Incumbent Performance in the Face of a Radical Innovation: Towards a Framework for Incumbent Challenger Dynamics.

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ABSTRACT

A common belief among both academics and practitioners is that incumbents generally do not perform well in the face of radical technological change. However, while incumbents face serious challenges or may even be overthrown by a radical innovation, many continue to survive and even perform well when challenged by new entrants. While extant literature has provided many useful insights into incumbent-challenger dynamics (ICD), several issues have received less attention, such as the role of the state, the effect of the temporal dimension and the role of complementary assets. To address these issues, we perform an in-depth case study on the Dutch TV industry and develop a comprehensive framework that identifies and collates several relevant factors in ICD. Our ICD framework advances both theoretical and managerial understanding in this important domain.

Recent times have been characterized by several influential new technologies, such as the Internet and mobile telephony that have posed huge challenges for incumbent firms. Business models are being continuously challenged – Dell taking out the middlemen and Skype undermining the landline telephony business for some of the world's largest incumbent telecom providers through use of Voice over Internet Protocol (VoIP), (Financial Times, 2006). But what do these developments mean for incumbent firms and for their challengers? More specifically, how do large incumbents perform amid the onslaught of radical innovations?

A common belief among both academics and practitioner is that compared to new entrants, incumbents generally do not perform well in the face of radical technological change (e.g. Christensen 1997; Rotharmael & Hill, 2003; 2005). But what is behind this belief and why do we tend to associate the old with rigidity and the young with agility? Is it because incumbents would rather exploit and refine existing competences rather than explore new technologies and markets and are better at exploitation rather than exploration (Levinthal & March, 1993)? Surely, incumbents face serious challenges or may even be overthrown by a technological innovation, but does it mean that incumbents usually go into decline whenever a challenge arises, as many standard models of innovation seem to suggest (Freeman & Soete, 1997; Sull et al., 1997; Tripsas & Gavetti, 2000; Tushman & Anderson, 1986; Utterback, 1994)?

Examples are aplenty to support the argument that incumbents often slide into decline in the wake of technological disruptions. For instance, the arrival of electronic calculators, biotechnology, diesel-electric locomotives, jet engines and solid state semiconductors each enabled new entrants to overthrow entrenched incumbents (Cooper and Schendel, 1976; Majumdar, 1982; Foster, 1986). However, there are many instances, where the old continued to perform well and did not go into decline. Cohan, (2000) illustrated that Charles Schwab, an

established and leading financial industry incumbent, successfully embraced online brokerage – a disruptive innovation and overtook E_ Trade, the new entrant and first mover, while Methe et al. (1997) found that industry incumbents could be credited with many major innovations in the telecommunications and medical device industries. Furthermore, Klepper and Simons (2000) found that nearly all dominant U.S. manufacturers of television sets previously were dominant producers of radios and that they took the lead in television product and process innovations, while Tripsas (1997) found in the typesetting industry that an incumbent manufacturer remained an industry leader for over a century, despite three waves of technological shifts that introduced competence-destroying innovations. Indeed, a vast body of recent empirical research has found that the extent of the "incumbent's curse" or the innovative inertia of incumbent firms may have been overstated.

How could these cases be explained by the theory on incumbent challenger dynamics? What are the determinants of incumbent performance in the face of radical innovation? What makes them survive the challenge? What are characteristics of incumbents that prosper in the face of disruptive technological change in comparison with those that fail?

Prior work has provided several explanations for such cases. Factors such as complementary assets, commercialization (Rothaermel & Hill, 2003, 2005), government subsidies (Levinthal, 1992), cognitive models of the top management team (TMT) (Tripsas and Gavetti, 2000) and luck (Burgelman, 1991) have been shown to explain incumbent survival in the face of radical innovation. However, while offering valuable insights into incumbent-challenger dynamics in the face of technological innovations, a clutter of many different factors and at times conflicting arguments has tended to preclude the emergence of a coherent picture that can guide academic and managerial understanding of the subject (See figure 1 for an illustration).

Insert figure 1 about here

Moreover, whereas previous studies (e.g. Cattani, 2005; Rothaermel & Hill, 2005) have tried to explain the observed phenomena through various bivariate and trivariate models, not many attempts have been made to structure this field of knowledge and develop a more comprehensive and holistic framework for incumbent challenger dynamics (ICD). In this paper, we intend to develop such a model, using the TV industry as an illustration. From a thorough review of the literature and a study of the TV industry, it emerged that the cotemporaneous roles of the institutional environment (e.g. Chesbrough, 1999b), related markets (Porter, 1990) and customers (e.g. Danneels, 2003), and how they interact with firm-level capabilities, while clearly acknowledged, has not been not analyzed *concurrently* nor addressed in a systematic manner. Addressing their role allows us to capture some of the complexities in this process.

To address these issues and develop a comprehensive ICD framework, we perform an in-depth case study on the Dutch TV industry that is dominated by three incumbent firms – NPO, RTL and SBS – collectively holding about 75% of the market share. The introduction of the decoder and the opportunities it created for technological improvement (more choice of channels) and new business models constitute radical discontinuities that should have upturned the incumbent advantage but did not. As such, the TV industry provides a useful setting to understand the dynamics of instances where incumbents survive a radical innovation. Moreover, since both the government and related industries always had great influence on the TV content market, this particular context offers a fascinating setting for studying the multifarious factors that mediate incumbent survival in the face of a radical innovation.

This paper aims to contribute both academically and managerially. First, by using the TV industry as an illustration, we develop a more comprehensive conceptual framework for Incumbent-Challenger Dynamics that includes several dimensions not yet made explicit in

existing literature. More specifically, we highlight the role that complementary markets, government intervention and the type of consumer buying decision play in how incumbent firms perform in the face of a disruptive innovation. We integrate these dimensions with other more articulated determinants of incumbent firm performance in the face of radical innovations. We hope to further both practitioner and scholarly understanding through developing a holistic framework that reflects the complexity of actual competition in an incumbent-challenger setting. Especially for practitioners, this framework identifies relevant factors to develop strategy tailored to the specific needs of a particular organization and industry (Porter, 1994).

The paper is structured as follows. First, we discuss existing literature on incumbent challenger dynamics and present our research questions. Second, we describe our research methods and summarize the historical development of the television industry in the Netherlands. Third, we present our findings. We conclude with the implications of our findings for both theory and practice.

STRUCTURING A FRAGMENTED FIELD

Over the past two decades, radical innovation and its consequences for incumbent firms have been a well-conversed academic topic. Research has long suggested that technological change can turn the capabilities of incumbents into liabilities and thereby cause entrants to replace incumbents (Abernathy & Clark, 1985; Schumpeter, 1942). Scholars have argued that existing capabilities cause incumbent firms to be less adaptive or responsive to change that prevents them from successfully exploiting a new market niche. It has been suggested that biased information, misaligned incentives, and cognitive biases prevent incumbent managers from understanding the rules of competition in emerging niches that often follow a technological shift (Christensen & Bower, 1995; Uttterback, 1995). As a result, incumbent firms often either

fail to adapt to technological change, and successfully enter new niches or enter too late to be able to effectively compete (King and Tucci, 2000).

This has been argued to be especially the case when the innovation or technology is "competence-destroying" rather than "competence-enhancing" for incumbents (Tushman and Anderson, 1986). If innovations are competence destroying, they either render established technologies obsolete or change the basis of competition that is they change the performance metrics along which firms compete. They therefore, destroy the value of both incumbents' linkages to existing customers using existing technologies as well as that of the investments that incumbents have made in those technologies (Danneels, 2004). Even when incumbents do invest in radical, competence-destroying technologies; they are often at a disadvantage relative to new entrants. This is due to their existing organizational structures, architectures, routines and procedures that have evolved during periods of incremental technological change and often prove difficult to displace (Burns and Stalker, 1961; Nelson and Winter, 1982, Henderson and Clark, 1990).

However, despite most standard models of innovation supporting the notion of incumbent decline in the face of radical innovation, there have been notable 'exception cases' that motivate our quest to learn more about Incumbent-Challenger Dynamics (ICD). For instance, in studying the postwar launch of television manufacturing, Klepper & Simons (2000) found that under certain conditions, such as low uncertainty, well-established compatibility standards, proven technological and economic feasibility, and a prolonged incubation period due to the Second World War, incumbents (high-volume radio manufacturers) were able to survive the challenge from the new television technology. Similarly, Chandy and Tellis (2000) found that after World War II, it was incumbents who introduced a significant majority of radical product innovations within the two product classes they studied. They concluded that the notion that incumbents always lag when it comes to

innovation might have been overstated. What then explains the survival of an incumbent firm after an innovative shock in its industry? And although incumbents on average may perform less well relative to new entrants, what explains the differential success of certain incumbents?

While there have been important contributions in this domain (e.g. Argote & Beckman and Eppel, 1990; Baum & Ingram, 1998; Chesbrough, 1999a; 1999b; Danneels, 2004; Tripsas, 1997), these have been limited to focusing on a particular dimension, such as the firm, the industry or the national institutional environment. Few studies, if any cut across multiple levels of analysis to provide a more holistic account of ICD.

To develop a multi-dimensional and inclusive framework, we draw on Minto (2003) who has suggested structuring complicated concepts in the form of a pyramid where each level supports the factor located on top of it. Each level contains concepts that in the same logical order and that should be mutually exclusive and totally exhaustive. We use a method, termed as the Pyramid Principle as a process guide for developing a framework that is both practical and comprehensible. The three salient dimensions of the framework we develop are the *industry effects*, the *incumbent firm* and the *challenge* from an innovation.

Industry effects

We first address the *industry* dimension including the role of the government. A useful concept for studying the playing field of ICD is that of value network (Christensen, 1997; Ghemawat, 1991; Rosenbloom & Christensen, 1998) that encompass all links to suppliers, customers, competitors, community, complementary products etc. that an incumbent firm builds over time. This value network can either inhibit incumbents when faced with a radical innovation or protect it, depending on the context and the challenge.

Scholars have documented several factors that explain incumbent versus challenger performance in the face of a radical innovation. One such factor is experience with turbulence

in previous markets (Rothaermel and Hill, 2003). Although an important capability, it cannot be attained without having gained "transformational experience" inside an industry where turbulence is the modus operandi (King and Tucci, 2002). When technological or market changes are frequent or spaced more closely together, it may prevent incumbents from becoming inflexible. On the other hand, if incumbents have only "static experience" inside a stable and less dynamic industry, a technological shock might destroy them. Stated differently, the frequency of turbulence in an industry influences the effect of any single innovation shock. As a result, transformational experience is likely to increase the probability of success in the face of change. Rapid changes in the industry itself may also directly prevent the development of organizational inertia (e.g. Eisenhardt and Martin 2000). In short, the level of competition in the industry (as a proxy for turbulence) influences incumbent survival.

Within the discussion of the industry, Levinthal (1992) brings government intervention to the table, suggesting that governments can subsidize certain industries and incumbents that would have otherwise failed, continue to flourish. For instance, Chesbrough (1999b) argued that misguided governmental policies towards "national champions," and from the institutionally mediated capital markets resulted in incumbents in the disk drive industry to often be too closely tied to their country or region, and to the captive needs of their systems companies and therefore unable to respond to the challenges of new technologies and globalization. Similarly, Chesbrough (1999a) in his study of hard-disk-drive industry in three regions: the United States, Europe, and Japan found that incumbents lost their leadership position across technological transitions in the United States, while in Japan incumbents maintained their dominance. He highlighted various aspects of the institutional context that impact the fate of incumbents relative to entrants when faced with disruptive technological change; such as entrants' access to qualified and experienced personnel, national contexts and the availability of venture capital for new entrants, the strength of incumbents relationships

with customer and suppliers and government policy, especially in terms of subsidies and preferential treatment towards incumbents. Finally, Darby and Zucker (2001) argued that that the restrictions imposed on star scientists at Japanese universities, who were prohibited legally from holding equity interest or founding roles in new firms, was an institutional factor that contributed to the lack of biotech startups in Japan

The government factor and the role it plays at an industry level have not been discussed in conjunction with other dimensions and we elaborate on this point in the case. Furthermore, suppliers, customers and complementary markets however also have received less attention in the ICD literature. In short, the industry dimension includes the level of rivalry, customers, suppliers, complementary markets and government action.

