Weaving Business Model Patterns
Understanding Business Models

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Abstract: A business model describes the way in which an organization acquires raw materials, transforms them into a product or service that is delivered to a client, and gains money in exchange. In consequence, it is possible to decompose the model into four core processes: supply, transformation, delivery, and monetization, which have both structural and behavioral dependencies among them. Unfortunately, most business model representations focus only on the structural part and leave aside the interactions between said processes. The objective of this paper is twofold. Firstly, it presents a conceptualization and representation for business models that is capable of handling their components and interactions. Secondly, it uses the proposed representation to introduce a catalog of business patterns applicable in the design and analysis of business models. Each pattern includes the basic participants, resources, activities and interactions that must be accounted for in order to perform the core process.

1 INTRODUCTION

Business models describe the way in which an organization transforms, delivers and monetizes value. Though this definition is quite simple, it has led to different interpretations and consequently, a great variety of models that try to embrace the concept. However, this broad selection of models has also contributed to a lack of formality in the idea itself (Lindgren and Rasmussen, 2013). It is no longer clear how business models are supposed to be used, designed, or described. In addition to the scarcity of standards, there is a dearth of means to define and communicate business models, so that they can be understood, analyzed, and improved upon.

With a precise definition of a business model, small and medium enterprises (SME) could perceive various benefits. Since their main concern is staying afloat in the market, long term decisions are not part of their priorities, leading to two possible outcomes: either they grow and manage to position in the market, or they fail, cease to exist (Frick and Ali, 2013) and stop contributing to the economic growth, innovation and employment of their country (Robu, 2013).With a well defined business model, SMEs would be able to recognize the different relationships present in their business and plan ahead, in order to execute a successful strategy.

The critical problem with current business model representations is the focus on a structural dimension (e.g., Osterwalder's Canvas (Osterwalder and Pigneur, 2010), or Gordijns e3-value (Gordijn and Akkermans, 2001). In particular, they leave (mostly) aside the specification of how business models components interact and behave in order to make the model work. Therefore, only a partial understanding of the business can be achieved with these business models. Additional artifacts are thus required, especially to achieve the goals behind Enterprise Modeling and Enterprise Engineering efforts.

This paper proposes two contributions. Firstly, it presents a conceptualization and representation of business models that includes all of their elements and allows further and more advanced analysis and understanding. Secondly, it introduces a catalog of business patterns which targets all the aspects of a business model. These patterns are intended to be the starting point for understanding and improving business models, especially in small and medium enterprises.

The paper is organized as follows. Section 2 discusses the current understanding and representation of business models. Then, Section 3 presents our proposal for understanding business models by showing all its elements and the way in which they can be graphically represented. Next, the designed catalog of business patterns is introduced, and a few selected patterns are presented. Finally, related work is presented

in Section 5, and in Section 6 the paper is concluded.

2 UNDERSTANDING BUSINESS MODELS

A business is defined as a commercial activity in which one engages in, in exchange for money. Regardless of the product or service that is being exchanged, to produce the desired revenue every business transforms, delivers, and monetizes value. The way in which they do so, is known as a business model.

Several attempts to define what a business model is, have led to a diversity of interpretations. In turn, the concept has become blurry and there are no formal representations for it. This scenario explains the success of tools such as Alexander Osterwalder's Business Model Canvas (Osterwalder and Pigneur, 2010). The simple yet complete representation of the business model, has been adopted worldwide for describing businesses. By identifying 9 key elements, a canvas is able to communicate how a business works on a superficial level, and even propose alternative designs in order to adjust the model in a changing environment. Thus, these 9 elements allow the description of the business model, by defining its structural components.
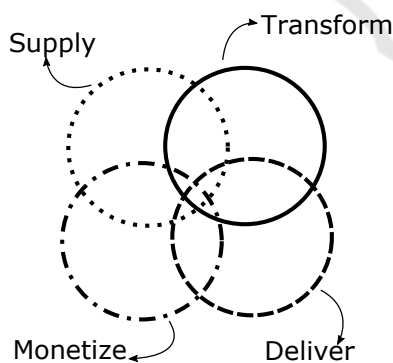
2.1 Core Processes

Figure 1: Business Model Processes.

Another perspective for understanding business models is the way in which an organization acquires supplies, transforms them into products and services, delivers these products and services, and obtains some money in exchange i.e., monetizes products and services. Accordingly, a business model can be decomposed into the four processes shown in Figure 1: *Supply*, where the business performs all the activities necessary to acquire raw materials; *Transformation*, in which supplies are processed, typically adding value to them, in order to obtain the desired good or service; *Delivery*, that considers the distribution of the product or service to the client, and all the activities that lead to this delivery (e.g., marketing, customer acquisition); and *Monetization*, where the business performs the activities associated to the generation of revenues.

