Does business model experimentation in dynamic contexts enhance value capture?

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Abstract:

Established theory suggests that firms experiment with business models in dynamic contexts. However, the relationship between business model experimentation and organizational performance remains unclear. Barriers to empirical analysis exist as experimental business models are normally utilised by new market entrants and the unit of analysis to test a business model in dynamic contexts extends beyond traditional firm boundaries. To overcome these barriers, we propose an assessment of the economic value of business model experimentation in dynamic contexts by defining the unit of analysis at the industry level. Analysis draws upon a unique panel dataset from the recorded music industry composed of 414 observations from 32 countries for the period 1998–2010. Evidence is provided of the relationship between sales format diversity, taken as a proxy measure of business model experimentation, and industry revenues as the measure of value captured. Both measures have been validated by industry experts. The results show two optimal modes for maximising value capture in dynamic contexts. First, if a dominant format exists, a 'network' effect becomes prevalent which has a positive impact upon revenue. Second, when firms engage in experimentation leading to a highly diversified set of business models the industry sector becomes better able to capture value from diverse and changing consumer needs.

Keywords: Business model, Experimentation, Value capture, Music industry, Format density.

BIOGRAPHICAL NOTE

Ferran Vendrell-Herrero, Ph.D. (Universitat Autonoma de Barcelona) is a lecturer in managerial economics in the University of Birmingham, UK. His research focuses on the innovation dynamics of business models within creative industries as well the impact of digital technology in organisation of creative businesses. This has led him to assess empirically innovation policies, and to analyse recent changes in the business models of multinationals in the music, publishing and media sectors through close collaboration with industry partners. Across these themes he has made a distinctive contribution through publications in top academic journals, including the International Journal of Production Economics, Technovation, Small Business Economics, Regional Studies and Supply Chain Management. Additionally, Dr Vendrell-Herrero initiated and scientifically directs the International Conference on Business Servitization, which is now into its fifth edition, and is actively involved in an Horizon 2020- Marie Skłodowska-Curie Actions project called MAKERS on Smart Manufacturing for EU Growth and Prosperity.

Glenn Parry, Ph.D. (Cantab) is a Professor of Strategy and Operations Management at the University of the West of England, UK. His research is characterised by a strong industrial focus on process combined with the rigour of academic analysis. His work aims to capture leading practice, moving companies forward through transformations based upon data driven analysis. He has been published in a number of international journals and has published the books, "Build to Order: The Road to the 5-day Car", "Complex Engineering Service Systems" and "Service Design and Delivery" which was ranked in The IIJ top 20 upcoming books for innovators. He is currently involved in Enterprise Transformation, studying the move of complex engineering companies from product to service provision.

Oscar F. Bustinza, Ph.D. (University of Granada) is an Associate Professor of strategy and operations management at the University of Granada, Spain. His work aims to capture successful business practices, analyzing drivers of firm's boundaries choice and the leveraging of supplier, customer or inter-firm relationships based upon data driven analysis. Dr. Bustinza's research has been published in the International Journal of Operations and Production Management, International Journal of Production Economics, Journal of Supply Chain Management, Supply Chain Management, and British Journal of Management among other outlets. Dr. Bustinza is Principal Investigator on Service Innovation in MAKERS, a H2020 project that supports an EU-wide network of researchers. This over €1 million project is funded by the European Commission.

Francisco J. Sanchez-Montesinos, Ph.D. (University of Granada) is a part-time professor at the Complutense University of Madrid. His main areas of research are servitization, absorptive capacity, and CRM. Over the last 10 years he has occupied senior management positions in different industries in Spain.

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1   Introduction

In December 2013 Amazon announced it was to develop aerial drone delivery technology by 2015. Whilst heavily critiqued in the media, the concept has the potential to transform retail operations[1,2]. Why would Amazon, currently the largest and most successful retailer on the internet, experiment with new technology and an alternative business model for delivery? Perhaps the experiment was merely to bolster their marketing, but more positively it could be to protect their competitive position and prepare for technological disruption in the market. Technological disruption

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[1] Farhad Manjoo (State of the Art) in the New York Times summarizes Amazon's ultimate aim in delivery (Last accessed 15th March 2018)
https://www.nytimes.com/2016/08/11/technology/think-amazons-drone-delivery-idea-is-a-gimmick-think-again.html
[2] Lisa Eadicicco in Time magazine reports on Amazon Prime Air service (Last accessed 15th March 2018) http://time.com/4185117/amazon-prime-air-drone-delivery/

impacted negatively on Nokia, the world's leading manufacturer of mobile phones during the 90s. Their managers were unable to react to the numerous new Smartphones market entrants offering new innovations and technologies (McCray et al., 2011).

All industries are subject to disruptions that can affect their competitive landscape (Vendrell-Herrero et al., 2017a; 2017b), but the relationship between the business model and technological innovations still lacks theoretical and empirical underpinning (Baden-Fuller and Haefliger, 2013; Popa et al., 2017). Literature is silent on the role of business models in industries with 'dynamic contexts' - characterized by existing in environments which are highly technologically dynamic and where multiple different innovations may take place simultaneously (Cruz-González et al., 2015). Consequently, one of the main research questions that arise from this debate is whether experimentation with business models in dynamic contexts provides a direct reward to a firm in terms of value capture (Chesbrough, 2010; Lee et al., 2017; Suarez et al., 2013; Velu, 2015).

Extant literature analyses business model experimentation and innovation within organizational boundaries (Chesbrough and Rosenbloom, 2002). However, this approach has potential limitations as new entrants with greater flexibility and a first mover advantage (Wan et al., 2015) have a greater propensity to experiment with new business models. Examples of successful experimental new entrant business models include Apple in smartphones, Ryanair and EasyJet in the low-cost airline market, retailers such as eBay and Amazon, taxi firm Uber, streaming media provider Netflix, and accommodation provider AirBNB.

In order to address the challenge of collecting data from numerous new, diverse and often difficult to access actors, this work instead analyses a known dynamic market at the industry level. In seeking to link multiple firm activities with sales the approach taken in this paper goes beyond organizational boundaries and analyses the relationship between business model experimentation and the value capture of an industry. The industry chosen for study is that of recorded music which, like television, experienced a revolution led by new digital business models (Choi and Perez, 2007; Parry et al., 2018; Vendrell-Herrero, et al., 2018). Longitudinal analysis of the recorded music industry is undertaken across thirty-two countries from 1998 to 2010, a period of time in which the industry incumbents, the leading major label firms of Warner Music Group, Sony/BMG, Universal and EMI, suffered revenue loss and multiple technological disruptions (Gilbert, 2015; Liebowitz, 2014; Myrthianos et al., 2014). Value capture is measured in terms of sales per capita to compensate for the different market sizes. The measure of business model

experimentation is given as a proxy of the diversity of formats in which music is sold, a novel construct thereafter named *Format Density*. The construct has been validated by three senior managers from leading global music firms and one academic expert.

The results of our quantitative analysis using Format Density and sales per capita support extant theory (Chesbrough, 2010; McGrath, 2010) which suggests that a positive relationship exists between business model experimentation and value capture in dynamic contexts. A high diversity of business models is found to satisfy heterogeneous consumers with changing and complex needs (Huff, 1990), and the phenomenon of numerous offers being tried by consumers is encapsulated in this research using the term 'taster effect'. However, the evidence also identifies that in the presence of 'network effects', where an offers value increases as more people use it, business model experimentation can initially lead to a reduction in revenues.

