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Fundraising across digital divide: evidences from charity crowdfunding.

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"As our circle of knowledge expands, so does the circumference of darkness surrounding it."

Albert Einstein

Un ringraziamento particolare alla mia famiglia che mi ha supportato per tutti questi anni.

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Contents

Abstract.

This thesis spans across two main areas of interest that may seem very distant, but in reality, they are not. Crowdfunding is a “modern” way to raise capital, at least its digital counterpart. Most of the studies on this topic focus on the commercial side and few on the human side. In this paper, we focused on donation-based crowdfunding. We wanted to understand if the effectiveness of this web-based fundraising method was correlated to several other contextual factors related to the degree of digitalization in different geographic areas and social media. These topics are of particular interest, especially for those working on a crowdfunding campaign who would like to foresee its dynamics based on the context.

We analyzed the topic with the help of charitable donations data from the Italian division of Mary’s Meals. The non-profit organization is embracing the grassroots culture and it is embracing it by empowering its backers (and itself) with a simple, crowdfunding-oriented, online platform. Digital divide data came from ISTAT and it is on a regional scale. Available data covers the period April 24 2015, January 10 2017. We measured the efficiency using the donations received through the online platform, identified one variable for each area of interest among the appropriate ones and performed correlation and bivariate analysis. We proposed a model to test the validity of our hypothesis based on four indicators. The purpose of this study is thus to act as a starting point for other scholars.

Analysis of data in our case showed a positive and significant effect of digital literacy (measured with time spent using a personal computer) on donations to the charity, confirming our hypothesis. Our model shows a great correlation among our dependent variable and social media activity (number of post shared on the Facebook page of the organization). The impossibility to establish a causal relationship opens up even more questions for research. It also shows us that digital infrastructure development (measured using the amount of families that uses broadband connections) does not interact with the dependent variable; while it is true in our case, we suggest that it may be different in others. Moreover, it shows that external events (measured using the date variable since holydays happen at the end of the year) do not seem to influence our dependent variable. Further research showed quantity increase but reduction in size of donation for year-end holydays.

1 - Introduction

Crowdsourcing has been around since before it was defined so, it is a method to leverage the crowds in order to deliver results. Crowdsourcing as we define it is a broad category encompassing many different sub-categories, crowdfunding being probably the most known among all.

There is no one field where this method could not be employed, in fact examples span from astrology to public health. In the past crowdsourcing has been broadly used when in need to find an economic and efficient solution to known problems, the first known of such contests dates back to 1714: The Longitude Prize. When the British government was trying to find a way to measure a ship's longitudinal position, they offered the public a monetary prize to whomever came up with the best solution.[1]

The advent of the internet marked a turning point for crowdsourcing since the dematerialization of information made it easier to reach a vast public with little effort; it was just a matter of time before the first crowdsourcing platform would appear. In 1996 by Timothy Maxwell Keiser, Michael R. Burns, The Hollywood Stock Exchange is a web-based, multiplayer game in which players use simulated money to buy and sell "shares" of actors, directors, upcoming films, and film-related options. In 2007, players in the Hollywood Stock Exchange correctly predicted 32 of the 39 major-category Oscar nominees and seven out of eight top-category winners.[2] This can be viewed as the first online crowdsourced prediction platform.

Crowdfunding as well is not a new phenomenon, the Statue of Liberty campaign resembles a modern online crowdfunding effort, in fact, it raised money from more than 160,000 donors, including young children, executives, street cleaners and politicians, with more than three-quarters of the donations amounting to less than a dollar. It was a triumphant rescue effort: in just five months, The World raised $101,091 - enough to cover the last $100,000 to complete the pedestal and have money left over for a gift for the sculptor. If launched today, the campaign would be a classic crowdfunding project like those run online.[3]

Internet based crowdfunding become popular around 2003 when ArtistShare was launched as a platform gathering donations from fans in order to help artist get their records

[1] A Brief History of Crowdsourcing. Crowdsourcing.org
[2] Rachael King Hollywood Games People Play. *Businessweek.com*
[3] The Statue of Liberty and America's crowdfunding pioneer. BBC News

produced. Today it is a fundraising platform for emergent artists. ArtistShare success triggered the proliferation of reward-based crowdfunding platforms the most important of which are Kickstarter and Indiegogo. In 2014, more than 1,200 online crowdfunding platforms facilitated approximately $16bn of investment across the globe. Current estimates suggest investment volume exceeded $30bn in 2015.[4]

1.1 – Crowdsourcing

Crowdsourcing can be viewed as a sort of peer production but we must pay attention to some crucial differences between the concepts as Yochai Benkler (2016) states in his paper Peer Production and Cooperation:

- [Peer production] Organizationally, it combines three core characteristics: (a) decentralization of conception and execution of problems and solutions, (b) harnessing diverse motivations, and (c) separation of governance and management from property and contract. ()
- [Crowdsourcing] would most usefully be applied to instances where cost reduction, rather than distributed exploration of a resource and opportunity space, is the core function of the system. This would properly apply to situations where the task is conceived and defined by a given entity, and then put out to distributed individuals whose actions are limited to performing the pre-conceived task.

It is easy to notice how the scope of peer production is broader as the conception of problems and the execution of solutions is decentralized rather than being predetermined by the initiator (crowdsourcer) seeking the crowds for solutions to previously stated problems. The most notable example of something achieved using peer production is Wikipedia, it is the perfect example of how peer production works, the players (peers) would organize themselves to achieve the goal of codifying knowledge for others to freely access (Spagnoletti et al. 2015). On the other hand, a great example of crowdsourcing is Amazon Mechanical Turk, which gathers a crowd of workers, in order to perform tasks that are not readily performed by computers such as image recognition, and assigns them a monetary reward for completing the task.

[4] The Secret Life of Crowdfunding

1.1.1 – Definition

Since crowdsourcing as a concept is not confined by the field it is applied to, giving a precise definition can be a complex task. Jeff Howe and Mark Robinson invented the term while writing an article for Wired and since then it was misused by many as a surrogate to Benkler's concept of common-based peer production, he stepped in giving his own definition: *"Crowdsourcing is the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call."* [5]

This definition, while being correct, leaves aside many important aspects of crowd sourcing; Enrique Estellés-Arolas and Fernando Gonzales-Ladron-de-Guevara in their paper "Towards an integrated definition of crowdfunding" followed Tatarkiewicz's approach (find a definition using others' definitions) to construct a comprehensive definition of the term. They analyzed 209 documents and found 40 definitions among which the most cited were from Howe, Brabham and Wikipedia. They transformed the elements, from the author's point of view, designated as differentia specifica into concepts and obtained the components for an integrated definition, which is:

"Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken."

1.1.2 - Why crowdsourcing?

The rise in popularity of crowdsourcing is driven by many factors, listing all of them is out of the purpose of this research; Eric Schenk and Claude Guittard, in their 2009 paper Crowdsourcing: What can be Outsourced to the Crowd, and Why?, pointed out 3 potential benefits for which crowdsourcing is employed by firms, which are:

[5] Jeff Howe, June 2, 2006. Crowdsourcing: A Definition.

Cost: most of the participants are amateurs who wish to use their skill in their spare time; they usually do not rely on crowdsourcing tasks as their main income and most of the time they are pushed by non-material incentives such as ego gratification, peer recognition or skill signaling (von Hippel and Von Krogh, 2003; Lerner and Tirole, 2002).

Quality of output: Given a large enough beta-tester and co-developer base, almost every problem will be characterized quickly and the fix will be obvious to someone. (Raymond, 1999)

Risk can be reduced because of:

- Lower bargaining power of service providers (many, dispersed)
- Confidence in obtaining a satisfactory output

Or increased by:

- Reliance on a third party platform whose decisions may affect the firm.
- Crowdsourcing like outsourcing does not promote the in house development of new skills.
- Uncertainty that proposed solutions may not give rise to IPR litigations.

