The 6-Values Open Data Business Model Framework

Fatemeh Ahmadi Zeleti and Adegboyega Ojo

Abstract Business models for open data have emerged in response to the economic opportunities presented by the increasing availability of open data. However, scholarly efforts providing elaborations, rigorous analysis and comparison of open data models are very limited. This could be partly attributed to the fact that most discussions on open data business models are predominantly in the practice community. This shortcoming has resulted in a growing list of open data business models which, on closer examination, are not clearly delineated and lack clear value orientation. This has made the understanding of value creation and exploitation mechanisms in existing open data businesses difficult and challenging to transfer. Following the Design Science Research (DSR) tradition, we describe a 6-Value (6-V) business model framework built as a design artifact to facilitate the explication and detailed analysis of existing open data business models in practice. Based on the results of the analysis, we identify business model patterns and emerging core value disciplines for open data businesses. Our results not only help streamline existing open data business models but helps in linking them to the overall business strategy through value disciplines.

Introduction

Recently, attention of major stakeholders in the open data (OD) community, including policymakers have shifted to the economic value of OD assets. OD constitute an important resource around the world due to its potential to empower citizens, businesses, change how government performs, and improve the delivery of public

F.A. Zeleti (✉)
Insight Centre for Data Analytics @NUI Galway, Insight Centre, IDA Business Park, Lower Dangan, Galway, Ireland
e-mail: Fatemeh.Ahmadizeleti@insight-centre.org

A. Ojo
Insight Centre for Data Analytics, National University of Ireland Galway, Lower Dangan, Galway, Ireland
e-mail: Adegboyega.Ojo@insight-centre.org

A. Ojo, J. Millard (eds.), *Government 3.0 – Next Generation Government Technology Infrastructure and Services*, Public Administration and Information Technology 32, DOI 10.1007/978-3-319-63743-3_9

services (Manyika et al. 2013). Consequently, e-Government programs increasingly support opening up data and publishing OD on regional, national and international portals. This has spurned a growing number of small and medium enterprises seeking to tap into the potential of OD. As new entrants flood the marketplace, businesses are seeking to position themselves uniquely through specialization to create and capture value for their stakeholders (IBM Business Consulting Services 2005).

Business models are conceptual instruments for describing how value is created for OD customers (IBM Business Consulting Services 2005; Krcmar et al. 2011; Casadesus-Masanell and Ricart 2010; Brettel et al. 2012) and how revenue is generated and captured by organizations (Zott et al. 2010; Plé et al. 2008; Bekkelund 2011). Business models developed to harness the potential value of OD are increasingly available but not well understood. There are very few scholarly studies on business models for the OD industry. The lack of rigor (e.g. the use of a proper conceptual framework) in describing and analyzing existing Open Data Business Models (ODBMs) makes delineation and comparison of the models difficult. In fact, ODBMs are used interchangeably with revenue models, pricing strategies, distribution models, marketing techniques and architectural models (HM Government 2013; Relations et al. 2011). For example, while Howard (2014) claims that Open Source is an ODBMs, The 451 Group (2008) claims otherwise. Another example is the use of different names and labels for very similar business models making analysis difficult.

In this chapter, we address this problem by consolidating reported business models in both academic and practice literature, rigorously describe the models based on a 6V business model conceptual framework, and determining the ODBMs patterns and OD business value disciplines. Our contribution in this work is three-fold: (1) Consistent elaboration of existing business models based on the 6V business model conceptual framework we constructed grounded in traditional business models literature, (2) Determination of core OD business model patterns, (3) Determination of value disciplines for the open data-driven organizations.

Literature Review

Open Data

Nowadays, a surprising amount of data is generated and stored than at any other time in history (van den Broek et al. 2012; Avital and Bjorn-Andersen 2012). However, not all data can be published or made available to public for free. Some data is commercially confidential; some are sensitive personal information, which cannot be shared for reasons of privacy and security. However, where it is appropriate to do so, and the right protections have been taken, such as removing personal identifiers or aggregating data, sharing or linking data can bring both social and economic benefits (HM Government 2013; Fensel 2013).

As a practice of good governance, governments globally started to open up their public information in various domains, such as transportation, education, mobility, and meteorology (van den Broek et al. 2012; Relations et al. 2011). This is what is so-called OD. When data is freely accessible and re-usable by public, it could have a larger impact on citizens' ability to hold governments accountable and stimulate innovation (van den Broek et al. 2012).

The more technical view of OD is when OD is considered as machine-readable information, particularly government data available to others (Manyika et al. 2013; Davies et al. 2013). OD is published in common standards, accessible through non-proprietary software, and subject to open licenses (Julien 2012). Data can be raw data or processed data. It may be related to public services or related to internal processes (Julien 2012; Vickery 2011; Ren and Glissmann 2012; IBM Institute for Business Value Government 2011; Deloitte 2012). However, there are also limits to what can be released (Vickery 2011).

