-and-flows formulations, building on established system dynamics substructures such as information delays, first-order negative feedback loops and material delays (cf. Sterman, 2000). The model was initialised in a steady state (Barlas, 1989; Sterman, 2000) by carefully choosing parameter values that for all state variables, such that inflow equalled outflow. Then, to reflect empirical reality, the initial disequilibrium as well as the intervention made was implemented in the model. The resulting simulation model behaved in a history-friendly manner (Malerba, Nelson, Orsenigo, & Winter, 2001), broadly replicating what happened in reality.

5 ACTION RESEARCH IN DETAIL

5.1 Phase 1: diagnosis

Based on an interview with the CIO of the Authority and a kick-off meeting with key staff on both sides in early spring of 2011, the first two authors tailored their existing generic approach (citation anonymised for review purpose) for CSD to this particular setting. During the initial phases of the intervention, which focussed on diagnosis, the first two authors conducted 20 interviews, 13 of which were recorded and transcribed (interview reports were made for all 20). In this diagnostic phase, the first two authors also made several field visits to the physically dispersed locations of the companies involved. In addition, especially during the action taking and evaluation phases, they collected a variety of company documents, such as customer satisfaction surveys, workflow handbooks and meeting reports from both the supplier and the buyer as well as from the customer care centre operated by ITCo for the Authority. Quantitative data included reports with respect to performance quality and customer satisfaction.

Based on these interviews and data analysis, the two researchers produced a preliminary problem analysis. In essence, their preliminary diagnosis of what has happened in this case suggested three things. First, the cost-focussed contract had led to excessive cost-reduction efforts by the IT service provider. Second, the standardised workflow that was designed for the customer service processes to reduce costs was flawed and ineffective. It combined very specialised and high-risk maritime operations support with generic and low-risk office automation support. This did not harm the office automation operations but posed severe risks for the maritime operations. Third, improving buyer–supplier collaboration was further complicated by the segmented organisation of both companies. At the Authority side, the internal IT positions complicated direct communication between the actual business users of the IT services and the external IT service providers. On the ITCo side, various services were delivered by cost-driven service lines, with account management trying to provide an internally aligned appearance to the customer.
Phase 2: identifying the downward spiral and plan for the intervention

This section contains our synthesis of why events unfolded the way they did. Here we turn to causal loop diagrams because of their strength in building causal structures that can explain dynamically complex behaviours, such as relationship spirals, through fundamental building blocks such as feedback loops. Our analysis yielded three reinforcing feedback loops that collectively describe the causes driving the dynamics both before and after the intervention. Collectively, these causal feedback loops formed our process theory (Fang et al., 2018) of how and why events unfolded in the way they did. We provide narratives from the case material to support step-for-step each of our causal claims. We have numbered the constructs in our causal model to clarify the links between the diagrams, the quotes from the interviewees and our explanatory text.

R1: the short-term bias loop;
R2: the detailed supplier management loop; and
R3: the incentive misalignment loop.

5.2.1 Loop R1: the short-term bias loop, linking supplier’s room for investment to IT performance

Figure 3 summarises the first part of our synthesis: a short-term orientation bias was active during the first phase of the relationship; when the relationship was redefined, the focus was moved from short-term cost-cutting to long-term quality improvements.

[1–2] We start at the middle left of the loop shown in Figure 3. The first causal link there goes from the customer’s focus on short-term cost savings [1] during the outsourcing arrangement towards supplier room for investment [2]. In itself, there is obviously nothing wrong with a cost focus as a key driver for an outsourcing arrangement.
Indeed, Lacity et al. (2009) have observed that cost reduction is the most common motive behind ITO decisions. Nevertheless, cost certainly was a dominant factor in the decision-making process, as confirmed by both sides:

Cost focus was predominant in the tender. The main drivers of the Port Authority in outsourcing their IT services were decreasing cost on the one hand and leveraging supplier size and expertise on the other. (ITCo VP)

The former CIO has concluded the outsourcing deal in splendid isolation, only aiming at an as cheap as possible deal. (Authority Harbour Master)

In this case, the emphasis on short-term financial gains appears to have been counterproductive, in retrospect. On the customer side, the drive to squeeze the supplier to the utmost appears to have been especially strong:

The ICT Manager, who was about to leave the company, did the contract with ITCo and he absolutely went for the cheapest contract possible. (Authority Harbour Master)

On the supplier side, the drive to secure the deal at all costs may have been counter-productive as well. One of the ITCo executives in-charge confirmed:

During the final meeting in which the deal was made, our chief executive took off another X% of our already sharp final offer. (ITCo Client Director)

Our organization is too servile. In our drive to secure the deal, we accepted too many deviating demands from our customer. (ITCo VP)

Therefore, at the time, this may have seemed a well-executed deal on both sides, but in retrospect, the Authority may have lost more than it initially gained as it had to accept cuts in quality and quantity of IT support in exchange for the lowest price.

There is evidence from the case that because of the limited room for investment with the supplier, service quality suffered over time. Both sides acknowledge as much:

If it were my shop I would have dedicated staff for Maritime Applications. It’s always a problem when customers only focus on low pricing. It inhibits proper quality service management. (ITCo Service Manager)

Our CIO Organization is reactive as they do not have enough budget to be pro-active. (Authority Internal Consultant)

Four years later, in 2011, the urge to keep cutting costs that was triggered by the original outsourcing contract was still felt. For instance, the customer contact centre found its staff dedicated to the Authority’s IT business reduced by 25% and merged with other agents into a pool of staff collectively serving multiple unrelated customers.

ITCo’s Service Desk manager continues:

At this time I do not have Temp Labour staff, but I fear that as result of the continuing cost drive I will be obliged to make that step, which I abhor as it is detrimental to our service quality. Offshoring is something that up to now I have been able to fend off as Customer Service would be negatively impacted.

When service quality deteriorates, so does IT system performance. This is the next step in the causal loop in Figure 3. That performance went down is obvious from the increased number of IT-related incidents
that formed a key reason for customer dissatisfaction. IT incidents are difficult enough to handle in an office environment, but they are unacceptable in the maritime environment, where ships, crew and environment may be at risk if the right IT support is not available to guide operations. In the words of the Harbour Master, the executive ultimately responsible for harbour safety and smooth conduct, in 2011:

In the last 1.5 to 3 years we have suffered many lengthy incidents. For instance, one of our pivotal camera observation systems had an outage almost for over more than 4 months. My staff reacts disheartened to these events. One can hear them saying that in the old days it used to be much better. (Authority Harbour Master)

The incidents were not only dangerous but also led to significant handling costs on both sides. Here, the two organisations suffered from the original set-up of the incident-handling process, which was aimed at minimising costs, with an off-site customer contact centre as the primary and sole contact between ITCo resources and the Authority staff and with the same contact point for both office automation and maritime applications. This led to complex, time-consuming, and frustrating workflows when the standard operating procedures did not provide a solution (See Appendix 3 in Data S1 for an example of such a complex workflow). This led to higher costs for the supplier as well:

I believe our organization has been losing money on this deal. (ITCo Client Director)

No way that we can generate any returns with the present way in which the change request process is structured. (ITCo VP)

The next causal link in Figure 3 is between incident resolution costs and customer satisfaction. Here the data available on customer satisfaction can be traced back to 2009, 2 years prior to our intervention. In 2009 and 2010, average customer satisfaction for office automation and maritime calls was 6.8 on a 10-point scale at best and 5.6 at worst, with an average of 6.2 over these 2 years. In itself, this was already not such a positive picture, but the actual situation was even considerably worse because there was no separate score for maritime calls. For office automation, ITCo clearly had all the expertise in-house; but for the maritime applications, this was not at all the case. Two remarks given by anonymous respondents in a client satisfaction survey from May 2009 summarise the general mood:

In the past it was much better. The old team had much more experience and knew how to solve the problem quickly. I simply miss the old IT staff!
The people who staff the contact center outside office hours have no idea of what takes place here at the Authority, leave alone of the variety of [maritime] applications and the importance of those.

