Critical Success Factors of Online Music Streaming Services - A Case Study of Applying the Fuzzy Cognitive Maps Method

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Abstract:
The business model of online music streaming allows customers to listen to music on their preferred devices without owning any digital music files. The aim of this paper is to examine which are the Critical Success Factors (CSFs) of online music streaming services, what are the relationships between them and at what level the CSFs influence the business overall success. To achieve this aim, a case-study was applied that utilized the Fuzzy Cognitive Maps (FCMs) method. FCMs offer a soft computing tool capable of capturing human knowledge and behaviour of complex problems in uncertain environments. As a case-study to apply the FCM method, we selected Bandcamp, a music streaming service that allows users to stream full music albums for free and purchase music in digital/physical format right from the artist's web page. Bandcamp puts a different spin on the streaming music business model. It is an online music store, a streaming service and an artist promotion platform, all at the same time. The research findings suggest that the core CSFs of online music streaming are free music streaming, the ability to purchase digital and physical format music, the lack of advertisements and the satisfaction of supporting one's favourite artists.
Keywords: Online Music Streaming, Digital Music, Critical Success Factors, Fuzzy Cognitive Maps

1. INTRODUCTION

In the context of the recent digital developments, a new business model has risen in the music industry, called streaming. Music streaming essentially allows customers to listen to music on their preferred devices (PCs, iPods, smartphones, etc.) without owning a digital music file or a physical format. The music files are stored by the streaming provider on a server and they are provided to the customer on demand, when he/she logs in on a website or mobile app. There are usually several subscription/payment methods available to customers, either monthly paid subscriptions or free, ad-supported plans. A quick glance at several popular online music streaming services like Spotify, Deezer or MOG makes it obvious that the differences between them are rather small and mostly pertain to the number of available songs and the extra features offered by each service. As such, choosing one service over another is a matter of preference, brand awareness and geographical availability, and less a matter of price, since these services offer very similar pricing plans.

Bandcamp (www.bandcamp.com) is a music streaming service that puts a different spin on the streaming music business model. It is an online music store, a music streaming service and an artist promotion platform, all at the same time. It is looking to give independent and underground artists a place where they can showcase and sell their music and merchandise to their fans. Bandcamp offers each artist/band a customizable micro-website where they can host and sell their music. Regular users can listen to the albums for free and purchase them. Unlike other streaming services, Bandcamp allows artists to set their own pricing, whether it's a fixed price, pay-what-you-want or even for free. Bandcamp's business model (Bandcamp, 2010) is funded through a 15% cut off each purchase made on the website. The cut is lowered to 10% for artists who manage to sell at least $5,000 worth of music. By providing a simple, hassle-free, effective and good looking platform,

Bandcamp has managed to attract thousands of independent or underground artists who sell their own music, as well as established labels which offer their entire catalogues for purchase.

By comparing the business model of Bandcamp to other music streaming services it becomes apparent that there are some key differences between them. First, Bandcamp doesn't charge anything for streaming music, so users can listen to as much music as they want. Secondly, users have the option to purchase and download tracks, or even purchase CDs and merchandise, straight from the artist's Bandcamp page, something that isn't possible with other services, which work with partner stores in order to give their customers the option to purchase the music. The third most important difference is that Bandcamp caters more to underground or lesser known artists, as opposed to services like Spotify or Deezer, whose track catalogues contain many albums from world famous "mainstream" musicians. By considering these differences, Bandcamp can be seen as a rather unique business model on the digital music market, choosing to be an artist-driven online music store featuring free and unlimited music streaming.

Online music streaming services have risen in popularity and success in recent years, with more and more record labels and musicians recognizing their usefulness and importance in selling and promoting music. This type of business represents an exciting development mainly for upcoming artists, who have an easy, intuitive and working solution to what until recently was a major problem: how to get the music to the fans as easily as possible? The reverse of this problem was also present for customers: how to buy the music of an artist directly, without being hindered by intermediaries, whether they are online stores or physical record stores, thereby financially supporting the artist as much as possible? The paradigm of online music stores such as Bandcamp provides a way for artists and fans to connect directly, setting the stage for a relationship that brings mutual benefits to everyone: musicians, music fans, music journalists and critics. A reason for this research study is that the academic literature isn't very abundant in research papers concerning such services. Some studies have been done regarding the aforementioned iTunes (Gasser, 2004) and Spotify (Kreitz and Neimela, 2010). However, to the best of the authors' knowledge, no research regarding contemporary streaming music business models (such the one of Bandcamp) has been undertaken so far, representing a gap in academic knowledge that this study attempts to partially fill and perhaps spark further research.

