Institutions and Collaborative Innovation

Chander Velu

Abstract

This paper explores the importance of developing institutions as a means to govern collaborative innovation among stakeholders such as individuals and firms. We argue that institutions are a key element in the creation of markets to enable and sustain collaborative innovation. Institutions can be both informal and formal. Informal institutions include conventions, moral rules and social norms whereby there is no external enforcer. Formal institutions need external enforcement by a third party. We use the prisoner's dilemma game and the empirical results from it as an analogy to draw lessons about how institutions could be developed to enhance collaborative innovations. We use case vignettes to illustrate our findings. We draw implications for managers to shape the institutional structure for collaboration by demonstrating the importance of fairness, reciprocity, development of social capital and understanding demographic characteristics of the participants. In addition, we show when participants are less homogenous, a formal external agency is needed to encourage collaboration.

1 Introduction

Starbucks, the premier roaster and retailer of specialty coffee in the world, uses an online forum called MyStarbucks Idea to enable customers to provide ideas for innovation of its products and services. Starbucks recently launched a cup holder that enables customers to mix sugar with ease while holding the cup. This innovation was developed from the ideas generated by customers through

C. Velu (✉)
Department of Engineering, Institute for Manufacturing, University of Cambridge, 17 Charles Babbage Road, Cambridge, CB3 0FS UK
e-mail: c.velu@eng.cam.ac.uk

A. Brem, É. Viardot (eds.), *Adoption of Innovation*,
DOI 10.1007/978-3-319-14523-5_7

MyStarbucks Idea. HP recently formed an alliance with Brightidea.com to provide custom innovation portals in order to collaborate with customers, employees and partners. The concept of sourcing ideas from outside the firm to stimulate innovation is not new. However, firms are increasingly making the search for new ideas from outside a systematic process and a strategic capability to drive growth. The increasing prevalence of such a phenomenon is resulting in a call for marketing scholars to study innovation within a networked ecosystem of firms (Day 2011; Achrol 1997).

Idea generation to commercialization of new ideas was traditionally done internally, and firms rarely resorted to sharing innovative results as a means to generate competitive advantage (Chesbrough 2003). However, firms are moving to a more collaborative approach with customers, suppliers and even with competitors to drive innovation and growth. Such a process calls for collaboration and management of both multiple stakeholders, namely the hub firm and its partners and among partner firms. The forces that are shaping the move to a more collaborative innovation model are globalization, the intensity of technological change and shift in industry borders (Gassmann 2006). Although the concept of collaborative or open innovation has been extolled much in academic research and the popular press, one of the major issues to consider is the incentive for firms and customers to cooperate among each other (Vanhaverbeke et al. 2008). Often the act of opening up involves the risk of not keeping to the 'open' philosophy and ownership of intellectual property (Von Hippel and von Krogh 2006). Most existing studies in marketing assume that the market already exists and that firms need to find a way of competitively differentiating themselves from competitors (Humphreys 2010). However, in the case of radically new product and service propositions, the market itself needs to be created. Institutions and the associated governance is a key element of creating new markets. The sustainability of the collaborative innovation model calls upon the need for institutions to govern how participants cooperate with each other for their mutual benefit. This paper seeks to show how the development of institutions to govern cooperation of individuals and firms can be developed (Mantzavinos 2001). First, the paper will look at the development of informal institutions such as convention, moral rules and social norms in the absence of a formal external enforcer. Second, the paper will look at the development of formal institutions where third party entities are needed to encourage cooperation.

In this article, we develop a conceptual framework to understand the relationship between institutions and cooperation for collaborative innovation. First, we demonstrate the tension faced by firms in wanting to cooperate in order to benefit from collaboration whilst facing the threat of defection by using the prisoner's dilemma game as an analogy. We then use empirical results from past research on the prisoner's dilemma to draw lessons about how firms can develop the appropriate institutional structure to encourage cooperation between stakeholders in an ecosystem. We illustrate our findings using case vignettes.

The next section discusses the prisoner's dilemma as the conceptual model. Section 3 looks at the development of institutions as the governing mechanism for collaborative innovation. Section 4 looks at the managerial implications and concludes.

