An attempt to unified approach to the evolution of products in the entertainment industry

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Abstract

Aim. We analyze temporal dynamics of entertainment industry including literature, music, films and video games, introducing possible analogies between them. We provide a framework for further explanation based on the economic concepts as revenue, organization structure and marketing goals in these creative industries for different technological eras.

Methods. Initially, accurate data collected for time series of weekly record sales are analyzed from statistical point of view (e.g. networks of artists, record labels and producers). This method may be extended to other parts of entertainment industry in search of analogies, under the influence of technological revolutions.

Results. We provide the statistical properties of the mass art entertainment industry (including value of the markets, seasonality, products life-cycles) and interactions between various kinds of entertainment (e.g. films might be influenced by literature with a delay). We are able to distinguish predigital, digital and postdigital eras.

Conclusions. There are many ways of describing and measuring the impact of selected entertainment industries with the most important as literature, music, films and video games. However, universal analogies may explain objective properties of entertainment industry in general.

Key words: Entertainment industry, phonographic market, motion picture industry, video games, books market, social network analysis.

Introduction and motivation

The entertainment industry has been devoted to human basic needs since ancient times. The Nine Muses of Greek Mythology have given an inspiration to artists, philosophers and individuals for creation. This culture has accompanied humans on their journeys through life. The people themselves have created cultural trends and established businesses to satisfy the demand for culture and influencing the economy. Therefore, cultural products have acted as a means for giving a cultural voice to people – consumers (Cebula, 2013).

In the present paper we discuss four branches of entertainment industry: books or literature, films or motion pictures, songs and video games. In the digital era, computational and statistical methods dedicated to digital traces of human participation in culture (e.g. Big Data) via so called distant reading (Moretti, 2013; Jarynowski, Buda, Paradowski, 2019), are becoming more and more popular. The whole field of digital humanities has emerged (Eder et al., 2013; Michel et al., 2011). Based on empirical data, we present several use cases of statistical and quantitative analysis of the historical data from the above mentioned entertainment fields. In particular we demonstrate similarities in the evolution of those fields.

In the XVth century *literature* experienced a dramatic upsurge due to invention of earlier printing methods by Gutenberg resulting in the Bible becoming the best-selling item of all time. The biggest element of the global entertainment industry belongs to books (value estimated ~143 billion US dollars (Publishing Standards, 2017)), because books are still able to involve formal education at school or after school in adult life. Even the emergence of innovations by Thomas Edison and Lumiere brothers in phonographic and motion picture industry of XIXth century or videogames in XXth century did not change it. There was a rise of novels between 18th and 20th century (Moretti, 2013) - first in Europe and later in Africa.

The domination of books has been developed traditionally in the past, and is still unscathed, despite the Internet era. However, the number of novels in each country increased in different periods. The stability of domination in books sales is often based on book series (e.g. Harry Potter or The Lord Of The Rings, etc.) that may serve as inspiration for directors creating movies. Remakes are an important part of the US motion picture industry (StephenFollows, 2018).

The *motion picture industry*is worth at least 43 billion US dollars according to the latest annual reports (Lpesports, 2018). However, in the Internet era, the contribution of remakes (including prequels, sequels, etc. (Loocks, &Verevis, 2012)) in the total number of movies decreased (StephenFollows, 2018)over the last 120 years of Hollywood. A movie or book series are the main products traded on these markets with their own fan base.

On the other hand, in the *music industry*, artists could be considered as a product traded in the phonographic market because they all signed contracts with record companies. Their subsequent albums may be compared to remakes in the motion picture industry and books or video games series (Fig.1).

In the music industry, the role of film director or book author may be played by record producers who initially were only sound engineers . However, digi-

tal technologies had an impact on the art of sound creation and even deceased artists are able to "record" new music or put their holograms on well-paid live tours. Therefore, record producers are as important as directors in the film industry or authors for books. In the book industry, direct communication perspective between author via narratives (Moretti, 2011) and reader (Jarynowski, Boland, 2013) is very important, so the role of editor is the smallest in all the creative industries

Product Life-cycle

Relationship between agents in creative industry can be described by Actor--Network Theory (Latour, 2005). The creative market could be represented as a set of players (artists) managed by their companies - labels/studios/publishers, who sell products to customers. Sizes of the markets are limited, and the creative items are characterised as luxury goods in an economic sense. Companies and their artists are supposed to establish the optimal selling strategy. They can control many factors like release date, strength of promotion and item quality. From the economical point of view, we define an artist, film series (even in a single movie a bunch of people are involved as actors directors, producers, writers, composers), book series and game series as a product.Empirical observations (Fig. 1) show that album sales of an artist (product) reach maximum exactly in the first week

