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An axiomatic model towards understanding value creation and appropriation in demand-driven markets

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Abstract

Purpose In demand-driven markets, customer value, sometimes called perceived use value or consumer surplus, is defined by the customer rather than the firm. The value a firm can appropriate, its profits, is driven by the customer's willingness to pay for the value they receive, adjusted by costs. This paper introduces a conceptual framework that helps understand value creation and appropriation in demand-driven markets and shows how to influence them through strategic decision-making.

Design/methodology/approach This paper uses an axiomatic approach combined with an extended analytical formulation of the jobs-to-be-done framework to contextualise demand-driven markets. It mathematically derives implications for managerial decision-making concerning selecting customer segments, optimising customer value creation, and maximising firm value appropriation in a competitive environment.

Findings Rooting strategic decision-making in the jobs-to-be-done framework allows distinguishing between what customers want to achieve (goal), what product attributes need to be satisfied (opportunity space/constraints), and what value creation criteria related to features are important (utility function). This paper shows that starting from a jobs-to-be-done, the problem of identifying which customer segments to serve, what product to offer, and what price to charge, can be formulated as an optimisation problem that simultaneously (rather than sequentially) solves for the three decision variables, customer segments, product features, and price, by maximising the value that a firm can appropriate subject to maximising customer value creation and constrained by the competitive environment.

Originality This paper shows that starting from a job-to-be-done and simultaneously focusing on customers, product features, price, and competitors enhances firm profitability. Strategic decision-making is formulated as an optimisation problem based on an axiomatic approach contextualising demand-driven markets.

Practical implications Applying the derived results to simultaneously deciding which customer segments to target, what product features to offer, and what price to charge, given a set of competing products, allows managers to increase their chances of winning the competitive game.

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1. Introduction

Diverse industries have started shifting from being supply-driven to being demand-driven to support growth and economic prosperity, amongst others, due to the emergence of the internet, advanced information sharing, and growing customer knowledge (e.g., Witt (2001); Krysiak and Weigt (2015); Creutzig et al. (2016); Oskam and Boswijk (2016); Relano and Paulet (2016)). Demand, defined as what need customers want to satisfy or what problem they want to solve, rather than supply, determines the success of products[1]. The role of the customers and their decision-making processes gain relevance. Firms face growing challenges aligning their value propositions with how customers define value and delineate their willingness to pay. They can no longer solely rely on resource-based strategy theory. This leads to firms having to rethink and adjust their strategies.

Demand-driven strategy research has gained little traction despite the critical role that customers and their needs play in a firm's success. Strategy management literature has focused on supply-side reasoning, notably through multiple distinct and widespread schools (see Mintzberg et al. (2009) for an overview), studying strategy from the firm's or the market's perspective rather than the individual customer. For example, in a resource-based strategy, a firm first identifies resources it considers valuable, rare, imperfectly imitable, and lacking substitutability to derive what products to offer. Customers then decide whether to buy the products depending on whether they believe their needs are satisfied. As such, customers and their purchasing decisions are a consequence of strategic reasoning (what resources to exploit) rather than the driving force (what needs to satisfy). Some scholars explain this by arguing that strategy, first and foremost, aims at elucidating a firm's profitability and the value it can appropriate (Makadok and Coff, 2002; Amit and Zott, 2020), ahead of creating customer value.

More recently, researchers have focused on the concept of business model as the core strategic building block that connects customer needs with products and firm resources (Demil and Lecocq, 2010; Zott et al., 2011; Amit and Zott, 2020). *Value creation* for customers and *value appropriation* by firms have become dominant forces (Priem, 2007; Priem et al., 2018). The willingness to pay by the customer for the value created for them has been identified as a precondition for the appropriation of value by the firm, that is, profitability. In parallel, research on innovation and entrepreneurship has started addressing strategy through the lens of the customer (Christensen et al., 2005; Ulwick, 2005; Christensen et al., 2016a,b).

In this paper, I propose an axiomatic approach to contextualise demand-driven markets and combine it with an analytical extension of the jobs-to-be-done framework to offer solutions to the *strategy problem* defined as which customer segments to target, what products to offer that relate to customer needs at what price, and how to create value for customers as well as appropriate value by the firm through distinct value propositions. The axioms and the jobs-to-be-done framework provide a context for reasoning. In that context, I derive conceptual insights into solving the strategy problem. In contrast with the resource-based view, the term *value* is

[1] I use the terms *product* to refer to products as well as services.

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defined by the customer rather than the firm. First and foremost, focusing on customer needs allows for identifying critical value pockets missed by firm-centric, resource-based, or purely competition-driven approaches by broadening the opportunity space.

1.1 Research Question

This paper contributes to understanding *value creation* and *value appropriation* in demand-driven markets. The formal research question addressed is: *How should a firm define its strategy in a demand-driven market to maximise the value it can appropriate from distinct customer segments by simultaneously supporting value creation for customers and differentiating from competitors?* Answering this question means solving the *strategy problem* of identifying what customer segments to serve and what products to offer at what price to maximise the firm's profitability. Understanding possible answers to the research question allows firms to develop products that are aligned with how customers define value for themselves and decide to buy their products. Firms can avoid bringing to the market products that fail to deliver outcomes sought after by the targeted customers. This paper stresses the strategic benefit of aligning value appropriation by firms with value creation for customers.

The aim of this paper is not to build an econometric model of customer demand and fit it with historical data but to offer a descriptive framework that supports sound and forward-looking strategic decision-making.

