# MAKING SMART PROMISES

## THE ROLE OF ACCOUNTING IN ARTIFICIAL INTELLIGENCE SALES

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**Making smart promises: the role of accounting in artificial intelligence sales**

Abstract:

This thesis explores the role of accounting in business-to-business sales processes of artificial intelligence technologies. The study is conducted through a dual-case study at two Swedish artificial intelligence companies based on semi-structured interviews and organisational sales documents, focusing on the pilot part of the sales process. The empirical material is analysed through the theoretical lens of effectuation. Our study explores two parallel research questions; illuminating the role of accounting in the sales process, and identifying the characteristics and mechanics of promises made by vendors and clients. Our findings suggest that the role of accounting is to mediate between client objectives and the deployment of the innovation through an iterative learning process of need analysis and sales tactics. This indicates that the role of accounting is to enable and steer innovation. Moreover, we have showed that promises in the innovation sales context are initially abstract and informal but concretise over time as a result of an iterative learning process of need analysis and sales tactics. This indicates a tripartite link between the role of accounting, the concept of mediation, and promises; accounting mediated between promises and client objectives. Furthermore, our findings have tentatively extended the intra-organisational concepts of hardening and evaluative pressures to the inter-organisational domain, and suggest that hardening is a result of learning processes and sales tactics. Our main contribution is to illuminate the role of accounting in sales of artificial intelligence technologies by demonstrating its enabling and mediating role, while we also have empirically described the abstraction of promises and their temporal concretisation; both contributions as a result of iterative learning processes and sales tactics. Lastly, we have contributed to the theory of effectuation by showing its role in artificial intelligence sales, most pronouncedly in terms of describing the role of iterative learning processes in artefact creation.

Keywords:

   Artificial Intelligence, Accounting, Decision-making, Innovation, Effectuation

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# 1.    Introduction

From the times of Adam Smith to modern economics there has been a profound emphasis on the role of technological progress in driving general economic growth. As of 2019, we are in the midst of what many calls a fourth industrial revolution and what some others might call a sort of "third time's a charm": *the cognitive revolution*, driven by practical breakthroughs in artificial intelligence (AI) technologies.

AI is a function of three converging technological mega-trends: the refinement of decades-old mathematical algorithms, the creation of big data through digitalisation, and orders-of-magnitude increases in computing power through novel chip technology. The software technology enables machines to learn how to perform tasks from data, without being explicitly programmed to perform that task - the effect is the ability to automate a wide range of menial and repetitive cognitive tasks. It is expected to add $13-15.7 trillion of global GDP up to 2030 (McKinsey, 2018; PWC, 2018), or an incremental 1.2% of annual GDP growth, across near-all industries. Conversely, AI is expected to put 47% of all current US occupations at risk of being automated over the next decades (Frey and Osborne, 2013).

As businesses and organisations scramble to realise the benefits of AI, they face a common dilemma: do they buy it from vendors or build it internally? Often, the scarcity of AI talent and increasing returns to scale on data makes buying the preferable option (BCG, 2018; HBR, 2018). In general, AI is clouded in uncertainty; technologically, many of the latest technologies (e.g. deep learning) are "black-boxes"; organisationally, there is scarce knowledge on how to drive impact; managerially, many in business roles have limited understanding of what AI even is. In the midst of this, we expect AI adoption to largely be driven by vendor-client relationships as a consequence of the buy-or-build dilemma. Identifying the mechanics of AI sales is then imperative to understand how the innovation will propagate through society, and through that, the state of the global economy for the next decade.

Accounting generally plays a crucial role in organisational decision-making and performance evaluation (Burchell et al.,1980; Hopwood, 1972), and as an "engine for negotiation and interaction" in the inter-organisational innovation context (Carlsson-Wall et al., 2018). As AI requires co-creative investment by both vendors and clients (BCG, 2018), accounting is likely to be part both of initial decision-making on whether to buy, and the subsequent performance

evaluation. After all, accounting is used because "decisions need to be made and actions must be coordinated" (Jørgensen and Messner, 2010). Therefore, studying the sales process of business-to-business artificial intelligence through the lens of accounting is likely to produce insights on the underlying mechanics of the process.

The state of accounting literature is multifaceted. Accounting is understood as a rationally-designed decision-making tool which both reflects and shapes reality (Cabantous and Gond, 2011). It is dynamic in form and content; it is employed as different "machines" for answers, ammunition, learning, and rationalisation (Burchell et al., 1980) and populated with both subjective and objective, customised and standardised, and financial and non-financial, data (Rowe et al., 2012). In the context of innovation, characterised by high ambiguity, emphasis is put on the action-inducing and dynamic role of accounting in which it turns from reflecting the past to building the future. Accounting is said to "mediate" between network actors to mobilise resources (Miller and O'Leary, 2007; Carlsson-Wall and Kraus, 2014). Mouritsen and Kreiner (2016), in a synthesis of accounting, decision-making, and innovation, propose that decisions can be conceptualised as promises and that the role of accounting is to facilitate the promises. This is part of the broader current discourse on whether accounting enables or hinders innovation (Carlson-Wall et al., 2018), where accounting and promises stress the enabling aspect.

The concept of promises seems adequate for the context of AI sales; sales are promissory-based, AI is highly ambiguous, and the co-creative aspects require a degree of forward-looking given how the vendors and clients will build a product together. But there is little understanding of the characteristics and mechanics of promises made, and little empirical understanding of the link between accounting and promises. As such, this paper is an answer to call for research on accounting and promises made by Carlsson-Wall et al. (2018). Furthermore, while extant literature on accounting and inter-organisational innovation describes several features of accounting in networks, there is a gap in the empirical context of inter-organisational sales. These are the two theoretical gaps that this research paper aims to fill, which is translated into the research questions:

1. *What is the role of accounting in business-to-business sales of artificial intelligence technologies?*
2. *What are the characteristics and mechanics of promises in innovation sales?*

This thesis intends to answer the research questions through an exploratory qualitative dual-case study at two Swedish AI-vendors who sell in a business-to-business setting. We will delineate the empirical context to the "pilot projects", which is a limited product deployment employed by both case companies as final part of their sales processes. In section 2, we will develop a theoretical framework through which we will structure and analyse the empirical data, based on the domain of accounting, decision-making, and innovation, and the method theory of effectuation.

As its main contribution, this study finds that the role of accounting in the context of business-to-business artificial intelligence sales is to mediate between client objectives and the deployment of the innovation through an iterative learning process of need analysis and sales tactics. Hence, we find that the role of accounting is to enable and steer innovation. Moreover, it is empirically shown that promises in the sales process of AI technologies are initially abstract and informal, but concretise over time as a result of iterative learning and vendor tactics. Further, we have illuminated the use of accounting in the sales process of AI technologies through a mapping. Lastly, our findings extend the intra-organisational concepts of hardening and evaluative pressures to the inter-organisational domain, where they are suggested to be a consequence of iterative learning processes and tactics in this specific context.

The researchers would already now like to acknowledge the limited scope of this paper, given that it is a bachelor thesis. This makes our contributions highly tentative, but nevertheless accurate reflections of our limited empirical context. The limitations are mainly related to the small sample of interviews and inter-organisational documents that were part of the empirical collection, and the fact that we only have studied the vendor-side of the vendor-client relationship.

The rest of the paper will be structured as follows: Section 2 reviews and develops the theoretical underpinnings of this paper; Section 3 will describe the methodology of this study; Section 4 will present the empirical data based on the theoretical framework structure; Section 5 will analyse the empirics in relation to our domain; and Section 6 will be concluding remarks on contribution, and suggested avenues for future research.

# 2. Theory

## 2.1. Domain Theory: Accounting, decision-making, and innovation

"In from three to eight years we will have a machine with the general intelligence of an average human being."

In 1970, Marvin Minskey, one of the fathers of AI, made that bold claim in Life Magazine. A mere four years later, in 1974, the first era of AI came to a rapid halt and the first "AI winter" instilled.

Six years later, in 1980, the research field was heating up again, as scientists were pioneering the new *expert-rational* systems in attempts to emulate human behaviour. The same year, perhaps ironically, Burchell et al. (1980) wrote their now seminal paper on the role of accounting in organisations and society, stressing the acknowledgement of accounting - and humans - as *less rational* than previously envisaged.