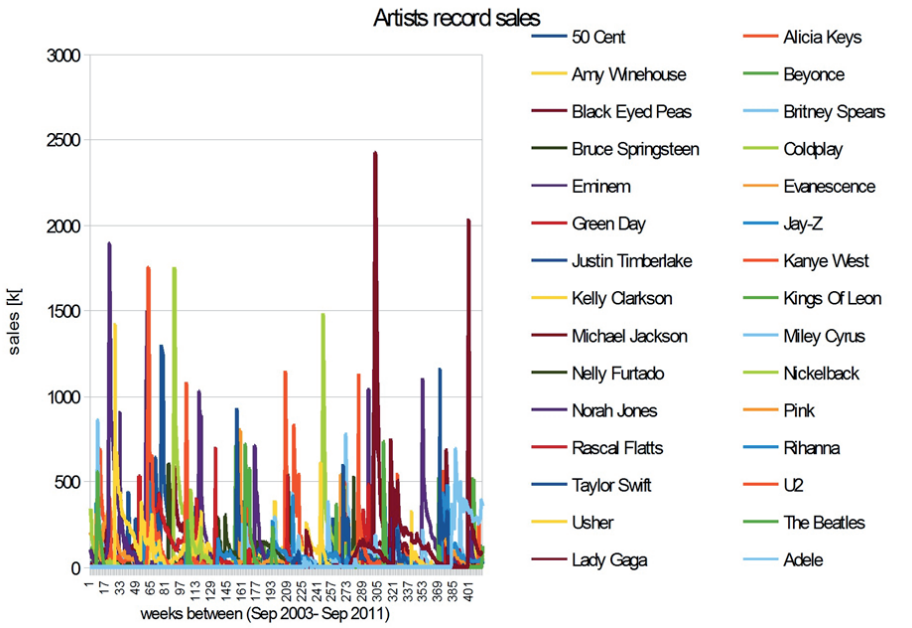

Fig. 1. Product life-cycles for the 30 most popular artists (2003-2011).
Source: Own graph based on IFPI reports as (IFPI, 2019).

of the new item (album) release. Companies often set album release dates (tuning inter-event times and exact release date) according to potential high sales, which is defined as an area under the sale curve (Fig. 1). Of course, companies are going to counteract this decrease by promotional events (in music industry singles can be released, in books authors readings are useful, etc.).

We observe symbiotic interactions between various creative industries, mainly around books (as e.g. Harry Potter movie/book (Nilsen Company, 2010) - interfered life cycle of book sales together with film released and Witcher book/game (Fig. 2)).

Fig. 2. Google Tends of Polish book/game: Witcher (Wiedźmin).
Source: Own graph based on Google Trends.

Creative industry revenues

Artists get their salary depending on the signed contract and companies (publisher/studio/label) make business on them. Success of the creative product can be measured in many ways such as critics opinion, chart position, popularity in media, etc. Monetary outcome is prioritised in this article, due to its quantitative character (even it is biased as overrepresenting high-income populations). E.g. the evolution of revenues of three creative industries (Movies, Games, and Music) was analysed in Ref. (Lpesports, 2018) and a trigger point was revealed (around 2005), when Games revenues exceeded Music and Movies revenues.

The value of video games industry – estimated to be $109 billion – consists of mobile gaming – $46 billion, smartphone games – $35 billion, tablet games – $11 billion, console gaming – $33billion, digital content – $22 billion, physical sales – $11 billion and PC gaming – $29 billion. Despite these new technologies, the book market (including e-books) is still the biggest one - $143 billion (Publishing

Standards, 2017) and music industry - $30 billion (including $15 billion because of physical records) and motion picture industry - $98 billion (including $27 billion from the global Box Office, DVDs & blue rays - $41 billion and TV copyrights - $17billion) seem to be outnumbered. In the music industry streaming revenue is 47% of global total and yearly growth in paid streaming revenues: +33% (IPFI, 2019). According to annual reports, the largest gaming markets of 2017 were in China – $36 billion, United States – $25 billion, Japan – 201 billion, and European Union – $20 billion (Vgames, 2018). On the contrary, the US and European markets dominate in music industry. According to the IFPI more than 90% of the total revenue of music in 2018 was derived from the 30 major countries with dominance of USA, Japan and UK and almost negligible position of China (IFPI, 2019). Books sales major markets are similar to music (dominating countries are still USA and Europe (Statista, 2019a)). However, cinema tickets sales major markets (China is just behind USA) are more similar to video games (Statista, 2019b).

