Rationalizing business models to mitigate the Darwinian effects of creative industries

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Résumé :

Malgré une croissance impressionnante au cours des dernières décennies, les industries créatives enregistrent des mécanismes de sélection sévères, ainsi que des taux de survie bas. Beaucoup sont appelés, mais peu sont choisis. L'une des difficultés majeures auxquelles font face les organisations dans les industries créatives a trait au fort niveau d'incertitude concernant le succès des productions. Alors que la littérature sur les industries créatives a montré la nécessité de rationaliser l'offre de produits afin de limiter l'incertitude de la demande, nous adoptons une perspective plus holistique en analysant les business models. Notre question de recherche est : « Quels sont les choix de business model effectués par les entrepreneurs pour s'adapter à un environnement incertain » ?

Sur la base d'une étude de cas multiples dans le secteur des jeux vidéo en France, nous étudions dans quelle mesure les studios indépendants adaptent leur business model pour survivre dans des conditions de forte incertitude et de ressources limitées. Nous trouvons que les studios sont confrontés à des sources d'incertitude dans toutes les composantes de leur business model, et qu'ils apprennent à privilégier la rationalisation dans leurs choix de business model. Nous montrons que la rationalisation de leur business model combine la recherche d'une plus grande efficience avec un management plus discipliné du risque.

Mots-clés : industries créatives, business model, incertitude, efficience, jeux vidéo

Abstract :

Despite an impressive growth over the last decades, the creative industries display high selective mechanisms and low survival rates. Many are called but few are chosen. One of the main difficulties faced by organizations in creative industries pertains to the high level of uncertainty concerning the success of their products. While the literature in creative industries has demonstrated the necessity to rationalize the product offering in order to limit demand uncertainty, we take a more holistic perspective by using a business model lens. Our research question is: "What are the business model choices made by entrepreneurs to cope with an uncertain environment"?

Based on the comparison between multiple case studies in the French video game industry, we investigate to what extent independent studios adapt their business model to survive under conditions of strong uncertainty and constrained resources. We find out that studios face sources of uncertainty in all components of their business model, and that they learn to favour rationalization in their business model. We show that the rationalization of their business model combines the search for a greater efficiency and for a more disciplined management of risk.

Rationalizing business models to mitigate the Darwinian effects of creative industries

INTRODUCTION

Creative industries defined as "*those that produce experience goods with considerable creative elements and aim these at the consumer market via mass distribution*" (Peltoniemi, 2015: 41) gained prominence and growth these last decades in mature economies. The size of the global market for creative goods more than doubled between 2002 and 2015 to reach $509 billion (UNCTAD, 2018). These industries offer potentially an opportunity to develop organizations in a munificent environment as they have been largely encouraged by public actors. These industries display specific characteristics despite their diversity, as they include films, books publishing, video games, music, fashion, opera, and so on (Peltoniemi, 2015). While their boundaries are fuzzy, they lead to commercial exploitation of creativity by temporary or permanent organizations (Boutinot and Delacourt, 2019: 474-475). However, promoting creativity and innovation as their dominant logic, these industries put actors in extreme uncertain situations as their projects display relatively long development duration and their market potential (and thus success) is revealed only once they are released. In these conditions, Caves (2000) underlines that the success of these projects depend partially on chance because the consumer tastes are discovered ex post and that these industries favor winners take all situations. In these conditions and due to an oversupply on the market (Peltoniemi, 2015) and the 'non-utilitarian' function of the goods (Hirsch, 1972), Darwinian effects of selection are operating at high level.

Evolving in this kind of environment may be tricky for entrepreneurs. They have to exploit or create opportunities and make decisions concerning the resources they coordinate and their offers in a highly risky and uncertain environment (Alvarez and Barney, 2005; Kirtley and O'Mahony, 2020). Unanticipated events may occur, consumer preferences are not fully known, cause-effects relationships are not entirely understood, or technologies may evolve. In such an environment, we argue that entrepreneurs design and progressively adapt their business models to face these challenges and integrate the management of risks in the conception of their business models (Girotra and Netessine, 2011, 2014; Schneckenberg et al., 2016). This

recommendation echoes the effectuation process describing the entrepreneurial development of new activities with a non-predictive decision making process and affordable loss (Sarasvathy, 2001, 2009). However, few works in the business model literature refer to and integrate the risk dimension (Andries et al. 2013; Brillinger et al., 2020; Girotra and Netessine, 2011, 2014; Schneckenberg et al., 2016). This seems all the more surprising as the business model concept developed a more entrepreneurial view of strategic choices and was coined to study how firms experiment new ways of doing business (Demil et al., 2019; Massa et al., 2017). Consequently, observing how entrepreneurs develop their business models in creative industries offers a good opportunity to study how they manage risks in an environment characterized by a high level of uncertainty. Hence, in this article our research question is 'What are the business model choices made by entrepreneurs to cope with an uncertain environment?'. This research question extends a long tradition of research studying the management of environmental uncertainty by organizations (e.g., Duncan, 1972; Pfeffer and Salancik, 1978; Wernerfelt and Karnani 1987). However, our specific contribution consists in studying the choices made by entrepreneurs to elaborate their business models and to mitigate the potential negative effects of uncertainty. Using the concept of business model enables to focus more on value creation for customers than traditional strategy concept, offers a holistic unit of analysis and enables to capture various dimensions of an organization's strategic and tactical choices (Casadesus-Masanell and Ricart, 2010).