The Incumbent Firm

Our second dimension is the *incumbent firm*. The nature of the firm and the various strategies that are employed by its managers have been discussed elaborately in the strategy literature. Discussing the complete body of literature on the nature of the firm and its strategies is beyond the scope of our discussion here. Instead, we draw on the work of scholars who have attempted to structure the strategy field into various schools of thought. For the purpose of our discussion, the work by Volberda and Elfring (2001) on the three schools of thought in the strategy literature is particularly useful. These are: the Boundary School, the Dynamic Capabilities School and the Configurationally School that include three key issues for firms, *boundary management*, *configuration* and *capabilities*. To use an analogy with the human body, configuration is about the structure of the body, capabilities about the ability of individual or collective body parts and boundary management about interaction with its environment. We discuss each below.

Boundary management is concerned mainly with ‘make or buy’ decision. Issues such as outsourcing, licensing or setting up cooperation with other firms, which are relevant issues

when considering new technologies, are factors that play a role in incumbent survival when facing radical innovation (Chesbrough, 2005; Macher et al, 2004; Rothaermel, 2001). Organizational responses such as setting up a joint-venture with new entrants, allying with them or simply acquiring them, depending on the *timeframe* available until the innovation becomes commercially viable (Helfat & Lieberman, 2002; Macher et al., 2004) are part of Boundary Management. Stated simply, if you cannot beat them, you join them or buy them. In short, the type of response an incumbent chooses in relation to a certain timeframe, improves the chances of its survival. Henderson (1994) has noted the importance of both internal integration across multiple disciplinary boundaries and external integration across firm boundaries, such as strategic alliances or long-term supplier relationships in identifying and integrating knowledge. Furthermore, Rothaermel (2001) has shown how incumbents in the pharmaceutical industry access biotechnological competences for new drug development by engaging – through a dedicated alliance function - in strategic alliances with startup biotech firms. In turn, the incumbent pharmaceutical firms provide complementary capabilities, such as sales and distribution networks, advertising and promotion skills, and brand names. While this particular formal organizational function is a configurational aspect, it is nonetheless also a proxy for the incumbent firm managing activities across boundaries and as such, we include it here.

Configuration considers factors related to the formal configuration or organization of the incumbent firm, such as being organized by functions or business units and the degree of autonomy for the various functions or units. In general, these are official functions on the organizational chart or other formal institutions inside the incumbent organization that either improve or decrease the likelihood of incumbent survival in the face of radical innovation. For instance, factors such as loose coupling of the commercial and R&D functions and the various mechanisms for inter-unit knowledge management are configurational issues that have been

shown to influence incumbent survival (Henderson & Clark, 1990; Rothaermel & Hill, 2003). Configuration influences how effectively an organization adapts or learns in the face of various types of innovations. For instance, Brusoni et al (2001) found that outsourcing component production, while maintaining knowledge about components and the system architecture enable incumbent to spot and benefit from major innovations.

Finally the notion of *capabilities* subsumes the largest number of factors identified in the literature. This particular category consists of factors that provide the incumbent firm with a competitive edge over the challenger firm, or facilitate change through a certain skill or competency and may increase the likelihood of incumbent survival in the face of radical innovation. Experience with turbulence in existing or previous markets and change or organizational slack (redundant capacity) to try out innovative projects have also been argued to improve incumbent survival (King & Tucci, 2002; Rothaermel & Hill, 2003). Indeed experience with organizational change has been argued to be able to "reset" the organization's inertial clock (Amburgey et al., 1993). For instance, Katz and Allen (1982) found that periodic reorganization of product development teams prevents them from developing a "not-invented-here" syndrome, while Tushman and Romaneili (1985) argue that reorganization reduces inertia and thereby keeps the organization adaptable. As early as 1950, Schumpeter noted that institutionalizing the innovation process creates new business opportunities. Transformational experience might thus provide a dynamic capability by creating routines that support organizational change and that allow a firm to be more innovative (Amburgey et al., 1993; Lavie, 2006).

As firms gain experience, they create routines for calibrating and analyzing the world (Nelson & Winter 1982). Just as technological experience can increase the ability to cope with new technologies (Cohen and Levinthal 1990), market experience may increase some firms' understanding of new markets. Chandler (1990) has documented the expansion of firms in a

number of pivotal industries during the Second Industrial Revolution while Lazonick (1991) has shown that incumbent firms can leverage their organizational resources in ways that new entrants cannot. New entrants may simply lack the experience needed to fully understand the opportunity and may suffer from what has been described as a calls a "Type II error in perceiving market opportunities," (Langlois, 1997). Thus incumbent managers may use their experience to navigate the market waves, despite rapid technological and market change.

Another advantage incumbents usually may have over challengers in terms of capabilities comes from either owning or having better access to complementary assets that buffer incumbents from the effects of competition and enable them to eventually appropriate the profits from the innovation (Rothaermel & Hill, 2003, 2005; Tripsas, 1997). For instance, with increased volumes, firms also need financial resources to invest in the new business and complementary capabilities for marketing, distribution, manufacturing, technical know-how and R&D in order to be able to reap the economies of scale (Cohen & Levinthal, 1990; Klepper & Simons, 2000; Teece, 1986). Arguably, if incumbent either have a lot of free cash flow or a broad base of knowledge, and hard-to-obtain complementary assets, they can either simply buy up innovators or become an attractive partner for the challenger firm in an alliance. As is often seen in the domain of pharmaceutics – incumbent firms and biotech challengers – this can improve survival chances for incumbents.

The arena of organizational learning and cognitive schools (Mintzberg 1990) offer other explanations within the realm of firm-level capabilities. For instance, top management team (TMT) beliefs, values, norms, mental models and cognition are factors that influence the ability of corporate leadership to adapt to the new environmental setting after an innovative shock (Tripsas & Gavetti, 2000). Burgelman (1991) introduced the notion of "inter-organizational ecology" in his reference to the balance between top-down strategic intent and bottom-up internal experimentation and selection. Along the lines of organic concepts and the

natural world of biology, Cattani (2005) brings in the notion of "firm pre-adaptation," a combination of strategic foresight – through learning many different skills that might one day become useful – and luck. All are capabilities that can increase the chance of incumbent survival. In short, under the rubric of the incumbent firm, we discuss boundary management, configuration and capabilities.

The Challenge

The third and final dimension of the proposed conceptual structure is the *challenge* posed to incumbents. The challenge is usually seen to come from various types of new entrants – firms from related or unrelated industries or *de novo* entrants or start-ups – rather than other incumbents (Christensen & Rosenbloom, 1995). The challenge dimension includes not just the new technology itself but also the various opportunities it creates for new entrants. Several authors have defined the dimensions of the innovative shock itself. We draw on their work to break down this particular aspect of ICD.

For instance, Tushman and Anderson (1986) have defined the difference between competence enhancing change – when an innovative shock builds on existing competences of incumbent firms - and competence destroying change – when the shock requires completely new competences. Similarly, scholars distinguish between technological and business process innovations and the radical or incremental effects that an innovation has on the incumbents market (Christensen, 2006; Govindarajan and Kopalle, 2006; Markides, 2006). We coin this distinction the 'innovation type' as we incorporate it in our framework. See table 1 for various studies on the different types of innovation.

Insert table 1 about here

Furthermore, Rothaermel and Hill (2005) have discussed the issue of commercialization of an innovation through leveraging either specific or generic complementary assets. We term these features 'commercialization requirements'. Finally, we

address the issue of urgency of response in the face of an innovative shock. For instance, in the early days of instant photography, the incumbent Kodak supplied many of the chemicals used to manufacture its challenger Polaroid's instant film that allowed Kodak to influence both the picture quality and the price of Polaroid film. Kodak was thus able to monitor the challenger's technological progress and defer actions such as launching its own instant cameras and film or one-hour processing until the market developed (D'Aveni, 2002). In a similar vein, Macher et al. (2004) has addressed this issue and possible organizational responses at different times when faced with such a challenge. In our framework, this issue is addressed as the 'time-horizon' of the challenge. Together these three factors – innovation type, commercialization requirements and time-horizon – provide us with a useful breakdown of the challenge dimension.

To sum up our argument so far, the literature on incumbent challenger dynamics, while significantly advancing our understanding does not yet provide a coherent picture. Even the relatively recent framework by Rothaermel & Hill, (2003) leaves several issues unattended, such as providing a practical grouping of factors that play a concurrent role. Furthermore, their division of ICD into economic, strategic and organizational factors does not distinguish between factors directly under incumbent control and those that are out of their direct control – a practical distinction when forging strategies.

We intend to provide a comprehensive and holistic framework for incumbent challenger dynamics (ICD) that incorporates many of the issues that have been left unattended to date and illustrate them through a case that further extends our understanding of incumbent challenger dynamics. Figure 2 depicts such a framework.

Insert figure 2 about here

METHODS

The case study described below provided us with a rich data set for illustration of the framework we derived from the literature. A case study is appropriate for several reasons. First, the phenomenon of interest – determinants of incumbent survival in the face of radical innovation – is not well understood (Siggelkow, 2007). Second, we wanted to study a contemporary phenomenon in its real-life context and boundaries between the phenomenon and the context are unclear (Yin, 2003). Third, the purpose of this research is to address certain 'blank spots' in the conceptual framework – and to provide insights into the mechanisms at work rather than trying to determine the exact causal effects (Gerring, 2004).

The TV industry offers a fertile setting for many reasons. First, it recently experienced both a technological and a business model innovation, providing the market with unprecedented improvement of price/quality and revenue potential. It is thus an obvious setting for studying incumbent survival of an innovative shock. Second, the role of government regulations – through the regulation of commercial television up to 1996 – and complementary products/service – through the role played by cable networks (*kabelnetten*) in the innovation central to this study – provides an opportunity to examine how regulation impacts ICD . Both regulation and complementary products/services have been addressed rather thinly so far yet play an important role in the TV industry. Especially for technology-based markets, the role played by related network infrastructures is of particular importance. As a final point, the innovative shock – the introduction of the decoder - took place in 1996 which gives us a sufficient timeframe to study its effects and at the same time, is also recent enough to be of interest for current business and academic practice.

Data Collection

The various theoretically derived determinants of incumbent firm performance facilitated the process of data collection and analysis (Yin, 2003). The unit of analysis

employed are the TV channels grouped together, based on their ownership, whenever the setting allows for such grouping. As such NED1, 2 and 3 are grouped under NPO (abbreviation for 'Nederlands Publieke Omroep', the Dutch public channels); RTL for RTL4, 5 and 7; SBS for SBS6, NET5 and Veronica; Talpa/tien; DTV channels) for all channels behind the decoder. 'Other' is the group of channels on analogue cable but not among the first 10 channels. Drawing on existing work, we employed three groups of factors - the Industry, Incumbent Firm and the Challenge – to steer our questioning in interviews and data collection.

We began our study on the TV Content Industry through unstructured interviews with two industry generalists to obtain a general understanding of the industry. We began with a short period of open questioning such as 'What has been the impact of DTV and why did it impact the industry in such a way?' The purpose of this question was to obtain a general opinion from the interviewee and minimize the bias that could originate from our theoretical framework. The second half of the interview was semi-structured with steering from our theoretical framework. Interviewees were asked to structure their general 'theory-free' opinion using industry, incumbent firm and challenge as a grouping mechanism. Naturally these terms were explained and detailed through questioning.

The industry generalists we contacted suggested the industry specialists – actors of content packager or distributor firms. We selected interviewees who were at either at the board level or reported directly to the board to ensure sufficient knowledge of strategic decision-making in the organization. The interviews started without structure as explained above, to obtain theory-free perspectives. Because obtaining information about the incumbent's inner workings – the incumbent firm – was best obtained from these actors, the second half of the interview was semi-structured and focused on this subject. Industry and Challenge were also discussed but mostly in relation to the incumbent firm. For a specified

structure of these interviews – both with generalists and specialists please refer to Appendix A at the end of this manuscript.