2. Background

The results in this paper relate to multiple loosely coupled conceptual and analytical streams in strategy research, of which the three most relevant ones relied upon are customers, their preferences and definitions of value (customers), products offered (jobs-to-be-done), and resources and capabilities (resource-based-view). The reliance on research streams that do not build upon each other is by design, leveraging insights from distinct areas in strategy research. What differentiates this paper from other contributions that address the strategy problem is that it looks at strategic decision-making through the lens of the customer rather than from a firm perspective.

Customer Adner and Snow (2010) showed in the context of new technology threats that when customers are heterogeneous (have distinct decision criteria), the best strategic decision may be to specialise and focus on smaller customer segments rather than compete for larger ones. Their findings can be interpreted as a particular case of the results in this paper allocating customer segments amongst competitors. Ye and Mukhopadhyay (2013) looked at the role of demand-driven strategic decision-making when a firm engages in duopolistic competition, focusing on quality and price. Their result relates to the findings of this paper when the customer purchasing decision criteria depend on a single quality factor in addition to price. Similarly, Li and Lee (1994) studied the impact of delivery speed as a decision criterion modelled by using queuing theory to determine a competitive equilibrium amongst market participants. While similar at first to the model presented in this paper, they assume that dynamically created customer value adjusts through supply rather than being determined upfront, thus not operating in a demand-driven market. Sohl et al. (2020) analysed strategic decision-making in demand-driven markets through the lens of business models (their reasoning context). They empirically showed that

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firms can increase profitability by exploiting demand heterogeneity (which I model through customers exhibiting different decision criteria for addressing the same job-to-be-done). While not explicitly taking a customer perspective, Enders et al. (2009) designed a value-process framework modelling value creation and capturing. Their approach looks similar to the one described in this paper. However, they only consider a single customer rather than multiple customer segments. They relate value creation to the firm's value chain rather than to product attributes and features, as this paper does. In addition, to them, customer value entirely depends on the customer's subjective perception, while I show that in demand-driven markets, customer value can be related to mandatory attributes and decision criteria that define the problem a customer seeks to solve.

Jobs-to-be-done Christensen (1997) and Christensen et al. (2016a,b) introduced the concept of jobs-to-be-done as the progress a person is trying to make in a particular circumstance. Similar reasoning has led Ulwick (2005) to define a job-to-be-done as an activity to achieve a goal. In this paper, I build upon these ideas and introduce an analytical extension of the jobs-to-be-done framework. Previous research has defined a job as a single concept. I distinguish between the mandatory attributes needed to address the job at hand and optional attributes that impact which product a customer prefers. Based on Christensen et al.'s research, Oestreicher (2011) showed that customer segments should be aligned with jobs customers need to get done rather than rely on market segmentation theory. I formalise these ideas by introducing the concept of customer segment-specific demand. While the formalisations do not present novel ideas per se, they allow for concise reasoning about a firm's strategic decision-making and apply insights from operational research theory.

Resource-based view A large stream of strategy research considers resource allocation at the core of strategic decision-making (Barney, 1991). Adner and Zemsky (2006) approached the question of competing in demand-driven markets by looking for drivers that lead to sustainable competitive advantage. In contrast with the contribution of this paper, they identified key drivers in heterogeneous firm resources (supply), notably in technology, rather than in the customer decision factors (demand), and related them to the customers' marginal utility. Similarly, Priem (2007) and Priem et al. (2018) showed how value creation for customers benefits firm profitability and complements the resource-based view. In this paper, I show that in demand-driven markets, a firm's resources only play a second-order effect (through the firm's cost structure) on strategic decision-making: what customers to serve and what products to offer. They are unrelated to how customers define their demand and decide.

3. An Analytical Jobs-To-Be-Done Framework

I introduce an extended analytical formalisation of the *jobs-to-be-done framework* for reasoning about strategic decision-making in demand-driven markets. A demand-driven market is a market in which output is determined by effective customer demand rather than firm supply. Firm profitability is based on a superior understanding of customer demand and the ability to satisfy it in a distinctly valued way.

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3.1 Jobs-To-Be-Done

Customer purchasing decisions are based on customers' needs, their faced problems, their felt pains, or their sought-after gains rather than the resources and capabilities of the firms. The needs result from what customers want to achieve, their *jobs-to-be-done* (definition 1). For example, a customer wants to eat a sandwich (the need) to satisfy their hunger (the job-to-be-done). When customers buy a product, they actually *hire that product* from a firm to help them get a specific job done (Christensen et al., 2006, 2016a).

Definition 1. *A* job-to-be-done *('JTBD') is a description of the* outcome a customer seeks to accomplish. *It is the abstraction of a customer need or problem, a felt pain point, or a sought-after gain.*

I model a JTBD j by the set $\mathcal{J}_j$ formalising what customers seek to accomplish such that

$$\mathcal{J}_j = \langle \mathcal{S}_j, \mathcal{E}_j \rangle ,$$

where $\mathcal{S}_j$ a set of mandatory, that is, make or break, attributes that any product addressing the JTBD j must fulfill (defining the *the solution space*), and $\mathcal{E}_j$ a set of optional attributes potentially of value to customers, called the *decision criteria*. Differentiating between the solution space and decision criteria when defining a JTBD extends the original concept and allows to better relate customer value (see Sec. 4.1) to how a given customer segment (see Sec. 3.2) perceives the JTBD. I use the term decision criteria, rather than product features or customer preferences, to stress that they play a key role in a customer's decision-making process to hire or not hire a product to accomplish their job. Decision criteria define what customers may or may not value in a solution to their JTBD. The multi-dimensional decision criteria expand the one-dimensional quality preference typically relied upon (Choi and Shin, 1992; Ye and Mukhopadhyay, 2013).