We explore our research question in the video game sector, the most dynamic creative industry of these last decades. In 2021, the sector is worth more than $300 billion in the world, surpassing movies and music combined, and continues to grow (Accenture, 2021). Benghozi and Chantepie (2017) described the sector as "The" 21st century cultural industry. Based on an inductive comparative case study approach (Eisenhardt, 1989), we isolate the environmental sources of uncertainty and the choices made by entrepreneurs in this dynamic industry to mitigate uncertainty and risks. Our analysis contributes to the business model literature by highlighting the major role of risk management in uncertain environment and the various tactics that entrepreneurs implement to counter the negative effects of uncertainty to develop their new ventures.

LITERATURE REVIEW: MANAGING BUSINESS MODELS UNDER UNCERTAINTY

Entrepreneurial ideas have to be translated into a viable business model to sustain an organization (Amit and Zott, 2001). This business model refers to the set of activities, organization choices and resources that entrepreneurs articulate to propose, to create and to capture value (Schneckenberg et al., 2016; Sorescu et al., 2011). Consequently, a business model includes internal processes and activities, but refers also to an ecosystem view and to the relationships that an organization establishes with partners (Adner, 2017).

Our research focuses on entrepreneurial firms facing the challenge to elaborate a viable business model in an uncertain environment. For the clarity of the literature review, we distinguish two specific situations to identify how entrepreneurs may manage uncertainty. The first one refers to nascent markets, i.e. situations where technology and demand do not pre-exist the entrepreneurial firm. The other one refers to new ventures in established industries where the demand and the technology exist. However, we have to note that in the context of creative industries and more generally in the entrepreneurial process, this second situation displays also potentially high level of uncertainty.

BUSINESS MODEL CHOICES TO MANAGE UNCERTAINTY IN NASCENT MARKETS

The literature has studied how entrepreneurs manage the strong uncertainty affecting the business model in nascent markets (McDonald and Eisenhardt, 2020), and more generally the business model of ventures launching innovations, whether they concern new technology, market or business model (Chesbrough and Rosenbloom, 2002; Markides 2006; Ojala, 2016). In such setting, there is a large consensus in the literature to acknowledge that entrepreneurs face a very high level of uncertainty regarding the sustainability of the business model envisaged initially. The main source of uncertainty concerns the demand, as users' expectations and behaviour in a market that does not exist are unknown (Chesbrough and Rosenbloom, 2002; McGrath, 2010; Sarasvathy, 2001). Other important sources of uncertainty include the behaviour of competitors, technological and regulatory evolutions, as well as the acceptance of a pioneering business model by external stakeholders from whom the venture is seeking support, such as buyers, partners and funders (Andries et al., 2013; McDonald and Eisenhardt, 2020).

Research suggests that developing a business model under a high level of uncertainty requires significant experimentation and learning (Sosna et al., 2010) because "business models often cannot be fully anticipated in advance" (McGrath, 2010: 248). For instance, Chesbrough and

Rosenbloom (2002: 551) consider that "in environments characterized by high technical and market uncertainty where many such mappings are possible, this learning process may be a critical determinant of creating economic value from a new technology". Various learning processes are used by entrepreneurs to progressively reduce the main sources of uncertainty, and adapt the business model accordingly. The literature has largely described how entrepreneurs conduct real market experiments, and based on the results of the experiments progressively adjust their business model through a trial-and-error process (*e.g.* Chesbrough, 2010; Kirtley and O'Mahoney, 2020; McGrath, 2010; Murray and Tripsas, 2004; Sosna et al., 2010). Other learning processes used by entrepreneurs are imitation and borrowing from peers (Enkel and Metzger, 2013; McDonald and Eisenhardt, 2020), as well as passive observation (Haunschild and Miner, 1997; McDonald and Eisenhardt, 2020).

Through an in-depth analysis of six ventures, Andries et al. (2013) suggest that alternative approaches to reduce uncertainty may be implemented by entrepreneurs. On the one hand, some ventures pursued focused experiments, altering the business model only a long time after the start of the experiment. While such an approach tends to favour growth (gained through first mover advantage, and through a greater attractiveness to funders and employees thanks to business model clarity), it proves less favourable in terms of probability of survival, as ventures with constraint resources can hardly operate a significant shift in their business model in case of failure of the experiment. By contrast, ventures which pursue several business model experiments in parallel initially record lower growth rates, but significantly increased their probability of survival. This more risk-adverse approach increases the probability of survival through two main mechanisms: diversification and effectuation. First, pursuing several business models in parallel increases the probability of finding a viable business model. For these ventures, the management of risk through diversification is internalized. In contrast, for ventures focusing on a single experiment, the management of risk is transferred to external stakeholders (diversified VC funds). Second, the higher probability of survival is pursued through an effective use of resources. Indeed, the studied ventures do not diversify in disparate business models. Instead, a new business model is tested only if it relates to other business models already experimented by the firm. Moreover, experiments take the form of pilots, with as few resources invested as possible. In this sense, they followed an effectual logic, which tends to favour investment strategies following a real options reasoning (Sarasvathy, 2001: 261), whereby investment is sequenced in several stages, and irreversible capital expenditures are postponed as much as possible.