OD can help uncover consumer preferences, allowing businesses to improve new products (Manyika et al. 2013), increase revenue, and expand the supply and value chain (Capgemini Consulting 2013). Julien (2012) has also claims that OD will provide market intelligence for businesses. However, to benefit and capture value from OD and build or expand the business value chain, businesses are required to develop sufficient business model.

Business Models

A business model describes how value is created and captured by an organization through the decisions made and the resulting consequences (Lambert 2008). In our study, we adopt the notion of the business model provided by Osterwalder (2004) which considers a business model as a conceptual tool that contains a set of inter-related elements that allows a company to earn money. It comprises a description of the value a company offers to one or several segments of customers, the architecture of the firm, and its network of partners for creating and delivering this value to generate profitably and sustainable revenue streams.

Three major business models are reviewed in this section. The various elements or components of these models were elicited from various sources including Plé et al. (2008), Morris et al. (2005), Calia et al. (2007), Lambert and Davidson (2013), Boons and Lüdeke-Freund (2013), Casadesus-Masanell and Ricart (2009), Casadesus-Masanell and Zhu (2011), Bonina (2013), Lüdeke-Freund (2009), Angot (2010), and Janssen and Zuiderwijk (2014).

Osterwalder and Pigneur Business Model

Osterwalder and Pigneur (Osterwalder 2004; Osterwalder and Pigneur 2009) presents a business model canvas with nine building blocks. Model is presented in Fig. 1. The model includes key partnership, key activities, key resources, value

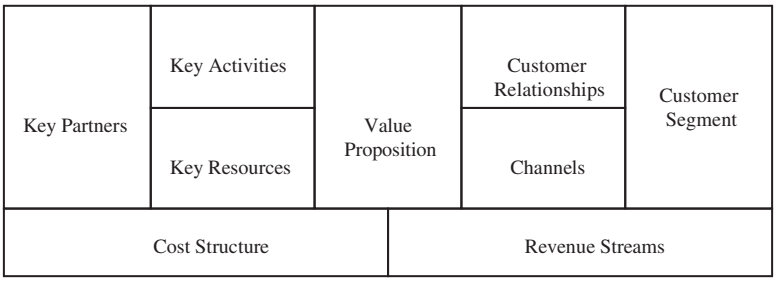

Fig. 1 Osterwalder business model canvas (Osterwalder and Pigneur 2009)

proposition, relationships with the customers, customers, channels, revenue stream and cost structures.

Customer Segment: It defines the groups of people or entities a business aims to reach and serve.
Customer Relationship: It describes the types of relationships a business establishes with specific Customer Segments.
Channel: It describes how a company communicates with and reaches its Customer Segments to deliver a Value Proposition.
Value proposition: It describes the bundle of products and services that create value for a specific Customer Segment.
Key activities: They describe the most important things a company must do to make its business model work.
Key resources: They include important assets required to make a business model work.
Key partners: They describe the network of suppliers and partners that make the business model work.
Revenue stream: It represents the cash a business generates from each Customer Segment (costs must be subtracted from revenues to create earnings).
Cost structure: It describes all costs incurred to operate a business model.

Shafer, Smith and Linder Business Model

Shafer et al. (2005) based their framework on the four elements common to most business models: Strategic choices; value creation; value network; and capture value. Figure 2 presents the model.

Strategic choices: It defines strategies a business has to be able to develop to offer a unique product to the customer. This is an element of the strategy formulation process. Strategic choice adds value to a strategy.
Value network: It defines a network of suppliers and partners required to implement the business model.
Create value: It describes value creation mechanisms from the different activities.
Capture value: It defines the process of recovering some or all of the value created for the customer.

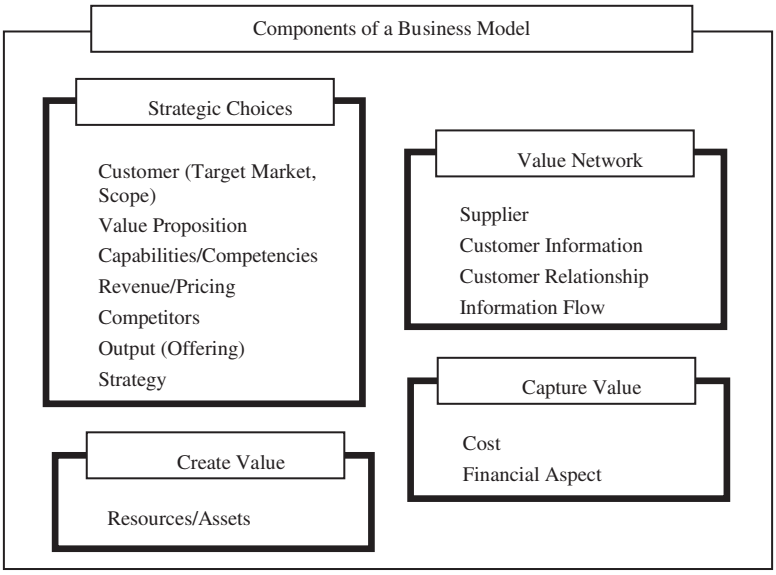

Fig. 2 Four components of a business model (Shafer et al. 2005)