Both sets $\mathcal{S}_j$ and $\mathcal{E}_j$ may include functional (focusing either on value or on costs), emotional or symbolic, as well as circumstantial or experiential attributes (Park et al., 1986; Diderich, 2019). They are defined from the customer's rather than the firm's perspective. In contrast with similar frameworks (Smith and Colgate, 2007), the job-to-be-done, not the customer or the product, is the fundamental unit of analysis (Christensen et al., 2006).

The definition of a JTBD does not prescribe how the two sets $\mathcal{S}_j$ and $\mathcal{E}_j$ are identified. Successfully describing a JTBD requires observing customers in their natural environment, using exploratory and qualitative techniques (Verganti, 2009; Liedtka et al., 2014; Diderich, 2019), especially ethnography (Spradley, 1980; Hammersley, 2019). Smart data, rather than big data, leads to successful JTBD definitions.

3.2 Customer Segment Specific Demand

Different customers have different preferences in how they want to get the same job done. Customers play a unique role in defining the constraints (delineating the solution space) and decision criteria for addressing their job and deciding which product to buy based on their definition of value. The solution space forms the basis for satisfying their *demand* (definition 2). Demand is driven by the job customers want to get done rather than the product supporting them to get their job done, which is a small but significant difference[2]. Customers are the jurors over value creation.

[2]Bezos (2013) described this difference by saying, "We don't make money when we sell things [the product]. We make money when we help customers make purchase decisions [the job-to-be-done]."

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Definition 2. *The* customer segment specific demand *('CSSD') resulting from a JTBD describes how a* specific customer segment *wants to address that said job based on their specific preferences.*

I model the CSSD $\mathcal{D}_{j,c}$ associated with a JTBD $\mathcal{J}_j$ such that

$$\mathcal{D}_{j,c} = \left\langle V_{j,c}, v_{j,c}(\mathbf{d}) \right\rangle,$$

where $c \in \mathcal{C}_j$ defines the customer segment, $\mathcal{C}_j$ being the set of all customer segments aiming at addressing the job $\mathcal{J}_j$, $V_{j,c}$ the value created for the customer by merely addressing their job (i.e., satisfying $\mathcal{S}_j$), and $v_{j,c}(\mathbf{d})$ a function defining from the customer's perspective, the value added by each of the decision criteria $\mathbf{d} \in \mathcal{E}_j$.

Each customer segment defines and wholly owns its value creation parameters $V_{j,c}$ and $v_{j,c}(\cdot)$. Although assumed well-defined, the function $v_{j,c}(\cdot)$ is not required to be monotone, positive, differentiable, or continuous. The concept of bounded rationality often found in strategic decision-making can, for example, be expressed by defining $v_{j,c}(\mathbf{d}) = \min\left(v_{j,c}(\mathbf{d}), V_B\right)$, where V_B is the customer's satisfaction value.

3.3 Value Proposition

The connection between a job-to-be-done and a firm's product potentially hired by a customer is defined by the concept of *value proposition* (definition 3) (Porter, 1996).

Definition 3. *A* value proposition *('VP') is a specification of what value a firm's product aims at creating for specific customers by helping them address a specific job-to-be-done.*

The value proposition represents a firm's hypothesis about how customers want to satisfy their jobs and how much they are expected to be willing to pay. It defines the link between the customer's perception of value and the value of a firm's product.

I formalise a firm's product and associated value proposition[3] $\mathcal{V}_{j,o}$ by

$$\mathcal{V}_{j,o} = \left\langle \mathbf{d}_{j,o}, P_{j,o} \right\rangle,$$

where $\mathbf{d}_{j,o} \in [0 \ldots 1]^{|\mathcal{E}_j|}$ is a vector identifying to what degree the product satisfies each of the customer's decision criteria and $P_{j,o}$ its price. For simplicity and without loss of generality, I assume that exactly one product is needed to satisfy a single job. A single product $\mathcal{V}_{j,o}$ may be aimed at more than one customer segment for addressing a single job. Similarly, different firms may offer distinct VPs to address the same JTBD.

Although irrelevant from a customer perspective, I denote by $K_{j,o}(\mathbf{d}_{j,o})$ the cost incurred by the firm to deliver the value proposition $\mathcal{V}_{j,o}$.

Fig. 1 illustrates the three concepts JTBD, CSSD, and VP, and their respective relationship to value creation for customers and value appropriation by firms.

4. Understanding the Concept of Value

4.1 Customer Value Creation

Although the exact form of the customer value creation function is an open empirical question, I consider that the value created (determined by the customer) and the price paid (determined

[3] I use the terms product and value proposition interchangeably when obvious from the context.

