



# Owners managing the commercial interface on complex projects: A pluralistic theoretical perspective

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## ABSTRACT

Research on the commercial interface in inter-organisational projects has developed in recent years but still has weaknesses, principally due to its theoretical reliance on transaction cost economics (TCE). We address those weaknesses by providing an innovative intervention-based research (IBR) study of owner commercial strategy development for a complex project that goes beyond TCE to provide a pluralistic perspective. We show how this pluralistic perspective, which we dub the four forces model, provides the principles for the development of commercial strategy for managing the commercial interface by project owners. We then show how the owner's commercial strategy evolved in the face of capability constraints as it moved through the project lifecycle. We thereby contribute to theory and practice in project organising research first by situating the commercial interface between the owner and the supplier domains of project organising as a central concern in project organising research; second, by providing an empirical basis for the strategic management of the commercial interface by project owners; third by developing a pluralistic perspective on managing the commercial interface from a project owner point of view that moves beyond the current reliance on TCE theory; and fourth by introducing IBR as a novel research method.

## 1. Introduction

There is a growing interest in research on “inter-organisational projects” (Ahola, 2018; von Danwitz, 2018) in the project organising literature, but this research stream tends to be conceptual and “very little is known about how selection criteria and methods vary between different contexts [and] .....existing contributions provide no empirical insights on specific governance institutions overseeing an inter-firm project” (von Danwitz, 2018: 535). This is a serious limitation in project organising research given that recent empirical research has called this area “the most difficult problem for most project managers. Contracting for engineering and construction services is always a combination of hoped for collaboration and feared conflict. For that reason, contracting strategy is less about the legalities of contracts and much more about human behaviour” (Merrow, 2023: 3).

While there has been a long line of enquiry on inter-organisational projects (Roehrich, Selviaridis, Kalra, Van der Valk & Fang, 2020; Winch, 2023) inspired by transaction cost economics (TCE: Williamson, 1975, 1985), this has been inherently limited by the dyadic nature of

TCE analysis which might explain von Danwitz' conclusion. Our theoretical aim in this paper is to move beyond such dyadic analysis to provide a pluralistic perspective (Lumineau & Oliveira, 2017) that will support further theory development on inter-organisational projects and the management of the commercial interface in particular. We will do this by both developing and analysing the use-in-practice of the *four forces model* of the contingencies underpinning the development of commercial strategy on complex projects from a project owner organisation's perspective.

The contribution of this paper, therefore, will be four-fold. First, it will contribute to theory development on inter-organisational projects by situating the commercial interface between the owner and the supplier domains of project organising (Winch, 2014) as a central concern in project organising research. Second, it will provide an empirical basis for the strategic management of the commercial interface by project owners, which we dub *owner commercial strategy*. We prefer commercial strategy to contracting strategy (Merrow, 2023) because, as we shall see, contract type is one of the less important factors in designing owner commercial strategies. Third, we will develop a theoretically pluralistic

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perspective (Lumineau & Oliveira, 2018) on managing the commercial interface from a project owner point of view that moves beyond the current reliance on TCE theory which we dub the *four forces model*.

For our fourth contribution, we make our first three contributions by analysing a case study of the evolution of commercial strategy by an owner organisation for procuring complex performance from its suppliers throughout the project lifecycle on an oil refinery upgrade project using an innovative intervention-based research (IBR) method (Chandrasekaran, de Treville, & Browning, 2020; Oliva, 2019) with an international oil company (INOC). The argument proceeds as follows. We first review the relevant literature on the commercial interface within project organising research and evaluate its strengths and limitations. We then present the IBR research method and the details of the research intervention as it evolved. A discussion of the presentation of the *four forces model* as a theoretically pluralistic perspective on the development of commercial strategy, discussion of the additional insights that the four forces model generates, implications of the IBR approach for theory and method, and conclusions follow. We thereby meet the call for greater specificity (von Danwitz, 2018) in research on the arrangements for overseeing the commercial interface on complex inter-organisational projects, and complement Merrow's (2023) empirical analysis of the performance of different contract types with more strategic insights.

## 2. The research literature on the commercial interface in complex projects

We divide our literature review into two parts. We first review the predominant (Cuypers, Hennart, Silverman & Ertug, 2021; Lowe, 2023) theoretical perspective on inter-organisational relations and its applications in complex project organising – transaction cost economics. We then move on to more recent elaborations of this perspective within complex project organising research – the procuring complex performance literature and the social network analysis literature.

### 2.1. Transaction cost economics

Early research contributions on the relations between owners and supplier relations on complex projects (Peck & Scherer, 1962; Williamson, 1967; Winch, 2023) drew generally on organisational economics to analyse the challenges of the acquisition of complex defence materiel, and argued that owners needed to develop capabilities for “projectising” the relationship with the suppliers of defence materiel. However, the development of TCE (Williamson, 1975, 1985) in the following decade meant that it quickly became the predominant perspective for researching the commercial interface on complex projects (Eccles, 1981a, 1981b; Masten, Meehan Jr & Snyder, 1991; Reve & Levitt, 1984; Stinchcombe, 1985; Winch, 1989) and remains so today (Cuypers et al., 2021; Lowe, 2023; Roehrich et al., 2020; Turner, 2004; Turner & Simister, 2001; Winch, 2001; Zhang, Guo & Zhao, 2022). The core TCE theory defines a transaction as occurring when a good or service crosses a technologically separable interface (Williamson, 1975). Firms then have the option to either make the good or service themselves (internal, hierarchical governance) or to buy that good or service from the market (external, market governance). Three contingencies affect this decision: the level of uncertainty around the future performance of the transaction; the level of specificity of the assets required to perform the transaction; and the frequency with which it is intended to perform the transaction. In essence, high levels of each contingency will favour hierarchical governance, and low levels will encourage market governance. Of course, there are many different combinations of these three contingencies, and Williamson (1985) provides significant elaboration.

In application to project organising research, TCE theory conceptualises the project owner as investor in, and operator, of the assets delivered by the temporary project organisation for which the owner buys – “procure” is the term typically used in a complex project context –

the goods and services required to deliver the project from their suppliers which are typically project-based firms (PBFs). The question TCE poses is whether the project owner should provide the project services required to shape and deliver the project internally from its own organisation or buy them from the PBFs in the supplier domain. From a TCE perspective, the challenge of owner commercial strategy on complex projects is that while transaction contingencies of uncertainty and asset specificity on complex projects would predict hierarchy, the option is vitiated by the very low transaction frequency associated with temporary projects (Winch, 2001). Owners of complex projects are typically constrained to commercial transactions in the market rather than internal hierarchical transactions within hierarchies simply due to the one-off nature of complex projects.

Partially in response to a critique of the behavioural assumptions underlying TCE (Ghoshal & Moran, 1996), increasing attention has been paid to the quality of the relationships between owner and supplier, and the evolution of trust between them (Gulati, 1995). This led to the conceptual distinction between contractual and relational governance (Poppo & Zenger, 2002; Sergeeva, 2019) and a stream of research comparing the two in project organising research. One line of enquiry is to show how “relational norms” (Macneil, 2001) mediate the relationship between the arrangements for contractual governance and overall project performance (Benítez-Ávila, Hartmann & Dewulf, 2019, 2018), particularly in the context of projects where the commercial interface is based on public-private partnership (PPP) principles. Similarly, research on information systems projects (Haq, Gu, Liang & Abdullah, 2019) has shown how the contractual and relational aspects support each other as they do on major infrastructure programmes (Gil, 2009). Thus recent research on the commercial interface on complex projects supports the overall conclusions of both a recent meta-analysis (Cao & Lumineau, 2015) and a systematic literature review (Roehrich et al., 2020) on the complementarity of contractual arrangements and trust-based relationships across the commercial interface between the project owner as buyer on the one hand, and its suppliers on the other.

### 2.2. More recent theoretical developments on the commercial interface

An important limitation of these two strands of literature is that they focus entirely on the nature of the transaction as defined in TCE above between the owner and its suppliers. Whether the analysis focuses on the contractual or relational aspects of this transaction, it does not move beyond the transaction as the unit of analysis. Research from a supply chain perspective on “procuring complex performance” on complex projects (Caldwell & Howard, 2011) has provided a broader perspective on the management of the commercial interface. It draws particularly on research in defence acquisition projects (Caldwell & Howard, 2014; Howard, Roehrich, Lewis & Squire, 2019), PPPs (Caldwell, Roehrich & George, 2017) and construction projects (Caldwell, Roehrich & Davies, 2009; Hartmann, Roehrich, Frederiksen & Davies, 2014). The procuring complex performance line of enquiry places the emphasis upon the challenges project owners face incentivising consummate performance from suppliers in inherently complex transactions for the creation of complex product systems. It investigates the contributions of innovative practice in collaborative working and integrated project teams (Chakol, Selviaridis & Finne, 2018; Roehrich, Davies, Frederiksen & Sergeeva, 2019). The contribution from a supply chain management research perspective of the procuring complex performance line of enquiry is an important advance for research on the management of the commercial interface in complex projects, but when it comes to the specifics of owner commercial strategy it remains focused on the transactional interface between owner and supplier (Kapsali, Roehrich & Akhtar, 2019).