This paper summarizes the literature on business models and sets the theoretical underpinning for the study. The second section describes the nature and evolution of the music industry and sets the contextual empirical hypothesis. Following this, the model specification and descriptive statistics are presented. Results are shown and the paper ends with academic contributions, managerial implications and future research avenues.

2   Theoretical underpinning

2.1 Business model and value capture

Business models are complex multidimensional dynamic concepts that are not easily defined, although there is design logic employed in their creation by managers and entrepreneurs (Nicolini, 2009). Zott and Amit (2008, p.1) propose that "the business model is a structural template that describes the organization of a focal firm's transactions with all of its external constituents in factor and product markets". Business model complexity is encapsulated by Tuli et al. (2007, p.14) who state that "selling solutions is a complex exercise that involves the consideration of conflicting requirements of multiple stakeholders". Consistent with this, Zott et al. (2011) present business models as capturing the value created arising from multiple sources. Others have linked the innovation aspect to the evolutionary nature of a business model (Aranguren et al., 2014; Ortin-Angel and Vendrell-Herrero, 2014), where business models emerge rather than are planned, often as a consequence of firm dynamics (Schneider and Spieth, 2013). In this context innovation is presented as a reconfiguring of the firm's

capabilities to add value. Therefore, business models underpin and define the interaction of the value proposition, value realization in use of the proposition and value capture which by implication impacts on the way the organization is structured for future agility and flexibility (Osterwalder and Pigneur, 2010).

Recent studies have developed the business models construct and describe how they may drive organizational thinking (see for example Chesbrough and Rosenbloom, 2002; Osterwalder and Pigneur, 2010). Business model determination is not an exact science and generic templates are available, but are difficult to employ in practice as business models differ from firm to firm and from industry to industry. Problems arise if the focus of value creation and capture are not aligned with the markets served (Edelman and Yli-Renko, 2010). An effective business model needs to take a systemic view of the firm and its interaction with the markets it serves, which requires a holistic (whole systems) view of the organization and its operation within the market environment.

The coexistence of business models and technological innovations is a subject still underexplored. Baden-Fuller and Haefliger (2013) formulate a two-way relationship between business model and technology. First, business models mediate the relationship between existing technology and value capture. Second, developing new technology depends on the firm's competitive positioning, the context of technological changes affecting a given industry, consumer engagement and ultimately their business model. In highly dynamic environments, consumer's desires and the value-in-use they experience from an offering change quickly, creating co-evolving consumer needs (McDonald et al., 2011). Thus at the industry level it may be expected that there is a high correlation between technological dynamism and consumer engagement.

The relevance of business model experimentation by new entrants is described by Chesbrough (2010), who cites the example of Xerox in the 1980s, a company that made substantial research and development investment but discarded many of their new inventions as they did not fit with the firm's strategy. Some of these inventions were successfully developed outside Xerox through corporate spin-offs, resulting in lost business opportunities to Xerox. Chesbrough (2010) stresses the significance of business model trial and error, experimentation in environments with high technological uncertainty, and the need for managers to learn how to capture value efficiently. According to McGrath (2010) this process is completely different from the analytical approach normally taken by managers in stable environments, in which statistical

predictions based on past observations are appropriate. This leads to the following proposition:

Proposition: *In dynamic contexts, with co-evolving consumer needs and new technologies, the coexistence of different business models leads toward successful processes of value capture at industry level.*

2.2   The context of the study: The recorded music industry

2.2.1 Business model experimentation in the recorded music industry

Previous research has employed various definitions of the terms *strategy, revenue model* and *business model*, often using them interchangeably. Recently, DaSilva and Trkman (2014) have sought to clarify the definition of these terms, in particular differentiating the term *business model* from the other two concepts. Their definition of a business model is developed from the resource based view and transaction cost economics, and is dependent upon two conditions. First, a business model is a description of the current [not future] resource base. Strategy is the enhancement of current resources through the exploitation of dynamic capabilities forms. Consequently, a business model is a short term perspective taken on firm resource management. Second, business models describe the mechanisms of value capture through monetary transactions, which is represented by the revenue model.

Following DaSilva and Trkman's (2014) definition we consider that music format provides a good descriptor of a business model for the recorded music industry. Current resources in the recorded music industry are the records or songs. Available technology dictates the way resources (songs) can be configured for sale. In this sense digital technologies allow music to be presented to consumers in new formats such as downloads, streaming or ringtones (Mason and Spring, 2011). Formats can be considered as business models as they are different propositions which produce direct and independent revenue streams or value capture mechanisms.

Whilst the extant theory supports the view that formats are a good proxy for business model experimentation, the evidence provided by Koukova et al. (2012) suggests that a business model might contain a bundle of complementary formats. To address this conflict of opinion, industry experts were engaged. The empirical design of this research requires a characterisation of different business models and a measurement of each model's ability to generate value. We sought to validate the approach based

on expert knowledge (Velu, 2015). All experts have themselves either researched or worked in the industry for a significant time covering the period of the study. Experts possess "technical process orientated and interpretive knowledge referring to their specific professional sphere of activity" (Bogner and Menz, 2009, p. 19)[3].

In 2012 the construct for employing format as a proxy for business models was presented to the Senior Vice President of a global recorded music company and his business team (Expert 1), who accepted and confirmed that the assumptions made were acceptable. They agreed with the empirical design and that music formats were sufficiently independent and reflected different sources of revenue. Subsequent validation for the model was sought in February 2015 from three senior executives and academics with industry expertise in the industry during the time of data collection and analysis. Their responses all confirm that the assumptions and empirical design are valid. When discussing the direct link between music formats and business models one senior executive (Expert 2) agreed this was the case, but only "if streaming is a format". Andrew Dubber, Professor of Music Industry Innovation, Birmingham City University and Director of Music Tech Fest (Expert 3), had a different position suggesting that formats have interrelation, consistent with the findings of Koukova et al. (2012). Expert 3 states "Bets are spread across the formats. The business model is a poker hand, not an individual card". However, he adds "that said, you could reveal some interesting phenomena by compartmentalising". Another senior executive from the industry (Expert 4) agrees with the use of music format as a proxy for business models but she considers that "experimentation has been undertaken within the older more established companies but those initiatives that fail have also disappeared quite swiftly". Overall, the assumption that music formats are linked to business model experimentation was validated by experts.

The measure of business model experimentation employed here can be constructed based on the relative dispersion of formats in a market. The construct is a novel way to describe business model experimentation, but the authors acknowledge the previous use of similar approaches to measure similar constructs. For example, Bercovitz and Mitchell (2007) used the number of product lines as a proxy of business scope, and Suarez et al. (2013) used the percentage of sales in service format to assess the linkage between the implementation of service business model and firm performance.

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[3] The transcripts can be available upon request.

2.3 Value capture and empirical hypothesis development

Empirical market data from the music industry (IFPI, 2012) shows that total revenues, the accepted measure of value capture have been in sharp decline since the start of the twenty first century, specifically since 1999, a point in time concurrent with introduction of illegal file sharing services (Myrthianos et al., 2014). Based on the substantial decrease in revenues the industry experimented with a multitude of new business models to reengage consumers at scale and recover the past levels of value capture.