2 Prisoner's Dilemma Conceptual Framework for Collaborative Innovation

One of the key areas of capability for embracing the open innovation business model is the ability to search for information to solve problems in order to innovate (Nelson and Winter 1982). However, for firms and communities to be involved jointly in such a collective problem solving initiative calls for cooperation from the stakeholders. One can look at this problem as a prisoner's dilemma game.[1] As is popularly known in game theory, the predicated outcome of the prisoner's dilemma (see Fig. 1) is for the players to defect as opposed to the optimal outcome of cooperation.[2] Playing defect is the dominant strategy for both players and is the only Nash equilibrium of the prisoner's dilemma, as there is no incentive for any of the players to change their strategies. This is analogous to the case where collaboration in an open innovation business model via a community can increase the payoff to the participants but defection by any one party (non-cooperation) could be the dominant strategy. For example, this could be the case when one of the firms or individuals once they have acquired the requisite knowledge or intellectual property decide not to continue cooperating but decide to profit from the discovery themselves. However, empirical testing of the prisoner's dilemma in laboratory experiments has shown that subjects are prone to cooperate far more often than

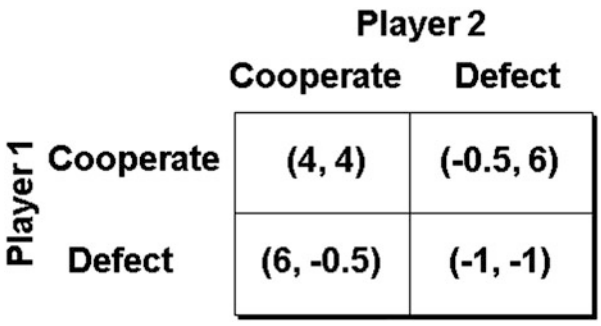

Fig. 1 Prisoner's dilemma [*Source* Adapted from Axelrod and Hamilton (1981, pp. 1392)]

[1] A public goods game is also appropriate to study the context of cooperation in this paper. A public goods game is essentially a prisoner's dilemma game with many players. However, for simplicity and tractability we use the prisoner's dilemma game as the conceptual model.

[2] The payoff to the prisoner's dilemma game is as shown in Fig. 1 where two players (1 and 2) have to decide whether to cooperate or to defect. If both players cooperate they both get a payoff of 4. However, both player 1 and player 2 could be better off by playing defect regardless of what the other player does. If player 2 chooses defect, player 2 gets 6 which is higher than 4 from playing cooperate, if player 1 chooses cooperate. On the other hand, if player 1 chooses defect as well, player 2 gets 1 by choosing defect instead of only 0.5 by choosing cooperate. The same reasoning could be applied to player 2 as well. Therefore, both players would reason that they are better of defecting and as a result end up obtaining a payoff of 1 each. Ironically this is less than the Pareto optimum of obtaining a payoff of 4 each by both cooperating.

Table 1 Type of institutions for governance

Type of institutions	Method of governance	Enforcing mechanism	Case examples
Informal Institutions	Conventions	Self-policing	Free Software Foundation (FSF) and sharing of software codes
	Moral rules	First party	IBM Philosophy of collaboration (e.g., ThinkPlace, InnovationJam, Virtual Worlds) Thomson Reuters and Hedgehogs The Sims Computer Games and User Modifications
	Social norms	Third party: Social forces, i.e. Individuals of the Group	Intel and 'Open Kimono'
Formal Institutions	Law	Third party: State	Nesta and 'Open Alchemy' Orange and the 'Air-Lock' System

Source Mantzavinos (2001, pp. 85)

game theory might lead us to predict in both one-shot games and in finitely repeated games (Axelrod 1984; Sally 1995). However, often for such a cooperation to develop one needs institutions as a mechanism for governance (Dixit 2003). How are such institutions formed in order to encourage cooperation?

