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Pokémon Go!: Stock valuation and disruptive innovation in entertainment industry

Pokémon Go!: Avaliação de ações e inovação disruptiva na indústria de entretenimento

Pokémon Go!: Valoración de acciones e innovación disruptiva en la industria del entretenimiento

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Abstract
This research aims to analyze the impact of the announcement of the launch of the game Pokémon Go! on Nintendo's stocks. The study anchors itself on conceptual foundations of disruptive innovation and previous research that examined the stock market reaction to the announcement of innovations. This is an empirical research whose sample is made up of 4 Nintendo company assets traded in the United States, Germany, Switzerland and Japan, as well as the assets of companies comparable to Nintendo that made up the Detailed Stock Report available in the Refiniv® system (Thomson Reuters), at the time of the launch of the game. Through conducting a series of event studies, Nintendo's stocks traded in the United States, Germany, Switzerland and Japan presented abnormal returns after one day of the game's launch. These findings proved to be specific of Nintendo corporation's assets, with no similar reactions observed in peer valuation analysis. Based on five variables of cumulative abnormal returns (CARs) for all entertainment companies listed in Japan and controlled by factors such as profitability, debt, size and market value, it was found that on average the cumulative abnormal returns of Nintendo were significantly higher than the other companies in all 5 models tested. In response, we hope to broaden the discussions listed in this survey to recognize the launch of Pokémon Go! as an innovation with typical traits of Disruptive innovation, which were not ignored by capital market when the game was launched in July 06th, 2016.
Keywords: Pokémon Go!; Disruptive Innovation; Capital Markets; Event Studies; Abnormal Returns

Resumo
Esta pesquisa tem como objetivo analisar o impacto do anúncio do lançamento do jogo Pokémon Go! nas ações da Nintendo. O estudo se ancora em fundamentos conceituais de inovação disruptiva e em pesquisas anteriores que examinaram a reação do mercado de ações ao anúncio de inovações. De maneira provocativa, este artigo levanta a questão sobre por que um jogo voltado para crianças provocaria uma avaliação dramática das ações da Nintendo. Trata-se de uma pesquisa empírica cuja amostra é composta por 4 ativos de empresas da Nintendo negociados nos Estados Unidos, Alemanha, Suíça e Japão, além de ativos de empresas comparáveis à Nintendo que compunham o Relatório Detalhado de Estoque disponível no sistema

Refinitiv® (*Thomson Reuters*), no momento do lançamento do jogo. Ao conduzir uma série de estudos de eventos, as ações da Nintendo negociadas nos Estados Unidos, Alemanha, Suíça e Japão apresentaram retornos anormais após um dia do lançamento do jogo. Essas descobertas provaram ser específicas dos ativos da Nintendo Corporation, sem reações semelhantes observadas na análise de avaliação por pares. Com base em cinco variáveis de retornos anormais acumulados (CARs) para todas as empresas de entretenimento listadas no Japão e controladas por fatores como rentabilidade, dívida, tamanho e valor de mercado, verificou-se que, em média, os retornos anormais acumulados da Nintendo eram significativamente maiores do que em outras empresas em todos os 5 modelos testados. Em resposta, esperamos ampliar as discussões listadas nesta pesquisa para reconhecer o lançamento do Pokémon Go! como uma inovação com características típicas da inovação disruptiva, que não foram ignoradas pelo mercado de capitais quando o jogo foi lançado em 06 de julho de 2016. Este artigo sugere que o lançamento foi provavelmente a primeira experiência de realidade aumentada testada em escala planetária e a mensagem econômica fornecida por essa experiência foi claramente capturada pelo mercado de ações global.
Palavras-chave: Pokémon Go!; Inovação Disruptiva; Mercados capitais; Estudos de eventos; Retornos anormais

Resumen
Esta investigación tiene como objetivo analizar el impacto del anuncio del lanzamiento del juego Pokémon Go! en las acciones de Nintendo. El estudio se basa en los fundamentos conceptuales de la innovación disruptiva y la investigación previa que examinó la reacción del mercado de valores al anuncio de innovaciones. Se trata de una investigación empírica cuya muestra está compuesta por 4 activos de empresas de Nintendo que se negocian en Estados Unidos, Alemania, Suiza y Japón, así como los activos de empresas comparables a Nintendo que componían el Informe de stock detallado disponible en el sistema Refiniv®. (*Thomson Reuters*), en el momento del lanzamiento del juego. Mediante la realización de una serie de estudios de eventos, las acciones de Nintendo negociadas en los Estados Unidos, Alemania, Suiza y Japón presentaron rendimientos anormales después de un día del lanzamiento del juego. Estos hallazgos demostraron ser específicos de los activos de la corporación Nintendo, y no se observaron reacciones similares en el análisis de valoración por pares. Sobre la base de cinco variables de rendimientos anormales acumulados (CAR) para todas las empresas de entretenimiento que cotizan en Japón y controladas por factores como la rentabilidad, la deuda, el tamaño y el valor de mercado, se encontró que, en promedio, los rendimientos anormales acumulados de Nintendo eran significativamente más altos que las otras empresas en los 5 modelos probados. En respuesta, esperamos ampliar las discusiones enumeradas en esta encuesta para reconocer el lanzamiento de Pokémon Go. como una innovación con rasgos típicos de innovación disruptiva, que no fueron ignorados por el mercado de capitales cuando se lanzó el juego el 6 de julio de 2016.
Palabras clave: Pokémon Go!; Innovación disruptiva; Los mercados de capitales; Estudios de eventos; Rendimientos anormales

1 Introduction

This research aims to discuss the stock market reaction to the announcement of augmented reality game Pokémon Go! by Nintendo in June 2016. Financial researchers have devoted high attention to specific events that may affect the rebalancing equity portfolios. According to this circumstance, the effort of investigation that focus on explanations of extraordinary movements under specific hypothesis may be considered a source of information and, therefore, indicate criteria to investment decision amid the typical volatility the surrounds the stock exchanges. Under this point of view, Grar (1997) defines an event as the information that is made public in the market and is liable to affect the value of one or more firms at the same time. The event can be general or specific, periodic or occasional, exogenous or decided by the management of the company.

In this sense, the launch of Pokémon Go! by Nintendo represents an important event for entertainment corporations in Japan and other countries. The Pokémon Go! is an augmented reality mobile game, developed by Niantic and Nintendo companies for iOS and Android platforms, based on the franchise of a cartoon worldwide known as Pokémon (Dorward, Mittermeier, Sandbrook & Spooner, 2017). On April 11th, 2019, the official website of Pokémon Company confirmed that Pokémon Go! had been downloaded more than 1 billion times for iOS and Android. Taking into account that this amount of downloads was made individually, it means that 14% of the world population downloaded Pokémon Go! on their mobile devices.

The launch of the game was representative for the stock market, as the company's stock had grown 9.3% at the announcement of the application, which occurred on July 6th, 2016. Until July 11th, the company had grown 24.54% on Tokyo Stock Exchange after the market closed (Lasalle, 2016). Scholars have been recorded this market valuation under two perspectives. The first is that the game has as reference a disruptive innovation through augmented reality (Carli, Gastal, & Gomes, 2016). Christensen, Raynor and McDonald (2015) define disruptive innovation as a process in which companies challenge established firms by providing products or services that meet the needs of some segment of society. The second perspective that may be awake the interest of market is the use of georeferencing and mobility attributes in an instantaneous way in

the game (Carli *et al*., 2016). In essence, geo-referencing is an attribute of cartography area that has gained space in the field of entertainment through electronic games. Cascón-Katchadourian, Ruiz-Rodríguez and Alberich-Pascual (2017, p. 204) infers that "their recent popularization is linked to the emergence and massive use over the last decade of websites and what surrounds them". The Pokémon Go! gains this popularity due to the use of georeferencing technology, because it allows to accurately reconstruct the geographical situation of plans on a large scale and without projections (Cascón-Katchadourian *et al*., 2017).

