Empathy in the business model: how Facebook and Google Maps manage external problem-solving processes

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Abstract

Keywords : Business models, Open Innovation, Problem-Solving.

This paper shows how leading Internet enterprises manage problem-solving processes occurring on their interfaces through the use of empathy. The data of the developer supports forums of Facebook and Google Maps reveal a particularly low problem solving rate (less than 15% of problems solves over a period of six months). To explain this phenomenon a generic construct for business models is proposed on the basis of empirical examination of the problem-solving process followed in those forums, rendering compatible the notion of empathy with well-known value adding activities.

1 Introduction

1.1 Approaches on Business Models

Google and Facebook are beyond any doubt among the leaders of innovation in digital economy. For instance, the OECD Digital Economy Outlook 2017 classifies these two companies on the Top 5 of Internet market capitalization leaders. The report borrows many details of their action as examples for the new tendencies in digital innovation (e.g. the way they implement Artificial Intelligence). At the same time, it examines the rest companies around the world using more elementary indicators, such as whether or not they dispose a Website or a broadband connection. In fact, the rise of the "tech giants" (Dobbs et al., 2015), has been an important preoccupation for a large range of established enterprises. Provided that innovation is studied as a problem-solving process (Baldwin et al., 2011; Simon, 1989, and others) taking place within business ecosystems (Adner and Kapoor, 2010; Van De Vrande et al., 2010; Tee and Gawer, 2009, and others), one would expect a high performance on problem-solving in the developer support forums of these leaders (i.e. that many problems reported in these forums would be solved). Yet, the data of the developer support forums of Facebook and of Google Maps examined in this paper show a particularly low problem-solving rate.

Open Innovation challenges existing business models introducing new ones, more open (Chesbrough, 2013, 2007), such as the freemium model (Baden-Fuller and Mangematin, 2013; Teece, 2010). While the influx and the outflow of information and knowledge throughout the boundaries of the enterprise has been early on identified as a reference point for capturing the

value of Open Innovation (Chesbrough, 2003; West and Bogers, 2014), less attention has been paid to the problem-solving processes taking place *on* those boundaries. In parallel, problem-solving theory is being challenged (von Hippel and von Krogh, 2015; Felin and Zenger, 2015) both in what concerns the process and the resulting value.

Studies on business models examine the actual mechanisms of value capturing in relationship with the problem-solving framework (Mangematin and Baden-Fuller, 2015; von Hippel and von Krogh, 2015; Achrol and Kotler, 2012; Zott et al., 2011), synthesizing the different perspectives from which business models have been addressed so far. Problem-solving performance itself can be measured as a function of the problems solved within a specific period of time (Öllinger et al., 2015; Thomke et al., 1998).

Another stream of research focuses on the expansion of the notion of business models to encompass *potential* values, too. For these studies, strategy is related to the *potential* of an enterprise to create value in the future (Tsoukas, 2017; Tsoukas and Chia, 2002; Felin and Zenger, 2015; Vaara and Whittington, 2012; Chrysos, 2013), as strategy benefits from the potential expressed in practice (Vaara and Whittington, 2012, p. 286). Scholars interested in understanding the dynamics of potential value, find that routines are not simple repetitions: instead, they change each time by integrating a part of this potential (Tsoukas, 2017; Tsoukas and Chia, 2002). Thus, forward-looking is a critical for enterprises as problem-solving places (Felin and Zenger, 2015), while time is needed to explore the potential value residing in future uses of new technologies (Chrysos, 2013; Gawer and Cusumano, 2002).

Still, managing the complexity of value creation in real-life situations is

not an easy task. Different ways are mobilized by scholars to tackle this challenge, such as the distinction of different focus of attention for different models (Mangematin and Baden-Fuller, 2015; Zott et al., 2011), the ways in which problems and solutions are coupled (von Hippel and von Krogh, 2015), as well as different market phenomena (Achrol and Kotler, 2012) related to the process.

As Teece and Chesbrough (2002) noted early on, what we observe in practice is most frequently the use of hybrid business models, of which the analysis requires the parallel study of the managerial challenges they imply. Thence, the study of Business Models can be operated through the examination of their elements and their corresponding linkages, as observed in the field, i.e. by studying their architecture (Ritter and Lettl, 2017; Leih et al., 2014; Chesbrough and Rosenbloom, 2002). In fact, to account for organizational complexity (Tsoukas, 2016), enterprises have to focus on different aspects of their activity, before considering them together (Birkinshaw et al., 2017). Carefully considering each idea separately in a contribution process "would consume lots of managerial attention" (Van Knippenberg et al., 2015). Thus, clarifying each time the focus of attention (Baden-Fuller and Mangematin, 2013) can contribute to the modeling of the ways in which different value elements are articulated in practice, thus providing a way to manage value in-between the levels of specific activities and holistic approaches.