The order in which these processes are performed and the specific nature of their activities, varies depending on the type of product or service offered. Manufacturing businesses with a traditional model, first acquire their raw materials (Supply) to transform them (Transformation) and deliver the resulting products to the client (Delivery) which pays for them (Monetization) and generate revenue. Other businesses require a different sequence. For instance, transformation and delivery may be performed simultaneously, if the product or service is transformed as it is delivered. A business that exemplifies this sequence is private education: an educational service that is provided, is transformed (adding value) as it is being delivered and it is only at the end, when students graduate, that the complete service that was paid for is perceived.

2.2 Structural and Behavioral Viewpoints

Business models comprise two aspects which can be analyzed from two complementary points of view: structural elements, which include the business model components and their structural relations; and dependencies and interactions between said components.

When business models are analyzed from the structural viewpoint, the first elements to study are their four main processes (Supply, Transform, Deliver, and Monetize) and their relations. This includes analyzing the participants in each one of these processes and their responsibilities, as well as the activities that they have to perform. Special attention is also paid to the resources required to perform the activities, such as machines, communication and delivery channels, as well as financial resources. All these resources and activities generate costs, which are considered part of the structural viewpoint as they are attributes that shape the model. Well known representations, such as Osterwalder's Canvas, or Gordijn's e3-value (Gordijn and Akkermans, 2001), are well suited to describe a business model from the structural point of view.

On the other hand, in the behavioral viewpoint the foremost element is the order in which processes are performed. This depends on the interactions among

participants and resources, and defines dependencies between activities: since the outputs of an activity are the inputs of the next one, flows are thus established both within and between the processes. These flows can be of *Cash*, *Information*, or *Value*: they represent the main, transversal linkage between components in the business model. The study of flows is thus necessary for the understanding of a business model. Unfortunately, current representations are not expressive enough for describing them and leave them to be figured out by the readers intuition. The following section presents a proposal that tackles precisely this problem.

3 RE-UNDERSTANDING BUSINESS MODELS

The conceptualization of a business model which we propose to fully describe a business model, including both the structural and behavioral aspects, is grounded in the following types of building blocks: Zones, Flows and Channels, Gateways, and Processors. These are described in the following pages and their role in a business model structure is discussed, along with the way in which they interact with each other. Together with the description of the concepts, we present a graphical representation for the business models.

3.1 Zones

A *Zone* represents a core process in a business model. A Zone contains participants, resources, flows, channels, and gateways (see Figure 2): participants perform activities which generate flows and define sequences depending on the order of generation, and the origin and target of each flow. Each zone also has a frontier to determine the process' scope and the points where interactions with other zones are established. Processors act as mediators between zones and are depicted in the frontier of zones.

Figure 3 presents three ways in which the four zones (S: Supply, T: Transformation, D: Delivery, M: Monetization) can be organized in order to describe different interactions in the model. Some models present more than four zones which means that they perform one or more of the four core processes in different ways. For instance, a business may gather raw materials from two different suppliers, involving different activities and participants interacting at different times.

Every zone includes participants, resources, activities, flows, gateways and processors. What varies
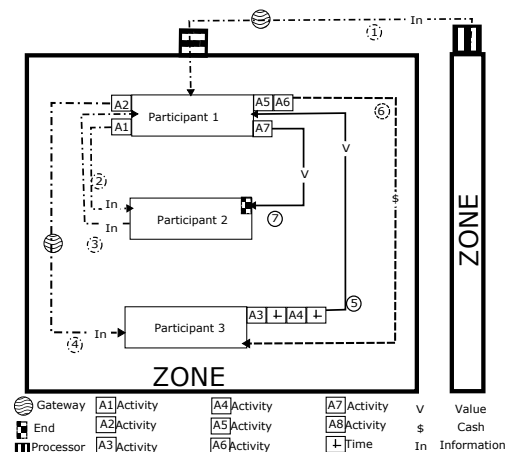

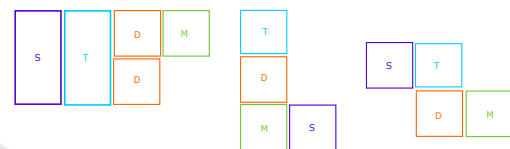Figure 2: A Zone and its components.