Since the role of complements – the *kabelnetten* – was obviously of relevance, we also interviewed managers from these markets. We interviewed the director of CAIW to understand the role as cable networks and the roll-out of the decoder. This particular firm has been quite informative, since they are one of few who have attained a 75% penetration rate of decoders among its customers. An interview with Tele2 – an alternative distribution platform employing IPTV – provided insights on DTV developments. Finally, we consulted archival and news sources (such as TV Year Reports and Viewer Ratings) for general information on the industry and objective data on performance measures of TV Content Packagers. Data sources are listed in table 2.

Insert table 2 about here

Data Analysis

The process of data analysis involved a number of steps. In the first phase of our research, the general purpose was to obtain an overview of the industry. Narratives were developed based on sources such as the *kabelraden* manual and diverse annual report for the entire TV industry (also see table 2). We then analyzed data that forms the basis for our insights on the introduction of DTV and its challenges. We developed various central concepts that recurred in each of the interviews and the historical narratives studied that we term as 'Supporting Information.' See table 3 for how we derived support for our central concepts.

Insert table 3 about here

A central concept was deemed relevant if at least three interviewees mentioned the issue. Afterwards, reports were sent to interviewees for review on accurateness. We did not include

reports due to the confidential nature of the interviews. A list of interviewees is contained in table 4.

Insert table 4 about here

In the final step of the analysis, we aggregated central concepts identified in phase two of the analysis into either one of the categories – Industry, Incumbent Firm or Challenge – or subcategories identified in theory. We aggregated first order or raw data into central concepts – second order concepts – and finally developed a framework – aggregate level dimensions (Maiitlas, 2005).

To illustrate the process, the concepts 'TMT belief in change' and 'complementary assets such as market power and knowledge' (see table 3) were derived from the analysis of interview and archival data. For instance, TMT belief in change – a first order concept - was reflected in quotes such as '"…we do believe that eventually this market share will erode…", "We are convinced that the world is changing.", "…NPO is deploying DTV with 18 new digital channels…" and in TV year reports issuing releases on incumbent firms creating DTV related positions in their organizations (the raw data). Similar raw data support (see table 3) was found for 'complementary assets' as a central first order concept. We aggregated these two first order concepts into 'incumbent firm capabilities' (a second order concept). Subsequently, we aggregated incumbent firm capabilities, configuration and boundary management, to come up with the dimension of incumbent firm properties. We repeated this process, frequently iterating between data and theory to develop other dimensions. See table 5 on data analysis and how we aggregated our data to derive central concepts

Insert table 5 about here

THE DUTCH TV INDUSTRY

The empirical setting is the Dutch television industry; specifically the 'content providers' in the industry supports the highest level concept. Bringing TV into the Dutch

households, involves content producers (they produce the shows), content providers (they pack and promote the shows) and content distributors (they bring the signal into the household). In the Netherlands, Content Producers are represented by parties like Joop van de Ende and EndeMol, but also by some of the large channels discussed below. This part of the industry is concerned with making TV shows. They – the industry suppliers – produce the shows, documentaries and soap operas that are consequently packaged into a channel by the large content packagers (the channels, in Dutch the '*programma aanbieders*'). Content Providers/Packagers – *programma aanbieders* - are represented by the large channel groups; NED 1, 2 and 3, RTL-group (RTL4, 5 and 7) and the SBS-Group (SBS6, NET5 and Veronica). Then there are a number of smaller "thematic" channels (music, foreign, science, etc.) appealing to a much smaller crowd. The big three (NED, HMG/RTL-group and SBS Group) have about 70% share of the viewers in the market and thus represent our Incumbent Firms in the study at hand. Most of these channels also partly produce their own content (vertical integration). Figure 3 provides an overview of market shares over time.

Insert figure 3 about here

The final group, the Content Distributors – *kabelnetten* - transports the signal of TV Channels into the Dutch households. There are about 7 million households in the Netherlands. About 6.3 million households watch TV though a cable connection – of which 373,000 household were digital by the end of 2005 (Broadband TV news, 2006). Companies like UPC, Casema and Essent are examples. About 300.000 households use Digital Video Broadcasting-Terrestrial (DVB-T), better know as '*Digitenne*' which is offered by KPN. Satellite – offered by firms like CanaalDigitaal - is used by about 700.000 households. Finally, a rather new technology – DSL – is used as distributing platform for about 150,000 households by distributors like Tele2 and MINE (also from KPN). All numbers relate to the end of 2006.

Some platforms also offer Video-on-demand, intruding the arenas of Content Packagers. See Figure 4 for an overview of this discussion.

Insert figure 4 about here

In short, there are several types of distributor platforms. In this study though, we focus on the cable network platform, since the subject of this research – the introduction of the DTV decoder – only pertains to this particular platform. Other platforms – which already used digital technologies - are used occasionally for reference in the discussion and if so, we clearly state it.

The Decoder – A radical innovation?

The content distributors employing the cable network were the first ones to introduce the decoder. This device has the size of a VCR and enables the distributors to scramble and digitize their signal. Previously, this was impossible because regular televisions on the market were unable to receive and display this type of signal. This development had a number of advantages for the distributors. First, the scrambling of the signal offered distributors the opportunity to limit the freely available TV channels on the cable network. Second, the digitization of the signal significantly increased the number of separate channels – from 30 to over 250 - that could be offered on (analogue) cable. We elaborate on these issues below.

Before the introduction of the (digital) decoder in the period 1995-1996, every channel available on cable was viewable by anybody with a TV. Distributors were unable to limit this ability. The TV business got its money from commercials and the small fee households paid monthly to their distributors to be able to watch TV. The decoder, through its ability to receive a scrambled signal changed this. Viewers who wanted to watch TV Channels offered through a scrambled signal had to pay an *extra* subscription fee to receive a decoder. This changed revenue streams and sources considerably. In other words, the business suddenly required different competencies. As an illustration, viewers using regular old analogue cable

pay about 15 euros a month. The government sets this fee. For using a decoder, viewers pay an extra fee of up to 15 euros a month and there is no government intervention on pricing (UPC, 2007; AtHome, 2007; Multikabel 2007).

Analogue TV in contrast to DTV, has limited capacity to broadcast channels (about 30) and the Dutch government has intervened with something called '*Kabelraden*' (Regional Cable Network Committees) to decide what was available on TV. The '*kabelraden*' indirectly made sure there was hardly any new competition because starting a new channel meant having to go to all the kabelraden – 61 of them - separately and convincing them that your content was worth watching in order to obtain broadcasting rights. This provided the market an 'institutional barrier to entry' although the intention of the *kabelraden* was to protect the consumer. Essentially, the decoder enables challengers to circumvent these barriers.

To wrap up, the introduction of the decoder has changed the market in a number of ways. First, more capacity meant more channels. The *kabelradens* have authority, only over the first 15 channels and digital TV had room for about 250. In other words, a new channel no longer needs to go through the *kabelraden* since it can use one of the digital channels. Secondly, an extra fee can now be charged for a TV channel. Subscription TV ('*abbonneTV*') provides for a whole new business model. Third, starting up a channel is less costly than before. Digital TV basically requires only one PC to do the encoding, scheduling and transmission of the complete channel for a content distributor. Finally, digital TV and the decoder together provide a basis for new kinds of services, like video on demand (VOD) and interactive TV (van Wijngaarden, de Jong en Briel, 2005). Clearly, the introduction of the decoder created both a business model innovation and a technological innovation and provided for a multi-faceted challenge in our study framework.

An overview of the decoder in the Dutch TV industry

By the end of 2003, after a period of many hostile takeovers and turmoil, the Dutch TV industry having gained experience with turbulence had relatively stabilized. The results were three large players: NPO with NED123, RTL Group with RTL4 and RTL5 (and RTL7 eventually) and the SBS Group with SBS6, NET5 and Veronica. The next challenge however was just about to arrive.

In the period 1995-96, the government did not only relax regulations on broadcasting commercial television, but also started to break up monopolies on network infrastructures, such as the telecom network owned by the firm now known as KPN to allow 'fair competition' in the market. The '*kabelnetten*' (content distributors) witnessing this phenomenon anticipated that their cable network would probably be next in line for such government measures and decided to develop a countermeasure: the decoder, the device that enables DTV. Around 1995, UPC introduced the analogue decoder that mainly enabled the network to limit signal availability through scrambling and charge extra fees for this content, which consisted of about 10 channels. Other distributors like Casema followed suit. Content offering developed slowly over the following year to about 15 channels at the end of 1999.

The digital decoder was introduced in the summer of 2000, with about 40 to 50 extra channels, growing to a total amount of 60 to 140+ channels depending on the distribution platform (UPC, 2007; Essent/atHome, 2007). Content distributors employed two different strategies for deploying the new decoder in the market. UPC used 'market push', selling decoders only in appointed stores and setting prices for the whole market. Casema and later Essent used 'market pull,' allowing stores to freely sell and price decoders and link them with the sales of new television sets (retail model). Initially, Casema and Essent were more successful with the market pull strategy and the number of digital households increased from 90,000 to 125,000. As UPC lagged behind, it started to push the decoder onto the market with

more force, freely sending decoder to all household connected to their network. It was able to increasing digital households from around 53,000 up to 100,000 in 2005 (Broadband TV News, 24-04-2007). The decoder was offered for free and consumers could try the contract for three months, after which everything could be returned for free, no strings attached. The method worked and UPC has recently grown much quicker. CAIW, a smaller network in South Holland used a 'compromise' strategy. They strongly contrasted the DTV offer with the analogue offer by limiting the number of analogue channels to 24 (instead of the usual 35 – 44) and offered the decoder nearly for free (about 10 euros) in order to stimulate DTV usage. The strategy worked well and they attained about 61,000 DTV subscribers in a total of 86,000 in 2005 (Broadband TV news, 24-04-2007). By 2007, they had about 75% of their customers watching DTV through the decoder. However promising these numbers may seem, the related market infrastructure for digital TV did not develop to a point where DTV content could seriously challenge incumbent TV channels.

Despite the increasing success of decoders in the Netherlands and despite the growth in channels offerings, Dutch consumers however, still seem unwilling to change their habits of watching the first 10 channels though some sources contradict this contention saying that there *is* a change in viewing behavior 'behind the set-top box' - on their TV sets. Also, the market share of the commercial stations (RTL and SBS – the NPO has no revenues from commercials) has hardly changed over the past 5 years, hovering around 40% for RTL (RTL Group Annual Reports 2003-2006) and around 30% for SBS (TMG Annual Reports 2003-2006). We later provide an explanation for the continuing survival of these incumbents.

THEORIZING ON INCUMBENT-CHALLENGER DYNAMICS

As before, we organize our discussion below across three themes; the industry setting, the incumbent firm properties and the challenge dimensions.

Industry Setting

The complicating role of related network infrastructures: The role of the related market for infrastructure – the content distributors – is critical to the development of DTV. One of the first things mentioned in interviews with industry specialists, is that installing the decoder is simply 'too much hassle' for the consumer. It requires deliberate action on the part of the consumer to get a decoder into the house and install it and they may simply not bother. A second problem is that the consumers simply do not understand or perceive the benefits DTV offers. The installed base of digital decoders is thus simply too small for DTV to really take off since a certain 'critical mass' is required for the business to become profitable.

In the age of information technology, many markets depend on related products and services. Mobile telephony is one example, where the service is heavily dependent on network availability and technologies incorporated into the cell phone. Any innovation that wants to seriously threaten the position of mobile telephone operators will also have to take mobile telephony network issue into account as most operators also own the network. An example of challenger success is Dell, who started offering made-to-order PC's to consumers through the Internet. However, it could not have reached success if internet connections and PC ownership had not been a widespread phenomenon.