The ultimate objective of crowdsourcing is the development and realization of a project for which, unlike crowdfunding, non-monetary contributions are needed that are based on the knowledge of the individuals involved. Nevertheless, crowdsourcing and crowdfunding are strictly related in fact besides the similarities in pronunciation they both leverage the possibilities of collaboration offered by the web that can ultimately amplify the opportunities to innovate or to get financing in a timely manner. Now that the concept of crowdsourcing is clear let's direct our analysis towards crowdfunding.

1.2 - Crowdfunding

1.2.1 - History

Crowdfunding as we know it today is closely related to the web, in fact we can hardly hear about it elsewhere; the first web-related crowdfunding project is considered to be a successful effort of an English rock band, the Marillion, to tour the united states and complete their last album. They realized the potential of the net and even though in 1997 its use was not so popular, they managed to raise $60000 reaching their goal.

"We emailed the 6000 fans on our database to ask, “Would you buy the album in advance?” most replied “yes.” We took over 12,000 pre-orders and went on to use the money to fund the writing and recording of the album. That was the crowdfunding model that has been so successfully imitated by many others including the most successful, KickStarter." [6]

During year 2000, another fundraising web portal "JustGiving" was founded; they allowed users to donate through their website, using debit or credit card, to registered charity associations or to individuals whose project aim was charitable. They introduced a fee system, usually a percentage on the donation, to help the continuation of the service. Such system would later be adopted by most of the crowdfunding platforms.

ArtistShare's success in 2003 paved the road for reward-based crowdfunding; from 2008 throughout 2009 both the Indiegogo (enables people to donate funds easily by removing the intermediary) and Kickstarter (a funding platform for creative projects supported by friends, fans and the public in return for rewards) projects gained traction. Their range spans from arts to social causes to small businesses. In 2012 Fundable was the first equity crowdfunding platform to launch in conjunction with the jobs act signed by the United States president Barack Obama.

Massolution crowdfunding industry report of 2012 highlighted a 38% growth in the number of crowdfunding platforms from 2007 to 2008 and estimated it to be 557% from the same period to 2012. In 2011, almost $1.5 billion was raised by crowdfunding platforms and the estimated total funding volume for 2012 of around 2800 million. It is worth to mention that of the total 1.187 million campaigns worldwide in 2011, 532,000 were from the U.S.A. and 654,000 were from Europe leaving just 1000 campaigns to the rest of the world. [7]

The current financial market crisis affected various business sectors and in particular that of research and development, which caused a slowdown in innovation and development of enterprises. The widespread growth of crowdfunding in recent years is due to several factors, the crisis of traditional credit models due to the credit crunch in particular has severely curtailed access to credit. Consequently, lower risk propensity among investors sharply reduced investment. New ways of fundraising offered by the web are developing, giving start-ups greater visibility to a larger audience and consequently raising the probability of participation from investors.

[6] How Marillion pioneered crowdfunding in music, virgin.com.
[7] Massolution, crowdfunding industry report 2012

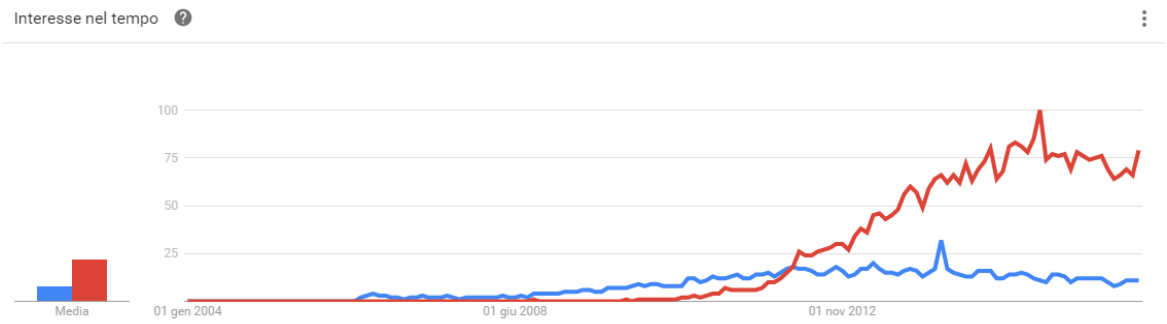

Figure 1 - Image by Google Trends, Crowdsourcing vs Crowdfunding popularity over time.

1.2.2 - Definition

In order to have a clear picture of the topic we will discuss in this paper we need to address the definition of the term crowdfunding, not for the term itself but to understand what are the different aspects we should focus on. Belleflamme et al. (2012) provide a conceptual definition of the phenomenon:

"*Crowdfunding involves an open call, mostly through the Internet, for the provision of financial resources either in form of donation or in exchange for the future product or some form of reward and/or voting rights*."

Rob Gleasure and Joseph Feller (2016) in their paper a metatriangulation of crowdfunding research provide a techno centric definition that does not restrict crowdfunding to specific forms:

"*Behavior where groups of individuals use digital technologies to fund people, projects, or businesses in exchange for financial or developmental commitments from those people, projects, or businesses"*

1.2.3 - Typologies

Even though crowdfunding is a recent phenomenon, it quickly developed and evolved acquiring different flavors. We can distinguish among them based on the type of project proposed or the reward promised to backers, we could relate this distinction to the platform chosen by the project initiator since there are more generic and more focused ones. On a generic platform, various projects coming from different fields and different area of interest can be found an example is Indiegogo; instead on a focused one only projects regarding a particular field can be proposed an example is JustGiving.

Differences in the type of reward offered to backers give rise to different models of crowdfunding, Rob Gleasure and Joseph Feller (2016) provide a differentiation of the categories according to two theoretical dimensions: the nature of returns, which can be financial or can take other forms such as material objects or social goods and the certainty of return to funders (I.e. fixed in advance or indefinite and conditional to some events). The main crowdfunding categories that they suggest are:

1) Reward-based: also known as crowd patronage, is the most widely spread and well known of all, Massolution (2013) reports that 43% of all crowdfunding platforms operate according to this flavor with an increase with respect to the previous year of 79%. This crowdfunding model is based on a compensation given by the initiator of the campaign to the funders; they are usually awarded different prices according to the donated sum. There are two categories in which reward-based crowdfunding can be subdivided; pre-order, people pay in advance for their goods, or profit-sharing where, if certain conditions are met and for a determined timeframe, the donor will be awarded part of the profits according to the amount of the donation. Returns for reward-based crowdfunding fall on the definitive side, as investors are awarded material or social benefits. Most of the times they are awarded with token rewards. We can distinguish two types of crowdfunding methodologies based on that happens at the end of the crowdfunding campaign:

- All or Nothing: given a fundraising period for the project, if the predetermined goal is reached or surpassed, the initiator will be able to obtain financing equal to the amount achieved, if not all pledged amount will be given back to the backers.
- Keep it All: the initiator will receive all collected funds disregarding the goal amount, then it is up to the initiator whether to keep the money to finish the project or refund all contributors.

2) Lending-based: it is a pure financial model of crowdfunding; it originates from the evolution of P2P lending through the internet and is based on the idea that classic financing channels are not available to anyone or ask for prohibitive interest rates and so crowd lending became a valuable alternative. In 2011 Massolution report (2013) highlights that lending-based crowdfunding is the smallest category of platforms amounting to 13% of all platforms with a growth rate at 50%. In this case, the platform gathers financing requests and looks for backers to fund part of the requested amount; backers will be paid through interest payments. Platforms operating in this area follow two models; they act as intermediaries, getting funds from lenders and giving it to borrowers bearing all the risk, or as meeting points for lenders and borrowers thus bearing no risk. In either case, typical activities offered by the

platforms resemble those of a money transfer institute. Gleasure and Feller (2016) define returns in this category as highly financial and definitive since funders receive back any principal plus interest according to the agreed contract.

3) Equity-based: is a relatively new form of crowdfunding and probably the most complex of all types. In this field, information asymmetries play an important role as investing in equity does not provide any form of protection against fraud. Over the last 5 years thanks to the intervention of governments to regulate the phenomenon it has gained much popularity, Massolution reports a 114% increase in the number of platforms operating according to this model, mainly in Europe. Gleasure and Feller (2016) describe the returns of this category as highly financial yet less definitive as it is impossible to predict the amount and date of payments. Even though returns are uncertain, investors in this category shows a clear preference towards big projects with 21% of them that raised more than $250,000 in funding. It is important to notice two distinct models applied by platforms in this area of interest: the cooperative model where funds are pooled into a single legal entity that is able to invest in single businesses, and the club model where each member is treated as part of a private investment club in such a way that limitation on public offerings can be circumvented.

