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# Contracting outsourced services with collaborative key performance indicators

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**Abstract**

While service outsourcing may benefit from the application of performance-based contracts (PBCs), the implementation of such contracts is usually challenging. Service performance is often not only dependent on supplier effort but also on the behavior of the buying firm. Existing research on performance-based contracting provides very limited understanding on how this challenge may be overcome. This article describes a design science research project that develops a novel approach to buyer–supplier contracting, using collaborative key performance indicators (KPIs). Collaborative KPIs evaluate and reward not only the supplier contribution to customer performance but also the customer's behavior to enable this. In this way, performance-based contracting can also be applied to settings where supplier and customer activities are interdependent, while traditional contracting theories suggest that output controls are not effective under such conditions. In the collaborative KPI contracting process, indicators measure both supplier and customer (buying firm) performance and promote collaboration by being defined through a collaborative process and by focusing on end-of-process indicators. The article discusses the original case setting of a telecommunication service provider experiencing critical problems in outsourcing IT services. The initial intervention implementing this contracting approach produced substantial improvements, both in performance and in the relationship between buyer and supplier. Subsequently, the approach was tested and evaluated in two other settings, resulting in a set of actionable propositions on the efficacy of collaborative KPI contracting. Our study demonstrates how defining, monitoring, and incentivizing the performance of specific processes at the *buying firm* can help alleviate the limitations of traditional performance-based contracting when the supplier's liability for service performance is difficult to verify.

**KEYWORDS**

collaboration, design science research, key performance indicators (KPIs), outsourcing, performance measurement, performance-based contracts, service procurement

## 1 | INTRODUCTION

Empirical evidence demonstrates that achieving the intended performance outcomes of outsourcing is not easy (Ellram, Tate, & Billington, 2008; Handley & Benton, 2013; Stouthuysen, Slabbinck, & Roodhooft, 2012). This applies in particular to outsourced services (Caldwell & Howard, 2011; Ellram & Tate, 2015; Hawkins, Gravier, Berkowitz, & Muir,

2015). One solution to overcome ineffective outsourcing arrangements is to adopt performance-based contracts (PBCs) (Guajardo, Cohen, Kim, & Nettesine, 2012). These contracts support collaboration by aligning incentives of suppliers and buyers (Eisenhardt, 1989; Selviaridis & Wynstra, 2015). However, implementing PBCs for outsourced services is not always feasible. Services are often coproduced by supplier and customer, making their respective activities interdependent and their responsibilities difficult to separate (Chase, 1978; Narayanan, Jayaraman, Luo, & Swaminathan, 2011; Sampson & Froehle, 2006). Consequently, besides environmental uncertainty, the supplier also faces the behavioral uncertainty introduced by the buying firm (Nullmeier, Wynstra, & Van Raaij, 2016). This leads to a situation of double moral hazard (Bhattacharya, Gaba, & Hasija, 2013; Roels, Karmarkar, & Carr, 2010). Classical contracting theories, in particular agency theory, suggest that in such uncertain situations, output-based contracts or PBCs are not effective (Eisenhardt, 1989; Jensen & Meckling, 1976; Mayer, Nickerson, & Owan, 2004). Roels et al. (2010) note that in collaborative services, such as information technology (IT) outsourcing, PBCs are uncommon given the challenges of low incentives in joint production, the limited liability of the supplier, and reduced outcome measurability.

To address the behavioral uncertainty introduced by the buying firm, we have designed and implemented a novel type of buyer–supplier contracting, based on our field work with several organizations that were experiencing these underresearched issues. This collaborative KPI contracting approach addresses the challenge of buyer–supplier process interdependencies by accounting not only for the performance of the supplier but also for the quality of processes at the buying firm in enabling supplier performance. Performance measurement in such a contract relies on collaborative key performance indicators (KPIs), which encompass two main advantages. First, by defining, incentivizing, and measuring the quality of processes at both the supplier *and* the buyer, collaborative KPIs can resolve the predicament of implementing PBCs in situations of buyer–supplier interdependence. Second, the *process* of identifying, in detail, the operational service delivery processes at both the buyer and the supplier and how they are interdependent, and constructively engaging the stakeholders in this process, helps to create the understanding and commitment for these KPI sets. Collaborative KPI contracting can be defined, in short, as a process for developing buyer–supplier relationship performance indicators that (a) promote collaboration by focusing on end-of-process indicators; (b) are 'two-way' by measuring both supplier performance and also customer (buying firm) performance; and (3) are defined in a collaborative process, together by the supplier and the customer (buying firm).

Various academic and management practice studies have recently proposed related yet distinct approaches. First, extensions of research on performance-based contracting investigate the interplay between output controls and relational governance (Nullmeier et al., 2016; Selviaridis & Norrman, 2014; Stouthuysen et al., 2012) or the interaction of output and process controls (Cardinal, Kreutzer, & Miller, 2017; Handley & Gray, 2013). These studies, however, do not address how contracting (i.e., defining, verifying, and incentivizing) the *buying firm's* performance can address some of the limitations of traditional performance-based contracting when the supplier's liability for service delivery performance is difficult to verify. A second related body of research deals with buying firms and consulting companies that conduct supplier satisfaction surveys assessing to what extent a supplier finds the relationship with a specific buying firm productive (e.g., Planning Perspectives, 2017). Two main differences, however, with collaborative KPI contracting are that supplier satisfaction survey scores refer to the general buyer–supplier interactions (e.g., payment behavior), regardless of the specific service or product being exchanged, and that the satisfaction scores have no impact on the financial rewards of the supplier (or penalties to the buyer). One specific management practice study has advocated the use of two-way scorecards to measure the processes "[…] for which the buyer and strategic supplier each have specific accountabilities and performance standards to achieve." (Slobodow, Abdullah, & Babuschak, 2008). However, such scorecards are not used to determine penalty or bonus payments for the supplier. Finally, the recently proposed 'Vested' sourcing model combines performance-based contracting with a 'collaborative relationship model.' It also emphasizes the importance of defining high-level, strategic 'desired outcomes' and argues that buying firms should not specify in detail how the supplier is to achieve those outcomes (Vitasek, Ledyard, & Manrodt, 2013). In contrast to our collaborative KPI contracting approach, however, 'Vested' sourcing does not address the potential benefits of making the buying firm partly accountable for the supplier's performance (Vitasek et al., 2013, 2015).

The collaborative KPI contracting approach was initially developed and evaluated in an IT outsourcing relationship in the telecommunications industry. In doing so, we combined a design science approach (Romme, 2003; Van Aken, Chandrasekaran, & Halman, 2016) with a longitudinal case study (Kaipia, Holmström, Småros, & Rajala, 2017). The objective of the design science research (DSR) is to produce "[…] well-tested, well-understood and well-documented innovative generic designs, dealing with authentic field problems or opportunities." (Van Aken et al., 2016: p. 1). Although there are differences in terminology, there appears to be considerable consensus on what makes for good design research: "[…] research questions being driven by an interest in field problems; an emphasis on the production of

prescriptive knowledge, linking it to interventions and systems to produce outcomes, providing the key to solving field problems; a justification of research products largely based on pragmatic validity (do the actions based on this knowledge produce the intended outcomes?)." (Van Aken, 2004: p. 395). Another common element is the recognition that design research proceeds through a series of tests and refinements (Jelinek, Romme, & Boland, 2008).

Our DSR started in 2003, when the Dutch telecommunications service provider KPN and its IT outsourcing partner Atos Origin (renamed Atos in 2011) were experiencing serious problems. In 2001, KPN had transferred its data centers, end-user services, and software house activities to Atos Origin, but 2 years later the performance of these services and the trust and commitment of both parties had deteriorated substantially. KPN wanted to build stronger incentives into the contract, whereas Atos Origin felt that its performance was seriously affected by how KPN managed their related processes.

Our direct and intensive engagement in this field problem helped us to understand the origins of the failure and to develop new insights regarding collaborative KPI contracting. We first describe the initial outsourcing contract, its implementation, and its outcomes (2001–2003). Subsequently, we examine the development, implementation, and evaluation of the collaborative KPI contract (2003–2007). More recently, we have conducted field tests of the collaborative KPI contracting approach in other situations, and we present two such evaluation cases in detail (in section 8). Figure 1 presents the overall timeline of our DSR efforts. The figure also refers to a failed case, which we briefly discuss in reviewing the transferability of the collaborative KPI contracting approach in section 9. In our DSR approach, we have looked for the simplest and most likely explanations for the set of observations we made over the years. Otherwise put, we have applied abductive reasoning, which "[…] forms and evaluates hypotheses in order to make sense of puzzling facts […]" (Fisher & Aguinis, 2017: p. 443).

The collaborative KPI contracting approach is the core design artefact in our study (Holmström, Ketokivi, & Hameri, 2009). Our initial longitudinal case study also describes the analysis and implementation process that was adopted. Although this collaborative service design process largely relies on existing tools and methods, we posit that its integration with collaborative KPIs is novel. The collaborative service design process is crucial in successfully developing and implementing the collaborative KPI contract. To be effective, the collaborative KPI contract should be adapted to the specific context and should be supported by different functions at both the buyer and the supplier. The collaborative service design process provides a coherent approach for achieving this.

After this introduction, we review prior research on implementing performance-based contracting and the challenges of effectively implementing such contracts in situations where performance cannot be easily verified and attributed to the efforts of suppliers. The method section provides details on our initial, longitudinal case study and how we applied the design science approach. Subsequent sections discuss the context, interventions, outcomes, and mechanisms of this initial DSR study. We then review two more recent evaluation cases in which we conducted similar interventions. The paper concludes with a set of propositions regarding the effects of collaborative KPI contracting and the extent to which this design artefact may be transferrable and the implications for further theory development and practice.

## 2 | LITERATURE REVIEW: PBCs IN OUTSOURCED SERVICES

Different theories emphasize the distinct functions of contracts. In transaction cost economics, safeguarding, that is, minimizing opportunism and protecting investments, is the most prominent function of contracts. Safeguards and control can be implemented by assigning decision and termination rights and by defining processes for dispute resolution (Schepker, Oh, Martynov, & Poppo, 2014). In the resource-based view, contracts serve the goal of interorganizational coordination (Mellewigt, Madhok, & Weibel, 2007; Schepker et al., 2014). Contracts may include clauses defining roles and responsibilities and monitoring provisions. As such, contracts serve as a blueprint for exchange, aligning the actions of both parties (Macaulay, 1963; Vanneste & Puranam, 2010). This

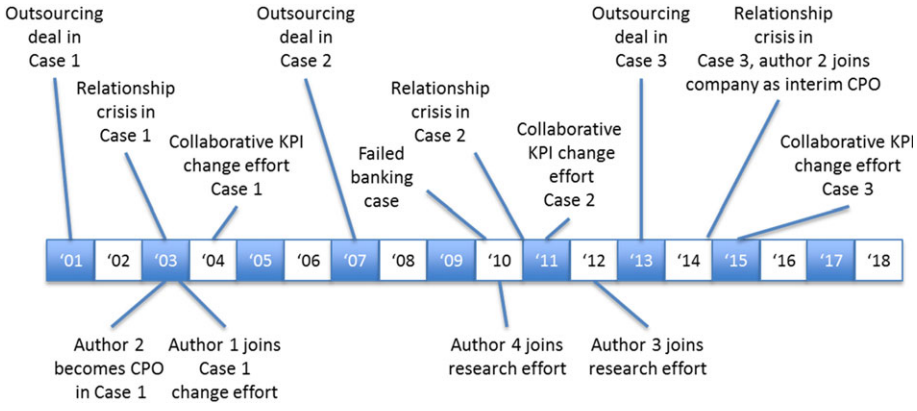


**FIGURE 1** Design science research timeline [Color figure can be viewed at wileyonlinelibrary.com]

function of contracts is particularly relevant when tasks are uncertain and complex (Gulati & Singh, 1998; Mayer & Argyres, 2004). Agency theory views contracts mainly as a vehicle to align interests and incentives and to achieve risk sharing between the parties involved, particularly in case of information asymmetry between parties (Eisenhardt, 1989; Jensen & Meckling, 1976). Agency theory is the commonly used theory to study the choice between contracting on effort or behavior (process controls) or contracting on performance or outcomes (output controls) (Selviaridis & Wynstra, 2015).

