

Eight Business Model Archetypes for PSI Re-Use

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Abstract

In recent years the Open Data philosophy has gained a considerable momentum. In the public realm the free release of PSI datasets, besides enabling novel and promising forms of governmental accountability, paves the way to third-party developed products and services. Nevertheless, PSI re-use performed by private sector entrepreneurs is struggling to take-off due to the presence of numerous inherent roadblocks which are coupled with a certain vagueness surrounding the rationale underlying business endeavors. Taking stock of this evidence, the paper aspires to shed light on the mechanisms allowing profit-oriented value creation based on public datasets. Delving into the intricacy of PSI re-use, the paper portrays eight archetypal business models currently employed by enterprises present in the world-wide PSI-centric ecosystem.

Keywords

Open Data, Big Data, Public Sector Information, Policy Making, Business Model, Sustainability.

1. The Multi-Actor Value Ecosystem

Numerous actors that coexist in the PSI-centric ecosystem are found to occupy different positions within a comprehensive value network as they perform distinct and specific tasks meant to enrich the value of raw data released upstream in its primitive features by public bodies (Figure 1).

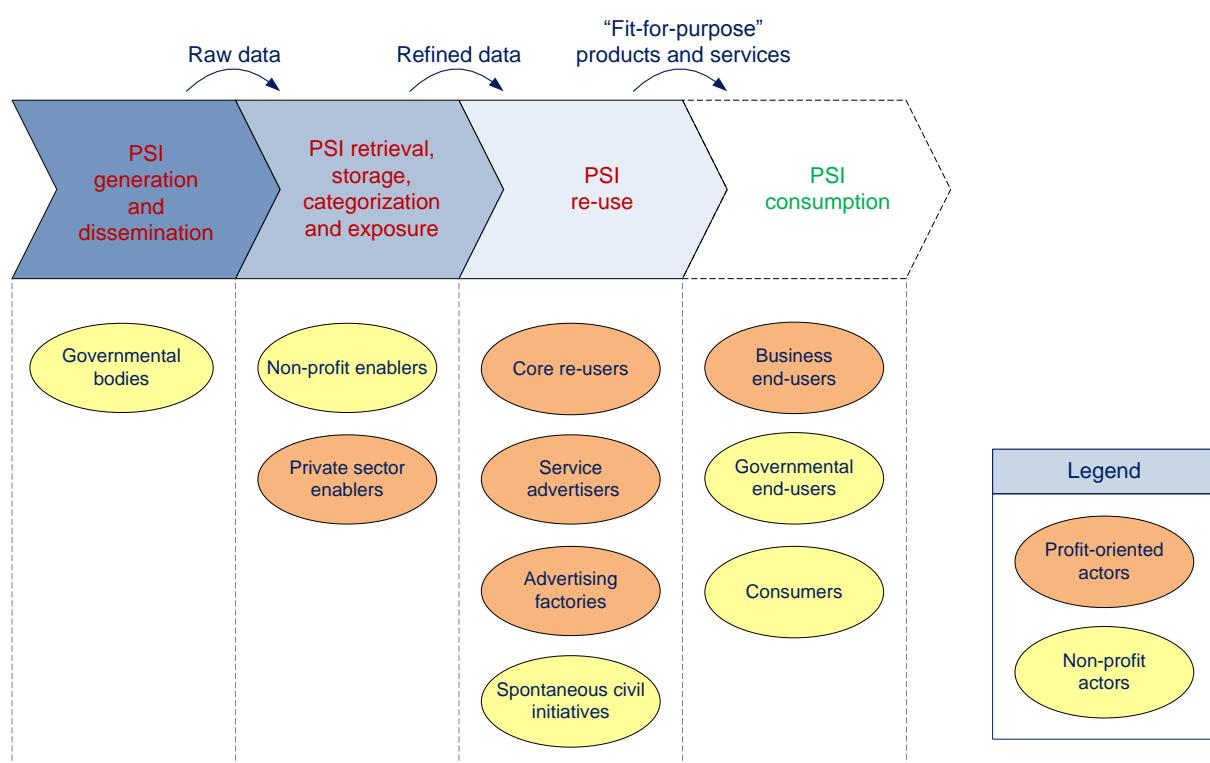


Figure 1 – PSI-based value chain

2. Archetypal Actors

Shining a spotlight on the business-side of the ecosystem previously hinted at, the research focuses on “how” it is possible to create (and appropriate) value from “downstream” information¹. All this in an attempt to answer a nagging question that hitherto has been often overlooked: “How may a public good² be turned into a profitable business venture?”.

In order to proceed along this trajectory, two basic dimensions have been outlined for the classification of profit-oriented actors.

A first vertical axis may be defined making reference to the positioning of the company in the value creation process. This axis differentiates actors located “on the front line”, i.e., in the downstream market that serves end-users (retail market, for the sake of simplicity), from the ones staying “behind the scene”, i.e., covering roles further upstream in the value chain.

By contrast, the horizontal axis concerns the strategic vision of the PSI realm. This criterion allows to distinguish re-users considering PSI as “bread and butter”, i.e., firms which are willing to generate robust and thriving revenue streams thanks to the commercialization of PSI-based product and services, from companies tapping PSI as “attraction tool”; the latter category consists of companies which consider PSI as a resource that may be harnessed for purposes that differ from profit *per se* (e.g., create brand visibility, boost the reputation, establishing promising new partnerships, paving the way for other complementary business lines).

In light of afore-said classification, the landscape comprises four archetypal actors, one for each quadrant stemming from the intersection of the axes (Figure 2).