The announcements of new products represent a focus of study for the marketing field combined to corporate finance and statistical methods. Several studies apply this approach and recognize the performance of stock market from the release of a new product. Examples of such investigations are the researches of Eddy and Saunders (1980), Chaney, Devinney and Winer (1991) and Koku, Jagpal and Viswanath (1997), among others.

Delattre (2007) emphasizes that event studies contribute to the identification of value creation or destruction. Market events are key points for checking stock valuation. On the other hand, this methodology may confirm the strategic measures the company adopted in certain periods, in terms of market reactions. In this research, event studies applications related to goods development and innovation becomes relevant as they integrate areas of knowledge and contributes to expand the technique and the understanding of informational content potentially produced by product releases.

For the field of finance and accounting, a good deal of research is to understand the effects of launching a new product versus the behavior of the stock market under the lens of Efficient Market Hypotheses (EMH) (Fama, 1970, 1991) in its semi strong form. Thus, it is possible to provide information regarding the normal or abnormal returns that the product release may trigger. A specific gain for accounting and finance is to provide empirical elements for the users of financial information regarding the behavior of the company's asset phenomena.

The announcement of Pokémon Go! presents itself a component in the capital market and may be relevant and shocking on decisions of economic agents. The challenges for launching an innovation focus on verifying the market acceptability of such a product or service. In this way, this research contributes to the verification of market absorption and acceptability on the launch of Pokémon Go!. As well, it contributes to understand how the market reacts and evaluates in financial terms the advertising of the information, which will make it possible to affirm the levels of operation under the aegis of HME.

The construction of the research involves the application of several event studies that considered the examination of the abnormal returns of Nintendo and the companies that integrated the entertainment industry in Japan at the time of the release of game Pokémon Go!. The data analysis were conducted into two stages. In the first, the abnormal returns were determined. Nintendo's stocks traded in the United States, Germany, Switzerland and Japan presented abnormal returns ranging from 4.61% (Japan) to 6.25% (United States) one day after and 17.91% (Japan) to 32.48% (Swiss) after three days the product was launched. These results prove to be peculiar of Nintendo company's assets, because no similar returns on Nintendo's peers were observed. The results of this stage were consistent even after the use of resilient estimators to the presence of outliers to determine the abnormal returns. In the second stage the analysis was carried out by cross section regressions. Based on five variants regressions of cumulative abnormal returns (CARs) for all companies in the entertainment industry in Japan and controlled by factors such as profitability, debt, size and market value, it was found that on average the cumulative abnormal returns of Nintendo were significantly higher than the other companies in the industry in all 5 models tested. The results allow us to decide on research hypotheses in order to broaden the discussions concerning game launch and the reactions of the stock market.

Markets are considered to be instantaneously backed up by their disclosure of information, reacting in a semi strong form. Thus, this paper contributes to discussions related to the efficiency of markets in a context of disruptive innovation through augmented reality, georeferencing and mobile devices. Combining marketing and finance, this paper fits into an emerging field, which is termed by Delattre (2007) of financial marketing. The study contributes to examine the relationship between shareholder and consumer behavior and the role of brand, considering the launch of an innovation with traits of disruptive one. On other points of view, this paper seeks to understand why a game for mobile devices and aimed at children and youth could provoke a dramatic valuation on a stock security and also to perceive what would be the economic message behind the launch of the game.

2 Empirical and Theoretical Framework

2.1 Disruptive Innovation

Disruptive Innovation has received extensive research attention since the 1990s by Clayton Christensen. However, its definition is not clear. The initial efforts of Christensen (2013) took as reference the conceptual structures of disruptive technologies. Nowadays, the same concept has been expanded to products and business models. Thus, this conceptual structure is used to explain a plurality of innovations, which has been developed in the markets. Markides (2006) points out that such attitude of scholars is a mistake, since the various types of innovations have as characteristic the capacity to influence and conduct the market

differently and yet the competitive effects of this innovation produce different effects in economic terms, financial and social aspects of the market. These phenomena deserve different lenses regarding their treatment and observation.

According to Christensen *et al*. (2015, p.4) "Disruption describes a process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses". In addition, Christensen and Raynor (2003, p. 69) make this point forcefully by arguing that "... disruption is a process and not an event and it might take decades for the forces to work their way through an industry but [they] are always at work". The empirical literature classifies Disruptive Innovation under two different positions. The first considers the innovations of business models. The second is related to the context of product innovations, i.e. the launch of a new product to the world (Christensen, 2013). Markides (2006, p.20) defines that “innovations of business models invade an existing market by emphasizing different product or service attributes to those emphasized by the traditional business models of the established competitors". The author argues that Disruptive Innovations from the constitution of a new product are included in terms of providing a new experience to the world.

These different types of innovation contribute to the creation of different markets, which represents to the field of innovation elements based on marketing and organizational challenges with significant consequences for business administration. At this specific point, it is worth emphasizing that decomposing disruptive innovation in terms of effects on markets presents as an issue, which is able to give relevant contributions to the market itself and to users of the innovation results (Markides, 2006).

Disruptive Innovation induces a certain discomfort in the market, since they present themselves as competitive advantages against the mighty corporations of the same industry. Thus, the insertion of a new product in the market at a cheaper price and even at a zero cost as is the case of the game Pokémon Go!, it will lead competitors to reshape their business forms, causing some discomfort in industry (Cândido, 2011; Markides, 2006). In addition, Markides (2006, p.22) argues that disruptive innovations "are disruptive to consumers because they introduce products and value propositions that disturb prevailing consumer habits and behaviors in a major way".

A peculiar fact in terms of behavior and participation in the composition of Nintendo's assets occurred on July 31th, 2016. According to data obtained through Bloomberg® terminals , on that date, weeks after the launch of the game Pokémon Go !, the fund named ARK Investing in Disruptive Innovation becomes part of Nintendo's investor group. To ARK Investing (2019, p.1) "disruptive innovation as the introduction of a technologically enabled product or service that should transform economic activity by creating simplicity and accessibility while driving down costs". In addition, the company believes that innovation typically needs time and maturity before gaining mass market adoption. Through an open research process that cuts across sectors, industries, and markets, ARK seeks to identify innovation platforms characterized by: (i) Dramatic cost declines; (ii) Strong price elasticity of demand; and (iii) Convergence which spawns further innovation. In this sense, it can be assumed that the entrance of a fund with these characteristics into equity composition of Nintendo was not a coincidence, but a decision weighted according to the impact that the game generated worldwide.

The context whereby Disruptive Innovation process is inserted can be considered inviting and provocative. Researchers and theorists have devoted attention to recognize the values of empirical tests involving the effects of Disruptive Innovation. Thus, "as an ever-growing community of researchers and practitioners continues to build on disruption theory and integrate it with other perspectives, we will begin to better understand what helps firms innovate successfully" (Christensen *et al*., 2015, p.11). Encouraged by the optimism portrayed by Christensen *et al.* (2015), it means that observe Pokémon Go! as a Disruptive Innovation represents a breakthrough in terms of cooperation with the emerging field of research, which integrates marketing and finance.

Innovation is a process that contributes to the development and continuity of organizations (Warren & Sorescu, 2017). This process is commonly manifested through new products or services and also through new processes (OECD, 2005). Corporations, especially those listed on the stock exchange, sometimes observe the market responses to innovative processes developed through stock returns, considered an important performance criteria (Pauwels, Silva-Risso, Srinivasan, & Hanssens, 2004) and so to speak, of recognition. From this perspective, researchers have dedicated efforts to understand this relationship and this alignment between innovative processes and the capital market (Eddy & Saunders, 1980; Chaney Chaney *et al*., 1991; Koku *et al*., 1997; Pauwels et al., 2004; Sorescu & Spanjol, 2008; Warren & Sorescu, 2017; Mann & Babbar, 2018, Tu, 2012).