In order to examine this question, we need to provide an understanding of how individuals perceive the world and connect with others. The starting premise is that individuals and firms use inferential strategy and analogy from solutions to other similar problems to solve their existing problems in order to maximize utilities or profits respectively (Mantzavinos 2001). Individuals or firms continuously test hypotheses in order to learn. Through this process of continuous testing of hypothesis, individuals and firms learn and develop a common view and form common mental models of the world (Mantzavinos 2001, pp. 67–69). If such a common mental model is formed then it is possible that individuals and firms would want to cooperate. This bias to want to cooperate is based on norms,[3] such as having experienced the benefits of cooperation, or the sanctions from not cooperating. Such norms apply to the prisoner's dilemma game whereby cooperation is observed from empirical testing of the game although this is not in line with the theoretical predictions (Sally 1995). Therefore, in order to foster such cooperation among individuals and firms, one needs an institutional framework to create and support the market (Mantzavinos 2001). These institutions can be both informal and formal institutions as shown in Table 1.

Informal institutions are conventions, moral rules and social norms whereby there is no formal external enforcer[4] (Mantzavinos 2001). The enforcing

[3] A norm is a widely held belief by a group or community about how members should behave in a particular context and hence, are expectations about behavior that are partially shared by the members (Gibbs 1981; Moch and Seashore 1981).

[4] These terms are discussed further in the following sections.

mechanism is either the individuals themselves or third party social groups. On the other hand, formal institutions require the sanction of law and third party enforcers such as the state or a large focal firm. Institutions are required to create a market—a key element for marketing scholars and practitioners. The next section looks at various institutional structures and how they develop.

3 Institutions

Institutions are normative social rules in a society that are enforced either through the law or other mechanisms that control and shape human interaction (North 1990). There are principally two reasons for the existence of institutions. First institutions often solve problems of cooperation in society by providing a platform for conflict resolution. Second, human beings have limited cognitive capacity. Hence, rather than trying to formulate rules for each social situation, institutions are able to stabilize expectations and provide a means of coping with uncertainty that individuals face when interacting with each other (DiMaggio and Powell 1991). Institutions can emerge either deliberately or spontaneously. First, in the case of deliberate action, institutions can emerge as a result of collective action on the part of society. Second, in the case of spontaneous action, institutions do not emerge out of some collective notion but as a result of action taken by individuals based on their perception of solving a particular problem. In this case, a shared mental model of the problem develops via communication between individuals which then results in a cumulative process of reaction and imitation by individuals (Mantzavinos 2001, pp. 67–72). This cumulative process of reaction and imitation contributes to a new behavior or pattern of action and hence, the development of a new institution. We next look at the informal and formal institutions respectively in the context of collaborative innovation.

3.1 Informal Institutions

Informal institutions are conventions, moral rules and social norms whereby there is no formal external enforcer. We examine in turn these informal institutions.

3.1.1 Conventions

Conventions are social rules that are primarily self-policing (Mantzavinos 2001, p. 101). Once a convention is established there is little incentive for any participant to switch from the rule that everyone else is following. It has been argued that people might play the cooperative outcome in the prisoner's dilemma even in the absence of a third party that might solve the problem externally. In Schelling's (1960) classic treatise *'The Strategy of Conflict'*, experimental evidence is used to show that people do coordinate when they cannot communicate due to the existence of contextual clues which he calls 'focal points'. Certain traditions can make a choice more salient and therefore makes it the natural focal point. Hence, although

there is no external coordination mechanism, it turns out that players will choose the coordinated outcome due to their expectation of what others will do as a matter of convention. Scholars have extended this line of reasoning to show that the history of interactions and subsequent learning of the individual could explain the development of such a focal point that leads to the development of conventions. For example, Roth and Schoumaker (1983) studied via experiments of a repeated bargaining game how a player that has been allowed to obtain consistently a larger share in the initial games than a Nash outcome would choose their actions. It turns out that such a player has every reason to continue to and does expect this outcome in subsequent games. Therefore, the players' experience and learning contributes to the development of a convention that is an important determinant of the player's expectations, which then influences the outcome of the game.