Particularly in service outsourcing, contractual governance may be applied in the form of performance-based contracting (Essig, Glas, Selviaridis, & Roehrich, 2016; Guajardo et al., 2012). Performance may be measured in terms of asset or product availability or utilization or even customer satisfaction and monetary revenues (Nullmeier et al., 2016). Several studies on management control find empirical evidence for the favorable effects of output monitoring on customer-supplier relations and supplier performance (Heide, Wathne, & Rokkan, 2007; Sumo, Van der Valk, Van Weele, & Bode, 2016; Tiwana & Keil, 2007). In practice, however, effectively implementing performance-based contracting is challenging (Ng & Nudurupati, 2010; Ssengooba, McPake, & Palmer, 2012). The interdependence between supplier activities and buyer activities, which is a defining characteristic of service exchanges, makes it difficult to effectively and efficiently verify performance in terms of outcomes and assigns rewards and penalties based on these outcomes. Often, service suppliers are reluctant to work under such contracts, because services (in varying degrees) rely on customer inputs including actors (the customer firm or its employees), physical assets, and information (Chase, 1978; Sampson & Froehle, 2006). Suppliers themselves are thus not always fully in control of performance (Gruneberg, Hughes, & Ancell, 2007; Nullmeier et al., 2016; Selviaridis & Norrman, 2014). Agency theory (Eisenhardt, 1989) and other theories that study the tradeoffs between output-based and process-based controls (Ouchi, 1979) suggest that PBCs are indeed not feasible or not effective under conditions of outcome uncertainty. For instance, a study by Stouthuysen et al. (2012) found that output controls have a negative effect on (perceived) supplier performance when services involve a high degree of customization and intensive interaction between the supplier and the client. As Handley and Gray (2013, p. 1543) note, Mayer et al. (2004, p. 1065) effectively summarized these challenges: "Contracting for supplier liability when the buyer's actions influence the size of the liability, or the size of the liability is difficult to measure, is not readily feasible because of verification difficulties". Such verification problems give rise to a moral hazard in which a supplier underprovides effort and hence quality. Selviaridis and Norrman (2014), in a study of outsourced logistics services, also find that one of the main antecedents of outcome uncertainty is the service provider's control over input and behavior of customers. The higher the impact of other factors, besides the efforts of the supplier, on the performance outcome of the service production process, the lower the attributability of the outcome. In-line with agency theory, Selviaridis and Norrman (2014) posit that low outcome attributability makes service providers less willing to accept the financial risks embedded in PBCs.

Recent research has proceeded along two main avenues to study how these traditional shortcomings of performance-based contracting may be addressed. The first stream of research investigates the interaction of outcome controls and relational governance, as a continuation of established research on the interplay between contractual and relational governance (Lumineau & Henderson, 2012; Poppo & Zenger, 2002; Schepker et al., 2014). Although research on the substance of relational governance is quite diverse, most of the literature suggest that it consists of three main elements: trust, commitment, and relational norms. Trust refers to "[…] the confidence in the partner's integrity, credibility, and benevolence in a risky exchange relationship […]" (Cao & Lumineau, 2015; p. 17). Trust can increase flexibility, enhance information sharing, and reduce monitoring and other transaction costs (Stevens, MacDuffie, & Helper, 2015). Commitment is typically defined as the willingness to make short-term sacrifices to maintain the relationship (Anderson & Weitz, 1992). Relational norms refer to shared expectations about the behavior of each partner. Relational norms and ties, formed by prior exchanges and mutual commitment for the future, enhance cooperation in interorganizational relationships. In a recent metaanalysis, Cao and Lumineau (2015) find strong evidence for a complementary relationship between contractual and relational governance. Contracts, trust, and relational norms jointly reduce opportunistic behavior and jointly enhance relationship performance and satisfaction. Yet, different elements of contracts may have different effects on relational governance (Malhotra & Lumineau, 2011; Weber & Mayer, 2011). For instance, Mellewigt et al. (2007) find evidence that increased levels of trust mitigate the effect of asset specificity on contractual complexity but enhance the effect of the need for coordination on contractual complexity. Within this substantial body of literature on the interplay between contractual and relational governance, there are a few recent studies investigating the specific interplay between output controls and relational governance. Selviaridis and Norrman (2014) argue that low performance attributability would require increased relational governance based on information sharing, collaboration, and trust, which in turn make service providers more willing to accept the risks of PBCs. Nullmeier et al. (2016) proposed that how information sharing by the buying organization, related to service delivery planning and monitoring, can help to mitigate some

of the negative effects of outcome uncertainty on supplier efforts. One of the few recent theory testing studies in this stream finds evidence that for high-volume routine services, information exchange and transparency can strengthen the already positive effects of output controls on supplier performance and, for low-volume customized professional services, can alleviate some of the negative effects of output controls on supplier performance (Stouthuysen et al., 2012). These findings support the earlier findings by Heide et al. (2007) that relational governance (specifically, relational norms such as mutually agreed assessment standards) increases the positive effects of output controls in curbing supplier opportunistic behavior.

A second, more modest research stream investigating how the shortcomings of performance-based contracting may be alleviated examines the effects of combinations of different contracting forms or controls (Cardinal et al., 2017; Selviaridis & Wynstra, 2015). These studies observe that practitioners combine output and process contracting approaches to share different types of risks across the buyer and supplier (De Jong, Bijlsma-Frankema, & Cardinal, 2014). For example, Handley and Gray (2013) investigate the complementarity in use and in effectiveness of output (or outcome) and process (or behavior) controls. In their study of quality management practices, they find support for a substitution effect between the use of the output-oriented quality controls and process-oriented quality controls. However, they also find moderate support for the complementary effectiveness of the output-oriented and process-oriented controls (Handley & Gray, 2013).

In contrast to both these two streams of research, our DSR study demonstrates that contracting for supplier performance in a situation of outcome uncertainty induced by buyer's actions can still be feasible and effective, as long as these buyer behaviors are verifiable and made accountable. Our longitudinal perspective, unlike prior cross-sectional studies, can help to understand the process of developing collaborative KPI contracts. This approach toward performance-based contracting in situations of buyer–supplier interdependencies—complementing the supplier-facing outcome controls with buyer-facing outcome controls—is conceptually novel in two ways. First, we do not study the complementarities of different types of supplier-facing controls but examine the combination of supplier-facing and buyer-facing controls. Second, we investigate how the process of building trust, commitment, and relational norms can help suppliers and buying organizations to create the willingness and transparency to identify the processes at both ends that affect the final service performance. In other words, relational governance may pave the way to develop meaningful performance-based contracting, including both supplier-facing outcome controls and buying-firm-facing outcome controls. Thus, we do not just investigate how outcome controls can still work under situations of outcome uncertainty (and initially, limited performance attributability) but also how the means to achieve this (collaborate KPI contracting, including buying-firm facing outcome controls) can be defined and implemented through relational governance mechanisms. In sum relational governance does not simply compensate for the inadequacies of PBCs but functions as a *means* to develop and implement this specific form, that is, collaborative KPI contracting.

# 3 | METHOD

## 3.1 | A DSR approach

Our DSR process can be described in terms of the four phases proposed in Holmström et al., (2009). Phases 1 and 2 are exploratory and design science-oriented, and Phases 3 and 4 are explanatory and theory building-oriented. This study encompasses the first three phases. The first phase is labeled 'solution incubation,' "[…] which consists in framing the problem and developing the rudiments of a potential solution design." (Holmström et al., 2009: p. 72). In the second phase, 'solution refinement,' the rudimentary solution design is subjected to empirical testing. The first and second phase are conducted within our initial case study, after which the second phase is reiterated in other contexts to validate that our design artefact "[…] can be transferred (within a certain application domain) to contexts other than the ones in which it has been made and tested without losing its basic effectiveness." (Van Aken et al., 2016: p. 5). DSR and case research approaches are complementary (Kaipia et al., 2017). In DSR, the researcher is actively engaged in the field problem, while in case research, the researcher is an observer. In the third phase of 'explanation,' the relevance of the solution design is established in the form of "Substantive theory [….] that is developed for a narrowly defined context and empirical application […]" (Holmström et al., 2009: p.75). Here, one reviews the field tested design in the context of previous research and the related propositions from a theoretical perspective. Within the scope of the current article, we cannot fully engage in Holmström's Phase 4 as it requires the development of a complete, formal theory, but we do report on the implementation and results of the design artefact (intervention) in multiple contexts, supporting the examination of the transferability of our solution.

## 3.2 | Research design

Our quest in this research has been for field-tested *technological rules*: chunks of general knowledge linking interventions or artefacts with desired outcomes or performance in certain fields of application (Van Aken, 2004; p.228). Our research design is the multiple case study, a typical design to study and test technological rules: "A series of problems of

the same class is solved, each by applying the problem solving cycle. Design knowledge is built up through the reflective cycle (…): choosing a case, planning and implementing interventions (on the basis of the problem solving cycle), reflecting on the results and developing design knowledge to be tested and refined in subsequent cases." (Van Aken, 2004; p. 229). From our original design case and the two subsequent evaluation cases, we gained insights into when our design artefact of the collaborative KPI contracting approach works or works best. Finally, we formulate our technological rules or actionable propositions in the context of the CIMO logic for design research (Denyer, Tranfield, & Van Aken, 2008): "IF Context contains contextual factor $C_1$, $C_2$,…$C_n$, THEN apply Intervention $I_1$..$I_n$ to invoke mechanisms $M_1$..Mn that generate desired outcomes $O_1$..$O_n$."

As noted earlier, the case in which the initial solution incubation and refinement took place is set in the telecommunications industry in the Netherlands in the period 2001–2007. It involves telco operator KPN and IT services company Atos Origin (Atos). In 2001, Atos acquired IT infrastructure, including data centers, from KPN and subsequently managed the related service delivery processes. In 2003, however, the outsourcing relationship turned out to be ineffective, and this is when our design science study started. While the implementation of collaborative KPI is, in principle, not limited to IT services, many IT outsourcing arrangements involve highly interdependent service processes, which makes this case a relevant context in which to develop our design (Barthelemy, 2001; Bhattacharya et al., 2013; Weeks & Feeney, 2008).

In our four-person research team, two of the authors were directly involved in developing and implementing the initial intervention (Phase 1 and 2). The second author, a practitioner, was recruited as a chief procurement officer (CPO) at KPN in the fall of 2003. The first author, an academic and part-time consultant, had already worked with the second author in various consultancy projects on system dynamics modeling. The successive interventions at other organizations were also conducted by the first two authors, while the practitioner had now changed to the role of consultant/interim manager. The third and the fourth author, both academics, collaborated with the first two authors in analyzing the effects of the initial intervention and in extracting the theoretical implications from the field tested design artefact (Phase 3).

The structure of the subsequent sections on the initial design case follows the CIMO logic for design research (Denyer et al., 2008). First, we describe the initial case context (C) including the surrounding external and internal environment factors. Then, we introduce the intervention (I) that was designed and implemented. While the CIMO approach obviously suggests that mechanisms precede outcomes, we subsequently first discuss the outcomes (O) of our interventions in the KPN-Atos case, as we can analyze the mechanisms (M) more precisely after we have reviewed the outcomes.

# 4 | CONTEXT: THE FIELD PROBLEM OF THE KPN-ATOS OUTSOURCING RELATIONSHIP

## 4.1 | Prologue

In the late 1990s, deregulation of the telecom market together with the advent of new (mobile) communication technologies and the associated investments in licenses and assets put substantial pressure on the competitive position of KPN, the previously state-owned telecommunications provider in the Netherlands (CNN, 2000). By the end of 2000, KPN started to consider the possibility of divesting or outsourcing some in-house activities that were no longer crucial to its business strategy, such as its IT activities. These activities were human resource intensive, required considerable management attention, and the general consensus within KPN was that outsourcing would improve quality. Also, KPN needed cash to pay off its major loans. In the fall of 2001, KPN initiated a turnaround process, focusing on cutting costs and divesting nonprofitable and nonessential assets and using the proceeds to reduce its massive debts. Over a period of 18 months, KPN's data center, its end-user services, and software house were outsourced to Atos, involving some 2,300 employees. Atos was awarded a revenue-guarantee contract (i.e., a take-or-pay contract, where a customer pays a penalty for any items that it orders less than contractually agreed), allowing it to recoup its dedicated investments. The main objectives of this outsourcing deal for KPN were short term: "Assets out, cost out, and cash in." Therefore, KPN's main criteria in selecting an outsourcing partner were financial attractiveness of the bid (for the assets), the ability to take over personnel professionally, and the ability to provide continuity of services and subsequent cost reductions. For Atos, the main objectives for this deal were making a serious entry into the telecommunications industry and entering the Dutch and German market, where KPN had a subsidiary. In 2001, the Atos–KPN deal was one of the largest IT outsourcing deals in Europe, adding some 20% to the revenues of Atos in managed IT services (Atos Origin, 2001). However, in the fall of 2003, almost two years into the contract, the relationship between KPN and Atos had deteriorated, with low performance and reduced trust and commitment at all levels of the relationship.