Figure 3: Organization of Zones in a Business Model.

among them are the actual components, which depend on the specific process represented. For example, the Supply zone might involve participants such as suppliers and clients, and activities such as placing orders, while the Delivery zone contemplates participants like distributors and activities like transporting the product.

3.2 Flows and Channels

A *flow* can be defined as a continuous relation between two participants, resources, or activities, established through a *channel*. The channel connects the output of its starting point to the input of the ending one. Flows can be characterized into three types. If the output is a document, a communication, or any other type of data, the flow is an *information flow*. If the output is a product or service, it is a *value flow*. And finally, money outputs mean that it is a *cash flow*.

Figure 2 presents the way in which flows are represented inside a zone. Since there is no structural difference between the flow and the channel, they are represented as one sole component. Value flows are presented with a black solid line. They appear as suppliers provide raw materials, as the business transforms them into the desired product, and as they are delivered and acquired by the client. It is thus possible to say that the business and the client establish a value flow as the latter acquires a product or service in exchange for money. This last element is associated to

the cash flow, which is presented with a dashed line. As it was mentioned, there is a cash flow every time that a payment takes place, which leads to the appearance of these flows in scenarios such as the business paying to its suppliers and intermediaries. The information flow, presented with a chain like line, generates every time there is a communication and information is exchanged.

The three types of flows can be found inside zones and between them because there are also cause-effect relations between processes. Figure 4 shows an interaction between zones, established by the tree types of flows. These flows cross the different zones through processors, the fourth type of component that will be presented.

3.3 Gateways

As flows relate processes and the components within them, it is necessary to know when variations in volume take place. If the volume of a flow changes, it may be related to a change in the relation between the two connected agents. For instance, if business sales decrease, it may be due to an alteration in the relationship with the client. In order to know this, a *gateway* is used to control the flow.

A gateway is defined as a control mechanism that regulates flows among zones or agents, depending on the quality of the relationship among them. Acting as a push-pull mechanism, the gateway is able to tell whether a relationship has changed and if so, the way in which the volume varies. If a relationship worsens, the flow is pushed, and if it gets better, it will get pulled. In the business, the gateway may be represented by an area or actor in charge of looking after the relationships. Figure 4 presents the gateway as a waved circle crossed by a flow.

3.4 Processors

Processors are the most complex building block since they depend on the zones that are being connected, and the flows that cross them. A processor is defined as the entry and exit point of a zone, capable of allowing a certain type of flow cross the zone and interact with the elements inside another.

Figure 4 shows three types of processors that correspond to the three types of flows. The squares represent the information processor, the rectangle the value one, while the pentagon the cash one.

As processors allow the circulation of flow through zones, they permit the cause-effect relations that trigger the execution of an activity or process and at the end, they establish the connection between the
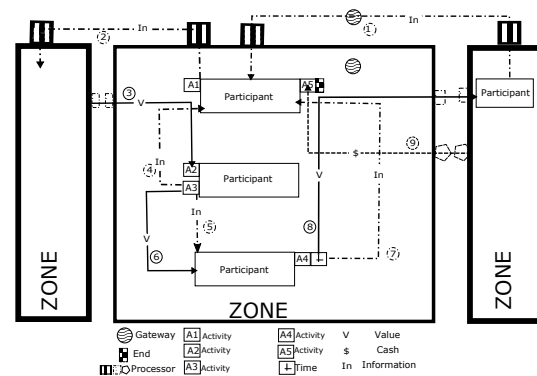

Figure 4: Connected Zones.

processes. Figure 4 presents a view of several zones connected through flows crossing processors. This intertwining of processors and flows is like weaving a business model.

3.5 Meta-model

To formalize the structure for the understanding of the business model that was just presented, a *meta-model* was built. A graphical representation using UML is shown in figure 5. In this figure, it is possible to see the business model and the decomposition into four processes with the correspondent structural and behavioral elements. By identifying the elements that compose the meta-model, it is possible to represent many business models regardless of the product or service being offered.This is possible since the representation process is not defined by the value proposition, but by the main building blocks that lead to the composition of the business model. When the zones are defined, so are the core processes, which in turn explains the way in which the business performs its different activities. Moreover, by recognizing participants and resources, the business model description is enriched and the different relationships in it are defined. As these relationships are characterized, flows begin to emerge and the business recognizes the points where money, information and value are exchanged.