In a departure from the classical roles of accounting, like of "rational decision-making" and "rational allocation of resources", Burchell and his colleagues proposed a new paradigm where accounting could be understood in more dynamic and less rational terms. Moreover, they further emphasised the point that accounting, aside from reflecting reality, also shaped it. The paper also confirmed one thing that accounting scholars seem to agree on; accounting is a decision-making tool (e.g. Hopwood, 1972; Burchell et al., 1980; Jordan and Messner, 2012; Jørgensen and Messner, 2010; Miller and O'Leary, 2007; Mouritsen and Kreiner, 2016). But how and to what extent accounting can serve as a decision-making tool is, as Burchell and colleagues base their framework on, linked to the inherent characteristics of accounting, decision-making, and of the contextual environment.

The purpose of this study is to illuminate the role of accounting in the sales process of innovative technologies, specifically AI. Here, for pedagogical purposes, there is value in breaking down the theoretical background into two fundamental components. First, any sales process - much like any organisational process - can be conceptualised as a series of decisions. To understand the sales process, and the role of accounting in it, we must understand the link between accounting and decisions. What role does accounting play in

organisational decision-making? Second, to properly acknowledge the highly ambiguous empirical setting, we must consult the link between accounting and innovation. What is the role of accounting when there is high uncertainty?

As so, this section will cover 2.1.1 Accounting and decision-making; 2.1.2. Accounting and innovation; and a synthesis in 2.1.3 Accounting, decision-making, and innovation.

### 2.1.1.  Accounting and decision-making

To understand extant research on what role accounting has in organisational decision-making, we will cover the literature in a three-step structure, each building on the previous. Firstly, briefly, how do people make decisions? Secondly, how do people make decisions in organisational settings? Thirdly, what is the role of accounting in organisational decision-making?

For decades, the concept of rational choice has been central to decision-making discourse, and remains "a normative ideal and a reference point for decision making" (Cabantous and Gond, 2011. p. 575). The "classical" definition of rationality considers humans as actors with known preferences that make decisions to optimise for said preferences (e.g. von Neumann and Morgenstern, 1947), but on the basis of weak empirical support, it has been gradually refined into concepts like "bounded rationality" or the "garbage-can model" (Cabantous and Gond, 2011). Such theories which stress limited rationality, where otherwise procedurally rational decisions are constrained by limits to computing power and information availability, remain "the received doctrine underlying most theories of organizational decision making" (March, 1997. p. 28).

However, recent organisational decision-making research has taken a more holistic view of rationality. Cabantous and Gond (2011) argue that organisations make procedurally rational decisions because of the integration of rationality into a larger framework, called *the performative praxis*. Here, rational decision-making reigns because rational choice theory has been embedded into actors and tools, and decision-making actors tend to utilise these "rationally designed" tools. The effect is that organisational actors are "framed" into rational choice by rationally designed tools (Callon, 1998; Cabantous and Gond, 2011; Mouritsen and Kreiner, 2016). One of these tools is accounting (Mouritsen and Kreiner, 2016). Furthermore, as alluded to in the framework by Cabantous and Gond, accounting has been argued to not only reflect reality, but also *shape* it (e.g. Burchell et al., 1980; Callon, 1998; Cabantous and Gond, 2011; Jordan and Messner, 2012; Mouritsen and Kreiner, 2016), a concept called

*performativity* (Cabantous and Gond, 2011). The concept of performativity is highly central to the innovation context and will be further covered in section 2.1.2.

If accounting is seen as a rationally-designed decision-making tool, it is relevant to study the content of that tool. As noted by Rowe et al. (2012), decision-making during organisational change is likely to rely on accounting information "often constructed using subjective information", which ultimately "lacks objectivity". Here, accounting information that initially was deemed "soft" (i.e. non-reliable and subjective) undergoes a "hardening" process from interpersonal agreements developed through socio-political games. This is illustrative of how accounting, while still considered a rational system, undergoes changes in evaluative validity as a result of the context. Moreover, it alludes to the incompleteness of accounting information as a result of low standardisation and low comparability in times of ambiguity (Rowe et al., 2012).

To summarise the examination of the role of accounting in organisational decision-making, extant research considers accounting a rationally-designed tool embedded into decision-making which frames decision-makers into procedural rationality (Cabantous and Gond, 2011; Mouritsen and Kreiner, 2016). Moreover, this tool is performative; accounting does not only describe organisational performance but also influences it (Cabantous and Gond; Mouritsen and Kreiner, 2016). However, the usefulness of accounting information as a decision-making tool is dependent on its context, and how this usefulness is perceived is dynamic over time as a result of socio-political factors (Rowe et al., 2012).

But to further understand accounting and decision-making, we must understand it at its perils. When ambiguity is high, rationality is constrained, and tools have little data, what is then the role of accounting?

### 2.1.2.  Accounting and innovation

Before the review of accounting and innovation commences, we will make a quick note on the theoretical distinction between intra- and inter-organisational innovation. While, technically, our empirical context is inter-organisational, the nature of a pilot deployment shares characteristics with intra-organisational change projects. Essentially, the AI vendor is inserted into the client organisation, in which the innovation is developed. Therefore, we consider it useful to borrow concepts from both intra- and inter-organisational innovation; or simply put, accounting and innovation.

Still today, Burchell et al.'s mapping of the role of accounting under uncertain circumstances is a useful framework (Mouritsen and Kreiner, 2016), especially in the context of innovation which is characterised by its ambiguity in cause-effect and objectives. Here, accounting becomes a *rationalization* machine; an ex post device providing an evaluative framework, but not necessarily one which aids decision-making or reflects reality (Burchell et al., 1980; Mouritsen and Kreiner, 2016). If cause-effect is uncertain but objectives are known, then accounting becomes a *learning* machine. In the context of innovation, cause-effect is highly uncertain; objectives are abstract at best. Here, the role of accounting as a decision-making tool is one with limited ex ante functionality (Hopwood, 1972; Jordan and Messner, 2012).

However, even in such highly uncertain circumstances, accounting is used in the decision-making process. As stated by Jørgensen and Messner (2010) when studying new product development:

> "Nevertheless, there is likely to be a need for some form of accounting in such a case. For, ultimately, decisions need to be made and actions must be coordinated. Rather than relying only or primarily on accounting representations, organisations may resort to other types of accounts which allow goals, decisions and actions to be selected and justified." (p. 185)

Developing on this notion of incompleteness, Jordan and Messner (2012) studied performance indicators during a period of intra-organisational change, noting how "accounting information usually does not capture all the dimensions of performance considered relevant". This bears resemblance to the innovation context, which by definition is a period of change, and where "dimensions of performance" are ambiguous. Here, the acceptance of the incompleteness of performance indicators is dependent on paradigms of control, which changed over time as a result of the socio-political context (Jordan and Messner, 2012). Targets that initially were viewed as "visions" became more concrete and rigidly defined by the final periods of change as "evaluative pressures" mounted; a process isomorphic to that of "hardening" (Rowe et al., 2012). Moreover, accounting was initially performative, called "a means rather than an end", but later became more representative (Jordan and Messner, 2012).

In the inter-organisational context, accounting has been proposed to act as a *mediating* instrument to mobilise disparate resources by synthesising the technical and economical

(Mouritsen and Thrane, 2006; Miller and O'Leary, 2007). This was further supported by Carlsson-Wall and Kraus (2014), when studying the "fuzzy front-end" of new product development; noting how accounting "operated as a 'mediating' instrument that guided and encouraged the fabrication technology innovation" between various network actors. Moreover, accounting moved from financial quantifications to other, more technical, measures (Carlsson-Wall and Kraus, 2014). Carlsson et al. (2018) in a summary on accounting, innovation, and inter-organisational relationships stressed the role of accounting as an "engine for interaction, negotiation, and compromise", akin to that of mediation and performativity.

In all, extant research proposes that the role of accounting in innovation moves from reminiscing the past to envisaging the future; it becomes less rigidly structured, less standardised, and less financial; it spurs action rather than purely reflecting the past. However, there is an empirical gap in domain literature with regards to the sales context. Intra-organisational studies fail to capture the inter-organisational aspects of innovation, while many of the inter-organisational studies (e.g. Miller and O'Leary, 2007; Carlsson-Wall and Kraus, 2014) are from the *network perspective* rather than a client-vendor perspective. Moreover, the network perspective fails to capture the direct negotiative decision-making aspects of sales. Overall, the empirical context of sales is especially important in AI because of the market dynamics, where many organisations decide to buy instead of build, thereby creating a high adoption dependency on the sales process of vendors. This empirical gap necessitates further study.

We therefore turn to domain literature which adequately covers the intersection of accounting, decision-making, and innovation.

### 2.1.3. Accounting, decision-making, and innovation

As referenced throughout the literature review, such relevant synthesis of accounting, decisions, and innovation is made by Mouritsen and Kreiner (2016). The two researchers conceptualise decisions in highly innovative settings as *promises* - stemming from the highly unpredictable nature of innovation projects - and that the role of accounting is to facilitate these promises. This feels suitable to the sales context; after all, are not salespeople known for making every promise they can find? When you sell something, are you not implicitly or explicitly making a promise to your client? Are not purchasing decisions then intricately linked to these promises?