Still, in value adding processes occurring in-between the internal and the external of an enterprise, a tension is observed between value creation and value capturing (Birkinshaw, 2017). To address this tension, we put forward the axiom of Value Realization - Value Capturing Distance. According to

this axiom, value is only delivered when Realization and Capturing are met.

1.2   A phenomenon-based approach

The developer support forums of Facebook and Google Maps will be studied as illustrations of problem-solving processes (Chesbrough et al., 2006; Lakhani et al., 2007; Baldwin and Woodard, 2010; Teece, 2010), and we are going to "detail the flow of value adding activities" (Ritter and Lettl, 2017) of the problem-solving processes empirically observed.

Our study will use a phenomenon-based research approach, aiming at the data-based distinction of the phenomenon, its empirical exploration and the suggestion of a generic design able to address it (von Krogh et al., 2012).

To collect the data, we will make use of the traces left online by the problem-solving process (Chrysos, 2016; Conaldi and Lomi, 2013; Nan and Kumar, 2013). The data is downloaded from the two forums and is examined for a period of six months. Examining the problem-solving performance of these settings, we'll be lead to the surprising finding that the problem-solving performance is particularly low. Then, we will then advance our research to answer the question "what is going on here" to find out "what is it all about" (Tsoukas, 2017; Langley et al., 2013). Operating an empirical study of the way Google Maps forum is managed, we will propose a generic model that renders our findings compatible with problem-solving and business model approaches.

To propose business model construct (Rietveld and Eggers, 2018; Zott et al., 2011; Teece, 2010; Tucci, 2001) we will make use of the axiom of value creation - value capturing distance, illustrated bellow.

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1.3 An illustration of the axiom of value realization - value capturing distance

To illustrate the challenge addressed by this study, let's consider an intuitive, everyday life situation, the activity of an enterprise commercializing technologies for business, before proceeding to the literature review (see Table 1) :

- *Value Delivery* refers to the actual delivery of the technology to the client. For instance, think about some new plotters being delivered at the local offices of a client active in the design business. In this case, the *value actually realized* is also *actually captured* by the successful selling of the plotters.

- *Value Proposition* refers to the technologies that are potentially available by the enterprise, without being sure of the capacity of the enterprise to actually create or deliver this value. For instance, think about the Google Car: almost everyone has heard about it, but no one can actually buy it. In such a case, we talk about a value proposition from a research project, a prototype or a concept car which *actually captures a value*, while the *realization remains potential* insofar it hasn't been turned into a product or a service.

- *Value Creation* refers to the actual creation of the technologies the enterprise proposes to a market. Still, not all the technologies are sold. For instance, think about the enterprises manufacturing terminals for the Minitel, the French data communication network preceding the Web, when the Internet started spreading in France during the late 90's.

	Value Capturing	
	Actual	**Potential**
Actual	*Delivery*	*Proposition*
	(e.g. plotters)	(e.g. Google Car)
Potential	*Creation*	*X*
	(e.g. Minitel)	

(With row label **Value Realization** spanning the Actual/Potential rows.)

Table 1: An illustration of the axiom of Value Realization - Value Capturing Distance.

> In this case, the *potential capturing* of the *value actually realized* by the Minitel manufacturer depended on the market share of the Internet.

As illustrated in Table 1, there is a missing point in the frameworks of value, yet present in technological businesses. It concerns the case where value creation, value delivery and value proposition are uncertain, altogether.

For instance, think about an entrepreneur who wants to find out whether it could be feasible to sell 3D printers to enterprises with low technical expertise, e.g. at nail salons, before it actually "becomes a thing". The entrepreneur should engage in an exploratory exchange with nail salons, trying to formulate a problem and illustrate a potential value for the use of such machines. Here, both value realization and value capturing are potential, but they may never become actual.

Let's name this particular situation "X" and mobilize it if necessary during the empirical study of the Google Maps Developer support forum. As we will see, considering this gap will allow us to frame a generic construct useful for contexts where problem-solving appears to have low performance.

This paper is structured as follows. Part 2 reviews the literature on value delivery, value proposition and value creation, through the perspective of the strategic importance of articulating different value elements in practice. Part 3 operates a phenomenological study exploring the phenomena of problem-solving in developer support forums hosted by two of the "tech giants", Facebook and Google. Part 4 suggests a typology and a generic flow model of value, integrating the empirical findings in the framework of business models.