4 BUSINESS PATTERNS

The difference between business models is explained not only by differences in their component's structure, but also in the behavior and interaction among them: the unique combination of processes and the way in which they interact is what explains why each business operates the way it does.
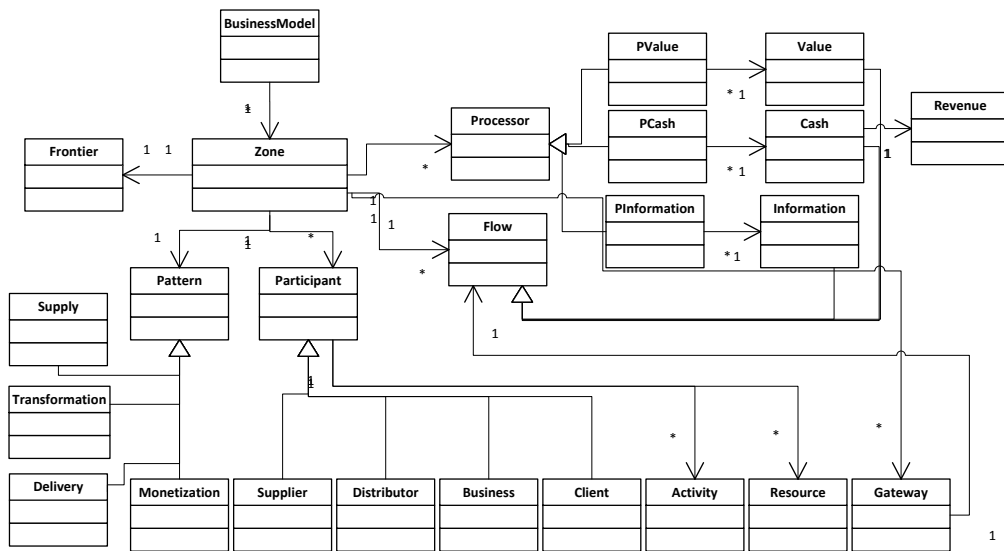
Figure 5: Business Model Metamodel.

It is fair to assume that the transformation process is unique for each business since it is the core point where value is added, where the actual strategy of the company is evidenced, and where competitive advantages are created. On the other hand, the supply, delivery and monetization processes do not differ enormously from one model to another. In fact, there is enough bibliography describing alternative designs and methods on each one of these topics to safely assume that each possible configuration for these processes has already been described somewhere (e.g., the ever expanding supply-chain corpus).

Considering this, we attempted to collect a significant number of the possible configurations for the Supply, Delivery, and Monetization processes in order to organize a catalog of Business Patterns. The goals behind this where two. Firstly, a pattern can be understood as a known solution to a well-known problem (Gamma et al., 1995). Therefore, by building the catalog we are making these solutions more accessible to those that are defining their business model, or redefining their existing one. Secondly, we attempted to create a structured body of knowledge about business models which can be analyzed and used as the base for the definition of new businesses. In this sense, the catalog provides a set of *building blocks* to define a new business model under restrictions or expectations.

The sources for the catalog included standards such as the SCOR framework (Supply Chain Council, 2008) and Osterwalders monetization patterns. For the moment patterns in the catalog only cover the business aspects of each process. However, it should be possible to expand the catalog in order to include

aspects such as typical IT support for each situation described in the catalog (see table 1).

The following pages present an extract of the patterns from the catalog, selected for illustration purposes. For each pattern a diagram is presented to illustrate the activities and flows within each zone. Furthermore, the interaction with the other zones are also presented.[1]

Table 1: Business Patterns Catalog.

CATEGORY	PATTERN
Supply	S1 - Source Stocked Product
Supply	S2 - Source Make to Order
Supply	S3 - Source Engineer to Order
Deliver	D1 - Deliver Stocked Product
Deliver	D2 - Deliver Make to Order Product
Deliver	D3 - Deliver Engineer to Order Product
Deliver	D4 - Deliver Retail
Monetization	M1 - Asset Sale
Monetization	M2 - Advertising
Monetization	M3 - Freemium
Monetization	M4 - Licensing
Monetization	M5 - Usage Fee

4.1 Supply Patterns

Supply patterns explain the way in which a business acquires raw materials from its providers. The following are three patterns extracted from the SCOR framework: source stocked products, source make to order and source engineer to order. Each pattern presents

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[1]The complete catalog can be found in the following URL http://backus1.uniandes.edu.co/ enardokuwiki/doku.php?id=wpatterns.

three main agents: the supplier, which typically is a different organization; business logistics, which are the coordinator of supply management activities; and the warehouse which stores and organizes supplies.