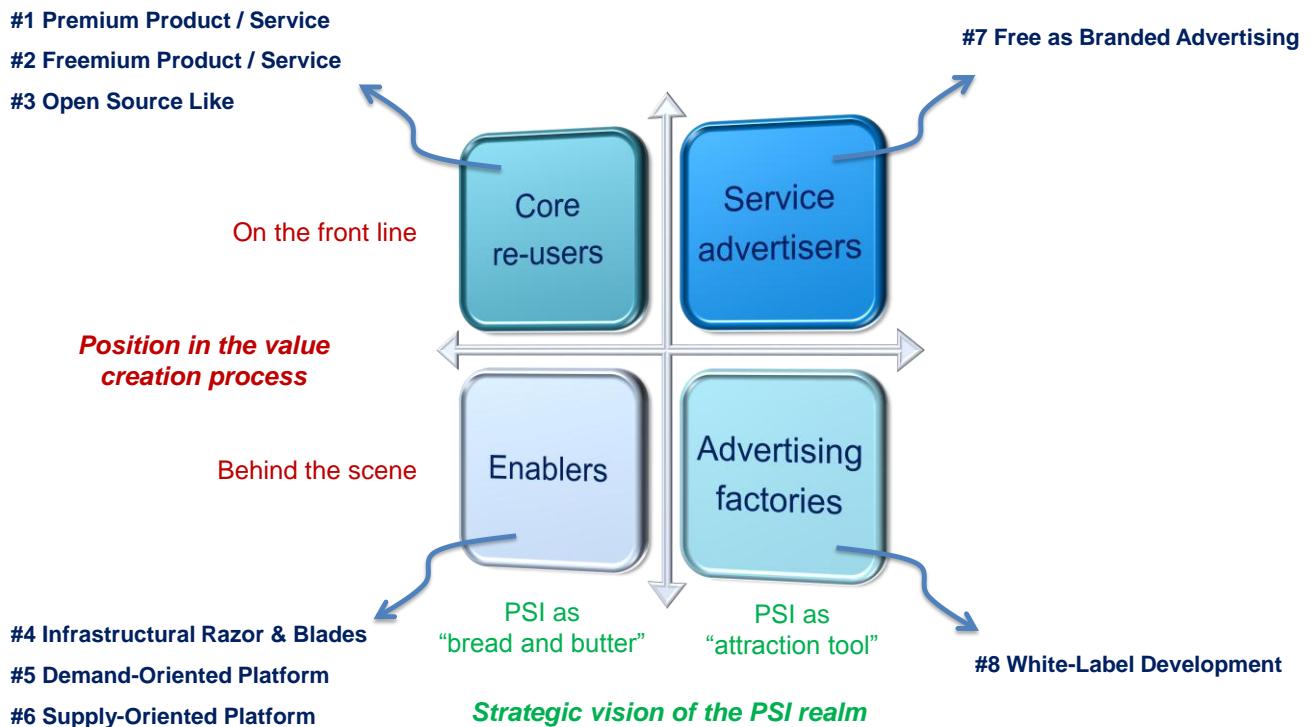


Figure 2 – Archetypal actors & archetypal business models

¹ “Downstream information” is the public information supplied by a PSI holder that can be seen as being, at least potentially, in competition with information from other suppliers. Conversely, “upstream information” could be defined as the public information for which the PSI holder is the sole source and faces no significant competition in its supply [1].

² When PSI is released in accordance with the “Open Definition” [2], it could be considered as a public good, i.e., a good that is non-rival and non-excludable. In this circumstance, the adherence to the Open Data paradigm implies the total openness of data, so that everyone is allowed to retrieve and use PSI datasets, whose access cannot represent a source of competitive advantage *per se*.

3. Archetypal Business Models

Archetypal actors portrayed in the matrix give life to archetypal business models whose bird's eye view is provided anew in Figure 2.

In order to point out distinctive traits characterizing archetypal business models - which emerge from real case studies examined by Ferro & Osella [3] - formal tools have been used for design-purposes. Firstly, archetypal business models have been synthetized through the framework coined by Ferro & Osella [4] that focuses on decision-making levers that a business developer has at his/her fingertips for molding the overarching architecture of a business venture hinged on public data re-use. However, this vision, although concise and effective in communication, does not allow to grasp the "big picture" of the business logic since it does not unravel the complicated mechanisms that orchestrate the various building blocks in the pursuit of the strategic intent. To overcome this obstacle, in the design phase another tool has been employed in order to visualize archetypal business models at an enterprise-level, i.e., the formalism brought by the Business Model Ontology (the "Canvas" [5]).

A round-up, albeit brief, of the eight archetypal business models is provided below while the Annex gathers visual representations obtained by resorting to both afore-mentioned formalisms.

Premium Product / Service. While implementing this business model, a core re-user offers to end-users a product or a service presumably characterized by high intrinsic value in exchange for a payment that could occur *à la carte* or in the guise of a recurring fee³: while the former implies the payment of an amount of money for each unit of product purchased (pay-per-use), the latter has an "all-inclusive" nature since it grants for a given timeframe the access to certain features in accordance with contractual terms. In this business model, probably associated to the "mainstream" model by the majority of analysts, the high intrinsic value, coupled with the price mechanism, calls for B2B customers (often called "high-end market" [6]) and for long or medium terms relationships going beyond single transactions.

Freemium Product / Service. Core re-users resorting to this business model offer to end-users a product or a service in accordance with freemium price logic: one of the offerings is free-of-charge and entails only basic features, while customers willing to take advantage of refined features or add-ons are charged. In the PSI realm, the implementation of this business model has its roots in limitations deliberately imposed by the core re-user in terms of data access: as a result, ad-hoc payments may be required to enjoy advanced features, to have recourse to additional formats or, sometimes, to weed out advertising. In contrast with the previous model, here the prominent target market is the consumer one (often called "low-end market" [6]) with which the firm establishes medium or short terms relationships that usually do not involve the customization. Target customers are generally reached via the Web or via the mobile channel, which are promising to "hit" a considerable number of installed bases.

Open Source Like. This very peculiar business model takes place on top of products, services, or simple unpackaged data that are provided for free and in an open format. In terms of economics, a cross-subsidization [7] occurs in the enterprise under examination since the costs incurred for free offering of data are covered by revenues stemming from supplementary business lines that are still PSI-based: in fact, trickles of revenue for the core re-users may stem only from added-value services⁴ or from license variations⁵ (dual licensing). The resemblance with Open Source software is given by the fact that in this circumstance data is provided in a totally open format that allows free elaboration, usage and redistribution without any technical barrier.