Mouritsen and Kreiner (2016) propose, rather philosophically, that decisions are composed of two sequential processes: one leading up to the decision (i.e. the decision-making process), and one following the decision where the decision-maker engages with an uncertain future to realise the intended outcome of the decision. Given that the future is uncertain - which is especially true in the innovative context - the role of a decision then shifts towards the attempt to engage with the future to realise the decision. This means that new decisions and investments have to be made, and the decision is then conceptualised as a promise to make these new decisions and investments (Mouritsen and Kreiner, 2016). In the context of AI sales, where you co-create the product with the client rather than sell a plug-and-play, the decision to buy is rather constructively conceptualised as a promise from both vendor and client to engage in this co-creation. This makes promises an appropriate point of departure in our empirical analysis.

As for the role of accounting, Mouritsen and Kreiner (2016) propose that it shifts from reflecting the past to envisaging the future; accounting confirms its performative role. As a consequence, accounting also moves from providing solutions to alternatives-generation. The role of accounting is then to facilitate promises. However, there is little theoretical understanding of the underlying characteristics and mechanics of these promises, and little empirical understanding of the role of accounting in promises (Carlsson-Wall et al., 2018).

Therefore, in summary of the domain literature, this paper aims to fill the two identified research gaps in the domain of accounting, decision-making, and innovation. The first is concerned with the broader empirical setting; the second with the specific theoretical gap:

1. *What is the role of accounting in the sales context of innovation?*
2. *What are the characteristics and mechanics of promises in innovation sales?*

To fill these gaps, we must employ an appropriate analytical lens to view our empirical material. Here, we borrow from Mouritsen and Kreiner (2016), who as their *main* contribution noted that when decisions are conceptualised as promises, and the perspective turns from retro to futuro, the performative nature of decisions transforms the underlying decision-making logic. Now, the role of decisions moves from *causation* to *effectuation* (Mouritsen and Kreiner, 2016).

## 2.2.  Method Theory: Effectuation

Effectuation (Sarasvathy, 2001) is an entrepreneurial logic of decision-making which stands in contrast to a traditional causation-based logic. From the original paper (Sarasvathy, 2001):

> "Causation processes take a particular effect as given and focus on selecting between means to create that effect. Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means." (p. 245)

Essentially, effectuation argues that when the future is clouded in uncertainty (like in innovation), predictive methods (e.g. business plans) have little value. Instead, you want to control as much as you can, and move in short iterative loops. In causation-based logic, you start with a specified predetermined goal and then choose from a range of means to achieve that end. But in innovation and entrepreneurship, that does not seem to accurately reflect how decisions are made (Sarasvathy, 2001b; Sarasvathy and Dew, 2005), nor does it logically seem like the most optimised approach. Instead, in effectuation-based logic, you start with an aspiration or a general objective, review your available means and choose appropriate ends which best suit the general aspiration.

Figure 1. below is the process model of effectuation (Arend et al., 2015). As a decision-making model, it can be employed at both individual, project, and organisational levels.

**FIGURE 1.**

**A PROCESS MODEL OF EFFECTUATION**
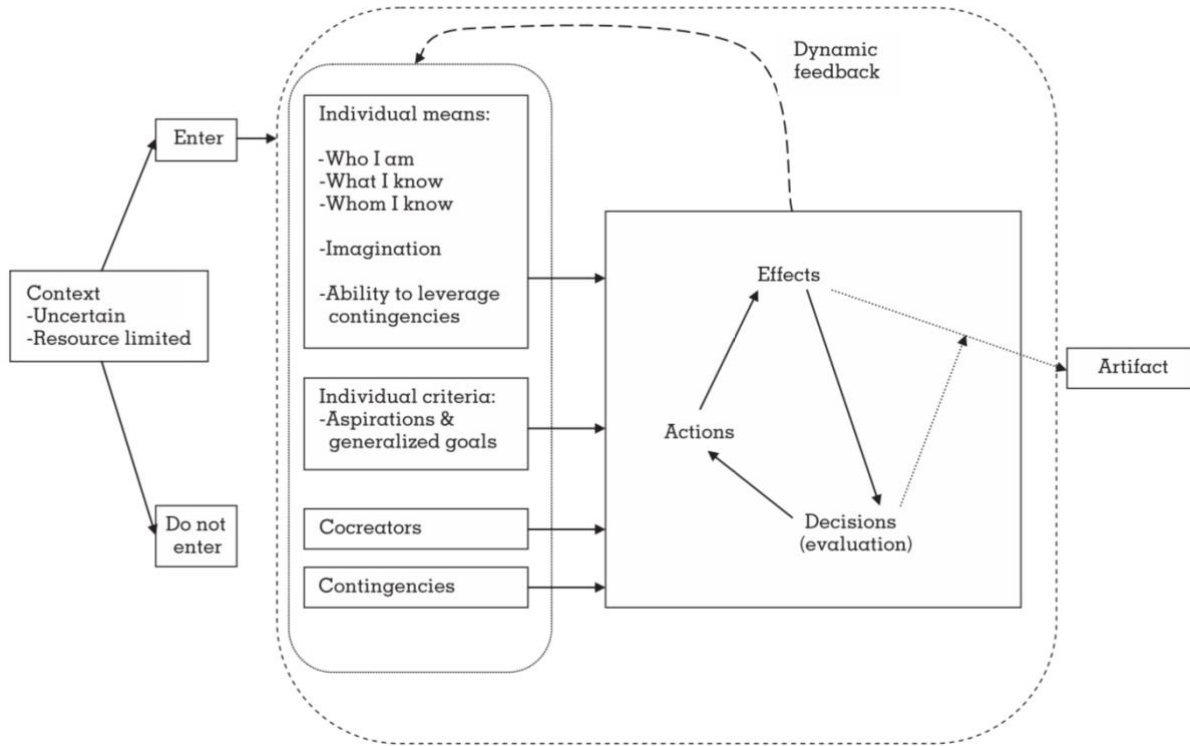


The process model of effectuation starts with the decision to enter or not enter the process, which is based on the concept of affordable loss, explained in Table 1. The core process, as depicted in the right square, consists of an iterative process of decisions, actions, and effects; each iteration produces dynamic feedback to the process input variables depicted to the left. Here, as referenced earlier, effectuation is based on available means, imagination, and the ability to capitalise on emerging, non-predictable, events. Objectives are in the form of generalised goals (e.g. to start a business, or to deploy AI methods) rather than concretely specified (e.g. to start a rice-selling business, or to improve a specific metric with AI). In this process, there are co-creators and contingencies. The core process is, for each iteration of actions and effects, evaluated against the generalised goal and the process finishes when the goal is met, thereby producing an artifact (e.g. a business, a successful deployment).

There are a few core components of the effectuation model that will serve as indicators of validity in our empirical context, in terms of being used as analytical lense, presented in the table below (Sarasvathy, 2001; Sarasvathy and Dew, 2005; Arend et al., 2015).

**TABLE 1.**

**CORE COMPONENTS OF AN EFFECTUATION PROCESS**

| Component | Description |
|---|---|
| *Control* | Entrepreneurs want to control the immediate environment rather than try to predict the future |
| *Selecting ends from means* | Choosing the project objective based on available means, rather than the opposite |
| *Affordable loss* | Choosing what projects to engage with based on a calculation of what loss can be afforded |
| *Strategic alignment* | Viewing sales as strategic proto-alliances rather than purely transactional, stressing underlying alignment of objectives |
| *Co-creation* | Products are co-created with customers |
| *Aspirations & generalized goals* | Projects have abstract rather than concrete objectives |
| *Contingencies* | Unexpected influences that could not have been predicted |

Effectuation, while critically and constructively discussed by some (e.g. Arend et al., 2015), has empirical support in the world of entrepreneurship, especially in new market creation (Sarasvathy, 2001b; Sarasvathy and Dew, 2005; Sarasvathy et al., 2007). This makes it especially relevant to the re-emerging field of artificial intelligence vendors. In the context of our study, it will be employed as an analytical lense to understand *how* AI vendors act in the deployment of their technologies at customers. Through that process model lense, we have a framework in which we can embed the role of accounting in a generalisable manner.

## 2.3. Theoretical Framework

We have now developed a theoretical framework through which we will analyse our empirical data. This framework is a synthesis of extant research in the domain of accounting, decision-making, and innovation, viewed through the lens of effectuation. Figure 2. visually depicts the proposed role of accounting in effectuation processes.