The next causal link in Figure 3 is between customer satisfaction and trust. We have a few direct quotes from interviewees on either side confirming that, at the time, they did not trust the other side any more. One obvious reason in an ongoing business relation may be that such statements are not socially desirable.

What we do know is that one consequence of trust is a strong focus on cost cutting, and that both sides actively stepped up their efforts to cut costs over time:

There is an X percent annual reduction on our costs in this outsourcing contract. As a result, we have looked at direct ways to cut costs, without looking too much at what those would imply for the customer. (ITCo Client Director)
Service Management & Operations [the internal IT service organization] has too little funding to do what is necessary to perform well. Of course the Executive Board doesn't need to finance every request, but currently the budget is really tight. (Authority Sector Coordinator)

In the causal loop model shown in Figure 3, we have made a full circle starting from the original focus on cost cutting [1] towards supplier room for investment [2]. Over time, this negative spiral only got stronger.

5.2.2 | Loop R2: detailed supplier management, trying to solve performance problems “the old way”

The second part of our synthesis concerns the frequently occurring, but ineffective, attempts to solve performance problems through detailed supplier management on behalf of the customer, which was also evident in this case. Continued dissatisfaction with the performance of the supplier, in combination with a continued focus on cost reductions, led the customer to try and micromanage the activities performed by the IT supplier. This led to detailed supplier supervision by the customer, where the customer tried to solve problems that were now the responsibility of the supplier in “the old way,” that is, through detailed direct supervision. The reinforcing feedback loop that this triggered is labelled R2 in Figure 4.

[1—8] We start at the bottom of Figure 4, focussing on short-term cost reductions [1], which in this figure leads to very detailed supplier management [8]. One example may illustrate this: in a bid to drive down the acquisition costs, a request for proposal for a certain kind of surveillance camera was split in hardware and software by the Authority to drive acquisition cost down. However:

Total Cost of Ownership went up as result of these two suppliers that had difficulty to align their processes and business requirements. Our initial offering was integrated and would ultimately have led to lower Total Cost of Ownership. (ITCo VP)

[8—9] In Figure 4, detailed supplier management [8] inevitably leads to local ad-hoc negotiations [9]:

Often, the requirements from Division Harbour Master for tailor-made IT applications could only be fulfilled by customized standard solutions. Off-the-shelf solutions are not available for their requirements. (Authority Information Manager)
The Port Authority over-specified their outsourcing needs, resulting in a very complex set of requirements. (ITCo VP)

[9—10] One unintended effect of such local ad-hoc negotiations with different suppliers [9] is that they result in a proliferation of the number of suppliers [10] next to the main outsourcing partner:

We learned from taking final responsibility for a camera surveillance solution. Instead of insisting that we would work with our own preferred suppliers for hard- and software, we went along with the Port Authority’s preference for a certain hardware supplier and the hardware supplier’s preference for a software supplier. In the end, you really want to close the deal. (ITCo VP)

Hardware is procured centrally by the Purchasing department, yet specific radar software is procured by the Facilities department itself. (Authority Technical Specialist)

[10—11] As Figure 4 explains, more suppliers [10] require more coordination from the Authority [11]:
ITCo’s Service Desk currently does not function as a real single point of contact. Once a call has been put through to one of our other suppliers, they consider the call closed and we need to keep chasing the other supplier ourselves. (Authority Service Manager)

If there was an issue for which the expertise of a supplier other than ITCo was required, both knowledge and coordination issues arose:

ITCo has no agreements with our other suppliers. Yet ITCo is the single point of contact for the other suppliers. This does not yet run smoothly in terms of fulfilling SLAs. (Authority Service Manager)

This fragmentation of knowledge was true both for the supplier base as well as for the internal Authority organisation:

Regarding the network infrastructure, a lot of knowledge is scattered around the organization and there is no overall, consolidated knowledge base. A lot of knowledge has dissipated from the organization following internal mutations. (Authority Service Coordinator)

More coordination costs more time and money, as the loop in Figure 4 suggests. This was acknowledged by the Authority, yet they overlooked the fact that they were themselves partly responsible for these extra costs.
It is striking that the Port Authority has many internal business IT demand organizations that pose requirements towards the CIO Office as the IT supply organization. In its turn, the CIO Office functions as an IT demand organization towards the Port Authority's suppliers in a management/subcontractor configuration that does not work. (Authority IT Service Coordinator)

Costs are borne not only in terms of money but also, indirectly, in terms of employee time involved, especially when many handovers and iterations are needed where all these knowledge sources need to give their input:

There are far too many links in the chain and too much time is lost. (Authority Technical Specialist)
The many handovers lead to delays. It is not unusual that the actual execution time to fulfil a request is half an hour, but the process surrounding the request spans two or three days. (Authority IT Service Coordinator)

[12—6] Loop R2 flows into Loop R1; we described this earlier when we stated the obvious truth that higher costs [12] in themselves lead to lower customer satisfaction [6]. As we observed, this lowers trust [7], which reinforces the focus on short-term cost reductions [1].

We conclude that high costs [12] and coordination efforts [11] partly arose out of well-intended detailed supplier management actions. It remains ironical that the strong focus on cost reduction by the [1] customer that had originally triggered this chain of events, led to higher costs for both the Authority and ITCo in the end.

5.2.3 | Loop R3: incentive misalignment, short-term focus rather than a long-term one

The third part of our synthesis zooms-in on the root cause of the relationship spiral: incentive misalignment with a short-term, rather than a long-term, focus. This third vicious cycle (R3) is depicted in Figure 5.

[1—13] In Figure 3, we started our analysis with a focus on short-term cost reductions. This construct now reappears in Figure 5. In R3, we argue that the focus on short-term cost savings [1] engendered misalignment of incentives [13] throughout the process. Misalignment occurred not just between the buyer and supplier but also within the Authority and within ITCo.