Toward the end of 2003, the service outsourcing relation of Atos and KPN could be summarized by the following five contextual factors:

- C1: The service delivered to KPN by Atos was essentially one of the coproduction, which meant that performance lapses by Atos were directly felt by KPN's customers, and

Atos' performance was directly affected by shortcomings in KPN's behavior toward its IT service provider.

- C2: The supply network of service processes as well as the IT landscape were complex. Understanding the overall system and its leverage points was practically impossible for one person or even one department.
- C3: The financially driven contract design with its revenue guarantee and cost drive led to misaligned incentives within both parties and certainly also between them.
- C4: These three factors contributed to a 'burning platform' of unacceptably low operational performance toward KPN's end customers.
- C5: All these factors resulted in an all-time low relationship quality on both sides, with much distrust, intransparency, and opportunistic behavior, which hurt performance even further.

## 4.2 | Contextual factor C1—Coproduction of services directly affecting customer's business

After outsourcing, Atos managed more than 40 critical IT systems that each directly affected KPN's performance toward its customers. If one of these systems failed, the service itself could fail, that is, a call center agent could not access customer information or customer order changes could not be processed. Moreover, all these systems were interconnected, so breakdowns could easily (and often did) propagate throughout the IT system network, triggering major service disruptions. Appendix A provides more details on how closely Atos and KPN processes were intertwined in coproducing services to KPN customers.

## 4.3 | Contextual factor C2—Complex operational service process network

The network of IT systems and service processes that delivered services to KPN customers was very complex. The IT landscape was a patchwork of partly outsourced, partly still KPN internal IT systems: often legacy systems, with some 1,700 point-to-point interfaces between them, which had to be maintained and monitored continuously. Also, the management of this network was very fragmented and complex and not very effective. For example, at KPN, server SLAs were managed by at least four or five KPN managers, each involved solely from their own functional perspective. On the supplier side, Atos managers controlled only parts of the system landscape. Communication among all these individuals was mainly by e-mail. Most operational managers were barely acquainted with one another and did not understand their process interdependencies. During the interventions, KPN employees would introduce themselves not just to Atos staff but also to each other. The same was true for Atos employees. So the key people involved on a day-to-day basis only knew each other's email addresses and had never met before in real life. Higher up, at middle and certainly higher management levels, there was very limited knowledge of shop floor processes and interdependencies between processes and systems. As a result, their complexity was daunting to most.

## 4.4 | Contextual factor C3—Financially driven contract leading to misaligned incentives

The contract design, with its revenue guarantees and no explicit incentives for innovation, led to misaligned incentives in multiple ways. The contract drawn up in 2001 stipulated for each year of the 2002–2007 period, a guaranteed revenue for Atos. In case of a shortfall, KPN would pay a penalty equal to 25% of the shortfall in each of the first three years and 50% of the shortfall in each of the latter three years. Over 2002, KPN already had to pay a penalty of several million Euro. KPN was able to mitigate that penalty by offering Atos revenue with respect to alternative projects.

Within KPN, departments focused on very different KPIs, some focusing on costs, others on revenue and response times. The lack of management at the strategic level resulted in misaligned incentives and lack of transparency. In turn, this led to complacency and lack of innovative solutions. KPN continued to procure services from Atos just to avoid paying penalties. Internally, both companies were internally still quite stovepiped, with departments focusing on very different KPIs. KPN business units focused on customer response times, while the purchasing department focused on acquisition price. Typically, Atos managed its service lines on costs, but the account teams were managed on revenue and therefore more focused on new business than on solving issues in existing relations. As a consequence, internal transparency and collaboration on both sides was quite limited.

During the outsourcing, there had been a clear alignment of goals between Atos and KPN. However, this alignment deteriorated fast. Already during the outsourcing implementation in 2001–2002, the internet bubble burst and the telecom business declined fast. This meant that the value of KPN's assets to Atos, as a springboard into the telecom market, was seriously reduced. Atos therefore became more dependent on the returns from the outsourcing deal with KPN, rather than on additional external revenue growth. As a result, KPN's increasing emphasis on cost reduction conflicted with Atos' revenue aspirations.

The outlook for the upcoming years (2004–2007) looked bleak as KPN was drastically reducing its IT spend, which would lead to massive penalties under the revenue guarantee provisions. KPN's conservative estimate ran into more than 20 million Euro penalty exposure.

Additionally, the partnering vision implicit in the original outsourcing arrangement was 'lost in translation' when the specifics of the service-level agreements were worked out, resulting in conventional adversarial buyer–supplier role definitions. In senior management contacts, both sides kept their 'cards close to their chest' and acted under an assumption of zero-sum-gaming. Gradually, the partner board, which was the regular meeting of senior management on both sides, became a meeting of adversaries, not of partners. The relationship—involving a contract that was worth hundreds of millions of euros annually—was not managed by KPN at a strategic level but by two procurement managers.

### 4.5 | Contextual factor C4—Burning platform of low operational performance and financial losses

By the end of 2003, operational performance had become so poor that it acted as a 'burning platform' to motivate both companies to seek urgent action. Performance was at an all-time low. For instance, in KPN's basic telephone (i.e., landline) services, there were an extremely high percentage of 15% customer complaints after something as basic as moving house or changing the type of subscription. At the call center, customer queries—the bulk of which were standard and straightforward—were resolved in only 82% of the cases, while the first time right (FTR) norm was 95%. This dismal performance was reinforced by misalignment at the tactical level through large sets of purely technical and fragmented KPIs, rather than through a small and coherent set of interconnected process KPIs. In 2003 alone, there were over 20 escalations of operational issues as resolving performance issues at the operational level became more problematic. Meanwhile, KPN continued to procure services from Atos—even when the relevance of their expertise was in doubt—just to avoid paying penalties from the outsourcing agreement. Obviously, this poor performance costs extra manpower on both sides.

### 4.6 | Contextual factor C5—Low relationship quality: Mistrust on both sides

In 2003, KPN's internal client satisfaction with Atos, which can be seen as a proxy of trust in this context, was 3.9 on a 10-point scale. In the light of this, it is not surprising that in that year over a hundred new IT projects were started with other IT suppliers, while the original plan was that Atos would be the sole IT services supplier. KPN had seriously considered replacing Atos as its outsourcing partner but ultimately there was no feasible alternative. KPN's cost-down drive was in direct conflict with the revenue guarantees that had been given to Atos in the original outsourcing deal. These guarantees led to complacency, which triggered irritation at KPN. Meanwhile, KPN's IT demand management competencies had effectively been outsourced to Atos, and Atos did not introduce innovative solutions to avoid risky and costly investments. Internally in KPN there were also tensions. KPN top management had originally viewed outsourcing mainly as a financial instrument to generate cash to payoff the huge debts. The outsourcing deals had mostly been a corporate affair, while KPN's business units had to put up with the costs and the unsatisfactory performance of this outsourcing relationship.

## 5 | DESIGNING AND IMPLEMENTING THE INTERVENTION

### 5.1 | Solution incubation: Framing a potential design for the application domain

As Holmström et al. (2009) points out, framing the problem is often a key issue in design research. At KPN, many stakeholders framed the problem as one of a supplier who abused a contract. Similarly, at Atos, KPN was seen as the unreliable business partner. The second author, who had become the CPO of KPN in the fall of 2003, framed the problem quite differently. From his extensive experience as general manager of one of the Toyota's suppliers, three things were clear to him. First, that the solution to the current problems was in the '*gemba*,' in the actual operations at the factory floor, as invariably is the case in the Toyota Production System (Shingo, 1989). Second, that such a solution would require KPN to reach out to Atos in a constructive effort at supplier development, Toyota style (Liker & Choi, 2004). There could be no zero-sum game between supplier and customer; a strategic partnership was required given the importance of the IT services for KPN's operations. Third, that in order to build such a strategic partnership, the nature of the collaboration and therefore the type of contract would have to change. From his industrial background, the new CPO had prior experience with redesigning buyer–supplier settings into PBC settings. Indeed, in his role as CPO for his prior employer, he had successfully turned around a situation of bad supplier performance in industrial maintenance into one of the good performance, partly by redefining the contract as a performance-based one. In services, however, it is complicated to delineate where the performance impact of the supplier ends and where the customer becomes responsible. This fact was not lost on the CPO, but in the earlier industrial maintenance setting this had also been the case, and the turnaround had been successful nonetheless. In short, it was clear to the KPN CPO that the change method would have to (a) focus on operational improvements; (b) use operational performance KPIs to incentivize the supplier; and (c) do so in a collaborative partnership.

The CPO turned to the first author for help in bringing about this change, building on his work in developing models of operations strategy issues with groups of managers, mostly in manufacturing industries. His method that focused on group-modeling building processes (Vennix, 1996) was aimed at creating greater transparency and trust between stakeholders from different companies, by jointly mapping out 'the whole elephant' (Senge, 1990) and by creating room to 'unfreeze' the buyer–supplier setting (Lewin, 1951). From there on, parties can jointly develop a new mode of organizing and governance. In summary, the two authors together had the makings of what was a promising potential design (Holmström et al., 2009). Also, the technological rules in their professional repertoire suggested that the application domain as described above was a challenging one (Van Aken, 2004). The collaborative KPI contracting approach consisted of two major elements:

- I1. The suite of process interventions used to develop the collaborative KPIs.
- I2. The collaborative KPI contracting the method itself.

## 5.2 | Intervention I1—Process interventions to develop collaborative KPIs

None of the process interventions are new in themselves. The novelty arises from the collaborative KPI contracting approach that they are used for and integrated with.

### 5.2.1 | Reframing the relationship from adversarial to partnership

The relationship was adversarial and zero-sum minded, also at top management. To have a fair chance of success, the relationship at the top management level had to be reframed into a strategic partnership, with significant relation-specific investments on both sides. This redefinition was not an easy task. Of course, there was the burning platform of the dramatic operational performance. Still, it took a veiled threat to the Atos CEO to get a go-ahead from the supplier side. At one of the partner board meetings, the KPN CFO, to whom the CPO reported, made it clear that if Atos would not go along with this new drive, KPN would publicly announce its dissatisfaction and its intention to move to alternative suppliers. This threat was effective. The much disliked revenue guarantees were removed from the contract, and both parties formally agreed to redefine the outsourcing relationship into a partnership mode.

### 5.2.2 | The pot of gold

In a way, the revenue guarantees became very helpful to incentivize both parties to behave as partners. The net present value of the possible cumulative penalty payments by KPN to Atos under the previous revenue guarantee contract was calculated. This sum was put in a dedicated reserve; a 'pot of gold' as it was called at the time. The bonuses under the collaborative KPI contract could be paid out of this account in the years to come. If Atos met its performance targets, the company would have 'drawing rights' for payments from this 'pot of gold.' For KPN, failure to meet its performance targets would result in financial penalties, that is, additional drawing rights for Atos. The actual payments of the drawing rights, or bonuses, had to be funded by the specific functions or business units that did not comply with the KPIs and would directly impact their operating budgets. Both the potential penalties and drawing rights were substantial; the potential KPN penalties amounted to a maximum of €15 million, and the potential bonus for Atos was €18 million, for the 2004–2007 period. We discuss this in further detail below.

### 5.2.3 | Interviews and group meetings on both sides

The first two authors took the lead, starting with a round of interviews at all levels of the KPN organization in the third quarter of 2003. The insights gained from these interviews led to a series of meetings with both parties, in a confidential setting, to assess and recalibrate strategic commitment and alignment between both parties. Both parties agreed to codesign the new way of working by detailing out operational processes and performance targets in one business area (standard fixed-line telephony).

### 5.2.4 | Root cause analysis workshop

The foundation for this new strategic partnership was laid in a 2.5 day off-site session of some twenty executives from both parties. A key technique applied in this root cause analysis workshop was group model-building (Vennix, 1996), in which the entire group went through a causal loop diagramming session, identifying interdependencies and causal linkages between end customer performance and actions throughout the service supply chain (see Appendix A). The session aimed at exploring the question: "What happens when something goes wrong in the operations?" This made it clear how actions from the IT supplier directly and indirectly affected KPN customer satisfaction.

The root cause analysis workshop process revealed clear technical reasons behind the severe performance issues. It also highlighted that there were also organizational causes for the problems, problems of misaligned incentives and limited communication between parties. It revealed the dysfunctional nature of the existing detailed KPIs or service-level

agreements (SLAs) as they were called in this IT context. There were thousands of these SLAs, all defined at a very specific technical level. For example, if a server was performing according to its SLA, Atos could not be penalized, even if complaint levels were high (as a result of broader quality issues).