Hybrid business models embraced predominantly in manufacturing (Kastalli and Van Looy, 2013; Bustinza et al., 2017; Rabetino et al., 2017) have influenced music industry in recent times. These models usually consist of a service offering limited access to a music catalogue, with full access to large catalogue of music through a premium subscription (i.e. Spotify). The effectiveness of these models is still to be researched but evidence to date suggests that almost two thirds of UK consumers are willing to consider a subscription (Parry et al., 2012). Hybrid models have also been found to re-engage consumers with music, increasing sales across various formats (Aguiar and Martens, 2013).

The music industry presents a suitable context for analysis of the theoretical proposition. It is a highly dynamic, influenced by new technology and there are a number of co-existing business models (Bustinza et al., 2013a; 2013b). In this context the proposition outlined earlier will be hold, if and only if countries with a diverse set of formats capture more value (have greater revenues) than those countries with a dominant format. This leads to the formulation of the empirical hypothesis.

Hypothesis 1: *More format diversity will increase revenues per capita.*

3   Method

3.1 Empirical approach

As discussed earlier the diversity of business models and the capture of value in highly dynamic contexts are phenomena observed beyond organizational boundaries (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010). The evolution of these variables can be seen by comparing different markets at different moments in time. This was

achieved using a panel of 32 countries[4] for the period 1998–2010. The panel is not perfectly balanced since two observations are missing for the year 2010, and therefore the sample contains 414 country-year observations. The data that creates the panel is drawn from different sources. Data for the recorded music was received from industry firms and their trade body, the International Federation of the Phonographic Industry (IFPI).

Sales have been shown to be a good measure for assessing business models (Suarez et al., 2013), therefore the dependent variable utilizes deflated industry sales figures, *Sales*. The data collected was from countries with diverse population sizes. To overcome the potential dominant size effect we divided total sales in the industry by total population to create a comparable unit across countries[5], *Sales/population* (Applebaum, 1966). Further to this, we took the log of our dependent variable to reduce skewness and enhance estimation accuracy, *LN (Sales/population)*. This transformation facilitates the interpretation of the estimated coefficients and parameters will be interpreted as variations in percentage points of sales per inhabitant (Manning, 1998). Table 1 presents descriptive statistics for this variable. The information is in US\$ with a fixed exchange rate and is deflated to 2010 values. The average annual expenditure on music per capita is US\$15.01.

<INSERT TABLE 1 ABOUT HERE>

In the period analysed the recorded music industry offering is characterised by offering a greater diversity of formats than were previously available to the market (Nokelainen and Dedehayir, 2015). Our sample revenues are divided by 22 sales formats[6] which, following validation of the construct by

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[4] Australia, New Zealand, Brazil, Canada, Chile, Mexico, United States, South Africa, China, India, Indonesia, Japan, Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom.

[5] Participants in the music industry (i.e. musicians, distributors) attribute more relevance to large markets (i.e. US) than to small (i.e. Portugal). In order to test if the results are generalisable to all the markets we replicated all the analysis using as dependent variable total sales. The results are consistent with those provided in Tables 3 and 4. These tests and others not provided in Tables are available upon request.

[6] Formats in which music is commercialized (denoted with the subscript *g* in Equation 1): Vinyl Singles, Vinyl LPs, MCs, CDs, Minidisc, DVD-Audio, Super Audio CD, Music Video, Online Single, Online Album, Online Music video, Online Streaming, Mobile

industry experts act as the proxy for business model experimentation and provide a measure of the relative market dispersion. The explicative variable measures the diversity of business models employed and is named *Format Density*. This is computed through the implementation of a Herfindahl (1950) index as depicted in Equation 1. This index has been widely used as a measure for industrial, trade and property concentration (Hirschman, 1964), but its use as a measure of business model experimentation is novel.

$$\text{Format Density}_{it} = 10 * \sum_{g=1}^{22} \left(\frac{\text{Sales format}_{git}}{\text{Total SALES}_{it}} \right)^2 \quad (1)$$

By construction the Format Density index can take values from 0 to 10. When the index takes values close to 10 there is a high concentration of sales in one dominant format, suggesting the existence of a network effect. When the index takes values close to zero there is very high heterogeneity in revenue from across the sales formats, meaning the market no-longer has a single format, and thus business models satisfy a wide range of consumer preferences. As shown in Table 1 the variable decreases significantly at an annual rate of -2.49 percent. On average it takes the value 6.51 with a standard deviation of 1.60.

Equation (2) formally presents the empirical model, where the subscript *i* makes reference to the country and the subscript *t* makes reference to the year (from 1998 to 2010).

$$\text{LN(Sales/Population)}_{it} = \alpha + \beta_1 \text{Format Density}_{it} + \sum_{j=2}^{n} \beta_j X_{jit} +$$

$$v_{it} \quad (2)$$

The parameter β_1 empirically tests Hypothesis 1, which will be confirmed if the parameter is significantly smaller than zero ($\beta_1 < 0$), suggesting that high format concentration and therefore limited experimentation with new business models, may be negatively related to revenues (value capture). *X* is composed of a set of control variables which includes the lag of sales per capita, information on wealth and agglomeration (GDP per capita and population density), information on culture and regulation (Intellectual Property Index and Control of Tax Evasion; both indexes from IMD World Competitiveness[7]), and information on relevant conditions for the recorded music industry (Average Price of a

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Ringtones, Mobile Single, Ring back Tunes, Mobile Music Video, Mobile Streams Online, Subscriptions, Mobile Subscriptions, Bundled Subscriptions, Advert supported content and Performance Rights.

[7] https://www.worldcompetitiveness.com

CD from IFPI and internet users per 100 inhabitants from the World Bank[8]).
The descriptive variables are shown in Table 2.

Each country and year may have some specificity (i.e. Taste for music, Economic Crisis, new style of music, etc.). To control for specific patterns, accepted econometric models are used for panel data samples and decomposes the error term v_{it} into a country persistent effect, ε_i, a time effect, ε_t, and the specific error term for the country i at period t, ε_{it}, as $v_{it} = \varepsilon_i + \varepsilon_t + \varepsilon_{it}$. The Hausman's test (1978) shows that countries' and years' fixed effects outperform the random-effects model estimations.[9] Therefore, the estimate of the Equation (2) shown in Tables includes countries' (ε_i) and years' (ε_t) fixed effects.

<INSERT TABLE 2 ABOUT HERE>

The error terms ε_{it} are a set of random variables following a normal distribution with a mean of zero. The assumption of independence and equal variance between the error terms would not hold if some countries are systematically affected by unobserved variables in excess of the average during certain periods. This may lead to potential misspecification of coefficient values (Maas and Hox, 2004). Accepted practice in dealing with such misspecification is to apply the Heteroskedacity-robust or Huber-White robust estimator. However, when such estimators are applied to panel data with fixed-effects results are subject to serial correlation (Stock and Watson, 2008). To simultaneously avoid both misspecification and serial correlation the coefficient presented contains clustered-robust standard errors (Petersen, 2009).