To clarify, this effectuation process is applied to our empirical context of a pilot deployment at a client by an AI-vendor, where the pilot is a crucial stage of the sales process. The core process refers to the deployment of the AI technology, which is co-created by the client.

**FIGURE 2.**

**ACCOUNTING IN EFFECTUATION PROCESSES**
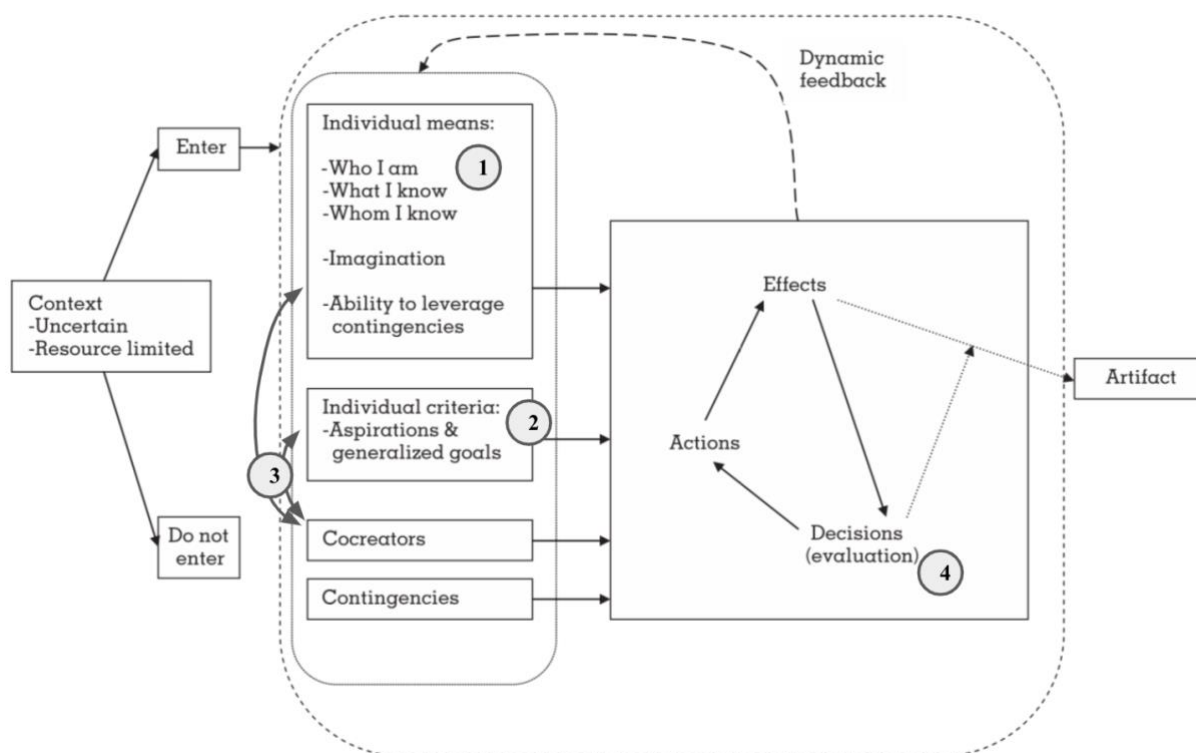


Extant domain theory proposes several roles of accounting in subprocesses of effectuation. As a note, we acknowledge the clear role of accounting in dynamic feedback if both process input variables and the core process contains accounting, but argue that this specific subprocess is an artificial abstract concept which is required for the *model* to make sense, rather than being empirically grounded (e.g. if you evaluate an effect, then that automatically

updates your aspirations; it is not a conscious effort to "send dynamic feedback"). Information transfers between actors is covered in subprocess 3 below.

*1. Means-selection*

In highly innovative settings, the role of accounting moves from solutions to alternatives-generation, as a consequence of the shift from causation to effectuation (Mouritsen and Kreiner, 2016). Here, accounting helps state different possible means in a common framework, generating alternative strategies of innovations (Mouritsen et al., 2009; Mouritsen and Kreiner, 2016). To exemplify, one could map out the possible ways of deploying AI by mapping out the potential target KPIs.

*2. Generalised goals*

Accounting is a method of stating goals, given that organisational performance is, at the end of the day, measured through accounting. In the context of the pilot deployment - which is a co-creative environment between vendor and client - the generalised goals are linked to promises (Mouritsen and Kreiner, 2016). To exemplify, ahead of a pilot deal, the vendor is likely to argue how the deployment will impact organisational performance; in effect constituting a promise, which would translate into the generalised goal of the pilot. Given how goals direct and focus, this will be a focal point of our empirical collection.

*3. Co-creative communication*

In the co-creative environment of innovation, accounting is used as a mediating instrument to mobilise resources (Miller and O'Leary, 2007; Carlsson-Wall and Kraus, 2014; Mouritsen and Kreiner, 2016).

*4. Evaluative framework*

If accounting is an instrument of goal definition, then the evaluative framework will logically be accounting-based as well. Relevant domain literature suggests that the role of accounting in performance evaluation is dependent on paradigms of control (Jordan and Messner, 2012) and emerging interpersonal agreements (Rowe et al., 2012).

**TABLE 2.**

**SELECTED EMPIRICAL CONTRIBUTIONS**

| Empirical theme | Theoretical concepts | Empirical contribution |
|---|---|---|
| *Means-selection* | Alternatives-generation | How are alternatives generated in practice? |
| *Generalised goals* | Decisions as promises | <u>What are the characteristics and mechanics of promises in practice?</u> |
| *Co-creative communication* | Mediation | Is there evidence in this empirical setting? |
| *Evaluative framework* | Incomplete performance indicators; evaluative pressures; paradigms of control; hardening | Could these be extended to the inter-organisational context; and if so, what does that socio-political process look like? |

While our theoretical framework has produced suggested roles of accounting, Table 2. illustrates some selected further questions. However, acknowledging the nascence of our field and context, we hope to contribute with additional inductive insights. To leave the reader with an element of focus after a lengthy theoretical exposition, we will reiterate the main research gaps in domain theory that we aim to contribute to, which adequately cover both the theoretical and empirical setting. Based on these gaps, the research questions of this paper read:

1. *What is the role of accounting in business-to-business sales of artificial intelligence technologies?*
2. *What are the characteristics and mechanics of promises in innovation sales?*

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# 3.   Methodology

This section covers the main considerations and challenges related to the construction of the research design, data collection and subsequent data analysis. In addition, we argue around the limitations on reliability and validity arising from our choice of research design.

## 3.1.   Research design: Qualitative multiple case study

The chosen research topic was based on the researchers' interest in the intersection between business and technology. It combines the study of accounting, an age-old and well-researched business construct, with what is arguably the most alluring and engaging area of modern-day technology - artificial intelligence. Whereas accounting has been previously studied in the context of high-tech innovation, this has often been from an intra-organisational or network perspective. To the best of our knowledge, there hasn't been any prior research on accounting dynamics in the fuzzy and ambiguous inter-organisational setting that is AI sales. Thus, the relative nascence of our domain forces us to find theoretical support in various streams of research, ranging from decision-making logics to accounting and innovation. This broad theoretical synthesis is an important step in theory building, which is the preferred research approach for nascent domain settings (Edmondson and McManus, 2007). Moreover, the exploration of a new research topic calls for an open-ended research question and the method chosen should allow field data to impact and shape the researchers' appreciation of the phenomenon (Edmondson and McManus, 2007). Methods for data collection that are deemed appropriate include interviews, observations, open-ended questions and obtaining documentation (Edmondson and McManus, 2007). As such, we went for a research design that opted for these modes of collection in order to ensure methodological fit with the remainder of our research project.

For the purpose of this project, the multiple case study approach has been chosen - a common approach when collecting qualitative data. However, it is extensively debated in the literature whether the optimal structure of case study research should be of a single or multiple case design (Eisenhardt, 1989; Eisenhardt, 1991; Dyer and Wilkins, 1991; Siggelkow, 2007; Eisenhardt and Graebner, 2007; Dubois and Gadde, 2002). While Dyer and Wilkins (1991) argue that multiple case studies might lack the depth and nuance of a single case study, it is a widely held belief that a multiple case study approach can mitigate the risks of generalising based on a single case study. Yin (1984. p. 53) convincingly argues that "even if you can only

do a 'two-case' case study, your chances of doing a good case study will be better than using a single-case design." Two different cases will most likely display some variance in organisational context, and if under these differing circumstances you still reach similar conclusions, they will greatly expand the generalizability of findings. Ergo, we argue in favour of the multiple case study approach despite it being somewhat limited by the scope of a single-semester bachelor thesis in terms of time and interview occasions.