4) Donation-based: this model of crowdfunding is based on voluntary donations without the necessity of a reward of any kind. Usually the objectives of these campaigns are oriented towards social and humanitarian causes; the payoffs are not specified in fact most of the times there is no physical or financial reward for a donation since investors are usually driven by ideological, philanthropic intentions or personal beliefs and passions. Gleasure and Feller (2016) define the returns for this category as less financial and less definitive. Nonetheless, Massolution reports that donation-based crowdfunding platforms are growing at a pace similar to the lending-based one at 41% but show much smaller projects with 66% of them generating less than $5,000. Since this category is based on feelings, it is well suited to cope with emergencies since it can be significantly faster to obtain funding through this channel than through government grants or other traditional fundraising methods.

1.2.4 - Actors and motivations

Multiple actors play distinct roles and bear different responsibilities in the crowdfunding process, according to the chosen type (which we just discussed); the most prominent and widely adopted model for crowdfunding is the indirect one since an intermediary, in the form of a platform, is present. Unfortunately not many researchers

focused on the direct model since data gathering is a difficult task when dealing with multiple singular initiatives. Belleflamme et al. (2010) make a distinction based on the scope of the campaigns and states that the indirect model is better suited for broader scope entrepreneurial initiatives while the latter is connected to social entrepreneurship. Agrawal et al. (2013) identify three primary actors in crowdfunding: funders, creators and platforms. We now go into a deeper explanation of their role, incentives and possible disincentives in the crowdfunding process.

Funders

Also known as, "the crowd" or the group of people the open call is addressed to; it represents a large and anonymous group. It is well known that the first backers of any embryonal stage project are the so-called three Fs, friends, family and fools; even though there is a relation between the three Fs and the entrepreneur, thus non-anonymous, they can be considered part of this group as long as their investment is made using the intermediary. Some may draw a fine line of distinction between the crowd intended as the group of all potential supporters and actual backers that pledged money towards the project. Crowdfunders are considered investors with no differentiation between crowdfunding models (Agrawal et al. 2010). Agrawal et al. (2013) identifies heterogeneous motivations for which people engage in crowdfunding, the most notable are five, which include:

1) Access to investment opportunities: since the regulation of equity crowdfunding, ordinary investors have the opportunity to participate in what they believe could be the next big idea, something that before was restricted only to accredited investors outside of the friends and family circle. Moreover, it does not restrict funders to geographically near investment opportunities like traditional early-stage funding mechanisms do.

2) Early access to new products: typical of non-equity crowdfunding models, it shows surprising levels of demand for new products and early access to them. It can be bundled with equity in a way that aligns early shareholders' incentives to their means such that it enhances the value of the company.

3) Community participation: many of the funders perceive investing on a crowdfunding platform as a social activity, they commit capital in order to obtain something from which they derive consumption value such as direct communications with creators, updates, feeling of being part of a community or among a select group of early adopters (Schwienbacher and Larralde, 2010).

4) Support for product, service or idea: Philanthropic behaviors can be found across all major crowdfunding platforms, it isn't uncommon that backers of a given campaign, being it for-profit or non-profit, do not ask for anything in exchange, being it tangible or intangible.

5) Formalization of contracts: as already stated many of the early-stage backers are from the entrepreneur's family and friends circle; many of the transactions at this stage could have been just informal financing. The use of a platform that formalizes such transactions gives both parties a balance between costs and benefits of stipulating a financial contract. Since social relationships may be hindered by failures, the use of a platform can mitigate such risk giving the entrepreneur incentives for ex-ante risk taking (when necessary).

Creators

Can be a team or a lone entrepreneur who decided to resort to crowdfunding to reach a wider audience hoping to get financial support for the realization of the project. Many believe that most of the entrepreneurs that resort to crowdfunding do so because they are excluded from the circle of traditional funding institutions, being those angels, VCs or banks. Recent research (Niederer, 2013; Lawton and Marom, 2013; Gerber, et al. 2012) suggest that this is not the main reason as they identified other reasons such as validation of project concept, marketing, community buildup and early market research. Hui et al. (2012) point out that usually much effort is required to run a successful crowdfunding campaign and the time needed to complete the process may be as long as or longer than the time it takes to obtain financing through traditional means. Agrawal et al. (2013) identify two primary motivations for creators:

1) Lower cost of capital: since crowdfunding extends the pool of potential investors from a local scale to a global one, it is easier to match with those individuals that value early access the most thus have a higher willingness to pay for it. Agrawal, et al. (2011) report that more than 86% of backers of creative projects came from greater than 60 miles away and the average distance was 3000 miles; this tendency is reversed when talking about traditional sources of financing. Moreover, increased information exchange between funders and creators may increase the formers' willingness to pay since funders are able to take part in the development of the project.

2) Access to more information: another positive aspect of increased information exchange is that given early access to a particular product or service, crowdfunding serves as a particular type of marketing research aimed at predicting post-launch demand or reducing

post-launch demand variance (Lauga and Ofek, 2009). An effect of this can be a higher number of launched products in a given period and to higher rates of success among those products. In addition, creators receive feedback on their product or business plan facilitating the development of an ecosystem that can ultimately lead to the creation of network externalities. While user-driven innovation has well documented benefits (Chatterji and Fabrizio, 2011), it is still not clear whether feedback from early backers is representative of the wider market.

Platforms

Financial resources pledged by contributors are channeled to creators with the help of platforms, which act as intermediaries. The near totality of platforms operates with similar underlying principles: they pool a large number of small contributions in order to gather enough for the financing of the project. Platforms thrive by charging fixed fees or percentage-based commissions on the raised amount; Agrawal et al. (2013) suggest that it is typically 4-5%. Moreover, being platforms for-profit businesses they are highly motivated to maximize the number and size of successful projects. In order to reach this objective, they have incentives to reduce fraud, design the market to attract high-quality projects and facilitate efficient matching between ideas and capital. He further suggests that platforms may be incentivized in attracting project that have the potential to generate great media attention in order to expand their community and consequent network effects.

Recently an upsurge in the number of platform can be noted in an effort to distinguish themselves from one another; Lawton and Maron (2013) define platforms as gatekeepers, filtering the appropriate campaign for the right site. Agrawal et al. (2010) found three main properties that all platforms share: 1) they help creators presenting their project in a clear and comprehensive way; 2) they facilitate small scale financial transactions between the crowd and the creators thus enabling participation of the former; 3) platforms provide a communication interface for crowd investors as well as basic fundraising information such as statistics.

Moreover, Agrawal, Catalini and Goldfarb (2013) argued that platforms facilitate the exchange of information among parties and bring other benefits such as:

- Matching funders with creators is now more efficient and effective due to lower search costs online.

- Risk exposure is reduced because funding in small increments is economically feasible online.
- Low communication costs facilitate better (though far from perfect) information gathering and progress monitoring for distant funders and also better enable funders to participate in the development of the idea.

2 - Online charity crowdfunding

2.1 - Crowdfunding literature

Early research on crowdfunding focused on funders' behaviors and their motivations for participation; it found that supporters are not pushed solely by rewards, being them physical or financial, but also from intrinsic motivations such as curiosity, altruism or the fun they may derive from investing (Bretschneider et al. 2014). Taking part in crowdfunding activities is a highly social activity and investors value the community benefits they derive (Belleflamme et al. 2014). Social relationships influence funding behaviors, Agrawal et al. (2011) found that friends and family are an important financial resource when talking about reward-based crowdfunding. Determinants of success linked to offline and online social networks were analyzed by a number of scholars: Colombo et al. (2015) investigated the role of social capital in the attraction of early funders and found a positive relation; Mollick (2014) found contradicting but significant results when analyzing social network size and found it is relevant to campaign success. A study performed on Kiva.org by Burtch et al. (2014) found that backers prefer geographical and cultural proximity; Lin and Viswanathan (2014) confirmed that funding transactions are less likely to happen across state or country borders, what they call "home bias".