Conventions normally develop as a result of individuals or firms trying to solve a common problem. The interaction of the individuals or the firm results in the development of a common mental model of the problem. The individuals draw on their common knowledge to develop the same solution. Often they infer the best solution from utilizing such common knowledge to draw on analogical reasoning. This then gradually develops into a convention. Such a convention could be developed spontaneously or deliberately. For example a case of spontaneous development is the use of the convention of copyleft in the case of open source movement. In the early days of the development of computer operating systems in the early 1960s to early 1980s, it was common place to share basic operating code of computer programs (the source code) between programmers in different organizations (Lerner and Tirole 2002). The very early days of the development of such computer technology was based at major research universities such as Berkeley and MIT or corporate R&D labs with significant autonomy driven by an ethos of sharing. Developers made significant efforts in cooperating to develop operating systems that could run on multiple computer platforms. For example, the Unix application developed at AT&T's (a major telecoms company in the United States at that time) Bell Laboratories was freely modified and installed across institutions (Lerner and Tirole 2002, pp. 200–202). The process of sharing code was enhanced with the advent of Usenet, a computer network begun in 1979 in order to link together the Unix programming community. However, following the move by AT&T to enforce the intellectual property rights, the formation of the Free Software Foundation (FSF) promoted the convention of free sharing of software codes on cooperatively developed software. This formal process is called the General Public License or better known as 'copyleft', where users agree not to impose licensing agreements on other users. Therefore what started out as a spontaneous process had now become a deliberate process encouraged by the FSF which then developed into a convention.

3.1.2 Moral Rules

Moral rules are essential in the case where there is a conflict between community benefit and individual benefit (Mantzavinos 2001, p. 106). A prisoner's dilemma game with exit option captures this element neatly. This is because the real world

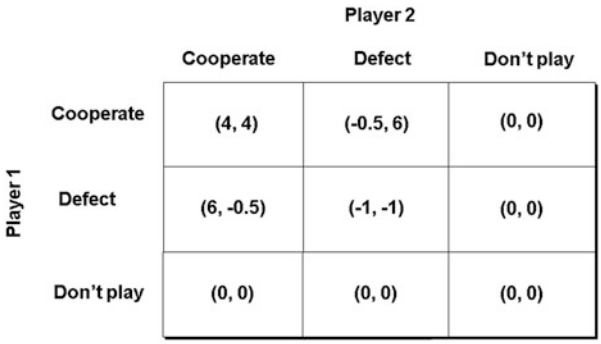

Fig. 2 The prisoner's dilemma with an exit option [*Source* Adapted from Mantzavinos (2001, pp. 85)]

often allows people not to play the game or follow the moral rules prescribed. This is shown in Fig. 2.

The principal assumption to the modified game is that payoff from the exit option is lower than mutual cooperation but higher than mutual defection. This can be related to the case where either a consumer or supplier can cooperate, defect or choose not to engage with the ecosystem at all. Vanberg and Congleton (1992) show through simulation experiments of such a prisoner's dilemma with an exit option that a viable strategy is one where one cooperates with those who have cooperated in the past and avoid those who have previously defected. This prudent moral strategy might not always yield the highest return. However, the experiments show that the prudent moral strategy is a viable strategy even when the most amoral behavior is possible among the population.

The emergence of moral rules could be supported by three streams of literature (Mantzavinos 2001, pp. 109–111). These are: morals sentiments (Mackie 1985), exchange theory (Blau 1964) and learning process from psychology (Kohlberg 1984). First, in the case of moral sentiments, it is the desire to punish wrong actions and reward good actions that contribute to the development of moral rules. This is related to the incorporation of notions of fairness into game theory, through which people help others that help them, and hurt others that hurt them (Rabin 1993). An example of the concept of fairness is IBM's (a major IT hardware and services firm) philosophy of collaboration (see Gabor 2009). IBM embraces a culture of trust and openness by redefining its mindset and workflows.[5] IBM's experience for a successful innovation ecosystem is equity within the ecosystem with mutual benefit being derived by all participants. In addition, IBM encourages active engagement from all participants, focused towards a common goal and based on trust. IBM does this through the use of various social networking systems (e.g., ThinkPlace, InnovationJam, Virtual Worlds) that encourage rapid flow of intellectual property within the firm as well as with outside partners.