The case companies were chosen on the basis of their fulfilment of domain theory criteria in combination with their interesting organisational contexts as well as the fact that we as researchers had secure access. The two companies are both business-to-business AI startups, operating in highly uncertain and ambiguous settings, and their respective use cases have been described as "frontiers of AI" according to a well-reputed consulting firm. Further, the researchers were granted full access because of prior professional engagements with the two companies. This access involved interviews with all desired employees, as well as access to intra- and inter-organisational documentation, which constituted another key determinant in choosing them as case companies.

Lastly, it should be noted that a delimitation has been made with regards to the scope of this study. This study has confined itself to only looking at the pilot process instead of general sales in order to increase depth and stringency. This makes sense as the pilot can be seen as an extreme situation in which a more general process becomes "transparently observable", as noted by Pettigrew (1988). In addition, it ensures a level of specificity that we seek in relation to the research questions. Further description of the sales process and the pilot will follow in Section 4.

## 3.2.    Data collection: Semi-structured interviews

In terms of data collection, our primary source has been semi-structured interviews. Arguably, interviews are a superior way to gather rich empirical data (Eisenhardt and Graebner, 2007; Edmondson and McManus, 2007). Also, studying a more novel phenomenon calls for adaptability in data collection in order to accurately capture the emergence of new theoretical themes (Eisenhardt, 1989). As such, we argue for the relevance of the semi-structured interview approach in our empirical setting - AI sales in a business-to-business context. The approach was semi-structured in the sense that we started the interview series by mapping out a set of general questions common to every interviewee. These were related to roles and responsibilities, corporate identity and culture, as well as product and service offering. We

followed this with other themes and areas of interest, derived from a preliminary screening of the literature, our inceptive research scope, and our prior understanding of the field from having worked with the case companies. During the interviews, this allowed us to follow a set of key themes while remaining flexible with the interviewee in order to capture knowledge that would have otherwise been outside of our initial scope. The researchers actively pursued follow-up questions and clarifications where necessary, in accordance with Edmondson and McManus (2007) who argues that new phenomena require the researcher to be open to new themes and additional data. One limitation of the semi-structured interview approach is the risk of drifting away from the relevant scope of the research, which can be detrimental given constraints on time and available interview occasions. However, our predetermined thematic structure constantly served as a reminder of the areas that we needed to cover.

All in all, we conducted six interviews with six different interviewees at our two case companies. The shortest interview was 28 minutes and the longest interview was 63 minutes, with an average of 47 minutes. All interviews were held at the respective company's offices in central Stockholm and both researchers were present during four out of the six interviews. The interviews were recorded and later transcribed by the researchers. All interviews except one were held in Swedish, and the quotes from the Swedish interviews that are presented in this paper have been translated by the researchers. Although six interviews might sound like a modest amount, we managed to interview all the people who actively work with the questions that we sought out answers to. At both companies we interviewed the CEO & Founder, as well as the Director of Business Development (BD) at one case company, and the similar position of Head of Deployments at the other. In addition, we interviewed people from both sales and tech that have assumed responsibility over pilot deployments. As such, we believe that our empirical underpinnings remain relatively strong despite the limited number of interviews.

We were also granted access to inter-organisational documentation, such as pilot contracts and pitch decks. Perhaps the most interesting thing about this documentation was not what it contained, but what it left out. Either way, they provided another source of data collection which added to our triangulation effort. It furthered our understanding of how promises and expectations were communicated, and it constituted a meaningful cross-check point of the consistency in interview observations.

## 3.3.  Data analysis

As soon as we had defined a general research topic and scope of this study, we made an initial effort to review extant literature within our domain. In addition, we searched for and reviewed the literature on effectuation as a part of our pre-interview process. This literature review informed the themes and questions that we brought with us into the interviews, and it focused the data analysis process on identifying concepts and patterns related to our theoretical framework. Over time, as new data collection opportunities surfaced, contrasting lines of thought emerged, and more literature was reviewed, we took advantage of this and adjusted our interview questions. We attempted a constant reconciliation of cases, different types of data, and literature, which could be extended to saying that this study applied an abductive approach.

The empirical data in this study is grouped based on the propositions that we make in the theoretical framework. The rationale behind this approach to empirical grouping is simple: these propositions reflect our research question and informed the case study design, ultimately affecting both data collection and interpretation (Yin, 1984). The approach allows us to focus on certain data and ignore other, slowly filling the gaps that still remain with empirical insights, extending extant theory even further. In effect, it becomes a very powerful way of structuring the empirics so that our theoretical contribution becomes evident when seen through the lens of our synthesized theoretical framework. Rival interpretations will of course be surfaced and, if there is enough evidence, we will address them as part of our empirical findings. If not, they might be suggested as an avenue for future research.

## 3.4.  Limitations on reliability and validity

A research design is supposed to reflect a logical set of statements and inferences, where valid insight is found only in the epistemological notion of *a posteriori* knowledge. Here, concepts such as reliability and validity find their way to the centre stage. But for our chosen 'two-case' case study design, these concepts become moot. As a result, this section will concern itself with addressing the necessary steps that the researchers have taken to ensure methodological rigor and quality.

Since one of the researchers had previous work experience from the two case companies, a test of construct validity becomes especially relevant. Case study research has been criticized for failing to establish correct operational measures and that subjective judgment is used to

collect data. Even if the one researcher's prior knowledge of the field informed our interview questions, we made sure that they were never targeted questions that led the interviewee to a preferred answer. Potential bias in the construct of interview questions was constantly challenged by the second researcher that had no prior knowledge of the case companies. As such, we argue that the researcher's prior expert knowledge of the field only added a layer of richness to study insights. Furthermore, multiple sources of evidence were used in order to cross-check data across several lines of inquiry.

Two related concepts are external validity, concerned with generalizability of findings, and reliability, concerned with replicability of data collection and results. The external validity of this study is challenged by two things: a small sample and the fact that we only cover the vendor-side of the story. As argued earlier, in accordance with Yin (1984), there is a preference for 'two-case' case studies over a single case study as it significantly increases generalizability. It should be noted that our aim is not statistical generalization, but instead analytical generalizability, in which a sample generalizes findings to a broader theory (Yin, 1984). Here, having more than one case becomes imperative for the replication logic to hold. Moreover, the fact that we only cover the vendor-side of the pilot process is essentially a function of the scope of a bachelor thesis. We acknowledge this weakness and suggest that an avenue for future research is a study that covers the client-side as well. However, in this study, we have tried to mitigate this shortcoming by interviewing all relevant subjects, using several sources of evidence, and a lot of quotes in our empirics. We aimed for clarity in empirical and analytical underpinnings with the purpose of giving the reader an honest chance to assess the generalizability of our study. Reliability has been handled by developing an ample database that consists of all documentation, interview audio files, transcripts, and various drafts and study protocols.

# 4. Empirics

In the following section, we present the empirical data collected as part of this study. The empirical context of our study is the pilot part of the sales process at two AI business-to-business companies; the focus is on understanding the characteristics and mechanics of promises made between vendor and client, and the role of accounting. The section will begin with an introduction to our two case companies and their sales processes. Secondly, we present a mapping of when and where accounting is used during a pilot. Thirdly, we will present empirical data grouped based on the theoretical framework.

## 4.1. Introduction to case companies and their sales processes

The two case companies of this study are anonymised due to the client-sensitive nature of the empirical material that has been collected. However, they are both a) venture capital funded; b) 1-10 employees; c) business-to-business with enterprise-size customers; d) Stockholm-based; and e) in the "start-up" phase (i.e. early-stage with high-growth ambitions).

The case companies are vendors of research-based software applications of artificial intelligence, and their technologies are at the forefront of their respective domain. The software sold by the companies are deployed both internally at their clients and in an external consumer-facing setting; this is a key determinant in how the technology is embedded into the client organisation. The vendor products are algorithm-based platforms on which unique versions are built with each client. Essentially, client and vendor build a new "product" together based off the vendor platform, which is referred to as a "deployment". Further, the product is populated with client data to enable AI techniques. This co-creation process is a core component of the vendor technology and the sales process.