Infrastructural Razor & Blades. Entering in the realm of enablers, this business model is chosen by enterprises acting as intermediaries that facilitate the access to PSI resources by profit-oriented developers

³ In this circumstance, however, hybrid forms of payment are far from rare. For instance, two-part tariffs are made up of a fixed component and a variable component, i.e., a lump-sum fee and a per-unit charge.

⁴ Examples in this vein include, *inter alia*, on-demand analytical data processing, implementation of ad-hoc queries, mash-up of original data with other sources of information, which are accompanied by a broad spectrum of consulting services related to the harmonization of PSI with specific application suites and to the fruitful use of such data to enhance customer's business processes.

⁵ Dual licensing may take place in presence of licenses that do not permit commercial re-use (e.g., CC BY-NC-SA) or when licenses allow users to freely share, modify, and use contents provided that the same freedom is maintained for others (e.g., ODbL).

or scientists not driven by commercial intent. As it happens in the well-known model “razor & blades”⁶, the value proposition hinges on an attractive, inexpensive or free initial offer⁷ (“razor”) that encourages continuing future purchases of follow-up items or services (“blades”) that are usually consumables characterized by inelastic demand curve and high margins. Applying this model in the PSI environment, datasets are stored for free on cloud computing platforms being accessible by everyone via APIs (“razor”) while re-users are charged only for the computing power that they employ on-demand in as-a-service mode (“blades”). This business model exhibits another case of cross-subsidization whereby profits accrued from the provision of on-demand computing capacity cover costs attributable to the storage and maintenance of data. Finally, it goes without saying that application of this model is limited to contexts and domains in which the computational costs are significant.

Demand-Oriented Platform. Following this business model, the enabler acting as intermediary provides developers with easier access to PSI resources that are stored on proprietary servers⁸ having high reliability. Once collected, PSI datasets are subsequently catalogued using metadata, harmonized in terms of formats and exposed through APIs, making it easier to dynamically retrieve data in meaningful way. As a result, a wide range of critical issues pertaining to original raw data are made irrelevant due to the usage of platforms capable to convert datasets in data streams, contributing significantly to the “commoditization” and “democratization” of data. In addition, developers may reap the benefits given by the “one stop shopping” nature of such platforms: they may resort to one supplier and access a variety of information resources through standardized APIs - even beyond the borders of the PSI⁹ - without having to worry about interfaces connecting to each original source. This “procurement” approach is crucial to minimize search costs and, by consequence, transaction costs. In terms of pricing, as a good that was born free and open (such as Open Government Data) cannot be charged in absence of added value on top of it, enablers adopting this business model earn revenues in exchange for advanced services and refined datasets or data flows. To sum up, re-users are charged according to a freemium pricing model that sets the boundary between free and premium in light of feature limitations.

Supply-Oriented Platform. To conclude with enablers, this business model entails the presence of an intermediary business actor having again an infrastructural role. However, on the contrary of the previous case, according to this logic PSI holders are charged in lieu of developers. In fact, the enabler, following the golden rules of two-sided market [8], fixes the price according to the degree of positive externality that each side is able to exert on the other one. Consequently, this approach is beneficial for both sides of the resulting arena: from developers’ perspective, their barriers are wiped out (i.e., they can retrieve data without incurring cost) while, from the governmental angle, PSI holders become platform owners taking advantage of some handy features such as cloud storage, rapid upload of brand-new datasets by public employees, standardization of formats, tagging with metadata and, above all, automated external exposure of data via APIs and GUI. Public agencies that adhere to such programs in order to dip their toes into the water of Open Data establish long term relationships with providers and are required to pay a periodic fee that depends on the degree of sophistication characterizing the solutions¹⁰ purchased and on some technical parameters¹¹.

⁶ Examples in this vein are not limited to razors and blades as this model has manifold applications such as printers and cartridges, machines and coffee pods/capsules, video game consoles and games, sometimes even cell phones and contracts for voice/data.

⁷ Ideally, the price is equal to or less than the marginal cost; sometimes, the price may be zero.

⁸ The computing infrastructure can also be owned by third-parties.

⁹ The approach chosen by these players may be depicted as “holistic” since they aim at providing access to a “mine” of data regardless of the organization that generated them. The mix of information made available by these players incorporates, in addition to PSI, datasets (or, more precisely, data streams) from Social Media platforms, from collaborative Open Data initiatives and from private companies.

¹⁰ Taking stock of the extensive market research conducted by Ferro & Osella [3], advanced features that may determine the degree of sophistication of the solutions are, but not limited to, the following: registration of a domain name, presence of a workflow engine, possibility for users to interact with the PSI holder, automated geo-referencing of spatial data, creation of “galleries” wrapping applications developed hitherto from data, and integration with analytical tools aimed at monitoring Web traffic.

¹¹ Prominent technical quantitative parameters that influence the price are size of the data storage, data delivery bandwidth per period of time and API calls per period of time.

Free as Branded Advertising. Service advertising is an emerging form of communication aimed at encouraging or persuading an audience towards a brand or a company. Conversely to the more famous “display advertising”, where commercial messages are simply visualized, in service advertising the advertiser strives to conquer the customer by providing him or her with services of general usefulness. That said, in the PSI realm, services offered in this way do not generate any direct revenue but they are supposed to bring positive return in a broad sense, driving economic results on other business lines - unrelated to PSI - that represent the enterprise’s core business. The rationale fuelling this “enlightened” business model is twofold. Firstly, it may be based on a powerful advertising boost that leads the company to consider the cost as a promotional investment in the marketing mix. Secondly, it seems to be very convenient in presence of zero marginal costs [7], a situation that occurs when the costs of distribution and usage are not significant.

White-Label Development. Last but not least, if service advertisers do not have in-house sufficient competencies required to develop their business endeavors, they can knock the door of advertising factories. Such firms, in fact, come into play as outsourcers carrying out duties that otherwise would be handled by service advertisers. Hence, the development of PSI-based solutions is particularly compelling for companies willing to use PSI as “attraction tool” but not equipped with competencies required to do so (e.g., data retrieval, software development, service maintenance, marketing promotion). In order to let the service advertiser’s brand stand out, solutions are developed in a white-label manner, i.e., shadowing the outsourcer’s brand and giving full visibility to the sole service advertiser’s brand. Taking into account the “one stop shopping supply” and the business-criticality of the solutions in terms of corporate image, the resulting one-to-one relationship between provider and customer is tailor-made and “cemented”. Concerning financials, advertising factories collect lump-sum payments or recurring fees in exchange for turn-key solutions so developed, depending on whether the crafted solution takes the form of product or service: whilst in the former case service advertisers perceive the cost as CAPEX, in the latter one the respective cost assumes an OPEX nature.