Second, in the exchange based theory of sociology, the tendency for human beings to reciprocate is seen as a sociological phenomenon that enables cooperation

[5] This case vignette is based on author's own interview with a number of senior executives at IBM.

in society. Empirical studies have supported this result. For example, Berg et al. (1995) show that common history among subjects reduces social distance and leads to reciprocity. This is supported by Thomson Reuters' (Thomson Reuters is an infrastructure and information provider to the financial services industry) experiment with Hedgehogs (Barrett et al. 2011). Hedgehogs is a web based forum whereby investment professionals in the hedge fund industry can share ideas and discuss issues. Thomson Reuters is using Hedgehogs as a test bed to reduce social distance among the community of professionals in the hedge fund industry in order to promote a more collaborative innovation system. Moreover, research has shown that a strategy of generosity encourages cooperation in the prisoner's dilemma (Axelrod 1984). This is shown through Goldcorp's (Goldcorp is a major Canadian gold producer) strategy of being generous in sharing its historical mining data going back to 1948 on Goldcorp's website for anyone who is able to locate gold deposits on its mining land (Tapscott and Williams 2007). Although this was initially seen as a risky strategy, the availability of the historical mining data encouraged many specialists to analyze the data and cooperate among themselves in order to point to possible areas where gold could be mined across its 55,000 acre property. The contestants had identified 110 targets of which 50 % had not been previously identified by the company. In addition, over 80 % of the new targets yielded substantial quantities of gold which catapulted Goldcorp from a struggling company into a giant within the gold mining industry.

In addition, Gachter and Fehr (1999) have shown that approval incentives, such as rewards for cooperation, in combination with social familiarity can give rise to a significant increase in cooperation. An example of this is The Sims, a life simulation video game series considered to be one of the best-selling video game series of all time (Ederly and Mollick 2009). Players control a household of simulated people (Sims) who have human needs such as companionship, emotions and sleep. The player keeps these simulated people happy by providing for their virtual needs. The success of The Sims is attributable to the recognition for cooperation among the user community. The user community has created a variety of products for The Sims as a result of such cooperation: users have created 20,000 kinds of chair, nearly 100,000 articles of clothing and 52 different goatees (Mollick 2008). Allowing user modifications has boosted revenue and adds features at little or no incremental cost once a platform has been created. However, this means strategies beyond just making a video game and putting it out there. There needs to be a mechanism to reward community members who participate. For instance, allowing them to keep a piece of the revenue, giving them access to features or new releases, and having external forums where credit can be amply taken and given. There are formal mechanisms to listen to users, and for users to share ideas about what they want. Third, the learning process theory from psychology points to the fact that people go through moral stages where there is concrete individual perspective, to a member of society's perspective to the final stage where the values are defined in terms of self-chosen principles. In addition, empirical evidence of the prisoner's dilemma shows that similarities in terms of characteristics, such as demographic and work value, contribute to cooperation (Pruitt and Kimmel 1977). In recognizing

this type of development, IBM categorizes people participating in innovation into three groups (See footnote 5): traditionalist (born before 1964), Gen X (1964–1984), and Gen Y (1984–1994). For example, the Gen-Y'ers that grew up with technology and are more collaborative and networked compared to other categories. They exhibit different characteristics which is taken into account when formulating cooperative behavior.

All the above explanations suggest that the development of moral rules calls for three principles (Mantzavinos 2001). First, only a small number of individuals need to start the process. Second, the development of the moral rules will emerge as a result of self-interest due to learning process from observing successful cooperation and then reciprocating accordingly. Third, the retributive emotion and characteristic process combines with the learning attribute within an interacting process to provide reinforcement of each other's cooperative behavior resulting in the development of such moral rules.