There is a tendency by funders to fund project that already show signs of success; thus, collective judgement is a reliable indicator of project success (Herzenstein et al. 2011; Mollick, Nanda 2014). Shen et al. (2010) found that crowdfunders are not perfectly rational when choosing what project to support and rely on others judgement; a "relational herd" effect was shown by Zhang et al. (2014). Zhang and Liu (2012) found that already well-funded ventures are more likely to attract funding and Agrawal et al. (2014) showed that nearly funded projects are more likely to succeed. Moreover, Kuppuswamy and Bayus (2014) discovered that donations to crowdfunding projects are concentrated in the beginning and last weeks of the campaign and thus follow a bimodal distribution shape.

Research focused on seekers in the crowdfunding market is aimed at showing how they can improve the probability of achieving their funding goal; we identify three main areas on which initiators can operate to increase their odds for a successful campaign:

1) Information provision: thorough explanation of the project's layout such as risk factors involved, financial roadmaps and dynamics of internal governance play an important

role in mitigating perceived risks by funders as explained by Ahlers et al. (2012). Verhaert et al. (2012) found that final funds can be increased during the fundraising process by disclosing at an appropriate time the seed money received. Moreover, information provision needs to be especially addressed based on the objective being it investment or pre order performance; Y. Liu et al. (2014) found that emphasizing on creators' perspective improved the former while a focus on consumer utility and benefits improved the latter. Allison et al. (2015) noticed that funders are more likely to have a positive response when narratives are framed as an opportunity to help others rather than business opportunities.

2) Campaign exposure: getting one's project featured on the front page of the platform (Do et al. 2012 and Qiu 2013) and using leverage from both online and offline social networks (Stephen & Galak 2012) increase the chance of getting funded. Social capital of seekers is an important asset to leverage (Zvilichovsky et al. 2014); however, its effect is influenced by time, culture and changes among individuals (Greiner & Wang 2009; Xu et al. 2011) and it is more significant with friends made online on the crowdfunding platform rather that friends carried over to the platform from offline (Lu et al. 2012). Freedman & Jin (2014) and Mollick (2014) noted that the success of crowdfunding projects is closely related to entrepreneurs' social networks and Hekman & Brussee 2013 discovered that, contrary to what some may believe, denser networks are not as beneficial to project success as diverse ones.

Gleasure and Feller (2016) identified two categories in which most of the studies about crowdfunding can be classified; the first focused on funding behaviors, i.e. how donators choose whether to participate in a project according to different personal, social or economic factors; the second focusing on the broader impact of crowdfunding on individuals, communities, organizations and the mainstream market. For both categories, they identified three variables that could be extended across the four flavors of crowdfunding (equity, lending, patronage and charity) but for simplicity, we will just focus on the charity one since it will be our target. For funding behaviors are:

1) Paying for financial or material benefits: tax breaks stemming from donations may result beneficial for funders. (Meer, 2014)

2) Paying for pro-social benefits: funders may benefit from improved reputation and environment. (Riggins and Weber, 2012)

3) Paying to participate: Funders benefit from self-image or empathy-related reward. (Choy and Schlagwein, 2015)

And for the impacts are:

1) Competition and democratization in financial services: charity platforms may stimulate the rise of financial markets in new areas and domains. (Cooke, 2011)
2) Greater availability of funding for pro-social projects: the poorest people's problems in developing countries can be addressed by charitable platforms. (Heller and Badding, 2012)
3) Erosion of organizations' financial boundaries: projects can be used by funders as vehicles for collective initiatives. (Hollow, 2013)

When comparing donation-based crowdfunding with other forms it is easy to notice a lower emphasis on the concept of paying for financial or material benefits; while it is true that donors do get nothing directly from project initiators, they value other returns. Meer (2014) analyzed donations on a US charity platform, DonorsChoose, where teachers seek support for their disciplinary projects, and found that funding behaviors are influenced by tax price and tax deductibility; an increased price of giving will lower the probabilities of a project being funded.

Paying for social benefits is the leading motivation for many donors in charity crowdfunding as by donating they generate reputation and improve the circumstances of people they identify as similar to themselves. Burtch, Ghose, and Wattal (2015) studied the effect that anonymity has on giving; they found that a significant impact as donors might feel embarrassed when deviating from the "normal amount" of the donation. (Sinanan, 2009; Riggins & Weber, 2012) found evidence that cultural similarities, such as occupation and gender (Galak et al., 2011), play an important role for funders. Ly & Mason (2012) suggested that groups or consortia were less likely to experience empathy than individuals thus resulting in lower levels of donations. Smith, Faro, & Burson (2013) found that this phenomenon is partially mitigated when recipients are described with positive features rather than negative ones i.e. African children receive more funding than comparable individuals while jailed African children receive less funding than comparable individuals.

Scholars researching the concept of paying to participate in the context of crowd charity focused particularly on funders' self-esteem and sense of satisfaction, the concept that funders may enjoy hedonic benefits when giving to charitable fundraisers (Burtch, 2011; Wash, 2013) is called warm glow, and is even stronger when the fundraisers are individuals instead of organizations (Gleasure & Feller, 2016). Such intrinsic motivations were further analyzed by Choy & Schlagwein, (2015) they identified individual-intrinsic (enjoyment, satisfaction) and social-intrinsic (participate in a community of similar-minded people) motivations.

Ariza-Montes, López-Martín, Morales-Gutiérrez & Lucia-Casademunt (2012); Merritt & Stubbs (2012); Kauffman & Riggins (2012) research on the concept of Competition and democratization in financial services found that the rise of charitable crowdfunding platforms is associated to positive local outcomes stemming from greater availability of capital from microfinance markets. Other studies focused on specific elements of the microfinance process; Ibrahim (2012) studied how small sustainable business in Indonesia can be bolstered by microfinance; Ly & Mason (2012); Stiver et al. (2015) investigated the potential of competition for donations of NGOs and civic organizations on crowdfunding platforms.

Greater availability of funding for pro-social projects is a concept that pivots around the help that microfinance and crowdfunding can offer to developing countries most vulnerable people; Heller & Badding (2012); Ly & Mason (2012); Moodie (2013) found that female borrowers are more likely to receive funding as are people from poorer countries or those targeting health-related issues or educational goals. Support for this is given by Liu et al. (2012) that by analyzing lenders' motivations on the platform Kiva.org found the most common are altruistic feelings, empathy towards individuals perceived as similar, religion, and belief in the core principles of microfinance. Support for the core principles of microfinance was highlighted by numerous other studies (Heller & Badding, 2012; Smith, Cronley, & Barr, 2012; Smith et al., 2013).

Erosion of organizations' financial boundaries is described as a trend of crowdfunding projects used as vehicles by funders for enabling masses to participate in different projects. Hollow (2013) studied the phenomenon that stimulates the larger civic society towards local or niche interests and at the same time can be used as a tool to investigate the market early in the development. Yang et al. (2015) studied the phenomenon in China where an extreme potential impact of crowdfunding campaigns was found giving projects the capacity to feed into mass political movements that are not possible because of political constraints, the so called subversive charities.

We notice the span of research on crowdfunding is wide and deep. However, a small number of studies if not any focuses on socio-economic conditions of donors and in particular on digitalization level of various geographical areas. We are particularly interested in the topic and think it plays a decisive role in the effectiveness of online platforms. Under a managerial perspective, we are therefore interested in describing a phenomenon that is of particular interest for who needs to implement a crowdfunded project and wants to foresee its dynamics based on contextual factors.

2.2 - Digital divide.

The concept of digital divide dates back to the nineties when there was a growing gap between those who had access to the internet and those who had not (Compaine, B.M. 2001). Nowadays the term digital divide may refer to a macroeconomic problem such as the disproportion of individuals having access in a country vis-à-vis other, less developed, countries or to a more focused phenomenon present inside a country. With growing mobile phone penetration across all nations, International Telecommunications Union estimated that over 95% of total population possesses one, the inequality is assuming an always more relativistic measure among those who have more or less bandwidth available and those who possess the skills to harness the possibilities offered by the net.