### 5.3 | Intervention I2—The collaborative KPI contracting method itself

Following this initial workshop, a series of further workshops were organized to specify the KPIs, the sub-KPIs, the measurement process, normalization, and the determination of the relevant data sources in detail. An important outcome was a true and detailed understanding that delivering the service involved coproduction by both parties. Therefore, the required KPIs had to be collaborative in three distinct ways. First, they had to register to what extent Atos supported KPN's business goal. The aim was that Atos should measurably contribute to improving KPN's business performance by enhancing end-customer satisfaction and reducing complaint levels in KPN's fixed-telephone business. Second, the KPIs also had to support the supplier. If Atos was to perform well, it needed KPN's collaboration as well. Therefore, KPIs were needed not just for the supplier but also for the customer: in other words, two-way performance targets. Third, the KPIs had to be codeveloped together, in a collaborative process, to gain support from both parties. Without our intervention-oriented DSR approach, these insights would have been much less likely to emerge.

Both parties agreed that operational and enabling KPIs were required for both Atos and KPN. Four top-level KPIs were developed for Atos and two for KPN. Table 1 presents the top-level KPIs, and the corresponding maximum bonuses (for good performance by Atos) and penalties (for bad performance by KPN). Details of these KPIs and their targets are explained in Appendix B. Each top-level KPI was an aggregate of supporting KPIs, structured as a KPI tree. Atos and KPN's 'operational and enabling KPIs' were defined as the core of the collaborative KPI contracting approach. The operational and enabling KPIs were considered collaborative in the sense that KPN could actively contribute to Atos delivering better performance. The development of these KPIs took about 2 months.

Both parties recognized that the complex collaborative KPI structure would require significant work to sustain it, as well as an organization that could deal with any future issues. As a result, a joint collaborative KPI office was set up to manage and monitor the main KPIs and their supportive KPI trees. Its mission was to facilitate and provide assurance in monitoring the KPIs to develop a full-fledged business partnership between KPN and Atos. This office involved both parties. At KPN, it was part of the corporate purchasing department, and at Atos, it was part of the KPN customer unit.

## 6 | OUTCOMES OF THE INTERVENTIONS

We now describe the four main closely interrelated outcomes of the two interventions.

### 6.1 | Outcome O1—Transparency of process performance and its drivers

Operationally, KPN and Atos started to work as a team to measure performance and to continually improve it, under a policy of maximum transparency. The collaborative KPIs offered clear alignment opportunities to do so. At the tactical level, innovative Atos ideas aimed at simplification and rationalization of IT architecture, and processes were implemented as the focus of the relationship moved from a 'cost-down' drive to a 'quality and collaboration' movement. At the strategic level, there was also more transparency under the collaborative KPI contract. Both parties received regular updates of strategic issues at the now well-functioning partner board. As targeted by the 'sell to, with, and through each other' KPI, both parties started addressing corporate customers with joint business propositions, with KPN addressing telecom needs and Atos other IT needs, and this led to several successes. KPN did not quite have its IT governance in order, which was detrimental to Atos's project planning and operations, but these issues were now discussed at partner board level. This

**TABLE 1** Maximum bonus and penalty payments 2004–2007 (in € million)

| | 2004 | 2005 | 2006 | 2007 | Total |
|---|---|---|---|---|---|
| Collaborative KPIs for Atos | | | | | |
| Innovation and redesign | 1 | 0.5 | 0.5 | 0 | **2** |
| Operational and enabling KPIs | 2 | 2 | 1.5 | 1 | **6.5** |
| TCO (35% reduction target) | 2.5 | 2 | 0 | 0 | **4.5** |
| KPN BU client satisfaction | 0.5 | 0.5 | 0.5 | 0.5 | **2** |
| Sell to, with, and through Atos | 1 | 1 | 0.5 | 0.5 | **3** |
| Total | *7* | *6* | *3* | *2* | ***18*** |
| Collaborative KPIs for KPN | | | | | |
| Atos wallet share at KPN BUs | 2 | 4 | 2 | 1 | **9** |
| IT governance | 1 | 2 | 0.5 | 0 | **3.5** |
| Operational and enabling KPIs | 1 | 0.5 | 0.5 | 0.5 | **2.5** |
| Total | *4* | *6.5* | *3* | *1.5* | ***15*** |

**TABLE 2** Performance outcomes

| | |
|---|---|
| Strategic | KPN satisfaction from 4.2 (2004) to 5.6 (2005), 5.9 (2006) and 6.2 (2007) |
| | Cumulatively, €17.9 M paid to Atos; €14.7 M related to positive incentives Atos and €3.2 M tied to KPN penalties. |
| | Total cost of ownership savings achieved of €48 M. |
| | KPI 'sell to, with, and through Atos' was major success. |
| Tactical | Host of innovative Atos ideas implemented. |
| | Focus on quality and collaboration. |
| | Simplification and rationalization drive. |
| | Potential conflicts captured and addressed before reaching escalation levels. |
| Operational | Complaint level fell from 15 to 5% in two years. |
| | Service order rework reduced from 14 to 8%. |
| | First time right call resolution increased from 82 to 95%. |

also resulted in significant penalty payments from KPN to Atos.

## 6.2 | Outcome O2—Performance transparency improves decision-making

In their case study of the design of an interorganizational planning process in a high-tech electronics supply chain, Akkermans, Bogerd, and Van Doremalen (2004) identified strong interrelations between transparency and trust between the partners and the performance achieved. The KPN-Atos case echoes this. A strong relation was observed between the transparency achieved through better communication and the resulting quality of the decision-making. Better decisions led to better performance, leading to more trust, leading to even more transparency, and so on. The workshops were needed to kick-start this virtuous cycle. They provided the 'travail,' the joint hard work that led to the first gains in transparency and trust (Akkermans et al., 2004).

## 6.3 | Outcome O3—Improved operational performance

The performance outcomes of the interventions are shown in Table 2. At the operational level, the percentage of rework decreased from 14 to around 8% within five months after finalizing the intervention process (see Figure 2). Customer complaints fell from 15 to 5% over the first two years. FTR call resolution rose from 82 to 95%. Also, significant total cost of ownership savings were achieved. Financially, this resulted in Atos receiving almost €17.9 million in the 2004–2007 period. This included €14.7 million due to Atos's improved performance but also €3.2 million due to penalties incurred by KPN.

## 6.4 | Outcome O4—Improved relationship quality

The joint 'Collaborative KPI Office' worked effectively in reducing the complaint level. This collaboration also fostered trust at the operational level. An 'Atos unless' policy was implemented and was effective, fostering Atos trust in KPN. At the strategic level, the renegotiated contract signified collaboration and partnership, which was radically different from the old contract that encouraged cost, antagonistic behavior, and control. The development of the KPN client satisfaction scores, based on a survey of client satisfaction in the KPN BUs, clearly illustrates this (see Table 2). At the end of 2003, client satisfaction had hit an all-time low of 3.9. Subsequently, client satisfaction rose from 4.2 in 2004 to 6.2 in 2007. This meant a bonus for Atos of €0.4 million in 2007 against a maximum of €0.5 million. As a KPN senior executive stated in 2007:

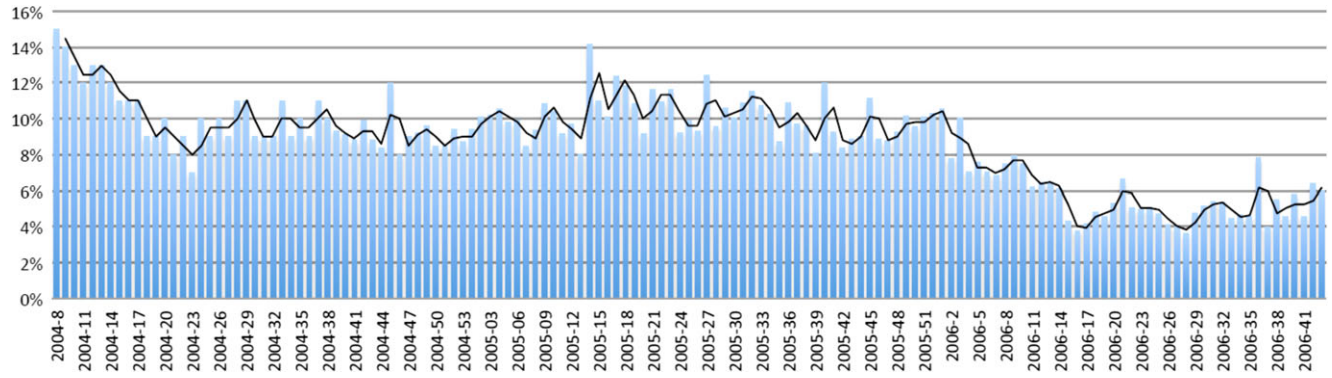


**FIGURE 2** Service rework/aftercare at KPN-Atos, 2004–2006 (as percentage of total service requests/tickets) [Color figure can be viewed at wileyonlinelibrary.com]

> *"The collaborative KPIs were instrumental in building trust for the cooperation between KPN and Atos in an innovative business area where both parties could benefit only if they were willing to invest and change their mode of operations. The success was safeguarded by setting attainable goals with a healthy balance in ambition and practical measurement of progress. The workforce at both Atos and KPN was empowered at operational management level to drive the collaborative KPIs. Not boardroom deal-making, but a better understanding of each other's processes, creating value together."* (Director of IT Operations KPN, 2004–2007)

Also Atos management was very positive about the process and outcomes:

> *"The collaborative KPIs have been the lever for Atos Origin to change its behavior towards its customers. It has opened our vision towards a more customer-focused attitude. It has regained trust in cooperation between KPN and Atos in conjunction with innovations to the benefit of both parties. Finally, success was safeguarded by mutual incentives for both Customer and vendor."* (Executive Vice President Managed Operations, Atos Origin)

## 7 | THE MECHANISMS

Our analysis is that the following four mechanisms collectively explain the successful turnaround in this service outsourcing contract:

- M1: Stakeholders on both sides showed a genuine willingness to engage in a novel and high-risk process.
- M2: At the operational level, systemic thinking and modeling facilitated integral process understanding.
- M3: The collaborative design process fostered consensus and commitment on both sides.
- M4: Incentives were aligned through well-chosen collaborative KPIs.

These four mechanisms together led to a reversal of a vicious cycle of lower trust, transparency, and performance into a virtuous cycle of more transparency leading to more trust and to better performance (Autry & Golicic, 2010).

### 7.1 | Mechanism M1—Willingness to engage in open dialogue to 'unfreeze'

Both Atos and KPN had a lot to lose when they engaged in the collaborative design process. However, it was clear that this was not time to get stuck in organizational inertia (Hannan & Freeman, 1984). As long ago as Lewin (1951), it is known that successful organizational change requires a willingness to 'unfreeze.' The burning platform of the performance problems was an essential requirement to start the change process in the first place. Given our experiences in the later field tests, we believe that the senior management role of the second author helped but having a CPO act as primary change agent does not seem an essential requirement.

### 7.2 | Mechanism M2—Systemic end-to-end modeling leads to integral understanding

Systems thinking has long been identified as one of the five disciplines that together constitute the learning organization (Senge, 1990). This is just as true in interorganizational contexts (e.g, Vennix, 1996). In complex interorganizational processes, nobody sees much more than just a small part of the whole network. Once the collective insight emerges that the way of working so far is simply not effective, in this case from the group modeling process, many people will be willing to change their behavior. When 'the whole elephant' becomes visible, design flaws become more visible as well.

As a result of the group model building process, operations managers from both KPN and Atos recognized not only *what* went wrong but also *why* things went wrong. More importantly, they saw how they could cooperate and address the identified problems. At the beginning of the root cause analysis workshop, a slightly hostile 'us against them' atmosphere could still be felt. However, managers who at the beginning of the session were at arm's length later could be found in the bar well beyond bedtime, discussing ways to enhance the service delivery process. This enthusiasm led the participants to reach across company borders. The clear joint objective helped operations managers to embrace the business aim of the process: reducing complaint levels that directly affected KPN customer satisfaction.

The careful systematic analysis of all the mutual interdependencies in the service processes also identified the most important indicators for effective collaborative KPIs. Financial incentives were tied to final outcomes such as KPN's customer satisfaction—and not, for instance, the uptime of individual servers. The systemic approach supported the feasibility of finding and measuring such KPIs and helped stakeholders to appreciate the logic of the collaborative KPIs.