2 Literature Review

Behind models of firms and the economy there often hides an intuition (Teece, 2017), to be complemented with reason (Das and Long, 2010). Our intuition is that the study of problem-solving processes occurring on the boundaries of services like Google Maps and Facebook can provide new insights on the way emerging value is managed and can be integrated into different business models. In fact, empirical evidence from the adoption of emerging technologies has shown that new value is not easily accumulated in existing business models: instead, a challenge for enterprises adopting new technologies is the *"maximal preservation of existing complementary assets"* (Khanagha et al., 2013). While facing this challenge, enterprises are lead to review or even re-consider their business model (Khanagha et al., 2014). In technology mediated environments, leveraging complementor (i.e. external developers) dynamics has been suggested to be a levier for competitive advantage (McIntyre and Srinivasan, 2017; Gawer and Cusumano, 2008). Crowd-based input is one of the contemporary ways for capturing propositions from a

large pool of individuals in a process controlled by an enterprise (Birkinshaw, 2017; Howe, 2006). However, research on digital networks has shown that the value leveraged doesn't fit into the usual categories: instead, values such as *self-expression* (Jensen Schau and Gilly, 2003) and expression of identity (Haefliger et al., 2011) emerge during the process. In innovation processes taking place beyond the standard enterprise procedures, personality and openness to experience can have a positive impact (Stock et al., 2016; Bozeman and Fellows, 1988). Still, there is an unexplored tensions between value creation and value capturing in open processes (Birkinshaw, 2017).

2.1   Open processes and fragile engagement

Business models can be defined as the relationship between creating value for the customer and capturing value for the firm (Teece, 2010; Baden-Fuller and Morgan, 2010). Still, this relationship is not automatic: value can be created for the customer without being captured by the firm. Hence, "to profit from innovation, business pioneers need to excel not only at product innovation but also at business model design, understanding business design options as well as customer needs and technological trajectories" (Teece, 2010, p. 173). To tackle the complex problem of value creation, delivery and capture (Zott et al., 2011) a modular approach has been suggested, decomposing each dimension to a module (Aversa et al., 2015). A very well-known case where value created cannot be captured is the "chicken and egg problem" in N-sided markets (Rietveld and Eggers, 2018; Eric et al., 2007; Rochet and Tirole, 2003, and others).

To manage processes of value emergence the variable of *time*, often ne-

glected in management research (Langley et al., 2013), should be taken into account. Process research "focuses empirically on evolving phenomena, and it draws on theorizing that explicitly incorporates temporal progressions of activities as elements of explanation and understanding" (Langley et al., 2013). For instance, the temporal progression of the activities of the Wikimedia Foundation (the nonprofit that operates Wikipedia) evolved around the local/national constrains and opportunities, understood and explained by Wikipedia contributors, with Wikimedia limiting its own role in *"identifying growth opportunities in key markets and coming up with ways to keep contributors satisfied"* (Newstead and Lanzerotti, 2010). While raising the issue of relevance of the action modes observed in non-profit organizations for the study of enterprises, research has also suggested the use of data mining methods to better seize emerging topics (Dobusch and Kapeller, 2017). Value management activities that depend on external contribution focus on *potential* engagement in the process, i.e. engagement that cannot be taken for granted in standard way (Stieger et al., 2012; Toubia and Florès, 2007). In fact, while a lack of engagement in a contribution process can intuitively be expected for non-employees, research has shown an extremely low participation to such processes from employees, too (Denyer et al., 2011). Thus, studying value that may be added in a future time, requires methods and models that are based on empirical data, albeit remaining open to future, unpredictable and not fully controlled engagement.

In value processes depending on user engagement (Baden-Fuller and Haefliger, 2013), one should know that there is always the possibility of the community to collabse, as "contributors do not work for the organization and

have many other alternative ways to spend their time and talent" (Chesbrough and Appleyard, 2007, p. 68) and the possibility of collapse is always present for the community. This uncertainty becomes even more important when it comes to value creation through open innovation, where the path for innovation is not only *"unknown, it is unknowable"* (Chesbrough, 2004, p. 34). Yet, far from being territories for the enterprise to avoid, unknown concepts have been suggested to play a crucial role in an enterprise's strategy (Hatchuel et al., 2010).

Taking into account the important part of the unknown ruling open processes, our study considers the distinction between *actual* and *potential* value. Actual value refers to the present, for instance the value that an enterprise already delivers through selling its products. Potential value refers to the future, for instance a value that could be contributed by third parties which are not employed by the enterprise.

According to their focus of attention (Mangematin and Baden-Fuller, 2015; Zott et al., 2011), we can review the elements of business models in terms of 1) value creation, 2) value proposition and 3) value delivery. Different business modules focus on different aspects of value, articulated in broader value chains, potentially spreading across the industry.

2.2 Business Modules Focusing on Value Creation

Business modules focusing on value creation focus on the way value is realized, rather than the mechanism by which it is eventually captured. In problem-solving, this approach considers that added value comes rather from the configuration of the means to solve a problem than from the delivery of

its solution.