S1 - Source Stocked Product. The first pattern describes a supply process in which orders are made to maintain a stock of raw materials that allow the fulfillment of clients' orders in a defined period of time. This pattern is triggered by the client's demand (1) which tells the business the amount of product that may be needed and, consequently, the amount of supplies that must be ordered. Inventory is then checked (3), and necessary materials are ordered (4) based on actual inventory levels. Afterwards, the supplier prepares the order, which involves a certain time lead time, and then submits the raw materials (5). The business receives the order, for it (6), and stores the received materials in the warehouse (7).

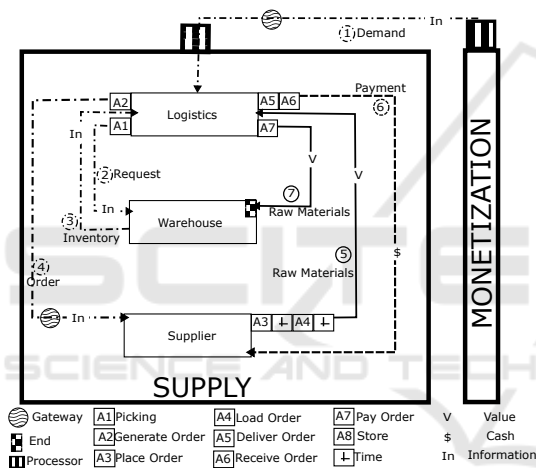Figure 7: Source Make to Order.

Figure 6: Source Stocked Product.

S2 - Source Make to Order. This pattern describes a supply process in which raw materials are produced and delivered based on a client's order. In particular, once the order is placed (1), an information flow tells the supplier that the product must be made (2). Once the product is ready it is delivered to the business (3) which in turn pays for the supplies (4) and stores them in the warehouse (5).

S3 - Source Engineer to Order. This supply pattern describes a supply process in which raw materials are designed, produced and delivered based on an order (1). In particular, there is a negotiation event where the final product design (2) is defined (3). Later, there is a placed order (4) that indicates the supplier that the product must be produced and delivered. Once the supplies arrive (5), the payment is done (6) and the materials are stored (7).
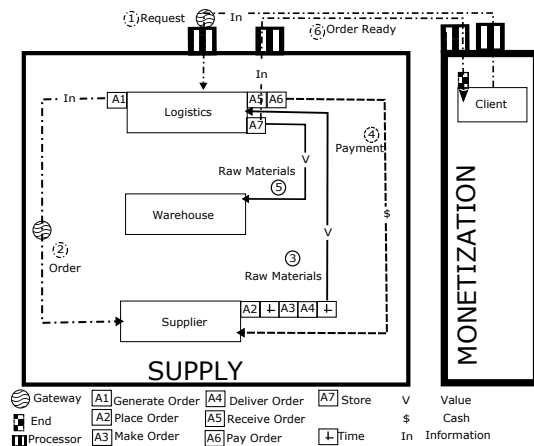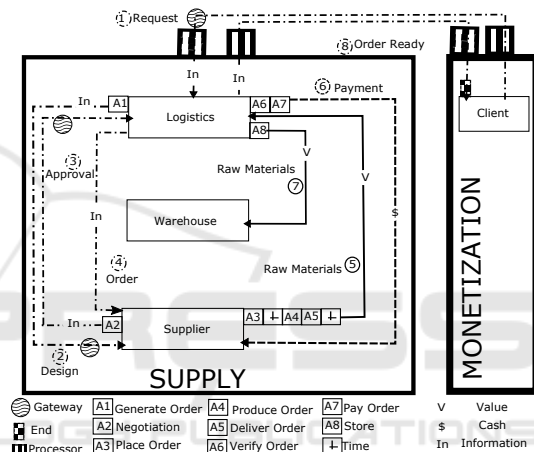

Figure 8: Source Engineer to Order.

4.2 Delivery Patterns

The second core process in the business model, delivery, initiates after value is transformed. Delivery patterns include two types of participants: distributors and final clients. It is important to note that the distributor can represent the business itself, or a third party in charge of the activity. We now present four delivery patterns extracted from the SCOR framework.

D1 - Deliver Stocked Product. The first pattern describes a process in which the client maintains a stock of the product offered by the company. After the client's order(1) is placed (2), the product is picked from the warehouse (3,4) and delivered (5). Once it reaches the client (6,7), the payment is received (8). Depending on the relationship quality between the client and the business, the product demand may vary. See Figure 9.