### 7.3 | Mechanism M3—the collaborative design process fosters consensus and commitment

Both parties were equal in this design process. They were equal because they were both essential to solving the joint problems and because they both contributed crucial knowledge. The service (re)design process reflected this inherent equality and mutual respect. This led to high perceived 'procedural justice' (Rawls, 1971) for the collaborative KPIs and thereby also to consensus and commitment to achieve them.

### 7.4 | Mechanism M4—Align incentives through well-chosen collaborative KPIs

PBCs can have positive effects but not under all conditions. As discussed in the literature review, if output is uncertain due to influence beyond the control of the supplier, implementing PBCs may be very costly as the supplier will demand a very high cost-of-risk premium, or it may not be feasible at all if the supplier is not willing to take the risk. Partly, this uncertainty is dependent on the behavior of the buying firm. For instance, does the buyer provide sufficient and timely information to the supplier, so the latter can plan its production activities optimally? Does the buying firm sufficiently collaborate in the actual execution of activities, for instance, by providing the supplier with timely access to malfunctioning equipment on its premises, which the supplier needs to repair? As suggested earlier, the essentially coproductive or interdependent nature of services only exacerbates this problem. Efforts to implement performance-based contracting, particularly in the context of complex and interdependent B2B services, should focus on addressing the role and impact of customer-induced uncertainty. So, how can this source of uncertainty be reduced, or at least accounted for, so that PBCs can also be implemented in these situations?

We argue that collaborative KPIs are an effective solution to this problem. As discussed, in this case, four top-level KPIs were established for Atos and two for KPN. The total amount of bonuses available over the period 2004–2007 was 33 € million; 18 € million was tied to the performance of Atos, and 15 € million to the performance of KPN (Table 1). The fact that KPIs were used to assess also KPN's performance, and that this was included in the calculation of penalties and rewards, is the most explicit way of addressing the interdependent nature of the service operations and exchange process, making a PBC effective even in such a situation of (buyer-induced) outcome uncertainty. Tying salient financial consequences to performance levels on KPIs and enforcing the actual payment of bonuses and penalties helps focus management attention. When a CIO has to pay €0.5 million to an IT vendor because his own IT governance has not been working properly, leading to late information to that vendor, the supplier's interests will be better safeguarded in the future.

In our analysis of the case, we have thus identified five contextual variables that triggered the search for a solution to the severe problems in the relationship between KPN and Atos. We evaluated the implementation of the two interventions in terms of four performance outcomes and identified four mechanisms that explain how the design artefact led to these outcomes. Our complete CIMO framework is presented in Figure 3. Similar representations have placed the mechanisms before the interventions to depict the sequence of designing an intervention (cf. Groop, Ketokivi, Gupta, & Holmström, 2017). We choose to present the elements in the C-I-M-O order, as we intend to represent for any given intervention the sequence of context affecting the applicability and details of the interventions, which trigger mechanisms that subsequently lead to outcomes.

## 8 | DESIGN EVALUATION IN OTHER CONTEXTS

In the decade following the initial design of the collaborative KPI contracting approach, the first two authors have applied several similar interventions. The choice of these intervention cases was not 'a priori' theory driven. In DSR studies, the selection of cases is highly dependent on the availability of case study organizations. Designing and implementing the collaborative KPI contracting approach requires considerable investments in time and effort by the buying firm and the supplier involved. These organizations also need to be willing to let researchers document and share the process and outcomes.

Here, we present two of these interventions as evaluation cases, which can deliver relevant insights regarding *transferability*: what is the efficacy of the collaborative KPI contracting approach in other contexts? (Holmström et al., 2009; Van Aken et al., 2016). The two cases selected are highly similar in terms of the five contextual factors identified in the original case setting, suggesting that the collaborative KPI contracting approach would be effective. There is buyer–supplier coproduction of services (C1), a complex operational service network (C2), there are financially driven contracts (C3), a burning platform of low operational performance (C4), and low relationship quality (C5). The two evaluation cases also represent the most complete interventions in relation to the original design. In contrast, there are differences with the original case in terms of the application domain. Like the KPN-Atos case, the two cases involve IT services but they pertain to different business processes (ship traffic regulation and human resource management). The cases are also from different customer sectors (port authorities/public infrastructure and energy). Thus, the evaluation cases can bring insights whether the efficacy of the collaborative KPI contracting approach is affected by the application domain

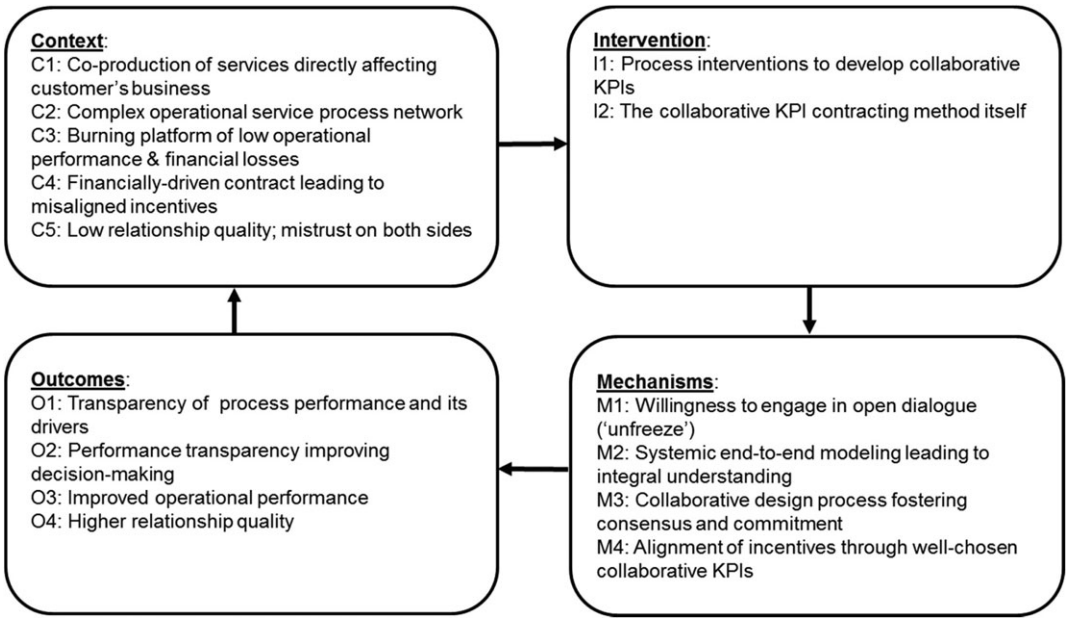


**FIGURE 3** CIMO framework for the collaborative KPI contracting approach

characteristics. They are also set relatively recently; in 2011–2012 and 2015, respectively.

Finally, compared to the initial design case, the two cases represent variations in two of the contextual factors, which make them even more interesting as evaluation cases. In the first evaluation case, outsourced IT services for a port authority, the operational service network is not only complex, but the specific service process we focus on—incident management in ship traffic regulation—is also a discontinuous and variable process rather than a highly repetitive service process. This increases the complexity of the service process, as there is more variety in the incidents and the detailed service processes required and the time pressure is high (variation of C2). In the second case, outsourced IT services for an energy company in the area of human resource management, the coproduced service affects the customer's operations but not directly the customers of the customer (variation of C1). In sum, the evaluation cases are testing whether the efficacy of the collaborative KPI contracting approach is affected by variations in two of the core contextual factors, and whether its efficacy is affected by application domain characteristics.

## 8.1 | Evaluation case 1: Outsourced IT services for a port authority

This case concerns an IT outsourcing relationship between a European port authority and a mid-sized European IT service provider. This relationship started in 2007 with the outsourcing of the port authority's maritime IT system and related processes, which are enabling port officials (in the port control room but also on the water) to manage the flow of inbound and outbound traffic including enforcing regulatory requirements. Ship pilots would also rely on these systems for navigation, and failure in the performance of these systems would at best lead to serious delays and at worst to dangerous incidents. The most critical part of these services involves incident management: mobilization, incident resolution, incident knowledge management, incident prevention, and incident mitigation. The joint work processes of the port authority and the vendor in incident management, as described in detail below, were closely interdependent (C1) and, also given the variety in possible incident situations, quite complex (C2).

In 2011, four years into the outsourcing relationship, the relation between the two parties had substantially deteriorated. The original contract had led to misaligned incentives (C3). It had been strongly cost-driven, resulting in severely hampered investments in quality improvements, to the dismay of the port authority. Both parties blamed the other side for the present difficulties. There were no end-of-process KPIs, just monthly (internal) customer satisfaction measurements. Operational performance was poor, and several dangerous and frustrating incidents had occurred. Satisfaction with the offsite, outsourced customer helpdesk was very low. Thus, there was clearly a burning platform for change (C4), related to low relationship quality with mistrust on both sides (C5). Contract renewal would be up in the following year, and it was clear that major changes were needed, urgently.

This setting made both parties motivated to engage in a full intervention process, as in the KPN-Atos case (M1). In the first months of 2012, systemic end-to-end modeling took place to obtain integral understanding of the processes involved (M2). After a round of interviews, a collaborative diagnostics workshop was conducted, which generated quite some enthusiasm from the 20-odd participants. A group model building

session generated a causal loop diagram that showed close interdependencies as well as leverage points for performance improvements. The subsequent improvement task was split up into four teams, corresponding to the incident management processes mentioned earlier. Each team was staffed with representatives from both companies and made responsible for identifying the KPIs, redesigning work processes, and ultimately for improving performance. This integral collaborative service redesign effort took almost one full year.

The initial collaborative diagnostics workshop was important in identifying the process interdependencies in mobilization and incident resolution but also key in creating the commitment at operational and middle management levels to push through the service redesign effort. The subsequent scope focused on operational performance improvements, working simultaneously to redefine the working relationship into a partnership mode (M3). The penultimate steering committee meeting in April 2012 was fully dedicated to the specification of collaborative KPIs (M4). It was decided that these collaborative KPIs were to replace the traditional bonus/malus arrangements. Similar to the collaborative KPI structure that was developed for the KPN-Atos case, different collaborative KPI 'buckets' were used: operational and enabling KPIs; bi-directional overall satisfaction KPI; and strategic collaboration. For the three buckets combined, the total weight of supplier-facing KPIs was 45% while customer-facing KPIs weighted for 30%. In this case, we also defined *joint* KPIs (25% weight); KPIs that were impossible to allocate to just one of the two parties. The respective specific KPIs are explained in more detail below. As in the KPN-Atos case, the relative size of the financial incentives was modest; around 1% of the total contract value, funded equally by both sides.

### 8.1.1 | Mobilization

Within minutes after the occurrence of a serious incident regarding maritime-related IT, all the relevant actors needed to convene and engage in concerted decision-making and action. Serious incidents occurred, for example, when a camera at a particular important bridge, with high traffic density and a narrow passage, malfunctioned and the responsiveness of the service provider was lagging behind and no status updates were issued. Another instance involved the prolonged malfunctioning of the dynamic harbor chart, preventing most of the largest container ships berthing at the quays, as there were no water depth information available, leading to severe constraints in harbor approaches (because water depths in this port are strongly affected by the tide). The relevant actors would be from both the customer and the service provider and sometimes external stakeholders. This was a process in which both service provider and client had to collaborate seamlessly, hence the need for KPIs both for the supplier and for the buyer. The port authority was responsible for the "Speed and quality of the conference call" (15% weight within the operational and enabling KPI bucket) with all the relevant parties within minutes after the incident was reported. The quality of the work done subsequently by the supplier depended heavily on the quality of this call. The supplier was responsible for "First Time Right routing" (FTR; 5% weight). This refers to the percentage of cases in which the IT service provider's call center could immediately locate the right expertise to deal with the issue at hand. The second supplier-facing KPI was "Customer satisfaction" (20% weight), referring to the satisfaction that port authority employees (within the maritime operations) have with regard to the service provider's call center.

### 8.1.2 | Incident resolution

Resolving the incident typically required the efforts from both customer and supplier. Two KPIs were defined: "Number of major incidents" (5% weight) and "Turnaround resolution duration" (10% weight). Both are clearly end-of-process KPIs, the scores on which are jointly determined by the actions of both parties. It was explicitly acknowledged that, irrespective of where a major incident originated, incidents and incident resolution were a joint responsibility and therefore assessed through joint KPIs. Still, the governance structure and demarcations of authority between both organizations, and within them, needed to be crystal clear to reduce incidents and to achieve the most effective resolution process.