Therefore, lessons learned from the DTV case can be generalized across many technology-based markets. Any challenge, or consequences thereof, which are dependent for its rollout on a related product or service, more specifically a network infrastructure is bound to be delayed or fail if this network is not 'equipped', that is, the network is unable to serve large numbers of consumers due to technical failures or lack of user-friendliness (hassle to install). As ICD theory has not touched upon this subject extensively, we propose:

> ***Proposition 1****: If the incumbent market is dependent on another market for network infrastructure and the employability of this complementary market is low (high), the likelihood of incumbent survival will be higher (lower).*

A separate note on this proposition is that only one end of the continuum has been identified in this particular case – low employability leads to high incumbent survival chances. The other end is an assumption and requires further investigation.

Government intervention as barrier to entry for challengers: From this particular case, it becomes clear how much impact a government can have on the development of a market – or lack thereof. First, although the Dutch government installed the *kabelraden* to protect consumers against 'commercial evil,' the byproduct was a barrier to entry for new entrants into the (analogue) TV Content Packager market. Second, the development of the cable network was also heavily protected by the government, as can be seen from the history of commercial TV. The setting of subscription prices – at around 15 euros a month – has spoiled the customers because they eventually did get a high quality product. For DTV to take off, it would require some willingness to pay higher fees but why would consumers want that if what they already have is a high quality, low price product? Third, the *Kabelnetten* (content distributors) have become overconfident with their secure market position because through government regulations they have become near-monopolists in certain regions – consumers can only pick from one *kabelnet* in the region they live in – and can deter challenger firms from challenging their network. This has also slowed down – and still does - the success of DTV. The process took a different trajectory in the UK where the development of television took place through another technology: DVB-T. This type of broadcasting has enjoyed considerably fewer regulations and the market has therefore developed much quicker than in the Netherlands – consumers are used to paying higher prices (up to 50 euros) and over 60% of their households now receive DTV (Ofcom, Oftel Report 2005). They are about 5 years ahead of the Netherlands.

Apparently, government intervention, even with good intentions sometimes harms consumers as it stifles innovation by limiting the amount of money available in the market to

pay for these developments. Levinthal (1992) has identified the use of subsidies as sponsoring incumbent survival beyond their own abilities. Moreover, the regulation of any market generally delays any changes or developments in that market – compared to a 'free' market – and inadvertently affords incumbent firms more time to cope with these developments. A defending position is beneficial if things change slowly. Developing and extending existing theory on government influence introduced by Levinthal (1992), we propose:

> ***Proposition 2:*** *The higher the degree of government regulation– setting prices or controlling products offered - in a challenged market that limits 'normal' market forces, the more likely it is that incumbent firms survive challenges.*

Consumer 'inertia' as mitigating factor for challenger success: From the case interviews and industry archival sources we gathered that consumers do not seem to switch to the extra DTV channels (the challenger firms), even if they have the decoder installed and thus have to overcome minimal trouble to switch to these new products. However, some sources do contradict this assertion stating that a change *is* occurring.

A little sidestep on this issue is in order. Based on the matters discussed above and the fact that DTV will eventually bring a vast supply of channels for consumers to choose from, they simply may not be able to deal with such a huge choice. This observation is not unusual in the information age we live in today. Take the Internet and its countless websites for example. If it was not for search engines such as Google, we would not have been able to deal sensibly with the immense supply. DTV may face the same problem. The Electronic Program Guide (EPG) has been introduced to cope with this issue and has the potential to empower consumers. Just as Google has been transformed to a powerful marketing tool, where large multinationals bid for a top spot on Google search results for any keyword you can think of, the EPG may become a pivoting point for marketing power in DTV and entice 'inert consumers' to change their habits.

Consumer inertia is one of the explanations provided for this phenomenon. Apparently, when many of the consumers turn on their TV after a hard day's work, they do not want to think about what to watch and thus decide to put on the channels they know best. This has been described as "habitual buying behavior" (Asseal, 1987) and applies when choosing the product happens frequently and the costs involved in the buying decision are minimal. Consequently the consumer picks whatever he or she knows best, passively receiving the information communicated by advertising. These criteria also apply to the choice of TV channels and benefit the incumbent firms that usually enjoy this kind of brand familiarity. The argument is that if this type of buying decision is common in a market, it is harder to change buying behavior that is a must for an innovation to be successful. In contrast, in the market for cars for instance, where decisions are infrequent and involve high costs, consumers inform themselves more elaborately when buying a new product and may be more receptive to the innovations offered. Current ICD theory has not addressed the issue of the different types of buying decisions consumers take in their purchase of different products and how that affects whether they switch to new products or not. Stated in the form of a proposition:

> ***Proposition3a:*** *If consumers in the challenged market are 'inert consumers' – frequent low-cost uninformed buying decision makers – the likelihood of incumbent survival is higher.*

Understandably, it is possible for firms to influence consumer behavior through promotion even when they are inert buyers. However it became evident that there was a complete lack of the perception of benefits for DTV. For one, consumers already had a great product on offer. Second, consumer couldn't clearly perceive the benefits of DTV over analogue. Who needs more than 32 channels to choose from? Why do I need higher quality signal if I already have great quality? According to some sources, this perception has been partly caused by the fierce competition in the distribution platform market and the mixed

message – what exactly are the benefits of DTV - the market emits on the benefits of the new technology. The promotional apparatus has failed so far to convince the consumer to switch. As such we extend the previous proposition:

> ***Proposition3b:*** *The lower (higher) the perceived benefit of the innovation, the stronger (weaker) the effect of consumer inertia on incumbent survival.*

From the discussion above it follows that market power is highly relevant when dealing with this kind of consumer. The factor thus interacts with a factor discussed below under incumbent firm properties: market power or brand familiarity. Moreover, the consumer was 'spoiled' by the government intervention – proposition 2 – pushing consumer inertia to further extremes. Finally, the related network infrastructure – proposition 1 – has not been particularly helpful in stimulating consumers to switch. It is the confluence of these three factors that resulted in the market being unreceptive to the new innovation.

Incumbent firm properties

TMT belief in changing world: During interviews with incumbent firm actors, it became clear that their entire organization – at least the upper layers of the firm – were convinced that DTV was the future and the world would inevitably change. The future of TV holds 500+ channels was an illustrating comment by one of the interviewees. The role of TMT and their mental models (Tripsas & Gavetti, 2000), strategic foresight (Cattani, 2005) and rational strategic intent (Burgelman, 1991) are clearly important in any strategic decision. Only after TMT is convinced of the inevitability of a changing market, will they start to change their existing mental models, develop strategic foresight and strategic countermoves. As such, TMT belief in a changing world is an important factor in incumbent firm capabilities along with other TMT-related factors – such as strategic foresight (Cattani, 200), TMT cognition, beliefs and mental models (Tripsas & Gavetti, 2000), rational strategic intent (Burgelman, 1991) that have been discussed in the literature.

This firm belief of the TMT and the organization at large in an innovation becomes an organizational capability in times of turbulence and acts as a change enabler. We therefore propose:

> ***Proposition 5:*** *The stronger the TMT belief in change – and consequently support of projects dealing with change – the higher the likelihood of incumbent survival in the face of radical innovation.*

Complementary assets as a mitigating factor for challenger success**:** During the case study, several complementary assets were identified. A number of respondents discussed issues of market power, brand familiarity and "the asset of being under one of the first ten buttons on the remote," obviously downstream assets. The sheer knowledge the large incumbents hold on market trends and content packaging cannot be easily matched by the small DTV channels as yet. This knowledge builds up over time and experience and often subject to "time compression diseconomies" (Dierickx and Cool, 1989). Moreover, these assets are not remain valuable in the setting of the TV content industry but are also valuable in related applications. For example, interviewees mentioned business such as mobile TV, TV over IP network like Internet and on-demand services. Knowledge on consumer trends and brand familiarity as well to combine existing resources into new applications is very valuable in these industries and provides the incumbent with an opportunity to diversify into other markets and to cope with increasing competition in their old markets. As such they can be termed "dynamic capabilities" (e.g. Teece et al, 1997) that provide the incumbents with a clear advantage over the challenger firms, especially when these competencies are not eroded by the innovation itself and are not traded on the open market (see the next section on Challenge Dimensions for an elaborate discussion of these factors). Incumbent firms can use this advantage to either negotiate attractive partner deals with challenger firms (Rothaermel & Hill, 2005), or simply meet them head on as direct competitors.

Complementary assets – both upstream and downstream – have been identified by Rothaermel & Hill (2003, 2005) as relevant in the incumbent-challenger dynamics (ICD)

field. As such, we add a nuance to existing theory by adding the interaction consideration; whether the assets are still valuable after the innovation and whether they are tradable on the open market:

> ***Proposition 6:*** *The more complementary assets an incumbent holds, which are not eroded by the innovation itself or obtainable in the open market, the higher the likelihood of its survival in the face of radical innovation.*

Institutionalization of organizational sensitivity to change: From interviews with industry generalists and incumbent representatives, we gathered that a number of methods have been employed to develop relevant 'skills' in the face of radical innovations. For example, in one incumbent firm, there were periodic meetings, consisting of actors from diverse disciplines within the company discussing new ideas, changing business models and other trends, while going about their daily activities. The meeting was presided over by the CEO himself to ensure quick support for promising ideas. New business development was institutionalized through this organizational body – the periodic meeting. In this setting, new ideas did not only come from the board of directors but from the 'middle-up' as well. TMT functioned as the critical eye, deciding whether new ideas were viable business. In a way, this kind of institutionalized process stimulated people throughout the organization to constantly scan the environment for new ideas. It prevents people with good ideas from thinking 'they will never use my idea anyway' and encourages a culture attentive to changes in the environment.

Another matter was the fact that incumbents had several functions dedicated to 'business development' at the director or manager level. This kind of function also helps to drive innovation throughout the organization. For example, it was occupied with investigating options such as mobile TV and IPTV although it is not yet clear what the commercial value of these services would eventually be. It certainly is an illustration of what Cattani (2005) called 'firm pre-adaption'; investigating a broad set of options in order to know a bit about

everything, making small 'toe-hold' investments. This particular factor has been widely discussed in the literature of the ICD field under different concepts, such as "absorptive capacity" (Cohen & Levinthal, 1990), "organizational entrepreneurship" (Burgelman, 1991) and "firm pre-adaption" (Cattani, 2005). In practice though, these concepts can be problematic since they do not describe how to develop absorptive capacity for example.

To summarize, incumbents need to be sensitive to change in order to survive radical innovations. The actual practical implementation of this concept can come from the institutionalization of this organizational sensitivity through specific and dedicated and functions and processes. To generalize this idea:

> ***Proposition 7:*** *The institutionalization of 'organizational sensitivity to change' – through organizational bodies or specific functions – increases the likelihood of incumbent survival in the face of radical innovation.*

Cooperative attitude towards competitors and challengers: A cooperative attitude towards (new) competitors – in the manifestation of alliance, joint venture or acquisition – can be beneficial for incumbent survival (Rothaermel & Hill, 2003, 2005; Macher et al., 2004; Rothaermel, 2001). In the case study, though there was a negative attitude towards this type of strategy that provided conflicting information as to the relevance of this factor. When asked about the possibility to ally or acquire the new entrant DTV channels, respondents usually claimed that "it didn't fit the strategy" or "it is not the way we do business." There were also factors that simply prevented them from acquiring the new DTV channels. Mostly, they are part of Pan-European or global firms and thus not for sale. Scale economics were also problematic; the new channels were serving small crowds, not a typical strength of large incumbents. The incumbent business model – revenue mostly from commercials and partly from subscribers – also did not fit the thematic channel business model of revenue streams that would mostly come from subscription fees.