D2 - Deliver Make to Order Product. The second pattern describes the distribution of products that

are manufactured or provided given a client's order. In this case, an order is placed (1) along with the key information to initiate value transformation. These elements are recognized by the distributor and communicated into the value transformation zone(2). After the production and lead time are over, the product is placed in the warehouse (3,4) and dispatched (5,6). Once the order is delivered and received by the client (7,8), the payment is received (9). Like the previous pattern, the relationship with the client determines the amount of product ordered.
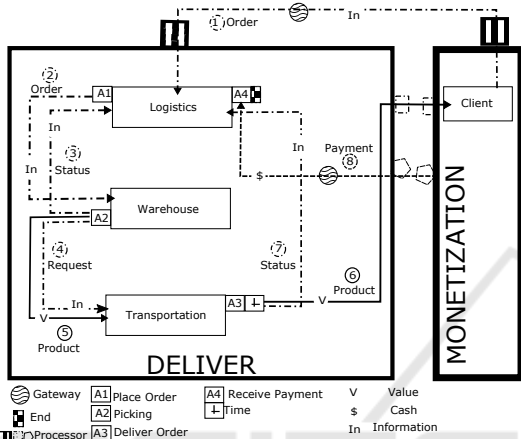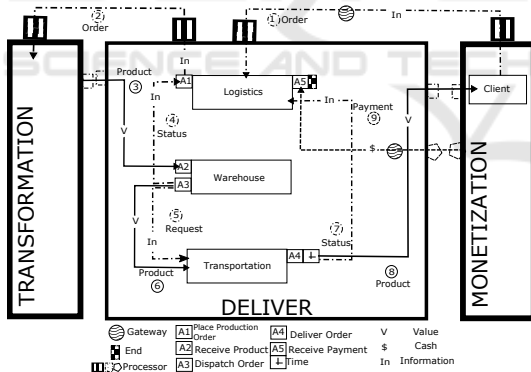

Figure 9: Deliver Stocked Product.

Figure 10: Deliver Make to Order Product.

D3 - Deliver Engineer to Order Product. The third pattern describes the distribution of a product whose design and production are defined and triggered by the client. Since the process involves an order and a negotiation, it begins with the client communicating the desired design and conditions of the distribution and payment (1). This information is delivered to the business, evaluated, and communicated to the client (2). When the negotiation is complete, the order is placed (3) and the distributor proceeds to communicate the clients final design, and adjust the distribution requirements. Once the product is

ready(4), it is stored in the warehouse (5) where it is picked and dispatched (6,7). After the expected arrival time, the client receives the product (9-10) and pays for it (11).
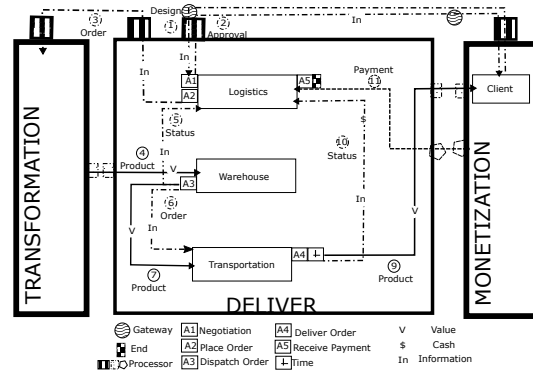

Figure 11: Deliver Engineer to Order Product.

D4 - Deliver Retail. The final delivery pattern describes a special type of business model: Retail. In this case, the distributor delivers the final product to a spot where clients acquire it. As in markets, and stores, this model considers clients acquiring the desired value in a physical location; therefore, the delivery reaches a middle point. In particular, depending on the demand (1), an order is placed (2), products are picked (3,4,5) and the orders are delivered to an intermediary (6,7). The latter sells(8) the product to the client (9,10) and sends the payment (11).
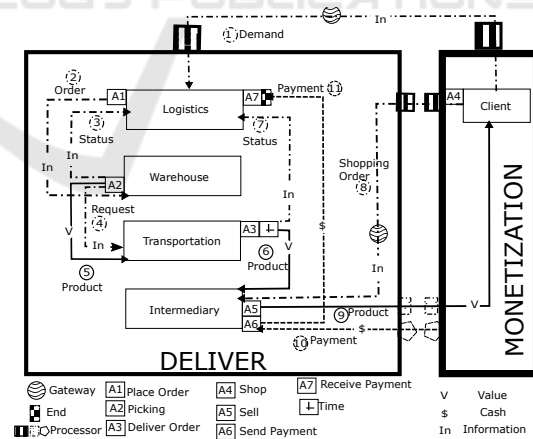

Figure 12: Deliver Retail.

4.3 Monetization

The third group of patterns is proposed taking into account revenue stream models adopted in the market. Five different patterns are now presented, even though there are some similarities between them. Actors in these patterns are the business and the client that is

acquiring or receiving the products and services produced (the ultimate recipients of value).