The discontinuous or irregular delivery of these incident-related services was the main reason that no performance indicators related to external customers were included in the KPIs. Even though port users and health and safety authorities could be directly affected by (lack of) adequate incident handling, it is more challenging to consistently include performance or satisfaction measures for such external users.

The other two main work processes, knowledge management and incident prevention and mitigation, were defined as tactical processes enabling effective and efficient operational processes of mobilization and incident resolution. Knowledge management referred to all the information that needed to be available and shared on both sides to successfully conduct this and the other stages. A common vocabulary was key here, as well as the quality of the reporting about incidents, their causes, and how they were handled. Again, this was very much a coproduced activity. Three enabling KPIs were defined: lead-time for updating knowledge base (supplier-facing; 10% weight); define workaround and implementation of definitive solution (customer-facing; 15%); no closing of ticket without change workaround (supplier-facing; 10%). Incident prevention and mitigation, essentially proactive monitoring

(10% weight), would have to be deployed by both parties. At the time of our intervention, the incident prevention and mitigation process still had to be designed in detail.

Following (and already during) the collaborative change effort, process performance became transparent to both parties (O1) and trust improved on both sides (O4). For example, the port authority IT manager explained: "Every morning, we all gather around the plan board to see what progress has been made on specific topics." The most important outcome was improved operational performance (O3). The number of IT-related maritime incidents dropped substantially, as shown in Figure 4. The data reported there also demonstrates that, interestingly, the share of supplier-induced incidents declines over time. In addition, customer satisfaction with help desk performance, which had been very low at first, quickly reached satisfactory levels. Note, although, that these performance data span a relatively short period.

Two years later, the port authority's director of IT services reflected as follows: "We launched the KPIs in combination with a bonus/malus arrangement. The proceeds went not only to the service provider, but were also used to finance improvement projects. Thanks to the introduction of collaborative KPIs, the resolution time of major incidents has been reduced from 8 hours to less than 4 hours. […] Also the port authority has responsibilities in meeting certain KPIs: in major incidents, the authority has to assure that within 30 min the right people from the suppliers involved are gathered around the same table." (Hmamouch, 2014; our translation).

## 8.2 | Evaluation case 2: Outsourced IT services for an energy company

In 2013, a mid-size Dutch energy company had outsourced its IT-based human resource (HR) services and salary administration, and by 2015 it was experiencing deteriorating performance.

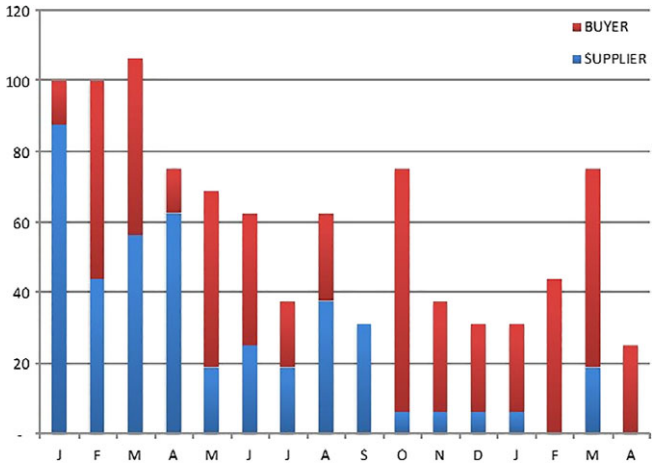


**FIGURE 4** Major IT incidents per month at port authority, 2012–2013 (indexed; number of incidents in January 2012 = 100) [Color figure can be viewed at wileyonlinelibrary.com]

The process design was that employees and managers, in a digitally supported Do-It-Yourself (DIY) mode, would submit changes in their own HR details and as well as in those of their direct reports. This included, for instance, entering details of new employees or reporting sick leaves. The DIY principle made this very much a coproduced service; to achieve a certain quality level in the HR and payroll services, the vendor was dependent on the quality and timeliness of the inputs provided by customer managers and employees (C1). In contrast to the KPN and port authority cases, however, the outsourced service only indirectly affected performance toward the customer's customer. Only when problems with these HR services led to staff shortages would the service ultimately affect external customers, but there were no structural indications of this.

With some 700 managers who had to update information regarding their staff and themselves, the service network was certainly complex. To complicate matters, the supplier had moved its helpdesk from the Netherlands to Southern Spain and the customer had 'thrown over the fence' a nonoptimized IT landscape toward the outsourcing partner (C2). The outsourcing contract had been focused on cost reduction, and the call center had been moved abroad for labor cost reasons. Call center agent incentives were also mostly aimed at productivity, not at quality (C3). Many outages and mistakes led to extremely low employee satisfaction, extensive rework, and exploding costs (C4). As a result, there was low relationship quality, with mistrust on both sides, amplified by the drastic reduction in in-house HR staff who accompanied the introduction of the DIY service (C5). The central workers council, an important internal body in Dutch corporate law especially regarding labor conditions, demanded that something should be done.

Fortunately, the mistrust on both sides did not prevent the parties from sitting down together. There was a willingness to discuss openly how to improve performance; there was much to be gained (M1). In the problem diagnosis phase, a collaborative diagnostics workshop was held with representatives from both the customer and the IT vendor. A causal loop diagram was developed with all the stakeholders involved, and a systemic end-to-end model of the workflow interactions related to HR IT systems was developed (M2). This identified the root causes of nonperformance. It became clear that the outsourced, nonoptimized IT landscape was creating havoc in the HR processes. The process interactions between customer staff and supplier staff contained many flaws. Customer staff that suffered from high workloads had to find time to submit sick-leave details in complicated IT tools, with unhelpful support from the supplier's call center in Spain, staffed with cheap labor. This led to irritation, time lost in rework, and even higher workloads on both sides. The irritations then led to higher churn at the call center, which further reduced their expertise level. This led to even more mistakes, overtime, corner cutting,

irritation etcetera, while quality was eroding further (Oliva & Sterman, 2001).

At the outset there were many technical KPIs, not related to end-of-process outcomes, and there was a strong focus on cost reduction. A team consisting of a manager from both parties and support staff (M3) decided to reduce the extant 25 KPIs to just three, with a focus on quality rather than costs: (a) lead time in dealing with customer query tickets; (b) FTR percentage in dealing with service requests; and (c) employee satisfaction. This set-up in turn led to coherent and aligned incentives (M4).

The analysis of the work processes and the definition of fewer KPIs led to transparency of process performance on both sides. Both parties indicated that they highly appreciated the opportunity to have a detailed look into each other's operations (O1). In a subsequent collaborative service design process, two months after the workshop, remedies were detailed out, including investments in optimization of systems, interfaces, and processes (O2). In a number of areas, operational performance improved (O3). The HR operations manager reported a reduction in the number of open tickets and a resolution of the lead time problem. The relationship quality between the utility company and its HR/payroll outsourcing partner improved substantially as a result of the intervention (O4). Directly after at the initial root cause modeling workshop, participants indicated "more understanding for [Supplier]," "more understanding of interrelations of processes," and "everyone has the intention to collaborate and improve." In the month afterwards, employee satisfaction increased, and rework and related costs decreased. However, the overall improvements in outcomes were less substantial than for the other two interventions.

As identified earlier, collaborative KPIs share three common elements: they align goals because they are focusing on end-of-process indicators; they are two-way; and they are defined in a collaborative process. In this case, only two of these conditions were met. In the end, no specific KPIs were implemented to measure the activities and performance of the customer, although the root cause analysis workshop had identified several possible indicators, such as available documentation of processes, training of customer staff in the relevant workflows, and completeness of queries submitted to the supplier. Ultimately, however, the intervention did not include buyer-facing KPIs due to changes in the external business conditions in early 2016. Based on new government regulations with regard to the split of energy production and distribution, it became clear that the company would have to be split. This challenge started to dominate the agenda of senior management. The split of HR systems was one of the major projects that had to be taken on, and management decided to fully focus on this before dedicating serious efforts to redesigning existing work processes.

Table 3 summarizes the similarities and differences across the original design case and the two evaluation cases, for the various elements of the CIMO framework.

## 9 | PROPOSITIONS AND TRANSFERABILITY OF THE DESIGN

Based on the original design case and the two evaluation cases, we now put forward five actionable propositions (Kaipia et al., 2017) or technological rules (Van Aken, 2004) relating to the application of the collaborative KPI contracting approach. In these cases, we have designed and evaluated the collaborative KPI contracting approach, defined as a process for developing buyer–supplier relationship performance indicators that (a) promote collaboration by focusing on end-of-process indicators; (b) are 'two-way' by measuring both supplier performance and also customer (buying firm) performance; and (c) are defined in a collaborative process, together by the supplier and the customer.

Two of the three cases (KPN-Atos and the port authority case) have demonstrated that (and how) using a combination of supplier-facing and buyer-facing KPIs leads to substantial improvements in performance outcomes. Across the three cases, the specific KPIs used were substantively different to reflect the specific service processes and the business priorities of each case. In all the three cases, albeit to a varying degree, the approach led to higher process transparency (outcome O1), better decision-making (O2), better operational performance (O3), and higher relationship quality (O4). Because our intervention in the energy company was cut short because of the company split, KPIs measuring the customer's performance toward the buyer were identified but not implemented. Still, the new KPIs were collaborative in the sense that they measured end-of-process performance and were developed collaboratively. The operational performance improvements in the energy company case, however, appear more limited than in the other two cases, and this may be partly explained by this lack of buyer-facing KPIs. This leads to our first proposition:

> *P1: Performance of an outsourced, co-produced service will be enhanced by the use of KPIs that measure and reward both supplier and customer (buying firm) performance.*

In all the three cases, collaborative processes were used to effectively develop and implement the collaborative KPI contracting approach; the change management approach was quite similar in all the three cases. More specifically, the mechanisms triggered by the change approach are similar. There was a willingness to engage in open dialogue (M1), systemic thinking and modeling was used to facilitate an

integral understanding of the process (M2), consensus and commitment were fostered (M3), which led to alignment of incentives through collaborative KPIs (M4). Teams were formed with representatives from both organizations, and these teams played a central role in analyzing the problems and developing the possible solutions. These teams always included the representatives that were intimately familiar with the actual service operations. We therefore put forward:

> *P2: The development of a collaborative KPI contracting approach, and thereby the performance of an outsourced, co-produced service, will be enhanced by the use of collaborative development and change management processes, involving representatives deeply familiar with the actual service operations and the interdependencies between the service processes at the supplier and the buyer.*

For more specific propositions regarding the conditions under which the collaborative KPI contracting approach may be transferrable or the most effective, we turn to the contextual factors. Coproduction of the outsourced service (C1) is an essential requirement for the implementation of the collaborative contracting approach, as buyer-facing KPIs would not be necessary otherwise. The evaluation cases have provided more specific insights regarding the sub-requirement of C1 that the co-produced service should 'affect the customer's business'. It has become clear that this effect may occur in two different ways; as an impact on external customers or as an impact on internal operations and employees. In the KPN and port authority cases, the operational performance of the customer toward its own customers is directly affected by the performance of the service suppliers. Nowadays, such settings are quite common as a substantial share of outsourced services is directly part of the buying organization's value proposition to its customers (Wynstra, Spring, & Schoenherr, 2015). In those situations, the supplier and the buying organization typically coproduce a service for the benefit of external customers. In contrast, the energy company case demonstrates that impact on the customer's business does not have to imply that the customer's customers are directly affected. The business of the customer (buying organization) may also be affected by outsourced 'back office' services (Chase & Apte, 2007) that 'only' have a direct and substantial impact on its internal operations processes and its employees, as in the case of outsourced HR services and salary administration. Only in exceptional cases—such as when personnel is not hired on time—will lack of adequate performance affect external customers, and then only indirectly. As we have demonstrated, coproduction of services can also apply to such outsourced 'back-office' services, and collaborative KPI contracting can thus be effective. This also means that the collaborative KPI contracting approach does not by definition have to include (among others) end-of-process indicators that assess performance toward or satisfaction of external customers. These KPIs can also be related to outputs or outcomes related to internal customers. Thus, we propose:

> *P3: The collaborative KPI contracting approach will have a positive effect on the performance of an outsourced, co-produced service, both when these services directly affect external customers of the buyer and when these services directly affect the primary processes of the buyer.*

Complexity of the service process network (C2) appears also a required condition. The collaborative KPI contracting method requires a substantial commitment from management and staff from both buyer and supplier, and therefore the context must justify such a joint commitment: else simpler alternatives will be more efficient. The port authority case demonstrates that the collaborative KPI contracting approach may not only work in situations of a more or less continuous complex service delivery network, but also in situations where the service delivery is irregular or occasional. Thus, we put forward:

> *P4: The collaborative KPI contracting approach will have a positive effect on the performance of an outsourced, co-produced, and complex service, both in the case of services with continuous delivery and in the case of discontinuous delivery.*

Severe operational performance issues (C4) and relationship problems (C5) are not inherently necessary conditions, but both form an incentive to adopt this approach and increase the potential impact from the development and use of collaborative KPIs. As mentioned, two of the authors have applied the collaborative KPI contracting approach in a number of other settings. We tried to apply the method, unsuccessfully, to a case in the banking industry, where there was coproduction of services directly affecting the customer's business (C1) in a complex operational service network (C2). However, there was no burning platform in terms of operational performance (C4) and mistrust on both sides (C5). We soon found management unwilling to commit the required resources to what to them still seemed a fairly straightforward design issue; there was not yet a burning platform. This supports (but does not replicate, as the intervention ultimately did not take place) the findings from our three cases, suggesting that the efficacy of the collaborative KPI contracting approach and its transferability are limited if there are no substantial performance or relationship problems.