Thus, the main research objective of this study is to determine the factors that contribute to Bandcamp's success (the so called Critical Success Factors-CSFs), how they relate and connect with each other and how their interaction has the potential to affect the overall business success. Accordingly, this paper assesses the impact of CSFs on the business success of the case company using the Fuzzy Cognitive Maps (FCMs) method applied to a panel of experts (Kosko, 1986; Papageorgiou and Salmeron, 2013). FCM is a soft computing tool that maps a system into a form that corresponds closely to the way humans perceive it. A FCM can be particularly useful to identify and analyze the relationships between CSFs of a given system (Rodriguez-Repriso et al., 2007).

2. BACKGROUND

Being a relatively new field, the literature on online music streaming isn't very abundant and there have been no studies concerned with services which follow a business model such as the one of Bandcamp. Still, some very insightful research has been done on the subject of online music streaming. Representative studies relevant to this research were performed by Chiang and Assane (2009), Regner and Barria (2009), and Aguiar and Martens (2013). These studies have revealed that music is an important form of entertainment for young people and that they would be interested in paying for an unlimited, all-you-can-listen music streaming service, that legal streaming services have no impact on CD sales, but have a positive effect on legal digital music purchases and live concert attendances, that willingness to pay for digital music is influenced by personal income and perceptions of risk, but also by ethical considerations and that lowering music sampling costs will drive up digital music purchases, because the total cost of evaluation and acquisition for customers

will be lower. Thus, both artists and their fans stand to gain from the emergence of legal music streaming services.

In the current research, we adopt the concept of Critical Success Factors (CSFs). The concept of CSFs first appeared in Rockart (1979) and was further developed by Bullen and Rockart (1981). For this study, the CSFs of Bandcamp have been identified and linked with one another through the model of FCMs. The FCM method has been used to determine and evaluate opinions, thoughts and attitudes about various issues (ranging from banking to environmental management) in the academic literature, by researchers such as Bueno and Salmeron (2008), Nasserzadeh et al. (2008), Papageorgiou and Kontogianni (2011) and Salmeron and Lopez (2012). FCMs provide a number of advantages to the present research. A FCM takes into account the uncertainty of situations through the use of fuzzy logic and numbers. It is an additive method and allows the FCMs generated by each expert to be combined together. This serves to aggregate the opinions of the experts in order to reduce conflicting results and relationships and increase the FCM's relevance. Moreover, further elements can be subsequently added to the FCMs and their effects are easy to see and take into account, allowing researchers to identify the most important or relevant cause-factors which affect other variables in a given system.

Several methods of assessing the CSFs are available, apart from FCMs, like Critical Success Chains (CSCs), the Analytic Hierarchy Process (AHP) and the Decision Making Trial and Evaluation Laboratory method (DEMATEL). According to Rodriguez-Repiso et al. (2007), who reviewed and compared the CSCs, AHP and FCMs, "CSCs considers the important relationships between attributes, CSFs and organization goals" and it focuses on the needs of the users, helping to determine why they prefer certain features of a system. AHP is a decision making method which aims to determine and rank how important certain CSFs are for users. Even though AHP usually produces better and more consistent results than other methods, inconsistencies in the answers of respondents when dealing with a large number of CSFs may lead to difficulty computing the importance of each CSF (Rodriguez-Repiso et al., 2007). In the same review paper, the main advantages of FCMs were identified to be the following: they allow for consensus to be achieved between experts, the information is presented in a much richer and clearer way than through tables, their flexibility, the fact that they allow planners to focus on the most important success factors and to run simulated scenarios in order to enhance their decision-making process. As for the limitations of FCMs, the authors argue that the higher the number of factors considered and the larger the panel of experts used, the more complex data analysis is, but the results are also more accurate. The DEMATEL method is another suitable way of studying CSFs and emphasizes on computing the values of their relationships between factors in an analogous way with FCMs. However, DEMATEL is tedious and time-consuming and it requires that interviews with the subjects be taken face-to-face, something which wasn't possible for the current research (Tan et al., 2012).

