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The role of institutional entrepreneurship in standard wars: The Blu-ray

Disc Case

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Abstract

This study uses institutional entrepreneurship to explain and respond a main research question: how do firms win over competitors in standard wars? I claim that technological standards are similar with institutions. The study suggests that collective action, discursive activities, network effects, and product performance are critical attributes for winning standards wars. Further, I suggest that focal firms should have appropriate practices to manage critical stakeholders, collective actions, and discursive activities then produce network effects and product performance. The study uses Sony Blu-ray Disc and Toshiba HD DVD as the single case and modified grounded theory to produce a theoretical framework to respond the research question. Besides, I also found that media played as an indirect stakeholder in the standard war. The study not only provides an integrated model to standard wars studies but also contributes theoretical implication to resolve network inertia in interorganizational relationships. Sony rotated the control right on decision making processes make the other two facilitators (Panasonic and Royal Philips) to access their complementary capabilities in the Blu-ray Disc Association. In contrast, Toshiba used dominant leadership to lead the camp. Hence, by

using rotating leadership, Sony created a high-performing collaboration to beat competitor in the standard war.

The role of institutional entrepreneurship in standard wars: The Blu-ray Disc Case

Introduction and Literature Review

Traditionally, technology management scholars use economic and strategy perspectives to explain how did firms win over competitors in standard wars (e.g., Suarez, 2004; Anderson & Tushman, 1990; Suarez & Utterback, 1995; Katz & Shapiro, 1986; David, 1985). Later, Kaplan and Tripsas (2008) use cognitive perspective to explain how to establish technological frame to win over standard wars by using discursive activities. In many relevant studies, scholars connote the role of stakeholders. For instance, in 1980s, JVC's VHS and Sony's Betamax standard war, Hollywood studios influenced and backed the VHS standard, which is integrated huge capacity and copyright protection mechanism proposed by Hollywood studios. Hence, JVC beat Sony (Cusumano, Mylonadis, & Resenbloom, 1992).

In short, these studies outline that focal firms initiating standard wars should maneuver appropriate strategies to increase network effects by collaborating actions, communicating information and constructing meanings of new technologies to markets in increasing adoption. However, these studies have paid less attention on the role of stakeholders throughout standard wars. Moreover, the relevant studies lack an integrated theoretical model to explain, how focal firms manage stakeholder, collective action, and discursive activities in standard wars.

I suggest that standard wars can be viewed as institutional entrepreneurship. The term, institutional entrepreneurship, refers to the "activities of actors who have an interests in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones" (Maguire, Hardy, & Lawrence, 2004: 657). In technology management studies, this study suggests that the process of establishing technologi-

cal standards is closely linked to institutions (Garud, Jain & Kumaraswamy, 2002, 197), i.e. rules, norms and identities, which can be changed by social actors' deliberate actions. Technical standards reduce uncertainty and risks and address problems of current standards in a field by establishing clarity in relation to formal and informal rules of the game. In efforts to establish technical standards, organizations ally with other actors to establish new institutions and strive for wider support to replace the old ones and compete with other actors propagating alternative new standards. Technological standard setting is inherently a process of institutionalization or institutional change and the role of institutional entrepreneurship. In this vein, focal firms who are initiating standard wars can be viewed as institutional entrepreneurs, who are aware of contradictions and environmental uncertainties then are capable of motivating other actors to deal with these tensions and uncertainties.

Particularly, the study explicitly identifies the role of stakeholders in institutional entrepreneurship and standard wars. Although many studies have mentioned their roles, they have received little attention on how institutional entrepreneurs interact with them then construct identities to obtain their supports.

Rather than other broad and narrow definition of stakeholder (e.g., Frooman, 1999; Mitchell, Agle, & Wood, 1997), I adopt a strict perspective on stakeholder in the standard war, named critical stakeholders. Critical stakeholders refer to an organization's stake relating to institutional entrepreneur's actions in promotion, R&D activities, manufacturing, and marketing in technological standard change processes. Institutional entrepreneurs should have close relationships with these critical stakeholders. In a nation-state setting, government policies should be viewed as a basis for organizations. Although government's policies influence focal firm's actions in a certain way, initiating standard wars means that focal firms and competitors are on the same basis to compete the dominant position. If A

firm has some exclusive favors from government, B firm does not stand on the same foundation to compete the A firm. In short, it will not be accounted in standard 'war'.

Consequently, the viewpoint of critical stakeholders in this study are based on Frooman's (1999) viewpoint in the aspect of high interdependence. Focal firms is directly dependent on critical stakeholders, such as product manufacturers, retailers, and many organizations who can produce complementary products and generate network effects to focal firms, and, vice versa. In turn, focal firms should view these critical stakeholders as symbiotic partners. These critical stakeholders possess critical resources that are contributive to standard wars. In order to maintain relationships with these critical stakeholders in quality, focal firms have to treat them by using reciprocity.

The rationale of discussing critical stakeholders is, organizations as nexuses of stakeholder relationships. The viewpoint links other concepts, like organizational community (Tushman & Rosenkopf, 1992) and organizational field (DiMaggio & Powell, 1983). Organizational community as the set of organizations that are stakeholders for a particular technology (Tushman & Rosenkopf, 1992). This set of organizations include suppliers, manufacturers, consumers, standards bodies, and professional associations. Organizational field refers to "those organizations that, in the aggregate, constitute a recognized area of a given life: key suppliers, resource and product consumers, regulatory agencies and other organizations that produce the service or products" (DiMaggio & Powell, 1983: 148). In broaden speaking, organization depends on stakeholder's resources and support in a given field, especially in an uncertain environment. In order to achieve goals, organizations have to understand stakeholder's expectation, respond their requirement, sufficiently manage and allocate their resources. Drawing on these two concepts, when a firm in going to innovate a new technology and standardize it to dominant design, the new

technology should consider whether or not the new technology is adopted by critical stakeholders in the organizational community or field.

Consequently, this study is using institutional entrepreneurship to explain how institutional entrepreneurs win over competitors in technological change process. Throughout institutional entrepreneurship, focal firms manage critical stakeholder, collective actions, and discursive activities to beat competitors. In other words, this study is trying to integrate stakeholder, strategy, cognition, and industrial economic perspectives then propose a new theoretical framework in responding the research question.

Research Method

The study uses case study method to respond the research questions. This study chooses Sony Blu-ray Disc (BD) vs. Toshiba HD DVD in 2002 to 2008 as a case of standard wars. There are three reasons that explain why the BD-HD DVD case is suitable for the setting. First, some of activities in the case represent attributes of previous standard wars, such as collaboration (Sony's Blu-ray Association vs. Toshiba's DVD Forum), network effects (used not only disc players but also game consoles), and product performance. Second, both camps used lots of technological exhibitions and discourses to promote and construct meanings of their new technologies and undermine competitor's. In order to explore the role of discursive activities in the standard war, the study collects lots of media reports as the main data source. Third, in the standard war, Hollywood studios, game software developers and publishers, hardware manufacturers, and retailers were critical stakeholders in the standard war.