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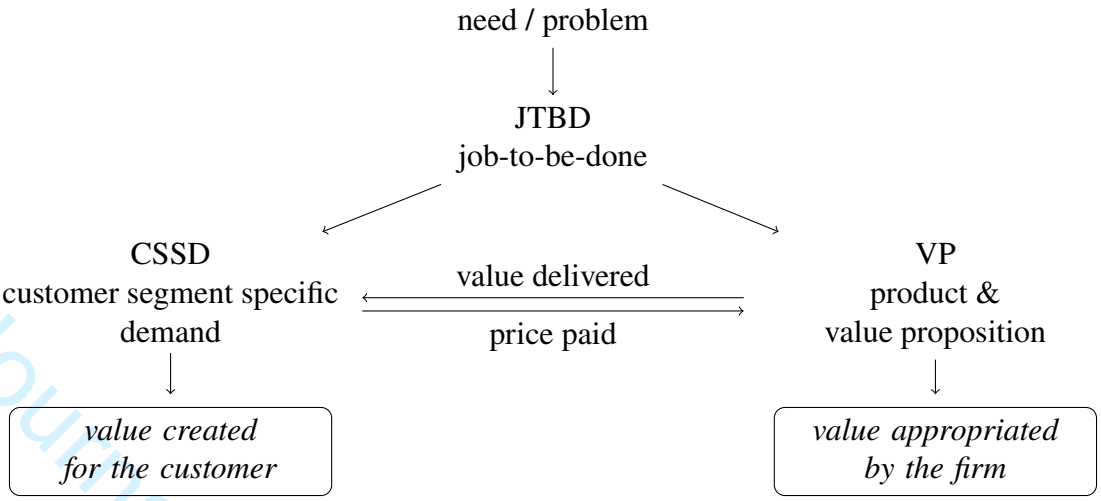

Source: Author's own creation

Figure 1. Relationship between customer needs/problems, jobs-to-be-done (JTBD), customer segments (CSSD), resulting demand, products and value proposition (VP), and how value is created for customers and appropriated by firms

by the firm) are linearly separable. The value created can be decomposed, consistent with the definition of a CSSD, into value related to decision-neutral attributes and value attributed to decision criteria.

Definition 4. *The* value created *for each customer in the customer segment c hiring the product $\mathcal{V}_{j,o}$ to address the CSSD $\mathcal{D}_{j,c}$ is defined by*

$$V^{C}_{j,c}(o) = V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) - P_{j,o}.$$

Definition 4 generalises previously proposed value creation models (Hagerty, 1978; Levin and Johnson, 1984; Priem, 2007). It furthermore does not impose any structural requirements on the function $v_{j,c}(\cdot)$. It aligns with the definition of customer value from Woodruff (1997, p. 141): "Customer value is the perceived preference for and evaluation of those product attributes, attribute performances, and consequences from use that facilitate achieving the customer's goals and purpose in use situations." In an empirical study on electric utility firms, DeSarbo et al. (2001) defined $v_{j,c}(\cdot)$ as a linear function of perceived quality $\mathbf{d}$ based on eight quality criteria (i.e., reliability, preventative maintenance, repair service, account representation, technical support, customer servicing, record keeping, and billing).

The *willingness to pay* for a given product is the highest price that a customer accepts to pay to hire the product. The concepts of willingness to pay and value created from addressing a JTBD are similar to the traditional budget constraint concept, except that the focus is on whether the customer believes it is worthwhile addressing a given job rather than whether the customer has sufficient income to spend on addressing it.

4.2 Firm Value Appropriation

The value appropriated (profits) is defined from the perspective of the firm delivering the product that gets hired in a similar way.

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Definition 5. *The* value appropriated *by a firm from a given product $\mathcal{V}_{j,o}$ provided to multiple customer segments $\mathcal{C}_{j,o}$ is defined as*

$$V_j^F(o) = \sum_{c \in \mathcal{C}_{j,o}} |c| \cdot V_j^A(o)$$

where $V_j^A(o) = P_{j,o} - K_{j,o}(\mathbf{d}_{j,o})$.

The value a firm can appropriate depends on three parameters, that is, 1) the customer segments targeted and their size, 2) the price charged for the product bought by the targeted customer segments, and 3) the cost to produce the product.

5. An Axiomatic Model of Demand-Driven Markets

Answering the research questions requires a formal understanding of demand-driven markets in addition to the concepts of job-to-be-done (definition 1), value creation (definition 4), and value appropriation (definition 5). I introduce four axioms[4] to contextualise *demand-driven markets*. They define the relationship between customers, their demand, and firms addressing the demand with their products. An axiomatic approach allows to simply and concisely delineate demand-driven markets from supply-side ones.

Axiom 1. *Customers and firms systematically relate their utility to value. Customers focus on* maximising the value created *for them when hiring a product to address their job to be done. Similarly, firms focus on* maximising the value they can appropriate *from all customers that hire their product.*

Axiom 2. *Customers define their demand, including their perception of value, ahead of any product being made available to them, that is, in a myopic way.*

Axiom 3. *If a product meets the criteria for being hired, then the customer hires/buys the product, and the firm sells the product. No dynamic bargaining occurs.*

Axiom 4. *Any decisions taken by either the customer or the firm depend only on the publicly known definition of $\mathcal{J}_j$, $\mathcal{D}_{j,c}$, and $\mathcal{V}_{j,o}$, as well as costs.*

Axiom 1 objectivises human decision-making and ensures that decisions are solely based on the concept of value. It is the most debatable axiom, as decisions sometimes include emotional biases (Simon, 1991; Kahneman, 2003; Virlics, 2013). While the context it defines may not always apply, alternatives that are sufficiently recognised and analytically defined are hard to identify. Postulating customers and firms focus on value maximisation is a fair choice common in strategy research.