4   Results

Figure 1 shows the evolution of album prices, both physical and digital, sales per capita and Format Density. All the variables, with the exception of digital prices, decrease with time and the decrease in business model

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[8] http://data.worldbank.org
[9] Using Column 1 in Table 3 as a baseline model the Hausman Test (1978) concludes that differences in coefficients between random and fixed effects models are systematic (chi2(20) =165.72, prob>chi2=0.000). In sum, the fixed effects model outperforms the random effects.

experimentation and value capture appear similar.[10] The Format Density in 2010 is 4.48, approximately two thirds of the value observed in 1998, indicating that a greater number of business models are employed and that the music industry has transited from a 'network' effect created by a dominant format to creating a 'taster' effect from a wide range of diverse formats. However, concurrently sales per capita in 2010 are US$8.91, approximately half the sales per capita value recorded in 1998.

<INSERT FIGURE 1 ABOUT HERE>

Figure 1 descriptively shows how the development of digital music business models correlates with a decline in total music revenues, which means that contrary to our hypothesis, H1, business model experimentation appears to be negatively correlated to sales per capita. This is consistent with the findings of Elberse (2010) and suggests that experimentation with digital business models reduce value capture. However, a simple correlation with average values needs to be treated with caution as the recorded music industry has suffered subsequent negative disruptions (i.e. file sharing, broadband, economic crisis) which are the main causes for the decline in sales. During this period of time it could be argued that business model experimentation could actually be softening this decline in sales.

<INSERT TABLE 3 ABOUT HERE>

It is possible to test whether the sharp decline in sales was reduced in those markets with more business model experimentation by implementing the multivariate analysis shown in Equation (2). This analysis includes control variables and deals with country and year heterogeneity. Table 3 makes estimations for the full sample (all years) and the periods 1999–2004, 2005–2007 and 2008–2010 independently. The test explores the influence of the explanatory variables over time.

That β_1 equals zero cannot be rejected at the usual levels of significance for the full sample and the subsamples analysing 2005–2007 and 2008-2010 periods. In the initial period, 1999–2004, a negative and significant (p<0.10)

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[10] Notice that level of physical prices in 2006 was the same as 1998. This descriptively indicates that the decrease of revenues until 2006 was mostly associated to a decrease in the quantity sold, and not with the price.

relationship between Format Density and sales per capita is found. A decrease of 1 unit in the Format Density index implies an increase of sales per capita of 2.47 percent[11]. In sum, in the results in Table 3 β_1 equals to zero or is negative, depending on the period analyzed, which give partial support to our empirical hypothesis. Therefore, H1 is accepted for the period 1999-2004 and rejected for the other sub-periods and for the full period.

In discussion as to why the result is only significant during the first period we need to look at specificities. According to Liebowitz (2016) business model experimentation remained low during the period 1999–2004. At this time the market was dominated by a single format, the CD, and was physical sales oriented. Digital music was a new phenomenon and digital business models had not yet been developed. This implies that, consistent with Fosfuri et al. (2013), first movers in digital experimentation had better sales results which would provide a moderating force to the industry sales decline.

The results in Table 3 are based on the assumption that the relationship between business model diversity and revenue per capita is linear. This might not be the case if business model diversity has barriers to implementation. One of those barriers would be market resistance to change from a well-established situation, identified by Suarez et al. (2013) in the implementation of service business models in the US software industry. In the context of the recorded music industry a dominant format (i.e. CD) with a strong network effect would not be easy to rapidly substitute. However, a wide range of new digital formats (i.e. downloads, streaming, etc.) coupled with small numbers of consumer returning to older modes of listening to music (i.e. vinyl) offer consumers many options which are suitable for different contexts, producing a taster effect (Nokelainen and Dedehayir, 2015). In this scenario two opposite forces act (network effect Vs taster effect) and a U-shaped form better describes the relationship between business model experimentation and revenue per capita. Whilst research is silent on the relationship between business model experimentation and value capture, previous research has already identified a U-shaped relationship between business model innovation and various forms of outcomes such as firm survival (Velu, 2015) and firm profitability (Suarez et al., 2013).

Table 4 explores this proposal and introduces the parameter Format Density Squared to Equation (2). The analyses are also conducted for the full period and 1999-2004, 2005-2007 and 2008-2010 sub-periods. The

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[11] The dependent variable is in logarithm and therefore, we have had to transform the parameters shown on the table by calculating the true effect which equals $\exp(\beta_1)$-1.

results show that the estimated coefficients for Format Density and Format Density Squared are statistically significant, with the only exception being the post economic crisis period. For the full sample the significance level is 5 percent, for the sub-periods 1999-2004 and 2005-2007 the significance level is 1 percent.

Further, Figure 2 examines the quadratic effect of Format Density for the full sample in more detail, where β_1=-0.089 (p-value<0.05) and the estimated parameter for Format density squared equals 0.006 (p-value<0.05). The result suggests that the function is convex and hence it has a U-shaped form, suggesting that abandoning a dominant format model is not cost free.

<INSERT TABLE 4 ABOUT HERE>

Assuming that excepting Format Density (*FD*) the rest of independent variables remain constant, the minimum through a first differentiation of the function is calculated: $f(FD) = - 0.089FD + 0.006FD^2$; $f'(FD) = -0.089 + 0.012FD = 0$; $FD^* = 7.41$. Format Density value 7.41 indicates the point of minimum revenue. According to the estimate for the full sample any shift of the index from this mid-point will increase revenue. Therefore, the Hypothesis H1, can be accepted when Format Density is equal or smaller than 7.41. The same procedure can be performed for both subsamples, suggesting that the Format density level that produces the minimum level of sales per capita has decreased from 7.80 in the sub-period 1999-2004 to 5.77 in the sub-period 2005-2007. The U-shaped result suggests that the industry should either develop strategy that moves the market towards business models based upon provision of a single dominant format or rapidly transition to offer a full diversity of formats using a broad range of business models.

It is difficult to find a conclusive justification as to why the result is not significant post 2008. One explanation is that after much trial and error consumers and the industry may have begun to reach an optimal degree of diversification. Though non-significant, the relationship between format density and sales per capita in the 2008-2010 period follows an inverse U-shaped relationship, reaching a maximum sales per capita when formal density is 5.68, suggesting that this may be the case.

Control variables provide three insightful results. First, the level of legal protection is only significant in the digital business model period, 2005-2007. According to Table 3 in that period an increase in one unit in the IPR

index produces an increase in sales per capita of 6.38% (p-value<0.1). In discussion as to why these results are only significant for the period 2005-2007, it is noted that in this period legislation covering IPR protection was developed that focused upon the impact of revenue loss to the creative industries (European Commission, 2010). International law did not significantly change during the subsequent period, 2008-2010, and the effect of other relevant legal measures like graduated response or blocking webpages (Flint, 2012) are not observed in the sample. Second, our measure of social corruption and tax evasion impacts sales positively and significantly for the full period and the 1999-2004 sub-period. According to Table 3 in the full sample an increase in one unit in the tax evasion index produces an increase in sales per capita of 3.66% (p-value<0.01).