Digital divide may be caused by multiple factors many of which are still being researched; in developing countries, for example, large part of the population simply does not have the means to afford a computer or a mobile data plan but this explanation alone cannot describe the full picture. In fact, other influencing factors can be easily identified:

1) Lack of basic networking infrastructure in poorer countries or lack of broadband coverage in developed countries.

2) Computer literacy of users, for both the use of the machine itself and the use of the internet as an instrument (Blau, 2002).

3) Other socio-economic factors such as age, education, gender and income may generate turbulences in the adoption of new technologies (Hilbert, M. 2010).

Digital divide can therefore bring the widening of existing economic gaps and have severe consequences on the capacity to access information; this can in turn trigger a vicious circle for poorer countries, which are excluded from new means of production based on the dematerialization of information. Different authors analyzed the variety of aspects that influences digital divide each of which is reasonable depending on the objective of the analysis. Martin Hilbert (2011) based on previous literature conceptualized four broad categories of variables which he resumes in the question “who, with which characteristics, connects how, to what?” follows a brief explanation of the categories.

1) Who: the subject of the analysis, it can be individuals, organizations, communities, societies, countries, etc.

2) Which characteristics: attributes of the subject such as education, age, gender, geography, size, profitability, etc.

3) How it interacts: the level of digital literacy of the subject, passive or active use of digital services.

4) What it interacts with: internet, computer, phone, etc.

This conceptualization is useful for our purpose since it defines the four aspects that one must focus on when analyzing such a complex topic.

The European Commission has analyzed the phenomenon as well, it developed the Digital Economy and Society Index (DESI)[8] that is "a composite index that summarizes relevant indicators on Europe's digital performance and tracks the evolution in digital competitiveness of EU member states". It is structured around five dimensions, each of which is further divided in multiple sub-dimensions, aimed at assessing the degree of digital divide present in different geographic areas, which are:

1) Connectivity: the necessary condition for a digital society to develop; in modern society however since most of the countries have capillary network reach, the problem is no longer about (or not mainly) whether the connection is present or not, but rather in the quality of connection or ease with which a connection can be established. The sub-categories are: a) fixed broadband, the extent to which individuals use a broadband connection, b) mobile broadband, the extent to which individuals use a mobile broadband connection, c) speed, the availability of high-speed internet, d) affordability.

2) Human capital: connectivity alone is not enough; users need to be capable of operating the device they use as an interface to the web in order to take advantage of its potential. Skill level is variable and ranges from basic use to advanced knowledge that is able to enhance productivity and economic performance. The sub categories are: a) basic skills and usage, the extent to which individuals can use the internet, b) advanced skills and development, the extent to which the workforce has the capacity to develop the digital economy.

3) Use of internet: the range of activities that can be performed online can be divided in passive activities such as consumption of online content or active ones such as the use of social network sites or of e-commerce ones. The sub-categories are: a) content, it portrays the consumption of online content; b) communication, aimed at understanding the interactions of online users based on the activities they engage in; c) transactions, the extent to which users are prone to performing financial transactions online.

[8] The Digital Economy & Society Index (DESI). Europa.eu.

4) Integration of digital technology: this indicator is more business oriented; in modern society, digitalization is among the top, if not the most, influencing factor for enhancing efficiency and competitiveness of businesses. It does so by reducing costs or functioning as a global sales outlet, thus the sub categories are: a) business digitalization, the extent to which digital technology are adopted by businesses, b) e-commerce, the extent to which businesses take advantage of the internet as a sales channel.

5) Digital public services: interactions between individuals and the public sector can be improved by the adoption of digital technologies for both sides; public administrations can save on costs and provide a better service at the same time, while customers gain in the range of services available and reduced time waste. The only sub-category is e-government, which indicates the level of development of the services offered by the PA.

2.3 – Method

Online interactions can be more clearly observed under the digital innovation lens; one area on which to focus is the effects that various aspects of the digital divide may have on the adoption and use of online platforms. It is clear that digital divide is a broad term, thus we decided to inspect more closely two particular aspects of it: the infrastructure development and the digital literacy of users. One challenge that arises is how infrastructure development and digital literacy of users can be measured. The European Commission provides a useful framework for the measurement of digital divide but there is no precise regional index on which to operate since the topic is so complex and influenced by so many factors. In the following research, we will explain which indicators we chose and how we chose them.

The availability of an online platform for an organization could be a tremendous source of data. Unfortunately, the organization did not provide us full access to its database, in fact it only provided us four variables on which to operate, the date of the donation, the amount, the origin and the gender of the donor with a distinction among groups and couples. It is true however that even though it would have been much more interesting to be able to study on a larger dataset, it would have shifted the focus outside the digital innovation field. Data form Mary's Meals was then polished and other variables were added to construct the complete dataset. Other sources of data were the I.Stat platform from ISTAT and the Facebook page of the organization.

The rationale upon which Digital Divide was elected as a variable that could influence the amount donated is that it can be viewed as a sign that the users were able to navigate to the website and were familiar with online financial transactions. It is strait forward to understand the two sides of the coin: one infrastructural and one human. As we saw in the digital divide paragraph, the presence of a connection besides being a necessary condition to operate the platform is not enough to enable the user to make a donation. It is clear that the user must at least have an elementary understanding on how to use the platform and e-payments methods; and thus its digital literacy should play an important role.

Crowdfunding is an activity that is particularly tied to the use of the net; we can infer that low levels of human capital among users may consequently lead towards lower number of campaigns initiated and thus influence the overall amount received by the organization. From the infrastructure side we are able to draw a further division between different technologies users connect to the internet with (fixed line, mobile) and the effective device they do it with (mobile phone, computer). However, the data we will use does not indicate whether the donation was made directly to Mary's Meals or through a crowdfunding campaign started on the platform. This limitation severely hinders the possibilities of research on the effects of Digital Divide on the use of the platform.

Crowdfunding alone does not describe the full picture, we talked about the grassroots environment that Mary's Meals operates in; we discovered that grassroots campaigns are firmly related to offline action through marketing. In present days it is not advisable, if not counterproductive, to limit marketing efforts to the offline world; in other words a successful campaign must have an offline and an online complement. There might be interactions between the two worlds; and we intend to explore them starting from the fact that December is considered the most important part of the year for almost every fundraiser. Is it possible that offline campaigns affect online donation? Technically the bridging role of the platform, a faster way to make a donation, suggests us that they do. Unfortunately, we were not able to have enough data to be able to discern if donations were made for a specific campaign or for the charity in general and thus we will try to verify its existence. The link between amount donated and Facebook interactions is interesting as well. From the research conducted during the writing of this paper emerged that grassroots movements are embracing social network sites; this suggests that a link between social network activities and the amount donated could be present. Another point of view is that of peer effect on donated amount (Smith et al. 2014); could it be true that social network interactions may influence other users to donate?

Now that we have covered the main areas of interest of this research, the theoretical framework upon which we will operate is becoming clear; two groups of variables are starting to emerge. One group concerns digital divide and will help us investigate the possible interactions it has on the amount of charitable donations. It is composed by two sub-variables: an infrastructure indicator to measure the impact of infrastructural development and a human capital indicator to measure the impact of digital literacy. The other is more marketing-oriented let's say; the rationale upon which we build is that the organization could leverage on a specific group of users, grassroots campaigners, we want to investigate possible connections with the amount donated. The two sub-variables that compose the grassroots group are a social media activity indicator and an offline events indicator.