Axiom 2 states that, from a game-theoretic perspective, customers play the first move (defining $\mathcal{D}_{j,c}$), followed by moves from competing firms (defining $\mathcal{V}_{j,o}$ respectively). This is consistent with demand-driven markets, starting with the demand, that is, the job-to-be-done,

[4] An axiom, sometimes called postulate, is an unprovable rule or first principle accepted as true and used as context for reasoning and inference. Consider a proposition P that cannot be shown to be true without context. Postulating axiom A and proving by inference $A \Rightarrow P$ shows that proposition P holds in the context of axiom A.

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before turning to how the supply side, that is, the firms, address it. Customers do not revise their value preferences after having assessed available products. As such, supply (products available and price) does not affect how customers define their demand.

Axiom 3 states that customers base their hiring decision solely on the value a product creates for them. Similarly, firms solely focus on appropriating value from their products. Allowing customers not to hire a product, even if it meets the criteria of getting hired, is inconsistent with the concept of demand-driven markets and could lead to significantly different outcomes.

To make modelling tractable, parameters underlying the job-to-be-done, customer demand, and products are assumed to be well-defined (axiom 4).

6. Maximising Value Appropriation by Creating Value in a Distinct Way

I answer the research question of how to maximise firm value appropriation by supporting customer value creation for specific customer segments from three complementary perspectives:

1. Competing on price when customers do not exhibit any preferences (section 6.1).
2. Focusing on getting hired by meeting decision criteria in a differentiating way (section 6.2).
3. Winning the dynamic competitive game (section 6.3).

Before studying the conditions to be met for a firm to get hired, let me formalise the terminology of *feasible product* and *hired product* for a given CSSD $\mathcal{D}_{j,c}$.

Definition 6. *A product $\mathcal{V}_{j,o}$ is called* feasible *for a given CSSD $\mathcal{D}_{j,c}$, if and only if $V^C_{j,c}(o) \geq 0$ and $V^A_j(o) \geq 0$, that is, the product creates value for the customer and allows the firm to appropriate value (based on axioms 1, 2, and 4).*

Definition 7. *A product $\mathcal{V}_{j,o}$ is called* hired *by a customer for a given CSSD $\mathcal{D}_{j,c}$, if and only if $\mathcal{V}_{j,o}$ is a feasible product and $\forall o' \in \mathcal{O}_j : \mathcal{V}_{j,o'}$ is feasible with respect to $\mathcal{D}_{j,c} \Rightarrow V^C_{j,c}(o) \geq V^C_{j,c}(o')$, that is, the product maximises the value created for the customer, where $\mathcal{O}_j$ is the set of all products available targeting the JTBD $\mathcal{J}_j$ (based on feasibility and axiom 3).*

A firm deciding on how to solve the strategy problem has to address two competing goals while meeting the criteria for getting hired:

- Maximise the *value it can appropriate* from each product getting hired (sold).
- Maximise the *number of customers* that hire (buy) the product.

Lemma 1. *The price $P_{j,o}$ of a hired product $\mathcal{V}_{j,o}$ addressing the CSSD $\mathcal{D}_{j,c}$ satisfies*

$$K_{j,o}(\mathbf{d}_{j,o}) \leq P_{j,o} \leq \min_{o' \in \mathcal{O}_j} \left(P_{j,o'} - \left(v_{j,c}(\mathbf{d}_{j,o'}) - v_{j,c}(\mathbf{d}_{j,o}) \right) \right), \tag{1}$$

where $\mathcal{O}_j$ is the set of all products targeting $\mathcal{J}_j$.

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Proof. If the product o is feasible, then $V_j^A(o) \geq 0 \Leftrightarrow K_{j,o}(\mathbf{d}_{j,o}) \leq P_{j,o}$, proving the lower bound. The upper bound of equation (1) is derived by

$$
\begin{aligned}
& o \text{ is a hired product addressing the CSSD } \mathcal{D}_{j,c} \\
\Rightarrow \quad & \forall o' \in \mathcal{O}_j : V_{j,c}^C(o') \leq V_{j,c}^C(o) \\
\Rightarrow \quad & \forall o' \in \mathcal{O}_j : V_{j,c} + v_{j,c}(\mathbf{d}_{j,o'}) - P_{j,o'} \leq V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) - P_{j,o} \\
\Rightarrow \quad & P_{j,o} \leq \min_{o' \in \mathcal{O}_j} \left(P_{j,o'} - \left(v_{j,c}(\mathbf{d}_{j,o'}) - v_{j,c}(\mathbf{d}_{j,o}) \right) \right)
\end{aligned}
$$

□

Therefore, the price of any product to get hired must be no larger than the lowest price of any competing product, adjusted for the difference in optional value created. Customers are willing to pay a premium if they perceive receiving additional value. The better a firm understands its customers' perception of value, the higher the price it can charge and the value it can appropriate. If there exists only one feasible product in the market, then axiom 3 implies that the customer will hire that product anyway and pay any price satisfying equation (1). The firm can charge up to $P_{j,o} = V_{j,c} + v_{j,c}(\mathbf{d}_{j,o})$ for the product o sold to a single customer segment c or $P_{j,o} = \min_{c \in \mathcal{C}_{j,o}} \left(V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) \right)$ when selling to multiple customer segments $c \in \mathcal{C}_{j,o}$.

6.1 Competing on Price

Consider a CSSD with no specific preferences for hiring a given product (perspective 1). Customers in that segment will hire the cheapest feasible product offered, as all products will create the same value $V_{j,c}$ for them. The research question simplifies to: *What price can the firm charge to maximise the value it can appropriate and still get hired?*

The highest price a firm can charge is determined by solving the bargaining problem between the firm and its competitors, subject to the constraint that the customer hires the product from the firm.