4. Conclusive Remarks

Leveraging real case studies in the limelight and an ad-hoc crafted framework [3] in order to grasp the inherent diversity and heterogeneity lying in the *mare magnum* of the PSI realm has been very fruitful and has generated precious inputs for both entrepreneurs and policy makers.

Although still in its infancy, the conceived approach represents a promising stepping stone on which to stand for the creation of a new breed of analyses covering the business-side of public data re-use.

Trying to envisage future works along this direction, next step may be to resort to this approach in order to examine the several hundreds of proposals usually submitted in national and international contests for PSI-based apps.

5. Selected References

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Annex – Business Model Archetypes at a Glance

Premium Product / Service

Types of Data Elaboration	Role of PSI in the Value Proposition	
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input checked="" type="checkbox"/> Data geo-referencing <input checked="" type="checkbox"/> Data validation <input checked="" type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input checked="" type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input checked="" type="checkbox"/> Marginal ingredient of a product <input checked="" type="checkbox"/> Marginal ingredient of a service	
Price Mechanisms		
<input type="checkbox"/> Premium <input checked="" type="checkbox"/> À la carte <input checked="" type="checkbox"/> Subscription fee <input type="checkbox"/> Royalties	<input type="checkbox"/> Freemium <input type="checkbox"/> Feature limited <input type="checkbox"/> Time limited <input type="checkbox"/> Size limited	<input type="checkbox"/> Free <input type="checkbox"/> Advertising powered <input type="checkbox"/> Cross subsidization <input type="checkbox"/> Zero marginal cost

Figure 3 – Premium Product / Service (“Framework” view)

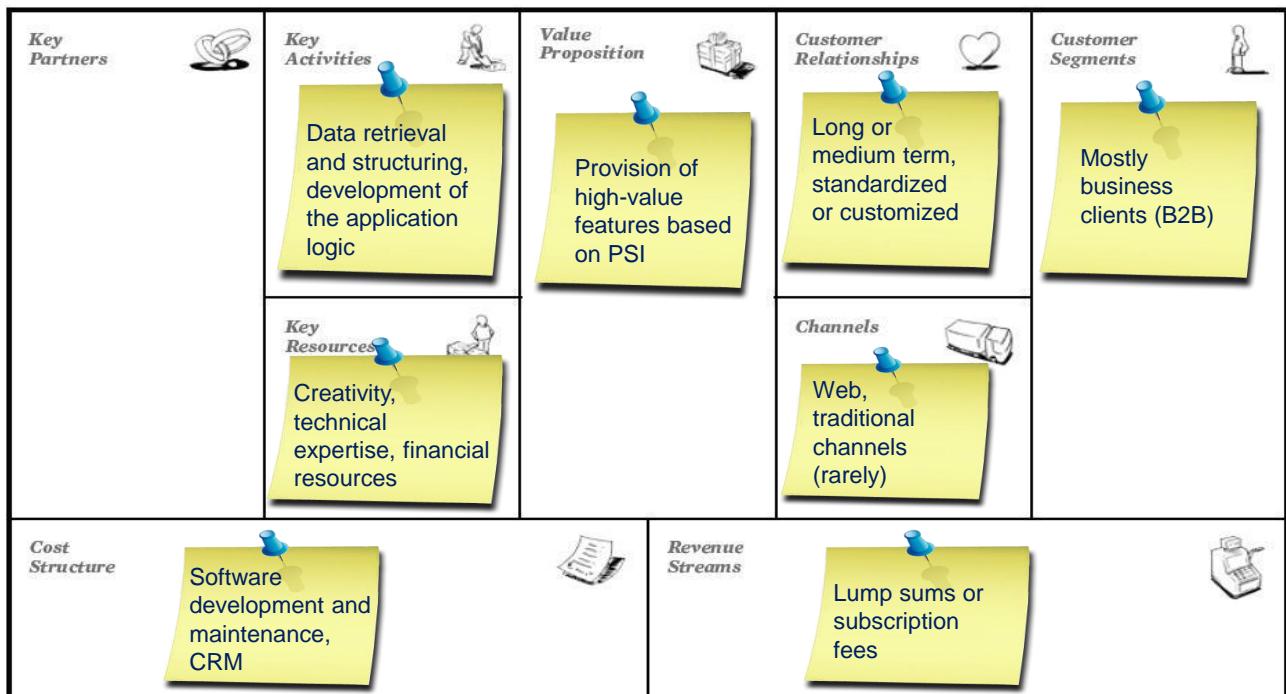


Figure 4 – Premium Product / Service (“Canvas” view)

Freemium Product / Service

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input checked="" type="checkbox"/> Data geo-referencing <input checked="" type="checkbox"/> Data validation <input checked="" type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input checked="" type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input checked="" type="checkbox"/> Marginal ingredient of a product <input checked="" type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
<input type="checkbox"/> Premium <input type="radio"/> À la carte <input type="radio"/> Subscription fee <input type="radio"/> Royalties <input type="checkbox"/> Freemium <input checked="" type="checkbox"/> Feature limited <input checked="" type="checkbox"/> Time limited <input checked="" type="checkbox"/> Size limited <input type="checkbox"/> Free <input type="radio"/> Advertising powered <input type="radio"/> Cross subsidization <input type="radio"/> Zero marginal cost

Figure 5 – Freemium Product / Service (“Framework” view)