BUSINESS MODEL CHOICES TO MANAGE UNCERTAINTY IN ESTABLISHED MARKETS

Extant research has explored how entrepreneurs innovate a business model in the context of nascent markets, especially with the development of the literature on business model innovation (Foss and Saebi, 2017). This stream of research implicitly assumes that the uncertainty is progressively reduced as entrepreneurs learn about the market and as the market matures. For example, ventures analysed by Andries et al. (2013) which initially experimented several business models eventually reduced their activity to a single one. In nascent markets, experimenting and learning rapidly can then be considered as a key success factor for the business model of new ventures (Chesbrough and Rosenbloom, 2002; Sosna et al., 2010).

In contrast, business models choices made by entrepreneurs to manage uncertainty in the context of established markets have received less attention in the literature. Some major business model innovations have been implemented primarily with a view of mitigating risks inherent to the industry in which a firm operates. For example, Zara's fast fashion business model was designed in order to accommodate for the very high demand uncertainty, which is a major challenge in the apparel industry (Girotra and Netessine, 2011). Thus, a traditional objective for entrepreneurs may be to design a business model with a view to lower fluctuations of cash-flows and profits. While this objective may be eventually a source of innovation, the risk management in uncertain situation –even if the market is established- has been quite overlooked in the business model literature (Girotra and Netessine, 2011, 2014; Brillinger et al., 2020). Entrepreneurs can engage in a variety of actions to increase the certainty of the outcomes associated with making their decisions (Alvarez and Barney, 2005). For instance, they can collect data on consumer preferences, analyze the successes and failure of other firms, co-create value with customers or adopt adaptive pricing (Alvarez and Barney, 2005; Schneckenberg et al., 2016).

In a rational view, the first step of risk management consists in identifying the main sources of uncertainty and risks. Through a literature review and a group interview of twelve risk-management experts, Brillinger et al. (2020) have established a list of 28 sources of uncertainty and the corresponding risk factors. These factors were grouped into categories corresponding to the four business model elements identified by Osterwalder and Pigneur (2010): customer, offer, infrastructure and financial viability. The second step of risk management consists in assessing the probability of occurrence of a specific risk factor, and its potential impact on the firm's cash-flows. Based on this analysis, the risk-exposure of a given business model may be evaluated, and changes in the components of a conceptual or existing business model may be envisaged in order to reduce the level of risk.

At a more strategic level, Girotra and Netessine (2011) identify three main mechanisms through which the design of a business model may mitigate risks. First it may delay production commitments and postpone engagement (for instance in production on-demand business model). Secondly, it may try to pass on risk exposure to other stakeholders in the value chain (for instance by externalizing some risky activities). Finally, it could upgrade the firm's information-collecting capabilities (for instance by favouring customers' feedback or co-creation activity). These mechanisms echo Milliken (1987) observations concerning the organizational responses to uncertainty. She notes that beyond imitation "*if the stakes are high and an incorrect response is perceived to be costly, high levels of response uncertainty may have the effect of delaying strategy implementation as possible alternatives are generated and carefully evaluated. It is likely that high levels of response uncertainty are associated with high levels of boundary spanning and information acquisition activities. Also, one might expect administrators who are uncertain about how to respond to place a good deal of emphasis on forecasting techniques that would allow them to model the consequences of various responses under various circumstances*" (Milliken, 1987: 140).

In the specific context of creative industries, the academic literature has suggested multiple tensions threatening the survival of organizations and producing high level of uncertainty. The business model of firms may try consequently to balance creativity with familiarity in their production (Lampel et al., 2000), to favor rationalization (Tschang, 2007) or exploitation (March, 1991; Wada, 2011) without killing inspiration or risk taking. While the literature (e.g. Lampel et al, 2020; Tschang, 2007, Wada 2011) has primarily investigated how firms can adapt their product development process to address the inherent uncertainty in creative industries, some research suggests that this objective may also be pursued by adapting the business model. For instance, the major American film studios have changed their value proposition by replacing a diversified movie portfolio approach by the release of sequels as their main risk management mechanism (Pokorny et al., 2019). Hirsch (1972, 2000) observed that cultural organizations adopt several strategies to manage uncertainty and reduce environmental dependence (Pfeffer and Salancik, 1978). They allocate resources to boundary spanning roles, over-product (hypothesizing that these industries are not capital intensive) or co-opt mass media gatekeepers to orient the audience judgments. Hirsch (2000) notices especially that the concentration of retailers and distributors observed in the cultural industries aims to reduce uncertainty over the outcome of their investments.

To conclude, actively considering risk management in the business model design may be particularly useful in industries marked by a high level of uncertainty. This may notably be the

case in highly dynamic industries with fast-evolving environment, or in industries displaying a structural uncertainty in customer demand, *e.g.* when demand is primarily guided by fashion, or when demand concerns an experience good, whose success cannot be evaluated *ex-ante*. In that respect, creative industries are a good example of a sector marked by a high level of structural uncertainty. In this article, our objective is to further analyse how firms can adapt their business model in order to mitigate risk in creative industries. While the creative industries literature has mainly investigated the means used to reduce uncertainty by major firms, *e.g.* large video games studios (Tschang, 2007, Wada 2011) or major film studios (Pokorny et al, 2019), we will focus on entrepreneurial ventures.