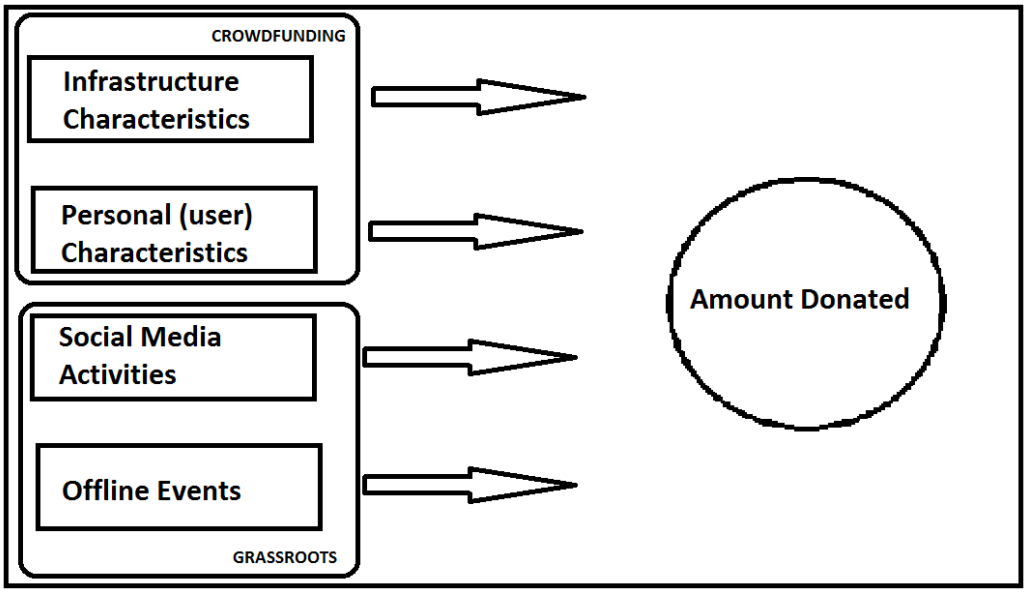

Figure 2 - Dependent and independent variables considered in the study.

The core of this study is based on the theoretical framework we just illustrated. The goal of this thesis is to try to find what drives the amount donated to charity; of course, the focus is extremely narrow since we only have data regarding one specific organization but nevertheless the findings could be applied to other cases. We would also like to point out that this study was conducted on data retrieved from very distant sources that cover very different populations. There are several implications stemming from such a stretch in the use of the data, which could lead the results of the study to be different from completely reliable. Besides these obvious limitations the questions we will try to answer are:

1) Is the amount donated to the charity influenced by the net infrastructures present in various geographic areas?

To answer this question we will test hypothesis:

H1: Net infrastructure availability positively influences the amount donated.

2) Is the amount donated to the charity influenced by the digital literacy of users?
To answer this question we will test hypothesis:
H2: Digital literacy of users positively influences the amount donated.

3) Is the amount donated to the charity influenced by activities carried out on social networking sites?
To answer this question we will test hypothesis:
H3: Activities on social networks positively influence the amount donated.

4) Is the amount donated to the charity influenced by external events such as holydays and celebrations and so by the date?
To answer this question we will test hypothesis:
H4: Date positively influences the amount donated.

2.4 - Mary's Meals company overview.

Mary's Meals is an international charity that operates across 12 countries that in 2015 reached the goal of feeding more than one million children each day. The CEO of Mari's Meals is Magnus MacFarlane-Barrow who, with the help his brother Fergus, started operating in the charity environment in 1992 during the Balkan conflict. The story, that is spammed whenever and wherever the term Mary's Meals appears, tells that the two brothers organized a local appeal for goods of first necessity to be brought to Bosnia and Herzegovina after they saw moving images of the war that was devastating those places. From Argyll County, Scotland, they left with a jeep full of supplies headed towards Mejugore. When they got back, they did not expect to find their garden shed full of supplies ready to leave for those who needed them.

After a year of going back and forth, Magnus decided to register the project as a charity under the name Scottish International Relief. At first the scope of the charity was broad; they started building homes for abandoned children in Romania, Liberia, helping refugees where possible, funding other projects and helping overcome a famine that was afflicting Malawi. It was there that Magnus met Tony Smith, a UK businessman that suggested

him to focus on famine relief and to call his charity Mary's Meals. It was 1 May 2002 when Scottish International Relief changed its name to Mary's Meals and focused on providing a meal in a place of education to those who need it. Even though the name was clearly inspired by the Christian Mary, the charity is nondenominational and apolitical. A great number of kids in developing countries is forced to skip school in order to focus on their survival, they work to get food either on the streets or in the fields. By providing a meal in the school Mary's Meals achieves a double objective, it increases the number of kids frequenting the school and makes the time they spend in school enjoyable because a full stomach enhances concentration and participation.

On January 1 2015, a change in the organizational structure took place, which we could not find more appropriate words to express it like the company's annual report:

"*MMI now has responsibility for the delivery of our school feeding programmes and acts as the central organisation that co-ordinates, supports and leads the global movement. The main focus of our National Affiliate organisations is on fundraising activities and raising awareness within their countries, whilst our Programme Affiliates and partners deliver the school feeding programmes. The Mary's Meals mission, vision and values remain unchanged.*" [9]

Since then to 31 December 2015 the total income of Mary's Meals International was £21.870 million, 99% of which was generated by national affiliates with the UK division being the largest contributor (74%), followed by the US (11%); the remaining 15% came from other national affiliates, international fundraising groups and individuals.

2.4.1 - Sustainability.

Charitable organizations are often criticized since they bring supplies to destination for a while and after the mission is complete, they move to the next one. The problem is that once they leave the people that are now used to receiving goods, meals and help face a situation of abandonment, no one is caring for them anymore. The main critic is that charities do not teach the population to care for themselves, to create what they need, they do not act in a way that leaves something solid and not volatile behind them.

Mary's Meals instead focuses on sustainability, their objective is to provide food and education to people that otherwise would not have the possibility to get and to make a significant impact for the communities they work with. One example is that instead of

[9] MMI annual report, pp. 11

bringing food from developed countries to poor areas they source it locally, catching two birds with one stone, first and foremost they help local economies to develop, second they save on transportation costs and thus can invest more in charitable activities. Needless to say that by sustaining the economy local food producers increase their business and could develop best practices to pass on to the next generation.

On the economic side Mary's Meals annual report focuses on the percentage of the amount of donations received that has been spent on charitable activities; the company's long-term commitment is to spend at least 93p of every 1£ received. According to the annual reports, the company achieved:

Table 1

	2014	**2015**
Charitable activities:	94.6%	98%
Fundraising:	4.2%	2%
Governance:	1.2%	0%

Evidently, both years are well above the 93% bar and with a steep upwards trend in the percentage of donations devoted to charitable activities, we can see a decrease of the fundraising expenditures of 2.2% and unfortunately the governance share has been omitted. This may cast long shadows on the reputation and credibility of the charity as transparency has been pointed out to be one of the leading factors of success of many companies, especially those who operate in the charity industry. There is no public information about the number of the organization's staff. The company states that they have in place a system of salary cap where the highest paid worker of the charity must not exceed £60,000 per year. This is a controversial decision since while it gives credibility to the charity it may cause higher social capital employees to leave the company because of low financial incentives. When working for a charity, however, financial return is not all that matters, in fact the organization involves local workers with the double advantage of keeping costs down and at the same time helping local populations.

2.4.2 - Fundraising.

Like most charitable organizations Mary's Meals rises funds through both offline and online channels; they receive support mainly from the UK but have bases that help in the US, Austria, Germany, Croatia, Ireland, Italy and Bosnia-Herzegovina. In the UK Mary's Meals

operates several charity shops and multiple parishes and businesses have adopted Mary's meals as the charity of choice. Talking about offline fundraising, national affiliates promote awareness in the respective areas by organizing events and collecting donations. Online fundraising is what we focus on, since it resembles crowdfunding in many ways; on the company website there are two options for donating, one is the classic choose-an-amount donation while the other prompts the user to start his/her own fundraising campaign.