<INSERT FIGURE 2 ABOUT HERE>

This result is consistent with the work of Liebowitz (2016) such that in the period 1999-2004 piracy was a predominant factor to explain revenues, but in subsequent periods other variables such as IPR or digital business models become more relevant. Third, the population density significantly impacts revenue per capita in the 1999-2004 and 2008-2010 sub-periods. Whilst in the period 1999-2004 the effect is negative, in the period 2008-2010 the effect becomes positive. According to Table 3 an increment of 10 inhabitants/Km^2 would produce a change in sales per capita of -9.17% (p-value<0.01) and 20.19% (p-value<0.05) in the piracy and economic crisis periods respectively. Population density is highly correlated with information flows and knowledge spill-over (Audretsch and Belitski, 2013). Therefore, this result suggests that whilst during the piracy period population density was negatively linked to sales due to consumers exchanging technical information on how to share files, population density became a positive factor to stimulate sales when the information exchanged between consumers related to novel legitimate business models, such as music streaming.

5   Conclusions and implications

5.1 Theoretical contributions

The literature discussing Business Models has refined the concept and empirical evidence has largely focussed on case study, financial and economic assessment of new business models within traditional organizational boundaries (Chesbrough and Rosenbloom, 2002). Recent theoretical advances explore in-depth the relationship between business models and technology (Baden-Fuller and Haefliger, 2013). It is argued that technology disruptions are a catalyst for managerial efforts to explore and experiment with new business models, accepting failure as a possible outcome (Chesbrough, 2010; McGrath, 2010). This paper contends that only through business model experimentation can value be captured in dynamic environments. Exploration is not limited to large enterprises, as the case of Xerox in the 1980s demonstrates that large companies are often reluctant to commercialize new technology, which may sit outside boundaries of their traditional organization. That business models experimentation is mostly performed outside of organizational boundaries makes it difficult to empirically assess the relationship with value capture.

The alternative approach is to assume that business model experimentation remains within the boundaries of an industry and that a positive linkage with value capture is observable at this level of analysis. This paper contributes to the business model literature, providing a novel methodological insight that controls for market boundaries through analysis at country level; controls for market dynamism by using data for thirteen years; and proposes a new measure for business model experimentation based on a Herfindahl (1950) calculation.

The results are drawn from the recorded music industry, which provides a highly dynamic market context (Bustinza et al., 2013a; 2013b; Myrthianos et al., 2014) and a testing ground for new mechanisms of capturing value (i.e. Digital rights management, Digital downloads, Streaming-Freemium). Whilst the analysis is based on the music sector, the work is potentially instructive and valuable for other digital industries, particularly related creative industries like book publishing, motion pictures or videogames (Hartley, 2005). These industries are also suffering the negative effects of disruptive innovations linked to market digitalization (Wan et al., 2015), though apparently lagging the music industry (Enkel and Gassmann, 2010).

Analysis of the relationship between business model variety and value capture uses longitudinal data for 32 countries during the period 1998–2010; and based on the previous literature (Liebowitz, 2016; Myrthianos et al., 2014) specifically looks at the sub-periods 1999-2004, 2005-2007 and 2008-2010. The format the music is sold in is taken as a proxy for the business model employed, an assumption validated by industry experts for the period of analysis.

The results show that the diversity of sales format offered in a market has an impact upon revenue. A U-shaped relationship is found between the diversity of music formats available and revenue per capita. The academic implications of this result are twofold. First, it suggests that business model experimentation in dynamic contexts is not cost and risk free, yet can potentially offer significant returns. Second, it provides evidence of the existence of two opposite forces in format implementation. The convenience of a dominant format and its network effect rivals the increasing complexity of consumer needs and subsequent development of new offerings, described in this research as a 'taster' effect.

5.2 Practical implications

The analysis suggests that to capture value from heterogeneous consumers, the music industry should experiment with analogical and digital formats. It should be noted that initial movements from dominant and well-understood formats are not free of economic cost, but revenue will return once either a suitable diversity of offerings to match consumer need develops or a new dominant offering becomes established. The finding is also consistent with the work of Zott et al. (2011) who state that researchers should present business model concepts with much greater clarity if performance is to be better understood. Development of clarity for business models goes beyond the present research since it requires the introduction of consumer data measuring subjective perceptions of business models.

The results suggest that in dynamic contexts both managers and consumers need time to transition. Software companies had a well-established business model based on selling licenses for use and have been moving to a more complex business model selling software as a service (SaaS). Publishers are currently moving from selling books to selling other formats such as e-books (Gilbert, 2015). Motion pictures and music are increasingly sold via sophisticated streaming business models. When technological disruptions appear, time is needed for optimal format or bundles of formats to be found whilst simultaneously consumers learn about and adapt to the offerings. Business model experimentation is not free of economic costs, but trial and error is the only way of establishing what may be successful in dynamic environments (McGrath, 2010).

The results are also valuable for managers of large incumbent companies. In the creative industries new entrants exploit novel business models with decreased dependency on alliances with incumbent distributors (Hracs, 2015) to gain first mover advantage. In this regard one of the

industry experts emphasized "[major] labels tried lots of things around digital innovation but the only ones that cut through were non-label" (Expert 4), so in her experience whilst the large firms were experimenting, the successful outcomes came from new entrants to the market. It is suggested that managers of incumbent firms revisit their organization's business model and consider changes, particularly focussing on opportunities and business models which may lie outside of their traditional firm boundaries and roles (Nicolini, 2009). Moreover, results suggest that information on sophisticated business models flows fast in regions with high population density. Therefore, those regions with high population density tend to provide the best contexts for experimenting with new business models since the outcomes will be visible earlier than in regions with low population density.

6 Limitations and future research avenues

The qualitative evidence collected signals that format is a good proxy for business model experimentation when the format of an offer provides an independent revenue stream. According to three of the experts contacted this happens in the music industry and they agree that format is a useful proxy to use. However, Expert 3, consistent with the work of Koukova et al., (2012), had some doubt and postulates that some music formats have complementary attributes and hence some content might be purchased by a consumer in multiple formats. We do not rule out this possibility and acknowledge this as a limitation. Future research needs to explore in more detail current digital business models, examine potential format complementarities and the propensity and volume of consumers making multiple format purchase of the same item.

The methodological design of this research was developed on the assumption that in highly dynamic contexts the majority of business model experimentation happens beyond the firm boundaries. The assumption is used to justify the use of a country-level unit of analysis. The assumption is validated by three out of four industry experts and reinforced by the use of successful digital business models have been implemented by new entrants (i.e. Apple, Spotify). Arguably this does not explain incumbents that experimented with business models, but whose efforts were not successful. This opens a relevant research avenue to develop a better understanding of market entry decisions and first mover advantage (Fosfuri et al., 2013). Work is required to disentangle the extent to which flexibilities (rigidities)

of new entrants (incumbents) determines the success rate of business model experimentation.

Given the data requirements of the analysis presented research relates to a specific given period (1998 to 2010) and does not contemplate future market dynamics. Analysis suggests that supporting a market where a format centric business model dominates is potentially beneficial. In practice this may mean that discounts may be given for specific formats. However, in discussion with industry experts it was agreed that such market manipulation in a competitive industry is strategically difficult, if not impossible to sustain in the longer term. However, as was previously observed over time a single dominant format may emerge from an innovative business model in perfect consonance with consumer preference e.g. Windows OS on PCs. Future research needs to examine the market conditions that encourage the prevalence of 'network' or 'taster' effects in different contexts.

Future investigations will also use the lens of value co-creation (Parry et al., 2012) to determine how partners and consumers may be better engaged in mutual value creating processes. Business models are drivers of the co-creation process in the music industry and our findings suggest that greater understanding of links between the value proposition, value realisation and worth capture will inform future business model strategy. One approach suggested by Expert 4 was to make use of "the natural experiments that have occurred on Spotify" to examine streaming at scale, as well as other digital business models that are engaging large numbers of music consumers.