This case study is mainly analyzed by modified grounded theory. The most of difference between traditional and modified grounded theory is, the modified one allows researchers have literature reviews before the data analyzing, rather, the traditional

grounded theory claims that researcher should have a 'blank sheet' before doing field study (Glaser & Strauss, 1967). Along with time variation, no matter theories or research methodologies may be altered or revised by new viewpoints. In 21st century, Locke (2001) claims that using grounded theory associated with previous theoretical viewpoints is a proper way. In practice, mostly, every researcher has a certain possibility of taken-for-granted in his/her viewpoint in doing a given study. It is difficult to claim that a researcher has a 'blank sheet' in mind when he/she is doing the study. Originally, grounded theory claims that researchers can use the 'SOP' (comparison, open, axial, theoretical codings) to produce theory grounded in the data. However, Locke (2001, 2011) claims that having previous knowledge and theoretical viewpoints, the findings of grounded theory can be further used to accumulate human being's intelligence. The study adopts the same logic. The study outlines the attributes of standard wars and saliences of stakeholders in the foregoing sections then analyzes the case in advance. The aim is, systematically analyzing the dataset by using grounded theory is to produce the relationships between concepts and expect to explore more theoretical viewpoints which are not mentioned or paid less attention in standard wars.

Using modified grounded theory has several rationales. First, due to the limitations, the researcher cannot access the fully information from Toshiba, DVD Forum, even some data in BDA. Comparing to western societies, Japanese culture is more closer (Hofstede, 1993). It is difficult to access proper informants who have had experienced the standard war. Moreover, due to the language barrier, researcher decided to use secondary data as the primary source of data. Because, using secondary data has the opportunities to view the data from a different perspective to the standard war. In turn, I have to collect media release and other supplemental data sources as many as possible. Choosing a proper data analyzing tool to disaggregate these second hand data, squeeze meaningful vari-

ables, and find the connections among these variables, grounded theory is a proper matter.

Second, following the first point, using media reports as the main source of the data can make the study explore the role of discursive activity in the standard war. Rather than grounded theory, discourse analysis is advantageous on analyzing “how texts work within socio-cultural practice” (Fairclough, 1995: 6). However, the aim of the study is to not only respond to the literature but also find out more viewpoints unseen in the literature. The main advantages of discourse analysis is not able to respond to the requirement. Thus, the study chooses modified grounded theory.

The study follows grounded theory’s open, axial, and selective coding procedure. In general, the study collected media reports and conducted interviews with few informants. The former is collected from EBSCO and proQuest database while the latter conducts face-to-face and email interviews. There are two informants, Japanese and media journalist. The Japanese informant is a member of top management team in Sony. He also attended the standard war. The other informant is a *New York Times* journalist. His route was the consumer electronic product.

The study collects media reports from magazines, newspapers, and trade publications¹. The study also collects other supplement documents and data, including annual reports from Sony and Toshiba, the official information in terms of collaborations from BDA and DVD Forum, patent data from WIPO (World Intellectual Patent Database), and market numbers (Euromonitor and Datamonitor database).

¹ Magazines include Business Week, The Economist, Black Enterprise, Economist.com, Marketing, Newsweek, TWICE, U.S. News and World Report, Wired, and Video Business. Newspapers include Financial Times, New York Times, San Jose Mercury News, The Wall Street Journal Eastern Edition, Financial Times, and TechWeb. Trade publications include EBN, Computer Technology Review, Dealerscope, Emedia, Computerworld, Broadcasting & Cable, FT.com, DSN Retailing Today, Brandweek, AdvertisingAge, Electronic Business, EventDV, TelevisionWeek, Network Computing, New Media Age, and Retailing Today

Finally, the establishment of collaboration and discursive activity are not presented in media reports. Thus, I conducted a face-to-face interview with Japanese informant in March, 2009 in Tokyo Japan. This interview does provide many critical viewpoints to the study. In 2011, I conducted the second interview to the Japanese informant via email. Further, in order to triangulate the primary findings, I also email the questions to many other journalists, columnists, and scholars. Their names are collected from media reports and research articles in the dataset. Their emails are collected from Google. However, only one journalist working in *New York Times* responded the questions.

Data Analysis

The short brief of the standard war

In 2002, Sony announced that it had in cooperation with eight other leading companies² collaboratively established the basic specifications for a next generation large capacity optical disc video recording standard called “Blu-ray Disc” (BD). The BD standard is aimed at satisfying the demand for storage capacity and copyright protection much bigger and greater than DVD. Shortly after, Toshiba, another leading Japanese company in the electronics industry, announced the establishment of HD DVD standard to compete with Sony. In the struggle to become the unique and new generation optical storage device standard, Sony and Toshiba strived for support from stakeholders (Hollywood studios). In order to manage and leverage their supports and resources, Sony established the BDA in 2004 while Toshiba established HD DVD Promotion Group which is under the DVD Forum. By using collaborations, Sony and Toshiba promoted ideas and criticized each other’s technical problems through media, technical exhibitions and so forth. At the same time, they keeping seeking for support from Hollywood studios and PC companies. Early on,

² These eight leading companies are: Hitachi, LG Electronics, Matsushita, Pioneer, Royal Philips Electronics, Samsung, Sharp, Sony, and Thomson Multimedia

because of backward compatibility, DVD Forum's leading position in the industry and cheaper price, many Hollywood studios back the HD DVD standard in 2004 and market share in 2006. By contrast, the BD camp announced that the PlayStation 3 (PS3) would support the BD standard. The rationale is to establish a considerable network effects. By 2005, Toshiba announced that Microsoft backed the HD DVD standard. In order to retain the advantage of DVD standard (the disc content is easily copied onto PCs), they announced that the HD DVD standard would allow users to copy the content onto their PCs and home networks. Although Microsoft's Xbox 360 (the game console) was able to seed the HD DVD player to customer's living room, this announcement contradicted Hollywood studios' economic interests. By contrast, Sony not only promised their copyright protection mechanism against the HD DVD standard but also kept developing additional copyright technology onto the BD standard, named as BD Plus (BD+). In the short run, Microsoft's engagement gave the BD camp a big punch; however, in the long run, it was a big chance for the BD camp. Because the stakeholders evaluated that the BD standard is more able to protect their economic interests than DVD and HD DVD. Later, more and more stakeholders changed their mind to inclusively or exclusively support the BD standard. By 2007, many studios and video retailers announced that they exclusively supported the BD format. Subsequently, in early 2008, Toshiba announced that they would no longer support the HD DVD format, including hardware, software and supporting specifications. Sony had won the competition. The BD standard becomes the new technological standard.