A complementary approach starts from the observation that inter-organisational projects consist of temporary coalitions of firms (Winch, 1989) and has developed the application of social network analysis (SNA) concepts to interorganisational relations within these

project coalitions (Oliveira & Lumineau, 2017; Pryke, 2012, 2018). However, these networks are explored empirically as overlays upon the underlying temporary coalition of firms on the project exploring, for instance, informal interpersonal networks, integration networks, communication networks, and financial incentive networks. Theoretically, this research relies upon TCE for conceptualizing the temporary coalition itself drawing particularly on the TCE concept of the firm as a “nexus of treaties” (Aoki, Gustafsson & Williamson, 1990; Pryke, 2012). Moreover, it has largely overlooked the use of coordination mechanisms of contract and integrators (i.e. project managers) in project networks (Oliveira & Lumineau, 2017), and does not investigate how the project network was initially configured by task packaging and supplier selection. Our concern in this paper is on how the underlying temporary project coalition is initially configured. We will return to the complementarities between the approach taken here and SNA in the discussion.

### 2.3. Overview

Our review has shown that while there is a rich stream of research on the management of the commercial interface between the owner organisation and its suppliers which draws deeply on theoretical perspectives such as TCE and its critiques, it remains rather narrowly focused upon the “governance” of the transaction between owner and its various suppliers, and that analysis remains inherently dyadic (Cuypers et al., 2021; Roehrich et al., 2020). That is to say, it presumes that the owner has only one supplier on its project. Questions such as how the owner simultaneously manages transactions with multiple suppliers; how it decides which suppliers do which tasks in the work breakdown structure; and how the owner’s strategy for the commercial interface evolves through the project lifecycle remain largely unaddressed. While the SNA influenced work does move beyond the dyadic, it still has no answers to these questions. In sum, the existing research does not encompass the full range of considerations that an *owner commercial strategy* needs to address in relation to the owner’s internal supply side stakeholders. Our research question is, therefore:

What are the principles that should underpin the development of commercial strategy by the project owner organisation on a specific complex project with respect to managing the commercial interface?

### 3. Research method for IBR: defining S, T and M to achieve T\* and S\*

Our inspiration for this research is the principles of engaged scholarship (Van de Ven, 2007) in which researchers and practitioners from the partner organisations work collaboratively to co-create new conceptual frameworks that both enhance theory and address specific organisational problems through abductive inference. Within this overall commitment to engagement in our research, we selected to implement the specific method advocated by Intervention-based Research. We now turn to a more detailed explanation of the rationale for our research method and how it was used to generate and validate our theoretically pluralistic perspective which we dubbed the *four forces model*.

#### 3.1. The principles of engaged scholarship

Engaged scholarship (Van de Ven, 2007) is a form of research that is driven by real-world problems rather than gaps in theory. It therefore starts with a problem that is “owned” by a social actor, and in the case of business and management research, this actor is typically some form of organisation. Researchers then “engage” with the organisational owner of the problem in order to provide a solution that is better in some way than the existing organisational practice. In terms of its underlying philosophy of science, engaged scholarship is both ontologically realist in that there is a problem in the real world on which an agreed description can be reached and epistemologically subjectivist in that

there are multiple possible ways to address such a problem and that any solution generated can only be tentative. These two positions in combination are typically associated with a critical realist philosophy of science (Bhaskar, 2008; Van de Ven, 2007), and, for Van de Ven and ourselves, critical realism underpins engaged scholarship.

While not being theoretically driven, engaged scholarship remains committed to the use of appropriate organisational and behavioural theories – this is perhaps what most clearly distinguishes it from consultancy in external engagement in organisations. Yet theory is not applied directly to problems but the relationship between potentially useful theories and the chosen problem is mediated by conceptual models (Cabantous & Gond, 2011). A classic example of such a model is Porter’s competitive advantage model (Porter, 1985) which mediates between the theory of the firm and strategy formulation by particular companies. The difference from theory-driven research is that the theory is selected for application to the problem, rather than the problem being chosen to test the theory. This encourages a pluralistic theoretical perspective which recognizes the heterogeneity and multiplicity of social phenomena (Lumineau & Oliveira, 2018) and may draw simultaneously on differing research traditions (Van de Ven, 2007).

Engaged scholarship may employ variance or process theories. Whichever is chosen the creative process of moving between evidence and theory is abduction, rather than the induction associated with constructivism and the deduction associated with positivism. (Van de Ven, 2007; Chandrasekaran et al., 2020). Abduction (Sætre & Van de Ven, 2021) is a process of disciplined imagination (Weick, 1989) in which potential explanations of the phenomenon of interest are iteratively generated through cycles of evaluation and selection. Abduction is inherently dialogical as different “hunches” are tested out until the most plausible survives.

There are many differing modes of engagement on a dimension of 1) external or internal engagement with the organisation with 2) the purpose of describing and explaining, or designing and controlling (Van de Ven, 2007, fig. 1.2). The combination of internal engagement with the purpose of describing and explaining is achieved through the co-creation of knowledge in collaboration with the organisation’s representatives. Such co-creation is highly appropriate for the “wicked problems” faced by many organisations in a complex, dynamic, and uncertain world. Co-creation combines the researchers’ existing models-to-hand with the experience of the collaborating managers to generate novel, creative solutions which are most usefully embodied in a tool (Sharma, Greco, Grewatsch & Bansal, 2022), as a kind of “boundary object” (Carlile, 2002; Spee & Jarzabkowski, 2009) between the researchers and practitioners in the collaborative team. In such collaborative work, the tool acts as the encapsulation of the hunches that are evaluated and selected and enables the model to be practically useful by carrying rationality (Cabantous & Gond, 2011).

#### 3.2. The practice of intervention-based research

These principles of engaged scholarship underpin intervention-based research (IBR) which moves on from the limitations of design thinking and action research for the development of theory (Chandrasekaran et al., 2020; Oliva, 2019). While design thinking and action research are both problem-orientated they are limited in the extent to which they enable the co-creation of new theory and hence the generalizability of the results of the intervention. We adopted IBR in this research study because our research arose out of a specific intervention in the partner organisation. The authors of this paper had been engaging with practitioners from an INOC which we dubbed “Venez” over many years on a regular collaborative basis in a form of frequent conversations, dialogues, interviews and presentations as part of an executive education teaching programme on project leadership similar to that run by NASA (Hoffman & Boyle, 2017). In particular, Venez subject matter experts (subsequently referred to as “experts”) were our principal interlocutors. Venez asked academic researchers (including all the authors) to help

them with project commercial strategy development as part of the executive education programme supported by a teaching case study.

The method underlying IBR is that an intervention in some aspect of the organisational practice of the partner organisation is made, framed by a particular appropriate theoretical perspective derived from the research literature. The intervention can be made using a variety of research methods, and, as a result of the analysis of the data collected, recommendations are made to the partner organisation for changes in practice and limitations to existing theoretical perspectives are exposed. In formal terms, the elements of IBR (Oliva, 2019) are a problem situation (S), an existing theory (T), and a research method (M) that applied together produce a changed situation (S\*) and a more developed theory (T\*).

We went through this research process in three phases as shown in Fig. 1 and summarized in Table 1. In phase 1, we defined S, identified T, and worked with our collaborators to critique it and thereby move to T\*. In Phase 2, we defined M and thereby moved to an empirical application of T\* which demonstrated the ability of T\* to generate insights for practice thereby generating S\*. In a third phase we identified additional applications of T\* on different projects around Venez that demonstrated that S\* was being achieved, thereby providing a validation of T\*. Our approach is therefore Mode 2 IBR which “uses the intervention results as evidence for the development of new theories not considered prior to the intervention” (Oliva, 2019: 712). We started the intervention believing that TCE would suffice as the theoretical basis for developing owner commercial strategy for Venez projects, but quickly came to realize its inadequacy for addressing that process through our collaborative intervention. This was the motivation for then developing T\* as a theoretically pluralistic perspective. We now explain our particular definitions of S, T, and M used in this research before presenting the analysis which produced S\* and T\*. It should be noted that, as in all engaged research, earlier research can only provide guidelines and not a template for our research, because all engagements are different.