3.1.3 Social Norms

Social norms exists to provide coherence and solutions to problems in which conflicting individuals or organizations interact (Mantzavinos 2001, p. 118). Social norms can be distinguished from moral rules on two fronts. First, social norms are more culture dependent than moral rules and apply to problems arising at specific times and places. Second social norms are enforced by an enforcement agency that is external to the agent and is usually the other agents in the group. Such social norms come into being as a result of individuals or organizations wanting a predictable environment to live in which increases the overall utility for all concerned. This need for a predictive environment is a weaker requirement than any feelings of duty that require moral rules (Mantzavinos 2001, pp. 122). In addition, the emergence of such a social norm could be the result of either superior bargaining power among some members of a society (Knight and Ensminger 1998) or the result of higher status and power accorded to those who conform and hence, are indirectly rewarded for their enforcing activities (Nee and Ingram 1998). Such social norms can exist when there is a tendency for sanctioning behavior from sufficiently large number of individuals within the group. In addition, research has shown that as long as there is a metanorm that guarantees the punishment of non-sactioneers of a primary behavior, the social norm will be relatively stable (Elster 1989).

The concept of power and trust is invariably evoked when large corporations embrace the ecosystem to enhance their innovative capability. An example of the application of power and trust is Intel (Intel is one of the world's largest semiconductor chipmakers) and its ecosystem of suppliers. In the case of Intel, it often uses its 'Open Kimono' principle to encourage smaller suppliers to share detailed financial models and technical information to achieve mutually advantageous benefits (Perrons 2009). In addition, Intel embraces the 'copy exactly' philosophy by setting the standards by which all suppliers have to follow the manufacturing process of the best supplier. By doing so, Intel reduces its own risk and is able to ramp up production at half the time it takes its competitors. Although this is

beneficial to Intel and its suppliers, it comes with the supplier having to invest in specific assets with all its associated risks. However, in order to compensate for cooperation provided by the suppliers, Intel often goes out of the way to help suppliers when they are unable to meet Intel's standards when technological developments force it to adopt an innovation. It does this through investment in staff, resources, time as well as cash. This trust is often reciprocated by the suppliers who are willing to invest in asset specific investments. Intel is also known to soften the blow to suppliers when it drops them from being a supplier. For example, when Intel moved from ceramic/wire bonded packing to organic/C4 packaging for microprocessors it helped one of its major suppliers, Shinto by encouraging a rival supplier to buy its technology when Intel decided to drop Shinto as a supplier (Perrons 2009, pp. 1307). The Intel example shows that the ability to enforce standards through the benevolent use of power to build trust encourages other firms to conform to the 'social norm' that is often rewarded for their enforcing activities. The next section discusses formal institutions as a basis of encouraging collaboration.

3.2 Formal Institutions

The maintenance of order without law has been shown to exist via conventions, moral rules and social norms. For example, maintenance of order has been shown to exist among the Neur, a pastoral community living in the upper Nile region and other societies (Evans-Pritchard 1940). However, these societies consisted of rather homogeneous populations with kinship ties and good information networks that helped preserve such order without formal enforcement mechanisms. A more formal external enforcing agency is needed when such homogeneous populations with good social capital and strong information networks do not exist (Jasay De 1995). Formal institutions are institutions with such formal external enforcing agency (Jasay De 1995).

Empirical evidence from the prisoner's dilemma has shown that players tend to cooperate more when the returns to cooperation increases or when the returns to defecting decreases (Sally 1995). Therefore, the role of an intermediary is often to provide these 'carrots' and 'sticks' to enable the whole ecosystem to benefit. The enforcing agency can play two roles. The first is to be the catalyst for the cooperation between firms. The specialization and cooperation in production increases output and hence, is more efficient. The second is to act as the external enforcer to effect punishment in the case of non-cooperation. The carrot approach is taken up by intermediaries like NESTA (National Endowment for Science, Technology and the Arts is an innovation charity based in the UK) by promoting innovation in the United Kingdom (Simoes-Brown 2008). NESTA is providing intermediary services to help firms create more commercially viable products by sharing the knowledge and stories around open innovation across firms. For example, NESTA provides forums like Open Alchemy whereby participating organizations meet and discuss their top ideas openly with a view of acting as the starting point for further

collaborative idea generation. In addition, NESTA conducts ethnographic studies so as to be able to disseminate stories about the benefits of collaborative innovation. NESTA's role as an intermediary is essential to help set the groundwork for working relationships that can create substantial business value. NESTA has helped form venture operations and collaboration program for large firms, for instance, Rolls Royce, McLaren Applied Technology, BBC Labs and Shell GameChanger.