In organizational theory, March et al. (1993, p. 199) focus their attention on the processes of "aggregating simple elements" of the problem, "searching for information" in various repositories and "screening items" to test if they "qualify for possible solutions" , rather than ways to deliver a given solution. In organizations, problem-solving is typically seen as "cognitive enterprise undertaken by individual members" (Argyris, 1977, p. 12), rather than integrating input from individuals that may not even be members.

For instance, in the development of platform technologies, platform leaders "create a neutral group inside the company, with no direct profit-and loss responsibility, as well as a Chinese wall between the platform developers and other groups" (Gawer, 2010, p. 56). The internal organization follows design rules, successfully limiting the scope of the problems to be solved from different organizational units (Baldwin and Clark, 2000), to the extend open digital settings for the development of new technologies are not used in the process (Colfer and Baldwin, 2016). This approach requires, however, that the technological interfaces are stable. To that these interfaces are not yet stabilized, new modes of coordination emerge (Colfer and Baldwin, 2016).

An example can be found in the history of the mainframe computer preceding the launch of the notorious IBM 360 System: while early mainframe computers were used by enterprises for the task of printing payrolls, it became evident that they could be also sold to airline companies for ticket booking. Yet, while there was an actual value to capture, there was a missing piece to enable the realization of this value: dynamic memory. Failing to invent such a memory, many early computer companies where forced to leave the market

(Chrysos, 2013).

Enterprises focusing on value creation, e.g. suppliers or manufacturing units of large corporations, prioritize indicators such as the volume of production or technological goals to measure the performance of their activity. Their major challenge is to manage organizational and technological interfaces and to assert their criteria within the broader value chain.

2.2.1 Business Modules Focusing on Value Proposition

Business modules focusing their attention on value proposition seek to capture potential value on the basis of value that has already been realized. It is typically the case of services that provide a place where different stakeholders can match around a value proposition. Value proposition can be seen as a "cognitive artifact" (Argyris, 1977, p. 12), which captures the value realized by the long process of becoming an expert.

While autonomous communities, such as Wikipedia (Benkler, 2006), are often used as an example to follow, a growing corps of literature specifically focuses mechanisms to capture value from expertise in a large range of domains. For instance, Ebner et al. (2009) suggested a way to "engineer communities" in order to capture the value of expertise of SAP software users by motivating idea contribution, thus leveraging "the potential of the crowd" (Ebner et al., 2009). Lakhani et al. (2007) managed to capture scientific expertise of 26 firms by sharing scientific problems with over 80,000 independent scientists from over 150 countries. In parallel, Soukhoroukova et al. (2012) suggested a community design for enterprises to capture good ideas through idea markets. Haefliger et al. (2009) suggested that rating

mechanisms within an online community can capture evaluations of contributions by members of the community. Such mechanisms, while initially used to leverage external ideas (Piller and Walcher, 2006) are progressively used within the boundaries of the enterprise, too (Elerud-Tryde and Hooge, 2014). However, the articulation of value capturing and value creation in this context largely remains an open issue (Birkinshaw, 2017).

2.2.2 Business Modules Focusing on Value Delivery

Business modules that focus on value delivery bring together actual value realization and capturing.

In services, value capturing and value realization often occur simultaneously, during what is also called the "moment of truth" (van der Valk and Wynstra, 2014; Gummesson, 1990; Grönroos, 1990) when the enterprise delivers the service and the client pays. This mode often emphasizes on the "prescription" of value to its consumers (Benghozi and Paris, 2007; Hatchuel, 1995), as some knowledge on the product or the service is necessary in order for a transaction to conclude.

The "freemium" model, broadly met on the web (Baden-Fuller and Haefliger, 2013; Teece, 2010) challenges this approach, with the dissociation between the value capturing and the value realization, as enterprises first capture users and "initiate" them to the value of the product before - some of them - actually pay for an advanced use. In parallel, on-line client communities can also undertake the task of prescribing the required knowledge to potential (Eric et al., 2007; Jarvenpaa and Lang, 2011).

Globally, value can be delivered by stakeholders who did not create or

propose it. Enterprises focusing on value delivery prioritize the indicator of the volume of sales in the measurement of the performance of their activity. Such a focus is typically the case for services or marketing units of large corporations and after sales services. Their challenge is to engage customers in the desired transaction, as external stakeholders do not necessarily follow the rules defined internally.

2.3 Hybrid and Emerging Value Models

While the Web is used in different business models according to the value focus of each enterprise considered from the perspective of a business ecosystem, it also creates the space for the emergence of new, hybrid actors (Felin and Zenger, 2014; Raasch and Von Hippel, 2013; Chrysos, 2013; Fauchart and Gruber, 2011), often developing value by and for their own. Hybrids can come either from the "fogginess" of the value itself or by the unstable nature of the actors implied in innovation processes (Chrysos, 2013), for which the very participation in the process can be a sufficient motivation to innovate.