Attribute 1: Collaboration

Before the standard war, Toshiba has had DVD Forum, the international organization, which composes of hardware, software, and content companies that use and develop the DVD and formerly HD DVD standards. Sony and many other BD founders are in the fo-

rum. Most of them hold the position in the Steering Committee, the highest governance group of the DVD Forum. In contrast, in the beginning of the standard war, Sony led many companies to establish Blu-ray Disc Founders (BDF) in 2002. Then, in 2004, the BDF transformed to the Blu-ray Disc Association (BDA), a formal collaboration that develops and licenses BD technologies and is responsible for establishing and promoting the BD standard. No matter DVD Forum or BDA, they have formal structure and rules to manage their standards development and stakeholder's resources. However, since Toshiba announced that the HD DVD standard lose the standard war, the relevant information in terms of HD DVD standard has been removed. Consequently, the main analysis is around the BDA. The HD DVD information is limited. I figure out stakeholder management and rules setting capabilities in this attribute.

1. Critical stakeholder management capability

The definition of critical stakeholder management is the process of managing and responding the expectation and requirement of critical stakeholder who has an interest in a project or will be directly effected by its deliverables or outputs. I find four indicators in the capability.

(1) Expectation understanding

In the standard war, both camps used expectation understanding strategy, referring to the process of realizing what stakeholders' interests and requirement in standard wars. to understand their expectations (copyright protection, disc capacity, and backward compatibility). Especially copyright protection issue, the DVD standard's protection mechanism is weak. The weak protection makes content providers lost millions of dollars per year be-

cause of pirating. Moreover, focal firm may also understand stakeholder's voice by inviting them to engage collaboration.

(2) Requirement responding

Understanding stakeholder's expectation, focal firms should respond their requirements, referring to the process of the focal firms taking actions and replying stakeholder's expectations. For instance, in the standard war, both camps adopted Advanced Access Content System (AACS) as the main copyright protection mechanism on their standards. This adoption can be viewed as a kind of requirement responding strategy. In standard wars, once focal firms broke their assertion to stakeholders, it may cause negative outcomes (Ford & Ford, 1995; Leary & Kowalski, 1990). In 2005, Toshiba and Microsoft announced jointly that the HD DVD standard would use managed copy system. In other words, content providers could not fully protect their contents. Oppositely, in order to obtain 20 century Fox's support, the BD camp announced that they would add BD+ on to the BD standard. In other words, the BD standard not only has AACS mechanism but also BD+. The announcement gave a confidence to many other Hollywood studios in a way. The difference in terms of responding stakeholder's requirement caused totally different consequence to both camps.

(3) Exclusive support seeking

Exclusive support seeking is viewed as a process of seeking exclusive support from stakeholders in standard wars. Rather than inclusive support, having exclusive supports means that content providers would just produce complementary products to a specific standard, only. In the standard war, having exclusive support is critical for both camps. Be-

cause, having exclusive support means focal firms might be able to generate stable network effects then increase economic scale by using their complementary products.

(4) Incentive giving

Finally, the 'incentive giving' is defined as a process of using tangible or intangible resources to attracting stakeholder's engagement. In order to attract them to join in their camps, focal firms give incentives to stakeholders. For instance, in August 2007, The Wall Street Journal reported that Paramount and DreamWorks announced that they chose the HD DVD standard over the BD. Superficially, Paramount said that they could put all of our resources behind one format. In fact, market rumors said that Toshiba offered huge financial incentives like marketing support and cash payment. In fact, the HD DVD standard's disc players market share was better than BD players, because HD DVD player was cheaper. In the BD camp, according to the journalist's response, Sony also gave some incentive to attract stakeholders to attend the BD camp. The journalist said, in the early beginning of the collaboration establishment, Sony gave incentive to founder companies percentage of future royalties. In this vein, even the focal firm perhaps no money at the beginning, but a share of the sales in the future to induce them to join. In turn, this strategy may further reinforce stakeholder to exclusively support the specific new technology in a way.

2. Rules setting capability

Apart from stakeholder management capability, the study also found rules setting capability is another critical capability, which should be held by focal firms in standard wars. In the standard war, having rules setting capability is to not only sufficiently and proactively manage member's resource but also contribute to the development of new technology, in-

cluding R&D, promotion, increasing network effects and product performance. In the standard war, Sony used different practices to critical stakeholders and other member organizations. Institutional entrepreneurs should use particularized practices to their critical stakeholders to obtain critical resources while generalized practices to coordinate other member organization's action in standard wars. In turn, Sony established a sequential rules in setting up members in the BDA.

The definition of 'rules setting of collaboration capability' as a process of establishing formal structure and rules to manage the effective collaboration where divergent members exchange and share opinions and resources and achieve common goals. Rather than any specific capability, like communication and R&D capability in the standard war, rules setting capability is a general term meaning focal firms should be capable of setting many rules for collaboration in standard wars. Precisely, having the stakeholder management capability enables focal firms to obtain more supports from stakeholders. Having this capability enables focal firms to further lead to sufficiently manage and accumulate stakeholder's resources in collaborations and lead to network effects and product performance by using formal rules and structure. Five indicators are found in the study³.

(1) Focal firm's portfolio

Focal firm's portfolio in the study can be defined as an focal firm's set of direct ties in standard wars. Theoretically, because a focal firm aggregates properties, such as tie diversity and mix of the strengths. High-performing portfolios may affect final performance. Practically, portfolios can be seen as engines of network evolution. focal firms adjust their

³ Studying collective action is the beginning part of the whole processes of data analysis. Although the DVD Forum has removed the information about the HD DVD Promotion Group before the study, I still can obtain the relevant information about the structure. However, according to the data limitation, the study cannot completely compare the DVD Forum and BDA.

original connections to high-performing portfolios, thereby changing the networks in which they operate.

Before the standard war, Toshiba has had a portfolio, the Steering Committee in DVD Forum. Toshiba had a high-performing portfolio has dominating the DVD market for decade. On the BD site, in 2002, Sony established its portfolio, BDF. Most of the BDF members have the positions in the DVD Forum as well. Later, in 2004, BDF transformed to the BDA. These original founders keep their positions as Board of Director in the BDA. Board of Director is the highest level in the BDA. BOD sets an overall strategy and approves key issues. Members can participate in all activities and attend all meetings. Apart from the original founders, by 2004, the BDF has invited HP, Dell, TDK (a leader of manufacturers of recording media), and JVC, who beat Sony in the VHS vs. Betamax standard war. Originally, the BDF was mainly consist of consumer electronic companies. The later invitations made the portfolio more divergent. Sony aimed to build up a portfolio associated with multiple and divergent partners that affect performance (Ozcan & Eisenhardt, 2009; Uzzi, 1997).

(2) Structure of collaboration

Establishing collaborations in standard wars can be viewed as an output of professionalization process. It is a set of rules which explicitly define every member's responsibility and obligation in a collaboration. Toshiba had the DVD Forum and Sony established the BDA. Both collaborations establish several sub-groups which are responsible for different tasks. Having many members who are responsible of doing various technical and strategic jobs and producing problem-solution. The study claims that focal firm should have skills to establish well structure of collaboration. However, in the standard war, I can not obtain

more detailed information in relation to the DVD Forum. Thus, the analysis is focusing on the BDA.