Proposition 1. *If a customer segment c does not associate any value to any decision criterion (it has no specific preferences for one product over another), that is, $\forall \mathbf{d} : v_{j,c}(\mathbf{d}) = 0$, then any customer in that segment hires the product with the lowest price $P_{j,o}$. The firm hired by the customer can maximise the value appropriated by setting the price $P_{j,o}$ at or slightly below the cost $K_{j,o'}$ of any competing or substitute product $\mathcal{V}_{j,o'}$.*

Proof. A customer hires a product o from the set $\mathcal{O}_j$ of all feasible products such that the value created for them is maximised (axiom 1), that is,

$$
\begin{aligned}
\operatorname*{argmax}_{o \in \mathcal{O}_j} V_{j,c}^C(o) &= \operatorname*{argmax}_{o \in \mathcal{O}_j} \left(V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) - P_{j,o} \right) \\
&= \operatorname*{argmax}_{o \in \mathcal{O}_j} \left(V_{j,c} - P_{j,o} \right) \\
&= \operatorname*{argmin}_{o \in \mathcal{O}_j} P_{j,o},
\end{aligned}
$$

as $v_{j,c}(\mathbf{d}_{j,o}) = 0$ and $V_{j,c}$ is fixed (axiom 2), confirming that the product with the lowest price is hired.

Consider a firm delivering the product o hired on price by the customer segment c (axiom 3). Then, $\forall o' \in \mathcal{O}_j : o \neq o' \Rightarrow P_{j,o} \leq K_{j,o'}(\mathbf{d}_{j,o'})$ because, if $P_{j,o} > K_{j,o'}(\mathbf{d}_{j,o'})$, then the firm providing the product o' could set $P_{j,o'} = K_{j,o'}(\mathbf{d}_{j,o'})$, be cheaper than the product o, and as such get hired (lemma 1). □

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6.2 *Competing on Differentiation*

Consider a firm that wants to compete with a product for a single JTBD $\mathcal{J}_j$ addressing multiple CSSDs $\mathcal{D}_{j,c}$ from distinct customer segments. Different solutions exist if customers rely on more than one decision criterion. Therefore, to successfully compete on differentiation, a firm must simultaneously (rather than sequentially) make three strategic decisions:

1. Decide which customer segments $\mathcal{C}_{j,o}$ to target (and which ones to ignore).
2. Decide which decision criteria $\mathbf{d}_{j,o}$ to meet (and which to ignore).
3. Decide what price $P_{j,o}$ to charge for the product.

A firm maximises the overall value it can appropriate (its profitability), that is, answers the research question in a static context (perspective 2), by solving the optimisation problem (2) in proposition 2. Different firms may target different customer segments $\mathcal{C}_{j,o}$, with their products o and price $P_{j,o}$ by each solving the optimisation problem based on their distinct cost structure.

Proposition 2. *A product o with value proposition $\mathcal{V}_{j,o}$ and price $P_{j,o}$ from a firm targeting the JTBD $\mathcal{J}_j$ that is a solution to the optimisation problem (2), gets hired by all customer segments in the set $\mathcal{C}_{j,o}$ and maximises the value appropriated by the hired firm.*

$$
\begin{aligned}
\underset{\mathcal{C}_{j,o},\mathbf{d}_{j,o},P_{j,o}}{\operatorname{argmax}} \quad & \sum_{c\in\mathcal{C}_{j,o}} |c| \cdot \left(P_{j,o} - K_{j,o}(\mathbf{d}_{j,o})\right) && (2a)\\
\textit{s.t.} \quad & \mathcal{C}_{j,o} \subseteq \mathcal{C}_j \\
& \mathbf{0} \leq \mathbf{d}_{j,o} \leq \mathbf{1} \\
& \forall c \in \mathcal{C}_{j,o}, \forall o' \in \mathcal{O}_j : V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) - P_{j,o} \geq V_{j,c} + v_{j,c}(\mathbf{d}_{j,o'}) - P_{j,o'} && (2b)\\
& \forall c \in \mathcal{C}_{j,o} : V_{j,c} + v_{j,c}(\mathbf{d}_{j,o}) - P_{j,o} \geq 0 && (2c)\\
& P_{j,o} - K_{j,o}(\mathbf{d}_{j,o}) \geq 0 && (2d)
\end{aligned}
\tag{2}
$$

where $\mathcal{C}_j$ is the set of all customer segments targeting $\mathcal{J}_j$, and $\mathcal{O}_j$ the set of all products targeting the CSSD $\mathcal{D}_{j,c}$.

Proof. Consider a product o solution to the optimisation problem (2). Then

- the product o is a feasible product because constraints (2c) and (2d) are satisfied according to definition 6 (feasible),
- the product o is a hired product because o is a feasible product, and the constraint (2b) is satisfied according to definition 7 (hired), and
- the product o maximises the value appropriated by the firm because of the utility function (2a) and definition 5 (value appropriated).

Converse, consider a product o that is hired and maximises the value the firm appropriates. Then

- the product o satisfies constraints (2c) and (2d) which implies that o is a feasible solution according to definition 6,
- the product o is feasible and satisfies the constraint (2b) which implies that o is a hired product according to definition 7 (hired), and

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- the product o is hired and maximises the utility function (2a) resulting in the value appropriated according to definition 5 being maximised.