Hence, according "private-collective model" (von Hippel and von Krogh, 2006), which has principally emerged through user innovation studies and the case of open-source software (von Krogh et al., 2012), value proposition is made by and it is delivered the users (von Hippel, 2007), while the process of value creation is undertaken within user communities (Sojer and Henkel, 2010; Lakhani and von Hippel, 2003). Enterprises harness community-based value development by participating in value creation (West and Lakhani, 2008), by capturing value propositions (Lakhani et al., 2007; Mahr and Lievens, 2012) or using them as a network for value delivery (Kalyanam

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et al., 2007; Fichter, 2009). While the scale of value development in self-sufficient models is most usually insignificant when compared to the value development from the enterprises, such third-party stakeholders, different from customers, suppliers or partners, can be integrated in a business model as complementary processes (Baldwin et al., 2011), for potential value capturing or realization. In parallel, those developing value in this mode, the "developers" can have hybrid incentives which can be transformed in the way (Raasch and Von Hippel, 2013). Besides, value created in a "bottom up" mode for own use, can also trigger entrepreneurial incentives (Haefliger et al., 2010; Shah and Tripsas, 2007).

3 Research Methodology

The following paragraph outlines the setting of the developer support forums of Google Maps and Facebook, which have identical procedures.

As pointed out by von Krogh et al. (2012), the first step of phenomenological research is the distinction of the phenomenon from against existing practices. To this end, we use evidence provided by the data of the two forums. The analysis of data coming from online settings has become a common practice, especially in field of software development, where the traces of online collaboration are available to harness (Chrysos, 2016; Conaldi and Lomi, 2013; Nan and Kumar, 2013).

Then, we proceed to an empirical exploration to "detail the flow of value adding activities" (Ritter and Lettl, 2017) in the case of Google Maps forum. This exploration will suggest a construct (Rietveld and Eggers, 2018; Zott et al., 2011; Teece, 2010; Tucci, 2001), inducing the concept of *empathy*,

which can serve to distinguish relevant from irrelevant data to describe the phenomenon (von Krogh et al., 2012), beyond the concepts of the problem-solving frameworks.

Finally, based on the evidence of our study, we will discuss how empathy in problem-solving processes can extend current business models.

3.1   The setting

Our study examines two developer support forums, the one of *Google Maps* and the one of *Facebook*. The selection of these two enterprise forums is based on the fact that they are both among the leaders of the sector, as they emerged and grew within the very context of on-line business. These elements suggest that an identification of "strange", yet common methods is very likely to be representative of the original action norms used in the specific industrial settings.

The identification of the websites where forums themselves are situated is easy, as a Web search with the name of the enterprise and the keywords "developer support" is sufficient to identify the addresses of the corresponding forums. In addition, these sites provide the option to actually download the entire discussion files. In this paper, the problem-solving cases studied concern the period from 1/1/2010 to 31/5/2010. In the forums, a formal pattern is easily distinguished: the conversation opens by the reporting of a problem (e.g. structural problem on the data format). In all cases, the reporter of the issue, is, himself, concerned by it and has met it during his own activity, as indicated by the usual expressions of the reporters (e.g. "*I need to. . .* ", "*I am getting an error. . .* ", "*I don't know the problem in my*

code, but. . .").

Once the issue is reported anyone can reply. Typically, the employees of the firm, may provide solutions (e.g. "*why don't you try this ?*"), demand more information (e.g. "*can you give us more information to reproduce the problem?*") and structure the conversation by characterizing it (e.g." *the conversation status changed to Acknowledged*"). In addition, other developers may join the discussion and either ally with the reporter, emphasizing on the need to solve problem (e.g. "*I have the same problem!*"), or provide solutions themselves (e.g. "*try doing this, instead*"). The conversation pattern distinguished above is independent common for both forums.

Once the problem is well defined, so as the value proposition becomes clear, the enterprise lets the developers know that the report or request has been acknowledged and that an internal process has been undertaken for its resolution. Eventually, when the "bug" is fixed or the feature is integrated in the platform, the enterprise informs the community.

While the setting appears to serve the will of both Facebook and Google to leverage external developer dynamics (McIntyre and Srinivasan, 2017; Birkinshaw, 2017; Gawer and Cusumano, 2008), the way in which it appears to be done is through problem-solving (Mangematin and Baden-Fuller, 2015; von Hippel and von Krogh, 2015; Achrol and Kotler, 2012; Zott et al., 2011). Moreover, personal expression (Stock et al., 2016; Haefliger et al., 2011; Jensen Schau and Gilly, 2003; Bozeman and Fellows, 1988) transcends the ways in which issues are reported and discussed. In addition, the distinction between internal and external stakeholders is difficult (Birkinshaw, 2017) and one can induce their identities by the content of their post and

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their e-mail address.