Hamel Business Model

The business model framework described by Hamel (2000) characterizes a business model with three main components: Customer benefits (link between the strategy and the customer needs), Configuration (company-specific combination of resources, skills and procedures, which is used to support a given strategy) and Company frontiers (decisions regarding activity, which require recourse to the added value of an external network). Figure 3 presents the framework.

Customer logic: It defines a segment of people a business aim to reach and serve. The Logic part defines all the activities required to maintain and improve the segment.

Strategy: It defines strategies a business must develop to offer a unique product to the customer. This is an element of the strategy formulation process. Strategic choice adds value to a strategy.

Resources: It describes the most important assets required for a business model work.

Network: It defines a network of suppliers and partners that make the business model work.

Existing Business Models

Various business models have been identified in the literature, mainly in the practice community. These include: Howard (2014), Ferro and Osella (2013) identified eight ODBMs: Premium, Freemium, Open Source**,** Infrastructural

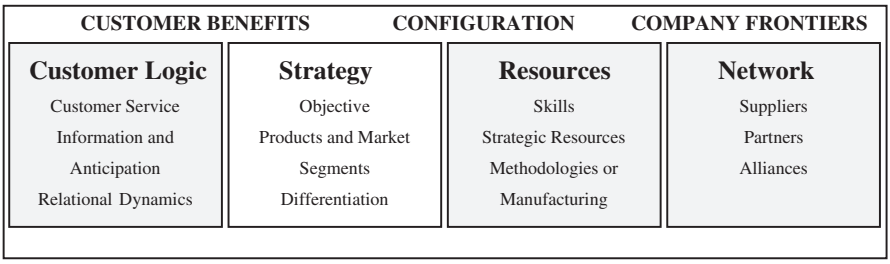

Fig. 3 Hamel business model (Hamel 2000)

Razor and Blades, Demand-Oriented Platform, Supply-Oriented Platform, Free as Branded Advertising and White-Label Development. Models identified by Musings (2012) are Cost Avoidance, Sponsorship, Dual Licensing, Support, and Services, Charging for Changes, Increasing Quality through Participation, and Supporting Primary Business. Description of each model above is presented in the appendix as well as in Zeleti et al. (2014)). Models above are not clearly defined and mix many concepts. Table 1 presents a very brief description of each model.

Conceptualization

Building on existing conceptual and theoretical roots, it is possible to develop a standard framework for characterizing a business model. Therefore, our 6V conceptual model is grounded in the extant literature of business models, as shown in Fig. 4. By consolidating elements of the various business model frameworks and careful analysis of the literature, we identified six core elements of a successful business model. We refer to our resulting framework as the *6-V Business Model Framework* (see Fig. 5).

The elements of the 6-V framework include *value proposition*; *value adding process*; *value network*; *value in return*; *value capture*; and *value management*.

Value Proposition specifies the value that business is offering. Value proposition included product, services, distribution channel, information, and price.

Value Adding Process delivering value requires value-adding process including key activities and resources such as physical resources, human resources, supply chain management, partnerships, and technology. Value adding process is classified into three:

Operational includes activities, organizational structure, technologies and logistics systems, revenue model, resources and assets and financial model;

Table 1 List of existing ODBMs

Models	Description
Premium	In the premium business model, the offering is high-end products and services, and the customer has to pay (Huber 2011).
Freemium	In the freemium, quality product is given away for free for a short period and then customers are asked to pay when they are hooked on the free product (Teece 2010).
Open Source	Product in this model is provided in a totally open format that allows free elaboration, usage, and redistribution without any technical barrier (Ferro and Osella 2013).
Infrastructural Razor and Blades	A razor-blade business model is about selling a product for a low price to generate revenues from the complementary products (Graeme Pietersz 2013).
Demand-Oriented Platform	This model involves charging consumers (e.g. developers) for the added value (Howard 2014)
Supply-Oriented Platform	This business model entails the presence of an intermediary business actor having an infrastructural role (Ferro and Osella 2013).
Free as Branded Advertising	This model encourages audience towards a brand or a company by delivering commercial messages through visualized data which is also called "display advertising" (Ferro and Osella 2013).
White-Label Development	A white-label product is a new product or service developed by one company but acquired and rebranded by another as theirs (Howard 2014).
Cost Avoidance	This model reduces the cost of data publishing by having a sustainable publishing solution (Epimorphics Ltd 2012).
Sponsorship	This model entails giving the product for free to customers and obtaining revenue from some sponsors (Casadesus-Masanell and Zhu 2011).
Dual Licensing	Dual licensing is based on the idea of the simultaneous use of both open source and proprietary licenses (Välimäki 2003). Products are given away in an open license for certain purposes and under a closed license for others (Musings 2012).
Support and Services	This model ensures that the paid packages are given away with guarantees for paying customers (Musings 2012).
Charging for Changes	In this model, the fee is applied for changes made to the product (Musings 2012).
Increasing Quality through Participation	This model involves increasing participation and satisfaction of the customer with the goal of generating higher margins (Angot 2010).
Supporting Primary Business	This model is used when releasing product naturally supports the primary goal of business or organization (Musings 2012).