It is quite clear to me that there is a stark difference between what I have “contracted” with our CIO and what he subsequently "contracted-out" to the ITCo. (Authority Harbour Master)

Also ITCo perceived misalignment of incentives: here, stovepipes and SLAs flourished:

It seems as if the process is being run based on SLAs: nobody sees a problem, everybody has taken care of his own part of the process, but the coordination is at the front end and the customer is still having a problem. (ITCo Project Executive Data Centre)

[13—14] This incentive misalignment [13] led to an almost total absence of focus on long-term quality improvements [14]. In a 2-day workshop conducted as part of the intervention (discussed later), dysfunctional demarcations of responsibilities emerged as one of the main improvement opportunities. The group responsible for specifying what needed to be done in this area summarised the core issues as follows:

- Knowledge distributed over many nodes in the chain
- Demarcations between parties and within parties
Focus on improving components instead of reducing complexity
No end-to-end overview
Incorrect expectation that end-to-end overview resides with customer contact centre (Output Joint Workshop Subgroup Control Complexity/Demarcations)

Such misalignments could be fixed through a redesign of the shared workflows, but there was simply not enough trust on both sides [7] to bring up the willingness to work in partnership mode [15]. [15→14] Given that work processes were closely interwoven, any effort from one side to shift the focus towards long-term quality improvements [14] was doomed if the other stakeholders would not collaborate in partnership mode. [14→3, etc.]

The rest of R3 in Figure 5 is identical to the links in the short-term bias loop shown in Figure 3 but now working in the reverse direction. Hence, from that point in time, focus on long-term quality improvements would lead to higher service quality. This would lead to better IT system performance [4], which would lower incident resolution costs [5] and increase customer satisfaction [6] and lead to higher trust [7]. In this manner, the group consisting of representatives of both parties had become aware that they themselves were in a fine position to reverse the vicious cycle they all suffered from into a virtuous one.

5.3 | Phase 3: interventions

5.3.1 | The intervention by the authors

The interviews and subsequent workshops that the authors conducted as intervention yielded four crucial business processes on which improvement efforts in the ITO relationship had to focus:
1. resource mobilisation;
2. problem resolution;
3. knowledge management; and
4. incident prevention and mitigation.

In all these four processes, the IT vendor played a crucial part, but its role was intertwined with that of the client. The first two aspects had direct short-term to mid-term operational impact, and knowledge management was as an enabling factor to them. Incident prevention and mitigation had long-term operational impact. This was a requirement to become a world-class port authority. The authors and the stakeholders worked together on these processes in a number of steps. Appendix 4 in Data S1 shows the intervention approach in the first stage: interviews on both sides, a steering board meeting with management of both companies, two company-specific workshops and then a big 2-day workshop with all stakeholders involved. Each step was logically linked to the next.

A key role was played in the intervention by the joint 2-day workshop. This was carefully prepared and planned, as Appendix 4 in Data S1 visually summarises these processes. The interviews helped formulate an initial diagnosis and derive from that a sensible activity plan. In the two company-specific workshops, the participants developed process flow maps of the activities most directly affected by the outsourced IT systems, as summarised in Appendix 5 in Data S1. Fact-based, objective materials were shared in the joint workshops. As an example, Appendix 3 in Data S1 shows one such process flow that illustrates how, in a worst-case situation, a simple question to the IT call centre resulted in a very complex escalation process, in the end involving the Harbour Master.

Content-wise, the process flows created in the diagnostic phase formed a safe and solid preparation for the 2-day inter-company workshop. With these flows, one came well-prepared to the joint workshop. They also laid the groundwork for more trust and a better understanding of the other party’s expectations, as they made it clear that some of these processes were just ill-designed.

The focus on building trust through greater transparency (cf. Figure 1) of the problems faced due to the ill-designed processes continued in the 2-day workshop. Here, mixed groups from both companies played the beer game (Sterman, 1989), a stylised system dynamics board game depicting a four-echelon supply chain where lack of communication and collaboration has disastrous effects on performance. This helped create a better understanding of the interdependencies that the two companies were facing. The Harbour Master himself came to the workshop to articulate the “voice of the customer”, albeit as an internal customer of the Authority’s IT systems. He explained how he perceived the state of affairs. This made it even clearer that something had to change in the way both groups had organised their joint processes.

But how? To address this question, the researchers conducted a so-called “group model-building session” (Vennix, 1999) with the entire group of 20-odd company representatives, in which they used system dynamics modelling to zoom-in on what was causing the main performance issues in the existing collaboration. Here, the root causes for the present problems became transparent and agreed upon. Trust could grow further, as it was clear that people were not just forced by ill-designed processes and incentives to deliver suboptimal performance. The list of priorities the group collaboratively defined for what needed to change included the following:

- One integral chain coordinator 24/7
- With contractual mandate and ownership
- Separate process flow for maritime incidents, also within ITCo
- “Virtual war room” with good insight
- Good problem intake
- Shortening of incident resolution time through structured incident management process
- Output joint workshop subgroup control complexity/demarcations
At the end of the workshop, every participant mentioned one key benefit and one key concern from the workshop in a so-called "benefits & concerns exercise." Here we found statements such as "deeper insight" being mentioned 11 times; "openness and transparency, more understanding" being mentioned five times and "willingness to seek solutions with all of us together" being mentioned three times. These comments illustrate that this 2-day session indeed marked a significant departure from the past. The 2-day off-site workshop with the key stakeholders from the two companies was a turning point for both sides. During this workshop, the stakeholders for the first time really heard "the story from the other side" and also saw how the problem descriptions from the other party seamlessly complemented their own perceptions. Both sides realised that they had so far only seen "parts of the whole elephant" (Senge, 1990). A detailed description of this big workshop and the two workshops that were conducted in preparation is included in Appendix 5 in Data S1.

The four main business processes referred to earlier became the bases for four project teams consisting of participants from both sides. From this day on, it was no longer "us" and "them," but there were "four cross-company teams guided by a steering board with the authors taking a step back, staying involved but only periodically," as auditors on the progress made by the inter-organisational problem-solving teams set up to implement the solutions defined. In particular, the authors oversaw the overall structure of the set of collaborative KPIs that were developed by each sub-team on the various aspects of preventing and resolving nautical IT incidents. Appendix 6 in Data S1 shows how these operational and enabling collaborative KPIs covered and causally linked the four business as a "strategy map" of interconnected KPIs (Kaplan & Norton, 2004).

The last steering committee meeting in April 2012 was fully dedicated to the formal specification of these collaborative KPIs. It was decided that the collaborative KPIs were to replace the traditional "bonus-malus" arrangements. Different collaborative KPI buckets were used: operational and enabling KPIs (weight 50%); bi-directional satisfaction KPI (weight 30%) and strategic collaboration (weight 20%). The relative size of these incentives was modest, around 1% of the total contract value, funded in half by both sides.

One year later, in 2013, 2 years after the 2-day workshop, the evaluation interviews took place. A team of four master's students conducted six evaluation interviews with managers on both sides of the relationship, all of which were recorded, transcribed and analysed. The students were conducting this work under an honors program arrangement and had no direct supervision relationship with the researchers. This limited the risk of socially desirable responses to questions or analyses with regard to effectiveness of the intervention made. During this phase, the students also collected additional post-intervention performance data on customer satisfaction and IT performance.

From these evaluation interviews, the picture that emerged was mostly positive. It was clear that the relationship between the Authority's IT department and ITCo management had become much more intense and open, and that the nautical incidents that had given rise to the relationship crisis had been tackled effectively (see Figure 3). Moreover, there were positive sentiments about what had been achieved in the past period on both sides.