This thematic line of investigation is important because it provides the ability to allow inferences about investors' expectations regarding the company's future (Warren & Sorescu, 2017), which can be extremely relevant not only for shareholders, but also for managers and the boards (Sorescu & Spanjol, 2008). In this sense, when combining elements of Marketing and Finance, this research approach proves to be innovative in terms of performance verification and the effects of investment decisions and, therefore, useful for capital suppliers to understand the destination given to resources directed to processes of innovation.

Aligning Marketing and Finance allows providing guidance to companies regarding the behavior of market when launching games, leading to a positive perception between society and investors. As well, this

research works as a thinking material regarding the answer that can be given by society when launching games and similars (Mann & Babbar, 2018; Tu, 2012).

2.2 Hypothesis Development

Efficient Markets Hypothesis (EMH) in its semi strong form, evidenced by a large number of empirical studies, presents that current stock prices reflect all publicly available information of corporations, such as financial statements, other periodical and non-periodical publications, as well as disclosures potentially relevant to investors' decisions. Since the information is public, no investor will achieve extraordinary returns because prices are quickly adjusted to new information disclosed. Another point to be highlighted in terms of market behavior in the semi strong form are expectations of future results. Under these conditions, the investor accesses publicly available information and positions itself from a behavior in which it is expected future gains. This fact reveals a possible learning process by investors (Sawyer & Gygax, 2001; Fama, 1991).

The announcement of the development of Pokémon Go! by Nintendo occurred on September 10th, 2015, with its launch scheduled for 2016. Given the importance of the already consolidated Pokémon franchise with several products on the market, it was to be expected an increase in company stock after its launch. In the first two days of the game's launch in the United States, Australia and New Zealand, Nintendo shares rose more than 25% with gains of market value of $ 7.5 billion. The entry of ARK Investing in Disruptive Innovation, which seeks to "capture longterm outperformance and capital appreciation created by disruptive innovation" (ARK Invest, 2019, p.1), also represents a positioning of an investor seeking future gains from development of the disruptive innovation provoked by the game. "The fund aims to identify large-scale investment opportunities in the public markets resulting from technologically enabled innovation centered around DNA sequencing, robotics, artificial intelligence, energy storage, and blockchain technology" (ARK Invest, 2019, p.1).

Nevertheless, after a release by Nintendo on July 22, 2016, the Japanese company's stock plunged almost 18%, a drop of approximately $ 6.4 billion in market value. This drop occurred because the application was developed and distributed by Niantic Inc. where franchise ownership rights belong to the Pokémon Company, to which it receives a licensing fee, as well as compensation for collaboration in application development and operations. In addition, Nintendo owns only 32% of the voting shares of Pokémon Company, accounted for using the equity method. Therefore, revenue reflected in the game profits for Nintendo, will be limited to the results counted by the company Pokémon Company.

Since new information released by organizations can influence behavior of stocks, researchers have sought to analyze how advertising and launching new products can affect abnormal returns of corporations. Hu et al., (2013) investigated the launch effects of new products on price stocks of US companies from 1997 to 2007. The authors noted that companies that launched new products had significant abnormal returns over a period of three days (-1, 0 and 1), where its highest value occurred on the day of the new product launch. On average, the advertisers had a significant gain of 0,408% on the day before the launch, 0,925% on the launch date and 0,537% on the day after launch. The results support Efficient Market Hypothesis in its semi strong form as information about the launch of the new products had already been released by the organizations, so the positive and significant changes in stock prices one day before launch, at launch and one day after the launch corroborates the EMH.

Mann and Babbar (2017) analyzed the impact of new product announcements on the stock value of Indian companies listed in the BSE 500 stock in the period 2003 to 2012. The findings demonstrated that companies that made the announcement of new products achieved significant positive abnormal returns compared to other organizations. In addition, it also corroborates the Semi strong Efficient Market Hypothesis, since positive returns occurred at the day of the announcement of the new products.

Qin, Hung, Jang, and Lehto (2017) researched whether the introduction of mobile applications affects the value of the shares of hotel and airline companies. The results indicated that, on average, hotel and airline companies that introduced mobile applications had a 1,32% gain on abnormal returns on the day of the event. In addition, the launch event was the only day with significant abnormal returns and the highest gain among the 11 days during the event window (5 days before and 5 days later). The authors conclude that there is no leakage of information before the event and no reaction of stock market delays, which contributes to Semi strong Efficient Market Hypothesis.

Based on the arguments presented and the results of the mentioned researches, two hypotheses of research were formulated:

H1: The launch of the game Pokémon Go! led to informational content causing abnormal positive returns on the Nintendo company's stock.

When observing the game release not only as an isolated event, but also as materiality of innovation concept, that is, as a process, it is consistent to expect that the circumstance of its announcement was able to provide informative content to its shares and, therefore, providing substantial gains to the assets of Nintendo. In these terms, it is also notable the existence of literature where it is argued that, in addition to promoting

abnormal gains in companies, the innovation processes, whether incremental or properly so-called new (Sorescu & Spanjol, 2008; Hu *et al*., 2013; Mann & Babbar, 2017; Qin *et al*., 2017), have the capacity to yield higher abnormal returns to companies directly involved in innovations, compared to companies that make up part of the market and are not. In view of recent literature, it is emphasized that it is possible to assume that significant returns can be engendered in companies that were directly involved with the evaluated event (ie Nintendo) when compared to the returns of companies that were not involved, assuming, therefore, about the strength that the information reached when it was propagated to capital markets. Based on these arguments, the second research hypothesis is elaborated:

H2: The cumulative abnormal returns after the announcement of Pokémon Go! were more pronounced on Nintendo stocks compared to the companies that integrate the entertainment industry in Japan.

3 Data, Sample and Methods

This section aims to describe the methodological approach used to investigate the stock market reaction to the launch of Pokémon Go! game. The main focus is to provide full disclosure concerning the steps related to the construction of the database and the methodological choices made. With these priorities, it is sought to provide possible the reliability of the study.

3.1 Event Study and Event Window

Elton, Gruber, Brown and Goetzmann (1995) define Event Study as an econometric tool aimed at debugging the impact of internal or external announcements on companies' stock valuation. Similar to the empirical studies that examined the impact of changes or announcements related to corporate innovation, this research followed the similar stages on database construction and application of similar methods to the investigations developed by (i) Chaney *et al.* (1991) e Hu *et al.* (2013) that investigated effects on the stock price of new product advertisers; (ii) Mann and Babbar (2017) that evaluated the impact of announcement of new products on the value of stocks of Indian companies listed in the BSE 500 stock at the industry and firm level; and (iii) Quin *et al.* (2017) who verified whether the introduction of mobile applications affects the valuation of hotel and airline industry. Therefore, it is shown that this research has as priority to examine the reaction of the stock market in a few countries in world to the announcement of the game and not to provide or test innovations in the proposed econometric method.

Specifically, the event to be investigated is the release of the game called Pokémon Go! by Nintendo and Niantic with applications in mobile devices (cell phones and tablets). More specifically, the date that will be used as the starting point for conducting this study will be the world announcement day on July 6th, 2016. For purposes of applying the Event Studies, that date is called "zero date". It is understood that the interpretation of informational content of certain ads depends on the possible impact to be examined at a viable intervals of time. For this reason, the quotations for the assets selected in this study occurred on a daily basis in the form of stock price quotations, which will serve as basis for the determination of observed, expected and abnormal returns. According to Benninga (2008), it is recommended that the closing price adjusted for splits and inplits and the payment of dividends are used to determine observed stock returns.