Eras

In history culture evolved over time (Michel et al., 2011). New genres come to life, merge, and die. Fashion trends are dynamic (Lorenz-Spreen et al., 2018; Cebula, 2013). Device and technology drive revolutional transition in culture (Buda, Jarynowski, 2015b;Jara-Figueroa et al., 2019: Hidalgo, 2015).

These four industries could be divided in general into three Eras due to technological changes (with the influence of new technologies by Industrial Revolutions):

- *pre digital* with a dominant role of broadcasting technology and physical supply chain of device (Adorno, 1999);
- *digital* with digital mean of devices (Third Industrial Revolution) and shortened transporting time (Schneider et al., 2013);
- *post digital* with streaming technologies and on demand content (Fourth Industrial Revolution) – consumer emancipation via choice.

In detail the following chronology:

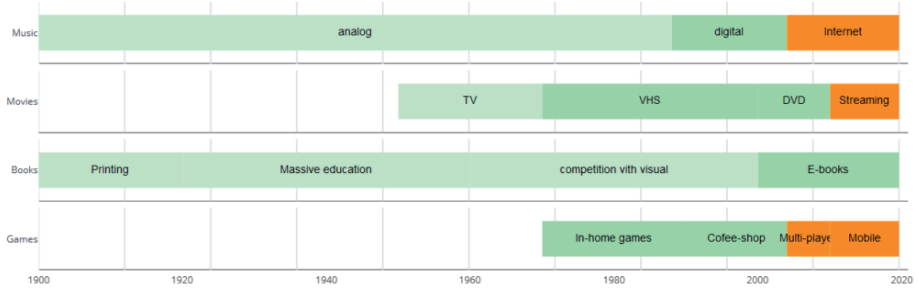

Fig. 3. Characteristic subjective Eras in the four creative industries from the XXth century (light green- predigital, dark green - digital, orange - postdigital).
Source: own graph.

Consumption of creative goods

In entertainment/culture consumption models, we need to consider individualistic consumption (more specific) and tribal consumption (more fashion driven) (Castells, 2011; Cebula, 2013). In post digital era, attendance at cinema or a concert – social events – are declining, while consumption of video games and streaming on device (individual actions) is increasing.

Digitalisation of devices and Internet sharing of resources gave an opportunity for piracy which unequally impacted selling distributions in different countries and given products. Current technologies of creative companies as cloud storage (e.g. Amazon kindle), streaming technologies (e.g. Netflix), or external license management (e.g. Google Play) decreases the piracy size. Let us consider China . This country is leading in terms of videogames sales (with ~30% of global share (Vgames, 2018)) and second in books (~10% (Statista, 2019a)) and movies (~15% (Statista, 2019b)) markets. However, China almost does not exist on the phonographic market (less than 1% of global share (IFPI, 2019)). Cultural difference cannot explain such a difference, the music industry is the most vulnerable for piracy.

Historical time series are similar to standard life-cycle (Rogers, 1962) due to gaining popularity via information diffusion by physical devices (Buda, Jarynowski, 2015b). Current time series of album sales in music (as well as in other creative industries) differ from a classic product life-cycle (Stark, 2004) because album sales usually reach their maximum in the first week after premieres (Fig. 1). There are, moreover, symptoms of sales increase one week before the peak detectable, because of pre-orders in the Internet era (the same effect can be seen for Harry Potter movie/book(Nielson Company, 2010)). From the marketing (Thomas, 2006) point of view (Fig. 1), on the Internet era (2003-2013), the global phonographic market is over-represented by innovators, early adopters and early majority (Rogers, 1962). Other participants (including customers that are laggards or late majority) are not entirely affected (their seasonal impact may be explained well by stochastic models (Jarynowski, Buda, 2013)). Moreover, an observed seasonality of items sale (increase of album releases late autumn and early winter) is universal (also in DVD sales (Inceoglu, Park, 2011), in book sales (E-book comments, 2010), (Fig. 4) (Christmas "madness"). Monthly global video games sales between 2013 and 2018 is increasing with similar seasonal patterns (CNB, 2019). It means that "customers wallets"-approach is crucial to understand that phenomena (after Christmas and New Year Eve people might have less money for such a luxurious item as a creative items).