From the literature it becomes clear that this type of strategy is quite relevant in the ICD field. Macher et al (2004) explain that if time to commercialization of an innovation is short, strategies such as starting a joint venture with the new entrants or acquiring them is preferable over internal development of a competing innovative product or service. In pharmaceuticals, this type of behavior has been empirically researched by Rothaermel (2001). Incumbents in that industry simply acquire new entrants with high R&D capabilities. If incumbents believe in this option and have the capabilities to follow this strategy – financial strength, absorptive capacity for acquired/allied knowledge due to broad R&D capabilities (Rothaermel & Hill, 2003, 2005) and managerial capability to manage a JV or acquisition – then their chances of surviving a radical innovation are higher. TV content packager incumbents however, have a 'negative' score on this issue. Partly, this lack of 'belief' in such an approach is explained by the lack of capabilities to follow such a strategy. We thus propose:

> ***Proposition 9:*** *If incumbents hold a positive attitude towards a "cooperative" strategy – alliance, JV or acquisition – and hold the capabilities to follow such a strategy, the likelihood of incumbent survival in the face of radical innovation will be higher.*

Challenge Dimensions

Time horizon: From the interviews it became clear that the incumbents clearly understood the challenge of DTV but simply do not see the need yet to undertake any counter strategic moves. As one respondent mentioned, the "incubation time of this new technology is clearly not over yet." Before the *kabelnetten* are ready and have deployed enough decoders to provide for sufficient scale for profitable commercialization of DTV, it may take another 5 years.

An interesting detail is that incumbent firms are able to influence the time horizon of DTV as well. Because they have so much market power, DTV will probably take off once the incumbents start new channels based on the new technology. The new channels on DTV apparently cannot reach this 'critical mass' (Rogers, 2003). Therefore, incumbent simply

seem to be waiting for the right time to open the gates into this new realm of possibilities. Clearly an interaction between factors is at work here.

Rothaermel & Hill (2003) discussed the notion of 'gestation period' for an innovation. Macher et al. (2004) used the dimensions of long-term and short-term as a criterion for the organizational strategies – internal development, acquisition, alliance or joint venture – that are possible in the face of an innovation. An obvious scale for this time horizon is short or long term. We include the dimension, since it evidently has significant influence on the likelihood of incumbent survival, either through specific challenge characteristics – like maturing technologies – or through direct incumbent influence – preventing critical mass through market power. We define this time horizon as the time between the moment incumbents become aware of the innovation and the moment of potentially profitable commercialization, since these are the relevant moments for incumbent strategic decision making. The reason for the criterion of 'potentially profitable' is that an innovation can be introduced on the market but does not form a threat until the moment is becomes potentially profitable. This assertion is supported by the fact that incumbents in the TV industry are still biding their time intentionally to leverage late mover advantages, (Leiberman and Montgomery, 1998) while DTV has already been introduced. Obviously, this moment of potential profitable commercialization is an estimate on the part of the incumbent firm. It seems clear that a longer horizon provides for more time to act. Therefore we propose:

> ***Proposition 10a:*** *If the time-horizon –the period between the moment incumbents become aware of the innovation and the moment of potentially profitable commercialization – is longer (shorter), the likelihood of incumbent survival is higher (lower).*

Commercialization requirements – specific or generic: Respondents clearly stated that although DTV is a good concept in principle, it still required some significant additions to become successful. Market power through brand familiarity has already been discussed. This is a specific asset for the TV market and you cannot buy it in the open market unless the

challengers acquire an incumbent firm. Knowledge about content packaging was another issue discussed by the interviewees as an essential asset to commercialize DTV profitably. Incumbents obtained it through years of experience and research.

A noteworthy case is Talpa or – as it is currently know – Tien. This channel started in 2005 on the analogue part of the cable network and therefore is not one of the challenger firms in this study. It is an interesting case though, because it is a new entrant and therefore noteworthy to illustrate how the industry reacted. After two years of operation, Talpa/Tien is making serious losses and is talking with RTL about a take-over. The general reason according to NRC Next (Waarom is tien mislukt?, 2007) and case interviews confirmed that Talpa/Tien lacked the knowledge on TV Content Packaging. Its target group was therefore unclear and consequently it did not receive enough revenues from commercials sales to push profit into the green. This particular case illustrates the importance of specific assets – content packaging knowledge – that is required for commercialization of a new TV channel.

Rothaermel and Hill (2005) posit that if generic assets are required for commercialization, incumbents firm will probably not survive the innovation shock since these can also be acquired by challenger firms on the open market. For specific complementary assets, which you cannot buy on the open market, the opposite is the case. Building both on the case-study and prior research, we thus propose:

> ***Proposition 10b:*** *If the assets required – i.e. currently not in possession or under control of the challenger firm – to profitably commercialize the innovation are specific (generic), the likelihood of incumbent survival is higher (lower).*

Innovation type – competence enhancing or destroying: Innovations that challenge incumbents in a market can either be of the kind that builds on competencies currently relevant in the market and usually in the possession of the incumbent firms, or of the kind that completely upsets the rules of the game and destroys whatever competencies incumbents deemed relevant for their business (Tushman & Anderson, 1986). Their general reasoning is

that competence-enhancing innovation usually provides the incumbents with more market power. Competence-destroying capability increases the likelihood of incumbent decline.

Dell Computers, the on demand 'mass customizer' of computers, provides a clear illustration of these concepts. When it started its online business, PCs were bought through regular shops and customization was limited. The new concept of Dell – cutting out the middlemen – was competence destroying, since it rendered useless the competencies of configuring computers *before* they were sold and of running regular computer stores. Dell offered configuration during the buying process, their products were cheaper and consumers did not have to leave their homes. Regular computer builders like Compaq were at a total loss and not equipped for sales through the internet with mass customized products (Holzner, 2005).

In the case of DTV, it seems hard to classify the innovation as either one of the types discussed above. On the one hand, the innovation changed the business model of the industry through the possibility of *AbonneeTV* – not something incumbent practiced so far. But some of the same old competencies of incumbent firms – brand familiarity, content packaging knowledge – are still necessary for DTV as discussed earlier. Indeed, these competencies were not destroyed by the innovation and thus incumbent decline still seems limited in the TV industry.

A nuance is in order at this point. Of course, incumbent firms have many capabilities that provided them with their market position in the first place. Most innovations will not destroy all of them at once, some will survive the onslaught. The dimension can therefore be seen as a scale of degree – one innovation is *more* competence destroying than another - rather than a black and white distinction between innovations. The more competence destroying an innovation, the less likely it is that an incumbent will survive. We thus propose:

> ***Proposition 10c:*** *The more competencies an innovation destroys, the less likely it is that an incumbent firm will survive the radical innovation and vice versa.*

It may be argued that this proposition is the other side of the same coin as the previous dimension of commercialization requirements. When an innovation requires certain specific assets for commercialization, one might argue that the innovation necessarily is not competence destroying, since these specific assets are usually in the hands of the incumbent firms. True, but not necessarily. Commercialization requirements are indeed competencies but an innovation may be so radical that neither the challengers nor the incumbents possess the relevant competencies. The specific-generic dimension is meant to indicate whether the commercialization requirements – which are competencies as well – can be transacted in the open market or not. The competence enhancing-destroying dimension considers competencies that are owned by incumbents and whether they are still valuable after the innovation.

To sum, we address some of the 'blank spots' we identified from the literature review and have added more body to existing theory on incumbent-challenger dynamics. The following section will further elaborate on these concepts and provide arguments towards developing an ICD framework.

TOWARDS A FRAMEWORK FOR INCUMBENT-CHALLENGER DYNAMICS

We accumulate insights gathered from the case and prior theory into a coherent framework for incumbent-challenger dynamics, based on three basic dimensions: the Industry Setting, Incumbent Firm Properties and Challenge Dimensions. Although the value network was introduced as a theoretical backdrop for industry setting, its applicability is to specific firms. For the purpose of this framework, we aggregate the value nets of all incumbents into the value network of the industry. Complementary markets and their mitigating influence on an innovation's commercial success, rivalry as a practicing stage for incumbents, buyer factors such as consumer inertia and perceived benefits of the innovation that prevent a consumer switch, the institutional environment and its influence on market forces and supplier factors and their attitude towards the innovation, all interact and add up to explaining

incumbent survival or decline. No propositions have been developed for the latter – supplier factors – because of insufficient and contradictory data. It seems that most content providers were content with an extended market to sell their products but some refused their content to certain new distribution platforms introduced by challengers. Supplier factors thus offer an interesting avenue for future research.

Incumbent firm properties are broken down into the conceptual structure we proposed earlier; boundary management, capabilities and configuration. Factors, such as TMT belief in change, complementary assets, institutionalization of organizational sensitivity to change and relationships with related market players are factors that predispose an incumbent firm to either survive a radical innovation or go into decline. As a separate note, financial decision making models were clearly identified in the literature and together with financial strength, seem to be relevant in an ICD framework. However, we did not have sufficient data to elaborate on this factor. Future research should investigate this competence.

The three factors introduced in the literature review – Innovation Type, Commercialization Requirements and Time-horizon – provide us with a breakdown of the challenge dimensions and have been addressed in the propositions. However there is an interesting interaction, derived from the case, which accumulates into an overall predisposition of the challenge facets towards either incumbent survival or decline. Figure 5 depicts a model of this interaction.

Insert figure 5 about here

If a challenge has specific commercialization requirements that are in the possession of incumbent and that are not destroyed by the innovation itself, then the likelihood of incumbent survival is high – irrespective of the time horizon – as far as the challenge dimension are concerned. Vice versa, if commercialization requirements are generic and the innovation is competence destroying then incumbent survival is less likely. If the time horizon

becomes longer the chances of incumbent survival are improved as can be concluded from the right part of the figure.

To illustrate, the Dutch TV industry falls inside the right matrix, top left quadrant since the time-horizon has been identified as long – 10 or more years of incubation time since its original introduction – commercialization requirements are specific and most existing competencies survive the challenge. As such, the overall challenge has a positive predisposition to incumbent survival. However, the innovation may move to the upper right quadrant, depending on the exact development of DTV and how it changes general TV watching behavior through new services, such as 'on demand' video and IPTV.

To conclude, we develop a new framework to explain incumbent survival in the face of radical innovation. Together, the three dimensions explain to some extent the reason that incumbents survived the introduction of the decoder (so far). Industry setting, incumbent firm properties and challenge dimensions positively influenced the likelihood of incumbent survival. Figure 6 provides a schematic representation of the ICD Framework.

Insert figure 6 about here

A framework should reflect real competition and encompass an exhaustive list of relevant variables, to help both managers and academics to formulate questions that need to be answered when formulating a strategy. The application process is illustrated in figure 7.

Insert figure 7 about here

CONCLUSIONS & IMPLICATIONS

In current times, technological change is a given and understanding its dynamics is critical to the survival of incumbents. The ICD field consists of many studies identifying many relevant factors but there have not been many efforts to connect the dots or to identify additional factors that influence ICD. By structuring the field, developing a coherent and holistic framework for ICD and adding additional determinants of incumbent survival, such as

government intervention, types of consumer buying decisions and the role of the related market infrastructure, we have attempted to improve the general understanding of ICD.

The framework includes three key dimensions: the industry setting, the incumbent firm and the challenge from a disruptive innovation. First, Industry setting was divided into five factors. Rivalry – as a proxy for turbulence – provides a practicing stage to gain experience with change. Complementary markets – related network infrastructures – influenced the ability of challenger firms to successfully launch their innovations. Government intervention (institutional environment) negatively influenced innovation in an industry by keeping prices low, and consequently limiting funds available for innovation in a market. Another effect of the price regulations was that it increased consumer inertia – part of buyer factors – and as such mitigated challenger success. An interaction among these three factors was clearly illustrated. Supplier factors were identified only to a limited extent. Second, incumbent firm properties were discussed under boundary management, capabilities and configuration. The attitude towards cooperation with related industries and new entrants provides the content for boundary management, together with other factors such as forming alliances for new product development. However, support was limited on these issues and further research should improve on the assertion. Capabilities has enjoyed the most diverse attention by scholars, with factors such as TMT belief in change, complementary assets – market power and market knowledge – not destroyed by the innovation, experience with turbulence, financial decision making models and financial strengths termed as change enablers and thus beneficial to incumbent survival. Finally, configuration was found to have a positive influence on incumbent survival through the institutionalization of organizational sensitivity to change. Third, the challenge dimension was elaborated according to the type of innovation, the commercialization requirements and the time horizon. If the innovation type

was competence destroying (enhancing), commercialization requirements were generic (specific) and time-horizon was short (long), then incumbent survival was least (most) likely.