5.3.2 | Three reinforcing feedback loops generating ITO relationship spiral dynamics

After explaining the interventions, we are now ready to combine our three strands of theory into one theoretical synthesis. Similar to Akkermans et al. (2004), we synthesised the three individual reinforcing feedback loops into one integrated causal loop diagram that is capable of explaining the vicious relationship spiral and role of the intervention in this case. This is shown in Figure 6. For a description of the individual causal links in Figure 6 refer to the analyses in the preceding sections, together with evidence from our empirical material.

There are two new elements in this diagram. These refer to the effects of our intervention, and they are shown in the centre in italic capitals in red, as explained by interview data below:
Through collaborative service redesign [16], the parties involved were able to regrow their trust [6] in the other side.

Through the collaborative KPIs that were developed [17], incentives could be aligned [13] much better.

These two exogenous factors made it possible to change the direction of the three causal loops, which would have otherwise continued in the same direction. In previous sections, our empirical material had shown evidence of the occurrence, in this case, of a downward relationship spiral, or a vicious cycle. The structure of Figure 6 confirms this because it only contains so-called "positive" or "reinforcing feedback loops" (Sterman, 2000). Such a structure implies that, without intervention from factors outside of the loop, the loops will lead to behaviour that will keep moving in the same direction over time. This can be either a vicious cycle, with ever-lower values, or a virtuous cycle, with ever-higher values. To change from a vicious to a virtuous cycle, one needs some external force that can flip the direction. This is where the exogenous effect of the intervention comes in. We argue from the case and will argue further using results of the simulation analysis we conducted on Figure 6, that such an exogenous intervention could have such an effect.

5.4 Phase 4: post-intervention evaluation

In the post-intervention phase, we needed to evaluate: did the intervention really work? Did business performance really improve? Academically, and even more importantly, did the intervention really change the direction of the

**FIGURE 6** An integrated causal process theory of ITO relationship spiral dynamics [Colour figure can be viewed at wileyonlinelibrary.com]
loops? We will first look at operational performance in the post-intervention period and then look at the values of the three interconnected loops from Figure 6.

One year after our formal involvement, operational performance had improved significantly. Major incidents, which had caused a significant deterioration in customer satisfaction and relationship quality, had greatly reduced in number in the period after the intervention and especially those caused by the IT supplier (see Figure 7).

Second, not only did major incidents reduce in number but incoming calls from the Authority reduced as well (see Figure 8). Such calls may be seen as proxies for how well IT services were performing overall, for if everything is proceeding smoothly there is no reason to call the helpdesk.

Third, the reduction in the number of incoming calls coincided with better scores on customer satisfaction, moving from below 6 on a 10-point scale to over 7, 1 year later. The improvements in both performance and relationship quality that our quantitative data suggest are mostly confirmed by the qualitative assessments made by the key stakeholders, as we see later in Tables 1-3. It is important to highlight that there was no contract renegotiation during the intervention. The existing contract was NOT modified. It is the process and relationship improvement that made the difference.

We now move on to address the question whether the intervention really changed the direction of the loops. We found the values of the variables in loops R1-R3 consistent with the facts of the case concerning a pre-intervention vicious cycle. However, we needed to know whether these values indeed changed for the better in the post-intervention period and whether the situation evolved into a virtuous cycle. To provide material that suggests that this was indeed the case, we show in Tables 1-3 quotes from our case material. The evidence indicated that the values of most of the variables “flipped” in a direction for the better. The empirical data mainly came from the evaluation interview transcripts from 2 years after the start of the intervention.
5.4.1 | Loop R1: moving away from short-term cost focus

Table 1 summarises the key quotes from the interviewees on both sides with regard to Loop R1, namely "moving away from the short-term focus." These quotes suggest that this dyad had indeed succeeded in reversing the vicious cycle of more and more short-term focus on costs and the detrimental effects on performance and trust associated with it. What we observed was a clear focus by the IT supplier on making incremental improvements to existing issues. Both sides now recognised that for the benefit of both, the supplier needs to be able to make a decent profit. The negative effect of the original contract had been acknowledged and was abolished by both sides.

The drastic reduction in the number and duration of nautical incidents, as shown in Figure 7, was recognised by both companies; but at the same time, the performance in office automation had not improved significantly, which was also recognised by both sides. Both customer satisfaction and inter-organisational trust grew significantly. A comment to that last point is that in the service triangle of Authority business, Authority IT and IT supplier, the IT supplier still felt left out of the discussions with the Authority business.

5.4.2 | Loop R2: moving away from detailed supplier management

In the area of detailed supplier management, it appears that things took longer. At the time of the interviews, it had not yet moved fully away from the prior vicious cycle of very detailed coordination by the customer of supplier activities. The Authority being a complex organisation, a hybrid between a public service and a business company in which many "desks" are involved in processing decision proposals, changes in organisational routines takes time – years rather than months. Therefore, both sides still suffered from avoidable delays and staffing costs. These observations are summarised in Table 2.

5.4.3 | Loop R3: moving away from incentive misalignment

Issues of detailed supplier management notwithstanding, we now examine whether this relationship dyad was able to break out of the vicious cycle of incentive misalignment. The overall assessment that emerges from Table 3 is positive.

Both parties now had very intense, daily problem-solving contacts, so the willingness to collaborate was definitely there. There was also certainly an improved alignment of incentives. The main concern here from the perspective of the IT supplier was that the direct relation it had with Authority was mostly with the IT department and not with the business departments. This implies that the real alignment with this "final customer" was not present. Nevertheless, the reality remains that ITCo is not the only IT supplier for Authority and that often problems and solutions require coordination with those other suppliers. In retrospect, this was only to be expected. The Authority remains its own "systems integrator."

6 | COMPLEMENTARY SIMULATION ANALYSIS

6.1 | System dynamics analysis

The above action research data allowed us to establish a process model for describing the dynamic ITO relationship spirals. In order to generalise and augment the theory emerging from the case data, we devised a computational model to simulate the vicious and virtuous cycles following the combined-method approach used by Chandrasekaran et al. (2018) and Sting et al. (2019). The purpose behind including the system dynamics analysis was to provide more...
quantitative evidence to the qualitative claims we made earlier. More importantly, our aim was to identify the critical decisions and boundary conditions for which there was no counterfactual in our empirical case.