**FIGURE 3.**
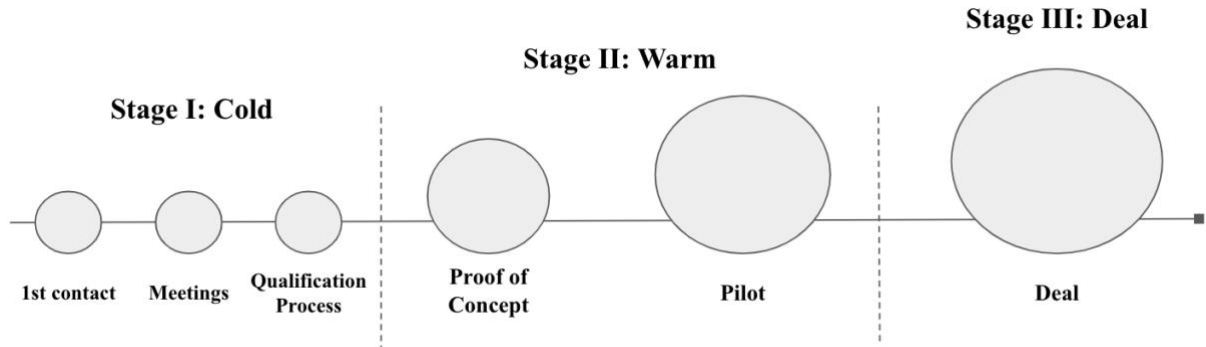
Pre-Stage I is the sourcing of prospective clients, or marketing efforts that create inbound leads. Stage I consists of the initial points of contact, usually performed in-person, via mail, or in virtual settings (e.g. Skype). These meetings, at both case companies, revolve around a few core elements: a) general introduction of people and organisations; b) presentation of vendor product; and c) need analysis of client. The general goal of this stage is to identify a use case for the client, and proceed to the next sales stage based on the expected value creation derived from the identified use case. Both case companies perform a qualification of their prospective clients in Stage I in order to ensure client potential and through that, to efficiently allocate resources. While the length of this stage naturally varies across clients, it generally consists of 3-10 touch points and lasts for a few weeks to a few months. Minimising the sales cycle was mentioned as a strategic priority at both case companies.

Stage II of the sales process consists of a limited deployment of the product. The "proof-of-concept" only lasts for a couple of weeks and usually does not result in a full embedding into the client organisation, but is a rather isolated deployment to demonstrate the use case potential. The pilot, which is the focal point of this study, is a full deployment but with a limited scope. This limitation could mean deployment on only one client product instead of all, or a limit in depth of deployment. Moreover, the evaluative aspects of a pilot could be eased (e.g. demonstration of potential could suffice, rather than requiring full impact). The pilot usually lasts for a 1-3 months, and is a heavily co-creative process with allocated

resources from both sides. Both the proof-of-concept and pilot are charged, but the price was described as negligible to the client given their corporate size.

The pilot is a key determinant of whether a deal is reached and a full contract is signed. As referred to by both case companies, if you fail to demonstrate value creation in a pilot - albeit with limited scope - there is very little reason for the client to proceed with a deal. Moreover, the pilot is a real-case deployment of the AI product in a dynamic setting, making it highly revealing and illustrative of potential organisational impact. Therefore, the pilot was chosen as an optimal focal point of this study.

## 4.2.  Mapping of accounting in the pilot process

The empirical collection has resulted in a mapping of when and where accounting is used during the pilot process, as summarised in Table 3. below; the table is representative for both case companies.

**TABLE 3.**

**ACCOUNTING IN A PILOT DEPLOYMENT**

| | | | |
|---|---|---|---|
| *Resources* | - Resource definition | - Resource management | - Resource management |
| *Performance* | | | - Performance measurement*<br>- Definition of project KPIs<br>- Evaluation |
| *Analytics* | - Need analysis<br>- Proposed business case | - Need analysis | - Evaluative business case |
| *Sales* | - Pricing<br>- Benchmark & case studies<br>- Qualification* | | - Pricing<br>- Deal proposition |
| * = vendor internal | **I. Initiating** | **II. Building** | **III. Testing**          TIME |

Firstly, the use cases of accounting in a pilot: a) defining resource requirements; b) resource management; c) performance measurement; d) definition of project KPIs; e) evaluation of pilot performance; f) need analysis, which refers to the identification of the client organisational needs that then guide the deployment, and is a vendor-internal process but it requires client involvement for data collection; g) proposed business case, which is based on the need analysis and intends to capture project potential; h) evaluative business case, based on pilot evaluation and intends to extrapolate and project future impact; i) pricing; j)

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benchmark numbers from external sources, and internal case studies; and k) deal proposition. Moreover, "accounting" refers to all types of metrics, not just financial.

Secondly, the late-stage definition of project KPIs may appear counter-intuitive, so for support:

> "I actually think we started to quantify, or even think about quantification, when it was time to deploy[1]; that is, two weeks before; that was when we started to map it out" (AI Engineer, CaseCo1)

> "So you can't say that KPIs are x, y and z - you'll say 'whenever we are ready and we have a product that is *only* dependent on our algorithm, then we're going to do A/B testing and we're going to look at the KPIs'." (Director of BD, CaseCo2)

A more in-depth inquiry of the role of accounting, and thereby an explanation of *why* the mapping in Table 3. looks like it does, will follow in section 4.3 and the subsequent analysis in section 5.

## 4.3.    Empirical themes

The mapping of accounting in 4.2 provides an empirical overview of where and how accounting is used, but it does not sufficiently explain the underlying structure; it does not illuminate the *role* of accounting. Therefore, we review the data from interviews based on the theoretical framework to uncover the underlying mechanisms.

### 4.3.1.    Means-selection

As a natural part of the qualification process in Pre-Stage 1 of the sales cycle, vendors perform an initial screening of clients and potential use cases:

> "Preferably, we want to have an idea of their current situation even before the start of the pilot. What hopes are there to use the platform? What are the possible applications?

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[1] "Deploy" refers to Stage III. Testing

Because often there are not just one but many deployments that you can target." (AI Engineer[2], CaseCo1)

However, in order to create a strong buy-in from clients there was an emphasis on vendor-initiated value creation proposals: "The client doesn't know exactly what value this is creating for them, it is up to us to prove" (Deployment Specialist, CaseCo1). According to the CEO of CaseCo1 "There are 12-15 different values [that we can add] - everything from warranty costs to time to a lot of things". Further, it was explained that "In some way you try to spur an interest, and when that interest has been spurred you slowly start discussing what exact problems you can solve for the client" (Deployment Specialist, CaseCo1). A similar tension was identified at CaseCo2, where the Director of BD said that "You really have to play with numbers and show 'look what happens if you do this'".

Essentially, the initial stage of the pilot process consists of a basic need analysis. When needs, wants and means have been established, you can start looking at appropriate use cases.

"And that you want to do in relation to a business case, so for some of our clients where $x^3$ is important we conduct a product inventory to see how we can integrate in order to improve x. For others maybe it is y - then we can execute in other ways. So in the first meeting we try to understand what their KPIs are, and in the second meeting we start digging in their products to find ways to improve those KPIs with our technologies." (CEO, CaseCo2)

As such, different target KPIs generate alternative deployments.

"Over time we start to see that 'these' metrics are the ones where we can make a difference, and then it becomes a bit more predictable. But I still think that if you keep it abstract you can later kick in the doors where there seems to be the most value." (CEO, CaseCo2)

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[2] The AI Engineer held a combined technical and business-related role in the context of our empirical collection

[3] Variables x and y in this excerpt have replaced the real metrics due to their company-revealing nature

### 4.3.2. Generalised goals

As hypothesised in the theoretical framework, generalised goals were a function of promises made in the sales process. This had empirical support, as the co-creative and ambiguous process of a pilot transformed decisions into promises. As noted by the CEO of CaseCo1, their product and use cases were indeed described as "complex". In terms of characteristics and mechanics of promises, four main sub-themes emerged across the board.

*Promises are informal*

Promises on performance were non-contractual, often implicit, verbally communicated, informal, and communicated between business people with a clear business focus (as opposed to technical). In terms of setting, promises were "not specified in the contract" nor even in "written form" but largely "brought up in meetings" (AI Engineer, CaseCo1). The companies tried to "stay away from [specifically defining KPIs]" (Director of BD, CaseCo2), and they were "rarely on-the-hook" for their promises, given the acknowledged complex setting (CEO, CaseCo1).

However, as noted by both case companies, there was a more formal demand on the client in terms of providing the necessary resources to enable the co-creation process. This was specified both in an initial joint workshop with the client which both case companies hold as standard procedure, as well as being "quite literally a promise in the contract" (CEO, CaseCo1) for CaseCo1. These demands, or promises made by the client, most often specified the number of human resources needed for building the product.