**TABLE 3** Case comparison

| | KPN | Port authority | Energy company |
|---|---|---|---|
| Outsourced IT services | Yes; data centers, end-user services, and software house activities | Yes; ship traffic regulation | Yes; HRM |
| Industry | Telecom | Transport infrastructure | Energy |
| Size of annual contract | N* 100 € M | N* 10 € M | N* € M |
| Duration of intervention | 3 years | 1 year | 1 quarter |
| C1—Coproduction of services directly affecting customer's business | Yes, directly affecting customer's customer | Yes, directly affecting customer's customer | Yes, but not directly affecting customer's customer |
| C2—Complex operational service process network | Yes, continuous service | Yes; discontinuous service | Yes, continuous service |
| C3—Financially driven contract leading to misaligned incentives | Yes | Yes | Yes |
| C4—Burning platform of low operational performance and financial losses | Yes | Yes | Yes |
| C5—Low relationship quality; mistrust on both sides | Yes | Yes | Yes |
| I1—Process interventions to develop collaborative KPIs | | | |
| Reframing the relationship from adversarial to partnership | Yes | Yes | Yes |
| Magnitude of financial incentives; the 'pot of gold' | 1–2% of annual contract value; predetermined amount | 1–2% of annual contract value; predetermined amount | Financial incentives in place; no predetermined amount |
| Interviews and group meetings on both sides | Yes | Yes | Some |
| Root cause analysis workshop | Yes | Yes | Yes |
| I2—The collaborative KPI contracting method | | | |
| Developing end-of-process KPIs | Yes | Yes | Yes |
| 'Two-way' supplier facing, and customer facing | Yes | Yes | No |
| Developed in collaborative process, together by supplier and customer | Yes | Yes | Yes |
| M1—Willingness to engage in open dialogue ('unfreeze') | Yes | Yes | Yes |
| M2—Systemic end-to-end modeling leading to integral understanding | Yes | Yes | Yes |
| M3—Collaborative design process fostering consensus and commitment | Yes | Yes | Yes |
| M4—Alignment of incentives through well-chosen collaborative KPIs | KPIs and incentives for both supplier and buyer; all business areas | KPIs and incentives for both supplier and buyer; focus on specific problem areas | KPIs and incentives for the supplier only |
| O1—Transparency of process performance and its drivers | Full | For key problem areas | For supplier–buyer interface |
| O2—Performance transparency improving decision-making | Comprehensive | For key problem areas | Some |
| O3—Improved operational performance | Substantial improvement in all aspects | In key problem area yes, in others not | Some improvement but issues remain |
| O4—Higher relationship quality | High improvement | Significant improvement | Some improvement |

In the KPN-Atos and the two evaluation cases, there were financially driven contracts (C3). Also this factor does not form a *necessary* condition for the applicability of the collaborative KPI contracting approach. Still, financially-driven contracts, with little to no attention to operational performance, are often leading to mistrust and inadequate performance, and in that way contribute to a 'burning platform.' In conclusion, we put forward:

> *P5: The collaborative KPI contracting approach will have the biggest impact on performance when there is a financially driven contract, very low operational performance, and extensive mistrust on both sides.*

In terms of the application domain, the original design case and the two evaluations cases demonstrate that we can have a certain degree of confidence in the efficacy of the collaborative KPI contracting approach for different forms of IT-related services and that IT-intensive service sectors such as telecom, infrastructure, and energy distribution are suitable industries (see Table 3). This does of course not mean than the application domain is limited to these industries and to outsourced IT services. Identifying the complete domain of contexts to which the method can be transferred will require further field testing. Currently, however, we see no inherent characteristic of the collaborative KPI contracting approach that limits its application to only IT services. Therefore, we are not including an application field restriction in our propositions.

# 10 | CONCLUSION

## 10.1 | Theoretical contributions

We posit that the collaborative KPI contracting artefact and its demonstrated effects represent a novel contribution to theories on output controls and performance-based contracting. The concept of collaborative KPI contracting complements other recent research on performance-based contracting, such as studies into the interaction of output and process controls (Cardinal et al., 2017; Handley & Gray, 2013) or the interplay between output controls and relational governance (Nullmeier et al., 2016; Selviaridis & Norrman, 2014; Stouthuysen et al., 2012). Our study demonstrates how relational governance, especially the development of transparency and commitment, is instrumental in developing and gathering support for a collaborative KPI contracting approach. This explanation resonates with the argument that whenever a party is monitored, it will perceive such governance as less intrusive when it is embedded in relational norms (Heide et al., 2007; Ouchi, 1979). In contrast to prior research, our study addresses how defining, verifying, and incentivizing the performance of specific processes at the *buying firm* can help alleviate the limitations of traditional performance-based contracting (output controls) when the supplier's liability for service delivery performance is difficult to verify.

While we have limited the (managerial) application domain of the collaborative KPI contracting approach to outsourced services characterized by extensive buyer–supplier coproduction and complexity, future research can go beyond that in formal theory building and testing (Phase 4 in DSR, according to Holmström et al. (2009)). Buyer–supplier relations where physical products are being exchanged may also be characterized by joint production, behavioral uncertainty introduced by the buying firm and, consequently limited liability of the supplier (Handley & Gray, 2013; Mayer et al., 2004). In particular, we submit that collaborative KPI contracting could be managerially and theoretically relevant in buyer–supplier exchanges that require intensive information exchange and coordination of operations, such as in build-to-order and engineer-to-order settings.

As indicated earlier, collaborative KPI contracting is similar to yet different from some other supplier relationship management tools that have recently been implemented. Supplier satisfaction surveys are similar to collaborative KPI contracts in that they typically refer to the quality of operational interactions between the buyer and supplier, such as, ordering and delivery processes (Essig & Amann, 2009; Vos, Schiele, & Hüttinger, 2016). Supplier satisfaction, defined as the supplier's "[…] feeling of equity with the supply chain relationship […]" (Benton & Maloni, 2005: p. 2), has been argued to have an impact on, for instance, the stability of buyer–supplier relationships (Essig & Amann, 2009). Supplier satisfaction surveys are, however, different from collaborative KPI contracts in three main aspects. First, supplier satisfaction survey scores do not affect the financial rewards of the supplier. Second, supplier satisfaction surveys, by definition, only measure *perceptions* of just *one* actor in the relationship, whereas collaborative KPIs measure quality and reliability of processes at *both* the customer and the supplier (in addition to, possibly, satisfaction of one or several actors). Finally, supplier satisfaction surveys are largely standardized and aggregated, referring to general buyer–supplier interactions (e.g., payment behavior), regardless of the specific service or product being exchanged. Incidentally, recommendations have been provided to extend supplier satisfaction surveys into 'dual accountability' tools, such as a two-way scorecard focusing on the operational and tactical sub-processes at both the supplier and the buying firm (Slobodow et al., 2008). In contrast to our collaborative KPI contracting approach, however, these dual accountability tools are not related to incentive schemes and thereby not specifically designed to address the deficits of PBCs in the context of buyer–supplier interdependencies in service outsourcing.

Collaborative KPI contracting is, in spirit, similar to the 'Vested' approach advocated by Vitasek and colleagues, which is recently gaining traction in practice (Vitasek et al., 2013). Vested outsourcing emphasizes the importance of defining high-level, strategic 'desired outcomes' (e.g., final customer satisfaction) and the use of incentives rather than detailed process specifications to encourage desired supplier behavior (Vitasek et al., 2013). The important difference, however, between collaborative KPI contracting and the 'Vested' approach is that the latter emphasizes the unilateral nature of traditional, supplier-facing performance indicators: "The challenge in a Vested contract is to find the right incentive to motivate service providers that ultimately will meet the company's desired outcomes." (Vitasek et al., 2013: p. 153–154).

Collaborative KPI contracting is different to all these before-mentioned approaches, also because of its emphasis on the interrelations between process and outcome. All four outcomes of the approach we distinguished do not come about only after the intervention has ended, but they grow from the moment that the intervention starts. Transparency of the process (O1) begins with the causal diagramming workshop with all stakeholders. However, long after the initial intervention, the KPIs still provide transparency of performance on both sides. Choosing suitable collaborative KPIs and designing the process to define and measure them are just the first instance of improved decision-making (O2) that this higher transparency achieves. It may also enable further service delivery redesign. As is evident from the original design case (Figure 2) as well as from the port authority evaluation case (Figure 4), operational performance (O3) started to improve during the intervention, not just afterwards. And, last but not least, from the first day of the intervention, relationship quality starts improving (O4).

## 10.2 | Managerial implications

By defining, measuring, and incentivizing the quality of processes at both the supplier *and* the buying firm, collaborative KPIs can resolve the problems of implementing PBCs in situations of buyer–supplier interdependence. Collaborative KPI contracting thus offers a potential remedy in situations of limited performance attributability, where traditional agency theory suggests that PBCs cannot be effective (Eisenhardt, 1989).

In the original KPN-Atos case, but also in the port authority and energy company evaluation cases, it became clear to both parties that the buying firm had an important role in supporting supplier performance in two areas. First, the customer was important in supporting the successful operational delivery of the service by the supplier. This was reflected in the development of buying-firm facing operational and enabling KPIs. While the actual KPIs will differ depending on the type of service, we postulate that because of the coproductive nature of business-to-business services, this supporting role is found in many services (Nullmeier et al., 2016; Selviaridis & Norrman, 2014; Tanskanen, Holmström, & Öhman, 2015; Vitasek et al., 2013). The second role of the customer was in commercially supporting the business of the supplier particularly regarding the efficiencies of serving this customer, in the KPN-Atos case reflected in the share-of-wallet KPI. This is a typical feature in many outsourcing relations, although rarely made explicit. Applying collaborative KPIs here as well will make this role more tangible.

The managerial relevance of the collaborative KPI contracting approach was validated soon after the initial case. In the Netherlands, the turnaround helped the KPN CPO win the Procurement Manager of the Year Award in 2006 and soon after, the innovation won the 2008 Institute of Supply Management R. Gene Richter Award for Innovation and Leadership in Supply Management, in the USA. These acknowledgements are also a reflection that many organizations find themselves in similar situations.

The collaborative KPI contracting approach is the core design artefact in our study, but we have also described, in detail, the analysis, development, and implementation process that was adopted; both for the initial design case and the two subsequent evaluation cases. The novelty of this collaborative service design process in itself is limited; it largely relies on existing tools and methods, such as systemic modeling interventions. Still, both the original design study and the evaluation cases suggest that the collaborative service design process is crucial in successfully developing and implementing the collaborative KPI contracting approach. To be effective, the collaborative KPI contracting approach should be adapted to the specific context; indeed, effective designs in (service) operations management are typically highly context dependent (Groop et al., 2017). Most tangibly, this contextualization takes place in identifying and selecting which buyer-facing and supplier-facing KPIs to apply. The collaborative service design process provides a structured approach for achieving this required contextualization. In sum, the integrated combination of the collaborative KPI contracting approach itself and the collaborative service design to develop and implement the approach in a specific case makes this overall design artefact inherently transferable. The generic model can in this way be used as a design model for making context-specific designs (Van Aken et al., 2016).

In addition, we reviewed the general empirical boundary conditions that may affect the applicability and efficacy of our design (Groop et al., 2017), as elaborated in the actionable propositions presented earlier. Based on our current design knowledge, we see the collaborative contracting approach being applicable to various types of outsourced services characterized by extensive buyer–supplier coproduction and complexity. These services may be affecting

external customers or 'only' the primary processes of the buyer (P3), may follow a continuous or discontinuous delivery process (P4) and do not necessarily have to be IT-related services. The efficacy of the collaborative KPI contracting approach is positively affected by the presence of financially driven contracts, low operational performance, and buyer–supplier mistrust (P5).