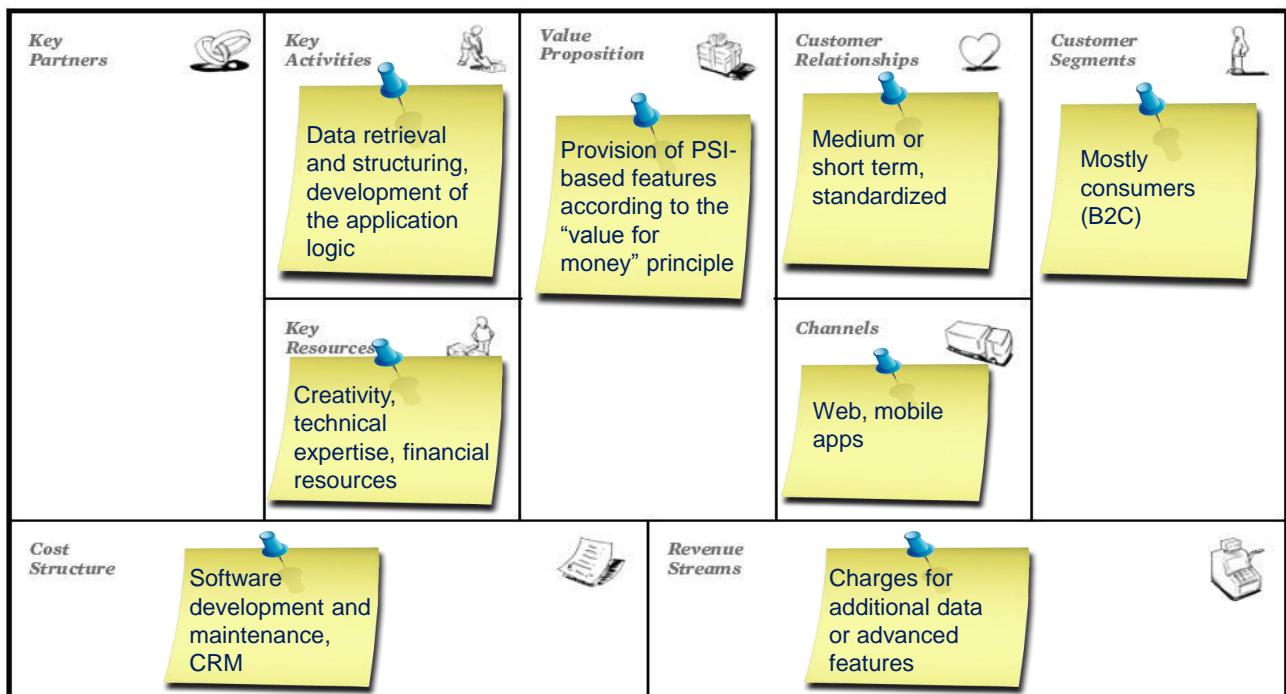


Figure 6 – Freemium Product / Service (“Canvas” view)

Open Source Like

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input checked="" type="checkbox"/> Data geo-referencing <input checked="" type="checkbox"/> Data validation <input checked="" type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input checked="" type="checkbox"/> Final good itself <input checked="" type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input checked="" type="checkbox"/> Marginal ingredient of a product <input checked="" type="checkbox"/> Marginal ingredient of a service

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Figure 7 – Open Source Like (“Framework” view)

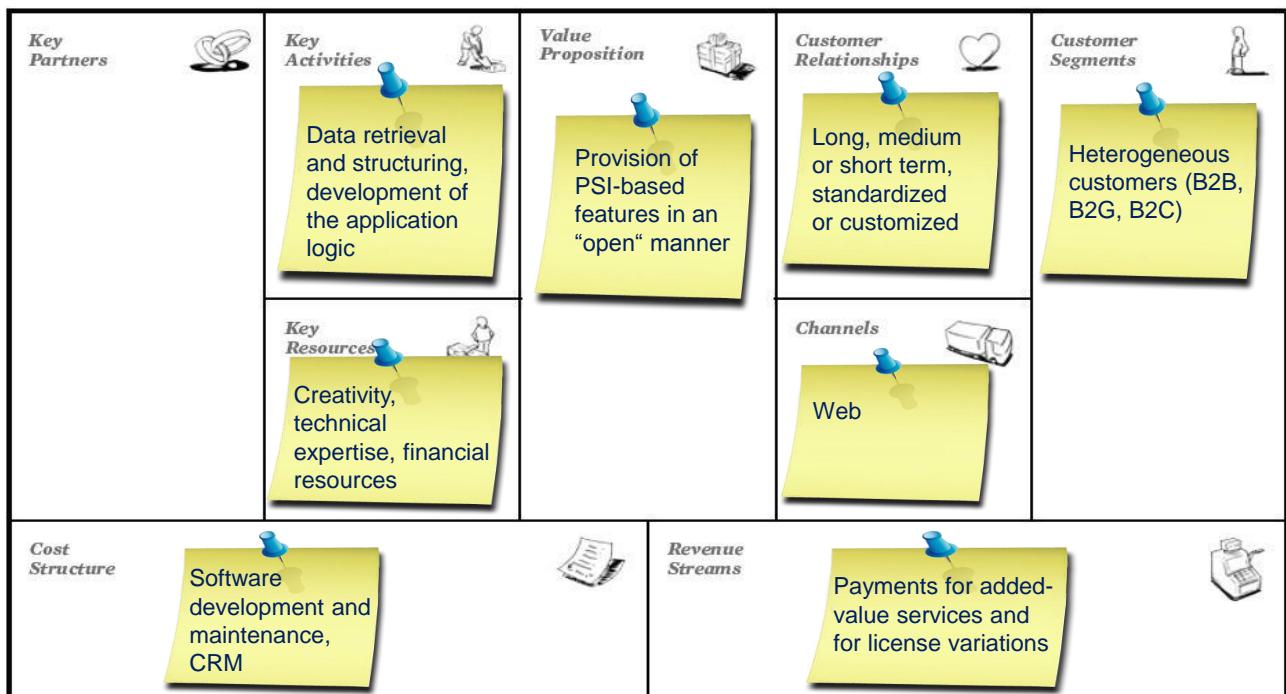


Figure 8 – Open Source Like (“Canvas” view)

Infrastructural Razor & Blades

Types of Data Elaboration	Role of PSI in the Value Proposition
<input type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input type="checkbox"/> Data geo-referencing <input type="checkbox"/> Data validation <input type="checkbox"/> Data mash-up <input type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input type="checkbox"/> Marginal ingredient of a product <input type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
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Figure 9 – Infrastructural Razor & Blades (“Framework” view)