The causal diagram in Figure 6 summarises our qualitative findings from the action research case. We make several claims here that need strengthening. First, we claim that this causal structure can explain the behaviour in the case, from worse to better, in terms of performance and trust on both sides. Second, we claim that in both cases, the same reinforcing loops were active, albeit working in opposite directions, from vicious to virtuous cycles. Third, we

| Causal loop element | Buyer perspective 1 y post intervention | Supplier perspective 1 y post intervention |
|---------------------|----------------------------------------|------------------------------------------|
| Focus on ST cost reductions: (+) | We regularly hear that there have been changes to improve the quality of the service. (Authority Service Mgr IT) [The supplier] is very active in technical life cycle management. (...) This way we can reduce the maintenance backlog and complexity (...) I see little structural investment in innovation. (Authority Contract Mgr) | When things are outdated they will have to be replaced (...) This is an ongoing process (...). There have been multiple changes, adaptations and improvements in the system in the last 2 years. (ITCo Account Mgr) We have now fully focused on quality (...) I would not sign the [original] contract again because the solution was to one-sided. (ITCo Client Director) |
| Supplier room for investment: (+) Supplier has actually invested successfully | We want a party that can earn a decent living from [Authority]. (Authority Contract Mgr) (...) We have been able to halve the recovery time for all major incidents and vastly reduce the number of incidents. (ITCo Client Director) | |
| Service quality: (+) Nautical incident much fewer and better | At this time I am moderately satisfied about both services combined [nautical incident treatment and office automation]. (Authority Service Mgr IT) | In 2011, we had to bother [Authority] with quite a few disruptions and as a company we cannot be proud of this. Looking back now I see that, since about a year, we are delivering very high quality. (ITCo Site Client Mgr) |
| IT system performance: (+/-) Nautical systems OK, office automation so-so | I am satisfied with the applications but not with their availability. (Programme Manager, In-house IT Development) | When I look at the office automation, there are still a number of improvements we would like to make. (ITCo Site Client Mgr) |
| Incident resolution costs: (--/-) Much lower incident costs | NA | (...) We have been able to halve the recovery time for all major incidents and vastly reduce the number of incidents. (ITCo Client Director) |
| Customer satisfaction: (+) Clearer delineation of responsibilities | Both responsibilities and authorities are clearer. That has all been arranged. This makes it easier to accommodate each other. (Authority Business Mgr) | NA |
| Inter-organisational trust: (+/-) Good and open dialogue, but ITCo feels left out of discussion between Authority business & IT | Fundamentally, the dialogue is good and open and that contributes to a better contact. (Authority Contract Mgr) | I think the factor trust has strongly improved, because the quality of the service has significantly improved (ITCo Site Client Mgr) Where we now talk with the IT department you should be talking in a triangle with the business and IT. We are now being kept at the outside. (ITCo Client Director) |
also claim that the change in behaviour occurred because of our intervention using the CSD method, including collaborative KPIs. We claim that this resulted in a reversal of the relationship spiral. However, these loops involve hard-to-observe constructs such as trust or satisfaction, inner drivers of behaviour.

### TABLE 2  Key quotes from buyer and supplier regarding supplier management dynamics

| Causal loop element | Buyer perspective 1 y post intervention | Supplier perspective 1 y post intervention |
|---------------------|----------------------------------------|------------------------------------------|
| Detailed supplier management: (-) Still ongoing at Authority | We have an ambitious agenda, also in IT. This makes that you have a lot going on and you have to remain alert that your attention does not get fragmented. (Authority Contract Mgr) | Despite all best intentions from [Authority] we notice that they still have problems making decisions for improvements because of work pressure, budget restrictions etc. (ITCo client director) |
| Local ad-hoc negotiations: (-) Still ongoing at Authority | There definitely is a whole decision trajectory behind innovation decisions and changes in system landscapes. (Authority Service Mgr IT) | For a number of project we have made plans and proposals the last half year several times, but then in the end there is no go. (ITCo Site Client Mgr) |
| Number of suppliers: (0) No apparent change | NA | NA |
| Need for coordination: (+/-) Better, but still fragmentation at Authority | Things are becoming clearer, but it is still not completely clear what impact a certain change would have on our IT landscape. (Authority Service Mgr IT) | I observe that there are very many decision handovers within [Authority] and so it is very difficult for me to find out who was to authorise a decision. That generates much unclarity and complexity. (ITCo Account Mgr) |
| Supplier management cost: (0) Still considerable SRM costs at Authority | There are seven of us (In the internal IT department): 4 service coordinators, one contract manager and two service managers. (Authority Service Mgr IT) | All the activities we now have to charge individually to [Authority] and they either have no budget for that or do not want to spend it. (ITCo client director) |

### TABLE 3  Key quotes from buyer and supplier regarding incentive alignment dynamics

| Causal loop element | Buyer perspective 1 y post intervention | Supplier perspective 1 y post intervention |
|---------------------|----------------------------------------|------------------------------------------|
| Willingness to partner: (+) Joint problem-solving on a daily basis | Every morning we stand with staff from ITCo in front of the plan board to see what the progress is on specific topics. (Authority IT Mgr) | The main turnaround has been that we no longer point fingers at each other but that we convene everyone to assure a solution (ITCo Client Director) |
| Alignment of incentives: (+/-) More alignment ITCo with IT department, but not yet with Authority business | It is absolutely no 80/20, with us paying horrible sums of money and getting nothing in return. It is also not so that we are in first rank. It is somewhere in between. (Authority Business Mgr) | The customer’s IT organization also has to be happy with your services and that may be at odds with what an end user will need, so I cannot fully say yes to that. (ITCo Site Client Mgr) |
| Focus on long-term quality improvements: (+/-) In incident management process yes, w.r.t. third parties no | We have contributed the [nautical] knowledge that was missing in the incident management process, (Authority Service Mgr IT) | In our contract renewal we have proposed changes so that we can react quicker and better to changed and incidents with regard to 3rd parties. Eventually, [Authority] has decided not to go along with those. (ITCo client manager) |
We provide additional evidence to support these claims by quantifying the causal diagram of Figure 6 into a system dynamics simulation model (see Figure 7). This enabled us to conduct rigorous experiments (Axelrod, 1997) involving the effects of hard-to-observe constructs such as trust and satisfaction. Obviously, the simulation was not like a simulation model of a factory or a computer algorithm, where the aim is to make a correct representation of a physical reality or a formal construct. Our aim was to test the dynamic theory (Davis, Eisenhardt, & Bingham, 2007; Fang et al., 2018; Sterman, 2000) that our causal loop diagram formed. The way to test was to evaluate if it could generate history-friendly behaviour (Malherba et al., 2001) that mimics the actual behaviour already observed empirically. This approach of translating a rich longitudinal case history into a formal simulation model and conducting experiments with the model to arrive at a deeper history of what really happened in the case, and why, has a long history in the system dynamics literature (eg, Hall, 1976; Rudolph & Repenning, 2002; Van Oorschot, Akkermans, Sengupta, & Van Wassenhove, 2013).

Below, we present a single model that behaves very differently when the value of one key policy variable is changed, a CSD intervention (Boolean value: YES or NO). This behaviour, as well as the intervention made, is in line with the facts of the case.

### 6.2 Model structure

The model structure is equivalent to the causal structure of Figure 6 but translated into a stocks-and-flows structure (Sterman, 2000). This results in a more complex model, as shown in Figure 9. This model consists of 8 state variables or levels, 28 auxiliary variables and 39 constants, a total of 76 elements. It is dimensionally consistent. All constants are shown in grey and between brackets. Data S2 file "simulation sensitivity analysis" contains a description of all the variable equations, according to the documentation guidelines provided by Rahmandad and Sterman (2012), a listing of all parameter values and a description of some of the sensitivity analyses conducted with the model (see Appendices 7 and 8 in Data S1 for details). In addition, in line with Fang et al. (2018), we also show how we used the same set of methods to validate the simulation model (see Appendix 9 in Data S1).