According to the BDA by-law, the BDA has Joint Technical Committee (JTC) and Compliance Committee (CC) to create, uphold, and test new innovations to the BD standard. The JTC coordinates and accelerates technical discussions in or among Technical Expert Groups⁴. Moreover, it submits technical proposals to the BOD for approval. They also present the technical point of view of the BDA, with strategic guidelines which are determined by the Promotion Committee. Besides, in order to guarantee consistent end user experience, the Compliance Committee ensures the compatibility and interchangeability of all BD products. It supports fast and broad acceptance of the BD standards in relevant industry.

Establishing hierarchical membership is another critical task in the standard war. In the BDA, not every member can freely join these committees or sub-groups. According to the BDA by-law, it has three levels of membership: General Member, Contributor, and Board of Director. General Member is the basic level. It provides access to specific information from Committee discussions. Companies in this level can attend general meetings and seminars. They also can participate in specific regional promotion team activities and specific activities of Compliance Committee. Contributor is the advance level, members in this level are active participants of the format creation and other key activities in the BDA. They can be elected to become a member of the Board of Directors. They not only have the right of general member, but also they can participate in Technical Expert Groups and most of the Compliance Committee activities. Board of Director is the highest level in the BDA. Companies in this level are active participants of the format creation and key BDA

⁴ There are five Technical Expert Groups in the BDA: BD RE physical specification, AV application, BD ROM physical specifications, BD R physical specifications, and file system and command set.

activities. These members are selected from the Contributors by election. BOD sets an overall strategy and approves key issues. Members can participate in all activities and attend all meetings.

(3) R&D activities

R&D activities, this study uses Roger's (1998) definition, referring to a "systematic investigation or experimentation involving innovation or technical risk, the outcome of which is new knowledge, with or without a specific practical application of new or improved products, processes, materials, devices or services" (p. 12). The definition is aimed at creating innovations for commercial exploitation.

No matter in the DVD Forum or BDA, developing, researching, testing, and verifying the technologies and specifications are the critical tasks. Their importances also reflect on the structure of the collaborations. According to the Japanese informant's answer, he did not involve too much R&D activities in the BDA. Because, the relevant activities were not his responsibilities and major. But, the study still defines it as a critical attributes in the standard war. Because, according to the limited media reports and information, the DVD Forum's R&D activities was less intense than the BDA. These differences led Toshiba to lose the standard war.

The rationale is, first, Toshiba did not successfully integrate the Microsoft's Xbox 360 together. Both Sony and Toshiba used game consoles (Sony PS3 and Microsoft Xbox 360) to promote their standard. However, Toshiba did not try to integrate the Xbox 360 but provide additional HD DVD drive for \$199. The strategy caused that the final price of Xbox 360 was more expensive than the PS3. In contrast, Sony put much efforts on integrating BD players and PS3. The relevant R&D activities caused the PS3 delay. Although the launch date of the Xbox 360 was earlier than the PS3 almost a year, it did not give a big

push to the HD DVD players. Consequently, the BDA successfully integrated the PlayStation 3 and the BD standard together. Since 2006, the PS3 played as a trojan horse in the standard war. That means, consumers buying PS3 is equal to have BD players. Further, BD standard can increase the network effects by using game consoles' network effects as well. In this vein, effective collaboration lead to network effects, indeed.

The second rationale is the BD+. In the beginning, both BD and HD DVD standards adopted the A.A.C.S. (Advanced Access Content System) encryption mechanism, the BDA used a additional software-based component that makes it possible to modify the copy protection scheme on new discs if the old one is broken by hackers. The technology was not developed by BDA. But, the BDA decided to integrate the technology into BD standard. The technology is based on an approach pioneered by a group of technologists at Cryptography Research in San Francisco as a safeguard in the event the AACCS is compromised. According to *Wired* report, originally, the BD+ was used to respond 20th Century Fox's expectation in terms of copyright protection. Later, the technology provided a good performance while the HD DVD player was hacked. In this vein, having effective R&D activities in collaboration lead to network effects and product performance in the standard war.

(4) Promotion

Promotion is defined as focal firms use collaborations to define campaigns and employ strategies to promote and train the standard and relevant technologies to key audiences. Comparing to discursive activity in standard war, the promotion means focal firms define and prove promoting and marketing campaigns in collaborations in united way. Without a united plan, focal firms cannot produce an 'ambiguous voice' to their key audiences and stakeholders.

Apart from the issues of less capacity and weak copyright protection mechanism, one of the main problem of DVD standard is too many confusing formats. The DVD standard was introduced in markets in 1995. There are so many different formats. Thus, it makes consumers are very confused, such as DVD-R, DVD-RAM, DVD-RW, DVD+RW and DVD+R. In contrast, the BD standard only has BD-R and BD-RE. Because of the hierarchical governance in the BDA, the BD standard can produce a more unified specifications than the DVD standard. The BDA very understand that unifying media message is very critical in standard wars. Correcting audience or stakeholder's misunderstandings may be costly tasks. Moreover, misunderstandings may leave space to rivals. The Japanese informant said, the main advantage of the BDA is to generate 'one voice'.

(5) Frequent communication

Frequent communication is defined as focal firms have formal communications in terms of opinion exchanging, sharing, and decisions approving with members in collaborations. Due to the data limitation, the frequent communication means formal communication.

According to the BDA by-law, the BDA has a clear statement about the general meeting. The meeting shall be held once a year upon the call of the BOD. Such meeting shall be notified by the Secretary in writing to all Members at least thirty days prior to the scheduled meeting date. According to the Japanese informant's answer, the BDA has four general meetings in a year. And every general meeting is arranged for a week time. At each general meeting, the BOD shall report a summary of the activities of the BDA during in the past (including adoption of Blu-ray Disc standard), as well as the plan for the next year's activities. Thus, the participants are all members. They shall be entitled to attend and participate at the meetings. Further, the informant also said that secretary office and other

committees can have telecommunication meetings apart from the face-to-face meetings. In this vein, frequent communication play a critical role in the collaboration as well.

In the analysis, the study highlights that these capabilities can help focal firms to maintain and develop relationships with critical stakeholders. In addition, when focal firms satisfy critical stakeholder's requirement and respond their expectations, they will further engage in collaboration and invest their resources to the standard wars, like R&D activities and promotion. Further, in order to retain and increase competitive advantages, focal firms have to well manage collaborations. In the standard war, the BDA establishes a hierarchical membership structure to assign different responsibilities and obligations. Within the collaboration, the BDA also further lead to good network effects and product performance, like BD+ and PS3.

Attribute 2: Discursive activity

Discursive activity in standard wars is to directly construct meanings and communicate information to target audience. Discursive activity can be defined as focal firms draw on different discourse in their texts to try to fix and construct understandings, shape interpretations, and justify practices to markets that are commensurate with their interests during standardization processes. Five indicators are found in the study.

(1) Framing

Framing can be defined as using various verbal and non-verbal discourses to construct the identification and expression of a novel understanding of the problem and establishing and explicitly provide compelling reasons to support the new vision being promoted. In standard wars, using framing process is to offer legitimating account of the new tech-

nology they seek to promote. Within the process, focal firms should highlight the problem of current dominant design and provide solutions to audience.