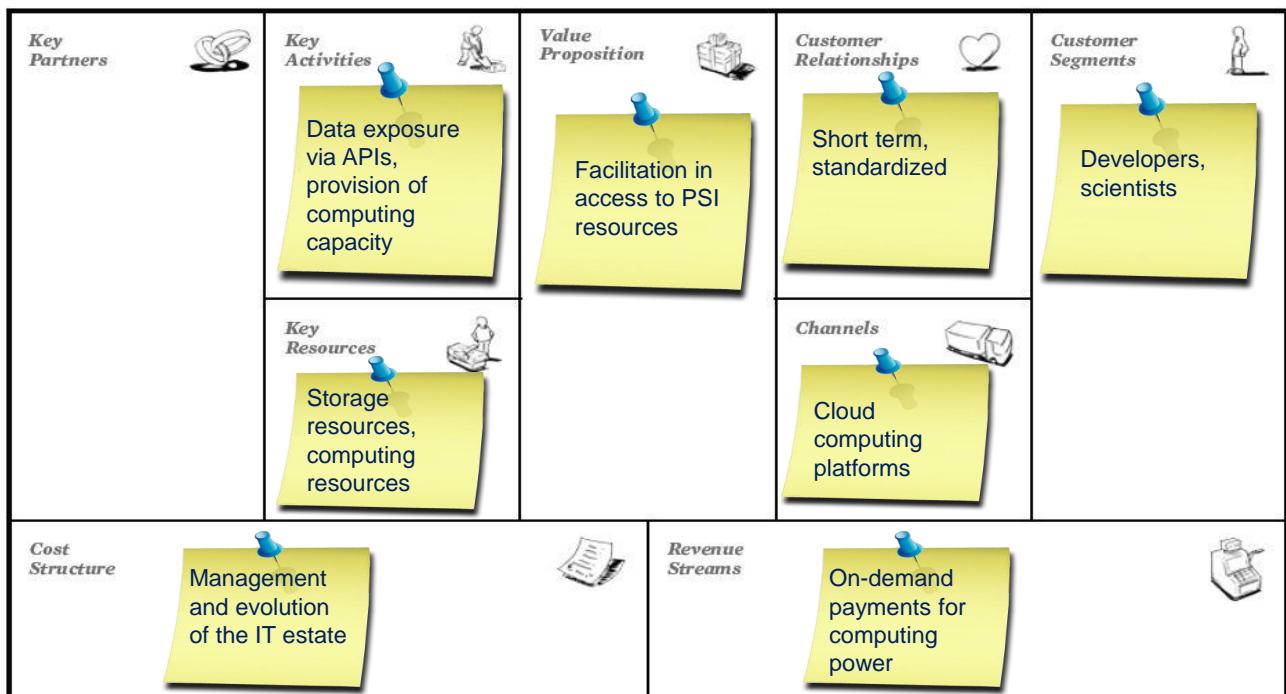


Figure 10 – Infrastructural Razor & Blades (“Canvas” view)

Demand-Oriented Platform

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input type="checkbox"/> Data geo-referencing <input type="checkbox"/> Data validation <input type="checkbox"/> Data mash-up <input type="checkbox"/> Visual analytics	<input checked="" type="checkbox"/> Final good itself <input type="checkbox"/> Key ingredient of a product <input type="checkbox"/> Key ingredient of a service <input type="checkbox"/> Marginal ingredient of a product <input type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
<input type="checkbox"/> Premium <input type="radio"/> À la carte <input type="radio"/> Subscription fee <input type="radio"/> Royalties <input type="checkbox"/> Freemium <input checked="" type="checkbox"/> Feature limited <input type="radio"/> Time limited <input type="radio"/> Size limited <input type="checkbox"/> Free <input type="radio"/> Advertising powered <input type="radio"/> Cross subsidization <input type="radio"/> Zero marginal cost

Figure 11 – Demand-Oriented Platform (“Framework” view)

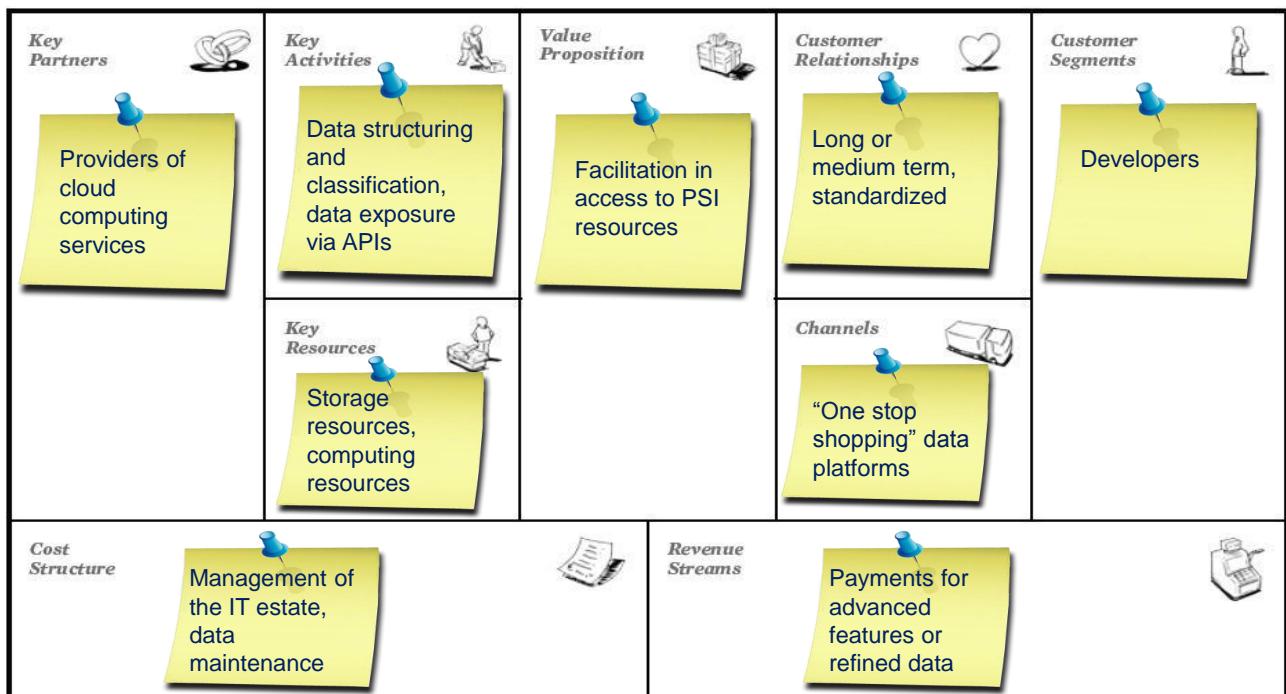


Figure 12 – Demand-Oriented Platform (“Canvas” view)