From an operational point of view, this research was concerned to not ignore the possibility that on June 6, 2016, other assets of similar companies or competitors of Nintendo had shown behavior similar to hers. Positive abnormal returns at other companies would weaken the argument that the game's release announcement was a consistent circumstance of driving Nintendo-specific information content. It is for this reason that simultaneously within the analysis of the company's abnormal returns exactly on June 6, a range of companies is also studied. As detailed in section 3.2, this comparative analysis was carried out in two stages.

However, the decision to seek solidity and precision about what happened on July 6 in the entertainment market had consequences. One of them was the non-inclusion of intermediate dates of announcements involving Pokémon Go! in the calculations, for example, the announcement made by the company about the beginning of the development of the game in 2015. Yet If several dates were included, maintaining the robustness demanded from the results, the investigation would gain high descriptive extension and adaptations of organization (of space) would be necessary, which in turn could impair the comprehension of the results in their fullness. In this sense, due to this methodology issue added to the strong social turmoil generated on June 6, 2016 as result of the game release, it was decided to conduct this research in a transversal way, that is, detailing only one date.

It is argued that a subjective component for conducting one or more event studies is the definition of the Event Window (Mackinlay, 1997). Several researchers use between 3, 5 and 10 days around "zero date" considering event windows with 7, 11, 21 days, respectively. In this study the Event Window adopted was 5 previous days (06/28, 06/29, 06/30, 07/01 and 07/05) and 5 days later (07/07, 07/08, 07/11, 07/12) to the "zero date".

3.2 Securities Selected and Data collection

Considering what is the proposed in this research, the selection of assets to be analyzed went through three stages. Initially, through the Bloomberg® terminal, there were verified Nintendo's stocks in United States, Germany, Switzerland and Japan. In view of the fact that this study seeks to examine the effect of launching the game Pokémon Go!, it would be inconsistent to ignore the possibility of observing effects in other companies considered Nintendo's peers. A possible reaction that translated into informational content of the stocks at Nintendo could be repeated throughout the entertainment segment, which would extenuate the hypothesis that Nintendo's specific reaction due to the launch of the game. In this sense, the second stage of asset selection was to consult the Detailed Stock Report for the year 2016 provided by the Thomson Reuters® terminal (current Refinivit®) and also the Peer Review analysis to identify the comparable assets and include them in the analysis considering same event window. The inclusion of peer-group analysis to comprehensively examine an effect is a research planning decision that is recurrent and can be observed in studies such as developed by Romano and Almeida (2015) and Barros, Lopes and Almeida (2019). Table 1 identifies all selected assets.

Table 1:
Securities selected for analysis

Companies (Short name)	Description of main activities
Nintendo	Engaged in the development, manufacture and sale of entertainment products in home entertainment field. The Company's main products include game machines such as portable and console game machines and software. **Headquarter: Japan.**
Bandai	Engaged in entertainment business. The Company operates in three business segments: toys, network Entertainment and facilities. **Headquarter: Japan**.
Koei	KOEI LTD.: engaged in game software business. The Company has six business segments: Software games, Online Mobile segment, Media Rights segment, Slot Pinball (SP), Amusement Facility Operation segment and others segment involved in real estate. **Headquarter: Japan**.
Sanrio	Sanrio: engages in the planning and sales of social communication gift products, theme park business and others. **Headquater: Japan**.
Tomy	TOMY LTD.: engaged in the design, development, manufacture and sale of toys, as well as the provision of toy development technology and sheared services. **Headquarter: Japan**.
Happinet	Happinet Corp.: operates through four business segments. toys, video and music, video game and amusement. **Headquarter: Japan**.
Fujishoji	Fujishoji LTD.: involved in the development, manufacture and sale of pachinko machines. **Headquarter: Japan**.
FuRyu	FURYU CORPORATION is a company principally engaged in the entertainment related business. **Headquarter: Japan**.
Nuts Inc	Nuts Inc., formerly Commonwealth Entertainment & Co. is a Japan-based company primarily engaged in the amusement business. **Headquarter: Japan**.
People	People.cn CO., LTD is a China-based company, principally engaged in the operation of Internet information business. **Headquarter: China**.
Kotobukiya	Kotobukiya Ltd. is a company mainly engaged in design, development, production and sale of hobby goods, such as polyvinyl chloride(PVC)f Figure, plastic model, collectibles and other related goods. **Headquarter: Japan.**

Source: *Refinitv®*

And lastly, in addition to collecting daily quotes from peer companies, it was decided to examine the valuation performance of the entire entertainment industry considering companies that were listed on the Japanese stock exchange at the time of Pokémon Go! launch which also includes Nintendo itself. The purpose of this third stage was to verify the significance of the valuation of the company's shares through 5 combinations of cross section regressions, further detailed. The sample of companies comprised to perform the cross section analysis is described in Table 2.

Table 2:
Company sample size to provide cross section regression analysis

Total listed Companies in Japan	3.817
Total companies in Entertainment industry	62
(-) companies with available information	(9)
Total sample size	53

Table 2 details that the universe of companies operating in Japanese entertainment industry in Japan was 62. Yet, 9 of them did not provide (1) all financial information (stock prices) to build up the necessary sequence of event studies to determinate Cumulative Abnormal Returns (CAR) or (2) data related to determination of control variables specified in equation 7. For this reason, they were excluded from the sample.

This data collection happened in 28th November, 2018 managing Refinitiv® terminal into the following steps. Firstly, the function "screener" was selected to choose Japan as "Country of Exchange". Secondly, after all the 3.817 companies were screened, the function GICS (Global Industry Classification Standard) was selected to identify companies within its economic sector. Thirdly, the entertainment economic sector was verified.

3.3 Estimation Window

Estimation window is a time series used to measure the daily valuation of stocks and it is constructed during the time interval preceding the Event Window. According to Benninga (2008), it is recommended to build Estimation Windows with at least a full year trading, that is, 252 days. For the development of the present study, the estimation window goes from March 31th, 2015 to June 27th, 2015. The author further argues that Estimation Windows never should overlap or intersect the Event Window under penalty of invalidity the result of the calculations of expected and abnormal returns.

According to the purposes of this study, the Estimation Window was designed by determining daily returns on a continuous form (natural logarithm) for the selected assets (R_i) and the market portfolios (Nasdaq, Dax, Swiss and Nikkei indexes) used (R_m), as shown next:

$$R_i = \text{Ln}(P_t/P_{t-1}) \quad (1)$$

$$R_m = \text{Ln}(C_t/C_{t-1}) \quad (2)$$

On what:

P_t is the stock price on day t;
P_{t-1} is the price of the stock on the previous day, ie, t-1;
C_t is the quotation of the Market Portfolio on day t;
C_{t-1} is the quotation of the Market Portfolio on the previous day, ie, t-1;

Taking into account that individual securities and Market Portfolios never present null or negative amounts, the stock prices and market quotations under logarithm calculations will be always positive. Results of those daily returns (i.e. variations) will be positive or negative. In others words, as presented in equation 1 and 2, the terms "Ln" represents natural logarithm divisons of the daily prices (for secutirites) and quotations (for Market Portfolios) which will produce daily returns described as R_i (for security returns) and R_m (for Market Portfolio returns). It is fundamental to realize that calculations of daily returns (equations 1 and 2) will never operate negative numbers, but the results may provide negative ones. Both R_i and R_m serve as the data source for estimating the parameters required to calculate expected and abnormal daily returns. To this purpose, two techniques were used. The first one was the traditional Ordinary Least Squares (OLS) method in a form of a simple linear regression, commonly called Market Model, according to equation (3):

$$R_i = \alpha_i + \beta i R_m + \varepsilon_i \quad (3)$$

The parameters α and β are estimated from the OLS application. The parameter β is the slope of the linear model (equation 3) obtained by the ratio between the covariance of the observed returns of the stock and the market and the variance of the market returns. The parameter α is the intercept, calculated by the average difference between the dependent variable (Ri) and the independent variable (Rm) of equation 3. The expected daily returns are the returns that would be generated by the individual asset under analysis based on α and β , according to equation (4):

$$E(R_i \mid R_m) = \alpha_i + \beta_i R_m \quad (4)$$

The abnormal daily returns (ARi) are calculated by the difference between the observed daily returns for the asset under analysis (Ri) and the expected daily returns [E (Ri | Rm)] for it. Thus, abnormal returns can be identified by one of the equations shown as follows:

$$AR_i = LN(Pt/Pt\text{-}1) - E(R_i \mid R_m) \quad (5)$$

$$AR_i = LN(Pt/Pt\text{-}1) - (\alpha_i + \beta i R_m) \quad (6)$$

The abnormal returns (ARi) are excesses that can be negative, positive or even null. If this surplus presents materiality, it is said to be statistically significant abnormal returns at the level of 10, 5% or 1%, respectively. Both the abnormal daily return and the expected daily return are calculated exclusively for the extension of the Event Window. The steps used to drive the decision on the presence or absence of statistical significance is described in subsection 3.5.