In the standard war, both camps used various discourses to frame the problems of DVD standard and solutions, no matter in media reports, their official technical reports and so forth. In the beginning of the standard war, Sony framed that the new optical storage device having greater capacity and greater display quality were critical in HDTV (high-definition television) era. In early twenty-first century, LCD and Plasma TVs has steady growth. The HDTV sets is the integration of ultra-high 2160 pixels resolution technology, which is up from the current 1080p and 720p (Gary, 2010). Comparing to the traditional RGB (Red, Green, and Blue color) pixel technology, HDTV adds color Yellow. Moreover, 2160p screens can be divided into four separate displays in maximum, each with 1080p resolution. In other word, in HDTV era, consumers can enjoy more entertainment from TV and other complementary products.

The BD camp gave an example the traditional CD format only can record audio for 74 minutes and DVD format only record movies for 2 hours and 15 minutes in MPEG-2⁵ format. In HDTV era, the BD camp suggests that the BD standard is able to record 22 GB for digital broadcasting. The storage capacity is bigger almost 5 times than the DVD standard. In general, in the original version of specifications, the BDF framed that the BD standard uses a 0.1mm disk substrate layer that allowed up to 23 GB of storage on one side of a new disc standard. By contrast, Toshiba and NEC co-developed new standard which was based on the same technology with BDF, named as Blue-violet laser, had 0.6mm disk layer used in the current DVD red laser standard. They claimed that DVD makers could switch production equipments much easier, cheaper and come to market much sooner.

⁵ MPEG-2 describes combination of audio data compression and lossy video compression methods permitting storage and transmission of movies.

But this new standard player would read disks with 10% to 25% less density than a BD product.

(2) Promoting

This study defined promoting as to give publicity to a standard, collaboration, and/or product so as to increase sales, adoption and public awareness. In the standard war, both camps used media discourses, conferences, technological exhibitions, and products to seed their standards into customer's home and promote their standards have been endorsed by critical stakeholders.

The promoting strategy in the standard war was used to promote the new technology which is legitimized by stakeholders. For instance, in 2004, Toshiba announced that it and Memory-Tech have developed a manufacturing line that can make both HD-DVD discs and DVDs, changing between the two in only five minutes. Toshiba said that such dual-purpose equipment will make it easier for disc makers to invest in a brand-new technology, especially when nobody can predict how fast high-definition discs will actually catch on. When HD DVD standard demand picks up, the dual-purpose machines can press high-def discs. In the BD site, in 2005, after Lions Gate announced that he would join in the BDA, the BD camp expressed that although the BD discs were likely to be expensive initially, the production cost would fall in the coming years. Because, Hollywood studios sell tens of millions of DVDs every year. Even a few pennies difference in the price of production costs in disc manufacturing process can chew into profits. Cheaper production costs allow the studios to sell discs at lower prices to consumers all times. The production cost issue was the most important advantage in the HD DVD camp in the beginning of the standard war. Since more and more studios engaged in the BD camp, Toshiba's advantages was getting lost. Consequently, promoting compelling reason in this way is not just respond critical

stakeholder's question and expectation, it also to provoke an awareness to other stakeholders and motivate they to take action.

(3) Debating

The 'debating' can be defined as focal firms deliberately express and explain their actions and behaviors being arguing by rivals on media. Normally, this strategy comes after rival's other discursive strategies. Because, as discussed in the foregoing sections, focal firm's discursive strategies implicitly or explicitly de-legitimize or erode competitor's new technology, products, collaborations and so forth. In order to defend their outcomes and convince stakeholders and audience that their new solutions are better than rivals or decrease their suspicions, using debating strategy is necessary. However, focal firms slightly used the strategy in very explicit way. In the case, both camps debated their standards and actions in various ways. Normally, they provided some statistics number or stakeholder's words to debate that their standards and products are better than competitor's. In other words, similar with undermining, debating strategy was associated with framing and promoting strategies in the standard war.

In the standard war, many debating strategies were presented by critical stakeholders and/or in important technological exhibitions. By using critical stakeholders, debating strategies not only express and explain their actions but also connote their solutions are endorsed by stakeholders. Thus, apart from Disney's opinion, in the section of promoting strategy, Lions Gate, one of the Hollywood studio, also express their opinion and support on the BD standard's production costs. On the other hand, using debating strategy in critical technological exhibitions, the relevant information can catch more media's attention in one place and timing. Like CEATEC (Combined Exhibition of Advanced Technologies) in Japan, CES (Consumer Electronics Show) in the United States and so forth.

(4) Undermining

The study defines the undermining strategy as actively using discourses to implicitly or explicitly erode or impede the base or foundation of rival's technology and collaboration. In the standard war, focal firms were more likely to use undermining strategy in implicit way. Because, many other strategies in discursive activities have the same matter. In the dataset, less evidence shows that BD or HD DVD camps explicitly undermine rival's standard. Further, the definition also presents that target being undermining is not only the standard but also collaboration.

For instance, in the standard war, Microsoft engaging in the HD DVD camp was a critical event. The event not only triggered the BDA develop BD+ technology to add on additional copyright protection on the BD standard but also pushed critical stakeholders to choose a specific standard to support. In the engagement, Microsoft also announced that its new operating system (Vista) would exclusively support the HD DVD standard. Indeed, this engagement and announcement gave pressure to some PC companies in the BDA. Because, Microsoft has almost dominate power in PC market. Once the Vista system exclusively supported the HD DVD standard, other PC companies supporting the BD standard have to pay additional cost to install BD players in their PCs. Thus, the engagement caused interest conflict between the BDA and HP. HP said, once the BDA does not adopt the same copyright protection mechanism, it would leave the BD camp. Almost after a month, the BDA spokesman told to *Reuters* that they would not adopt HP's request. They would still use BD-J⁶ in the BD standard and would not open the content protection mechanism. The BDA clearly understood that they have to balance different expectations

⁶ Differ with the DVD standard, BD-J allow users to access network, picture-in-picture, and expanded local storage, the BDA called these contents as "bonus content". All BD players are required by the specification to support BD-J.

from PCs manufacturers and Hollywood studios. In this statement, obviously, the BDA chose content providers.

Before their announcement, Paramount, Warner Brothers, and Universal did exclusively support the HD DVD standard. They control 45 percent of the market for the current generation of discs. On the other hand, in BD camp, Lions Gate, Sony Picture, Disney, and 20th Century Fox sold about 45 percent of the DVD's in the United States. Moreover, if MGM's (Metro-Goldwyn-Mayer) title was accounted into BD camp, BD camp hold almost 50 percent DVD market. Thus, Paramount and Warner Brothers' announcement did give pressure on HD DVD camp. In other words, after Microsoft engagement and the iHD announcement, HD DVD camp began losing their advantage on the main critical stakeholders in the standard war, Hollywood studios.