METHODS AND DATA

In this study we adopt an inductive research design based on the comparison of case studies in the French video game studios industry. Case studies are appropriate for exploring relatively under-studied research areas and to develop a fine-grained understanding of organizations in their contexts (Yin, 1994). Although case studies sacrifice statistical generalizability, they enable rich exploration of specific settings and theoretical generalizability by comparisons (Eisenhardt, 1989). As the business model may be defined as concrete choices made by an organization and their consequences (Masanell and Ricart, 2010: 198), we built case studies by retracing the development of different studios and their main choices. We consider the development of their business model over time, as business models may evolve especially in the first years of a new venture. We analyze our data first by understanding the sources of uncertainty and then by identifying the mechanisms and choices to reduce uncertainty and mange risks.

EMPIRICAL FIELD

Our empirical study investigates a sample of French video game development studios. Three reasons explain this choice. First, the studios are the creative reactor of the video game sector as they design and develop new concepts and products (Benghozi and Chantepie, 2017). They work eventually with publishers when they decide to outsource some functions as financing and distribution. However, the sample we study is using them with parsimony as they define themselves as ‘indie’ or independent studios, avoiding the control of publishers on their choices. Secondly, studios convey their creativity in multiple ways through a specific gameplay (‘game mechanics’), storytelling, graphical arts or more rarely new concepts. This creativity and

eventually innovations is difficult to protect as the management of Intellectual Property Rights is quite specific in the video games industry (Li and White, 2017). Game mechanics are vital for gameplay and for creating differentiation but can be easily copied by competitors. Moreover, the time to file patent is too long in a "*games industry [which] moves too quickly for this. Also, many games are developed by small, start-up companies that cannot afford the cost of IP protection*" (Li and White, 2017: 23). Patents are consequently rare in the sector except for several big international studios such as Konami or Zynga but remain out of reach for small studios, accentuating potentially the Darwinian selection in creative industries. Finally, the studios actually display a high mortality rate due to a volatile and uncertain environment, a context suitable for studying how to survive in a high-risk creative industry. According to the French professional association of video game industry, nearly 70% of the French independent studios have less than 5 years[1]. The industry was shacked out especially by digitalization these last decades. On a positive side, digitalization decreased the traditional dependence on traditional publishers and distributors, and opened up a potential access to a worldwide market. On a negative side, the perspective of the market became so attractive with digitalization that it induced waves of new entrants. Big platforms such as Google Play, App Store or Steam were also able to insure distribution at a worldwide scale without any other intermediaries but became the new gatekeepers between studios and audience / customers (Hirsch, 2000).

DATA AND METHODS

Study sample

The cases for this study were selected for theoretical reasons, as advised by Eisenhardt (1989). The selected firms complied with the following criteria: (1) the firm had a relatively long history, thus making possible to observe changes in its business model, (2) the firm was relatively small, making it easier to observe entrepreneurial actions by interviewing the entrepreneurs, (3) the firm was managed by its founders, and (4) the firm was independent at the time of the study. The development of the entrepreneurial firms occurs under uncertain conditions and it was important to capture how entrepreneurs change their initial business model and hypotheses as they make sense progressively of their market and collect feed-backs (Daft and Weick, 1984). They eventually -quite rarely- operate a pivot defined "*as a change in a firm's strategy that reorients the firm's strategic direction through a reallocation or restructuring of activities, resources, and attention*" (Kirtley and O'Mahony, 2020: 3). These

[1] Source : Syndicat National du Jeu Vidéo / IDATE, Baromètre du jeu vidéo en France 2016, 3ème édition.

incremental or radical changes indicate that entrepreneurs are likely to modify their business models during the first years of existence (Sosna et al., 2010); this all the more so since young firms have less rigidity for reorienting their initial decisions.

We build our purposive sample of 6 French studios to lead an inductive and comparative analysis of the data. As creative industries display generally a split between majors and independents (Peltoniemi, 2015), we choose to focus on 'indies' in this study as the two populations are not comparable and small companies with low level of resources are potentially more interesting to study the selective effects in creative industries. Indeed, each new project may put potentially the organization at risk. We do not include large companies as their business models are fundamentally different and are managed differently. Large companies (e.g., Sony, Microsoft, Nintendo, Tencent, Electronic Arts, Ubisoft) occupy the center of the market, acquire regularly other studios, invest massively in the promotion of their games and buy licenses. Their business model aims at publishing AAA games, the equivalent of blockbusters in the film industry. Console segment is also considered as a specific case of platforms competition (Maruyama and Kenichi, 2011).

To build a representative theoretical sample, the French video game trade association (Syndicat National des Jeux Vidéos (SNJV)) provides detailed and rich data about the structure, activities and financial elements of the companies in the sector (SNJV, 2015, 2016, 2017). The entire sector encompasses around 760 companies in 2016. Among them, 70% are studios developing video games. Their average number of employees and turnover are respectively 27 and 3.5 M€ but these figures display a high standard deviation: some international success stories counterbalance a vast majority of small studios. Our final sample enables to compare similar organizations covering various market segments and displaying variety in terms of activities, date of inception, and turn-over (Table 1).

The (co)founders we interviewed were relatively inexperienced when they set up their company, the sector attracting mostly relatively young people. For 5 out of 6, the studio they set up was a first entrepreneurial experience, eventually just after their academic cursus. Some of the companies we selected were relatively successful while others were poorly performing, and even near bankruptcy at the time of interviews. This last point is confirmed by the current situation (in 2021) of these companies and illustrates the Darwinian effects prevailing in the sector (Table 1). However, a studio like Beta was acquired not because of its perilous financial situation but on the contrary because it became an attractive target for a publisher thanks to its proprietary technology in the racing simulations. Thus, despite a survival selection bias characterizing ex post studies, we are confident that we have not selected only successful firms.