Concerning the second technique, according to Wooldridge (2015), estimates made by MQO are sensitive to the presence of outliers. Given the possible presence of outliers in the columns of daily returns

observed for the individual assets (R_i) and for the market (R_m), all 14 event studies conducted in OLS were recalculated using a robust estimation (for the parameters α and β) called LAD (Least Absolute Deviation). Sorokina, Booth and Thornton (2013) argue that the use of robust estimators to the presence of observations in conducting Events Studies in finance is a point that cannot be ignored. Thus, the use of robust estimators the outliers aimed to examine how sensitive the abnormal returns are in the Event Window.

3.4 Hypothesis Tests

The hypothesis tests were carried out into two stages. In the first one, considering the articulation developed for the formulation of research hypotheses H1 (The launch of the game Pokémon Go! led informational content causing abnormal positive returns on Nintendo), the hypothesis test is based on the *t* test associated to the abnormal returns for each day that comprises the Event Window. These tests are unilateral (one-tail) to the right. Hence, the null and alternative Hypothesis for the abnormal returns (AR_i) are identified as H_0: $AR_i \leq 0$ and H_1: $AR_i > 0$. The results presented in Table 3 describes in detail the necessary abnormal returns to conduct the hypothesis test, including an example of calculation for the *t* test.

In the second stage, 5 cumulative abnormal returns (CARi) was elaborated to verify if Nintendo's return in 5 different windows were significantly different from the returns of other companies in Japanese entertainment industry considering the sample presented in Table 1. This means that in this stage a more extensive analysis was conducted considering the generation of abnormal returns for all companies in entertainment industry at the time of announcement of the game Pokémon Go! This analysis was made considering the model presented as follows:

$$CAR_i = \beta_0 + \beta_1 D\_Nintendo_i + \beta_2 ROA_i + \beta_3 Size_i + \beta_4 Debt_i + \beta_5 Tobin_i + \varepsilon_i \quad (7)$$

Considering the articulation developed in section 2, it is expected that the returns of the Nintendo company due to the launch of the game Pokémon Go! were significantly higher than the other entertainment companies. In this sense, the null and alternative hypotheses are one tailed and they are concentrated on the direction of the coefficient β_1 of the model, which has the following definition: H0: $\beta_1 \leq 0$; and H_1: $\beta_1 > 0$. It should be noted that the model presented is controlled by factors of return (ROA_i) calculated by the ratio of net income and total assets, size ($Size_i$) measured by natural logarithm of total assets, indebtedness ($Debt_i$) ratio of total debt and total assets and Tobin's Ratio (Tobini) determined considering the ratio of market value of shares plus debts and total assets. All variables were calculated according to the last quarter reported amounts by the companies.

The model specified in equation 7 serves the purpose of elucidating the relevance of Nintendo company in terms of generating cumulative abnormal returns (CARs) in different extensions of the event window. In this sense, the utility of the model is limited to the result of p-value dummy coefficient ($D\_Nintendo_i$), which would exalt the weight of valuation of Nintendo's stock in the variants of the regressions, compared to the valuation of other companies in the industry. The role played by ROA, debts and proxy for market value is to control the additive relationship conceived by the model, that is, to act as control variables. This means that, as such, these variables are not at the center of the analysis and their function is to test how strong the behavior of Nintendo's stock valuation is out of a simplified univariate comparison, such as a univariate mean differential test.

4 Discussion of Results

This section has two purposes. The first is to present the descriptive statistics of Estimation and Event Window Nintendo's stock returns. The second one is to proceed the inferential analysis of the data in order to examine the Research Hypotheses defined in section 2.

4.1 Descriptive Statistics

Table 3 presents the descriptive statistics of the daily returns observed for the entire Estimation and Event Window of Nintendo's stocks traded in the United States, Germany, Switzerland and Japan.

Table 3:
Descriptive Statistics

Securities	Estimation Window				Event Window			
	E(x)	σ_x	Min.	Max.	E(x)	σ_x	Min.	Max.
Nintendo USA	-0,032%	2,673%	-12,442%	9,162%	4,146%	9,073%	-3,937%	28,985%
Nintendo_GERM	-0,031%	2,919%	-14,245%	13,037%	4,210%	10,368%	-3,814%	32,767%
Nintendo_SWISS	-0,029%	1,956%	-7,991%	5,876%	3,936%	10,703%	-7,411%	33,071%
Nintendo_JAP	-0,085%	2,935%	-9,403%	10,383%	4,127%	7,542%	-4,523%	21,933%

Note. **E(x)**: daily average returns; **σ_x**: daily standard deviation returns; **Min.**: daily minimum return; Max.: daily maximum return;

It is presented in Table 3 that in the Estimation Window period the average returns are negative with the lowest results reported for assets traded in the United States and Japan with -0.032% and -0.085%, respectively. The dispersions of returns measured by the standard deviation were not similar different from each other. The lowest observed are present in assets traded in Switzerland and the United States, with 1.956% and 2.673%, respectively. Regarding the minimum and maximum returns observed, it can be affirmed, although in a descriptive way, that there are the presence of returns positioned below and also above three standard deviations. This high dispersion suggests the presence of outliers in the series used to determine the α and β estimators. Therefore, the application of resilient estimators to outliers in the stage of determining expected returns is in fact reasonable.

Regarding the average daily returns in the Events Window, Table 2 discloses a high disparity (if compared with the Estimation Window), but a certain homogeneity among them. In a descriptive way, it is observed that the maximum returns observed are dramatically higher than those seen in the Estimation Window. On the other hand, the minimum returns can be considered trivial. This suggests a significant increase in returns on dates that are around the day of the Pokémon Go! by the Nintendo Corporation, although in this turn inferences could not be made.

4.2 Inferential Statistics

Table 4 shows the abnormal returns (ARi) determined for Nintendo's stocks and selected companies (peers) according to Detailed Stock Report. Taking into account specifically the valuation of Nintendo's stocks, Table 4 shows the presence of abnormal positive and expressive returns from one day after the release of the game Pokémon Go!. In the days prior to the announcement, statistically significant abnormal returns cannot be observed. These results indicate that all abnormal returns prior to the launch are null, which in turn presents the absence of valuation anticipation that could happen whether stock market players had anticipated the valuation capacity on Nintendo's because of the launch game. This fragment of findings presented here has a similarity and a difference compared to the findings of Quin et al. (2017).

The similarity is that in days prior to the launch of potentially innovative devices it is not possible to observe substantial reactions in stocks of companies investigated. The difference is that the results presented here were statistically significant in a sequence of up to three days (United States, Germany and Japan) and the results presented by those authors found to be significance exclusively for announcement day.