Strategic planning includes market or the target customer, competencies, capabilities, pricing and the control of costs, branding, differentiation, legal issues, mission and trust;
Knowledge management includes innovation and documents.

The Value in Return what is received from the value adding process either monetary or non-monetary value including revenue, advertising space, future contracts and opportunities and rent or commission.

Value Capture Value capture is the process of retaining some percentage of the value provided in every transaction. This allows the business to use the output from the value in return to rethink and redesign to support the value proposition.

Value Management top managers play a significant role in the whole process. This includes mindset, organization, governance, stakeholders and shareholders.

Value Network all the business activities are done within the value network. This includes customers, suppliers, information flow, product flow, service flow and partner businesses.

Extending the 6-V business model framework presented in Fig. 4 and to better understanding the model components, we present the 6-V model in table form that provides second-level and third-level components. Each of the 6-V business model main component includes sub-components (second-level components) in which each sub-component consists of other sub-components (third-level components).

	Authors/ Papers studied																						
Context	Lambert, 2008	Shafer et al., 2005	Hamel, 2000	Lauguna et al., 2004	Sandberg, 2013	IBM Bus. Cons., 2005	Goethals, 2009	Casadesus & Ricart 2010	Boons & Lüdeke, 2013	Chesbrough & Rosenbloom, 2002	Klievink & Janssen, 2012	Hamel, 2000	Demil & Lecocq, 2010	Chesbrough & Rosenbloom, 2000	Teece, 2010	Bethel et al., 2012	Massa, Zott, & Amit, 2010	Closs, 2011	Osterwalder, 2004	Yip, 2004	Wikström et al., 2010	Klievink & Janssen, 2012	Pandav, 2012	Doligalski, 2010
Value Network																							
Customer	x	x	x	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x
Information Flow		x							x		x										x		
Product Flow		x				x			x														
Service Flow		x	x						x														
Supplier	x	x	x	x					x	x		x	x	x			x	x	x	x	x		x	x
Partner Businesses		x			x				x			x	x	x		x	x	x	x	x	x	x	x	x
Value Proposition																							
Product	x	x		x					x	x	x	x	x	x	x		x	x	x		x	x	x	x
Service	x	x				x			x	x	x	x	x	x			x	x			x	x		x
Channel	x	x			x	x				x		x			x		x	x	x	x	x	x	x	x
Information	x	x	x	x									x						x					x
Price		x	x			x				x	x	x		x			x		x		x	x		x
Value Adding Process																							
Operation																							
Activities	x			x	x	x							x				x	x	x				x	
Org. Structure	x																							
Tech/Systems	x		x		x				x	x							x		x					
Revenue Model		x			x	x	x			x	x				x		x	x	x			x	x	
Resources/Assets	x	x	x			x	x					x	x				x	x			x		x	

Fig. 4 Components of a business model

Financial Model		x						x						x					x		
Strategic Planning																					
Market/ Segment	x	x	x		x				x		x			x		x			x		x
Competencies	x	x	x		x				x		x		x		x				x		x
Capabilities	x	x			x				x		x			x			x		x		x
Cost & Pricing		x			x				x				x	x	x	x			x	x	x
Branding		x													x						
Differentiation		x	x		x						x				x						
Legal issues															x						
Mission		x	x												x		x				
Knowledge Mngt.																					
Innovation						x	x	x	x				x	x	x		x		x		
Documents											x										
Value in Return																					
Revenue	x								x			x		x							
Advertising Space	x																				
Future Contracts	x																				
rent	x																				
Commission	x																				
Value Capturing																					
Profit Formula									x				x		x						
Profit		x		x						x			x	x	x						
Financial Performance										x					x						
Value Mngt. Model																					
Mind-set											x				x						
Organization							x								x			x	x	x	
Governance							x													x	
Stakeholders							x							x	x						

Fig. 4 (continued)