3. RESEARCH METHODOLOGY

The FCM method depends on the quality of the panel of experts. For optimum results, the experts should possess profound knowledge of the domain or subject matter and the expert panel should be a heterogeneous group, composed of people with similar knowledge, but different social or professional backgrounds (Salmeron and Lopez, 2012). Thus, the main criterion for selecting the experts for this research was in-depth knowledge of Bandcamp's features and functionality, as well as experience in using the website. It was thought advisable to select experts who are also involved in the music scene in some way. As such, the panel consists of five experts: independent musicians who promote and sell their music on Bandcamp, as well as avid music fans who use Bandcamp regularly. Most of the experts are in their twenties and live in Romania, the UK, the US and France. Due to the fact that the literature on online music streaming services isn't very abundant, the identification of the CSFs of Bandcamp was done through a combination of reviewing the existing literature for various concepts or features relating to online music streaming and consulting with the experts. A total of twelve CSFs were identified: Free music streaming (FMS), Ability to purchase music in digital format (PDF), Ability to purchase music in physical format (PFF), Ability to

showcase music collection (SMC), Sample before you buy (SBB), Comfort and Convenience (CC), Bandcamp Mobile Application (APP), No advertisements (NOA), Satisfaction of directly supporting the artists (SSA), Ease of use (EOU), Security of payment (SOP) and Constant updates and new features (CU).

Having obtained the CSFs list, a FCM was built by each expert in the panel (Figure 1), who relied on personal experience and in-depth knowledge of the subject matter in order to indicate nodes and the relationships between them, as well as the direction and strength of these relationships. In particular, a number of five individual interviews took place as part of this research, two of which were conducted in person, while the rest took place via Skype. The materials used for each individual interview consisted of the following items: the list of Bandcamp's CSFs, an interview guidelines document similar to the one used by Papageorgiou and Kontogianni (2011), the interview sheet containing information and notes about the date and place of the interview, the name of the participant and his/her thoughts and reasoning for designing his FCM and an explanatory example of a graphical representation of a FCM taken from the book "Fuzzy Thinking" by Kosko (1993). All of these items were presented to each participant during the interview.

The interview process with each participant was organised into three stages. After making sure each participant has understood what a FCM is, he/she was handed a printed list of the Bandcamp success factors and asked to study it for five minutes and add any additional factors that he/she felt may have been omitted from the list. After the participant had a chance to review the list, he/she was asked to get a piece of paper and a pen, pick two factors (randomly or not) from the list, write them down on the piece of paper and circle them. The participant was then asked to think whether there is any direct cause-effect relationship between the two factors. If so, he/she was asked to draw a directed arrow from the cause factor to the effect factor. If there wasn't any relationship between the two factors, he/she was asked to write a third factor from the list on the piece of paper and think whether there's any relationships between it and the first two factors, then draw the appropriate arrows. The participant was then allowed 10 minutes to continue the process with the rest of the CSFs, adding them to the piece of paper one by one and drawing arrows between them. The second stage of the interview involved the participant being asked to evaluate the relationships between the factors and then decide whether they were positive or negative. A positive relationship means that when the cause-factor increases (or decreases), the effect-factor also increases (or decreases). A negative relationship is the opposite of that: when the cause-factor increases (or decreases), the effect factor decreases (or increases). The participant was allowed five minutes to mark + or - signs on each arrow. For the third and final stage of designing the FCM, the participants were asked to evaluate the strength of each relationship on a scale between -1 and +1. +1 means that there is a very strong positive relationship between factors. -1 means that there is a very strong negative relationship between factors. 0 means that there is no relationship between factors.

Finally, by following the method presented in (Ozesmi and Ozesmi 2004, Salmeron and Lopez 2012), the five resulting FCMs were aggregated and an augmented adjacency matrix was created (Table 1). This matrix should be interpreted as the cause factors being the ones in the first row and the effect factors the ones in the first column. All of the relationships between factors were positive, meaning that a change in the cause factor would lead to a change in the same direction of the effect factor.

4. SIMULATING SCENARIOS AND INTERPRETING THE RESULTS

The augmented adjacency matrix the CSFs of the Bandcamp digital music service, as well as the existing connections between them. Following the creation of the augmented adjacency matrix, a number of "what-if" scenarios are created and simulated in order to study the impact of the CSFs on user satisfaction and the success of the website. In Scenario 1, the main CSFs related to Bandcamp's value proposition – Free Music Streaming (FMS), the Ability to Purchase Music in Digital and Physical Format (PDF and PFF), No Advertisements (NOA) and the Satisfaction of Supporting the Artists (SSA) – have been activated and given the value of 1, while the rest of the

Critical Success Factors are inactive, taking the value of 0. This scenario only takes into account the core functions of Bandcamp and determines how they affect the other CSFs. In Scenario 2, the opposite case is modeled: every CSF is active, except for the five main CSFs outlined above. This scenario simulates Bandcamp being a regular music streaming service like Spotify or Deezer, which doesn't offer free streaming or the possibility to purchase music directly from the website (therefore there is no satisfaction of supporting the artists) and displays advertisements. In this case, the scenario helps to determine how the absence of these CSFs impacts Bandcamp's success and appeal to users.