This last point is in our area of interest; and since this study is based on digital innovation it would be interesting to know how effectively the platform that Mary's Meals offers [10] converges to or diverges from the three characteristics that most crowdfunding platforms share which Agrawal et al. (2010) presented. Here are the characteristics followed by a brief description of how the platform implements such functions:

The platform helps creators presenting their project in a clear and comprehensive way: since the projects that are proposed on Mary's Meals do not entail anything material, they are not for a product or service, the aim is to persuade potential donors in becoming effective donors. From the documentation that is possible to find in the UK division site it is clear that online campaigns must be carried forward offline, organizing events and spreading the word; in fact in the fundraising ideas section the presented initiatives are just offline ones. [11]

Moreover, much of the material available in the fundraising resources section is suited for printing but still very usable in an online environment. These materials are of great help when trying to communicate the need of a donation; it can be both company oriented, when campaigning for a general cause, or personalized, when campaigning for a specific cause, in order to accommodate the majority of situations.

The platform facilitates small-scale financial transactions between the crowd and the creators thus enabling participation of the former; Mary's Meals platform provides a service for both sides of the market, we can say that it belongs to the category of two-sided platforms. By opening the possibility of creating a fundraising campaign the platform enables the participation of the crowd in fundraising activities. In order to do so it facilitates small-scale financial transactions with the use of a simple graphical interface where the user chooses the amount to pledge and is then guided towards the completion of the payment. Seen under an economic perspective we can say it eliminates the coordination costs that would otherwise arise without using the platform or offline.

[10] https://www.marysmeals.org.uk
[11] see “crowdfunding for grassroots movement” section

Platforms provide a communication interface for crowd investors as well as basic fundraising information such as statistics; the online platform is of great help for communications in general, it indicates the user to write frequent updates like many other platforms do. Besides this, while I was using the platform I noted that it was very hard if not impossible to find a list of all active, past or successful campaigns. It is not clear whether the company made this as a feature, i.e. the platform is not intended as a marketplace where to "shop" for a donation, or as a way of controlling the “marketplace” in order to increase the rate of click of interested funders of those campaigns that are already near the completion threshold (first page).

2.4.3 - Crowdfunding for grassroots movement.

Grassroots movements, as the term indicates, are spontaneous movements aimed at changing the status quo. They show a bottom-up approach that is considered more spontaneous, (Panda, B. 2007) and thus more involving for people who participate. It is frequent to find the term associated with political movements, in fact, most of the research is aimed in that direction; while it serves as a good starting point, it doesn’t help much in our case. We will focus our attention on how Mary’s Meals conjugated the concepts of crowdfunding and grassroots, effectively developing a platform able to leverage on its ease of use to empower grassroots movements interested in a specific topic.

Grassroots movements are characterized by their off-line activities since they derive their power from people, and in order to reach people they use strategies aimed at engaging human interaction with them. Events that are considered grassroots include house parties, annual group meetings, putting up posters, talking with pedestrians or walking door-to-door, raising money from many small donors for social help (S. Poggi). These campaigns carry with them a greater degree of empathy, participation and solidarity, when compared to exclusively online ones, at the cost of more time spent in fundraising activities. We see now the importance of the offline-targeted material present in the section of the platform. It is easy to notice that real life activities are influenced by real life events, there is extensive evidence that donations to charity increase during holyday periods, especially during Christmas time. This topic will be further explored in the case study of this thesis.

The platform provided by Mary’s Meals helps offline efforts to reach the organization. It serves as a communication point for both the crowd and the fundraisers. Traditional model of fundraising can be divided in two groups, direct and indirect. In the direct one, the ONLUS

engages in direct marketing activities and tries to acquire donations; in the indirect one, other fundraisers like churches or smaller organizations who do not have the means to intervene directly in the crisis they are addressing, organize charity events and then transfer all donations to the main charity (a). While it is true that the majority of the time the indirect method brings great amount of donation with relatively little effort on the ONLUS side, it seldom happens to hear that funds destined to charity are stolen from the fundraisers. Evidently, this happens because the fundraiser acts as an intermediator and has two consequences: on one side the actual loss of donations and on the other bad publicity for the charity itself.

The introduction of a platform (b) relieves the fundraiser from the burden of collecting and then transferring the money to the main charity (and thus the risk of fraud); this process is called disintermediation. It brings other benefits as well; relative to the previous example in fact it can foster the idea of transparency streamlining the actions that need to be taken to become a supporter of the social cause. It lets the fundraiser focus on the activity that he knows best, human relations, bringing a better environment in which to operate. Moreover, it provides the fundraisers with materials and helps them choose the objective of their charity, which in turn makes fundraising even more transparent and may ultimately affect its performance.

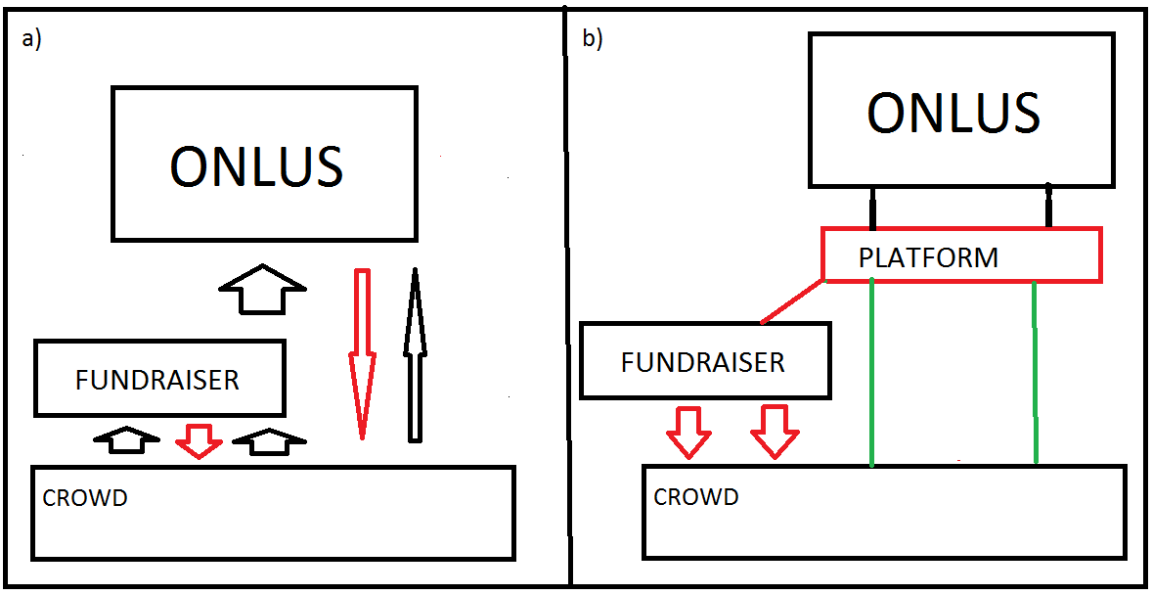

Figure 3 - interactions among players before (a) and after (b) the introduction of the platform.

From the ONLUS point of view, the introduction of a platform can bring advantages on at least three sides: it eliminates the need of coordination between the fundraiser and the

organization by acting as a repository where campaign initiators can find necessary materials. It acts as a gateway for a greater number of donors by streamlining the process of donation. Finally yet importantly, it can bring cost savings by having campaign initiators do the marketing with a consequent increase in the amount devoted to charitable activities. I will close this paragraph with a quote from Danae Ringlemann, Indiegogo's founder, which I believe captures the essence of charity crowdfunding paired with grassroots culture.

"*What crowdfunding really is, is people-powered finance, it is people voting with their dollar. And when people vote with their dollar, there's no stronger indication that they want something to exist.*"

- Danae Ringelmann

3 - Empirical data

During the writing of this paper, we covered three main areas of interest:

- Crowdfunding
- Digital divide
- Grassroots campaigns

These topics are deeply interrelated; they interact with each other in many ways. Even though very little and dispersed research on it is present, the Italian division of Mary's Meals let us have series of observations from their online platform which will let us shed some light on the topic. The platform that Mary's Meals provides is a perfect meeting point of Grassroots and Crowdfunding as we already saw. This opens up a link between the online potential of crowdfunding and the offline capabilities of grassroots campaigns. Under a managerial perspective, this topic is interesting because the model embraces both online and offline worlds with relatively less effort from the side of the ONLUS. Moreover, the duality of the model opens up other interesting questions about the interactions of offline events on online donations and an opportunity to verify if there is any connection between the amount donated and the use of the Facebook page of the organization. However, all the before mentioned activities are online based. Thus, digital divide should have some level of influence on them. We will now move on to the definition of the context of our study starting from the current situation of the digital divide phenomenon in Italy.