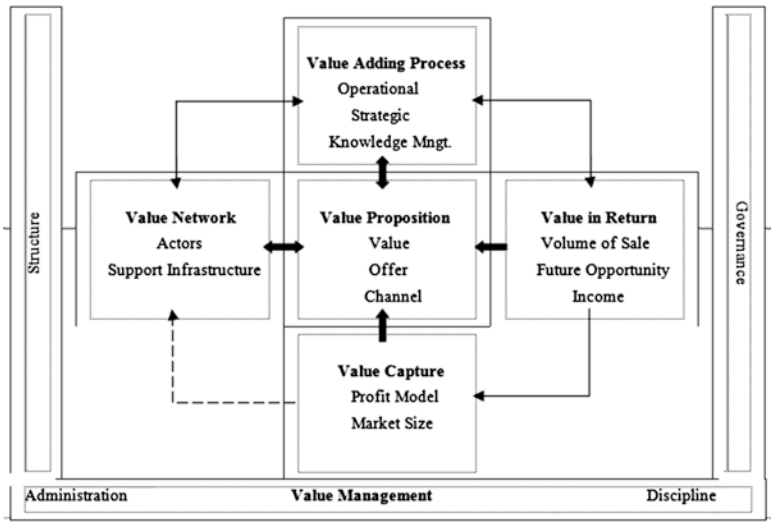

Fig. 5 The 6-V business model conceptual framework

Table 2 6-V model's top-level and low-level components

6-V Model Components	Second-Level Components	Third-Level Components
Value Proposition	Offer	Product, Service; Information
	Channel	Delivery Method
	Value	Price/Value for Money
Value Adding Process	Operational	Activities and Processes; Technologies and Systems; Resources and Assets
	Strategic	Market Segment/Position/Geographical Expansion; Logistic Systems; Competencies and Capabilities; Profit Model/Stream/Formula; Revenue Model/ Sources/Stream/Mechanisms; Financial Model; Pricing Mechanisms; Competitors and Competitive Outcomes; Internal Value Chain Structure; Cost Structure and Pricing; Branding and Marketing; Networking and Resource Leveraging; Differentiation; Legal Issues; Mission
	Knowledge Management	Innovation (Incremental and Disruptive); R&D
Value in Return	Volume of Sale	Volume of Product Sale
	Income	Revenue; Rent and Commission
	Future Income Opportunities	Advertising Space; Future Contract
Value Capture	Market Size	Product Cost and Quality
	Profit/Margin Model	Profit/Margin; Financial Performance
Value Network	Actors	Customer; Partner Businesses
	Supporting Infrastructure	Customer Relationship/Interface; Product, Service, Information and Resource Flow; Supplier/Supply Chain; Logistical Stream
Value Management	Discipline	Mind-Set and Dynamic Consistency
	Governance	Governance
	Structure	Organizational Structure (Organization Entity and Arrangement);
	Administration	Administrative Processes

For example, value proposition can include an *offer*, *channel,* and *value* in which *offer* can include *product*, *services* and *information*; *channel* can include a *delivery method* and *value* can include better *price* or the *value for money*. Table 2 shows this classification.

Model Elaboration

In this section, we apply the 6-V model described in section "Conceptualization" to characterize the 15 business models in the context of OD. We do not include Value Management in the analysis because it executes control over the performance of the

entire model to ensure the components are set appropriately to meet the objective/s. The resulting information is presented in Table 3 and highlighted below.

Cost Avoidance offers sustainable publishing solution, cost avoidance, and improved meaning of data and data integration as a value in return.
Sponsorship offers free and useful data to the public and provides availability of data to public as a value in return.
Freemium offers free but limited data and high-quality data at some cost and provides limited availability of useful free data to public and perceived value of data as a value in return.
Premium offers specific customer need and provides perceived value of data as a value in return.
Dual-Licensing offers free data for non-commercial uses and high-quality data for commercial use and provide limited availability of useful free data to public and perceived data as a value in return.
Support and services offer high value-adding data services and provide perceived value of data as a value in return.
Charging for changes offers free but limited data services and high-quality data at some cost and provides limited availability of useful free data to public and perceived value of data as a value in return.
Increasing quality through participation offers a higher quality of data and provides higher data quality as a value in return.
Supporting primary business offers strategic support to the business objective and provides improved in business results as a value in return.
Open source offers free data for non-corporate use and quality data for corporate use and provides limited availability of useful free data to public and perceived value of data as a value in return.
Infrastructural razor and blades offer incomplete data at a discount price while the complementary parts cost higher. It provides perceived value of data as a value in return.
The demand-oriented platform offers high quality and reliable data at some cost and provides commoditization and democratization of data as a value in return.
Supply oriented platform offers efficient and scalable infrastructure and provides perceived value of data as a value in return.
Free as branded advertising offers useful data for public and provides perceived value of data as a value in return.
The white-label development offers useful data services and Apps and provides saving in development time and budget as a value in return.