In Table 2, it can be seen that the CSFs reached values between 0.5 and 1, with a high average impact of 0.78. Moreover, 3 factors are heavily impacted and reach values much greater than the mean. The most strongly affected CSFs are comfort & convenience (CC [1]), ease of use (EOU [0.997]) and the ability to sample music before buying (SBB [0.951]). The ability to showcase music collections and the Bandcamp mobile application are also highly affected (SMC [0.752] and APP [0.628]). The least affected CSFs are security of payment and the release of constant updates to the website (SOP [0.5] and CC [0.5]).

These results reveal the profound impact these core CSFs have upon Bandcamp's overall success and how strongly they affect the other CSFs. The value of [0.951] reached by the Sample Before Buying (SBB) factor in the final step of the simulation shows that free music sampling is an essential part of the way Bandcamp works. Furthermore, the Showcasing Music Collection factor (SMC) reaches a value of [0.752], showing that the satisfaction of directly supporting their favorite artists through music (whether in digital or physical format) and merchandise purchasing, supported by cost-free music streaming, leads to a large increase in the appeal and satisfaction of users showing off their music collections to their peers, using Bandcamp's Fan Profile Page feature. Comfort and Convenience (CC) reaches the maximum value possible in the simulation. This reveals that Bandcamp, by offering free music streaming and direct purchases (which increase the satisfaction of supporting the artists), makes it easy and convenient for music fans to listen, discover and buy music.

The advantage of having the options to stream music for free or buy it, both in one place, complete with a clean, intuitive interface and no pestering ads also translates to increased Ease of Use (EoU), a concept which reaches near-maximum value in this scenario. The Bandcamp Mobile Application (APP) factor reaches a value of [0.628], highlighting how having all of these excellent features leads to an increase in the importance of having a mobile application which allows users to enjoy everything Bandcamp has to offer even when they're not in front of their computer.

A moderate value of [0.5] for the Security of Payment (SOP) factor shows that, even though security of payment is needed in order to safely make purchases online, users don't give it tremendous importance. This might have to do with the fact that we are living in a time when e-commerce has matured, along with electronic payment methods that are easy to use and which feature very safe security protocols and data protection methods. As a result, online shoppers have gotten accustomed to paying safely online and expect this to be a feature of any online store, so they are less likely to feel particularly satisfied by the security of payment.

An interesting result, however, is the moderate value of [0.5] reached by the Constant Updates (CU) factor. Bandcamp has been constantly rolling out new updates and features which improve the look and functionality of the website. This result might be a sign that users feel that Bandcamp has already delivered its value proposal and that future updates are only likely to bring minor improvements to the website instead of any major new features.

The second scenario was also applied and simulated, which yielded similar results, as shown in Table 2.
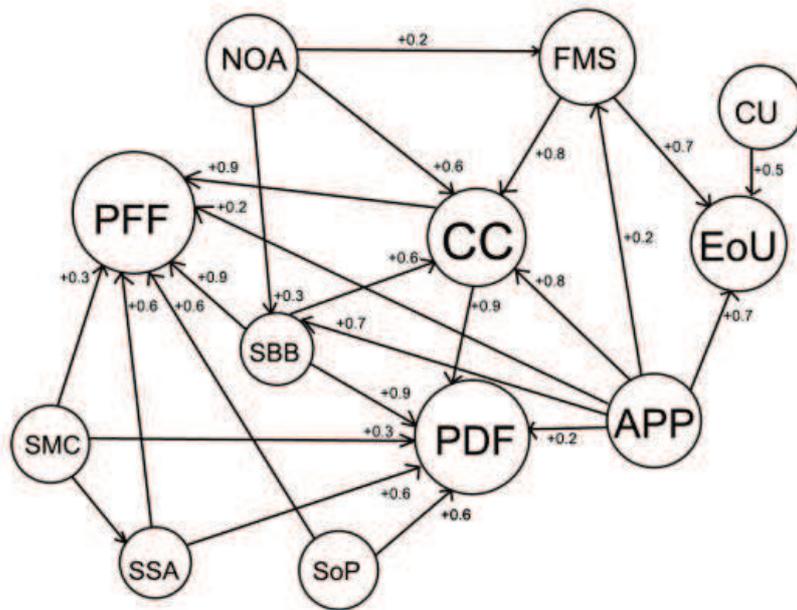
Figure 1: Example of a FCM created by an expert during the interview

Table 1: Adjacency matrix (excerpt showing the most important relationships)