### 6.3 Model behaviour

To bring this model in line with historical policies, and also considering the parameter values and changes are not visible in Figure 9, we needed to introduce two changes in parameter values:

- In the simulation, 2 years after the case started, we introduced an intervention that would last 12 months, during which the CSD activities lead to a temporary increase in trust.
- During this same period, a set of collaborative KPIs were developed (this Boolean parameter switches from 0 to 1), which lead to a better alignment of incentives.

The behaviour then unfolded in the simulation model similar to the behaviour observed in the empirical reality of the case. We started with the behaviour of constructs, trust and satisfaction, as shown in Figure 10.

For the first 24 months, there was a steady decline in trust and satisfaction. This downward trend, indicative of the reinforcing feedback loop/vicious cycle that was active, was reversed as soon as the intervention started. Trust immediately started to rise because during the invention both sides communicated intensively, learned from each other and worked together closely, leading to various forms of trust such as competence-based trust and habituation (Nooteboom, 2002). Satisfaction continued to decrease a little with a bit longer period but then started to move
upward. Satisfaction is driven by the costs of incidents and supplier management, and these did not go up for some time. As soon as the intervention stopped, there was a temporary dip in trust, but satisfaction continued to grow, and from week 45 onwards, trust started to grow as well. We will zoom-in the antecedents of trust later on.

We argue that what unfolded in the simulation is similar to what transpired in reality. We refer to Table 4 for this, where we have summarised the values of the key variables prior to and after the intervention, both from the simulation and from the case data analysis. We have shortened the quotes from Section 5.2 for the pre-intervention assessments and from Tables 1-3 for the post-intervention status.

Next, we continue our description of model behaviour. Trust is the main driver for the focus on short-term cost reductions. This is also evident in Figure 11. For the first 2 years, this focus kept increasing and so the room for investment kept declining.

However, when the intervention started and trust received a boost, the focus on cost reduced. Over the course of the intervention, investment funds available kept rising. There was a temporary dip after the intervention was stopped, but in the last year, the trend was again increasing.

These investments are essential to keep service quality up. It can be seen in Figure 12 that this quality was declining during the first 24 months, and so IT system performance was deteriorating and incident resolution costs were rising. Here too, with some delays, this trend was reversed after the start of the intervention in month 24.
Meanwhile, the associated loop of detailed supplier management followed the same pattern but only very slightly, in line with the empirical findings, which suggest that observable changes in supplier management were modest at best, in the year after the intervention. Still, we could observe, first, a slight rise in detailed supplier management, in the number of suppliers and in the associated supplier management costs, as shown in Figure 13. Then, from month 24 onwards, with a reversal of the trend towards less detail, both the supplier base and the SM costs broadly stayed the same.

6.4 Model analysis and boundary conditions

The simulation model indicated the boundary conditions of the CSD intervention method, as explained below. First, it confirmed our observation from the causal diagrams that the intervention was necessary to reverse the vicious cycle into a virtuous one. Figure 14 shows the behaviour of some key variables in a scenario without intervention. That means that no intervention would have led to lower service quality, higher incident resolution costs, lower trust and less room for investments. In the real world, the relation might have been terminated well before the 5-year period.

Second, the simulation model showed that the magnitude and the timing of the intervention mattered. In Data S2 document, we show the sensitivity analyses we conducted. The simulation analyses indicated that the intervention needed to last at least 6 months, as 3 months would not have generated a lasting change. Our simulation also indicated that a later intervention would have been, indeed, too late. After 36 or 48 months, values would have become too low to be receptive for a lasting reversal. Why is this? To answer this, we need to take a closer look at the behaviour of trust in the intervention scenario. It is understandable that it went up as soon as the intervention started. It is even quite logical that it dropped after the intervention ended. However, why did it pick up again after week 45? Here the overview of the antecedents of trust in Figure 15 gives the answer.

The state variable trust is determined by two rates of change: $T_d$ (the decay rate of trust) and $T_c$ (the change in trust). For months 0-24, $T_c < T_d$ and trust decreased, followed by a sudden increase in $T_c$. When $T_c > T_d$, trust grew. At month 36, the intervention stopped and $T_c$ dropped to around $-0.2$. Interestingly, after that, $T_c$ bounced back.
| Variable                  | Pre-intervention in sim. | Quotes Pre-intervention                                                                 | Post-intervention in sim. | Quotes Post-intervention                                                                 | Figure No. |
|--------------------------|--------------------------|-----------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------|------------|
| Trust                    | Down                     | *In the past it was much better. The old team had much more experience and knew how to solve the problem quickly.* | Up                         | *the dialogue is good and open and that contributes to a better contact...I think the factor trust has strongly improved.* | 10         |
| Satisfaction             | Down                     | *I simply miss the old IT staff!* ...The people who staff the contact center outside office hours have no idea of what takes place here.* | Up                         | *At this time I am moderately satisfied about both services.*                            | 10         |
| Investment room          | Down                     | *do not have enough budget to be pro-active ...low pricing (...) inhibits proper quality service management.* | Up                         | *We want a party that can earn a decent living from Authority.*                          | 11         |
| Focus short term cost reduction | Up                       | *an X percent annual reduction on our costs in this outsourcing contract.*             | Down                      | *We have now fully focused on quality ...The supplier is very active in technical life cycle management.* | 11         |
| Service quality          | Down                     | *... currently the budget is really tight. ...I abhor as it is detrimental to our service quality.* | Up                         | *...the quality of the service has significantly improved.*                             | 12         |
| IT quality               | Down                     | *in the old days it used to be much better. ...I simply miss the old IT staff!*         | Up                         | *I am satisfied with the applications but not with their availability ....since about a year, we are delivering very high quality.* | 12         |
| Incident resolution costs| Up                       | *we have suffered many lengthy incidents.*                                               | Down                      | *We have been able to halve the recovery time for all major incidents and vastly reduce the number of incidents.* | 12         |
| Supplier management cost | Up                       | *There are far too many links in the chain and too much time is lost. ...ITCo is the single point of contact for the other suppliers. This does not yet run smoothly.* | Slightly down              | *Things are becoming clearer, but it is still not completely clear.*                    | 13         |
| Number of suppliers      | Up                       | *...the requirements (...) for tailor-made IT applications can only be fulfilled by customised standard solutions. Off-the-shelf solutions are not available for their requirements.* | Slightly down              | NA                                                                                      | 13         |
| Detailed supplier management | Up                     | *Port Authority over-specified their outsourcing needs.*                               | Slightly down              | *The main turnaround has been that we no longer point fingers at each other but that we convene everyone to assure a solution.* | 13         |
After month 45, Tc was again greater than Td and trust started to grow. Why does this happen? Td is directly proportional to trust: a fixed fraction of trust leaks away over time. However, S, the customer satisfaction, determines Tc. Satisfaction continued to grow after the end of the intervention. Satisfaction's growth rate, Sc, is also shown in Figure 12. During the intervention, it reverted from its downward trend to an upward trend, and it stayed positive throughout the rest of the simulation. Satisfaction kept growing, so trust also had a higher long-term value. This explains why trust bounced back.