Analysis: Open Data Business Model Partners and Value Disciplines

The ultimate goal of understanding the business model variations in the digital world is to be able to analyze them to address the real-world problems that the business faces. It's one thing to understand what business model mean for different

Table 3 ODBMs elaboration based on the 6-V model

	Value Proposition	Value Adding Process	Value Network	Value in Return	Value Capture
Premium	• Meeting specific customer data need	• Publishing • Data maintenance	• Mostly business clients	• Perceived value of data	• Lump sums Revenue
Freemium	• Free, but limited data services • High-quality data at some cost	• Availability of different machine-readable formats • Unconstrained numbers of API calls • More sophisticated querying, • Access to data dumps rather than through an API (or vice versa) • Provision of feeds of changes to the data • Enhancement of the data with additional information • Early access to data • Provision of data on DVDs or hard disks rather than over the net	• Clients (mostly consumers B2C)	• Limited availability of useful free data to public • Perceived value of data	• Revenue from the small % of the free users • Charges for additional data or advanced features
Open Source	• Free data for non-corporate use • High-quality data for corporate use	• Publishing data • Data maintenance	• Mixed clients (B2B,B2G, B2C)	• Limited availability of useful free data to public • Perceived value of data	• Revenue from added value services
Infrastructural Razor & Blades	• Incomplete data at low cost • Complete data at higher cost	• Update data • Maintenance	• Developers • Clients	• Perceived value of data	• Revenue from data

Demand-Oriented Platform	• High quality and reliable data at some cost	• Refining Datasets • Collecting and cataloging data • Harmonizing data regarding formats and exposed through APIs	• Developers	• Commoditization and democratization of data	• Revenues in exchange for advanced services and refined datasets or data flows
Supply-Oriented Platform	• Efficiency • Scalable infrastructure	• Data retrieval • Standardization of formats • Automated external exposure of data via APIs and GUI	• Technology companies • Publisher (who is selling)	• Perceived value of data	• Revenue from potential advertisers
Free, as Branded Advertising	• Useful data for the public	• Data visualization	• Software development • Companies • Developers	• Perceived value of data	• Revenue from Adverts
White-Label Development	• Useful data services and Apps	• App making • App upgrading	• Mostly Business Clients • Developers	• Save development time and budget	• Lump sum Revenue
Cost Avoidance	• Sustainable publishing solution • Cost avoidance	• Publishing data as Linked Data • Data retrieval	• EU, parliaments • Government department • People	• Improve the meaning of data and data integration	• Sustainable publishing practice • Proactive data release
Sponsorship	• Free data and useful for public	• Publishing process	• Sponsors • Clients	• Availability of data to public	• Revenue from sponsors
Dual Licensing	• Free data for non-commercial use • High-quality data for commercial use	• Publishing data • Data maintenance	• Developers • Clients	• Limited availability of useful free data to public • Perceived value of data	• Revenue from added value services

(continued)

Table 3 (continued)

	Value Proposition	Value Adding Process	Value Network	Value in Return	Value Capture
Support and Services	• High value-adding data service	• Guarantees on data availability • Prioritization on bug fixes (both in data and its provision) for paying customers • Timely help for customers using the data • Services around data visualization • Analysis and mashing with other data	• Mostly business clients	• Perceived value of data	• Revenue • Presence in the service market
Charging for Changes	• Free, but limited data services • High-quality data at some cost	• Update data • Availability of different machine-readable formats • Unconstrained numbers of API calls • More sophisticated querying • Access to data dumps rather than through an API (or vice versa) • Provision of feeds of changes to the data • Enhancement of the data with additional information • Early access to data	• Mostly business clients	• Limited availability of useful free data to public • Perceived value of data	• Revenue from added value services
Increasing Quality through Participation	• Availability of higher quality data	• Update data • Cleansed data • Feedback	• Developers • Lawyers • Academics and government • Clients as an active player	• Higher quality data	• Revenue • Client satisfaction
Supporting Primary Business	• Open data supporting strategic business objective	• Publishing data • Providing APIs	• Developers • Clients	• Improved business results	• Revenue • Customer satisfaction

businesses, but it's quite another for a business to be able to distinguish different business models and understanding what business model suits their business. The elaboration in Table 3 shows that the 15 reported business models are ODBMs as they are well defining each component in the context of OD and therefore can be utilized by OD businesses. We further seek commonalities in the 15 ODBMs, and this will give us insight into what are the core ODBM patterns available and what OD business value disciplines can best define the model a business wish to employ. ODBMs patterns and value disciplines aid businesses especially innovative start-ups to define the right business model. Business model patterns and value disciplines are described below.