Table 1: Sample description of 'indie' video game studios under study

Case study	Inception	Number of employees*	Approx. Turnover*	Main activity	Current situation (2021)
Alpha	2005	~15	[1-5 M€]	Online Gaming	In operation
Beta	2006	~60	[5-10 M€]	Supplier of console companies (BtoB)	Acquired by a publisher
Gamma	2008	~20	[1-5 M€]	Advergame (BtoB)/ Online Gaming	Bankruptcy
Delta	2011	~10	[1-5 M€]	Online gaming	In operation
Epsilon	2011	~40	[5-10 M€]	Casual gaming	In operation
Zeta	2012	~10	< 1M€	Online gaming	Acquired by another studio

* Due to high volatility in employees and turn over, the figures may vary by more than 50% from one year to another

Data collection

The main source of data for this study is interviews of entrepreneurs who have (co)founded their studios and were asked very open questions concerning what was their initial business model when they enter in the sector and how it evolved over time. We used open-ended interviews starting by the founding conditions of the studios, then retracing the main historical events of the organizations, the business model they elaborate and their strategic (re)orientations. In accordance with grounded theory (Strauss and Corbin, 1990), we were open to emerging topics during the interviews.

The interviews were conducted in 2016 and 2017 during a collective research project on digital companies[2]. Two researchers took notes during the interviews of (co)founders. The choice of not recording the interview was made to encourage an open and frank discussion. Interviews were conducted on site, except for one company (by phone). After some interviews and their transcription, we asked some details by mail to check or to develop some points. In one case, we asked also a second interview to complement our notes. As founders were quite enthusiastic to tell their story, each in-depth interview lasted between 90 minutes and 180 minutes. We also had the opportunity to interview the president of the trade association who provided us with a general overview of the sector and of its dynamics.

Archival materials, such as press releases and internet websites concerning each company complement interviews. Analyst reports, professional trade association publications and

[2] Our case studies were part of a more collective research project which made it possible to compare the analysis of our small sample with 7 other case studies in the same sector.

governmental reports add information to apprehend the global sector environment and its evolution. Press releases and reports helped to grasp the overall dynamics of the sector and recent trends such as the role of distribution platforms, the trend towards dematerialization, the impact of smartphones revolution or new concepts of game such as the casual gaming phenomenon. Secondary data also help to prepare the interviews by acquiring knowledge on the different studios before interviewing entrepreneurs. Overall, these data allowed triangulation among different sources, which strengthened data accuracy and inference quality, but note that we interviewed only one member for each studio which may be considered as a limit in our data collection. However, we wanted to have the 'entire' story for each studio which limited the interviewees to the (co)founders. The notes and analysis of case studies by two researchers allows comparing interpretations.

DATA ANALYSIS

Due to our theoretical conditions for selecting our sample, we decided to reconstruct retrospectively the history of each company to capture the choices made by the founders since the inception of their company and the evolution of their business models. Indeed, we needed to identify challenges and choices over time as the business models evolve over time and are refined or abandoned (e.g., Demil and Lecocq, 2010, 2015; Ojala, 2016; Sosna et al., 2010; Tschang, 2007; Winter and Szulanski, 2001). After the data were collected, we wrote a case study for each company of about 10 pages. The main research question emerges after comparing the different entrepreneurial trajectories of the studios under study. The fragility of their financial situations and the uncertainty of their environment were rapidly apparent through the entrepreneurial discourses.

The number of our interviews is limited and therefore we do not use any software to analyze the empirical material. By asking entrepreneurs to recall the history of their studios, each one evoked their successes and failures, wrong hypotheses they made, the changes in the video game industry, and the evolution of their business model. Despite the low number of interviews, when we analyzed our notes and open coded them (Strauss and Corbin, 1990), several themes emerged rapidly and recurrently. Interviewees evoked particularly the themes of unpredictability of the environment and high volatility.

Two main conceptual themes enabled to regroup a large part of the empirical material we collected. The first one refers to the environment and its evolution. It encompasses changes in the competition, the different actors, evolution of the technologies and their consequences on studios. This theme leads to our first analysis concerning uncertainty. As suggested by several

authors, the uncertainty concept covers several dimensions and its sources have to be identified separately as they may have different effects (Alvarez and Barney, 2005; Miller and Shamsie, 1999; Milliken, 1987). Overall, the environment may be described as complex and dynamic (Duncan, 1972).

The second theme refers to the evolution of the business model to muddle through an uncertain environment. Our data display multiple ways that studios learned -often progressively- to mitigate what we call the Darwinian effects of this creative industry. Our inductive coding phase revealed two major themes implemented by the studios: learning to manage risks and learning to become efficient. For each of them, several tactical choices in the business model were made.

RESULTS

We present the results of our case-comparative analysis in two parts. The first one focuses on identifying the sources of uncertainty for the video game development studios. The second one displays the various business model choices we identify to survive in a very uncertain environment.

SEVERAL SOURCES OF ENVIRONMENTAL UNCERTAINTY

Although the founders were generally immersed in the video game or software industry for some time before setting up their own studio, the surprises and progressive discovery of the environmental uncertainty emerged as a main theme in their history. Analyzing the history of studios in our sample, we identify three main sources of uncertainty that refer to Milliken's (1987) original typology and Miller and Shamsie's (1999) study of the film genres of the major Hollywood film studios (Table 2). This typology is based on what is unknown by entrepreneurs in their context. The sources of uncertainty obliged the studios to make incremental or radical changes in their business models as they concern markets, technologies, the behavior of actors in the environment, due to the difficulties to anticipate cause-effect relationships.