Interevent time is defined as a time between the release of a new item (it could be a new record of an artist, new book in series etc.). In general it is increasing with time. We have analyzed 30 most popular artists album sales trajectories that depend on intervals between consecutive albums premieres (Fig. 5) and found out 2 characteristic time intervals: 1 and 2 years.

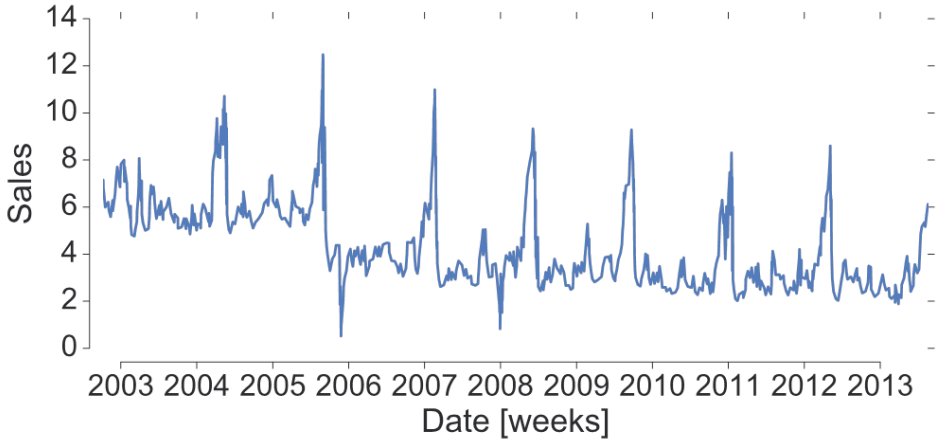

Fig. 4. Weekly global albums sales [millions of copies] between 2003 and 2013 for the 30 most popular artists defined in (Jarynowski, Buda, 2013) and Fig. 1.
Source: Own graph based on data from IFPI reports as (IFPI, 2019).

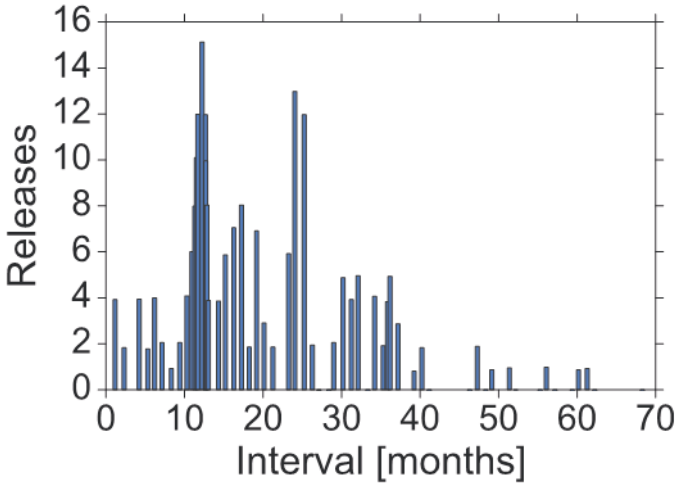

Fig. 5. The distribution of intervals (in months) between consecutive albums premieres obtained for the 30 most popular artists defined in (Jarynowski, Buda, 2013) and Fig. 1.
Source: Own graph based on data from IFPI reports as (IFPI, 2019).

Analogies between books, movies, music and video games creative markets

We could define the following similarities or common properties between the four creative industries:

- Creative market as a predictable system – in complexity and in particular for a record/movie/book/game;
- Creative industry might be considered as a programmable system – agents as labels, studios, editors optimalise profits;
- Even unpredictable popularity spread by the Internet does not break the equillibrium (Jarynowski, Buda, 2013) on the market (for example virals as "Gangman style" in music or "Farmville" in games);
- The system might be unstable in case of artists death only for music and book industry (as Michel Jackson case (Fig. 1));
- There is a strong seasonality, there are fans that buy records/DVDs/books/games every month and occasional clients who buy items just before Christmas (Fig. 4);
- There is a decreasing trend in selling physical devices of record/movie/book/game which characterise the creative markets all over the world and an increasing trend in streaming or digital copies (itunes, lastFM, Netflix, Kindle store, google play, etc.);
- The trajectory of items sales has a peak on the release day and decreases exponentially -like (Fig. 1) with some additional peaks caused by promotion including tours, author meetings, competitions etc.;
- In the past, the peak of item sales has appeared a few weeks after the release, and sales have decreased slowly, but currently the peaks of item sales appear in the first week after the release (Buda, Jarynowski, 2015a);
- Success of a product/company in creative industries is characterised by similar trajectories (NetworkDataScience, 2017) according to datasets asIMDb, Goodreads and LastFM. Moreover,luck seems to play a more important role in books and music than movie industry (NetworkDataScience, 2019);
- Popularity spreads both via cultural and geographical paths (Jarynowski, Buda, 2016).