(5) Spokesman

The study defines spokesperson as a person who is responsible of representing a company in the media. Overall, the BDA is aim to produce an united policies in terms of the standard. In order to provide the unambiguous voice, the BDA established spokesperson. This finding is only come from the BD camp, not the HD DVD camp. However, the study believes that having spokesperson was very helpful in the standard war. It also outlines that collective action influences discursive activity in standard war.

In the standard war, the BD standard do not have too many sub-standards. Rather, the DVD standard has DVD-R, DVD-RAM, DVD-RW, DVD+RW and DVD+R. These many sub-standards will confuse consumers. Moreover, the BDA has spokesman who is responsible of answering media's question and responding official announcement. The Japanese informant also said that every announcement, including media campaign, was endorsed

by BDA members. Thus, having spokesman is able to have unambiguous voice. In fact, originally, I did not pay attention on the role of spokesman in the BDA.

According to the media reports in the data set, the DVD Forum did not have spokesman in the standard war but Toshiba had. However, Toshiba's spokesman, Keisuke Oomori, was just appeared once on New York Times on 15 Sep, 2004. In that report, the spokesman used debating strategy to debate Sony's acquisition of MGM does not have any impact on HD DVD camp.

In the dataset, the first BDA's spokesman was Marty Gordon, the vice president of Phillips, in San Jose Mercury News on 10 Aug, 2005. He used promoting strategy to confirm that the BDA commits to offer the strongest content management system. Marty Gordon, Josh Peterson and Andy Parsons have presented on media reports in the data set. For instance, Josh Peterson was the director of strategic alliances at HP's optical-storage solution business in 2005. When Microsoft backed the HD DVD standard in 2005, Peterson have had played as a spokesman. However, when HP forced the BDA to adopt the open content protection mechanism later, Peterson's name was not presented on media reports in relation to the BDA information. Andy Parsons, was presented on the media reports collected in the study on October 2004. At that moment, his title was senior vice president of advanced product development for Pioneer Electronics (USA). In 2005, when his name appeared on the media reports, his title was not only Pioneer's senior vice president but also the spokesman of the BDA. After that, Parsons was responsible of many official information announcement and media interviews. By contrast, the HD DVD camp seems did not have official spokesman in the data. Keisuke Oomori, the Toshiba spokesman was just appeared on the media reports once. After, his name could not be found in any other reports.

To sum, the study claims that there is interrelationship between collaboration and discursive activity. Focal firm used discursive activity to promote the outcomes of collaboration (e.g., stakeholder management, new technology development, and so forth). At the same time, focal firm also use collaboration to develop specifications of new technology and define policies in terms of promotion for discursive activity. Further, the analysis also points out that focal firm may synergistically use different capability and strategies in the standard war. For example, Sony decided to adopt additional BD+ copyright protection technology onto the BD standard. This decision responded Hollywood studio's requirement in terms of copyright protection (requirement responding) and sought for stakeholder's exclusive support (seeking for exclusive support, Fox announced that it exclusively support the BD standard later). At the same time, the technology also undermined HD DVD standard's open copyright protection (undermining strategy).

Attribute 3: Network effects

Because Hollywood studios are able to produce complementary products (prerecorded disc) to the standards, in order to successfully generated the network effects, both camps used collective action and discursive activities to motivate critical stakeholders to engage in their collaborations, manage them to become symbiotic members, use them to express opinions to endorse the standards, debate suspicious problems to strengthen their commitment to the standards. Moreover, both camps used game consoles to promote the standard as well. The rationale is, game consoles have their own network effects by using game softwares. Game consoles' install-base provides a good platform to pave the road to the disc players. Rather than using Hollywood studio's pre-recorded disc (movie disc), using game consoles is more complex in the standard war. Hollywood studio's influence is not ignorable, how much network effects produced by Hollywood studios can be calculated

by their proportions. In contrast, how much network effects generated by game console is more interesting to explore in the standard war. This kind of network effects is also relevant to the outcomes of collaboration and discursive activity in the standard war. Hence, the study mainly present the role of game consoles. However, due to the data limitation, I cannot access the exact sales number of game consoles and disc players. In turn, I use other similar indicators in Euromonitor database to exploit the network effects in the standard war.

In Sony's history, Sony's PS2 was released with DVD players as well as upgraded music and video features. By 2006, Sony had sold 100 million game consoles and 1 billion game softwares. As long as gamers would like to buy the PS3 again, millions of PS3s would seed the market for BD players, providing huge economic scale and returns to Hollywood studios. Moreover, since the PS2, Sony's game consoles have had the capability of internet connection. For Sony, it needed PS3 to maintain its dominance of the game console industry in the emerging market for internet video downloads (The Economist, 2006). Thus, since Sony unveiled the PS3 on 17 Nov 2006, all of versions have BD players built-in. However, the 20GB version did not have Wi-Fi connection but 60GB had. The aim was to make all of users could experience what is BD's high-definition quality. Because, in the United States, pre-teenagers (aged 7-12) and teenagers (aged 13-19) are the most important consumers about the game consoles. Using 20GB version, Sony can make the users experience the BD standard. On the other hand, using 60GB, Sony can further explore other adult buyers who have deeper pocket to buy video, movie, and other complementary products online.

According to the Euromonitor database, the study finds that the PS3 may successfully explore the adult video games users in a way. Because of the 60GB version, Sony may successfully explore these customers having deeper pocket to buy the PS3 and

download other complementary products from Hollywood studios and other content providers.

Table 1

According to the Table 1, it proves that teenagers and pre-teenagers are the main customers of video game consoles. Further, the table also confirms the 60GB PS3 marketing strategy, because the number of adult users is boosted in 2007. They may have deeper pockets than young people. In turn, in some extent, Sony's 60GB version became these people's home entertainment centre. However, we cannot ignore the other factor, Nintendo Wii, because the product presents a new way for playing video game. The product is viewed that it explores a new market in the industry. However, the database do not provide each game consoles' market number, I cannot find the exact sales numbers and users' profile of Xbox 360 and PS3.

Apart from the video gamer population, the study further explores the database and see the market numbers and statistics between PC, video players and video players. The rationale of looking for the PC market number is, Microsoft back the HD DVD standard by using its new Vista system.

Since both camps launched their video players associated with new standards into US market in 2006, the per household grown up from \$17.9 to \$19.5 in 2006 but grown down to \$15.4 in 2007 and \$15.6 in 2008 in video player. Similarly, in the computer market, the per household grown down from \$176.9 to \$175.1 in 2006, but grown up to \$182.3 in 2007 but grown down to \$178.8 again in 2008. However, only the per household in video

games market grown up from \$95.4 to \$111.3 in 2006, \$115.1 in 2007, and \$177.2 in 2008. Especially, because Nintendo, Microsoft, and Sony launched their new game console in the US market, thus the number of per household was boosted in 2007 (see the Table 2).

Table 2

According to the Table 2, although PC has a boost in 2007 as well, the rate of growth is not bigger than video games hardware. The rationale is, Microsoft's new operating system, Vista, did not boost the market very much. The system software did not push customers to buy new PCs too much. Thus, using Microsoft's operating systems to seed the HD DVD players was not a successful action in the standard war (see the Table 3).