Effect /Cause	FMS	PDF	PFF	SMC	SBB	CC	APP	NOA	SSA	EOU	SOP	CU
FMS	0	0	0	0	0	0	0.04	0.04	0	0	0	0
PDF	0.2	0	0	0.06	0.92	0.18	0.1	0	0.32	0.2	0.52	0
PFF	0.2	0	0	0.06	0.92	0.18	0.1	0	0.32	0.18	0.52	0
SMC	0.4	0	0	0	0	0	0	0	0	0	0	0
SBB	0.7	0	0	0	0	0	0.28	0.06	0	0	0	0
CC	0.94	0.76	0.76	0.2	0.84	0	0.62	0.32	0.12	0.4	0.46	0.24
SSA	0	0.32	0.44	0.22	0	0	0	0	0	0	0	0
EOU	0.34	0.2	0.2	0.04	0.2	0	0.34	0.01	0	0	0.04	0.36

Table 2: Results of simulations

Critical Success Factor	Initial Value in Scenario 1	Initial Value in Scenario 2	Final Value for both Scenarios
Free Music Sampling (FMS)	1	0	0.556
Ability to purchase music in digital format (PDF)	1	0	0.999
Ability to purchase music in physical format (PFF)	1	0	0.999
Ability to showcase music collection (SMC)	0	1	0.752
Sample before you buy (SBB)	0	1	0.951
Comfort and convenience (CC)	0	1	1
Bandcamp Mobile Application (APP)	0	1	0.628
No advertisements (NOA)	1	0	0.5
Satisfaction of directly supporting the artists (SSA)	1	0	0.99
Ease of use (EOU)	0	1	0.997
Security of payment (SOP)	0	1	0.5
Constant updates (CU)	0	1	0.5

5. COMPARISON WITH RELEVANT WORK AND CONCUSIONS

This research has set out to discover what exactly are the Critical Success Factors (CSFs) of Bandcamp, how they relate to each other and to assess how their interaction influences the success of Bandcamp, using the Fuzzy Cognitive Map (FCM) method. The FCM method shows the main CSFs of Bandcamp, as identified by the panel of experts. Among them, the CSFs with the highest impact are Free Music Streaming, Purchasing Music in Digital and Physical Format and Sampling Before Buying, although other CSFs have moderate influence, like the Bandcamp Mobile Application, the Satisfaction of Supporting the Artists and Security of Payment. These findings are in line with the studies performed by other researchers in the field of online music streaming.

Aguiar and Martens (2013) and DangNguyen et al. (2012) proposed that there exists a complementarity between online music streaming and buying digital music. The results outlined above suggest that, in the case of Bandcamp, this holds true – the ability to stream music for free, thereby being able to sample the product beforehand, becomes an essential part of the entire Bandcamp experience. The fact that most of the artists selling their music on Bandcamp choose to offer their entire albums for free streaming, rather than just 30-second snippets of songs, has the potential and capacity to drive up digital music purchases due to the low (in fact, practically inexistent, aside from the Internet connection fees) sampling costs incurred by the users, as asserted by Gopal et al. (2006). Furthermore, digital music purchases occur because, as Bahanovich and Collopy (2009) pointed out, ownership of music still retains its importance for music fans, even in the digital age. As the present research indicates, the satisfaction of financially supporting their favorite artists in a direct way and the satisfaction of showing off their music collections to their peers also weigh in as important factors in the decision to purchase music from Bandcamp.

However, the results of this research should not be interpreted as suggesting that Bandcamp is superior in every way to regular streaming services, such as Spotify, Rdio or Pandora. They should be seen as what they are: different business models targeting different audiences. If Spotify is an online music streaming powerhouse featuring music by well-known, internationally famous artists for whom personally handling all of their music sales is simply not an option, Bandcamp is designed to be most helpful for underground musicians and record labels and their fans.

What should be noted is that both Bandcamp and other similar online music streaming services seem to be on their way of solving the age-old problem of music piracy: a recent study by the National Purchase Diary (NPD) group (www.npd.com), called "The Annual Music Study 2012" and cited by Forbes Magazine (Forbes 2013), has revealed that music piracy has dropped by 26% in 2012 compared to 2011 and that 40% of the respondents who claimed they pirated music in 2011 declared that they no longer do so in 2012. The survey has found that almost half of the respondents claimed that the availability of music on online streaming services – Spotify in particular - is the reason why they stopped pirating. The findings in this study were corroborated by other studies which took place in Norway (BGR, 2013) and the Netherlands (PaidContent, 2013) and they all point to the same thing: reducing music piracy was never about lawsuits and harsh fines, but about giving music fans a fast, easy and cheap way of listening to their favorite artists.

Acknowledgment

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