References

Aguiar, L. and Martens, B. (2016). 'Digital music consumption on the internet: evidence from clickstream data', *Information Economics and Policy*, Vol. 34, 27-43.

Applebaum, W. (1966). 'Methods for determining store trade areas, market penetration, and potential sales', *Journal of Marketing Research*, Vol. 3(2), 127-141.

Aranguren, M.J., Maza-Aramburu, X., Parrilli, D., Vendrell-Herrero, F. and Wilson, J. (2014). 'Nested methodological approaches for cluster policy evaluation: an application to the Basque country', *Regional Studies*, Vol. 48 (9), 1547-1562.

Audretsch, D.B. and Belitski, M. (2013). 'The missing pillar: the creativity theory of knowledge spillover entrepreneurship', *Small Business Economics*, Vol. 41 (4), 819-836.

Baden-Fuller, C. and Haefliger, S. (2013). 'Business models and technological innovation', *Long Range Planning*, Vol. 46 (6), 419-426.

Bercovitz, J. and Mitchell, W. (2007). 'When is more better? The impact of business scale and scope on long-term business survival, while controlling for profitability', *Strategic Management Journal*, Vol. 28 (1), 61-79.

Bogner, A. and Menz, W. (2009). 'The theory-generating expert interview', in Bogner, A., Littig, B., Menz, W. (Eds.): *Interviewing Experts*, Baskingstoke, pp. 43-80. Palgrave Macmillan.

Bustinza, O.F., Parry, G. and Vendrell-Herrero, F. (2013a). 'Supply and demand chain management orientation: adding services to product offerings', *Supply Chain Management: An International Journal*, Vol. 18 (6), 618-629.

Bustinza, O.F., Vendrell-Herrero, F., Parry, G. and Myrthianos, V. (2013b). 'Music business models and piracy', *Industrial Management & Data Systems*, Vol. 113 (1), 4-22.

Bustinza, O. F., Vendrell-Herrero, F. and Baines, T. (2017). 'Service implementation in manufacturing: An organisational transformation perspective', *International Journal of Production Economics*, Vol. 192, 1–8.

Chesbrough, H.W. and Rosenbloom, R.S. (2002). 'The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies', *Industrial and Corporate Change*, Vol. 11 (3), 529-555.

Chesbrough, H.W. (2010). 'Business model innovation: opportunities and barriers', *Long Range Planning*, Vol. 43 (2), 354-363.

Choi, D.Y. and Perez, A. (2007). 'Online piracy, innovation, and legitimate business models', *Technovation*, Vol. 27 (4), 168-178.

Cruz-González, J., López-Sáez, P., Navas-López, J. E. and Delgado-Verde, M. (2015). 'Open search strategies and firm performance: the different moderating role of technological environmental dynamism', *Technovation*, Vol. 35, 32-45.

DaSilva, C.M. and Trkman, P. (2014). 'Business model: what it is and what it is not', *Long Range Planning*, Vol. 47 (6), 379-389.

Elberse, A. (2010). 'Bye-bye bundles: the unbundling of music in digital channels', *Journal of Marketing*, Vol. 74 (3), 107-123.

Enkel, E. and Gassmann, O. (2010). 'Creative imitation: exploring the case of cross-industry innovation', *R&D Management*, Vol. 40 (3), 256-270.

European Commission (2010). Application of Directive 2004/48/EC of the European Parliament and the Council of 29 April 2004 on the Enforcement of Intellectual Property Rights.

Flint, D. (2012). 'Intellectual property alphabet soup: the battle against Pirate Bay', *Business Law Review*, Vol. 33 (7), 185-187.

Gilbert, R. J. (2015). 'E-books: a tale of digital disruption', *The Journal of Economic Perspectives*, Vol. 29 (3), 165-184.

Hartley, J. (2005). 'Creative Industries', Blackwell, Oxford, UK.

Hausman, J.A. (1978). 'Specification tests in econometrics', *Econometrica: Journal of the Econometric Society*, Vol. 46 (6), 1251-1271.

Herfindahl, O.C. (1950). 'Concentration in the Steel Industry', Columbia University, NY.

Hirschman, A.O. (1964). 'The paternity of an index', *The American Economic Review*, Vol. 54 (5), 761-762.

Hracs B.J. (2015). 'Cultural intermediaries in the digital age: the case of independent musicians and managers in Toronto', *Regional Studies*, Vol. 49 (3), 1-15.

Huff, A. S. (1990). 'Mapping strategic thought', Chichester: John Wiley.

IFPI (2012). 'Digital Music Report 2012: Expanding Choice, Going Global', International Federation of the Phonographic Industry, London.

Kastalli, I. V. and Van Looy, B. (2013). 'Servitization: Disentangling the impact of service business model innovation on manufacturing firm performance', *Journal of Operations Management*, Vol. 31(4), 169-180.

Koukova, N.T., Kannan, P.K. and Kirmani, A. (2012). 'Multiformat digital products: how design attributes interact with usage situations to determine choice', *Journal of Marketing Research*, Vol. 49 (1), 100-114.

Lee, J., Kim, C. and Shin, J. (2017). 'Technology opportunity discovery to R&D planning: Key technological performance analysis', *Technological Forecasting and Social Change*, Vol. 119, 53-63.

Liebowitz, S. J. (2016). 'How much of the decline in sound recording sales is due to file-sharing?', *Journal of Cultural Economics*, Vol. 40(1), 13-28.

Maas, C.J. and Hox, J.J. (2004). 'Robustness issues in multilevel regression analysis', *Statistica Neerlandica*, Vol. 58 (2) 127-137.

Manning, W. G. (1998). 'The logged dependent variable, heteroscedasticity, and the retransformation problem', *Journal of Health Economics*, Vol. 17 (3), 283-295.

Mason, K. and Spring, M. (2011). 'The sites and practices of business models', *Industrial Marketing Management*, Vol. 40 (6), 1032-1041.

McCray, J.P., Gonzalez, J.J. and Darling, J.R. (2011). 'Crisis management in smart phones: the case of Nokia vs Apple', *European Business Review*, Vol. 23 (3), 240-255.

McDonald, E. K., Wilson, H., Martinez, V. and Toosi, A. (2011). 'Assessing value-in-use: a conceptual framework and exploratory study', *Industrial Marketing Management*, Vol. 40 (5), 671-682.

McGrath, R.G. (2010). 'Business models: a discovery driven approach', *Long Range Planning*, Vol. 43 (2), 247-261.

Myrthianos, V., Vendrell-Herrero, F., Parry, G. and Bustinza, O.F. (2014). 'Evaluating firm profitability during the servitization process of the music industry', *Strategic Change*, Vol. 23 (5-6), 317-328.

Nicolini, D. (2009). 'Zooming in and out: studying practices by switching theoretical lenses and trailing connections', *Organization Studies*, Vol. 30 (12), 1391-1418.

Nokelainen, T. and Dedehayir, O. (2015). 'Technological adoption and use after mass market displacement: the case of the LP record', *Technovation*, Vol. 36, 65-76.