Table 2. Sources of uncertainty for the video game development studios (adapted from Milliken, 1987)

Environmental state uncertainty: "*inability to understand how components of the*	Inability to forecast consumers' behaviors, competitors' behavior or technological

environment might be changing" (Milliken, 1987: 136)	evolutions (what will change in the environment?)
Organizational effect uncertainty: "*inability to predict what the nature of the impact of a future state of the environment or environmental change will be on the organization*" (Milliken, 1987: 137).	Inability to predict the effect of environment on the organization (how changes impulsed by some actors will affect the organization?)
Decision response uncertainty: "*lack of knowledge of response options and/or an inability to predict the likely consequences of a response choice*" (Milliken, 1987: 137)	Inability to anticipate the consequences of organizational actions (what are the consequences of our decisions?)

The first source of uncertainty refers to the general environmental state uncertainty. It refers more particularly to the inability of studios to predict consumer's tastes and preferences, to the general volatility produced by competition but also to the unanticipated technological changes. Difficulty in anticipating the consumer's preferences is one of the most pervasive sources of uncertainty in creative industries. It may produce good surprises as the success of a game released by a studio was unanticipated in several cases, and eventually enabled to reach a high number of players despite some weakness in their first version. For instance Delta's founders released a free game, rapidly developed during weekends, which reached 250 000 players in only fifteen days. Similarly, Zeta's second game (the first one was a big failure) reached more than 700 000 players while less than 100 000 were anticipated, or Epsilon's first free game on Facebook reached one million users in a few days. During the period, the trajectories of studios were also impacted by important unanticipated technological changes. The development of platforms and social networks such as Facebook, or the blooming of the smartphone app market created opportunities to develop casual games. On a more negative side, the displacement of Flash technology by other ones such as Unity required investing in new technological learning. Beyond difficulties to predict players' preferences and technological changes, the studios also suffered from an increased competition. Games overcrowding on the market appeared rapidly as a problem for differentiating the thousands of new products in the market. For instance, Beta's founder considered that on the mobile app game market, "*only 1 in 100 can hope to make it*" and similarly Alpha's founder noted that, as the market matured, "i*t's 20 seconds, and if you haven't hooked the player, he goes somewhere else*".

The second source of uncertainty lies in the inability to predict what the impact of environmental events or changes will be on an organization. In the case of game development studios, the increased dependence on some actors of the environment and their decisions

participated largely in the environmental uncertainty (Pfeffer and Salancik, 1978). The complexity of the market dramatically increased at a rapid pace with the multiplication of the platforms hosting video games. It was especially the case with the explosion of the smartphone market after the iPhone success in 2007 and the development of casual gaming. The multiplication of models required regular adaptation of the games due to their specific technical requirements (e.g. RAM, size of the screen). Due to limited resources, the studios were obliged to choose which platform to follow or to abandon. A similar dependence on distribution platforms such as Google Play, Apple Store, Origin or Steam appeared over time. These platforms were creating bottlenecks in the market for the indie products and their choices affected directly the business model of studios. These platforms captured a fix (and huge) percentage of the sales made by the studios –typically 30%- and they were difficult to escape. Moreover, their unilateral strategic and technical decisions regularly endangered the studios, e.g. when they forbid some payment solutions or imposed new technical requirements without notice. While the dependence of indie studios on the decisions of big actors in their environment was detrimental, in some cases, a studio received an unexpected support from a platform. For instance, one of Zeta's game was placed in the top list games by Apple and succeeded surprisingly well in China.

The last source of uncertainty concerns the inability to understand the consequences of specific decisions, what Milliken (1987) and Miller and Shamsie (1999) depicts as decision response uncertainty. Along their history, all entrepreneurs pointed out the errors or wrong hypothesis they made (typically problems in monetization or bad concepts). However, this source may have positive or negative consequences for a studio. For instance, Epsilon's decision to add a social network dimension in their games (the possibility for players to communicate with each other) was depicted as a success factor that the founders had not planned at that time. On the contrary, Alpha anticipated a monetization of its game based on advertisement for 90% of its revenues and 10% for micro-payments, but the exact opposite happened after several months. Similarly, Gamma released its first video game in June, "*the only time of the year when geeks are not in front of their computers!*" and it was consequently a complete failure. As one of the founders explained, "*Positioning error, business model errors, technical problems, gameplay problems; all of which complicated things quite a bit and which were difficult to rectify quickly because for the most part they were fundamental problems*".

To sum up our first analysis, while the market promoted new products and innovations, it became clear for the entrepreneurs that if entering the market was relatively easy, it was difficult to maintain a position on the market, as uncertainty was high. As noted by Zeta, as the market

matured, the development costs were also increasing by a factor of ten between 2012 and 2016 due to increased project development times, corresponding to an increase in the quality required to subsist in the market and to face the competition: "*Whereas we could develop and launch a game in 6 months, it now takes 2 to 3 years to develop, and especially to test and refine the game*". Competition and subsequently costs were increasing whereas the ecosystem was becoming more complex and concentrated around major platforms. The market became consequently "*the most Darwinian market with lots of roadside deaths*" (Epsilon).