M1 - Asset Sale. The first pattern is perhaps the most common one when it comes to monetization. In this case, it describes value monetization based on a onetime payment that the client does to buy the desired product or service. It starts with an order placed to the business (1) which triggers an order to deliver (2) the product. Once the product reaches the client (3), the payment is received (4,5).
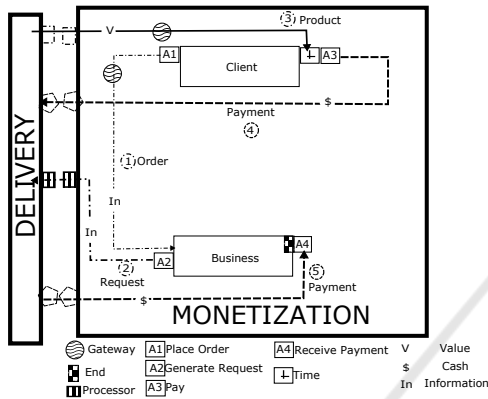

Figure 13: Asset Sale.

M2 - Advertising. The second pattern describes monetization based on advertisement. In this case, a company generates revenue streams by giving clients a space to advertise their own businesses or products. The pattern starts with an agreement or contract (1) that defines how long is a company able to advertise, its value, and the granted space. This contract generates a payment (2) and an order (3) that grants the defined conditions (4). Once the contract time is over, so is the advertisement and the client is given the chance (5) to extend renegotiate the contract or end it (6).

M3 - Freemium. The third pattern describes a freemium model in which clients acquire the product for free during a period of time, or with less characteristics or functionalities. This pattern starts with a client order(1) to receive value for free accepting certain constraints (Such as the time in which value will be received, or the value that is accessible). Once the order is placed (2), the product is delivered (3) until the agreed time is over, or the client desires to request premium(4). If it does so (5), a payment is received (6) and the product is delivered or upgraded (7,8).

M4 - Licensing. The licensing pattern describes a model based on the acquisition of a product or service through a license, which is bought by a client for a certain amount of time. The pattern starts with a client that buys a license (1,2), this generates a request (3) that triggers the distribution of the product
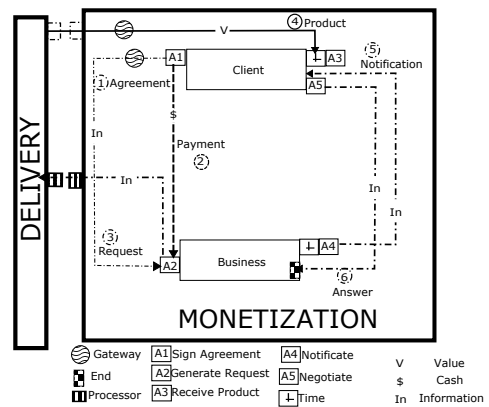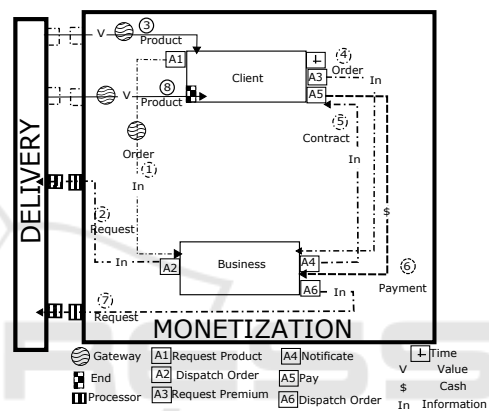

Figure 14: Advertising.

Figure 15: Freemium.

(4). Once the license time is over (5), the client is given the chance to renew it (6,7).
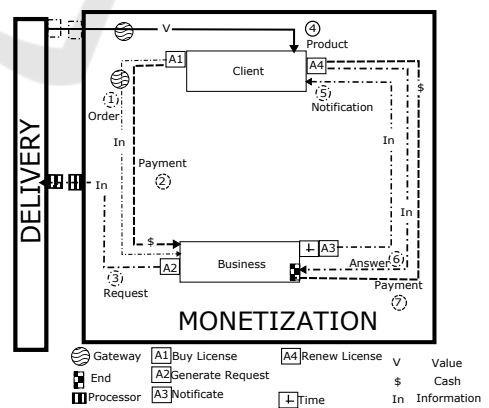

Figure 16: Licensing.