Ortin-Angel, P. and Vendrell-Herrero, F. (2014). 'University spin-offs vs. other NTBFs: productivity differences at the outset and evolution', *Technovation*, Vol. 34 (2), 101-112.

Osterwalder, A. and Pigneur, Y. (2010). *'Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers'*, Wiley, NY.

Parry, G., Bustinza, O.F. and Vendrell-Herrero, F. (2012). 'Servitisation and value co-production in the UK music industry: an empirical study of consumer attitudes', *International Journal of Production Economics*, Vol. 135 (1), 320-332.

Parry, G., Pogrebna, G. and Vendrell-Herrero, F. (2018). 'Windowing television content: Lessons for digital business models', *Strategic Change*, Vol. 27:151–160. https://doi.org/10.1002/jsc.2190 [in press].

Petersen, M.A. (2009). 'Estimating standard errors in finance panel data sets: comparing approaches', *Review of Financial Studies*, Vol. 22 (1), 435-480.

Popa, S., Soto-Acosta, P. and Martinez-Conesa, I. (2017). 'Antecedents, moderators, and outcomes of innovation climate and open innovation: An empirical study in SMEs', *Technological Forecasting and Social Change*, Vol. 118, 134-142.

Rabetino, R., Kohtamäki, M. And Gebauer, H. (2017). 'Strategy map of servitization', *International Journal of Production Economics*, Vol. 192, 144-156.

Schneider, S. and Spieth, P. (2013). 'Business model innovation: towards an integrated future research agenda', *International Journal of Innovation Management*, Vol. 17 (1), 1-34.

Stock, J.H. and Watson, M.W. (2008). 'Heteroskedasticity-robust standard errors for fixed effects panel data regression', *Econometrica*, Vol. 76 (3), 155-174.

Suarez, F.F., Cusumano, M.A. and Kahl, S.J. (2013). 'Services and the business models of product firms: an empirical analysis of the software industry', *Management Science*, Vol. 59 (2), 420-435.

Tuli, K.R., Kohli, A.K. and Bharadwaj, S.G. (2007). 'Rethinking customer solutions: from product bundles to relational processes', *Journal of Marketing*, Vol. 71 (3), 1-17.

Velu, C. (2015). 'Business model innovation and third-party alliance on the survival of new firms', *Technovation*, Vol. 35, 1-11.

Vendrell-Herrero, F., Bustinza, O. F., Parry, G. and Georgantzis, N. (2017a). 'Servitization, digitization and supply chain interdependency', *Industrial Marketing Management*, Vol. 60, 69-81.

Vendrell-Herrero, F., Myrthianos, V., Parry, G. and Bustinza, O. F. (2017b). 'Digital dark matter within product service systems', *Competitiveness Review: An International Business Journal*, Vol. 27(1), 62-79.

Vendrell-Herrero, F., Gomes, E., Collinson, S., Parry, G. and Bustinza, O. F. (2018). 'Selling digital services abroad: How do extrinsic attributes influence foreign consumers' purchase intentions?', *International Business Review*, Vol. 27(1), 173-185.

Wan, F., Williamson, P.J. and Yin, E. (2015). 'Antecedents and implications of disruptive innovation: Evidence from China', *Technovation*, Vol. 39, 94-104.

Zott, C. and Amit, R. (2008). 'The fit between product market strategy and business model: implications for firm performance', *Strategic Management Journal*, Vol. 29 (1), 1-26.

Zott, C., Amit, R. and Massa, L. (2011). 'The business model: recent developments and future research', *Journal of Management*, Vol. 37 (4), 1019-1042.

Tables:

Table 1. Descriptive statistics dependent and independent variable

	Sales Per capita (US$)	Format Density Herfindahl Index
Average	15.01	6.51

St. Dev.	12.40	1.60
Min	0.05 (China, 2005)	1.61 (China, 2010)
Quartile 25%	2.66	5.53
Quartile 50%	14.99	6.51
Quartile 75%	24.31	7.66
Max	48.93 (Japan, 1998)	9.99 (Brazil, 1999)
Growth rate	-5.06%***	-2.49%***

Level of statistical significance of the Growth rate: *** 1%, ** 5%, * 10%
(Country fixed effects estimation).

Table 2. Descriptive statistics control variables

Category	Variable	Measure	Mean	Standard Deviation
On wealth & agglomeration	Nominal GDP per capita	US$	25,274	18,197
	Population density	hab/(Km^2*1000)	0.119	0.107
On regulation & Culture	IPR Protection	IMD Index (from 0, no protection; to 10, full protection)	6.54	1.88

Control of tax evasion	IMD Index (from 0, no control of tax evasion; to 10, full control of tax evasion)	4.59	1.69
On market conditions	IFPI Average price CD	US$	8.92	3.49
	World Bank Internet users	Internet users per 100 inhabitants	41.21	27.40

Table 3. OLS with Fixed effects analysing a linear relation between business model innovation and revenues

		Techno-Social Disruptions		
	Full sample	**Piracy**	**Digital**	**Economic**
Dependent variable: LN [(SALES/Population) $_t$]	**1998-2010**	**1999-2004**	**2005-2007**	**2008-2010**
Business Model Innovation Variable				
Format Density	-0.006	-0.025*	0.002	0.156
	(0.009)	(0.014)	(0.032)	(0.024)
Control Variables				
LN [(SALES/Population) $_{t-1}$]	0.772***	0.687***	0.264	0.370**
	(0.032)	(0.084)	(0.201)	(0.146)

LN (GDP capita)	-0.051	-0.171	0.319	0.111
	(0.051)	(0.105)	(0.298)	(0.160)
Population density	2.115	-9.620***	6.195	18.39**
	(1.873)	(2.892)	(11.85)	(7.083)
IPR protection	0.014	-0.018	0.066*	-0.022
	(0.011)	(0.020)	(0.040)	(0.031)
Control of tax evasion	0.036***	0.069***	-0.008	0.021
	(0.010)	(0.022)	(0.015)	(0.018)
Average Price CD	0.006	0.008	0.011	-0.014
	(0.008)	(0.011)	(0.019)	(0.021)
Internet per 100 inhabitants	0.008	-0.212	-0.333	-0.054
	(0.102)	(0.153)	(0.303)	(0.366)
Constant	0.285	3.351***	-2.828	-2.307*
	(0.628)	(0.989)	(2.360)	(1.352)
R-squared within	0.878	0.694	0.485	0.647
Observations	414	192	96	94
Countries	32	32	32	32

Level of statistical significance: *** 1%, ** 5%, * 10%
OLS regression with firm's and year's fixed effects, and clustered-Robust Standard errors
(reported within parentheses).