BUSINESS MODELS CHOICES FOR MITIGATING A CHALLENGING ENVIRONMENT

The environment of the creative industry we study and we describe above produces a high level of uncertainty for the French independent studios due to several sources of uncertainty. This uncertainty put their survival at risk especially since entrepreneurial firms have few resources. In these conditions, each new project may be the last one as financial returns are highly uncertain and the cost structure was increasing during the period. Therefore, we analyze how studios manage to survive over time as they maintain their activity during several years before going bankrupt in some cases.

Several choices occurred early in the life of a studio or -most often- appeared once a studio received and interpreted feed-backs from the environment after errors and successes (Daft and Weick, 1984). Two important categories of choices appeared during analysis to understand how studios manage to survive in such uncertain environment (Table 3). For each choice we indicate the consequence for the business model (Casadesus-Masanell and Ricart, 2010) that entrepreneurs evoked during interviews or that researchers inferred.

The first category concerns all the choices made to limit and manage risks. These choices may occur early in the life of a studio (for instance by incubating the venture before establishing a company) but most of them appeared after the release of a first game, as the result of a learning process. We take inspiration from existing literature to code the different choices to manage risks. Some goals sought converge with the business model literature (Girotra and Netessine, 2011, 2014) while others converge with the creative industries literature (e.g., Hirsch, 1972, 2000; Lampel et al., 2000). For instance, limiting the dependency on others or collecting data are classical tactics for limiting risks. However, some choices such as overproduction or cooptation of gatekeepers (Hirsch, 1972) were not observed as we study new ventures.

The second category of choices made apparent by our analysis concerns choices to improve efficiency of a studio. These choices appeared clearly over time, after the inception of the company and the first experiences accumulated. As evoked by one founder, "*We have learned*

to make things simple and efficient" (Gamma). These choices enable to use resources (especially human and technological ones) more efficiently. For instance, a studio may specialize its development teams according to their level of experimentation or may use free-lance. Finally we categorize some choices in a third category as these choices refer to the two preceding categories. For instance releasing me-too games or making few incremental improvements in one of its own products enable to minimize risks and to produce efficiently. Acquiring existing catalogs of games reduce also simultaneously the development time of new products and the risks associated with new projects.

Table 3: Business model choices to mitigate the selective environment

Choices	Consequences
Risk management	
• Incubating the project before creating the company *(Delta, Gamma, Zeta)*	Delaying the commitment to production
• Co-developing games with other studios or with customers (BtoB) *(Beta, Gamma, Zeta)*	Sharing Risks with others
• Internalizing some resources such as servers *(Delta)* • Developing a proprietary technology to become a bottleneck *(Beta)*	Limiting dependencies on others
• Getting qualitative feedback from gamers on concepts *(Alpha, Delta)* • Testing games before their launch *(All)* • Allowing the gaming community to participate in the development and improvement of the game *(Alpha, Delta)* • Collecting player ideas to improve games *(Delta)* • Intensive use of analytics and metrics to manage the business *(Epsilon, Zeta)*	Collecting information
• Developing services (subcontracting for other studios or IT services) *(Alpha, Gamma, Zeta)* • Enriching and diversifying the games portfolio *(all)* • Moving from BtoC to BtoB (web agency, advert games, serious games) *(Gamma)* • Multiplying the distribution platforms *(all except Beta)*	Diversifying the activity
Efficiency	
• Outsourcing all or part of the production *(Beta)* • Recruiting new players thanks to virality *(Alpha, Delta, Epsilon)* • Using free lances and fixed-term employees *(Beta)* • Using the community of gamers to insure some functions such as moderation *(Alpha, Delta, Zeta)* • Using free access technology *(Alpha, Delta, Gamma)*	Reducing costs
• Specializing teams on different projects according to their complexity and innovativeness (*Beta, Gamma*)	Structural ambidexterity
• Deepening the known and mastered coding technologies *(All)* • Stabilizing a core experienced team *(Alpha, Beta, Epsilon, Delta)*	Favoring knowledge and experience accumulation
Risk management and efficiency	
• Acquiring existing catalogs of games *(Alpha, Gamma)*	Acquiring existing resources
• Building on known game concepts or recombine them *(all except Beta)* • Evolving a game rather than create new ones *(Alpha, Delta)*	Betting on incremental innovation and improvements

DISCUSSION

In this article, our research question relates to the choices made by entrepreneurs to develop their business model to cope with an uncertain environment. Choosing a creative industry like the video game development as an empirical field offers a good opportunity to observe entrepreneurs in a highly selective and uncertain environment which raises the question of sustainability for organizations (Caves, 2000; Peltoniemi, 2015). We select a sample of small French game development studios to explore our research question. These organizations appear particularly suitable for studying the potential selective effects of a creative industry on organizations which have few resources. The results of our research contribute both to the business model literature and to the creative industries literature.