Interestingly, it was noted that clients sometimes request more formal objectives and plans from the vendors, but this was deemed incompatible with the iterative and unpredictable nature of a deployment. When elaborating on why this was believed to be the case:

> **"**Because they have to justify the investment. It's pretty normal from their side."
> (Director of BD, CaseCo2)

> "It's fine to have milestones, but the problem is when you try to predict the future when it is too hard to predict." (CEO, CaseCo1)

*Promises are abstract*

The most recurrent and distinct comment by all interviewed subjects was that promises during the pilot were highly abstract and never quantified in the early stage. The level of abstraction was described as a consequence of opportunist tactics and deployment complexity.

"The [promises] are not so explicit." (Director of BD, CaseCo2)

"Yes, exactly, through keeping it abstract. You know that some metric will move, so the less defined it is, the better." (CEO, CaseCo2)

"You don't want to shoot yourself in the foot and set targets that are not the targets that create value in the end." (AI Engineer, CaseCo1)

"As a company we have an identity, so we tell [the clients] that 'we reduce time and save money'; you have these very fundamental general promises that you give." (Deployment Specialist, CaseCo1)

*Promises are based on need analysis*

The promises were a function of the need analysis; a process which was stressed as crucial for project success and an underpin of the entire pilot strategy. On how to find out the client goals:

"By asking questions and performing need analysis. The answer is no, people don't always have that clear. But sometimes you talk with them and they say 'my division at x is the only one to show red numbers in the whole company, and now I have a knife to my throat in that I have to reduce costs - I will lose my job if I don't reduce costs this year', then he has a target to reduce costs." (CEO, CaseCo1)

"So you always have to get up to the executive level and align with their strategic priorities to win. So we had a [client] where their OKR for Q2 was to "improve

retention"; then you have to align with that and the more you can align, the more you can charge." (CEO, CaseCo2)

"There is a phase called 'tailoring of the algorithms' for these Enterprise clients, and there we put in the objective function of the mathematics to increase their KPIs." (Director of BD, CaseCo2)

In some cases, the strategic alignment was even algorithmically deployed:

*Promises get specified over time*

Promises, and thereby the goals, were linked to the evaluative framework by the end of the pilot; the closer you got to performance evaluation, the more goals had to be specified and translated into KPIs.

"Exactly, in this case these were things that many had in the back of their heads but which we didn't sit down and specify until we were close to the testing." (AI Engineer, CaseCo1)

"If it's not required to [early-stage] fix super hard constraints on our performance, then just postpone it until we know more…" (Director of BD, CaseCo2)

### 4.3.3.   Co-creative communication

In highly innovative settings, where the end product is clouded in uncertainty, accounting has been said to mediate between disparate resources. As described in our theoretical framework, this is an iterative environment where the process of creation is shared by vendor and client.

"I think that both sides have experienced difficulties building an exact mental picture of how this project will look like and work out. So in order to get the process going it has been easier to just agree on trying to create value. We don't know exactly what it will

look like but we have some kind of shared understanding, and then you have taken it from there." (Head of Deployments, CaseCo1)

"As we are a young company with a young software, you have to be iterative - there is no straight path to follow to a good model. It's iterative." (Head of Deployments, CaseCo1)

In the context of the pilot, this level of abstraction has a direct impact on the nature of KPIs:

"Then there is the second analysis which is the pilot; we don't explicitly say a number of the KPIs that we're going to impact because it's usually that you're building a product together." (Director of BD, CaseCo2)

But as noted above, clients typically follow a different decision-making logic. They have the need to justify investments, be it qualitatively or quantitatively, which directly affects the role of accounting in the pilot process.

"Oftentimes people see an abstract value in our platform, like for example that we can maintain and represent information, but to actually convert knowledge management into a business value is pretty hard and then you want the pilot to focus on something where you can concretely point at 'here there is a value.'" (AI Engineer, CaseCo1)

The same logic was accentuated by this AI Engineer when asked how KPIs were tested and used over time, supported below:

"If you're in a grey area where there are hopes but you're not sure [of performance], then you really want KPIs that can point out that it is good." (AI Engineer, CaseCo1)

"And then you can look at specific numbers and show that right now it isn't working perfectly, but if I just do some fixes, integrate it a little better or develop the model, you will be able to do all of the things that you tried to accomplish, e.g. increase savings or improve customer experience." (AI Engineer, CaseCo1)

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### 4.3.4. Evaluative framework

Accounting played a natural role in the evaluation of decisions in a pilot; both indirectly in how the deployment was steered through goal-setting, and directly in the final evaluation. While initially very abstract, "during the process the demands become more concrete" (AI Engineer, CaseCo1).

Both companies have a final evaluation towards the end of the deployment process. Generally, a theme which underscored the role of accounting in the evaluative sense was the temporal transition from abstract into more concrete as a result of iterative learning of client needs. Case in point, as referred to earlier, was the "tailoring of algorithms" to fit customer KPIs (Director of BD, CaseCo2). Other examples below:

> "First of all [objectives] are communicated from start, at first contact. Then they become more and more formal the longer into the process you go." (Deployment Specialist, CaseCo1)

> "But, of course, in a bigger organisation you will pitch to some sort of management to show that this project worked, and then it's important that you have KPIs that you can measure and explain easily, so the more senior people understand the importance of this." (Deployment Specialist, CaseCo1)

Moreover, both companies wanted to control evaluative KPIs so as to optimise for success:

> "And then we can help clients set the right KPIs or goals, so that when we understand their situation and where they see value we can select the ones appropriate for the situation." (AI Engineer, CaseCo1)

In summary, the role of accounting in the pilot deployments according to the empirical collection was multitude, but predominantly characterised by a) the creation of focus and direction for the deployment through alternatives-generation and goal-stating; b) acting as a link between iterative processes of need analysis and goal-setting, and co-creative

participants; and c) the temporal transition from initially highly abstract and informal to the later more concrete and formal. Promises shared very similar characteristics, most notably the transition from initially abstract to more finally concrete; which in link to accounting meant a transition from generalised qualitative goals into evaluative accounting-based metrics.

# 5.  Analysis

On the backdrop of reviewing the empirical data through the theoretical framework lens, we now intend to relate our findings to the domain of accounting, decision-making, and innovation. Our analysis will be structured based on the domain theory which it aims to contribute to, and finish with a condensed and synthesised answer to our two research questions.

## 5.1.  Accounting and decision-making

The key empirical theme on accounting and decision-making was the temporal transition from initially abstract and informal evaluative constraints to more formal and concrete targets by the end of the pilot. Intricately linked to the goal-setting, decisions were in the beginning based on general aspirations, like "improve customer experience", rather than specific target metrics. In what was consistently described as an iterative learning process, the co-creative building narrowed the target scope for each iteration. This was very much based on the decisions to continuously monitor the potential of the specific deployment, and to continuously discover what was needed for this specific client. Illustratively noted by the AI Engineer at CaseCo1: "And then we can help clients set the right KPIs or goals, so that when we understand their situation and where they see value we can select the ones appropriate for the situation". This indicates the transition from abstract to concrete as a function of an iterative learning process - confirming the well-established notion that accounting is a machine of learning in ambiguous contexts (Burchell et al., 1980) - but also one controlled by the vendor. This is further supported by the mapping of accounting, where performance measurement was a vendor-internal process; this corroborates this element of control over performance indicator selection.

Borrowing from the intra-organisational domain, the process of evaluative metrics becoming more defined over time is isomorphic to that of "hardening" (Rowe et al., 2012). Moreover, the hardening of evaluative elements appeared to be linked to the "evaluative pressures" noted by Jordan and Messner (2012). As the final evaluation of the deployment approached, it was necessary to concretise the generalised goals into KPIs, which was specifically noted by the Deployment Specialist at CaseCo1. However, the hardening process in the intra-organisational setting was described as socio-political evolution where games developed interpersonal agreements on what constituted an "objective and reliable" accounting metric.

Our findings suggest that in the sales context, the hardening process was more a function of need analysis and sales tactics, enabled by the vendor-controlled environment. The vendors initially made generalised promises, then used the pilot to learn about the KPIs of the client, then aligned the deployment with client KPIs, and finally chose specific metrics as a function of where the product performed best. This was the hardening process in our empirical context.

Moreover, in the intra-organisational change process of Jordan and Messner (2012), the interpretative flexibility and thus the acceptance of "incomplete" performance indicators deteriorated over time as control became less enabling and more coercive. Similar to our findings, this shift from a broad view of goals as "visions" to hard targets seems to be a result of evaluative pressures. Additionally, as noted by both case companies, the final evaluation was a time when the senior managers of the client were brought in for decision-making; something suggested to produce a more coercive view of accounting metrics as a function of the need for organisational control by top management (Jordan and Messner, 2012).