Open Data Business Model Patterns

The first part of our analysis identifies the major patterns of business models focusing on value propositions – a central element of the business model which are directly associated with customers and external entities. The centrality of the value proposition in the design of business models is clearly reflected in our 6V business model conceptual model in section "Conceptualization". Specifically, we determined the business model patterns from the 15 ODBMs (see Table 3) by examining the similarities between value propositions as well as a careful comparison of what each model offers, tries to achieve and how. Our analysis resulted in five major business model patterns including *Freemium*, *Premium*, *Cost Saving*, *Indirect Benefits* and *Parts of Tools* categories. In Table 4, we describe specific ODBMs comprising each pattern. We also identify what 'offer,' 'Channel for delivering value', and 'Price/Value for money' mean and can include in each pattern.

Fermium includes *Fermium*, *Dual-Licensing*, *Charging for Changes*, *Open Source*, and *Free as Branded Advertising* models. All the models in this category offer limited data free of charge and apply fees for additional request for complete and higher quality datasets.

Premium includes *Sponsorship*, *Support and Services*, *Demand-Oriented Platform*, *Supply-Oriented Platform*, *White-Label Development* and *Premium* models. Data in this category is not offered free of charge. However, data are offered in high quality and complete form at some cost.

Cost Saving includes *Increase Quality through Participation* and *Cost Avoidance* models. Models in this category do not entirely cover the cost, but reduce the cost of opening and releasing data by engaging participants and publishing data as Linked Data. Data user or re-user participants play a vital role in this category as by active participation publishing data can happen at a lower cost.

Indirect Benefit includes *Supporting Primary Business* model. Opening up data in this category is strategic and releasing open data naturally supports the primary goal

Table 4 ODBM categories

Fermium Pattern	Offer	Channel	Price/Value for Money
Fermium, Dual-Licensing, Charging for Changes, Open Source, and Free as Branded Advertising	Limited data services, Quality data, Useful data	Data Portals, Data visualization platforms or display advertising	Limited dataset for free of charge, quality dataset at some costs
Premium Pattern			
Sponsorship, Support and Services, Demand-Oriented Platform, Supply-Oriented Platform, White-Label Development and Premium	Data services, Quality data, Efficient and scalable infrastructure, Useful data	Data Portals, Data Publishing Platforms, APIs, and Graphical User Interfaces	Quality data provided at a fee
Cost Saving Pattern			
Increase Quality through Participation and Cost Avoidance	Quality data, Sustainable publishing solution, Cost reduction	Data portals, Linked Data	Reduce cost of opening and releasing data
Indirect Benefit Pattern			
Supporting Primary Business	Quality data for supporting business strategic objectives	Data portals, Apps, Marketplace of created tools and Apps by other organizations	Releasing organization's data for free that can be used by others to make tools that improve the releasing organization
Parts of Tools Category			
Infrastructural Razor and Blades	Incomplete data, Complete data	Cloud computing platforms, API	Incomplete data for lower cost and complementary or dependent data at a higher cost.

of the business. Model in this category allows the business to develop its data and data infrastructure by using the third-party infrastructures that are created because the data is open and available.

The Parts of Tools includes *Infrastructural Razor and Blades* model. The business strategy in this category is to offer the first set of data at a discount while offering complementary or dependent data at a considerable higher price.

As can be seen from Table 4, most of the 15 ODBMs belong to *Fermium* and *Premium* categories. Consequently, in the open data business community, more emphasize is given to *Fermium* and *Premium* models than the other three categories.

Value Disciplines

A business model – and value proposition in particular – is shaped by the business's underlying value discipline which describes different ways a business can differentiate itself from competitors. It is a strategic focus that enables a business to set its

vision and objectives. Value discipline helps a business to tailor value proposition to exactly match the need. Therefore, before identifying the business model, defining business value discipline is necessary.

Our approach to identifying the implicit value disciplines for ODBMs patterns is based on the analysis of the model attributes such as value proposition and value in return. Determination of the value disciplines enables analysis of the required capabilities to enable attainment overall business objectives. A Delphi-like process involving the three co-authors of the research was adopted in the analysis of Table 3, resulting in four types of value disciplines for OD businesses. The identified value disciplines converged on *Usefulness*, *Process Improvement*, *Performance* and *Customer Loyalty*, which are explained below:

Usefulness, tailors, value proposition to support directly the needs of consumers in one way or another. Business strategic focus, corporate vision, and business objectives should be defined to meet usefulness of the offer. *Usefulness* is associated with the *Freemium*, *Dual-Licensing*, *Charging for Changes*, *Open Source* and *Free as Branded Advertising*. These models all somewhat focus on the usefulness of the data offered to the clients as the business value disciplines.

Process Improvement, tailors value proposition to match to the needs of the customer specifically for improving processes. *Process improvement* is associated with *Cost Avoidance* model. Business oriented on *Process Improvement*, aim at greater efficiency to reduce cost by optimizing its processes. OD published based on this discipline targets improving business processes.

Performance, tailors, value proposition for better performance. Performance is associated with *Support Primary Business* model. Businesses with this orientation aim to release data which support their primary business objectives.