The entrepreneurial process defined as "how opportunities are perceived and evaluated, how operational strategies are developed and executed and finally, how resources are assembled" (Kodithuwakku and Rosa, 2002: 434) is generally described as uncertain (Alvarez and Barney, 2005; Kirtley and O'Mahony, 2020). During this process, reassessment and revisions of initial business models are commonly required (Demil and Lecocq, 2010, 2015; Ojala, 2016; Sosna et al., 2010); entrepreneurs have to learn and experiment to find a sustainable business model whether they adapt to the environment or try to disrupt it (Saebi et al., 2017). Finding a coherent and sustainable business model takes several years and may potentially fail (Chesbrough and Rosenbloom, 2002). Discrete and continuous decisions by entrepreneurs (Packard et al., 2017) seek to find a coherent configuration of the different business model components and activities, to coordinate resources to elaborate a value proposition and to find a pricing enabling to capture value. By now, the business model literature has mostly favored the innovation side of entrepreneurial activities –giving birth to the business model innovation literature- and how new configurations were elaborated, eventually to deter incumbents. Our results highlight the necessity for two other learning processes. The first one relates to mitigating risks in a very uncertain environment where consumers' preferences are difficult to anticipate, the decisions of dominant actors may impact seriously the entrepreneurial firms and technologies evolve at a rapid pace. While risk and uncertainty may not be assimilated (Alvarez and Barney, 2005; Packard et al., 2017), the entrepreneurs engage in activities aiming at limiting some uncertainties in the environment, especially those concerning consumers' preferences. By testing the products with a sample of gamers, in some cases associating consumers to the

development of products, or using analytics measuring in real time the consumers' behavior, entrepreneurs partially transform uncertainty into risk by obtaining feed-backs before or during the commercial exploitation of a product. These activities enable to correct misconceptions or wrong hypotheses and converge with Girotra and Netessine (2011, 2014) suggestions to integrate some mechanisms in the business model to reveal consumers' preferences. However, the mitigation of risks does not only concern the value proposition in the business model as these activities could suggest. Entrepreneurs also seek to mitigate risks through the management of resources and competences (e.g. by stabilizing and retaining a core team of developers) and of the relationships they established with actors of the environment both by sharing risks with them (e.g., by co-developing products with BtoB customers) or by externalizing risks on other actors (e.g., by using free lancers) (Girotra and Netessine, 2011, 2014). Thus, all the components of a business model (Demil and Lecocq, 2010) are affected by the search for mitigating risks.

The second learning process we found predominantly among the studios relates to efficiency. While efficiency does not directly relate to the management of an uncertain environment, it participates in the success –at least in the survival- of the studios under study. Previous research has insisted on the role of managing resources in the entrepreneurial process, especially in constrained environment (Kodithuwakku and Rosa, 2002). The effectuation process of experimented entrepreneurs highlights that they do not try to predict the future but instead seek to shape future outcomes through effective control of resources (Sarasvathy, 2009). For new ventures set up by relatively young unexperienced entrepreneurs, detecting and creating opportunities may not be sufficient. As argued by Kodithuwakku and Rosa (2002: 436) for constrained environment, "the process of matching resources with opportunities should include both entrepreneurial as well as managerial elements". We may argue that the managerial dimension of the entrepreneurial process in uncertain environment consists in learning how to manage efficiently resources while learning also how to manage risks. Both of these processes may be referred as a process of rationalization of a business model. In the emergent phase of an industry displaying a high level of uncertainty, a key condition for the survival of an organization after its creation is to develop as quickly as possible an internal capability of managing rationalization.

Our article also contributes to the creative industries literature by showing the importance of making conscious decisions to rationalize the business model of the firm. So far, the literature had highlighted the efforts deployed by firms in the video game industry (Tschang, 2007) or the film industry (Pokorny et al, 2019) to manage demand uncertainty by rationalizing the value

proposition, thanks to the development of sequels, the use of licenses or the commercialization of a portfolio of products. The use of a business model lens, which favors a holistic view of the organization, enables us to extend this stream of the literature by showing that the rationalization process affects not only the value proposition, but also the other components of a business model, i.e. the organization, as well as the resources and competences.

This result is consistent with Lanzolla and Markides' (2021) finding that the way a business model is managed should theoretically be the main source of superior performance when resources are homogeneously distributed among firms and when the sector structure does not allow to extract rents from positioning. This type of settings fits well with the characteristics of entrepreneurial ventures in the creative industries, which are found to be particularly resource-strapped compared to ventures in other economic sectors (Heidenmann-Lassen et al, 2018; Kohn and Wevel, 2018). In particular, independent video games studios operate in an environment with low barriers to entry, and a low heterogeneity in resources. The only exception was Beta, who had developed a rare technological expertise. In this kind of environment, performance – in the first place measured by survival – is achieved through the management of a business model that favors rationalization. Rationalization takes the form of business model choices, which are taken with a view to control uncertainty, and to maximize efficiency. The prominence of the rationalization actions during the history of the studios was surprising in a sector where hundreds of new products are launched every week and the sector is presented as a creative industry. Indeed, before investigating empirically our field, we expected innovation to be a key factor of success.

The empirical results of this article have clear limits. In particular, we can expect a rationalizing bias due to the research design. While the interviews cover periods of several years, we are aware that events and information elements may be forgotten or transformed. This bias may be compounded by the fact that we decided to conduct interviews primarily with the (co)founders of the business under study, which limited our analysis to only one source of information for each firm. However, the comparative approach enable to draw conclusions and observe the same phenomena in most companies in our sample.

CONCLUSION

In this article, we show that one of the main challenges that video games entrepreneurs have to address when they set up a development studio is to integrate rationalization into their business model. Various mechanisms can be implemented to reduce risks and promote efficiency within the main components of the business model, whether at the value proposition, internal organization, external organization, and resource and competencies level. In the emergent phase of an industry displaying Darwinian characteristics, a key condition for the survival of a organization after its creation is to develop as quickly as possible an internal capability of managing rationalization.

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