For the days after July 6th, there are abnormal returns that are mostly significant at 1%, with emphasis on the third day after the launch with close returns or in the 30% range, which can be considered surprising when placed in perspective studies of similar thematic tendency and that applied data analyzes through Event Studies. Although Hu et al. (2013) have also found significant abnormal returns on dates close to the launch dates of new products, the greater representativeness of relevant returns remained between the previous day and the day after the launch. That is, it can be argued that the results observed in this study showed the propagation of abnormal returns in quantity of days above what is usually observed in empirical research.

Table 4 also presents that abnormal returns of similar magnitude to Nintendo were not observed in other comparable assets. This result suggests that the announcement of Pokémon Go! was an event with specific informational content and particular to Nintendo corporation and proved to be a positive surprise for the stock market. In certain degree, this lack of similarity in returns was already expected and this comparison is present much more to give a certainty that the launch event of Pokémon Go! would not be confused with a systematic event impacting the entire market, which would weaken the hypothesis that the launch of the game by the company led specific information content. Therefore, although in a tenuous way, these results resemble those found by Mann and Babbar (2017).

It should be noted how dramatic those returns were after the date of the event. For example, in assets traded in the United States, the abnormal return of 28.57% (on the third day) translates into a t-test of 11.39, which cannot be considered normal even for abnormal abnormal returns above levels traditionally used of 1%, 5% and 10%. Thus, considering the results of the abnormal returns shown in Table 4, there is evidence to confirm the first Research Hypothesis (H1) that the Pokémon Go! led to informational content causing abnormal positive returns on Nintendo's stock.

Table 4:
Abnormal Returns (AR_i) calculated for Event Window for 5 days prior to and 5 days after the global announcement of the Pokémon Go Game!

Companies	5 days before	4 days before	3 days before	2 days before	1 day before	Event Day	1 day after	2 days after	3 days after	4 days after	5 days after	Standard Error
Nintendo (USA)	0.32%	2.46%	-0.89%	-0.51%	-0.94%	0.22%	6.25%***	8.59%***	28.57%***	-0.75%	-3.72%	2.51%
Nintendo (GERM)	-2.21%	1.93%	-1.03%	-0.21%	-2.47%	2.68%	5.56%**	11.68%***	31.22%***	-2.69%	-4.75%	2.70%
Nintendo (SWISS)	-1.37%	-0.85%	-0.33%	-0.50%	3.74%	0.28%	0.06%	12.01%***	32.48%***	0.86%	-7.44%**	2.70%
Nintendo (JAPAN)	-0.13%	2.47%	0.88%	-0.18%	-1.39%	1.33%	4.61%**	10.09%***	17.91%***	9.36%***	-5.80%**	2.20%
Bandai	1.48%	1.62%	0.16%	1.77%	0.42%	0.08%	-1.29%	1.41%	0.94%	-3.44%**	-0.65%	1.64%
Koei	-2.09%	1.71%	2.57%	-0.43%	-0.69%	-0.54%	0.21%	0.39%	3.37%	-1.04%	0.40%	1.89%
Sanrio	-1.49%	2.31%	0.08%	-0.26%	-0.61%	-2.03%	1.37%	-0.38%	1.22%	0.74%	0.68%	1.78%
Tomy	0.81%	4.21%	-1.06%	0.93%	5.21%***	1.07%	-3.99%	0.68%	2.97%	-2.06%	0.44%	2.16%
Happinet	1.68%	-1.71%	-1.64%	-0.08%	-0.18%	-0.38%	2.29%	-2.29%	-1.09%	6.32%***	-2.21%	1.51%
Fujishoji	0.42%	0.02%	1.10%	-0.31%	-1.03%	0.10%	-0.02%	1.57%	-2.07**	0.13%	-0.50%	0.93%
FuRyu	-0.93%	3.18%	0.14%	2.37%	0.85%	-2.09%	-0.84%	0.56%	-0.67%	-0.10%	1.09%	2.74%
Nuts Inc	0.40%	-0.67%	1.10%	-0.58%	-1.14%	0.71%	0.19%	2.00%	-3.38%	-0.74%	-0.95%	4.85%
People	1.90%	0.94%	-1.32%	3.07%	-2.20%	1.40%	0.76%	-3.32%	-1.59%	-3.17%	-0.74%	2.80%
Kotobukiya	-0.78%	5.52%**	0.46%	2.52%	-3.01%	3.49%	-2.15%	-1.49%	-3.67%	-6.31%***	-0.80%	2.54%

Note. Authors. The Event Window comprises 5 days before the Event Day (July 06th 2016), including days 01th, 05th, 06th, 07th and 08th July and 5 days after which days are 12th, 13th, 14th, 15th and 19th July. For Nintendo USA, Nintendo GERMANY, Nintendo SWISS, the market portfolios used to determine daily market returns were NASDAQ, DAX and SWISS MARKET indexes, respectively. Abnormal returns (AR_i) were calculated with OLS regressions for each event study conducted. ***, ** and * represent the significance of abnormal returns (AR_i) at the 1%, 5% and 10% level, with critical values (one tail) of 2.33, 1.64 and 1.28, respectively. Standard Error: determined for the estimation window for each computed regression. For example, it can be noted that the Abnormal Return of Nintendo's stock (JAPAN) in 07/08/201 (column 3 days after) was 17.91%. The t-test calculated for this abnormal return is 8.14 (0.1791 / 0.0220), which p-value related is less than 1%. The regressions for the Estimation Window were computed with HAC (Heterokesdasticity and Autocorrelated Consistent) for assets in which the assumptions of homoscedasticity and (or) autocorrelation were not observed: Nintendo (GERMANY), Sanrio, Happinet and Nuts Inc. All series of daily returns of stocks and market portfolios were tested for the presence of unit root. Null hypothesis of presence of root unit (ADF test) was rejected for the 14 assets.

To examine the robustness of the results presented in Table 4, Table 5 shows the abnormal returns calculated considering robust estimators to the presence of outliers.

Table 5:
Least Absolute Deviation (LAD) Abnormal Returns (AR_i) calculated for Event Window for 5 days prior to and 5 days after the global announcement of the Pokémon Go!

Days	Nintendo (USA)	Nintendo (GERMANY)	Nintendo (SWISS)	Nintendo (JAPAN)
5 days before	0,32%	-1,99%	-1,50%	-0,10%
4 days before	2,48%	2,25%	-0,98%	2,55%
3 days before	-0,84%	-0,24%	-0,47%	0,91%
2 days before	-0,41%	-0,28%	-0,64%	-0,14%
1 day before	-0,78%	-0,31%	3,59%	-1,35%
Event Day	0,29%	1,94%	0,13%	1,32%
1 day after	6,36%***	4,14%	-0,08%	4,63%**
2 days after	8,62%***	10,75%***	11,87%***	10,08%***
3 days after	28,66%***	31,54%***	32,34%***	18,03%***
4 days after	-0,66%	-2,00%	0,72%	9,46%***
5 days after	-3,57%	-3,63%	-7,59%**	-5,74%**

Note. Authors. ***, ** and * represent the significance of abnormal returns (AR_i) at the 1%, 5% and 10% level, with critical values (one tail) of 2.33, 1.64 and 1.28, respectively.

It can be seen in Table 5 that even after estimation of α and β parameters taking into consideration robust estimators to the presence of extraordinary daily returns, the levels of significance for the abnormal returns of the Nintendo company remained similar to those obtained by estimations in ordinary least squares. In this sense, the results contained in Table 4 corroborate the idea of generating significant and positive abnormal returns one day after the world launch of the game Pokémon Go! and thus confirming surprising and unexpected reaction of the stock market. It should be noted that since the results of the abnormal returns of companies comparable to Nintendo were not expressively different from those observed in Table 3, it was decided not to report them.