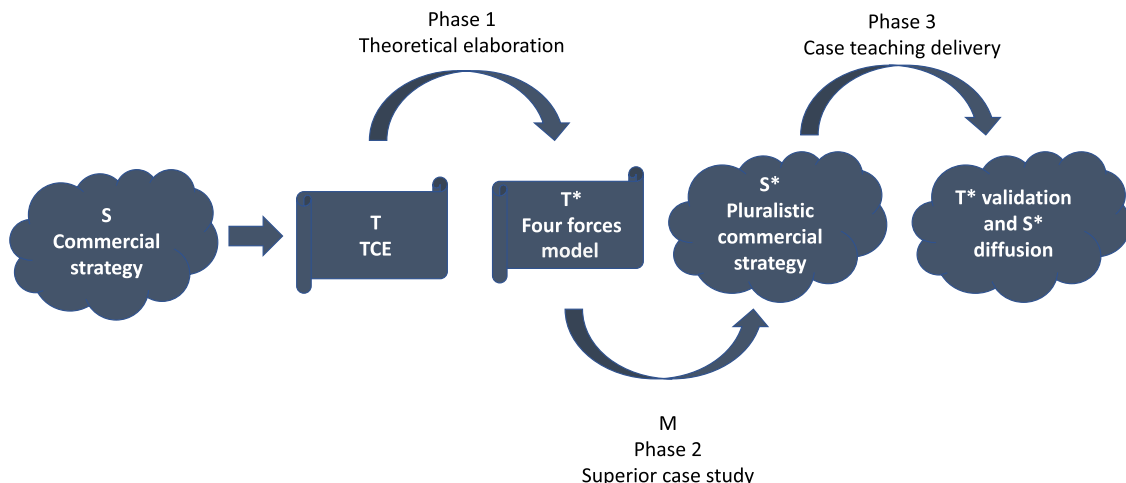
#### 4. Defining the problem situation S

The context for our intervention was an executive education programme on project leadership with Venez as client for its middle to senior level project managers. As part of the syllabus, we were asked to develop learning materials on *owner commercial strategy*; that is on the principles underpinning the strategy to be adopted for managing the commercial interface between Venez and its suppliers on complex projects. Venez introduced us to the *contracting map* as a descriptor of that strategy, but were unable to give us any coherent guidance on the principles underlying the preparation of the map. Indeed, views

**Table 1**  
The IBR method as applied in this research.

IBR Element	Phase Of The Research	Rationale for approach to phase
Problem Situation S		There was no agreement amongst Venez experts regarding the principles by which owner commercial strategies were to be developed for managing the commercial interface on their complex projects.
Theory T	Phase 1 involved intensive interaction with Venez experts who appreciated the insights of TCE, but critiqued its limitations as a sole theoretical perspective for developing owner commercial strategy.	Transaction cost economics (TCE) is the predominant theory for researching the relationship between buyers and suppliers.
Theory T*		A pluralistic theoretical perspective (the four forces model) was developed on multiple theoretical perspectives (supply chain management; econometrics; institutional theory) was developed which Venez experts agreed provided greater insight into the principles underpinning commercial strategy development.
Research Method M	Phase 2 involved case study research using multiple methods including formal interviews with Venez experts; a 2-day field visit to the Superior refinery which involved collection of documentary data, a refinery tour of the construction site, and numerous informal interactions and conversations with refinery staff and leaders. From these materials a class teaching case study was developed.	This research provided an empirical foundation for the four forces model and the material for a teaching case that supported classroom delivery of the four forces model. The research, in addition, revealed a further use of the model to identify conflicts of interest between the parties in the project coalition as motivator to make changes in the commercial strategy as the project moved through its lifecycle.
Changed Situation S*	Repeated cycles of delivery allowed us to gain further insight into the application of the four forces model and to learn of cases where it had changed the commercial strategy of new Venez projects.	Venez now has a consistent conceptual model as a tool for developing commercial strategy across its complex projects. This validated T* by showing it being applied to achieve S* across many different projects (both upstream and downstream) in Venez.

proffered to us by different experts from Venez were manifestly



**Fig. 1.** The IBR process as applied in this research.



contradictory in a way that was not explained by differences in national contract law on how that strategy should be developed. This lack of consistency in the formulation of commercial strategy provided the motivation for our intervention in the classic engaged scholarship approach (Van de Ven, 2007).

Contracting maps are a 2D graphical representation of the owner's commercial strategy for a particular project as shown in Fig. 2. The two dimensions of the contracting map are the scope of the project as defined by the WBS on the x axis (i.e. what has to be done) and the stage of the project lifecycle on the y axis (i.e. when it has to be done). The cells in the matrix therefore consist of the tasks to be accomplished at a particular stage of the project lifecycle. The cells thereby generated are then clustered by the owner into "work packages" which can be let to suppliers. These packages are then usually coloured and textured to show which supplier does what and the type of contract for each package such as lump-sum or reimbursable (Merrow, 2023). Thus, in a contracting map the cells identify which supplier is going to do the task, not what the actual task is. However, this can be inferred from reading the relevant x and y axes. The interfaces between the clusters in the map indicate the project interfaces of which the project owner has visibility and needs to project manage. The interfaces between the cells within the clusters are essentially "blind" to the owner and are the responsibility of that particular supplier PBF to project manage. So, our *problem situation* S developed in collaboration with Venez was the lack of consistency within Venez on the principles underlying the development of contracting maps. This, in turn, generated our research question defined above and motivated our initial selection of TCE theory.

#### Phase 1: From existing theory T to developed theory T\*

For the reasons explored in the literature review above, our starting theoretical perspective T was TCE. On the basis of this combination of S and T we engaged with the experts from Venez to develop teaching materials on owner commercial strategy in our first phase of IBR. However, these interactions with Venez experts soon brought us to the realization that TCE theory was far too limited in its explanatory scope and that further issues also needed to be addressed beyond the contingent nature of the transaction. These were abductively reduced in intensive collaboration with the appropriate Venez experts supported by extensive bibliographic research by ourselves to 2) the structure of

supply defined as the capabilities of the supplier PBFs available in the market in relation to the requirements of the project; 3) the point in the economic cycle at which the contract was to be formed; and 4) the institutional context of the project in addition to 1) the nature of the transaction. The resulting T\* which we dubbed the *four forces model* is illustrated in Fig. 2. It provides a pluralistic perspective (Lumineau & Oliveira, 2018) combining complementary (in this context) theoretical perspectives to generate analytic insight presented as a conceptual model (Cabantous & Gond, 2011) used as a tool (Sharma et al., 2022) to support the development of owner commercial strategy for a particular project.

Our collaboration identified one important limitation of the TCE approach to be that it does not take into account the perceived operational capabilities (Helfat & Winter, 2011; Winch, 2014) of the PBFs in the supplier domain which provide the temporary project organisation with the human and technological resources required to deliver the facility for the project owner. We therefore reviewed the literature on supplier operational capabilities as seen from the point of view of the purchaser (Kaufman, Wood & Theyel, 2000; Kraljic, 1983). These typically classify suppliers along two dimensions – their capability to collaborate with purchasers and their capability to provide the particular technologies required for the project. Following deliberations, it was decided jointly with the Venez experts that an adaptation to the project context of the well-known Kraljic matrix (Kraljic, 1983) would be appropriate. This has package technical complexity on one dimension and package criticality for project delivery on the other (Winch et al. 2022: fig. 9.3). Note that neither of these are TCE contingencies. This is the theoretical basis for the second force, the structure of supply.

Discussions with the experts also identified the importance of the point in the economic cycle at which decisions regarding the commercial strategy for a specific project are made as a contingency. The third force is therefore the perception of the point in the economic cycle at which the package is being procured. All capitalist economies are cyclical with periods of relatively fast and slow growth. These cycles are accentuated for major projects by the "accelerator effect" producing boom and bust cycles for inputs to project delivery which are the province of econometric theory (Ive & Gruneberg, 2000). It is, therefore, vital for commercial strategy formulation to understand how the economic cycle works, and where the project is within that temporal context. We saw

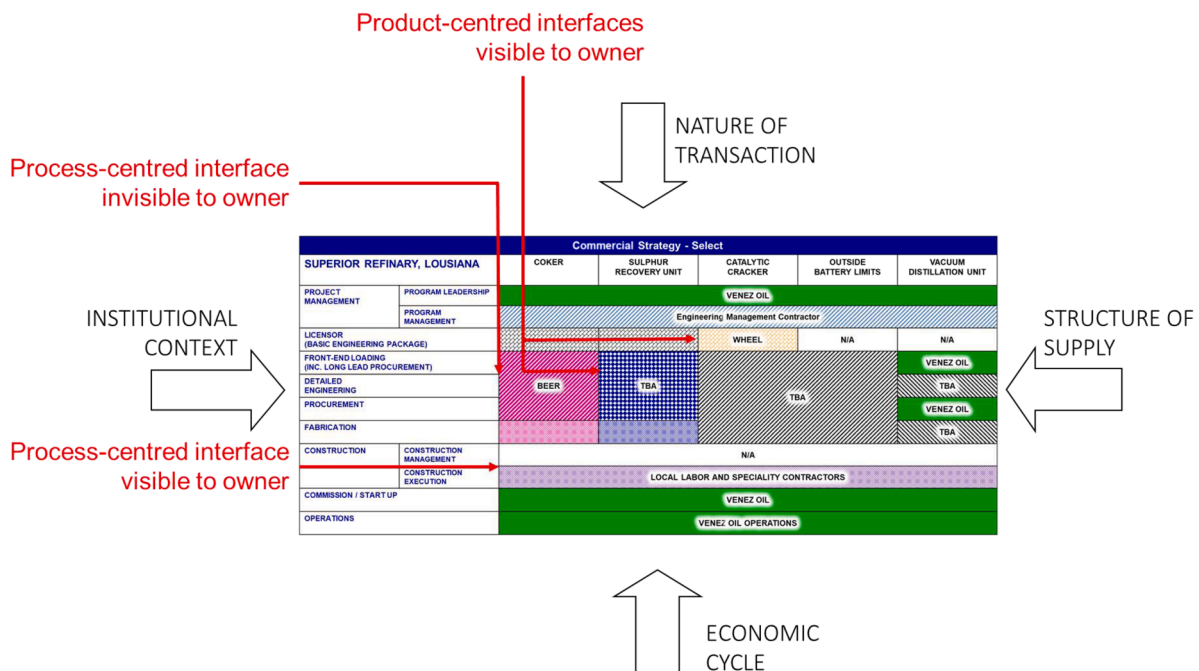


Fig. 2. The four forces model.

this in our work with Venez when the collapse of the oil price in 2016 quickly led to a significant alteration in commercial strategy across its major projects.