Customer Loyalty, tailors, value proposition to target customer loyalty. This is associated with *Premium* and *Infrastructural Razor and Blades*. Business with *Customer Loyalty* value discipline should apply *Premium* or *Infrastructural Razor and Blades* model to adjust their processes to meet the clients' satisfaction and build customer loyalty.

Table 5 shows that *Usefulness* value discipline is the most popular value discipline in the open data industry followed by the *Customer Loyalty*.

Summary

Finally, we organize existing ODBMs regarding their inherent value disciplines and their respective categories as shown in Table 5. For instance, an OD business which aims to focus on customer loyalty can have two choices for their business model which are *Infrastructural Razor and Blades* and *Premium*. Business can choose one depending on the business model category they aim to target.

For OD businesses aiming at increasing performance as their value discipline can have one choice for a business model which is *Support Primary Business*.

Table 5 ODBMs and value proposition categories

	Value Disciplines				
		Usefulness	Process Improvement	Performance	Customer Loyalty
Category	Parts of Tools	NA	NA	NA	Infrastructural Razor and Blades
	Indirect Benefit	NA	NA	Support Primary Business	NA
	Cost Saving	Increasing Quality through Participation	Cost Avoidance		NA
	Premium	Sponsorship, Support, and Services, Demand-Oriented Platform, Supply-Oriented Platform, White-Label Development	NA	NA	Premium
	Fermium	Fermium, Dual-Licensing, Charging for Changes, Open Source, Free as Branded-Advertising	NA	NA	NA

Similarly, for OD businesses aiming at improving processes as their value discipline can have one choice for a business model which is *Cost Avoidance*.

Most of the business models are targeting *Usefulness* value discipline. The nature of useful value provided will vary from one customer to another. *Increasing Quality through Participation*, *Sponsorship*, *Support and Services*, *Demand-Oriented Platform*, *Supply-Oriented Platform*, *White-Label Development*, *Freemium*, *Dual-Licensing*, *Charging for Changes*, *Open Source,* and *Free as Branded-Advertising* belongs to this value discipline. Depending on the business model patterns, a business can come up with a proper business model for the business. Table 5 shows this positioning.

Conclusion

All businesses either explicitly or implicitly should employ a particular business model. Similarly, OD businesses must utilize ODBMs. The first and foremost activity of emerging businesses is to identify the value discipline before identifying a particular business model. This particular research field; OD business value

disciplines; is missing and literature on ODBMs is also very limited to some number of websites and presentation files. Besides, regarding business models, various scholars present generic business model differently.

Our research findings clearly answered to the problems above both at the research and business levels. We also confess that the 6V business model conceptual framework, core ODBMs patterns – *Freemium, Premium, Cost Saving, Indirect Benefit* and *Parts of Tools* – and new OD business value disciplines – *Usefulness, Process Improvement, Performance* and *Customer Loyalty* – contribute significantly to business model and ODBMs literatures and assist not only start-ups and SMEs but also big businesses to deliver full value to their stakeholders.

This study provides insight to governments and government authorities by providing knowledge of the importance of availability and accessibility of OD for innovation and transparency. This allows more businesses and development of OD products like APIs. For example, with a focus on realistic local solutions, initiatives like CitySDK are working with pilot cities to create uniform APIs that have standard approaches to how APIs expose local government data. Therefore, governments have a new way of saving and making money by becoming a provider for the city. By opening the data, governments allow city (businesses and developers) to create products. Governments can also establish a partnership with private sectors to benefit. Therefore, governments should seek to identify how publishing OD can be done in a way that it provides value to general public and facilitates the development of both free and commercial products.

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Fatemeh Ahmadi Zeleti is a researcher at the e-Government unit at the Insight Centre for Data Analytics @ National University of Ireland Galway (formerly Digital Enterprise Research Institute (DERI) – a leading center in Semantic Web and Linked Open Data research). At the Insight Centre, her research and development work addresses capabilities for open data-driven organizations and how business (for-profit and nonprofit) entities can effectively leverage [Linked] Open [Government] Data for optimizing business processes and product and service innovation. In 2016, her research results have been selected as the best practice to address and achieve European PSI Directive (2003/98/EC). She is the moderator of the World Bank Open Data Innovation Network and an active member of the Swedish Research Network in e-Government and ImmigrationPolicy2.0.

Dr. Adegboyega Ojo is Senior Research Fellow at the Insight Centre for Data Analytics, National University of Ireland Galway (NUIG). He leads the E-Government Group at Insight Centre, serves as Adjunct Lecturer at the College of Engineering and Informatics. His current research interests include data driven innovations in government, Open data policies and Infrastructures, data analytics and governance of smart cities. He is member of the Editorial Boards of the Government Information Quarterly and International Journal of Public Administration in the Digital Age.