Table 4 has already demonstrated the presence of abnormal positive returns that differ from Nintendo's assets relative to their peers. However, in order to expand this examination to the entire entertainment industry in Japan where it is a representative part of the Nintendo company's peers and competitors, it was decided to examine whether the company's returns are significantly different from those of entire entertainment industry. The companies considered here were those that had shares listed in Japan during the announcement period of Pokémon Go! game and had daily price quotations of their shares that allowed the construction of events studies for each of them, as presented in subsection 3.2. This analysis was carried out through 5 linear regression variants cross sections in which it was verified, through a dummy variable, whether cumulative abnormal returns (CARi) of the Nintendo company for 5 specific intervals are statistically different. These results are presented in Table 6.

Table 6:
Cross Section Analyses considering all companies of entertainment industry and Nintendo Peers.

Variables	*CAR (0, 1)*	*CAR (0, 2)*	*CAR (0, 3)*	*CAR (0, 4)*	*CAR (0, 5)*
Constant	-0.12681 (0.137494)	-0.09826 (0.107424)	-0.09844 (0.123627)	-0.03743 (0.120009)	-0.02533 (0.134582)
D_Nintendo	0.37179*** (0.0705187)	0.42458*** (0.0550963)	0.43885*** (0.0634066)	0.43244*** (0.0615506)	0.43067*** (0.0690253)
ROA	-0.06295 (0.172355)	-0.01555 (0.134661)	-0.05623 (0.154972)	0.05369 (0.150436)	0.09996 (0.168705)
Size	0.00460 (0.00555218)	0.00326 (0.00433792)	0.00320 (0.00499222)	0.00096 (0.00484609)	0.00049 (0.00543460)
Debt	0.05766 (0.0665807)	0.10179* (0.0520196)	0.10453* (0.0598658)	0.14185** (0.0581134)	0.18122*** (0.0651707)
Tobin Ratio	-0.00077 (0.00751529)	0.00187 (0.00587170)	0.00257 (0.00675735)	-0.00288 (0.00655954)	-0.00163 (0.00735614)
R^2 Adj.	36.3971%	55.7842%	49.9116%	51.1059%	45.7138%
F (5, 47)	6.95***	14.12***	11.36***	11.87***	9.76***
Observations	53	53	53	53	53
Reset Ramsey	0.47100	0.32800	0.40000	0.09510	0.08590
Heterocedasticity	0.73066	0.04038	0.00774	0.11017	0.04735

Note. $CAR_i = \beta_0 + \beta_1 D_Nintendo_i + \beta_2 ROA_i + \beta_3 Size_i + \beta_4 Lev_i + \beta_5 Tobin_i + \varepsilon_i$D_Nintendo: "1" for the company and "0" for the others; ROA: net income / total assets; Size: natural logarithm of total assets; total debt in debt / total assets; Tobin: Market value of stocks and total debt/total assets. Ramsey Reset: p-values to test the null hypothesis that the model is linear. Heteroscedasticity: p values to test the null hypothesis of no heteroscedasticity. For the CAR model (0,3) the regression was computed with robust standard error. ***, ** and * represent the significance 1%, 5% and 10%.

According to data presented in Table 6, at the significance level of 1%, it was rejected the null hypothesis that the coefficient associated to the dummy of the model in question is less than or equal to zero, validating the assertion that the accumulated abnormal returns (CARi) are positive and significant. It can be seen from the results of estimation of the coefficients, the differential power of company's dummy in relation to other companies with shares listed in Japanese stock exchange at the time of announcement of game Pokémon Go!. Based on the findings presented in Table 4, there are elements to confirm the second Research Hypothesis (H2) that the cumulative abnormal returns after the Pokémon Go! are more pronounced in Nintendo's stocks compared to the companies that make up the entertainment industry in Japan. It should be noted that these results are controlled by specific factors of the companies that composed the analysis, which confers robustness to the findings.

The evidence that can support hypothesis 2 has implications for the field of empirical research and for the performance of corporate managers. Initially, it is identified that the cumulative abnormal returns after the announcement of Pokémon Go! were more pronounced in Nintendo's actions compared to the companies that make up the entertainment industry in Japan. From this, it can be argued that this result suggests a capital market response to the innovative processes developed by Nintendo, which in turn, taking into account a strategy point of view, it is a way of confirming the recognition of the stock market with regard to the generation or creation of competitive advantages.

This result can be presented as an illustrative example for organizations that intend to venture into the search for competitive advantages through innovation, which are capable of enhancing the permanence of their businesses. As Sorescu and Spanjol (2008) advocate, this result is a way to bring company managers closer to concrete marketing plans. In addition, advances are already made with the results already socialized in terms of product and service launch announcements (Warren & Sorescu, 2017).

It is estimated that product launch ads, as much as they may cause an upheaval in the capital market (Warren & Sorescu, 2017), these are subjectivity when aligned to innovative processes with disruptive characteristics (OECD, 2005; Christensen, 2013) and subjects to public scrutiny. A company can idealize filling a gap (linked to the supply of specific products and services) and the market assessment can be indifferent or even negative. Therefore, this example also shows a face of mercadologic risk involved in investments mobilized for innovation processes. (Duncan, 2011; Umiastowski, 2012; Lopes & Beuren, 2016).

5 Conclusion

The release of Pokémon Go! by the company Nintendo represented an important event for the entertainment industries present in Japan and in the World. Features and peculiarities, such as the use of augmented reality, georeferencing and mobility attributes instantly triggered the curiosity of thousands of people, which led the game to receive 1 billion downloads. In this scenario, this investigation was immersed in order to discuss the stock market reaction to the launch of Pokémon Go!. The research addresses as the field of investigation the entertainment industry listed on the stock exchange in Japan. The results indicated that the launch of the game Pokémon Go! has led to informational content inciting abnormal positive and sharply significant returns in Nintendo's stock. Additionally, cumulative abnormal returns after the release of Pokémon Go! were more pronounced in Nintendo's stocks compared to companies that integrated the entertainment industry in Japan.

This research provides support for three streams of research present in the contemporary literature. First, the findings are consistent with the efficient market hypothesis in its semi strong form, since Nintendo's stocks were adjusted based on the information disclosed by the company. The market did not anticipate itself in relation to the announcement of the game, a fact that evidences that it did not know of such an event in advance or remained calm as a speculation, in order to observe how it would be the reaction of the effective target public of the game. Thus, it is noted that the market absorbed the information that had been disclosed by the company regarding the availability of the game. In this situation, the market reacted by propagating abnormal returns up to three days after the game's launch for all Nintendo assets studied. It is emphasized that this valuation on stocks was not identified in other comparable assets, a fact that receives HME support in its semi strong configuration. Furthermore, the behavior observed here related to the abnormal returns may also reflect a learning process on the part of the investors (Sawyer & Gygax, 2001), that is, these investors or interested in Disruptive innovation already have expertise regarding the behavior of the market in what concerns the launch of games. This fact may also be included in the results discussed so far.

Second, the launch of the Pokémon Go! represents an innovation with typical traits of disruptive change to the technology market as it is characterized as a large-scale augmented reality experience. The announcement of the game was probably the first time the augmented reality experience has been tested on a planetary scale and the strength of the abnormal returns specific to Nintendo's stocks indicates that this experience did not go unharmed to capital markets. The company made use of this technological attribute to offer the market an experience, which it had not yet experienced. The use of the artifacts present in the characteristics of the Disruptive innovation revived a media belonging to The Pokémon Company, which has been present in the world since the 1990s. The launching of the game is aligned to what is proposed by Christensen (2013), as presents the ability to create different markets from the use of augmented reality,

georeferencing and mobility attributes in an instant. Another attribute perceived in the market that matches to the practice of Disruptive innovation by The Pokémon Company is that it provides the use of smartphone with a different attribute, the integration of reality with fiction, through the game. As a consequence, it is perceived that Nintendo seeks to differentiate itself from other companies also by creating elements of competitive advantage. For competitors, a timely scenario is illustrated, given that they can benefit from the use of Disruptive innovation to modify products and services, given the shocking market receptivity.