Table 3

According to the Table 3, the yearly growth rate of video games is more than computers and video players. Especially, the yearly growth rate of video players in 2006-07 is -19.7%. The rationale is, Wii, Xbox 360, and PS3 were unveiled in 2006. They not only boosted the whole video sales numbers but also erode some market of video players.

Attribute 4: Product performance

In the standard war, product performance is defined as the product's technical quality and price are developed by focal firms and have to be satisfied by stakeholders and customers. According to the definition, the product performance is critical stakeholder-oriented. In other words, a good product should satisfy their requirements.

Sony and Toshiba had different strategies on their new technologies, they caused different technical performance and price on the products. First, both firms used blue-laser technology to develop the BD and HD DVD standards. But Sony used thinner substrate later to produce the BD standard than Toshiba's HD DVD. The difference causes that the BD standard had bigger storage capacity than Toshiba.

Second, Toshiba claimed that the HD DVD players had backward compatible on DVD disc. The strategy did has lots of Hollywood studios' support in the very beginning of the standard war. By contrast, Sony did not promote the compatibility on disc players but game consoles. In other words, the PS3 not only combined with the BD players but also have compatibility with the PS2 game softwares. The aim was to utilize PS2's installed base then rapidly increase the economic scale of BD players by using network effects.

Third, Sony and Toshiba adopted different copyright protection policies. They both adopted AACS mechanism while Sony additionally added BD+ technology. As a result, more Hollywood studios chose the BD site as the proper technology.

Fourth, Sony and Toshiba had different pricing strategy on disc players and game consoles associated with new standards. In general, Toshiba used cheaper price to promote disc players but consumers have to pay expensive price to Microsoft Xbox360 while Sony decided to use the other way round. As a result, PS3 played as a trojan horse in the standard war.

Therefore, in August 2007, *The Wall Street Journal* reported that Toshiba had the lead on the hardware sales, because of cheaper HD DVD players price. However, the BD

standard had a big lead in sales of movie titles because of the PS3 and wide support from Hollywood studios. Because of the PS3's network effect and wide support from stakeholders, Warner Brother announced that it would exclusively support the BD standard in January 2008. Later, Toshiba announced that it lost the standard war with Sony.

Theoretical Framework and Discussion

Figure 1

The Figure 1 is the conceptual framework produced by the analysis. The solid lines represent the main finding in the study. Apart from the attributes discussed in the foregoing section, the study further outlines media is an indirect stakeholder in the standard war.

In general, collaboration (critical stakeholder management and rule setting capabilities) and discursive activity can be viewed as the main body of the framework. In the standard war, collaboration and discursive activity has interrelationship. Effective outcomes of them lead to network effects and product performance of new technologies.

In the case, media influence refers to media uses their reports to directly or indirectly influence audience's understanding and interpretations toward a specific event or artifact. According to Mitchell et al's (1997) viewpoint, media does not have legitimacy, power, and urgency to get involved the standard war. Obviously, they do not have any urgent request and power to focal firms. Once they get involved the standard, they will lost legitimacy. Thus, the role of media in the case is either dormant nor dangerous stakeholder.

The media role as indirect stakeholder has been connoted in the previous standard war studies. Although many standard war studies do not highlight the importance, the study suggests that media plays as a indirect stakeholder in standard war. For example, In

Kaplan and Tripsas' (2008) model, they highlight that focal firms can influence the perceptions and interpretations of new technology and determination of salient performance criteria by using media (Moreau, Lehmann, & Markman, 2001). Because, media can influence public opinion (McCombs & Shaw, 1972). Media is used to analyze every competitors and review their products in standard wars automatically. These reports may not intend to influence outcomes of standard wars. However, they may influence audience's interpretations in indirect way. Thus media mostly present both camps' daily activities and product information. However, their analyses and product reviews may influence focal firm's market sales. In turn, in standard wars, this study suggests that media is an indirect stakeholder.

Theoretical Implications

According to the findings, the main theoretical implication is to resolve network inertia in interorganizational relationships. Traditionally, long-lived relationships are thought to become the source of network inertia (Kim, Oh, & Swaminathan, 2006). Network inertia refers to "a persistent organizational resistance to changing interorganizational network ties or difficulties that an organization faces when it attempts to dissolve old relationships and form new network ties" (p. 704). Many studies on interorganizational network often embrace a rational cost-benefit calculus to changing and retaining interorganizational ties. These models assume that if the costs of current network ties are greater than firms' benefits, an organization with a need for network change will dissolve its ties and establish new ties without much difficulty. However, Kim et al. (2006) indicate that the relevant perspective neglect the network inertia issue. As discussed above, inertia may come from the inside of organizations, result from organizations' dyadic relationships with their partners. Besides, organizations' positions in interorganizational network and technical and institu-

tional environment also could be the sources of constraints. The data analysis connoted that the network inertia may exist in the HD DVD camp in the standard war. Thus, by comparison, in practice, the BDA should note the issue when the collaboration is getting bigger and longer.

In the HD DVD camp, according to the media reports, Toshiba did not share its dominant power with many other member organizations. It tended to control decision making and many actions in the collaboration. Even though it led the Steering Committee in DVD Forum and shared decision making and agreed to common objectives, the media reports show that only Toshiba was appealed on the relevant news releases. Along with time variation, by using dominant or consensual decision making type, both of which rely on mobilizing and sticking on similar member organizations' decision. It will cause insufficient innovation and poor product performance (Davis & Eisenhardt, 2011). In contrast, the BDA alternates decision control between three facilitators (Sony, Panasonic, and Philips). Although the BDA has similar decision making processes in consensual matter, the three facilitators substantially control the whole BDA (including the secretary team). In some extent, rotating control right on decision making processes make these three key companies to access their complementary capabilities. It overcomes the tendency of partners to overly rely on their own resources. Hence, it is more likely to create high-performing collaborations than the other ways (dominant and consensual decision control) (Davis & Eisenhardt, 2011).