The ICD framework suggests that if the industry setting, the incumbent firm properties and the challenge dimension all show a positive (negative) predisposition for incumbent survival, then the likelihood that incumbents will survive a radical innovation is high (low). Average predispositions of one or two dimensions lead to intermediate scenarios.

We make a number of contributions through this study. First, we provide a critical review of the literature on ICD and develop a conceptual structure to map the territory of ICD. Second, we develop several propositions – consumer inertia, government intervention through price regulation, related markets infrastructure, TMT belief in change, institutionalization of organizational sensitivity to change and the challenge dimensions – and as such added theoretical body to the ICD field. Finally, we contribute to both theoretical and managerial understanding of the ICD phenomenon through a framework that is parsimonious, relatively easy to comprehend, while reflecting the complexity of actual competition and offering a more complete list of variables and their interactions. It provides a useful guide for formulating questions a manager must answer to devise strategy tailored to the specific needs of his or her company. For instance, an important consideration for incumbents is the temporal aspect of the challenge dimension. The temporal dimension influences whether an incumbent with financial resources should consider an acquisition strategy or develop the innovation internally. It also influences whether or not incumbents can gain advantage through leveraging complementary and exercising market power assets or whether or not they can benefit from gaining early knowledge of the innovation through existing relationships with related industries and markets. For challenger firms, the framework suggests several directions for understanding and exploiting incumbent weaknesses or disadvantages.

Understandably, this study is not without its limitations. A well-known argument against case studies is their generalizability. However, the framework should be applicable at least to other technology-based industries, such as mobile telephony, sales through the internet and landline operators. In some of these industries, governments also play a regulatory role, related network infrastructures are involved and consumers make frequent low cost buying decisions (consumer inertia). As such, the TV industry might act as an exemplar or paradigmatic case justifying the use of only one particular industry (Flyvbjerg, 2004). The number of interviews was also limited due to time constrains. Further research could provide richer understanding of the propositions in this paper. Moreover, the explanatory value of this framework can be tested by comparing across cases – both where incumbent have survived and declined. Since in the TV industry, incumbent *have* survived, there might be a bias towards explaining the factors identified as being beneficial to incumbent survival and a lack of much contradicting information. We strongly encourage future researchers to take up this quest and further our understanding of incumbent-challenger dynamics.

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Figure 1: Illustration of the Fragmentation of ICD Field

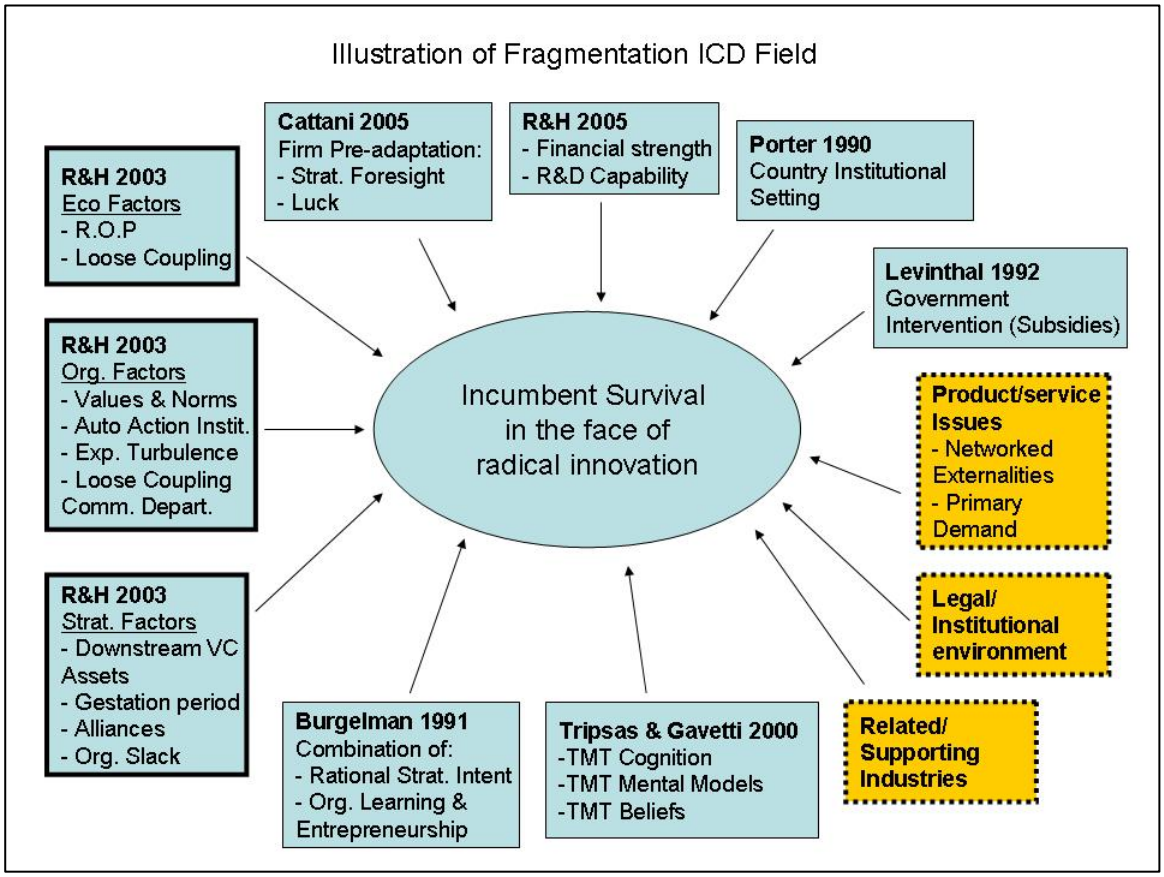


Table 1: Overview Definitions of Types of Innovations

Author	Kind of Innovation	Description
De Brentani, 2001. Christensen, 1997.	Technological	High technology, new-to-the-world innovations. This creates new products based on new underlying technological underpinnings.
Markides, 2006.	Business process	The discovery of a fundamentally different business model in an existing business.
De Brentani, 2001.	Incremental	Incremental innovations occur continually. Relatively simple improvements, adaptations, line extensions, or imitations of competitive offerings.
. Markides, 2006.	Radical	This changes the rules of the game and it offers opportunities for new entrants. It creates new products. A new product, new to the firm and new to the marketplace.
Christensen and Bower, 1995. Christensen, 1999.	Sustaining	Provides better quality or additional functionality innovation. Some sustaining innovations are incremental improvements; others are breakthroughs.
Christensen, 1997, 2006. Christensen and Bower, 1995. Govindarajan and Kopalle, 2006.	Disruptive	They occur only occasionally. They change the design of a product or process. They introduce a different set of features and performance attributes relative to the existing products.
Cohen and Levinthal, 1990. Lane and Lubatkin, 1998.	Exploitative	Associated with increasing the productivity of capital and firm assets through improving existing capabilities and reducing costs.
Cohen and Levinthal, 1990. Lane and Lubatkin, 1998.	Exploratory	Discovering new opportunities for wealth creation.

Figure 2: A Conceptual Structure for the ICD Field

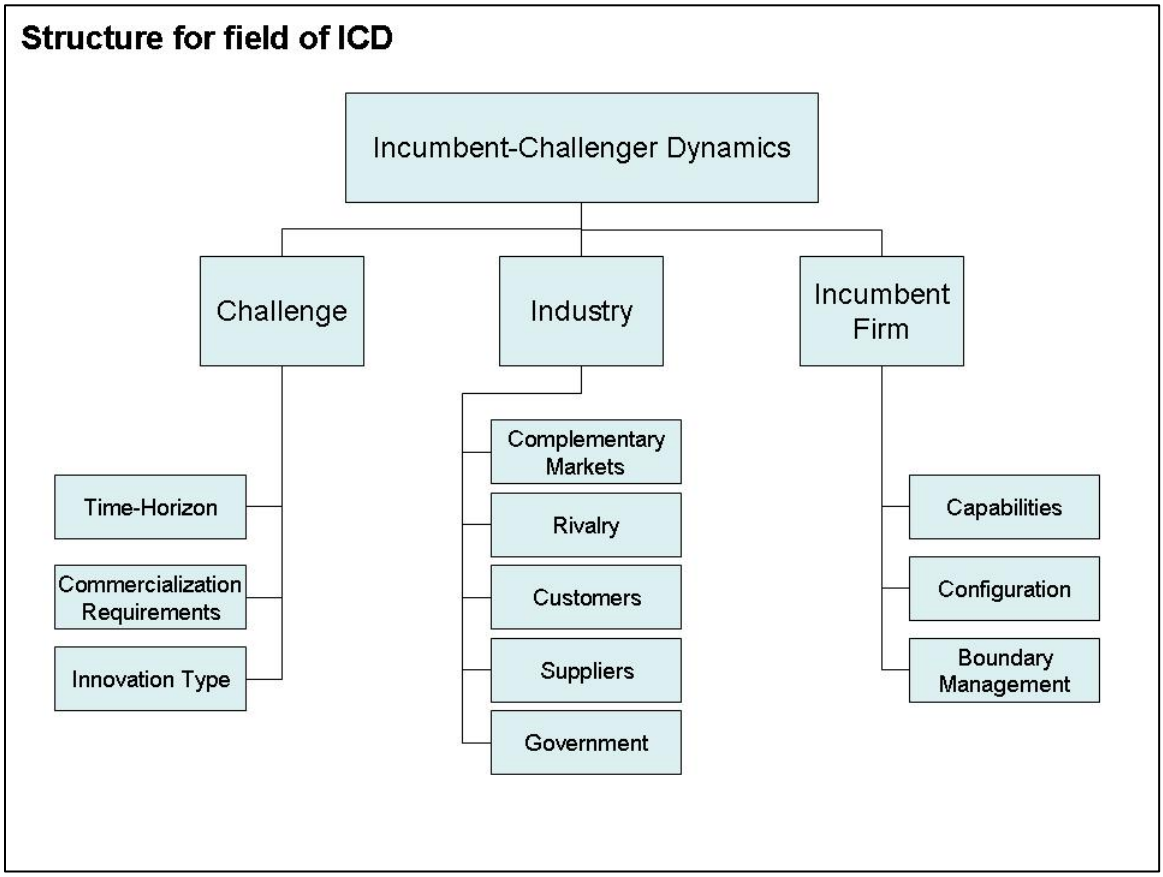


Table 2: Data sources

Source	Quantity/ Period	Authors	Purpose
Interviews with industry players	10 hours April-May 2007	Not applicable	Development of propositions and insights on the case
Kabelraden Handboek (Kabelraden Manual)	54 pages February 2007	Cooperation between kabelraden.nl (national organization of the kabelraden, several industry specialists and several branch organizations)	General History of the TV Content industry and general understanding of the total TV industry in the Netherlands.
Kijkcijfer Jaarrapport 2003-2006 (Annual report on viewer ratings)	About 300 pages February 2007	Stichting Kijkonderzoek	General information on the developments in the market and market shares for TV content players based on viewer ratings.
Market Shares (in viewer rating) of channels 1996 – 2001	Not applicable February 2007	Intomart GFK	Market share data on period before 2002.
TV jaarrapport 2003 - 2006 (TV annual report)	115 pages February 2007	Stichting ter Promotie Televisiereclame (SPOT)	General information on the developments in the market from sales of commercials perspective.
Broadband TV News.com (newsletter)	65 newsletters March – May 2007	Newsletter written by Robert Briel, Julian Clover and Chris Dziadul (industry specialists)	Information on concurrent developments in the TV industry and their background.
Annual Report SBS Broadcasting and RTL Group	330 pages April 2007	SBS Broadcasting by Annual Report of Telegraaf Media Group, shareholder of SBS Broadcasting (2003 – 2006) RTL Group Annual Reports (2003 – 2006)	Data on market shares in TV advertising market.