□

The optimisation problem (2) can be shown to be a combinatorial optimisation problem. Solving it requires determining a subset $\mathcal{C}_{j,o} \subseteq \mathcal{C}_j$ of customer segments to target among $2^n - 1$ such subsets, where n is the number of different customer segments seeking to get the job $\mathcal{J}_j$ done. This problem is similar to solving the knapsack problem (Dantzig, 1930).

A firm has to simultaneously consider the three decision variables *customer segments to target* $\mathcal{C}_{j,o}$, *product decision criteria to meet* $\mathbf{d}_{j,o}$, and *price to charge* $P_{j,o}$ to maximise the value it can appropriate from its product, rather than first identify customer segments to target and subsequently design products that get hired or vice versa. Maximising the value appropriated by considering all three decision variables concurrently increases the solution space over approaches that address the decision variables sequentially. This is in contrast to other strategy theories. For example, the resource-based strategy theory starts by defining the products based on the available resources and capabilities and subsequently seeks out customer segments that want to hire them. Competitive positioning strategy theory starts by identifying markets, that is, customer segments to serve, ahead of defining the products to offer and price to charge.

In contrast with firms competing on price alone, when competing on differentiation an equilibrium state usually exists, allowing multiple firms to succeed. Different firms can appropriate positive value (be profitable) by targeting distinct customer segments with distinct products and prices. Solving the optimisation problem (2) results in partitioning the different customer segments looking for products addressing the same JTBD among competitors. Each customer segment is served by at most one firm and one product.

6.3 Winning the Competitive Game in a Dynamic Environment

Proposition 2 answers the research question in a static context, that is, solves the problem of identifying the customer segments to target and the optimal set of decision criteria and product attributes to exhibit, in addition to price, to get hired in an environment with a fixed set of competing products available. In practice, actions result in reactions, that is, competitors will potentially adjust their products—decision criteria met and price charged—to continue getting hired (perspective 3). Competing in such a dynamic environment requires playing (and winning) a non-collaborative sequential game between competing firms (Ghemawat, 1997). Market participants adjust their optional product attributes (including price) and targeted customer segments sequentially and iteratively until an equilibrium is achieved or they are out of business.

Proposition 3 answers the research question of how a firm can maximise the value it can appropriate in a dynamic environment. To be successful, a firm needs to play the competitive game by executing the algorithm in Fig. 2, leading to an optimal allocation of customer segments to competitors and selection of distinct decision criteria to meet and price to charge over time by the product offered.

Proposition 3. *A firm maximises the value it can appropriate over time by applying the algorithm in Fig. 2.*

Proof. Given a competitive landscape defined by $\mathcal{O}_j$ at a given point in time, executing statement 3 of

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1: $\forall c \in \mathcal{C}_j : \mathcal{D}_{j,c} \leftarrow$ customers define $V_{j,c}$ and $v_{j,c}(\cdot)$ of their instance of $\mathcal{J}_j$ (axiom 2)
2: **loop**
3: $\langle \mathcal{C}_{j,o}, \mathcal{V}_{j,o} \rangle \leftarrow$ the focal firm defines targeted customer segments $\mathcal{C}_{j,o}$ and its VP parameters $\mathbf{d}_{j,o}$ and $P_{j,o}$ by solving optimization problem (2)
4: **if** the optimisation problem exhibits no feasible solution **then**
5: the focal firm exits the game by not competing in addressing the job $\mathcal{J}_j$
6: **end if**
7: **for all** $o' \in \mathcal{O}_j \backslash \{o\}$ **do**
8: $\langle \mathcal{C}_{j,o'}, \mathcal{V}_{j,o'} \rangle \leftarrow$ the competing firm defines/adjusts its targeted customer segments $\mathcal{C}_{j,o'}$ and VP $\mathcal{V}_{j,o'}$ or decides not to compete
9: **end for**
10: **if** neither $\langle \mathcal{C}_{j,o}, \mathcal{V}_{j,o} \rangle$, nor any $\langle \mathcal{C}_{j,o'}, \mathcal{V}_{j,o'} \rangle$, change from the previous iteration **or** there exist no more competitors **then**
11: the game ends successfully
12: **end if**
13: **end loop**

Source: Author's own creation

Figure 2. Algorithm for competing in a demand-driven customer-centric market by playing a sequential non-collaborative game against competitors

the algorithm ensures (see proposition 2) that the focal firm maximizes the value it can appropriate at that time.

In step 8 of the algorithm, competitors adjust their products, that is, update the set $\mathcal{O}_j$ to remain competitive, that is, remain getting hired (or lose the competitive game by existing). Note that firms are not required in step 8 of the algorithm to define their product as a solution to the optimisation problem (2), even though it would be in their own best interest.

The algorithm iterates (steps 2 to 13) until the competitive game successfully ends or the focal firm exists the game by no longer competing. At each iteration, the focal firm maximises the value it appropriates at each iteration. This leads to the conclusion that the value appropriated throughout the game is also maximised.

The sequentiality of the competitive game is determined by axioms 2 and 3. □

7. Discussion

This paper describes an framework supporting strategic decision-making in demand-driven markets based on an analytical version of the jobs-to-be-done framework. Firms decide their respective strategy by choosing which customer segments to serve, what products to offer, and at what price to sell them. These choices result from a non-collaborative game, played by iteratively solving a combinatorial optimisation problem, maximising the value the firm can appropriate at each stage of the game.

In demand-driven markets, optimal strategic decision-making is driven by customers and their jobs-to-be-done. Required firm resources, capabilities, and activities, as well as relied-on suppliers and partners, are a consequence (second-order effects) of strategic decision-making rather than their driving force as they are not relevant to the customer's decision-making process.