Table 4. OLS Fixed effects analysing a quadratic relation between business model innovation and revenues

		Techno-Social Disruptions		
	Full sample	**Piracy**	**Digital**	**Economic**
Dependent variable: LN [(SALES/Population) $_t$]	**1998-2010**	**1999-2004**	**2005-2007**	**2008-2010**
Business Model Innovation Variable				
Format Density	-0.089**	-0.312***	-0.300***	0.125
	(0.040)	(0.085)	(0.093)	(0.099)
Format Density Squared	0.006**	0.020***	0.026***	-0.011
	(0.003)	(0.006)	(0.008)	(0.010)
Control Variables				
LN [(SALES/Population) $_{t-1}$]	0.772***	0.666***	0.319*	0.360**

	(0.030)	(0.067)	(0.189)	(0.154)
LN(GDP capita)	-0.081*	-0.180*	0.028	0.169
	(0.046)	(0.099)	(0.294)	(0.162)
Population density	0.887	-13.63***	-5.611	16.73**
	(1.878)	(2.950)	(11.81)	(7.159)
IPR protection	0.011	-0.026	0.058*	-0.017
	(0.012)	(0.021)	(0.035)	(0.029)
Control of tax evasion	0.037***	0.065***	-0.015	0.020
	(0.010)	(0.020)	(0.012)	(0.019)
Average Price CD	0.004	0.008	-0.001	-0.012
	(0.008)	(0.011)	(0.017)	(0.020)
Internet per 100 inhabitants	0.035	-0.230	-0.267	-0.113
	(0.102)	(0.147)	(0.301)	(0.352)
Constant	0.977	5.082***	2.269	-2.931**
	(0.667)	(1.011)	(2.522)	(1.356)
R-squared within	0.881	0.718	0.578	0.655
Observations	414	192	96	94
Countries	32	32	32	32

Level of statistical significance: *** 1%, ** 5%, * 10%
OLS regression with firms and year's fixed effects, and clustered-Robust Standard errors (reported within parentheses).
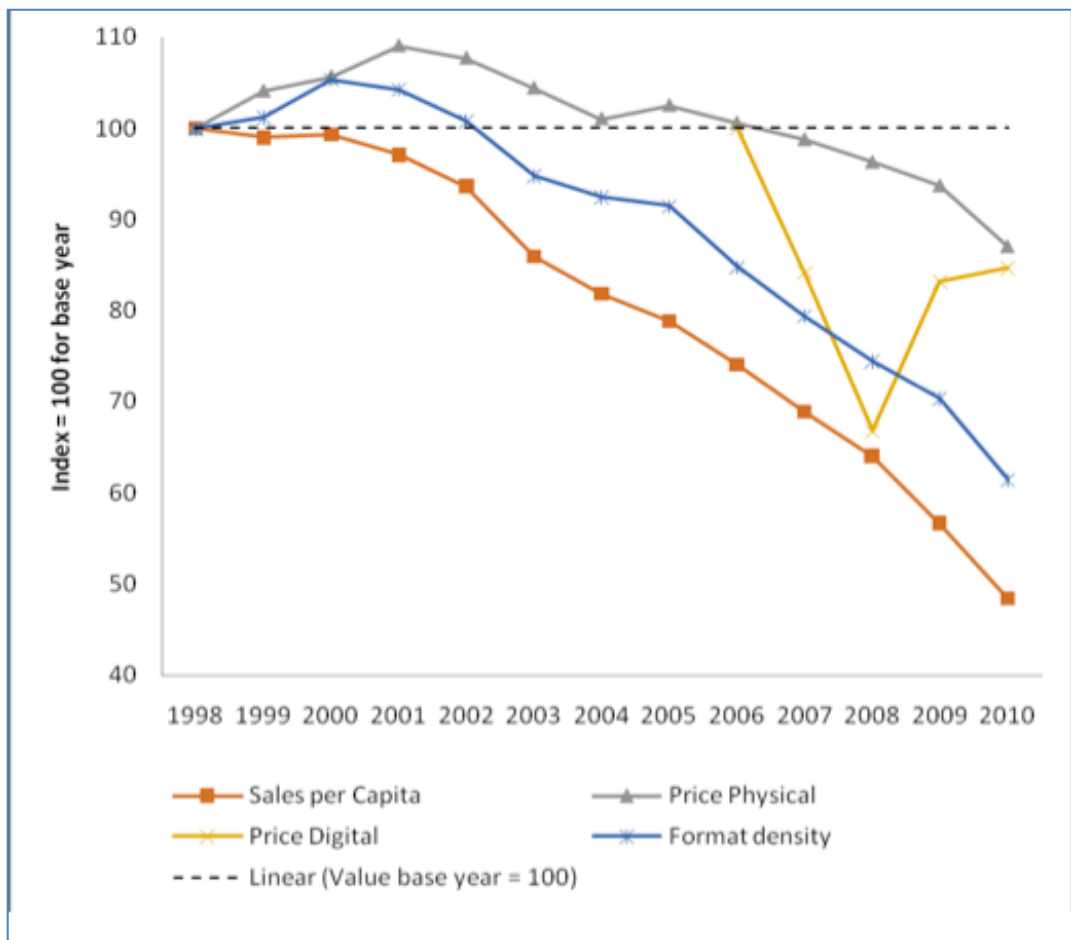
Figures:

Figure 1. The Figure shows the evolution of sales per capita, physical price (CD), Digital price (Digital Album) and Format Density. Values indexed to 100 for the base year. The base year is 1998 with the exception of digital price data, available only from 2006 onwards.
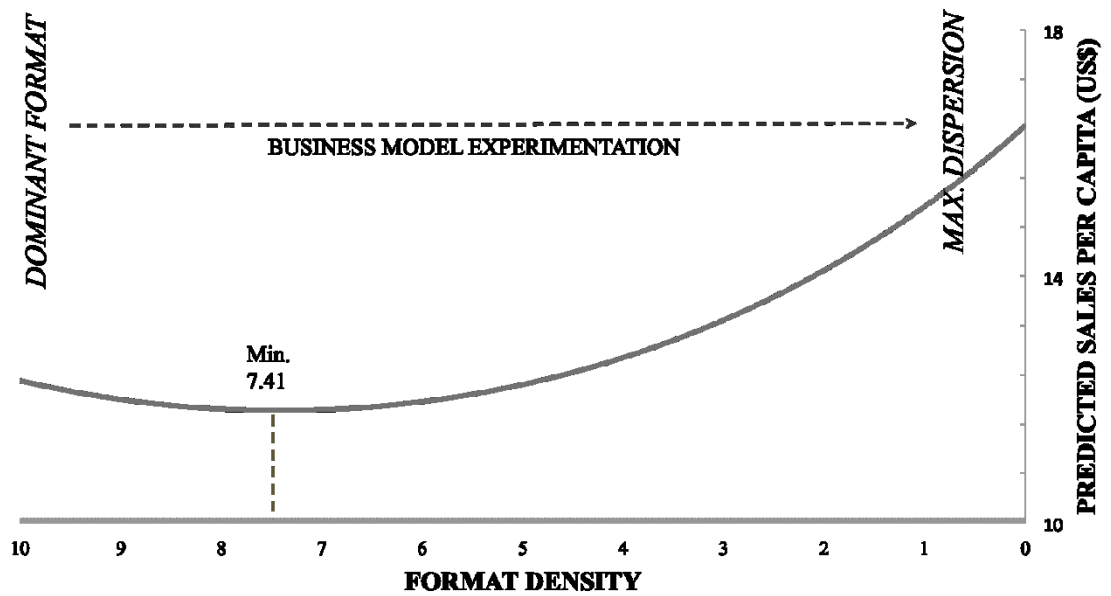
Figure 2. The Figure shows the estimated relationship between format density index and Sales per capita. Initial movement from format-centric business models to a larger scope of formats generates a reduction of revenues. When the Format Density equals to 7.41 a minimum of sales is reached. After this point *H1* is supported and more business model experimentation generates larger revenues.