Table 3: Supporting Information for Central Concepts

	Aggregate Dimension	**INDUSTRY**
	Central Concepts	Supporting Information
COMPLEMENTARY PRODUCTS	*Related markets providing the network infrastructure 'readiness'*	- "Actually, you can't look at the market of Content Packagers without also taking into account the role of the cable networks." - "The decoder still has some technical difficulties with operating. Moreover, it doesn't work with more than one TV set in a household. This annoys the consumer since they have to pay extra for the other TV sets to connect to DTV." - "Installing the decoder and making it work is still a hassle for most consumers. Especially the issue of several TV sets in one household still causes some consumer dissatisfaction." - "Analogue television and its quite extensive channel offer – around 32 in most regions – is still a unique selling point since it does not require the installation of an extra device (next to the TV set) for viewer access." - "Another issue is the role of the Kabelnetten (the Content Distributors), they do not cooperate because they are competitors. The consequence is though, that because they compete so fiercely they drive prices down even further and send out mixed messaged among consumers what DTV really is."
GOVERNMENT	*Government influence through price regulation slowing down innovation*	- "The UK is a nice reference case. They are about 5 years ahead of us. Government influence is significantly less over there since the market grew based on a different platform: satellite. The market has enjoyed considerably more freedom because of this." - "Deregulation of the market – the telecom network of KPN was first – really stimulated the development of the decoder. Cable networks had to come up with a new 'added value' for their role." - "By setting the prices for a TV connection, they have been controlling the market for ages. This low pricing has really spoiled the market, preventing any market mechanism to do its work, stifling innovation. There was simply no money in the market." - "It is questionable if politics will let go of price regulations in the TV distribution market and let the market mechanism do its work. - "…the Dutch are simply not used to paying for their daily television requirements."

CUSTOMERS	*Consumer inertia – frequent low-cost uninformed buying decision makers – is strengthened by lack of perception of DTV benefits.*	- "A second factor …. Is that consumers are simple too 'lazy' to switch to another channel to watch. They know the first 10 channels the best so that's what they watch even if they can easily watch the extended package once they have the decoder installed and working." - "The basic needs – basisbehoeften – were met by Dutch television so DTV is not really needed (content wise)" - "Consumer seems to be a bit passive in its viewing behavior. He just does not want to change his ways…. Watching TV is social behavior as well. You want to be able to 'join the conversations the next day on what was on TV the night before'" - "We want to feel like we are in control of what we watch but with as little effort as possible." - "…used to a unique quality product (32 channels) in high quality signal (our cable network is among the most dense in the world) for an absurdly low price (15 euros give or take). Why would any Dutchman want to switch? Why would you want more if you already have 32 channels to pick from?" - "I would say that linear TV viewing is very ingrained in society. Watching TV is social behavior, you want to be able to talk about it the next morning at work over a cup of coffee. We want to turn on the TV set and just watch."
RIVALRY	*History of TV industry is marked by turbulence*	History of TV industry indicating long periods of shifting powers; mergers & acquisitions taking place. See also chapter on 'A short history on the Dutch TV industry (1980 – 2006)'

Table 4: List of Interviewees

Date / Time	Interviewee	Location
03-04-07; 14:00 – 15:30	Monique van Wijngaarden theFrontDoor Media Consultancy	Hoofddorp
18-04-07; 14:00 – 15:30	John de Jong Manager Distribution & Business Development Cable RTL Nederland	Hilversum
23-04-07; 15:00 – 15:30	Monique van Wijngaarden theFrontDoor Media Consultancy	Over the phone
26-04-007; 12:30 – 13:30	Philip Bisschop Director BBC Benelux	Naarden
01-05-07; 10:30 – 11:30	Aart Verbree General Director CAIW Holding	Naaldwijk
22-05-07; 08:45 – 9:15	Lucien Roelofs Marketing TV and Content Tele2	Over the phone
24-05-07; 18:30 – 19:15	Michel Mol Coördinator DTV Nederlands Publieke Omroep (NPO)	Over the phone

Table 5: Data Analysis

	Aggregate Dimension	**INCUMBENT FIRM**
	Central Concepts	Supporting Information
CAPABILTIES	*TMT belief in change*	- "…we do believe that eventually this market share will erode. We are not arrogant enough to think that the world will stay the same while we 'smoke our cigars', it will stay the same a little longer though." - "We are convinced that the world is changing." - "For example, the NPO is deploying DTV with 18 new digital channels. Albeit with public money." - "We are in serious need of a more efficient way of packaging TV content…. I think the future is therefore in intelligent decoders with EPG's that are programmed by authorities that know what the consumer wants and offers it whenever the consumer wants to see it."
	Complementary assets – such as market power and superior knowledge on consumer needs – which are not eroded by the innovation itself.	- "If you do view the market from the content packager perspective, then you can hardly remove the large incumbent from the market image. They are ingrained in the viewer's mind." - "Knowledge on scheduling of TV is a rarity and as such a third factor why DTV – the content part - is not a success yet. The large three incumbent really have an immense knowledge base on the needs and wants of the Dutch viewer crowd." - "The fact that the large channels are still under the first 10 buttons of the remote, gives them immense market power." - "Analogue television and its quite extensive channel offer – around 32 in most regions – is still a unique selling point since it does not require the installation of an extra device (next to the TV set) for viewer access." - "The fact that we are under button number 4 is also still a very valuable asset for our company!" - "Then there is the power of the first 10 channels. If they switch everything will change."

BOUNDARY MANAGEMENT	*Relationships with related industries for the purpose of innovating or acquiring information on innovation*	- "The Kabelnetten have a very strong influence on the content market, Packagers usually just follow the new developments that the Kabelnetten introduce." - "Also, the KN sometimes come with innovations or innovative concepts. We also cooperate with them to develop new content etc. They are a usual source of new business." - "We [the Kabelnetten] are the ones that have the customers."
	Negative attitude towards the option of a "cooperative" strategy – alliance, JV or acquisition with challengers.	- "Well we don't really do that. First of all, it's hard to buy DTV start-ups because they are mostly pan-European or global projects or part of larger global players like Disney. It is also not part of our strategy or the way we do business." - "there is too little cooperation among parties to make DTV work…"
CONFIGURATION	*Institutionalization of 'organizational sensitivity to change'*	- "In the large incumbent organizations, there are plenty of creative minds already contemplating the use of DTV. These people also get a lot of freedom to develop these ideas. There is a culture of 'if you have a good – profitable - idea, let's have it and do something with it'." - "Parallel to the whole development of DTV, of which we are aware that its onset is inevitable, we are developing very different lines of business as well." - "[firm] has a periodic meeting where agents from diverse disciplines – including the interviewee – meet together with the CEO [NAME] to discuss new trends and opportunities." - "Yes you could talk to their [NPO] coordinator for DTV.."
	Aggregate Dimension	**CHALLENGE DIMENSIONS**
	Central Concepts	Supporting Information

TIME-HORIZON	*Innovation time-horizon – defined as the period between the moment incumbents become aware of the innovation and the moment of potentially profitable commercialization- is quite long or not over yet.*	- "The incubation period of DTV is clearly not over yet. Packagers do not react as yet because they know it will take some time before it really takes off." - "The consumers don't know yet what DTV is exactly, what it offers." - "… it will stay the same a little longer though." - "It will take until 2010 at least for the market to significantly change."
COMMERCIALIZATION REQUIREMENTS	*Assets required to profitably commercialize the innovation (specific-generic) are specific*	- "The large three incumbent really have an immense knowledge base on the needs and wants of the Dutch viewer crowd. It takes time and experience to amass such knowledge [and logically DTV thematic channels do not yet posses this knowledge on the Dutch TV crowd] *added*." - "If they [the incumbents] would start to offer DTV content, they would only open up the gates to new competition by creating a primary demand for DTV channels." - "Moreover, these incumbents would then really open the door for competitors 'behind the decoder'. So they have two very good reasons why not to switch to digital, the consequence is that DTV does not really take off." - "The fact that we are under button number 4 is also still a very valuable asset for our company!"
INNOVATION TYPE	*Innovation Type (Degree of competence enhancing-destroying) is competence enhancing*	- "Even if everybody in the Netherlands would have a decoder working in their homes tomorrow, still 85% will watch the first 10 channels of the *basispakket*. You can be sure of that." - "Then there is the power of the first 10 channels. If they switch everything will change." - "Then in 2004 we told our subscribers the analogue package would be reduced … If they wanted the old 44 plus 4 extra, then they would have to switch to DTV. It [offering the first 10 channels primarily 'behind the decoder'] really worked; the benefits of DTV now became very clear. By now we have about 80% DTV reach, about 75% of the subscribers actually use the decoder to watch TV."