The fourth force captures the variety of non-economic contingencies that need to be taken into account which we captured in “institutional context” and therefore used the PESTLE mnemonic for strategic decision-making (Pitkethly, 2003) which stands for Political, Economic, Social, Technological, Legal and Environmental. Institutional Context thereby forms the fourth force. These contingencies are typically the topic of institutional theory (North, 1990; Scott, 2014)

**Phase 2:** From develop theory  $T^*$  through research method  $M$  to revised situation  $S^*$

On the basis of the completion of this first phase of IBR, executive education teaching materials were developed using  $T^*$ , which we dubbed the *four forces model*, to which delegates on the programme responded well. It was quickly realized that a teaching case specifically designed to reinforce learning on developing owner commercial strategy by exploring the four forces model was required. We therefore chose to conduct single in-depth case study research. Single case studies are used to study phenomena in depth within a single context to retain meaningful and holistic to the real-life events and situations while also developing theory (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2017). Further discussions identified a suitable case and so we began fieldwork programme using standard case study research methods in a second cycle of IBR with Venez. We chose this case as a complex project to study how the commercial interface is managed strategically which we named the “Superior Refinery upgrade”. Thus, our  $M$  involved 5 formal interviews with key project participants which were recorded and transcribed; collection of project documentation; and an intensive 2-day site visit with 10-hour days involving formal presentations to us by project leaders, and a tour of the refinery to see the works in progress during which there were multiple opportunities for informal discussions with the Superior project team. The formal interviewees were senior project leaders with more than 20 years of experience each and gave us insights into how the Superior refinery upgrade was perceived within Venez more widely. The interview data were analysed based on narrative analysis as a storyline of what happened in the project. These materials were written up into a detailed case study for review by the Venez experts which formed the basis for further clarifications and confirmed the four forces model as an appropriate empirical framing for research into the principles underpinning the development commercial strategies by infrastructure owners and developers. A particularly important documentary source was the minutes of the Peer Assist and Peer Review processes in preparation for the stage-gate reviews required by Venez’ mandated corporate processes for the governance interface (Winch, 2014) between the owner and its projects.

From  $M$  we developed a more nuanced perspective on  $T^*$  and a revised set of practices for developing owner commercial strategy  $S^*$  captured in the four forces model as a mediator between theory and practice. First, we understood that the development of owner commercial strategy was not a one-off decision, but an evolutionary process that went through clear temporal cycles structured around Venez’ corporate-mandated project governance stage-gates. These largely followed the standard engineering construction stage-gate model of Appraise (investment opportunity), Select (scope), Define (project delivery plan), and Execute (on site) (Merrow, 2011; Winch, Maytorena-Sanchez & Sergeeva, 2022), so we will use that terminology here. Second, the fieldwork revealed an additional way in which the contracting maps could be used for examining owner commercial strategy because we could now see how conflicts of interest between the member organisations of the project coalition could be generated by poor strategic choices.

**Phase 3:** Validation of  $T^*$  and Diffusion of  $S^*$

In order to diffuse  $S^*$ , the case study materials were then structured into case teaching materials involving cycles of learning structured by Venez’ project governance stage gate model explained above. Delegates were presented with descriptive case material and asked to develop a contracting map, using an interactive PowerPoint template for ease of development. They were also asked to code the proposed contract type (Barnes, 1983; Merrow, 2023) using texturing. Following a classroom discussion of the results of this exercise, the delegates were presented with the “what actually happened” map which was also annotated to indicate some of the issues with the map at that stage of the project. Using this map as the template complemented by additional case material as the project moved through the lifecycle, delegates were asked to prepare a revised map. This cycle was repeated three times in each class. The contracting maps presented in Figs. 3–5 below are the three “what actually happened” maps for each project governance stage of Select, Define, and Execute. Fig. 5 is the map that was actually used during the later part of the Execute stage on the case project, as owner project team initially failed to rectify the problems with the Define map (Fig. 4) when they went into Execute.

Multiple delivery cycles of the teaching case allowed us to refine the analysis in the light of feedback from delegates on the applicability of the four forces model to their own projects. Over time, these cycles of delivery also allowed us to obtain evidence of  $S^*$  diffusion and to show that changes were being made to owner commercial strategy through the application of the four forces model to the *formulation* of owner commercial strategies on Venez’ other projects. After completing the case exercise, delegates were assessed and awarded postgraduate level credits using Reflective Practice Papers (Checkland, 1985; Schön, 1983). It was by this means we were able to track the adoption of the four forces model as the delegates applied it to their own projects and thereby establish diffusion of  $S^*$ . Delegates on the executive education programme thereby enhanced the analysis by both providing feedback on the application of the four forces model to their own projects in class and taking the model away to apply to the formulation of the commercial strategy for their own forthcoming projects. We were told that one Canadian gas project completely changed its commercial strategy as a result of learning about the model. We now turn to providing further details on the case study.

## 5. The superior oil refinery upgrade case

The case is a US refinery making a major upgrade to enable it to process heavy oil; it has been disguised to ensure confidentiality, as have the names of the principal suppliers. It should be noted that the case was anonymized for teaching purposes to avoid classroom discussions around the details of the actual project which was highly contentious within Venez. Venez’ Superior Refinery required a major retrofit and upgrade to take advantage of new opportunities offered by utilising lower-cost heavy crude feedstocks that could improve site competitiveness due to its position close to industrial markets. The project narrative (Sergeeva & Winch, 2021) was “heavy oil; it’s happening”. This was, by a significant margin, the largest capital investment the facility had ever seen. It was initially budgeted at \$3bn. Until then, projects at the facility were mainly either environmental or capital sustaining projects to support the existing capacity, which had been largely built in the immediate post-war era. The culture of the Superior Refinery was one of managerial autonomy from the rest of Venez, with close connections to the local community, and multiple generations employed at the refinery.

In order to attain the capacity for the treatment of ~ 350k barrels per day (bpd) of heavy crude, the principal elements of scope (as defined by the high-level work breakdown structure) on the x axis the upgrade as shown in Fig. 2 were:

- Coker
- Sulphur Recovery Unit

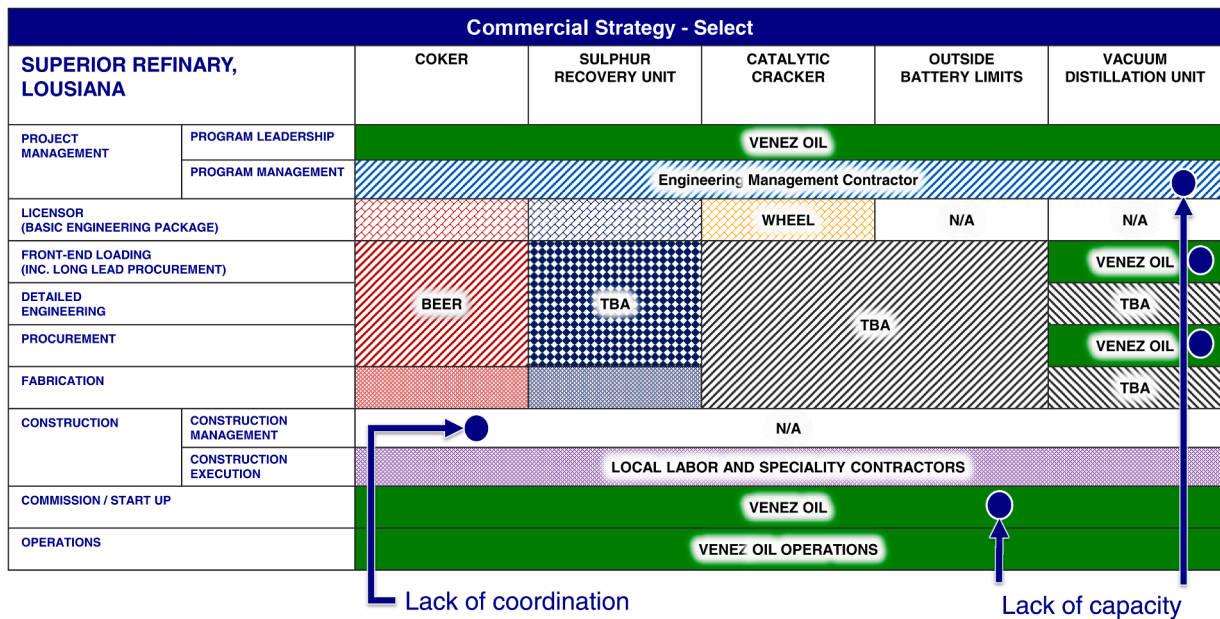


Fig. 3. Venez superior refinery upgrade project commercial strategy: select stage.