Overall, this process could be seen either as a process of *actual value capturing* (as it is much about clarifying problems) or a process of *actual value realization* (as problems solved concern the enterprise's own product). However, the conversation does not always lead to value capturing or value realization: sometimes, reports may be due to ignorance on how the technologies actually work, while problem formulations and problem resolutions are not always accomplished. In addition, the Web platform under discussion is not solely used by the enterprise: it is also used by third parties to create their own applications and, thus, serve their own - often emerging - business models.

3.2   Data-based distinction of the phenomenon

To intensify data gathering inside the focal concept (von Krogh et al., 2012) of problem-solving to test the relevance of the problem-solving framework to this particular phenomenon, we use the data available by the online settings (Chrysos, 2016; Conaldi and Lomi, 2013; Nan and Kumar, 2013) in a CSV (Comma Separated Values) format. The data contains a full account of all issues and problems reported during the examined period, along with their status at the end of the period (i.e. whether they have been resolved or not). Their elaboration was made by the use of the Perl programming language.

We find that what appears to be a problem-solving process is less so, as it is characterized by a very low rate of problems solved.

For the calculation of the number of the problems reported we subtracted from the total number of issues, the number of the duplicated ones, i.e. those

appearing twice or more in the forum and thus have been merged.

It is a common practice to use the *rate* of problem resolution within a specific period of time, to qualify the performance of a problem-solving activity (Thomke et al., 1998; Öllinger et al., 2015). Thus, the performance of problem-solving is eventually measured in terms of solutions provided.

Accepting for the moment that the problem-solving framework is sufficient to analyze our data, we measure problem-solving performance to test the relevance of this framework (von Krogh et al., 2012) for the for the two different developer support forums, *Google Maps* and *Facebook*.

Examining whether or not the problems (*"defections"*) reported in the forums by the users are eventually solved, for the period examined. To extract the evidence of from the data we calculate the following indicator:

$$\text{Problem-solving performance} = \frac{\text{Problems solved}}{\text{Problems reported}}$$

In the case of the *Facebook* developer forum, **1821** problems were reported from external developers during the period from 1/1/2010 to 31/5/2010 (not counting the 198 issues reported that were merged with previous discussions). From the problems reported, **296** were resolved within the same period. Hence, the problem solving performance, as defined previously, is **14%**. In the case of the *Google Maps* developer forum, **325** problems were reported from external developers for the same period (not counting the **24** issues that were merged with previous discussions). From the problems reported, 32 were resolved within the examined period. Hence, the performance in this case is **10%**.

The findings on problem-solving rates for the two Web services platforms indicate a low resolution of problems, compared to the importance problem

solving typically has for enterprises, as proposed by management scholars.

For instance, for sectors such as telecommunications, it would be empirically absurd for a user to face a problem with her connection and only have a 14% chance it being solved within a period of six months.

3.3 Empirical exploration of the observed process

To propose more relevant concepts for the study of the phenomenon, provided that the problem-solving rate has been found to be particularly low in the previous step, we operate a qualitative analysis of three types of data from the *Google Maps* developer forum, focusing our attention into the data samples.

To this end, additional insight from internal Google documentation on the management of developer support forums were taken into account. In fact, reading the guide "Issue Tracking: Why & How" written by a Google manager and addressed to her colleagues one sees that employees themselves attempt to produce some criteria and best practices on how to manage third-party developers. As typically mentioned in its introduction, *"the area of developer support is quite new, and there isn't much written about how to do it - what works, what doesn't"*. Moreover, the role of the enterprise is not limited to solving problems reported by developers. As stated during the interviews, sometimes the aim is to make developers *"keep faith"* on the enterprise, and to cultivate a form of *"empathy"* between the enterprise and the developers. This insight is inline with current reflections on Open Strategy, according to which *"the way senior executives treat these two very different groups of people [internal and external stakeholders], for example in terms of how to make an open-strategy discussion forum work well, are*

remarkably similar" (Birkinshaw, 2017).

The Table 2 shows samples of the discussions in the Google Maps forum. To address the case where what appears to be as a problem-solving process does not lead to solutions eventually, an additional concept needs to be introduced, beyond the problem-solving and the value management literature. More specifically, there is a need to name situations where the configuration of the problem or the value themselves remains unknown and thus, goes beyond the well-known categories.

Thus, the concept of *empathy* can describe actions that occur during situations where both value capturing and value realization remain uncertain.

More specifically, *Value Delivery* takes place when a solution is directly provided by the enterprise to the external developer. In the sample cited above, a developer requests the development of a new mechanism to achieve a desired effect during the use of Google Maps technologies. Google replies that there is no need for an extra mechanism and indicates the way to achieve the same result with the existing technologies. Here, we have both an actual value realization and an actual value capturing, as no further development is required by the enterprise and the user can actually use the technologies as previewed.