We can see that the direct effect of working closer together fostered trust, but after the intervention, this direct effect stopped and it is the indirect effect of better service quality, IT quality and the lower incident resolution costs that drove trust up again. An exogenous input (the intervention) succeeded in structurally reversing the endogenous dynamics and reversed the relationship spiral. This is what happened in the simulation model and had also happened during our observation period in the real case. It explains why, when the intervention was too small or too late, satisfaction did not go up sufficiently and trust did not bounce back. This also illustrated another boundary condition for the intervention: avoid “too little too late.”

Meanwhile, the simulation model illustrated that there are a whole series of specific cases under which reversal would either not happen or not be sustainable. We have already looked at the latter case. Regarding the former, any of the relationships in the two core loops could have been a show-stopper. If it was impossible to increase trust during the intervention, for instance, if the collaborative KPIs did not generate alignment of incentives or if the vendor simply lacked the capability to improve service and IT quality sufficiently. This may again be due to a number of reasons. For further analyses, refer to model documentation in Appendices 7 and 8 in Data S1.

7 | KEY FINDINGS AND REFLECTIONS

In this section, we summarise the main findings from both action research and the simulation analysis. This section also serves as a summary of the final reflection stage in a multi-year period of this action research project in order to portrait the research evidence and recapitulate the knowledge obtained from this research project.
First, the case analysis overall presents a process theory of how and why ITO relationship spirals occur and ways to overcome them, as visualised in Figure 6. This theory suggests that ITO relationships that are overly biased towards short-term financial gains can have harmful effects well beyond the formative contracting period, precisely because their effects become locked in relationship spirals. These spirals are generated by three
interlocked reinforcing feedback loops: (a) a vicious cycle of short-term bias because of inadequate room for investment with the supplier, (b) a vicious cycle of overly detailed supplier management by the customer and (c) a vicious cycle of incentive misalignment between customer and supplier that is self-continuing. Before the

**FIGURE 14** Behaviour of some key variables in a scenario without intervention [Colour figure can be viewed at wileyonlinelibrary.com]

**FIGURE 15** Behaviour of the antecedents of trust in intervention scenario [Colour figure can be viewed at wileyonlinelibrary.com]
intervention, both Authority and ITC are not considered this ITO project as a success because of the unsatisfactory contract performance and relationship. We also know that in the formative stages of the outsourcing relationship, both sides can make costly mistakes by either paying too much (the supplier) or losing too many core capabilities (the customer). What this study has shown is how these initial mistakes may become causally interlinked into persistent relationship spirals. The three interrelated spirals also indicate that short-term cost, service quality, reductions satisfaction, trust and alignment of incentives can start a downward spiral.

Second, our case has demonstrated that CSD can be an effective method to reverse a vicious relationship spiral. In order to reverse the above powerful reinforcing feedback loops, the relationship has to be redefined into a true partnership, where incentives between buyer and supplier become truly aligned. Directly, the discussions were content-based, covering the joint analysis of quality issues and their root causes, the joint redesign of KPIs and critical success factors and a joint contract redesign with collaborative KPIs. Indirectly, the CSD intervention led to greater transparency and trust between parties and effectively led to an inter-organisational change process. CSD and collaborative KPIs led from a focus on "value appropriation" to a focus on "value creation" (Wiener, Mähring, Remus, Saunders, & Cram, 2019) and to an emphasis on the strategic relationship (Choudhury & Sabherwal, 2003). The value creation aspect is the key to reverse the gridlock situation of a short-term cost-focused relationship spiral. In CSD, this is simply sheer hard work with the people directly involved and even harder work to turn around the groups not directly involved.

Third, to start the process of CSD, it first requires a shared, in-depth and end-to-end understanding of the joint business and IT processes. All parties are also required to be involved in moving from a vicious to a virtuous cycle of more collaboration leading to better performance. The items to be redesigned to achieve the partnership, as shown in this case, are the workflows of the key business processes, the contractual relationship and the associated KPIs. Implicitly, the expectations, habits and conventions on both sides are also changed.

All these suggest that the CSD method can be effective in triggering behaviour changes by facilitating the development of shared norms and values across key staff at the client and vendor firms, in line with the past studies on the importance of clan control in managing ITO projects (Choudhury & Sabherwal, 2003; Chua, Lim, Soh, & Sia, 2012; Wiener, Mähring, Remus, & Saunders, 2016). Importantly, the CSD workshops must recognise that joint KPIs and sequentially incentive alignments are an important outcome of the workshops. This CSD process suggests something different from the extant literature, indicating that social mechanisms shall be used to clarify and establish structural mechanisms, and then with the structural mechanisms, the social elements including inter-organisational trust and customer satisfaction can be reinforced. This view extends the complementary or supplementary perspective of ITO governance (Cao et al., 2013; Huber et al., 2013), and our study has demonstrated that these mechanisms are interwoven and shall be used sequentially in order, in which the collaborative process to achieve mutual understanding is a necessity to enable the end result of KPIs and process redesign. When fulfilling the objective measures of the relationship, the social and subjective elements can be reinforced and, hence, moved to a virtuous cycle.

Lastly, our proposed process theory of relationship spirals is grounded in the facts of the action research case, but one case of qualitative research cannot prove or falsify the theory itself due to the inherent limited generalisation of a case study. The simulation model helps to overcome this problem of generalizability to some extent. Through the simulation, we have also identified the conditions to turn around the vicious relationship spiral. We found that success requires that the supplier has the inherent capabilities to improve performance, given the right incentives and funds are provided. While this is obvious, what is less obvious is that sustained success requires an intervention that is timely and large enough to ensure that performance and customer satisfaction regarding that performance is going up before the end of the intervention in order to ensure that the momentum created by the intervention is sustained after the intervention itself has ended.
8 | IMPLICATIONS AND FUTURE RESEARCH

Our action research project, based on a longitudinal study of ITO relationship cycles, provided us with several theoretical and practical implications.

8.1 | Theoretical implications

8.1.1 | A visualised process theory

Several studies have reported on ITO relationship dynamics (eg, Radkevitch et al., 2006; Rajamani et al., 2010) or ITO governance dynamics (Cao et al., 2013; Choudhury & Sabherwal, 2003; Gregory et al., 2013; Huber et al., 2013). Although the extant research has highlighted the importance of examining the ITO client–supplier relationship from a process perspective, no research study has explicitly demonstrated relationship spirals, in particular a cost-focused approach to ITO within the scope of graphical depiction of the long-term implications. We were inspired by the call for process perspective of theories (Fang et al., 2018). In this study, we conceptualised and visualised a new process theory to capture the dynamics of relationship spirals based on the extant fragmented ITO literature and our empirical data. Via this study, we provide a systemic perceptive as an alternative to the current variance theories rooted in the ITO literature in order to capture the richness of the relation dynamics. We lay down the details of the dynamic management process in which focus on short-term cost, service quality, reductions satisfaction, trust, and alignment of incentives can lead to downward spirals. These granular details extend the findings of previous research works (eg, Akkermans et al., 2004; Aubert et al., 2015) regarding vicious and virtuous cycles in buyer–supplier relationships.