This paper contributes three key insights to the literature on strategic decision-making in demand-driven markets by answering the research question *how a firm should define its strategy to maximise the value it can appropriate from distinct customer segments by simultaneously*

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supporting value creation for customers and differentiating from competitors:

1. Creating value for customers and appropriating value by the firm *should be considered simultaneously* rather than sequentially.

2. Choosing which customer segments to serve, what products to offer, and what price to charge requires *solving a combinatorial optimisation problem*, maximising the value a firm can appropriate, subject to maximising customer value creation by addressing a specific job-to-be-done. Focusing on the largest customer segment(s) or on products with the highest margin first does not necessarily lead to maximising profits.

3. Optimal strategic decision-making is a dynamic process. It is best described by *playing a competitive game* that defines how to react over time to how competitors adjust their customer value creation and value appropriation. Furthermore, all three variables (customer segments, product attributes, and price) must be reconsidered at each game stage. Only reducing price, adding new product features, or targeting new customer segments may lead to sub-optimal strategic decisions.

7.1 Academic Insights

"The problem space that a manager deals with in their mind or in their computer depends on how they represent the situation as they face it" (Simon, 1996; Boland Jr. and Collopy, 2004). By formalising the concepts of JTBD, CSSD, and VP, this paper provides an analytical foundation for better understanding how different competitors should interact in demand-driven markets to appropriate value. It helps align a firm's VP with different CSSDs.

At the heart of strategic decision-making stands the concept of value, as defined by the customer, rather than the firm. The customer purchasing decision is driven by the perceived value created for them, adjusted by the price paid. Using an axiomatic approach combined with an extension of the jobs-to-be-done framework defining the context for reasoning supports the most generic definitions of how customers define value. The approach introduced allows modelling preferences beyond the typically considered quality and price factors, notably supporting concepts like bounded rationality, switching costs, network effects, and risk-based preferences.

Approaching strategic decision-making in demand-driven markets from an operational research perspective helps formulate the strategy problem, that is, identify which customer segments to target, what products and associated attributes to offer, and what price to charge, as a combinatorial optimisation problem. The solution space for identifying the best strategy is maximised by focusing on all three decision variables at once. This results in determining an optimal strategy that allows increasing the value which a firm can appropriate beyond what would be possible when considering each decision variable separately.

Strategic decisions typically result in reactions from competitors. In this paper, I have shown how to play and win the dynamic strategy game. Rather than trying to outcompete other market participants, an optimal dynamic strategy partitions the customer segments aiming at a specific job amongst competitors based on defining respective VPs that allow each market participant to maximise the value they can appropriate.

7.2 Management Implications

This paper derives three essential managerial insights from answering the research question how to maximise the value a firm can appropriate in a demand-driven market contextualised by

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four axioms and the jobs-to-be-done framework.

1. *The starting point of strategic decision-making in a demand-driven market should be the job customers seek to accomplish* rather than customer segments, product features, or distinct resources or capabilities.

2. *Successfully competing in a demand-driven market requires simultaneously identifying which customer segments to target, what decision criteria products offered should meet, and what price to charge.* Sequentially focusing on maximising the size of the targeted customer segments (focusing on identifying markets to target), maximising the value created for a generic customer segment (focusing on product features), or concentrating on products with the most significant margins will lead to sub-optimal profitability. An optimal strategy in a demand-driven market may mean not focusing on the largest customer segment or product with the highest profit margins.

3. *Optimal value appropriation from competing on differentiation is achieved by market participants targeting different customer segments with distinct products.* This leads to partitioning the customer segments amongst competitors. An equilibrium is achieved by playing an iterative competitive game in which each move determines which customer segments to target, what decision criteria products should address, and what price can be charged, given a set of competing products.

7.3 Limitations and Future Research

In this paper, I have focused on strategic decision-making when multiple customers with individual definitions of value seek to address a single job at a time with a single product. Different jobs are assumed to be independent of each other. Future research may extend the introduced framework along the following dimensions:

- The constraint requiring a one-to-one relationship between jobs-to-be-done and products could be relaxed.
- Another avenue would be to support firms developing strategies around a portfolio of interrelated jobs addressed by potentially cross-financed products.
- A third interesting extension would be integrating two-sided business models similar to those platform firms implement into the framework.
- Another valuable avenue to explore would be incorporating third-party stakeholders (like governments or regulators) that impact either value creation or value appropriation without contributing to getting the considered job done.

Finally, defining the utility function as maximising value is a core axiom of the model presented in this paper. One could imagine alternative models of value by introducing, for example, a stochastic definition of value creation or value appropriation rather than a deterministic one.

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8. Conclusion

In this paper, I have addressed the challenge of strategic decision-making in demand-driven markets through the lens of the outcome customers seek to accomplish—their job-to-be-done—rather than firm resources and capabilities or competitive positioning. This approach allows broadening the solutions space when compared to using a firm-centric perspective. Although other scholars have studied decision-making in demand-driven markets, this paper's approach is novel as it tackles the challenge from an axiomatic rather than empirical perspective. By taking an operational research approach, I show how firms can maximise the value they can appropriate (their profits) and support customer value creation by solving a combinatorial optimisation problem, similar to the knapsack problem. By modelling strategic decision-making as a non-collaborative sequential game, I propose an algorithm that firms should implement to identify which customer segments to target, what product attributes to provide, and what price to charge at any given point in time.

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