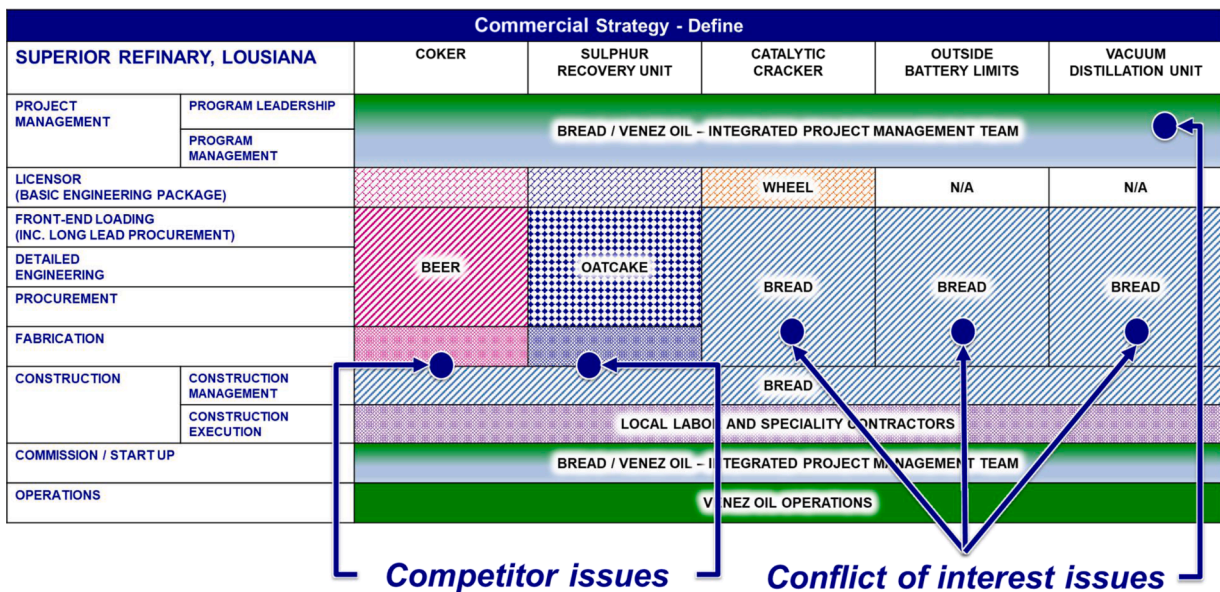


Fig. 4. Venez superior refinery upgrade project commercial strategy: define stage.

- Catalytic Cracker
- Vacuum Distillation
- Outside Battery Limits

The initial owner project team was primarily made up of engineers from the Superior Refinery, supported by project leaders from elsewhere in Venez. The Superior project team had responsibility for developing its own commercial strategy for the project. Engineering, procurement, fabrication, construction, and commissioning at the refinery historically had been performed by suppliers from the local market. These contractors also provided the resources for operational maintenance activities. There was a push to use these suppliers for the upgrade project by refinery management. Oversight of these suppliers historically had been through refinery resources and relied heavily on the suppliers' acquired tacit knowledge of the refinery. However, the requirements of the upgrade project were beyond the capabilities of these local suppliers, and

so the Superior project team drew on the resources of the mainstream international Engineer Procure and Construct (EPC) contractors with which they had worked many times before. These are first tier suppliers (Winch et al., 2022) responsible for detail design, procuring second tier suppliers, and managing project execution on site. In order to maintain confidentiality, we dubbed them Bread, Oatcake, Wheel, and Beer. These EPC contractors have different operational capabilities – for instance, Beer was the international leader for the supply of cokers. The contracting maps presented in this section are the actual maps generated by the project team by stage of the project as defined by the governance process defined above presented in a standardized format developed by the research team and then annotated by the research team to identify the conflict-of-interest issues.

The project was initiated during a buoyant period in the economic cycle, both in terms of the price of oil and the supply side for labour and equipment. In particular, there were supply constraints for large steel



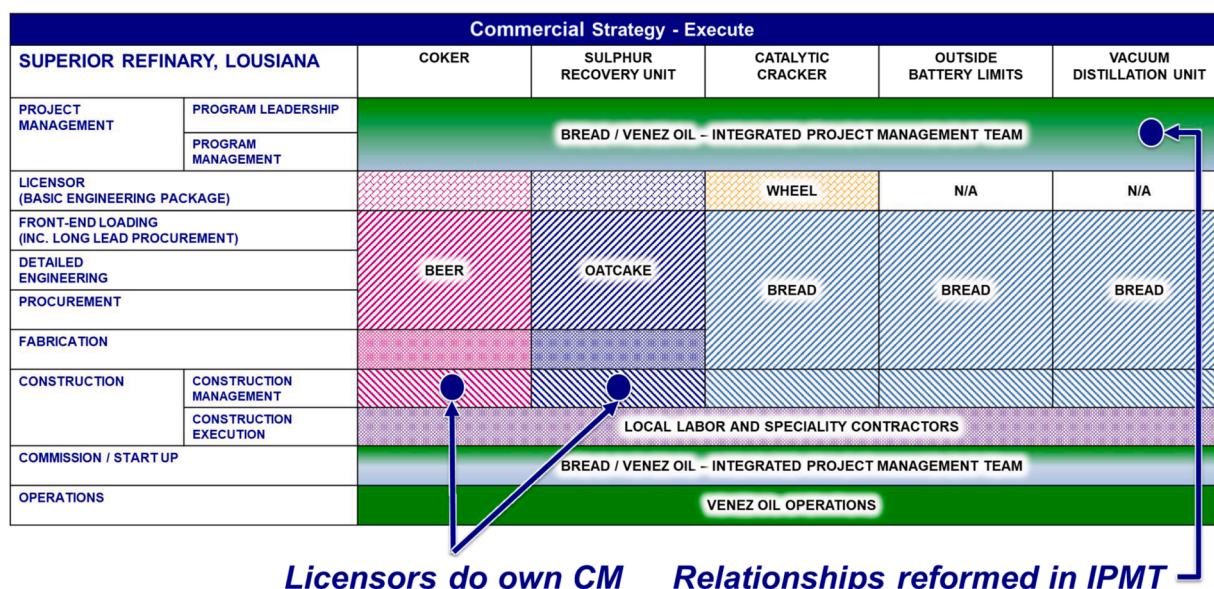


Fig. 5. Venez superior refinery upgrade project commercial strategy: execute stage.

vessels. A particular feature of this structure of supply is that the various technologies needed for the project were proprietary, and therefore licence fees for the use of the technology were payable to the relevant EPC. This applied particularly to cokers and sulphur recovery units. For instance, cokers are typically engineered, fabricated, and installed by a single supplier. Choosing a particular licenced technology effectively limited the choice of supplier of that technology, except for catalytic crackers.

During the Select stage, a Peer Assist session made a number of points regarding the economic cycle in the market for materials and equipment that the project required. It was noted that high demand from China for equipment for the oil and gas and nuclear power industries was generating higher prices and longer lead times. On prices, the overall expectation was an inflation rate of 5.5% per annum, while some alloys were expected to be experiencing up to 15% inflation per annum. The threats to the project were identified thus:

If you miss estimate by 5–10% and get \$25/barrel oil you do not have 15% IRR. Independent Project Analysis does not think we will keep the cost pressure under control. Steel is out of whack. There is no capacity left. Steel prices may not come back down (source: Peer Assist minutes).

Taking into account the Superior refinery's local operational context and the changing market for the supply of materials and equipment, the project team submitted the contracting map shown in Fig. 3 to the gate review process at the end of Select. The colouring serves to indicate which EPC supplier (Wheel, Beer, Bread, Oatcake and so on) has been selected for that package. As can be seen, already at this stage, some suppliers have been indicated, while other packages are left for selection in later stages of the upgrade project.

The Peer Review of the Select stage contracting map identified some further problems which would need to be addressed during the subsequent Define stage which are indicated on Fig. 3. The first set of issues is around the lack of project management capability and capacity of the Superior Refinery in-house team (remember that they had never done a project of this scale or complexity before). The Execute stage was estimated at 16 m operative hours, so this was an important omission. The second set was around the interaction between the vertical and horizontal elements of the contracting map. In effect, the principal elements of the work breakdown structure have been formed into silos with coordination between these silos performed by the Superior Refinery project management function. However, the high-level project coordination function lacked capability, while the on-site project coordination function – construction management – had not been addressed at all. A

fourth issue was the intended switch from reimbursable to lump sum for the (on site) fabrication stage for the coker and the sulphur recovery unit. While this kind of two-stage contracting is accepted practice, it needs to be carefully managed to avoid “hostage” negotiations during the negotiation of the lump sum price (Merrow, 2023).

As a result of these deliberations, the commercial strategy changed significantly and the map signed off at the end of the Define stage is shown in Fig. 4. Venez Oil addressed their lack of capacity and capability in the high-level project management roles by forming an Integrated Project Management Team (IPMT: Roehrich et al., 2019) with Bread for both Program Leadership and Program Management. They also used Bread to provide the construction management capability that had been identified as lacking. However, this solution then generated a number of other issues. The first was a set of conflict-of-interest issues because Bread was now responsible for project managing its own work. This generated a lack of trust in Bread by Venez. Second, Bread was a direct competitor of Beer and Oatcake in the structure of the supply market more generally which meant that the package EPC contractors also lacked trust in the project management decisions of Bread. This problem was made more intense because the project experienced severe budget escalation and schedule slippage which meant that Bread's percentage reimbursable fee for its role in the IPMT almost doubled from the original budget.