Effectively implementing the collaborative KPI contracting approach relies on two key notions. Firstly, that services indeed co-produced by buyer and supplier, and that this means that good performance can only be achieved through close collaboration between both sides. Secondly, that the main focus for senior management should not be in taking a close and genuine interest in detailed interactions at the operational level. This is the level at which stakeholders interact most closely and at which collaboration needs to be seamless. This once again illustrates the truth observed by Skinner (1969) half a century ago: effective operations management is essential for a successful business strategy.

## 10.3 | Methodological considerations and further research

Our study has applied a design science approach. In doing so, we follow Van de Ven's approach of engaged scholarship, in which organizations are seen not as "data collection sites and funding sources", but as a "learning workplace (idea factory)" where practitioners and scholars coproduce knowledge on important issues by testing alternative ideas and different views of a common problem (Van de Ven & Johnson, 2006: p. 809). The concept of collaborative KPIs did not exist in management practice or in academic literature. Academic literature only recently has started to investigate the challenge of outcome attributability in the context of performance-based contracting and possible remedies. Therefore, neither an inductive case study, nor a deductive survey study would have been able to identify this new design artefact or solution (Dubois & Gadde, 2002). Only by intensively engaging in problem-solving in the initial KPN-Atos case were we able to derive the detailed insights required to develop the concept of collaborative KPIs. Only by going into the field, during the initial case and the subsequent evaluation cases, were we able to develop the context-specific insights both into the appropriate collaborative KPIs and into the change processes required, and the tight interdependencies between the two. Our research illustrates that research in operations management needs DSR, not as substitute but as a complement to traditional research strategies.

Still, as any other study, our research has some limitations. First, each of the cases has involved the active role of two of the authors. While we therefore have specifically sought the collaboration with two authors that have not been involved in the actual intervention activities, this still leaves room for some possible bias in reporting. Hence, it is important that other researchers can use our artefact and propositions in other (DSR) studies. A second limitation pertains to the fact that our cases come from a limited range of countries and one type of services (IT). Further work thus remains to be done regarding the empirical boundary conditions regarding the applicability and efficacy of the collaborative KPI contracting approach.

Specifically, further research on collaborative KPI contracting could be developed in at least two directions. Firstly, our case studies involved IT services or services with a substantial IT component. While there are a priori no counter-indications that collaborative KPI contracting is not suitable for other types of services, it may be useful to explicitly investigate its implementation and effectiveness for other services that rely on substantial efforts and resources from both the buyer/customer and the supplier, such as specific types of cleaning services (Nullmeier et al., 2016). A specific consideration in such studies should relate to the process of defining and monitoring KPIs, which may be more challenging for a service process that does not generate as much measurement information, and as efficiently, as IT processes tend to do. A second direction for subsequent research could be to investigate whether collaborative KPI contracting can be effectively applied in situations where the outsourced service does not affect the end customers of the buying firm. Our third proposition suggests that the collaborative KPI contracting approach is not just suitable for situations where (the quality of) particular processes at the buying firm have a direct impact on the supplier's ability to achieve a certain performance vis-á-vis final customers. However, as the KPI contracting approach implemented in the energy company case was, due to external conditions, not *fully* collaborative, further (design science) research should investigate the effectiveness of the full approach in those situations where the final customer is not (directly) affected by the outsourced service. The development and measurement process of the collaborative KPIs in such situations may be somewhat less complicated, but any operational and cost problems are presumably less likely to create the required burning platform.

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## APPENDIX A: CAUSAL-LOOP DIAGRAMMING FROM COLLABORATIVE SERVICE DESIGN WORKSHOP

A causal-loop diagram was developed with the group of some 20 executives from both KPN and Atos, to get to the root of the question: "What happens when things go wrong?". Figure A1 shows part of the causal-loop diagram generated by the group when examining causes of problems in the network. The causal-loop diagram provided detailed insights into the propagation of errors. At the top-left is a central element: some interface between IT systems during the day breaks down. Consequently, the order entry systems are not or are only partially available. This means that new customer orders cannot be (fully) entered, that systems cannot be updated, and that pending queries cannot be resolved. There are many potential reasons for such an interface breakdown. Some of them are technical, others are human. The top-right part of the diagram explains why this happens so often. Most importantly, when a change is made to one of the 40 or so critical systems in the delivery process, the effect on any of the other systems is unclear, because of the large number of systems involved, complex interdependencies, and lack of control over their interfaces. Mostly, these are the responsibility of the IT vendor but there remain many interfaces with KPN.

When errors are made in the customer-facing processes, staff will try to correct them. This is described in the lower-middle part of the diagram. Doing so is a complex undertaking, requiring considerable skill. Most of that skill had either left the companies or was becoming obsolete as a result of the ongoing changes in all these systems. Budgets were too low to keep technical expertise up to standard. As a result, actual service deliveries were not 'FTR' far too often. The bottom-left of the diagram illustrates the vicious cycle of the service delivery

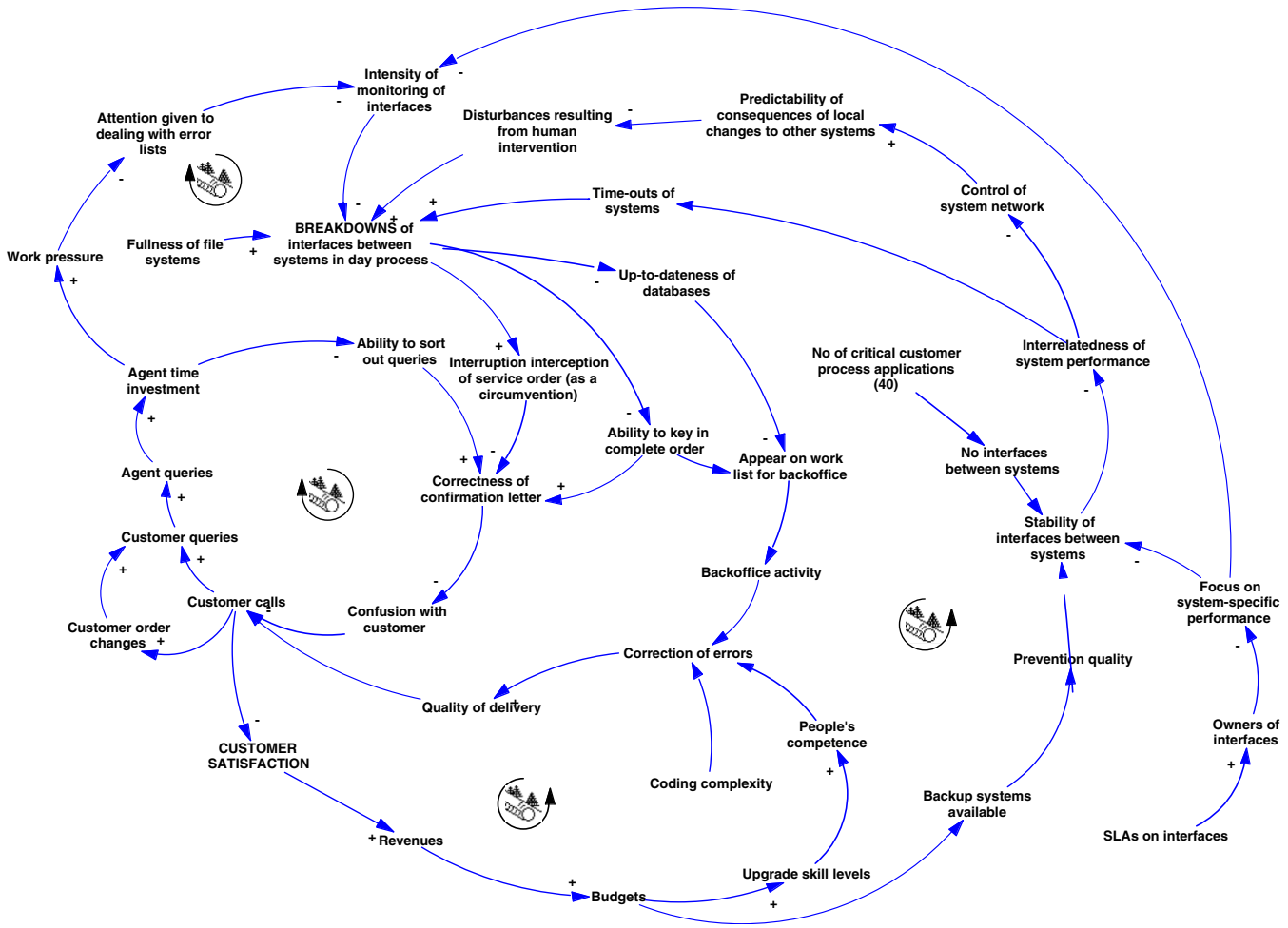


**FIGURE A1** A causal-loop diagram of propagation of errors in the network [Color figure can be viewed at wileyonlinelibrary.com]

process when such errors occurred. Mistakes in service deliveries could be caused by the wrong kind of confirmation letter to the customer because of system errors or because of data pollution in the systems as a result of inadequate error corrections. In all cases, mistakes lead to customer confusion, customer queries and, therefore, greater time pressure for the agents to sort out these queries, leaving even less time to deal with the list of known errors to be resolved. Obviously, these agents were mostly KPN agents. Such a delivery process evidently leads to low customer satisfaction, lower future revenues, and further pressure on budgets both for KPN and Atos, thus creating yet another vicious cycle of low performance, leading to low revenues, low investments, and even lower performance. This is shown in the bottom of the diagram. These are precisely the kinds of vicious cycles that keep service quality lower than it needs to be (Oliva & Sterman, 2001).

## APPENDIX B: TOP-LEVEL COLLABORATIVE KPIS

### ATOS KPIS

#### Innovation and redesign

The objective was to incentivize Atos to introduce innovative ideas and concepts that could be used to improve KPN's IT and help redesign KPI's IT infrastructure and customer-facing processes to cope with new business areas, such as Voice over Internet Protocol.

#### Operational and enabling KPIs

The objective was to measure the performance of critical processes, both at the operational level and the more tactical (enabling) level. These KPIs were divided into three groups: Service Process (five KPIs weighing together for 30%; e.g., measurement of end user satisfaction with the IT-chain of the service process PSTN/ISDN (based on data from an external market research agency); Delivery Process (seven KPIs weighing together for 30%, e.g., uptime of applications that support the day-process of delivery PSTN/ISDN) and Service and Delivery Chain Management (these included the enabling processes, five KPIs weighing together for 40%, e.g., completeness of delivery protocols).

#### Total cost of ownership

The objective was to measure the total cost reduction. As Atos was managing the IT systems, it was a logical KPI for Atos. This KPI was linked to performance in some of the operational and enabling sub-KPIs.

#### Business unit (BU) client satisfaction

The objective was to improve client satisfaction at the BU level at KPN. To improve cooperation, it was essential to reduce animosity between the two parties.

#### Sell to, with, and through

The objective was to encourage commercial collaboration. Three sales-oriented objectives that were important to KPN: selling telephone and communication services to Atos ('sell to'); Atos selling ICT solutions in the market, whereby KPN would take care of the 'C' of the ICT element and Atos of the 'IT' element ('with'); and using Atos market channels to expand KPN's telephone and communication business ('through').

### KPN KPIS

#### Wallet share

The objective was to measure Atos's opportunities to achieve economies of scale. Although KPN's objective was to reduce its IT spending, it was strongly felt that this should not be to detrimental for Atos. In reducing KPN's IT spend, Atos's share should not be reduced in favor of other IT vendors. If so, then Atos would be compensated.

#### IT governance

The objective was to measure KPN's customer demand discipline. As the outsourcing had taken place in great haste, demand management, IT procurement, and IT governance were not very well developed. The components of IT governance were awareness and use of the IT management manual, quality level and use of the contract-management structure, IT demand professionalism as reflected in a capability maturity model, IT overhead levels, and issue prevention.

#### Operational and enabling KPIs

The objective was to measure the performance of critical processes, both at the operational level and the more tactical ('enabling') level. KPIs were divided into two groups: delivery process (two KPIs weighing together for 40%, e.g., "KPN reacts to the notification of the service disruption and supplies the required instructions") and service and delivery chain management (these included the enabling processes, five KPIs weighing 60%, e.g., timely availability of service protocols). There were no service process KPIs (as in the case of Atos), as KPN was not responsible for executing the operational delivery process.