Figure 3: Market Share by Viewer Rating

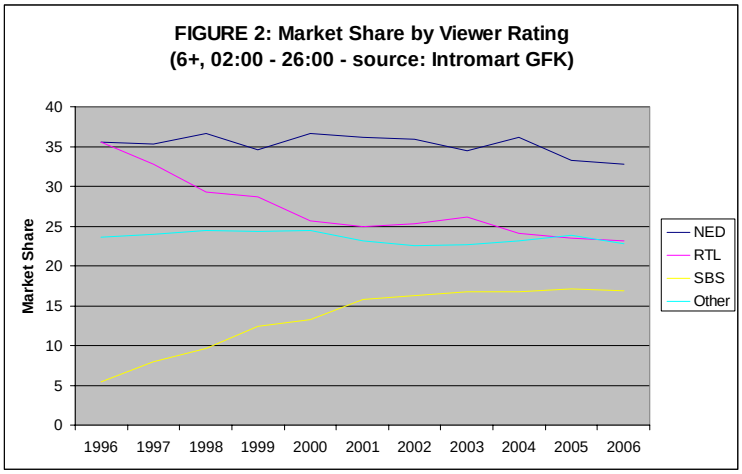


Figure 4: The TV industry process

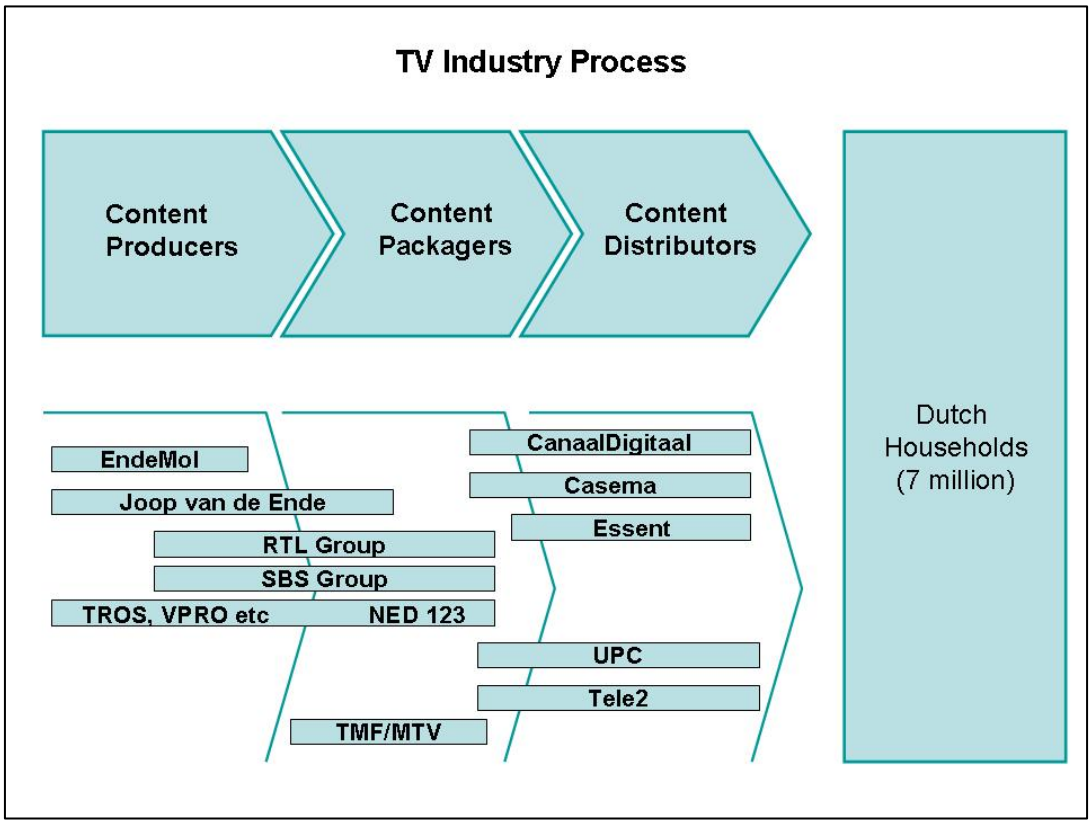


Figure 5: Interaction among Challenge Dimensions

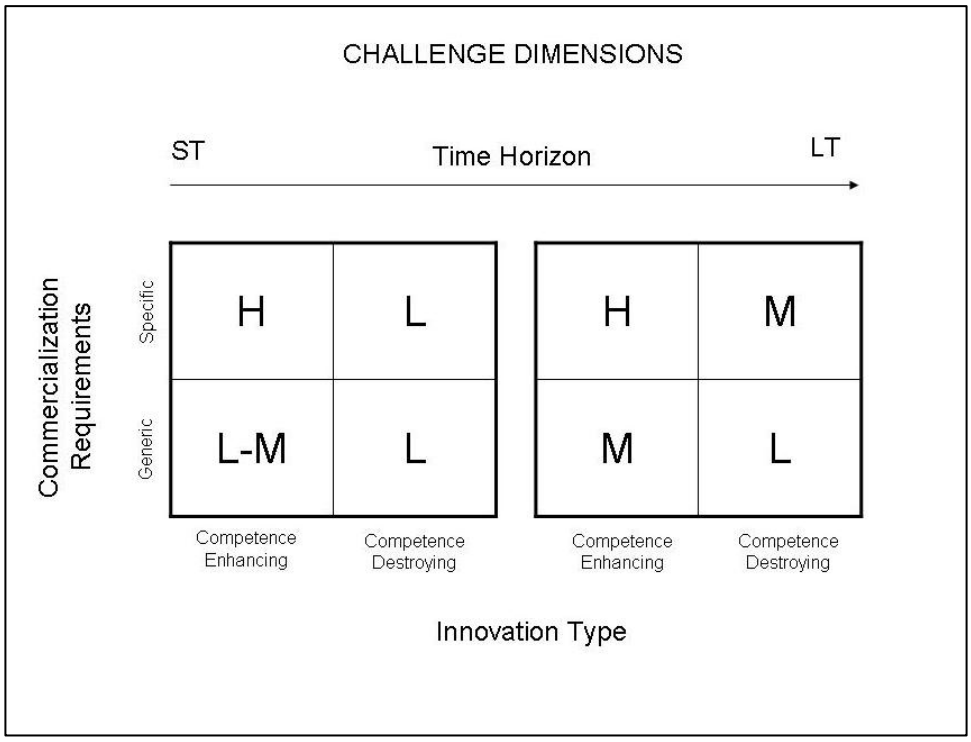


Figure 6: A Framework for Incumbent-Challenger Dynamics

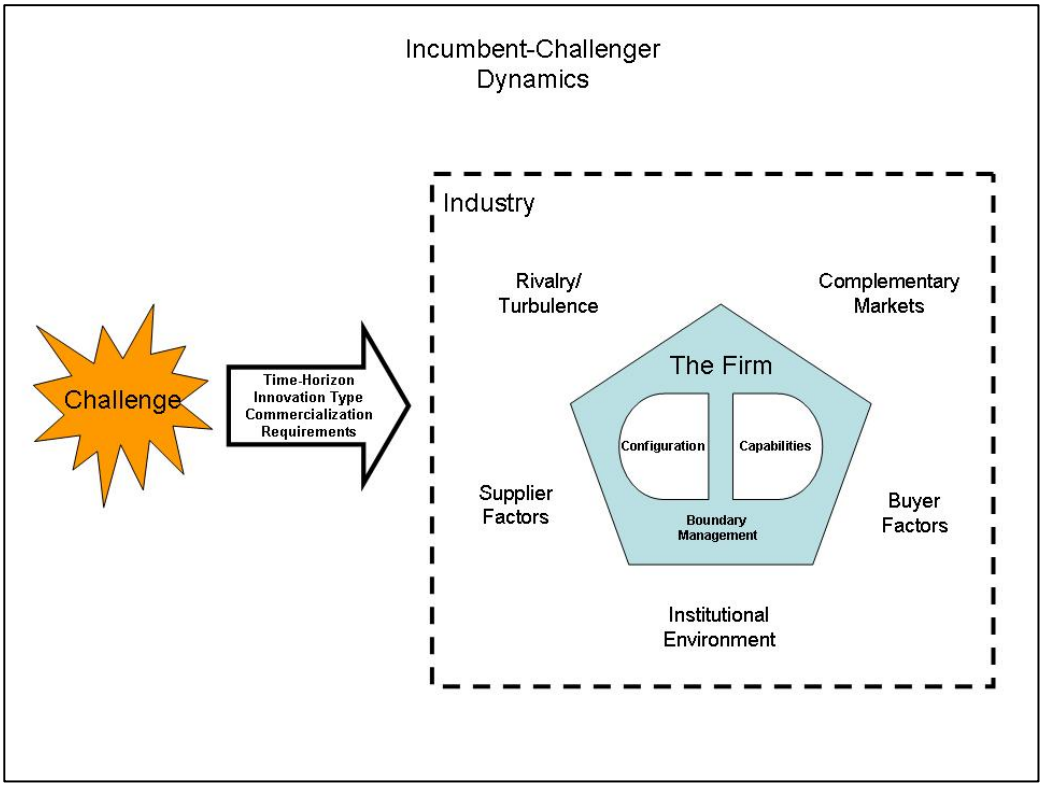
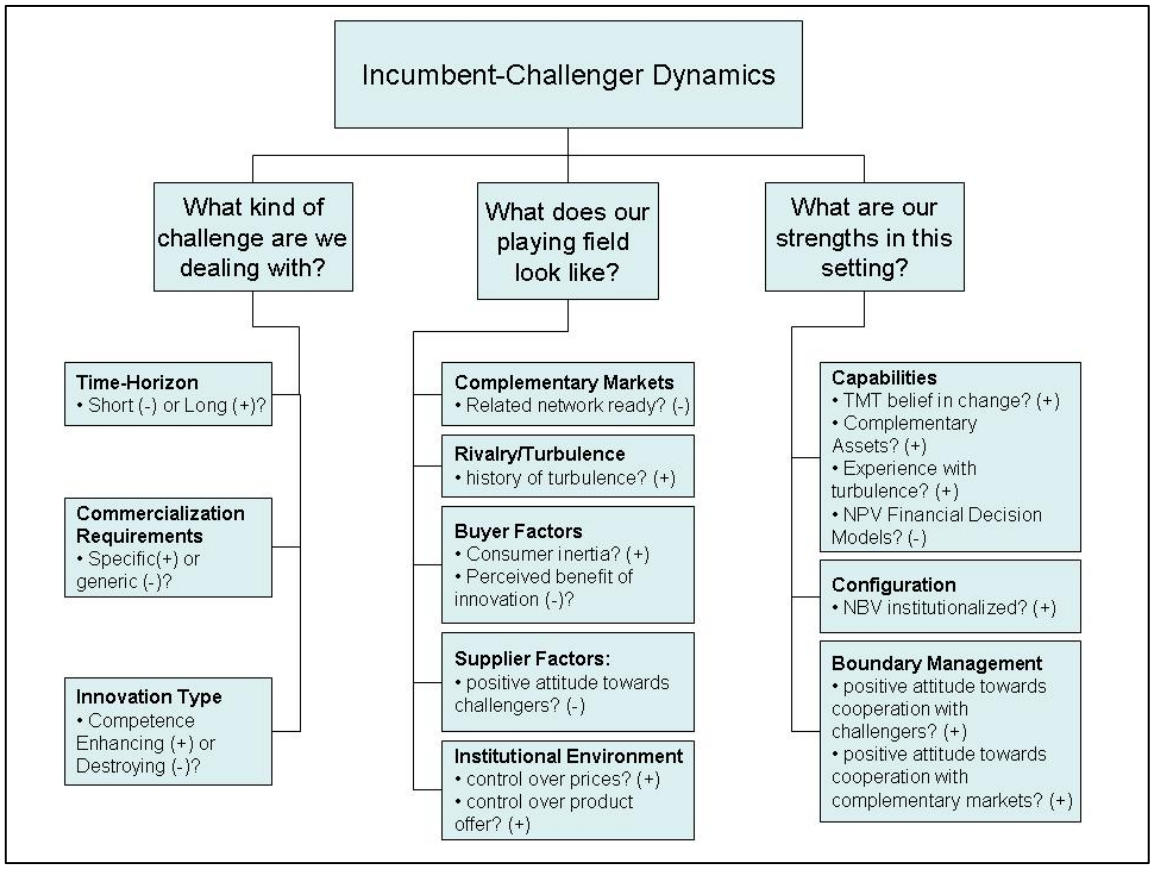


Figure 7: An application of the ICD Framework



APPENDIX A

Case Study Interview for Dutch DTV Market

First Part: General Background and Unstructured

- What is your position currently and where have you come from?
- What happened on a strategic level in the past 10 years within the TV industry?
- Looking at the hard figures, how would you explain the still to become success of DTV? What are the three most important reasons?

Second Part: Semi-Structured

- Could you please organize your story along three groups of factors?
    - Incumbent Firm
    - Industry
    - Challenge

Third Part: Specific Questions and discussion of prior three dimensions.

- Incumbent Firm Characteristics (priority with incumbent interviewees):
    - Dynamic Capability
        - What are the strong points of the large channels?
            - Financial strength / Organizational Slack
                - Does your firm have financial strength?
                - Is there any 'elbow' space for experimenting?
            - TMT capability and strategic foresight
                - How do you judge TMT vision concerning DTV? Are they change minded?
            - Organizational learning / entrepreneurship
                - Has you firm made an effort to internalize knowledge on DTV?
                - Would you say there is a spirit of entrepreneurship within you firm?
            - Culture
                - How does you culture behave itself towards the DTV developments?
            - Experience with turbulence/change
                - Would you say you organization has any experience with turbulence?
            - Downstream assets
                - What are important assets for you organization on the client side of the firm?
                - And what about the supplier or input side of your organization?
            - Financial decision making (investments) → R.O.P. of DCF of Break-Even?
                - How does the organization decide on investments?
                - What tools do you use?
    - Configuration
        - How is your firm organized? Functional, divisional or matrix? Other?
        - Loose coupling R&D
            - How much freedom do employees have for 'research'?

            - Does TMT decide on most of the research engaged in?
        - Loose Coupling commercial department
            - How much freedom does the commercial department, if there is one, have for experimenting? Does TMT decide on everything they have to investigate?
        - Autonomous action institutionalized at channel level? Or Top down?
            - How about freedom at the bottom of the firm? Freedom of the channels to undertake action?
    - Boundary Management
        - How does your firm feel about cooperating with competitors?
        - How does you firm feel about buying competitors to face the challenge of DTV?

- Discussion of Challenge dimensions (no specific priority)
    - Time-Horizon: How much time, from the moment of introduction of the decoder, was left to take counter-measures for the DTV onset?
    - Innovation Type: Was the innovation of the decoder competence enhancing or destroying (explain concept)?
    - Commercialization Requirements: What else is required for DTV to become (more) successful?

- Discussion of Industry Setting (Priority with industry generalists)
    - What was/is the role of suppliers concerning the DTV developments?
    - What was/is the role of consumers concerning the DTV developments?
    - What was/is the role of the government concerning the DTV developments?
    - What was/is the role of related markets – cable networks - concerning the DTV developments?

To conclude the interview
- Any annual reports I should take a look at?
- What other contacts should I interview concerning this research?
- What other challenger contacts should I interview concerning this research?
- What other outside contacts should I interview concerning this research?
- Would you like a copy of the paper?
- Do I have to treat your input – the report of this interview - confidentially? Would you like me to reveal your name or keep it secret as a source?