M5 - Usage Fee. The final monetization pattern is usage fee, which describes a model in which the business charges for the usage of its product. In this case, a client places an order to use the product (1). After it is delivered (2,3) and the billing period is over,

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a bill is generated based on the usage (4) (That may be quantified depending on the business). The client pays (5) and may keep using the product as long as it pays the bill.
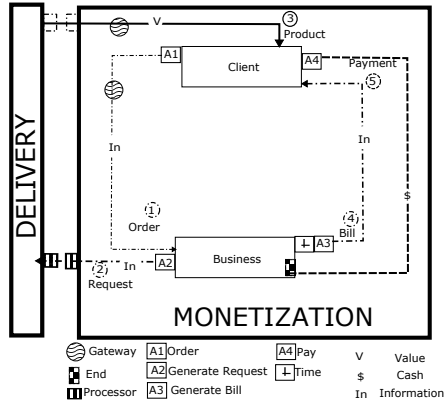

Figure 17: Usage Fee.

5 RELATED WORK

Business models and the different behaviors that emerge as they execute, have been matter of investigation for several authors. In particular, it is possible to find definitions and complete designs and representations of what a business model should look like. One of the most recognized efforts is Osterwalder's, who proposes both a structure for the model, and a method to use it (Osterwalder and Pigneur, 2010). Besides the well-known business model canvas, the author proposes several patterns to take into account when designing a business model. These patterns are based on five types of business models: unbundled, long tail, multi-sided, free and open business. Each pattern is appropriate for certain types of businesses (Osterwalder et al., 2014).

Business patterns established around the RossettaNet standards are other example of designs considering business models. Though the standard considers the interaction between participants with a business purpose, it is possible to generate patterns that guide the execution of a business model. In particular, it is possible to generate patterns that describe order and shipment processes and use them to evaluate the business model execution (Telang and Singh, 2010)

Taking into account the scope of business models, patterns centered on specific elements are also possible to find. For example, value-exchange patterns have been designed after analyzing models of real businesses. In these designs, agents and interactions are specified taking into account what type of

value is being delivered. The visual representation is also offered (Zlatev et al., 2004).

Moreover, efforts in generating guides for specific audiences are also in existence. For example, there is a business plan conception pattern language oriented to support entrepreneurs in the conception and design of their business models. Through a series of questions and descriptions, key aspects of the business model are addressed and depending on the concerns of the entrepreneur, several solutions for fulfilling them are offered (Laurier et al., 2010).

The amount of examples, patterns and guides generated towards the comprehension and adoption of successful business models, is considerable. From languages, to visual representations, to definitions, there is a wide variety of options when it comes to designing a business model. As it has been shown, these patterns can derive from existing companies, frameworks, or tendencies in the market. Regardless of where they come from, their purpose remains similar: to guide and provide a standard in the design of a business model.

Still, the expressiveness needed in order to communicate the business model approach described in this paper, can not be achieved with the discussed visualizations. Since there are five building blocks that need to be considered (zones, flows and channels, processors and gateways), it is necessary to count with notations that allow their representation. In Osterwalder's case although there is a notion of zones and channels, the flow concept is implicit within the canvas and the definition of the relationships among agents turns out to be more complex. The e3-value notation, on the other hand, is quite useful for the visualization of flows and processors, however, the detail level is not enough for the purposes of the proposed business model approach. In particular, since e3 value groups the different types of flow in one type (value), there is a need to define explicitly the element that is flowing. Furthermore, there is not a clear representation of the activities that lead to the flow establishment, and without, it is not possible to define the resources or participants key in each relationship. Considering the lack of a complete representation for the building blocks and their components, defining a new notation was appropriate.

6 CONCLUSION

A business model describes the way in which a business receives and transforms inputs to create value and build products and services which are then delivered and monetized. Even though the concept is

simple and interpretations abound, it is not formalized and there is a lack of comprehension of many business models. Furthermore, the semantics of a business model depend both on its structural features (components and their relations) and its behavior. The latter includes the interaction between these components and especially the flow of information, cash and value between them.

In order to understand both the structural and the behavioral aspects of a business model, we have proposed an interpretation based on the concepts of zone (or processes), processors that connect zones, flows that represent exchanges of value, information and cash, actors which perform activities, and gateways that regulate the exchanges. By using these elements it should be possible to have a more profound understanding of business models in order to better communicate and analyze them.

Using this conceptualization, patterns for supply, delivery and monetization were identified in the SCOR model and in the literature. Each pattern details a way in which a process can be performed, including the participating actors, their activities, and the exchanges of value, cash and information. Depending on the level of maturity of enterprises, these patterns should serve to understand their business models, or as a starting point for designing novel business models based on well known solutions.

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