The same forum is a place for *Value Propositions*, too. In the sample cited above, Google asked for input about the technology related to biking that they have developed, hoping to capture additional value. The potential of capturing new value, however, was never achieved through this forum, as, unfortunately, no one replied to this request.

The third sample provided in the Table 2 illustrates how Google is lead to

Samples of Empirical Evidence		Value Capturing ?	Value Realization ?	Business Module
Request	**Reply**			
Developer: "In many cases a custom MapType needs to respond to events fired by Map. Currently the MapType specification does not provide such mechanism so those interaction has to be done outside the custom MapType class. It will be nice to have a way to assign the map instance to the map type."	**Google:**"*Status: Won't Fix* Hi. You can listen to the events in the map object and check whether your map type is selected or not to act accordingly."	Actual	Actual	Delivery Google informs the reporter that there is no actual problem, the reporter just needs to implement the solution. The value is actually realized and captured by providing instructions to the developer on the right use of the technology.
Google: "What would you like to see us add to this API? You just add BICYCLING as a route type on the Maps V3. This seems like a simple addition that could be included in the Flash API. Thank you ******************************** For developers viewing this issue: please click the 'star' icon to be notified of future changes, and to let us know how many of you are interested in seeing it resolved. ********************************"	(No Reply)	Potential	Actual	Proposition Google Maps has developed a technology for biking. However, it feels that not all the value of the technology is captured, so it asks for propositions. No one provides feedback and the issue remains open.
Developer:"The changelog hasn't been updated yet, but there was an update from 3.28 to 3.29 recently. Since then, there is a rendering bug with the navigation control in IE8 where every control load the full png for buttons. This bug happens most of the time, but not always."	**Google:**"Reassigned to lu...@google.com."	Actual	Potential	Creation The request is validated by Google, who understands that there actually is a value to capture. A problem-solving process is assigned to realize in the future the value acknowledged by the enterprise.
Developer 1: "Please add support for map maker tiles for version 3. It's available on version 2 via G_MAPMAKER_NORMAL _MAP and G_MAPMAKER_HYBRID _MAP (GMapType values in v2)." **Developer 2:** "This layer is really useful since most of Latin America is where the real updated maps are, apparently the ones acquired initially by Google some has a lot of errors. For example in Guatemala, current google map data is useless and has errors, a lot, repeated towns everywhere etc, and this MAPMAKER layer is the one. . . :-) regards, please add this. . . " **Developer 3:** "My city has no roads in Google maps, except the main avenues. But in map maker people have maped the whole city. It would be very useful to have this feature. Pleeeeease :)"	**Google:**"Status: New"	Potential	Potential	Empathy Google acknowledges that the request has potential value, by stating that this is new. Meanwhile, other forum visitors express their interest for the same request. However, Google does not engage in any value creation process and the issue remains open.

Table 2: Empirical samples of discussions in the Google Maps Developer Support forum.

realize new value, in order to capture value that it has actually acknowledged. A problem is reported concerning the update of a version of the Google Maps technology, which affects the use of the service through the popular browser Internet Explorer. Google sees the problem and understands there is an actual value to capture. Thus, they assign the realization of the value (the correction of the update causing the problem) internally.

Finally, Empathy emerges for all the other cases that cannot be channeled to the well known ways to manage value. In the sample provided, a developer requests support of an old feature for a new version of the technology. Other developers express their personal interest and ask Google in a friendly manner to realize this value. Google replies by indicating that this issue is, in fact, new, implying that the request could potentially be addressed. However, it never satisfies this demand and the issue remains open.

4 Discussion

The tension between value creation and value capturing (Birkinshaw, 2017) has been addressed in this paper by the introduction of the axiom of value realization - value capturing distance. Thus, we put forward a business model construct (Rietveld and Eggers, 2018; Zott et al., 2011; Teece, 2010; Tucci, 2001) of which a part we initially named X was incomplete.

The study of developer support forums as settings for problem-solving (Chesbrough et al., 2006; Lakhani et al., 2007; Baldwin and Woodard, 2010; Teece, 2010) revealed that appearances may be illusionary: the rate of problem-solving for a period of six months was bellow 15% for both Facebook and Google Maps developer support forums. This striking evidence distinguishes

the phenomenon (von Krogh et al., 2012) from existing problem-solving processes.

Further on, we empirically explored what was "going on" (Tsoukas, 2017; Langley et al., 2013) by looking into the specific content of the data samples. Even though in many cases the preservation of existing assets (Khanagha et al., 2013) was put forward by Google, indicating to already existing solutions, a very important amount of issues remained open.