Table 1. U.S. Video gaming population in 2005 - 2008 (%)

Age Group	2005	2006	2007	2008
Total population playing video games	50.7	50.2	57.1	59.5
Pre-teenagers (aged 7-12) playing video games	84.6	85.6	87.6	87.6
Teenagers (aged 13-19) playing video games	84.1	85.1	86.6	87.6
Adult (aged over 20) playing video games	45.0	44.0	53.0	56.0

Source: Euromonitor

Table 2. U.S. Market size of PC, video players, and video games in 2005 to 2008

(US\$ per household)

Products	2005	2006	2007	2008
Computers	176.9	175.1	182.3	178.8
Video Players	17.9	19.5	15.4	15.6
Video Games	95.4	111.3	115.1	177.2
Video Games Hardware	37.3	50.1	75.5	84.4
video Games Software	58.1	61.2	79.5	92.9

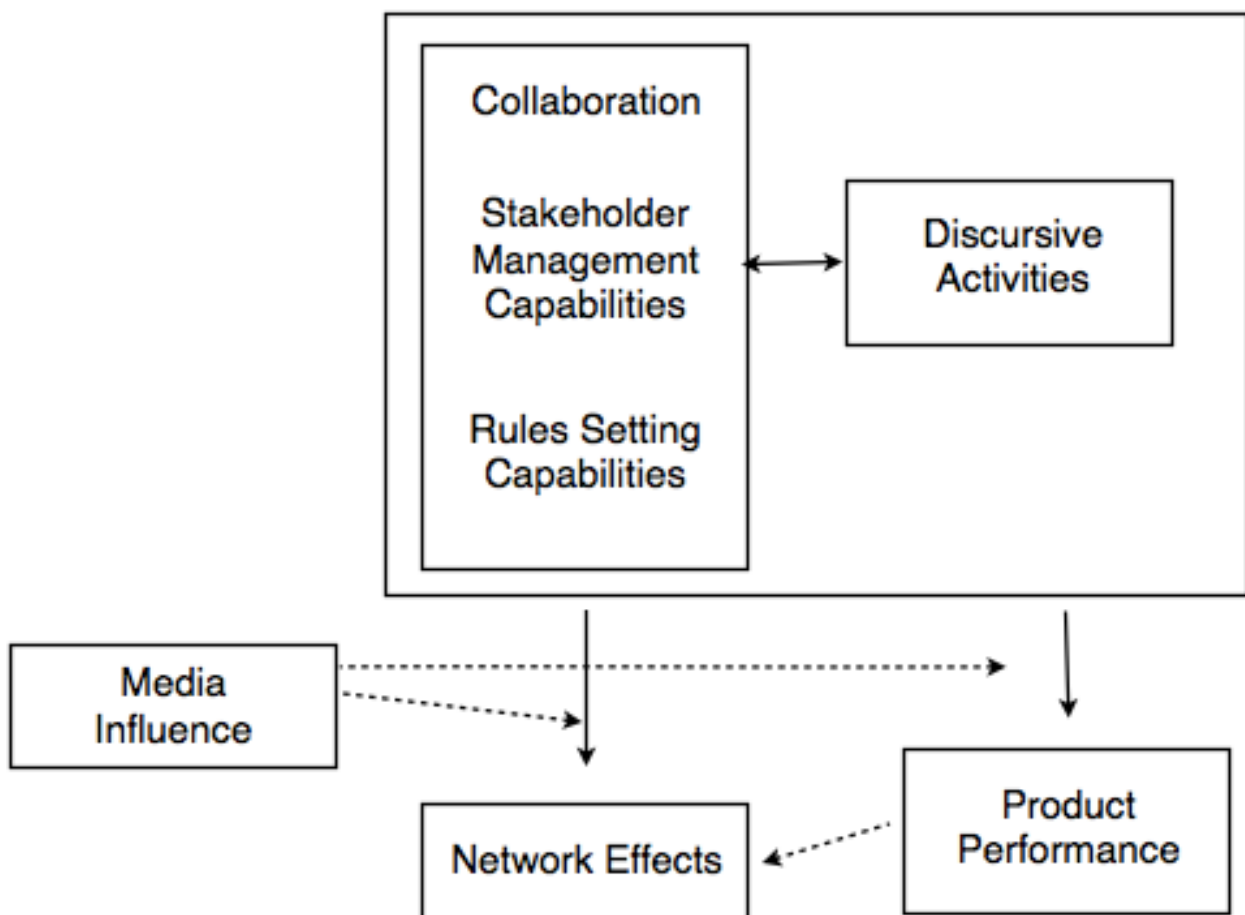
Source: Euromonitor

Table 3. The yearly growth rate in PC, video players, video games in U.S. market (%)

Products	2005-6	2006-7	2007-8
Computers	-0.1	5.6	-0.8
Video Players	10.1	-19.7	1.9
Video Games	17.7	41.3	15.5
Video Games Hardware	35.6	52.9	12.9
Video Games Software	6.3	31.7	18.0

Source: Euromonitor

Figure 1. Theoretical framework



References

- Anderson, P., & Tushman, M. 1990. Technological discontinuities and dominant designs: A cyclical model of technological change. *Administrative Science Quarterly*, 35: 604-634.
- Cusumano, M.A., & Mylonadis, Y., & Rosenbloom, R.S. 1992. Strategic maneuvering and mass-market dynamics: The triumph of VHS over Beta. *The Business History Review*, 66: 51-94.
- David, P. 1985. Clio and the economics of QWERTY. *American Economic Review*, 75: 332-337.
- DiMaggio, P.J., & Powell, W.W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Administrative Science Quarterly*, 48: 147-160.
- Fairclough, N. 1995. *Critical discourse analysis: The critical study of language*. London: Longman.
- Frooman, J. 1999. Stakeholder influence strategies. *Academy of Management Review*, 24: 191-205.
- Garud, R., Jain, S., & Kumaraswamy, A. 2002. Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java. *Academy of Management Journal*, 45: 196-214.
- Glaser, B., & Strauss, A. 1967. *The discovery of grounded theory: Strategies of qualitative research*. London: Wiedenfeld and Nicholson.
- Hofstede, G. 1993. Cultural constraints in management theories. *Academy of Management Executive*, 7: 81-94.
- Kaplan, S., & Tripsas, M. 2008. Thinking about technology: Applying a cognitive lens to technical change. *Research Policy*, 37: 790-805.

- Katz, M., & Shapiro, C. 1986. Technology adoption in the presence of network externalities. *Journal of Political Economy*, 94: 822-841.
- Kim, T.-Y., Oh, H., & Swaminathan, A. 2006. Framing interorganizational network change: A network inertia perspective. *Academy of Management Review*, 31: 704-720.
- Locke, K. 2001. Grounded theory in management research. London: Sage.
- Locke, K. 2011. Field research practice in management and organization studies: Reclaiming its tradition of discovery. *Academy of Management Annals*, 5: 613-652.
- Maguire, S., Hardy, C., & Lawrence, T. B. 2004. Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. *Academy of Management Journal*, 47: 647-679.
- McCombs, M.E., & Shaw, D.L. 1972. The agenda setting function of the mass media. *Public Opinion Quarterly*, 36: 176-187.
- Mitchell, R.K., Agle, B., & Wood, D.J. 1997. Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review*, 22: 853-8886.
- Moreau, C. P., Lehmann, D. R., & Markman, A. 2001. Entrenched category structures and resistance to really new products. *Journal of Marketing Research*, 38: 14–29.
- Suarez, F.F. 2004. Battles for technological dominance: An integrative framework. *Research Policy*, 33: 271-286.
- Suarez, F.F., & Utterback, J.M. 1995. Dominant designs and the survival of firms. *Strategic Management Journal*, 16: 415-430.
- Tushman M., & Rosenkopf, L. 1992. Organizational determinants of technological change: toward a sociology of technological evolution. In S.B. Cummings (Ed.), *Research in organizational behavior*: 311-347. Greenwich: JAI Press.