Finally, the third stream of contribution of this research hinges on the emergence of the line of research called financial marketing (Delattre, 2007) recognizing the effects of launching a game that uses augmented reality through Disruptive Innovation. Thus, integrating the elements of marketing and finance is also a way to demonstrate to internal and external users the creation of value from the perspective of the user of the game.

The construction of an investigation is a work developed by researchers, which is not free of limitations. In this sense, the methodological approach used to explore the research objectives are not the only ones and other methodological choices can be made to understand the signage that the game's launch had on the business world. It is also necessary to seek answers to the behavior of the entertainment industries in the world, since the launch of the game was worldwide, we can broaden the discussions listed in this research to recognize the launch of Pokémon Go! as a representative case of disruptive innovation.

This research explored the announcement in a transversal way, which means verifying Nintendo and its industry in a specific date. Taking into account the results disclosed by the investigation, a suggestion for future research is to valuate announcements and releases in a longitudinal way. In addition, it would still be possible to discuss the intraday reactions of Nintendo assets and therefore analyze the performance of abnormal returns in high frequency.

References

ARK Invest. *Invest in the Future*, Today. Recovered in 09 may, 2019, of https://ark-invest.com/disruptive-innovation-ark

Barros, C. M. E., Lopes, I. F., & de Almeida, L. B. (2019). Efeito contágio da operação carne fraca sobre o valor das ações dos principais players do mercado de proteínas do Brasil e do México. *Enfoque: Reflexão Contábil, 38*(1), 105-122. http://dx.doi.org/10.4025/enfoque.v38i1.39966

Benninga, S. (2008). *Financial modelin*g. MIT Press Books.

Cândido, A. C. (2011). Inovação disruptiva: Reflexões sobre as suas características e implicações no mercado. *Working paper:* Faculdade de Ciências e Tecnologia da Universidade de Lisboa. Disponível em: https://run.unl.pt/bitstream/10362/6912/1/WPSeries_05_2011ACC%c3%a2ndido-1.pdf

Carli, I. C. D. S., Gastal, S. A., & Gomes, M. N. (2016). Pokémon Go, Realidade Aumentada e Georeferenciamento: A gamificação nas suas possibilidades para o Turismo. *Revista Hospitalidade, 13*, 01-17. doi: https://doi.org/10.21714/1807-975X.2016v13nEp0117b

Cascón-Katchadourian, J., Ruiz-Rodríguez, A. Á., & Alberich-Pascual, J. (2018). Uses and applications of georeferencing and geolocation in old cartographic and photographic document management. *El Profesional de la Información*, *27*(1), 202-212. doi: http://dx.doi.org/10.4067/S0718-27242019000100073

Chaney, P. K., Devinney, T., & Winer, R. S. (1991). The Impact of New Product Introductions on the Market Value of Firms. *The Journal of Business, 64*(4), 573-610. doi: http://dx.doi.org/10.1086/296552

Christensen, C. M., Raynor, M. E., & McDonald, R. (2015). What is disruptive innovation. *Harvard Business Review, 93*(12), 44-53.

Christensen, C. M. (2013). *The innovator's dilemma: when new technologies cause great firms to fail.* Harvard Business Review Press.

Delattre, E. (2007). Event study methodology in marketing. *Recherche et Applications en Marketing, 22*(2), 57-75. doi: https://doi.org/10.1177/205157070702200204

Dorward, L. J., Mittermeier, J. C., Sandbrook, C., & Spooner, F. (2017). Pokémon Go: benefits, costs, and lessons for the conservation movement. *Conservation Letters, 10*(1), 160-165. doi: https://doi.org/10.1111/conl.12326

Eddy, A. R., & Saunders, G. B. (1980). New product announcements and stock prices. Decision sciences, 11(1), 90-97. https://doi.org/10.1111/j.1540-5915.1980.tb01127.x

Elton, E. J., Gruber, M. J., Brown, S. J., & Goetzmann, W. N. (1995). *Modern portfolio theory and investment analysis*. New York: John Whiley & Sons Inc.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417. doi: https://doi.org/10.2307/2325486

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance, 46*(5), 1575-1617. doi: https://doi.org/10.1111/j.1540-6261.1991.tb04636.x

Grar, A. (1997). *Etude d'événement*: encyclopédie des marchés financiers. Paris: Economica.

Hu, C., Jiang, W., & Lee, C. F. (2013). Managerial flexibility and the wealth effect of new product introductions. *Review of Quantitative Finance and Accounting, 41*(2), 273-294. doi: https://doi.org/10.1007/s11156-012-0310-3

Johnston, M. A. (2007). A review of the application of event studies in marketing. *Academy of Marketing Science Review, 11*(4), 1–31.

Koku, P. S., Jagpal, H. S., & Viswanath, P. V. (1997). The effect of new product announcements and preannouncements on stock price. *Journal of Market-Focused Management, 2*(2), 183-199. doi: https://doi.org/10.1023/A:1009735620253

Lasalle, L. (2016). *Pokémon Go! fait bondir Nintendo en bourse*. Recuperado de https://branchez-vous.com/2016/07/11/Pokémon-go-fait-bondir-nintendo-en-bourse/

Lopes, I. F., & Beuren, I. M. (2016). Evidenciação da Inovação no Relatório da Administração: uma análise na perspectiva da Lei do Bem (Lei Nº. 11.196/2005). *Perspectivas em Gestão & Conhecimento*, *6*(1), 109-127.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature, 35*(1), 13-39.

Mann, B. J. S., & Babbar, S. (2017). New product announcements effect on stock prices in India. *Journal of Asia Business Studies*, *11*(4), 368-386. doi: https://doi.org/10.1108/JABS-08-2015-0145

Markides, C. (2006). Disruptive innovation: In need of better theory. *Journal of Product Innovation Management, 23*(1), 19-25. https://doi.org/10.1111/j.1540-5885.2005.00177.x

Ojah, K., & Monplaisir, L. (2003). Investors' valuation of global product design and development. *Journal of International Business Studies, 34*(5), 457-472. doi: https://doi.org/10.1057/palgrave.jibs.8400049

Qin, M., Tang, C. H. H., Jang, S. S., & Lehto, X. (2017). Mobile app introduction and shareholder returns. *Journal of Hospitality and Tourism Management, 31*, 173-180. doi: https://doi.org/10.1016/j.jhtm.2016.11.006

Romano, P. R., & Almeida, V. D. S. (2015). Analysis of Effects in Capital Markets Resulting from Mergers: The BRF Case. *Revista de Administração Contemporânea, 19*(5), 606-625. doi: https://doi.org/10.1016/j.jhtm.2016.11.006

Sawyer, K. R., & Gygax, A. (2001) How Eventful are Event Studies?. *Available at SSRN*: https://ssrn.com/abstract=260697. https://doi.org/10.2139/ssrn.260697

Sorokina, N., Booth, D. E., & Thornton Jr, J. H. (2013). Robust Methods in Event Studies: Empirical Evidence and Theoretical Implications. *Journal of Data Science, 11,* 575-606.

Sprague, K. (2015). Innovative announcement effects in the pharmaceutical industry via stock market volatility. *University of Colorado, Boulder*, 957.

Tu, H. J. (2012). Performance implications of internet channels in financial services: A comprehensive perspective. *Electronic Markets*, *22*(4), 243-254. https://doi.org/10.1007/s12525-012-0108-0

Wooldridge, J. M. (2012). Introductory econometrics: a modern approach (upper level economics titles). *Southwestern College Publishing, Nashville, T ATN, 41*, 673-690.

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