The insights provided by an internal Google manual were revealed very useful, indicating that the lack of clarity in the roles between internal and external contributors (Birkinshaw, 2017) is not only a gap in the literature but also a fact in the field. Reviewing the business model (Khanagha et al., 2014) was through the practice of supporting developers, while leveraging external developer dynamics (McIntyre and Srinivasan, 2017; Gawer and Cusumano, 2008).

Empathy thus fills in the missing part of the construct we put forward in the introduction. Innovation situations taking personal characteristics (Stock et al., 2016; Haefliger et al., 2011; Jensen Schau and Gilly, 2003; Bozeman and Fellows, 1988) can be addressed through empathy. Overall, the friendly, intimate ambiance that characterizes the exchanges in the forum may be blurring the roles of internal and external contributors, but it also revealed useful in situations where engagement cannot be taken for granted (Baden-Fuller and Haefliger, 2013; Stieger et al., 2012; Toubia and Florès, 2007; Chesbrough and Appleyard, 2007), as it helps keep contributors satisfied (Newstead and Lanzerotti, 2010) while the solution of a problem remains unknowable (Chesbrough, 2004).

	Value Capturing	
	Actual	**Potential**
Actual	*Delivery*	*Proposition*
	(e.g. plotters)	(e.g. Google Car)
Potential	*Creation*	***Empathy***
	(e.g. Minitel)	**(e.g. Google Maps developer forum)**

Table 3: A generic typology of value modules.

Thus, Table 1 can now be completed as shown in Table 3. Value modules (Aversa et al., 2015) are here integrated in a generic typology taking into account situations where the value cannot be created, delivered or proposed yet, but there's the feeling or the intuition that it should emerge.

Insofar potential value is crucial for strategy (Tsoukas, 2017; Tsoukas and Chia, 2002; Felin and Zenger, 2015; Vaara and Whittington, 2012; Chrysos, 2013) rendering it compatible with known forms of value through the notion of empathy contributes to strategic planning frameworks.

From a practical perspective, we can detail the flow of value adding activities (Ritter and Lettl, 2017) using the typology of the Table 3 as shown in the Figure 4. In the search for possible solutions (March et al., 1993, p. 199), expertise (Argyris, 1977; Hatchuel and Weil, 1995) may meet its limits in face of unknown situations. During this process, the internal (Elerud-Tryde and Hooge, 2014; Reid et al., 2014; Iansiti and Clark, 1994; Cooper, 1990) and the external level (MacCormack et al., 2001; Chesbrough, 2003; Reid and

de Brentani, 2004) meet at the problems occurring in the technical interfaces (Baldwin and Woodard, 2010; Gawer and Cusumano, 2002), as we explored empirically. Empathy can be integrated into business model by a decision making process on whether the value under exploration is actually realized and captured or not, bridging the internal and the external levels.
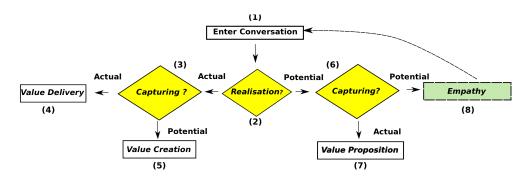

Figure 1: A flow model for integrating Empathy into business models

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5   Implications, Limitations and Future Research

Advancing the hypothesis of a distance between value capturing and value realization, and acknowledging the difference between actual and potential value, this study was able to seize an original way of value management by examining on-line developer support forums. The induced framework offers a generic way to address value that hasn't yet been created, delivered or proposed, by using empathy.

In Open Innovation (Chesbrough, 2013, 2007, 2004) new value may come from the outside, under conditions that are not fully controlled (Birkinshaw,

2017; Birkinshaw et al., 2017; West and Bogers, 2014). While using hybrid business models (Teece and Chesbrough, 2002), enterprises can expand these models to ecosystems (Adner and Kapoor, 2010; Van De Vrande et al., 2010; Tee and Gawer, 2009) by problem-solving processes (Baldwin et al., 2011; Simon, 1989, and others) that stream the requests of the third parties towards value realization or value capturing mechanisms.

This process is not limited to a simple task of information management, as it requires the the enterprise to focus its attention (Mangematin and Baden-Fuller, 2015; Zott et al., 2011) on the formulation of the requests, both in what regards the ways in which the value can be captured and the ways it can be realized, as they way in which problems and solutions can be coupled (von Hippel and von Krogh, 2015) may not be actually visible and thus require forward-thinking (Felin and Zenger, 2015). In situations where technological potential remains to be explored (Chrysos, 2013; Gawer and Cusumano, 2002), empathy enables researchers and enterprises to further address the phenomenon of potential value management.

Coherent with an architectural view of business models (Ritter and Lettl, 2017; Leih et al., 2014; Chesbrough and Rosenbloom, 2002) and the need for enterprises to tackle organizational complexity (Tsoukas, 2016), the suggested model for using empathy to manage the flow of value adding activities is suggested as a practical tool for strategy.

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