Supply-Oriented Platform

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input type="checkbox"/> Data geo-referencing <input type="checkbox"/> Data validation <input type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input type="checkbox"/> Marginal ingredient of a product <input type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
<input type="checkbox"/> Premium <input type="radio"/> À la carte <input checked="" type="checkbox"/> Subscription fee <input type="radio"/> Royalties <input type="checkbox"/> Freemium <input type="radio"/> Feature limited <input type="radio"/> Time limited <input type="radio"/> Size limited <input type="checkbox"/> Free <input type="radio"/> Advertising powered <input type="radio"/> Cross subsidization <input type="radio"/> Zero marginal cost

Figure 13 – Supply-Oriented Platform (“Framework” view)

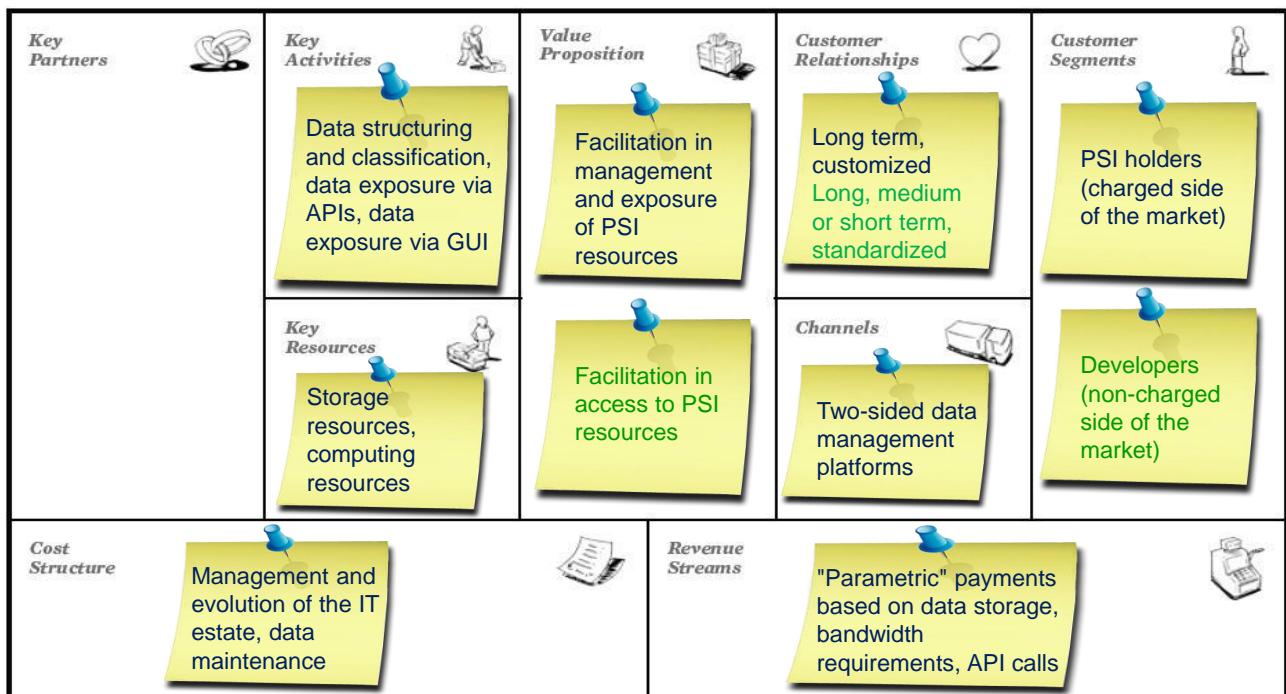


Figure 14 – Supply-Oriented Platform (“Canvas” view)

Free as Branded Advertising

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input checked="" type="checkbox"/> Data geo-referencing <input checked="" type="checkbox"/> Data validation <input checked="" type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input checked="" type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input checked="" type="checkbox"/> Marginal ingredient of a product <input checked="" type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
<input type="checkbox"/> Premium <input type="radio"/> À la carte <input type="radio"/> Subscription fee <input type="radio"/> Royalties <input type="checkbox"/> Freemium <input type="radio"/> Feature limited <input type="radio"/> Time limited <input type="radio"/> Size limited <input type="checkbox"/> Free <input checked="" type="checkbox"/> Advertising powered <input type="radio"/> Cross subsidization <input checked="" type="checkbox"/> Zero marginal cost

Figure 15 – Free as Branded Advertising (“Framework” view)