In response to these issues, the map was then further refined during the Execute stage of the project as shown in Fig. 5. This revision removed one set of conflict-of-interest issues by asking each supplier of licensed technologies to do their own construction management in the context of a strengthened IPMT. This was now based on a reimbursable contract plus a percentage management fee to protect Bread's overheads rather than a pure reimbursable contract. Bread thereby remained responsible for its own construction management, but was no longer responsible for managing competing firms. Within the IPMT, Venez allocated more resource from around the INOC, including from the upstream business which had much greater experience of managing large, complex projects.

## 6. Discussion

Our research moved through three phases as summarized in Fig. 1 and Table 1. We started with the assumption that TCE provided the answer to the research question i.e. it contained all the principles required for the development of project owner commercial strategy. Our



interactions with the Venez experts during phase 1 of the research quickly brought us to realization that this assumption was unfounded. A period of intense literature searching and interaction with Venez experts followed which generated a pluralistic theoretical perspective (Lumineau & Oliveira, 2018) which we turned into a model (Cabantous & Gond, 2011) that could be used as a tool (Sharma et al., 2022) for owner commercial strategy development. In the first section of this discussion, we position the resultant four forces model in relation to existing theory. In phase 2 of our research, we collected data for a case study of the application of the four forces model to a complex project, and so in the second section of this discussion, we show how the four forces model generated insights into the Superior Refinery upgrade case and the associated research literature. The field research during phase 2 generated additional insights on the use of the four forces model to identify issues in commercial strategy which generated threats to the successful delivery of the upgrade project, so this forms the third part of this discussion section.

6.1. The four forces model as an application of contingency theory

We summarize the conceptual differences between TCE (T) and the pluralistic theoretical perspective (T\*) that underpins the four forces model in Table 2. It is apparent that the four forces model is, in essence, an elaboration of the contingency theory (Mintzberg, 1979; Patanakul, 2023; Shenhar, 2001) that underpins TCE. In practice, it identifies additional contingencies that need to be taken into account by the project owner organisation when developing its commercial strategy. It is, therefore, closer to the variance approach rather than the process approach to engaged scholarship (Van de Ven, 2007).

6.2. Insights into owner commercial strategy development

The first force is the *nature of the transaction* which is well established in the literature discussed above. However, the other three are less frequently discussed in research on managing across the commercial interface. The second force is the *structure of supply* in the market for each type of technical expertise required by the scope. Project-based firms are not all alike; they have different technical specialism to offer through different business models (Davies & Hobday, 2005). We can see how the suppliers of the coker and sulphur recovery work packages were treated differently from the other three principal work packages on the one hand, and from the EMC supplier and the on-site construction execution suppliers on the other. The third force is the point in the *economic cycle*. We can see from the case how certain work package

elements – particularly large steel vessels – encountered significant inflation due to global demand. The fourth force is the *institutional context*, such as the obligation to use local union labour on site and broader integration of the Superior Refinery with the local community. These four “forces” can be combined within the contracting map to shape owner commercial strategy in the way indicated in Fig. 2.

Turning to the first force, we suggest that transaction cost economics remains a valuable theoretical foundation for analysing the nature of the transaction. In our view, the underlying contingencies of uncertainty, asset specificity and frequency (Cuypers et al., 2021; Winch, 2001) and the resulting distribution of power will shape the desired combination of contractual and relational governance across the commercial interface – the range of options is laid out by Williamson (1985: Figure 3.2). High levels of uncertainty will prevent the formation of complete contracts and mean that there will inevitably be changes in contractual terms during Define and Execute, and contractual terms therefore need to accommodate this. Low levels of uncertainty mean that it is feasible to write a fully specified contract at least at the level of a menu of future options. Thus, we can expect that higher levels of uncertainty will be associated with stronger preferences by owners for relational forms of governance when developing commercial their commercial.

We can see these contingencies shaping the contracting maps in Figs. 3–5. Providing programme leadership and management capabilities is an inherently uncertain process, but Venez opted for contractual approach selecting Bread to act as an EMC before moving to a more relational approach within a collaborative IPMT on a reimbursable contract. The basic engineering packages for the coker, sulphur recovery unit, and catalytic cracker were low uncertainty – these were known technologies and so could be specified completely. Licences for the relevant technologies could therefore be purchased at a fixed price from Beer, Oatcake and Wheel. However, it was decided not to select a proprietary technology for the catalytic cracker and so Wheel merely licensed its technology to Venez and Bread was asked to design and build it. However, the integration of these technologies together into the overall refinery system was more uncertain, so front-end loading (i.e. the early engineering) and detailed engineering were procured on a reimbursable fee basis. Projects are inherently a progressive reduction of uncertainty through time (Winch et al., 2022; Winch, 2010) and so as the coker and sulphur recovery unit packages moved towards fabrication once design was complete, the plan was to switch to a lump sum contract for this stage. However, erection of the fabricated components on site still contained significant levels of uncertainty due to weaknesses in construction management, so a reimbursable contract with a percentage fee was agreed to incentivise cost control by the suppliers.

Frequency is also very important because it is a strong influence on how much investment in sophisticated contractual governance arrangement is feasible. Williamson’s analysis of relational governance is developed in the context of bilateral relationships between firms which have a high level of frequency, but projects are inherently temporary organisations. While stronger project portfolio management can allow the development of repeated transactions (Merrow, 2023) between owners and suppliers which can facilitate the development of relational commercial strategies, not all projects in the portfolio require the same technical inputs and so not the same set of suppliers. Moreover, not all work packages warrant the investment in building relational commercial strategies - particularly those more for the supply of commodities. One solution to this dilemma is trilateral governance (Williamson, 1985) where third parties are retained to facilitate relationships and mediate disputes between the parties across the commercial interface; another, complementary, one is the use of standard forms of contract such as in the oil and gas, and construction sectors (Stinchcombe, 1985).

The third dimension of the transaction is usually characterised as asset specificity. However, as Williamson (1985) points out, the issues around asset specificity differ before and after contract formation. Pre-contract the commercial issues are driven by factors such as the

Table 2  
Contingency comparison of T and T\*.

T: Transaction cost economics	T*: Pluralistic perspective
TCE: uncertainty asset specificity frequency	TCE: uncertainty asset specificity frequency  Supply chain theory: Package technical complexity Package delivery criticality  Econometrics: Point in the economic cycle  Institutional theory: Political Economic Social Technical Legal Environmental

extent of monopoly in the supply market; a fully competitive market generates no asset specificity issues. Post contract – after what [Williamson \(1985\)](#) calls the “fundamental transformation” – asset specificities can be generated even in the absence of pre-contract asset specificity. Post contract asset specificities are often characterised in terms of the hold-up problem ([Chang & Ive, 2007](#); [Masten et al., 1991](#)) which generates switching costs for owners faced with the perfunctory performance of contracts, particularly when the package is on or near the critical path.

Turning to the second force – the *structure of supply* – we deployed a development of the well-established Kraljic matrix ([Kraljic, 1983](#)) because it emphasized the perception by the owner of the supplier's capability, was already familiar to the Venez experts, and could be adapted to the particular contingencies of complex projects. The developed matrix ([Winch et al. 2022](#): figure 9.3) has two dimensions, package technological complexity, and criticality of package to project delivery. Many elements of refinery technology (across the x axis of the contracting map) are complicated rather than complex ([Snowden & Boone, 2007](#)) and are not uniquely critical to project delivery and so are “leveraged” in the matrix for the structure of supply. This was the assessment for the coker and sulphur recovery which are well established technologies manufactured by reliable technology specialists ([Kaufman et al., 2000](#)) that are vertically integrated from the Basic Engineering Package (BEP) licence through to Fabrication. For these packages, a fixed price contract was preferred, and the principal challenge of the Superior upgrade project management team was to ensure that their delivery on site was not disrupted by other suppliers. Thus a proprietary technology was engineered, fabricated, and constructed by the supplier with the owner responsible for managing the interfaces between that work package and the rest of the project during Execute. Where packages have high criticality for delivery and are technologically more complex, then owners need to take a more strategic partnership approach. This was done for the supply of project management services where Superior chose a supplier with a high collaborative capability ([Kaufman et al. 2000](#)) and the arrangement evolved from a conventional Engineer Manage and Construct (EMC) package ([Merrow, 2023](#)) to a more collaborative IPMT.

A further dimension here is that the preferred owner commercial strategy with respect to supplier capabilities may be thwarted if no suppliers can perform at the requisite level. For instance, on BAA's T5 project, some firms were not capable of collaborating to the level desired by BAA. These were of two types – large multinationals for which T5 was just another job and they operated as technology specialists, and small firms in the finishing trades that did not possess the managerial capacity to collaborate ([Gil, 2009](#); [Winch, 2010](#)). We suggest that it is difficult for many low technological capability PBFs to develop high collaborative capability. Where the nature of the transactions suggests – at least in the owner analysis – a collaborative approach, suppliers may not be able to step up to collaborative working or value the investment in developing a relationship thereby frustrating the most appropriate commercial arrangement for the package concerned. The development of markets for the desired capabilities can be fraught and time-consuming ([Caciatore & Jacobides, 2005](#); [MacKenzie, 2008](#)).