Fig. 6. The network of the 30 most popular artists according to labels (evolution, importance) edges defined by belonging to the same label according to consecutive albums between 2003 and 2019.

Source: Graph done by Vitaly Belik based on data from IFPI reports as (IFPI, 2019).

These predictable results obtained for music industry might be extended to other creative industries. The internet era has forced some participants of the market to integrate with others or be eliminated for good when small labels/studios become a part of major labels. Moreover, music and the motion picture industry have the same participants (Universal, Warner, Columbia, etc.). Therefore, since the beginning of the 21th century, the number of major labels has decreased to these three. On the contrary, the value of video games market increases year by year since the early '80s.

Table 1.

Analogies between the four main parts of the global entertainment industry according Economy notation (Buda, Jarynowski, 2010).

Entity	***Books (B)***	***Films (F)***	***Music (M)***	***Video games (V)***
Economic product	series	remakes	artists (Fig.6)	series
Economic company	author	director	producer	producer
Economic distributor	publisher	studio	label	studio
Product life-time: predigital	very many publishers	many studios	2 years interevent	few studios
agents: predigital			many labels	
Product life-time: digital	many publishers	few studios	1 year interevent	many studios
Agents: digital			many labs	
Product life-time: postdigital	very many pubs (self-publishing)	few studios	1.5 year interevent	few studios
Agents: postdigital			few labels	
Inference- predigital	F	B	B	B
Inference- postdigital	V	V	V	B

Source: Own table.

On the other hand, according to annual reports, books are still the greatest and the most valuable part of the entertainment industry. Books Style (the linguistic structure constructed to reflect word co-occurrence, semantic similarity, grammatical relationships) evolve with time, so books written in different eras can distinguished (Staniszet al., 2019).Production technologies are also involving with as music instruments used (Percino et al., 2014). Consumers habits and taste is also changing (Pabjan, 2010) and some genres are more popular in given time (Buda, 2010). On the Internet era, the number of book publishers increases, but the number of distributors decreases. Number of record labels remains constant, but number of distributors decreases. In Post-Digital Age small companies (labels) are forced to merge or look for non-record related new sources of revenue (Galuszka, & Wyrzykowska, 2016).

Multimodality/Inferences of industries (Fig. 7, 8) is a common schema in Internet Era (maybe a new form of synesthesia).

Fig. 7. Harry Potter: Book series - Movies series – Videogame series.
Source: Own collage.

Fig. 8. The Witcher. Book series – Videogame series - Movies series – Soundtrack series.
Source: Own collage.

Summary

Such analogies within the most profitable 4 parts of the global entertainment industry may define networks of entities (Tab. 1) represented in a universal way and detect the importance of the technological eras in the evolution from historical and economic point of view. In our contribution, we present the results of quantitative analysis for music records and several results or analogies with other parts of entertainment industry. Such quantitative and distance reading approaches promise to provide deep insights into dynamics of entertainment industry and even to develop predictive models for e.g. revenues. All of these 4 industries changed their characteristics due to Internet (Tab. 1; Fig. 3).

Moreover, all these entertainment industries may interact with each other because of overlapping fanbase. For example, Lara Croft is the most successful human videogame character according to the Guinness Book of Records because she has extended her "activity"from Tomb Raider videogame series to comics, novels, television, films and soundtracks albums (featuring famous names like Graeme Revell or Alan Silvestri). On the other hand, The Lord Of The Rings and Harry Potter series, with their origin in books, have become interactive and universal too. Star Wars movies have inspired a lot of people to fill the gaps between consecutive series by creating books and videogames that have been later authorised by George Lucas. Even the Beatles fans may have occasion to participate in creating new versions of classic songs because of XBOX or jam together with other musicians online. There are examples of interference among all four creative markets. The Witcher (originally Polish book series) has gathered international attention in Books, Video Games and recently in the Movie Industry. However, The Witcher music records gather attention only in Poland (golden record in 2002). Despite blurred boundaries, the economy behind all the main branches of the entertainment industry remains invariant. Therefore, analogies between main branches of entertainment industry may be detected and unified as multilayer network elements (cultural dynamics, globalisation, commodity market, etc.).

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