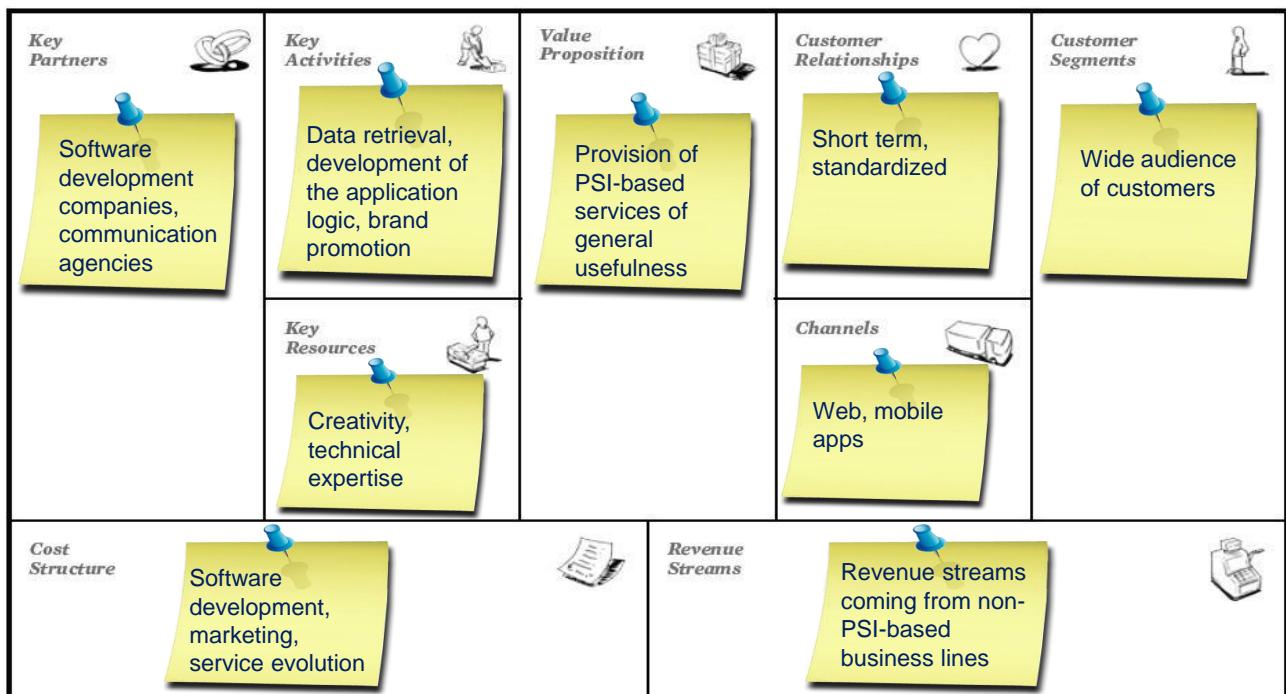


Figure 16 – Free as Branded Advertising (“Canvas” view)

White-Label Development

Types of Data Elaboration	Role of PSI in the Value Proposition
<input checked="" type="checkbox"/> Data aggregation <input checked="" type="checkbox"/> Data structuring and classification <input checked="" type="checkbox"/> Data geo-referencing <input checked="" type="checkbox"/> Data validation <input checked="" type="checkbox"/> Data mash-up <input checked="" type="checkbox"/> Visual analytics	<input type="checkbox"/> Final good itself <input checked="" type="checkbox"/> Key ingredient of a product <input checked="" type="checkbox"/> Key ingredient of a service <input type="checkbox"/> Marginal ingredient of a product <input type="checkbox"/> Marginal ingredient of a service

Price Mechanisms
<input type="checkbox"/> Premium <input checked="" type="checkbox"/> À la carte <input checked="" type="checkbox"/> Subscription fee <input type="checkbox"/> Royalties <input type="checkbox"/> Freemium <input type="checkbox"/> Feature limited <input type="checkbox"/> Time limited <input type="checkbox"/> Size limited <input type="checkbox"/> Free <input type="checkbox"/> Advertising powered <input type="checkbox"/> Cross subsidization <input type="checkbox"/> Zero marginal cost

Figure 17 – White-Label Development (“Framework” view)

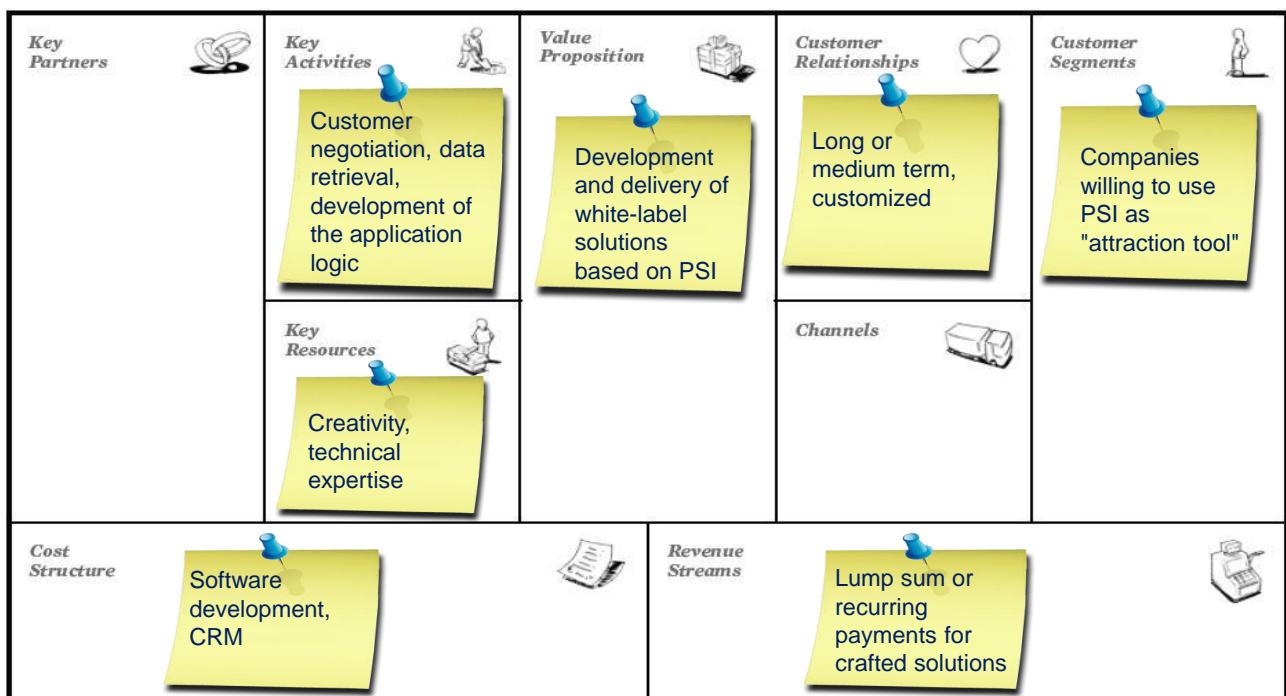


Figure 18 – White-Label Development (“Canvas” view)