The third force is the point in the *economic cycle*. Capitalist economies are inherently cyclical, and those cycles are reflected in the dynamics of sectors where the amplitude of the cycle at the macroeconomic level is amplified by the accelerator effect within the capital goods sector that is responsible for most project-based production ([Ive & Gruneberg, 2000](#)). For owner commercial strategy this has two implications. The first is that at low points in the demand for the owner's products and services, owners push on their suppliers to reduce costs through innovation. This was behind the development of alliancing for oil and gas projects in the North Sea during the early nineties, for instance ([Barlow, 2000](#)). The second is that cycles in the market for supply mean that commercial strategy formed near the peak of the cycle will be different from that formed nearer the trough. On the Superior

upgrade project, this was particularly an issue in the supply of large steel fabrications of which there are a lot in a refinery. The key influence of this factor is that entering into a fixed-price contract at or just before the peak of the cycle is likely to be expensive, while entering into a fixed-price contract at the bottom of the cycle is likely to be advantageous for the owner, at least in the shorter term. For this reason, first tier suppliers tend to be most profitable during the early months of a recession when fixed-price contracts agreed during boom times are being executed ([Ive & Gruneberg, 2000](#)). The academic discipline that addresses issues around economic cycles is econometrics, but its record in spotting turning points in the cycle, which is the information that is most useful in shaping commercial strategy, is rather poor.

The fourth force – the *institutional context* – is also of considerable importance in shaping owner commercial strategy because of its impact on transaction governance ([Bai, Sheng & Li, 2016](#)). There are many different aspects to the institutional environment ([North, 1990](#); [Scott, 2014](#)) including the law of contract and hence the enforceability of contracts, cultural preferences and perceptions of trust, government interventions and the like. Such factors can also be influential within nations and between projects. In our case, the principal issues were Social, and to a lesser extent Political. The Superior refinery had been established on the site for over 100 years, although Venez did not take ownership until the late 1990s. This meant that there were some very long-standing relationships with a range of local suppliers, and a high level of trust in them which economized on Venez' supervisory effort. This Social factor shaped strongly the commercial strategy for the construction execution work packages, as can be seen in [Figs. 3 to 5](#). The Political factor was the long-standing independence of Superior from corporate oversight by both Venez and its predecessors. This meant that the Superior leadership team did not seek help from elsewhere in Venez until things had started to go wrong. A Legal factor was the requirement to conform to the norms of union shop construction in the state where Superior was located.

### 6.3. Understanding the evolution of commercial strategy through the project lifecycle

The first phase of the IBR research addressed the first research question on the principles underlying owner commercial strategy development. The second, empirical phase, provided a much more nuanced perspective on the four forces model by investigating how the Superior project team mobilized its commercial strategy on the upgrade project. From the empirical evidence, we can see that Venez was low on the owner project capabilities ([Davies & Brady, 2016](#); [Winch, 2014](#)) required for this project, and therefore entered into a contract with Bread for EMC services, and also on-site construction management services during the project execution stage. This generated a number of issues for the upgrade project. Initially, the fee-based EMC contract escalated rapidly as the overall project budget escalated (outturn was \$8bn and 24 months late), so Venez attempted to align more closely incentives by moving to an IPMT with Bread. However, this did not resolve issues of competitor rivalry, and in the end Beer and Oatcake did their own construction management of the local suppliers on site. Conflict of interest issues also remained for the construction management on the three remaining packages where Bread was expected to manage itself. High performance on projects correlates with the project management team being “owner badged” in-house and not outsourced to suppliers ([Merrow, 2011](#)) and strong “owner domination” of the project process ([Hui, Davis-Blake & Broschak, 2008](#)). The Superior case indicates one reason why this might be so.

On the basis of the evidence presented here, we are also able to provide a more nuanced perspective on IPMTs ([Roehrich et al., 2019](#)). These integrate the project management teams from the owner and first tier supplier organisation. The Superior case reveals an important issue where the supplier partner in the IPMT is also a specialist supplier in a multiple first tier project coalition. These generate conflicts of interest in

two ways. First, the supplier member of the IPMT is, in effect, project managing itself which generates perceptions of a conflict of interest on the owner side. Second, other first tier suppliers find themselves being managed by a competitor they come up against in bidding on other projects, and so there are perceptions of conflicts of interest within the supplier coalition.

A further observation from the second phase of IBR is that commercial strategies evolve through the project lifecycle. This happens in two ways. First, movement through the project lifecycle is a progressive reduction of uncertainty through time, and so more has been learned regarding the capabilities of suppliers and the requirements of each work package on the project which creates the opportunity for a shift towards more transactional, fixed price, contracting often through two-stage tendering (Merrow, 2023). Second strategic decisions taken earlier in the project lifecycle to address one challenge can be seen to create further challenges later in the project lifecycle which generates the need for a further change in the strategy. This can be clearly seen in the early attempts to address the relatively low capabilities of the Superior project team. Hiring an EMC contractor led to perceived conflicts of interest between the owner team and the EMC project team, but addressing that by opting for an IPMT generated perceived conflicts of interest between EMC and the other suppliers it was expected to manage.

This suggests the importance of a learning perspective (Argyres & Mayer, 2007) on owner commercial strategy. Venez project leaders learned through iterative cycles of development of their commercial strategy for the Superior upgrade project, a process facilitated by the peer review process associated with Venez' project governance stage gate process. Other cases of procuring complex project performance through the commercial interface (Brown, Potoski & Van Slyke, 2013; Howard et al., 2019) report similar findings. Our inference from these cases is that owner commercial strategy on complex projects is never static, but always a continual work in progress through the project lifecycle.

#### 6.4. Overview

In summary, the evidence from the first two IBR phases suggests that the commercial capabilities required by the complex project owner include the following: the capability to package the contracting map matrix into work packages that reflect the *structure of supply*; the capability to select the most appropriate supplier of each technical specialism needed on the project; the ability to incentivise the selected supplier through an appropriate combination of formal and relational contracting through understanding the *nature of the transaction*; and, finally, the ability to manage the relationship with that supplier through time. These are complements to the project governance capabilities that the strong owner (Morris & Hough, 1987; Winch & Leiringer, 2016) also needs to manage the governance interface between the owner and the delivery domain (Winch, 2014). It should also be emphasized that this includes the capability to transact simultaneously with multiple suppliers on different contractual and relational bases. For instance, it can be seen from Fig. 5 that the relationship with Bread was very different from those with Beer and Oatcake, and also different from those with the local suppliers and speciality contractors doing construction execution on site. Table 3 provides a summative analysis of the relationship between the contingencies underpinning the four forces model, and their implications for commercial strategy on the Superior refinery upgrade project.

### 7. Theoretical and methodological contributions

In this section we turn to the broader implications of our findings for project organising research. Our methodological contribution is that we adopted an Intervention-based Research method for the research presented in this paper as shown in Fig. 1. Our *problem* (Chandrasekaran et al., 2020; Van de Ven, 2007) was developing a model as a tool for

**Table 3**  
Contingency analysis of the superior refinery upgrade project.

Force contingency (see Table 2)	Implications for superior upgrade project
Uncertainty	Supplying project leadership services is inherently uncertain on a major project, so formation of IPMT with Bread on a reimbursable basis. Basic Engineering Packages (coker; sulphur recovery) with low uncertainty could be purchased on a fixed price basis.
Frequency	Venez were only doing this once! This meant that the owner project management capability had to be developed by seconding human resources from Bread and elsewhere in Venez.
Asset specificity	Choice of technology meant choice of supplier for some technologies (coker and sulphur recovery) which removed the possibility of further competition to reduce costs during Execute.
Package technological complexity	Most packages were complicated rather than complex. The complexity in the project lay at the level of the project as a whole and the interfaces between the packages. This put considerable pressure on the IPMT.
Package criticality	None of the main packages was uniquely critical, and so a leveraged strategy was appropriate, except for the overall project management where a strategic partner approach was taken with Bread.
Economic cycle	Many steel components were experiencing run-away inflation due to global demand from China. This particularly affected large steel vessels, but also many steel fabrications.
PESTLE	While all these factors were in the background, the one that especially shaped project delivery was Social. The refinery had been on the site for over 100 years and was the principal employer in the district. Maintenance and sustainability projects were handled by a network of local suppliers with high tacit knowledge of the refinery. The IPMT had to be careful not to disrupt these existing relationships while moving beyond them to find appropriately capable suppliers for the upgrade project. Perhaps more Political, there was a strong tradition of the independence of Superior from corporate headquarters which was maintained when it became part of Venez. They were therefore reluctant to ask for the help they needed at the start of the project. A further Legal factor was the requirement to use union labour on the project.

developing the owner's commercial strategy for a complex project. This gave us S in the IBR methodology. Phase 1 of our *intervention* started with TCE as the most widely adopted theoretical perspective on the commercial interface as T in the IBR methodology. Iteration with our client's experts confirmed both the value of the insights generated by this perspective, but also its significant limitations. We then conducted literature searches to identify appropriate perspectives to address these limitations which we iteratively reduced to the structure of supply which we conceptualized with an adaptation of a well-established supply chain model; insights from econometrics on the effects of the economic cycle; and the importance of the institutional context in the development of owner commercial strategy captured in the PESTLE mnemonic. The outcome of this phase was T\* captured in the four forces model shown in Fig. 2.

The second phase of our intervention involved identification of an appropriate Venez case study and fieldwork by the academic team to research the details of the Superior case - M in the IBR methodology - to gain deeper understanding of how T\* worked in practice to create S\*. We further obtained evidence during phase three on how S\* diffused to create wider change in Venez from the learning the delegates took away from the classroom back to their workplaces and reported in their reflective practice papers, thereby validating T\*.