One of the main issues of collaborative innovation is the issue of intellectual property rights. The role of an intermediary might help resolve these property rights issue. For example, Orange the mobile phone operator experimented with a model whereby when dealing with a third party start-up firm, both Orange and the start-up firm engages trusted third parties respectively to create a forum for discussion via an 'Air-Lock' system.[6] The 'Air-Lock' system ensures assurance that parties in the collaboration are able to share ideas freely due the presence of the trusted third-party firm who is able to mediate issues as they arise. The use of such trusted third party intermediaries helps overcome the intellectual property issue whilst capturing the benefits of collaboration. Such an approach resulted in many new mobile phone and network based innovations for Orange and its partners. An alternative use of an intermediary model is the development of mobile PC whereby lists of members contribute money to fund a defined research stream. This fund is then augmented with government funding. The research is commissioned by the third party intermediary at research centers or universities. The members then have royalty-free access to any of the intellectual property right that is generated and are free to use them as they see fit without having to inform other members what they are being used for. This example from mobile PC clearly shows the benefit of a third party intermediary such as universities and government organizations playing a role in providing both the 'carrot' and the 'stick' to develop the formal institutions to promote collaborative innovation.

4 Implications and Conclusion

There are several managerial implications that can be drawn from the conceptual framework for scholars and practitioners in marketing. In particular the paper addresses the importance of developing the institutions to support the emergence of a new market to manage multiple stakeholders in order to sustain collaborative innovation. First, the development of institutions requires the active role of management in trying to shape the governance structure. Second, empirical evidence has shown that managers need to demonstrate fairness and reciprocity to encourage cooperation. Third, managers should encourage the development of social capital to foster a cooperative culture. Fourth, managers need to recognize different stages of learning among individuals as well as demographic characteristics in developing an

[6] This case vignette is based on author's own interviews with a number of senior executives at Orange.

appropriate institutional structure for cooperation. Finally, when homogeneous populations with strong social and information networks do not exist, a formal external agency such as an intermediary is needed to encourage collaboration. In doing so, the paper contributes to the call by marketing scholars to close the marketing capabilities gap by better understanding innovation within a networked ecosystem of firms (Day 2011).

There are several theoretical implications of our study. First, our study has implications for how game theory could be used to examine ways to develop institutions in order to create new markets. Scholars need to understand more deeply the theoretical underpinnings of how new markets emerge as new technologies enable new customer value propositions and make existing markets obsolete. Experimental game theory provides a rich source to understand behavioral issues which could form the basis for developing a richer theoretical base to explore the issue above. Second, our study has implications to better understand theoretically the balance between the roles of formal versus informal institutions during the life cycle of market development. The need for formal and informal institutions could vary over the lifecycle of the market and hence our study has implications to better understand such developments. Third, our study has implications for the development of collaborative models whereby firms work within an ecosystem with multiple leaders to develop new customer value propositions. Such an ecosystem of firms lies between a centrally organized hierarchical system and a more decentralized market based model where there are multiple firms acting as decision makers depending on the decision to be made. Such a polycentric ecosystem structure provides challenges from a marketing perspective in terms of gathering intelligence on customer requirements, disseminating that intelligence through the ecosystem and responding appropriately. Our study provides some preliminary theoretical building blocks to understand the institutions needed to govern such a polycentric ecosystem of firms.

This paper develops a conceptual framework using the prisoner's dilemma game and the empirical evidence of the game to draw lessons on how to develop institutions to govern cooperation in a collaborative model for innovation. Our framework is especially useful to develop a better understanding about how markets develop in order to sustain collaboration. The framework has certain limitations which can be addressed in subsequent work. First, a deeper understanding of the criteria needed for different institutional structures to manage different collaborative business models is required. Second, we need a more nuanced understanding of how firms manage the transition from one institutional form to another over time. Finally, a deeper understanding how firms can experiment with different institutional forms before committing to a particular one needs to be further developed.

Acknowledgments The author would like to thank Jan Heide and Sriya Iyer for helpful discussions. The author would also like to thank the Editors and the anonymous reviewers for their helpful comments on earlier versions of this chapter.

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