More specifically, a short-term cost-focused approach to ITO can trigger a deteriorating relationship and subsequently lead to performance issues. When trying to solve performance problems (in the old way), detailed supplier management further jeopardises the ITO relationship, causing the loss of long-term incentive alignment. Consequently, the ITO relationship evolves into a vicious spiral in which both the ITO supplier and client suffer. Through strong external interventions (ie, action by researchers), the ITO relationship can be successfully reversed and the parties can escape out of the gridlock situation of a relationship spiral. Our use of system dynamics analysis visualises this process in a graph.

8.1.2 | A novel approach to find a way out and intervention as an enabler to reverse a relationship spiral

Through our action research on this dyad (cf. Baskerville & Myers, 2004; Davison et al., 2012), we also demonstrate a tested approach on how companies are able to reverse an adversarial relationship into a much more productive one, resulting in improved IT and business performance. We term this important mechanism of reversal as CSD. This CSD approach consists of: (a) a joint, co-located analysis of the quality issues and their root causes with stakeholders from both buyer and supplier; (b) a joint redesign of a set of interrelated KPIs, again together with stakeholders from both sides that are linked to the critical success factors for the outsourcing party’s business; (c) a joint contract redesign that focuses on these collaborative KPIs and (d) an inter-organisational change process that redefines perceptions and expectations of the partner on both sides.

Our research data also provide support for the positive effect of a carefully planned intervention action in terms of reducing short-term bias in buyer–supplier relationships and in facilitating a CSD. Indeed, collaborative diagnosis between the research and the client in an action research project has long been known as an important step (Baskerville & Pries-Heje, 1999). Facilitated by researchers, collaborative diagnosis in ITO projects helps both IT client and supplier arrive on the same page. Our findings highlight that the intervention can be used to trigger a loop
reversal. In fact, as discussed in the case, during an intervention from an external party, both parties in the ITO relationship gain an integrated problem insight and a willingness to collaborate with each other again. This suggests the importance of social construction of sense, which can be facilitated by a third independent party, such as the researchers in this project. Via joint workshops and an open atmosphere of listening to each other, mutual understanding is reached and trust is rebuilt. The joint redesign indirectly reinforces the social aspect of ITO governance toward a virtuous cycle. The details in the interlocked cycles involve steps, sequences, objective activities and subjective perceptions. This micro-level of description expatiates the view of mutual enablement and thus complementarity of social and structural governance suggested by Huber et al. (2013).

8.1.3 | Methodological contributions

This research used a combined-method approach to investigate ITO relationship spirals. We grounded our theoretical building on action research (Davison et al., 2012) and then complemented our empirical case analysis with simulation results from a system dynamics approach (Fang et al., 2018; Sterman, 2000). This combined-method approach allowed us to find a much greater assortment of views (Venkatesh, Brown, & Bala, 2013) and to understand and visualise the focal ITO relationship spirals based on triangulations of data. In order to verify the dynamical process of the ITO relationship spirals, the results from the system dynamic simulation helped strengthen and refine the theoretical process model and provided details on the boundary conditions of the theoretical models. This research demonstrates how system dynamics can be integrated with case study research, extending the extant operational research with the similar combined-method approach (Chandrasekaran et al., 2018; Sting et al., 2019) into the IS discipline.

8.2 | Practical implications

In terms of managerial implications, this study suggests that companies that realise that they are caught in a relationship spiral should redefine their contractual relationship in terms of aligned incentives, targeted towards quality improvements that benefit the business of the outsourcing party. How is this to be achieved? Through the CSD processes such as the one we have described and tested here, in which all representatives from the relevant organisational groups involved jointly map out the shared process from end-to-end and define from there a way forward. This is the “travail” mentioned by Akkermans et al. (2004) and the “sheer hard work” that needs to be done to make outsourcing a success according to Lacity et al. (2009). The main managerial caveat here is that creating such joint awareness of the issues will not be enough in itself. The process of jointly defining and implementing a new way of working with fully aligned incentives between all ITO parties may well be the hardest part of the change that has to be made.

Furthermore, to summarise the key practical insights from our empirical and stimulation results, managers are recommended to pay attention to the three conditions to make the intervention in a vicious ITO relation spiral worthwhile: (a) if the benefits of the intervention would outweigh its costs. Here, it suffices to state that the contract was in the range of six figures, while the intervention itself was less than one man year of work. (b) More importantly, if the intervention would work or be successful in reversing the vicious spiral into a virtuous one. As the simulation model illustrates, there found a whole series of specific cases under which this would not be the case. Indeed, any of the relationships in the two core loops can be a show-stopper. For instance, if it is impossible to increase trust during the intervention or if the collaborative KPIs cannot generate alignment of incentives. (c) If the vendor has the capability to improve service and make IT quality sufficient. This may again be due to a number of reasons. In short, as boundary conditions prior to this intervention, one needs to be sufficiently confident: that the vendor can, that the participants really want, and that the intervention is worth the effort in time and money.
8.3 | Future research

Finally, the limitations of our study may be seen as the basis for future research. First of all, an action research study may be very effective in generating a new theory, but the generalizability of its findings is by definition problematic. Hence, we need more longitudinal descriptive studies to develop a better understanding of the dynamics of relationship spirals, of what triggers them, of how they persist and how they can be reversed. Meanwhile, it will be beneficial to improve our scholarly and practical understanding of the dynamics by case comparison (cf. Yin, 2009) such as between a cursed case and those observed in a virtuous case.

Second, this study has used some techniques, such as system dynamics method, that are not commonly used in studies on ITO in particular, but that can be fruitfully applied to address question of dynamics and change introduced by IT adoption or outsourcing. It seems worthwhile to apply more often the use of causal loop diagrams from system dynamics (Fang et al., 2018; Sterman, 2000), together with action research (Davison et al., 2012), to acquire in-depth knowledge on inner drivers and decision factors during a sensitive period of organisational change and the evolution of buyer–supplier relationships. We call for more research to use the system dynamics perspective to develop and verify process models.

9 | CONCLUSION

The extant literature offers us rich insights into both the theory and practice of ITO, yet the dynamics and the long-term relationship aspects of ITO settings have so far rarely been captured. The action research reported here focused on how a vicious cycle of buyer–supplier relationship in an ITO project emerged and on how such a vicious cycle was reversed into a virtuous one. This longitudinal study with a system dynamics perspective on the spiralling pattern of buyer–supplier relationships provides researchers a springboard to further explore the ITO research space and, at the same time, promises enhanced performance for practitioners.

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ENDNOTES

1 Further explanations of key terms are provided in Appendix 1 in Data S1.
2 Fang, Lim, Qian, and Feng (2018) provided in-depth discussions about the two theoretical perspectives—variance theories and dynamic theories—and offered detailed simulation models in their paper. In this study, we attempt to establish a dynamic theory in ITO relationship spirals and use the same system dynamics methods with both field and simulation models for theoretical development verification.
3 These eight journals include: Information Systems Journal, European Journal of Information Systems, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, and MIS Quarterly.

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