We suggest that customized executive education programmes provide an excellent context for IBR, particularly for "problematizing" rather than "gap-filling" research (Alvesson & Sandberg, 2011).



Through this intervention, we problematized the widespread use of TCE and associated governance concepts for researching the commercial interface between project owners and their suppliers on complex projects. On this basis, we suggest that the widespread use of the concept of “governance” in research on commercial relations between project owners and suppliers (Müller, 2011; Roehrich et al., 2020) be discouraged as it conceptually biases the analysis towards TCE, which is valuable for analysing only one of the four forces shaping project owner commercial strategy. Rather the concept should be reserved for issues around managing the governance interface (Winch, 2014) between the owner and the temporary project organisation in the delivery domain.

Theoretically, our contribution is to move beyond the existing literature on the commercial interface. Our intervention started from within the conceptual perspective of TCE, but we quickly realised that as an explanatory perspective, TCE was limited because of its focus on the nature of the transaction, a limitation it shares with more recent approaches that emphasize the importance of relational rather than transactional governance of the commercial interface. This was our “aha” moment that pushed us into Mode 2 IBR (Oliva, 2019). We therefore moved to a theoretically pluralist perspective (Lumineau & Oliveira, 2018) on relationships across the commercial interface on complex inter-organisational projects. We recommend further attention to multi-dyadic concepts of inter-organisational relationships which conceptualize the project as a “nexus of treaties” (Aoki et al., 1990; Pryke, 2012) consisting of multiple bilateral relationship coordinated hierarchically through contracts (Stinchcombe, 1985) and integrated by the owner’s project team, whether they are further integrated or not with the suppliers’ project teams in an IPMT.

In relation to the research literature on project networks, it is notable that this line of enquiry has empirically drawn on small and medium-sized projects such as building (Oliveira & Lumineau, 2017; Pryke, 2012) or film and TV production projects (DeFillippi & Sydow, 2016; Manning & Sydow, 2011; Sydow & Staber, 2002; Windeler & Sydow, 2001). These analyses cannot expect to be applied directly to larger, more complex projects (Oliveira & Lumineau, 2017). An important exception to this generalization (Pryke et al., 2018) suggests to us that the informal networks of interpersonal relations that allow complex project organisations to function organically are an overlay on the more formal outcome of owner commercial strategy as discussed in this paper. Network analyses are very good at investigating the interplay of network relations, but they cannot explain how the networks are formed in the first place. We submit that the four forces model provides one way of understanding how the networks are formed on major projects.

Much of the earlier research that has looked at the more practical aspects of commercial strategy has focused on contracting strategy (Barnes, 1983; Masterman, 2001; Merrow, 2023) i.e. the selection of the most appropriate contract type by the owner to procure the project services required from suppliers. This literature has largely focused on risk allocation between the parties embodied in different contract types. The four forces model incorporates this stream of research in the coding of the contract type for each package in the contracting map, but it also allows project owners to move well beyond this legalistic approach to explore the organisational implications of their choice of contract type and the interactions between the different contracts on a complex project.

### 7.1. Limitations of the research

There are two main limitations to the research presented here. The first is the standard one of the limitations of a single case study (Siggelkow, 2007). While we can claim to have gained considerable empirical depth into the case study which has allowed us to generate new theory, how generalizable are these findings? One response to this question is to argue that the case is inherently interesting – that it is a “talking pig” (Siggelkow, 2007: 20) – and so it can thereby inspire. We believe that this Superior refinery upgrade project is indeed inherently

interesting and therefore a story worth telling. However, we have also been able to position the insights it generates theoretically, and have been able through our IBR Phase 3 activity to test its applicability more widely in Venez on other types of projects. Recent executive education teaching on non-Venez programmes has shown that it resonates more widely in the world of complex projects, particularly with those from the infrastructure sector.

One approach to small-number case study research is to argue that the case has been “theoretically sampled” (Eisenhardt, 1989), but an inherent limitation of all engaged scholarship is that one does not sample cases on theoretical criteria. Rather, cases arise from interactions with organisations which articulate their challenges in a way that academic researchers can respond and so are pragmatically selected. This places considerable stress on the processes of abduction from data to theory. A related issue is that the IBR process summarized in Fig. 1 and table 1 is not a template for engaged scholarship – all engagements will be different because they are driven by different real-world challenges. Rather, what we took from earlier IBR research (Oliva, 2019) was a way of describing our unique engagement with Venez so that it could be methodologically evaluated by others.

A third limitation is derived from our theoretical positioning within the three domains of project organising (Winch, 2014). An “interface” is, by definition bilateral, in this case it is the commercial interface between the project owner and its suppliers on a particular project. Yet we have only researched the owner perspective on this interface. Even the structure of supply force is contingent upon the *perceptions* of supplier capabilities by the owner. Interviews with the EPC suppliers were out of scope of our engagement agreement with Venez. We say more on this in further research below.

### 7.2. Suggestions for further research

These considerations suggest a number of lines of enquiry for future research which we see as a complement to the agenda recently laid out elsewhere (Engelhart, Roehrich & Squire, 2023). From the presentation of the evolution of the Superior refinery upgrade case, it is clear that a first gap in the existing literature on the commercial interface is the absence of attention to the packaging problem. That is, which cluster of tasks in the cells of the contracting map matrix should be given to which suppliers? It is, perhaps, a sign of the remarkably low amount of attention that the packaging problem has had from researchers that the standard reference was published over 50 years ago (Thompson, 1967) which proposes that “organisations seek to place reciprocally interdependent positions tangent to one another, in a common group which is (a) local and (b) conditionally autonomous” (1967: 58). Positions which require only sequential coordination can then be coordinated by standardization rather than mutual interaction (Mintzberg, 1979). In commercial strategy terms, this translates into clustering together task cells in the contracting map matrix which require relatively intensive levels of coordination and thereby managing them hierarchically within work packages let to a single supplier. The supplier is therefore responsible for the within-package coordination. This leaves the owner responsible for coordination *between* work packages let to different suppliers as indicated in the contracting maps in Figs. 3-5 above. Yet we know little about the principles of how packaging is done through articulating the relationship between the requirements of the project scope captured in the WBS and the operational capabilities of the PBFs in the supplier domain.

A second line of enquiry would be to investigate how different strategic choices regarding the commercial interface by owners shape the informal networks of interpersonal relationships that are overlaid on top of them in multi-team organisational systems (Carter & DeChurch, 2014). Here, SNA analysis (Pryke, 2012) would be extremely valuable to identify how the informal networks of coordination interact given different choices in commercial strategy by project owners and hence different underpinning configurations of the project coalition.

Our theoretical perspective in this analysis draws on a variance theory approach to engaged scholarship (Van de Ven, 2007) due to the reliance on the contingency theory that underpins TCE. However, a process theory approach would be very welcome as a third line of enquiry. This could investigate the actual process of commercial strategy formulation in real time, and investigate the use of the four forces model as a tool (Sharma et al., 2022) for owner commercial strategy development combining a strategy-as-practice (Johnson, Langley, Melin & Whittington, 2007) and projects-as-practice (Hällgren & Söderholm, 2023) approach.

Fourth, a limitation of the research presented here is that it is from the owner perspective alone. Complementary research is required to investigate more deeply the commercial strategies of project-based firms as suppliers, particularly around how they manage the acquisition of contracts through “capture management” (Winch et al., 2022) and subsequently manage relationships with project owners through the project lifecycle and then onto other projects within the owner’s portfolio through collaborative working and the generation of trust. Such supplier commercial capabilities are essential complements to their project delivery capabilities (Davies & Hobday, 2005; Ethiraj, Kale, Krishnan & Singh, 2005).

Finally, further research also needs to be undertaken on how project owners can best acquire the required organisational capabilities (Leiringer & Zhang, 2021; Zhang, Leiringer & Winch, 2023), with particular attention to understanding the structure of supply, and perhaps, over the longer term deliberately acting to shape that structure. While IMPTs are certainly one way of doing this, their implementation is not straightforward as Venez’ challenges on the Superior Refinery upgrade project indicate, and the evidence remains that project success is correlated with the deployment of project management team members that are directly employed by the owner and investor organisation (Morrow, 2011).

## 8. Conclusions

In conclusion, we suggest that we have made four distinctive contributions to project organising research. We used the three domains model (Winch, 2014) of project organising to theorise the commercial interface between the owner and the supplier domains of project organising as one of the three key interfaces in project organising research and practice. We thereby hope to integrate this focus on projects-as-contracts more tightly with the three other main streams of project organising research – projects-as-coordination; projects-as-systems; and projects-as-planning (Winch, Brunet & Cao, 2023). Second, we have provided an empirical basis for the strategic management of the commercial interface by project owners, which we dub *owner commercial strategy*. Third, we have developed a pluralistic perspective (Lumineau & Oliveira, 2018) on managing the commercial interface from a project owner point of view captured in the four forces model shown in Fig. 2 that moves beyond the current reliance on TCE theory. We did this by using an innovative and engaged IBR methodology as presented in Fig. 1 and Table 1. The research presented here has all the limitations of a single case study, but we hope that by investigating a single case within an IBR method we have provided some of the granularity that is presently missing (von Danwitz, 2018) from project organising research on the commercial interface on complex projects.

## Declaration of Competing Interest

None.

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