Therefore, we have contributed to the literature on accounting and decision-making by tentatively extending the intra-organisational concepts of hardening and evaluative pressures to the inter-organisational context of innovation sales. However, in the inter-organisational context, the hardening of accounting metrics appeared to be a result of learning and tactics, rather than emerging interpersonal agreements. In the vendor-client dynamic, this seems logically plausible; there is higher information asymmetry between firms which requires learning, and differences in strategic objectives require a more tactical and self-serving approach to accounting.

## 5.2. Accounting and innovation

In the inter-organisational context of new product development, prior research has shown that accounting operated as a 'mediating instrument' - mobilising and coordinating resources between network actors through a common framework (Carlsson-Wall and Kraus, 2014). Here, we make a contribution by extending the concept of mediation to the process of innovation sales. This process was characterized by every interviewee as iterative, with a strong focus on creating shared value. Accounting was used here as a way of generating means (i.e. possible deployment versions), through need analysis. However, as the end-product is a result of this highly ambiguous and iterative process, there exists a need to focus ongoing attention on something that represents value in order to mobilise the co-creative effort. Strategically aligning client objectives with process KPIs, through need-analysis and

goal-setting, was described as imperative for the pilot project to be successful. In contrast to the network perspective, the more direct inter-organisational setting requires an act of persuasion from the vendor in order to sign a client. This was emphasized in our empirical findings, where the AI Engineer at CaseCo1 explained that an important role of KPIs was to redirect client-focus to the positive potential of vendor-solutions when performance was off. In effect, accounting mobilised further commitment of time and resources with a clear focus on strategic alignment.

However, in contrast to the network context of earlier studies on mediation (e.g. Miller and O'Leary, 2007; Carlsson-Wall and Kraus, 2014) where the purpose of mediation (e.g. through roadmaps) was to coordinate multiple actors in the collective production of the resources necessary for large-scale innovation (e.g. semiconductors), our findings suggest a more direct and tactical role of mediation between the client objectives and innovation deployment in the context of innovation sales.

As such, we contribute to the extant literature in three ways: a) our findings confirm the presence of mediation in innovation sales; b) empirical data shows that the effect of mediation is similar to previously proposed - mobilisation of resources between multiple actors; and c) our findings contextualise the purposive role of mediation, showing that in innovation sales, it is a more direct and tactical instrument of control.

## 5.3. Accounting, decision-making, and innovation

A focal point of our study has been the role of accounting in facilitating promises. In the highly ambiguous settings of innovation, decision-making logics do indeed shift from the linear to the iterative, as mentioned multiple times in the empirical material. Decisions then become promises, in the words of Mouritsen and Kreiner (2016). We are here answering a call for further research on the link between accounting and promises (Carlsson-Wall et al., 2018) and the gap in understanding of what, how, when, where, and by who promises are made. Therefore, we first contribute with a description of the characteristics and mechanics of promises, and secondly discuss the underlying role of accounting in promises.

Promises on performance by vendors were repeatedly described as "abstract", "vague", and "implicit"; they were akin to generalised goals rather than specified commitments. To exemplify, the promise from the vendor was to "improve customer experience", "save time", or even "deploy AI", rather than promising a specific metric of value improvement. These

promises were part of the sales decks but not of any contract; they were most often made linked to business-related goals rather than technical, although sometimes the AI feature itself was the goal, and consistently made by people in business capacities, ideally at top management levels. They were described as implicit and verbally communicated in meetings. The effect of such vague promises was the ability to tactically deploy AI in client-customised versions, which also is a key feature of the vendor products. On the contrary, promises on resources and investments were much more formalised and concretised.

Promises were concretised over time as a function of an iterative need analysis and learning process. This links promises to the evaluative aspect of the deployment, as discussed earlier. What initially began as a generalised goal (i.e. promise) iteratively narrowed down to more specific goals, then specific KPIs. What was distinctly emphasised, especially by both Founders/CEOs, was the role of the need analysis in creating promises. A generalised promise was stated based on preliminary need analysis, the pilot process was started, and a continued discovery of client needs and objectives concretised the promise over time. Here, our findings suggest a *tripartite* link between accounting, mediation, and promises. Accounting was the instrument mediating the need analysis and the promise; or as stated earlier, the instrument mediating between the client objectives and the innovation deployment. Accounting enabled the innovation through the facilitation of promises, echoing the proposition by Mouritsen and Kreiner (2016).

We therefore contribute by describing the characteristics and mechanics of promises, as well as suggesting the role of mediation in the creation and development of promises.

## 5.4.   A brief note on effectuation

Finally, we would like to note the appropriateness of effectuation as a method theory in this context. Many of the core elements, such as selecting ends from means, iterative processes, control, and affordable loss, were seen in the work processes of our case companies. Our findings suggest that in the context of AI deployment in sales, the iterative learning process of artefact creation is of distinct importance.

While acknowledging our limited mandate on commenting further on effectuation given the scope of this paper, we want to highlight the potential conflict in decision-making logics between entrepreneurial vendors and enterprise clients as suggested by the empirical data. While the vendors worked in effectuation processes, it was indicated that their clients worked

more causation-based. Examples include the occasional requirements of pre-set KPIs and generally more formal plans. This clash would be well-suited for future research on innovation sales.

## 5.5. Making smart promises: the role of accounting in artificial intelligence sales

The research questions of this study reads:

1. *What is the role of accounting in business-to-business sales of artificial intelligence technologies?*
2. *What are the characteristics and mechanics of promises in innovation sales?*

As a synthesised answer to the research questions, the following argument is proposed: the finalised innovation project (i.e. a finalised pilot deployment) was a result of alignment between client objectives and potential ways of deploying the innovation. In turn, as a part of the sales process, the pilot was a result of abstract promises made by the vendor. These initial promises were based on preliminary need analysis, and accounting was the mediating instrument in this need analysis; it expressed the client objectives in metric terms which based the promise. This process of alignment between client objectives and deployment continued iteratively, as the initial promises hardened into concrete KPIs. Ultimately, our findings then suggests that the role of accounting in the context of business-to-business artificial intelligence sales is to mediate between client objectives and the deployment of the innovation, as a result of iterative learning processes and sales tactics. Inserting this into current accounting and innovation discourse, we propose that the role of accounting is to enable innovation (Carlsson-Wall et al., 2018).

# 6.    Conclusion

In our view, accounting and artificial intelligence share a similar trait; both have undergone an epistemological journey over the past decades which is characterised by the transition from technical structuralism and rational decision-making, to a more dynamic and flexible interpretation of how the world functions. In AI, this shift is recent; in accounting, it arguably started with Burchell and his colleagues in 1980. Today, accounting is performative and dynamic. This is the empirical context of this study: the role of accounting in the ambiguous and dynamic world of innovation. Tentatively, we have made several contributions to this domain, which will be summarised below. Lastly, we will suggest avenues for future research.

As explored in our analysis, we have made several contributions to the domain of accounting, decision-making, and innovation. Firstly, and most significantly, our findings suggested that the role of accounting in the context of business-to-business artificial intelligence sales is to mediate between client objectives and the innovation project in an iterative learning process of client need analysis performed by the vendor. Moreover, accounting was a mediating instrument between the client objectives and the promises made by the vendor in the sales process; the goals of the innovation project were then based on these promises. Our research then suggests that the role of accounting is to enable innovation. Through this, we contribute to the literature on the role of accounting in the empirical context of innovation sales through showing its enabling role, and to the literature on accounting as a "mediating instrument".

Secondly, we have further contributed to the literature on promises by illustrating their characteristics and mechanics. In the sales context, promises were initially highly abstract and informal, but were concretised over time as a function of an iterative learning process, and of vendor opportunist tactics. Thirdly, we have further illuminated the use of accounting in the sales process of AI technologies through a mapping. Fourthly, we have extended and contextualised the intra-organisational concepts of "hardening" and "evaluative pressures" to the inter-organisational domain, and critically discussed their role as a consequence of iterative learning processes and tactics in this specific context. Finally, we contribute to the literature on effectuation by showing its usage in the AI sales context, especially with regards to the iterative learning process of artefact creation.

Finally, we would like to suggest avenues for future research. The most notable is to capture the innovation sales context from both the vendor *and* client side; we believe this would add richness to the insights on the role of accounting. How do the clients measure and evaluate performance? Another avenue would be to replicate this study across a larger sample, which should increase the external validity of any findings. Moreover, any of our findings could themselves be points of departure in future research. Most poignantly, a detailed study of need analysis and iterative learning processes would deepen the understanding of accounting in its mediating role. Additionally, in line with the first avenue, we suggest research on conflicts in decision-making logics between entrepreneurial vendors and enterprise clients; a characteristic of particular interest for the role of accounting in decision-making and innovation.

# 7.    References

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