3.1 - Digital divide in Italy.

In this section, we will try to give the reader a clearer picture of the digital divide situation in Italy by dwelling on the two factors that are more important in the context of this study. At first, we will present the industrial broadband coverage and move on with an analysis of the evolution of the phenomenon and the efforts that will be and were made to overcome this obstacle. We will then explain the different demographic factors that influence the use of the internet for the human capital dimension or digital literacy. Finally, we will focus on the infrastructure dimension to take a snapshot of the current infrastructural development in the country.

According to a 2014 study from Between SPA conducted on the industrial clusters in Italy, in the 90 top districts, only 19% of companies have access to ultra-wide broadband internet (download speed greater than 30 Mbps) and outside of industrial districts, at least 16% of companies do not reach the minimum threshold of 20 Mbps. The average download speed in the districts was 4.7 Mbps against 5.6 Mbps of national average. Fixed ultra-wide broadband line coverage is greatly influenced by the distance from main urban areas; it is possible to notice that only 20 districts are at least is partially covered by the service mainly because they are not far from populated areas nearby (Trieste, Udine, Trapani, Verona, Murano and Vicenza) and thus still profitable for operators to reach them. We can find a different picture when looking for mobile broadband services such as 4G; under an industrial district perspective mobile broadband services reached at least 60 of them each with an average coverage of 53%. It is important to notice though that this kind of connections are not flat (fixed fee) like most landlines are and coverage is still unsatisfactory.

According to a study supported by the Commissione Trasporti e Telecomunicazioni della Camera, carried out by the Osservatorio sulla diffusione delle reti telematiche[12], in 2010 at least 53% of Italian families had internet access at home (compared to 65% of EU27 average) and only 39% of families had a broadband connection (56% EU27 average). During the years, the situation got better, at least in theory, according to the European commission in fact in 2015 broadband coverage in Italy reached 99% of families with 44% of families taking advantage of it. Ultra-wide broadband connections instead are still underdeveloped with only 20% of families reached by the service (EU average is over 50%).

These forward steps are the results of many initiatives especially at a regional level; from the end of 2014, the regions of Abruzzo and Basilicata signed an agreement with Fastweb aimed at reducing the digital divide by taking broadband or ultra-wide broadband connection to rural or scarcely populated areas. Thanks to the European Agricultural Fund for Rural Development (EAFRD), other regions such as Lombardia, Campania, Piemonte and Emilia Romagna instituted multiple calls for bids to obtain non-repayable contributions to bring satellite internet technology to difficult-to-reach areas. The Italian government on its side thanks to the “decreto sblocca Italia” proposed tax deduction up to 30% for those telecommunication companies that decide to invest in the development of infrastructures in the so-called market failure areas. The objective of such policies is to meet the expectations posed by the European Digital Agenda to reach at least 50% of the population with ultra-wide

[12] http://www.forumpa.it/una-roadmap-per-la-digitalizzazione-del-paese-on-line-i-materiali-del-convegno

broadband connection (100Mbps) and the remaining 50% with broadband connection (30Mbps).

3.1.1 - Human capital and digital literacy.

According to a study made by Fondazione Ugo Bordoni (FUB) and ISTAT[13] in 2014, Italian citizens can be divided in two groups; the digital citizens' one is composed by around 30 million educated, highly skilled, young individuals. Those individuals that do not interact with the internet at all, the digitally excluded ones, mainly homemakers and retired workers over 65 years old, compose the other. The analysis of the activities carried out by individuals on the web highlights two classes: on one hand, young individuals aged 11-34 for whose networking and communication activities are the most common; on the other hand older individuals which use the net as a substitution of offline services like banking, e-mailing and interacting with the public administration.

The non-users of the internet in Italy are around 22 million; 50% of them are over 65. If we lower the threshold to 55, we see that the amount rises to 70%. The individuals in the range 19-54 compose another significant segment, it represents 25% of non-users; while only 4% are represented by individuals aged 19-34. Age is one of the critical factors that distinguish internet users and non-users; starting from the 14-18 age group percentages of non-users roughly double in the subsequent age groups until reaching more than 85% for the age group 65 or more. Internet non-users when compared to users, show signs of lower participation in cultural activities such as going to the cinema or to museums, they read less and are less interested in politics. The motivations that non-users put forward can be classified in four categories and are distributed evenly in all age groups. Individuals do not use the internet because they do not understand the potential of the web (27.9%), they perceive the web as useless (23.5%), they do not show interest for the web (28.7%) and they are not able to use it (27.3%). Aspects related to the cost of both the instrument and the connection itself are relative and only relevant for younger users while those tied to privacy are not relevant for the majority of non-users.

The involvement of users in e-commerce activities can be seen as an indicator of consumer confidence towards the technology. In 2014 around 22% of citizens engaged in e-commerce; if we consider just internet users the percentage rises to 35% but it is still far lower than European average around 60%. Even though the people show a great deal of

[13] http://www.istat.it/it/files/2015/12/Internet@Italia2014.pdf

interest in e-commerce, shown by its rate of growth of 20% a year, the proportion of the phenomenon are still modest, accounting for 2% of families' consumption. Owning a fixed broadband connection increases the probability of engaging in e-commerce (44%) with respect to owning just a mobile broadband connection (26%). The categories of goods and services bought online regard mainly tourism and travels, auto rental, sporting goods, books, house supplies, show tickets and digital technologies.

3.1.2 - Infrastructures.

According to Autorità per le Garanzie nelle Comunicazioni (AGCOM), Ofcom, Eurostat, ISTAT, in 2014, around 62% of Italian families had a broadband connection. Different connection modes were divided in the following way: 43.2% uses only fixed broadband connection, 17.3% only mobile broadband connection while 10.3% used both. Only 1.2% uses only narrow band connection and 35.7% does not have an internet connection. The decision to subscribe to a broadband internet provider is strongly influenced by many factors; families where at least one teenager is present tend to have a broadband connection 86.4% of times, against 15.5% of families with just old members. Families where at least one member has a university degree tend to have a broadband connection 83.8% of times against 47.4% of families whose members' highest education is elementary or none. Families where the head of the family is employed tend to have broadband connection 83.4% of the times against 35.8% of families where it is not. Families with a positive perception of their economic resources tend to have a broadband connection 77.4% of the times against 56% of families whose economic condition perception is negative.

The development of both fixed and mobile infrastructure seems to be adequate for the full fruition of modern internet services by the majority of the population. Differences in speed between geographic areas are still present; it is important to notice that those differences seem not to be related to the north-south differences but rather to differences in the composition of the terrain (more or less mountains). It is in fact possible to notice that major differences in connection speed can be found in Abruzzo, Marche, Valle d'Aosta, Basilicata and Toscana. Under this perspective it looks that first level digital divide, connection of at least 2 Mbps for the entire population, has been overcome although ultra-wide broadband connections are not the widespread still. Broadband connection landlines percentage in Italy is lagging behind other European countries; a different situation is found

regarding mobile broadband connections, which seem to be more in line with European averages.

There are no doubts that the reason why Italy's is lagging behind other European countries regarding the adoption of broadband landlines stems in part from lack of adequate broadband provision but this reason alone cannot describe the full picture. It seems that other socio-economic and cultural factors play a pivotal role in the adoption of the digital culture but not much research has been made on the topic.

3.2 - MM's donations statistics.

Available data was collected between 14 October 2015 and 10 January 2017 for a total of 860 observations sourced from the website of the Italian division of Mary's Meals. They comprehend donations made via credit card on the site directly to the company 50% or to individual campaigns started by users. Twenty-three of the donors are habitual donors who pledge monthly to the charity, thirteen (1.51%) are couples and twelve (1.40%) are groups. The dataset was anonymous to respect the privacy of donors but we were able to get a gender reference for the observations. It is possible to observe a lightly skewed distribution of gender in favor of male donors that that reach 51.28% against the 45.81% of female donors.

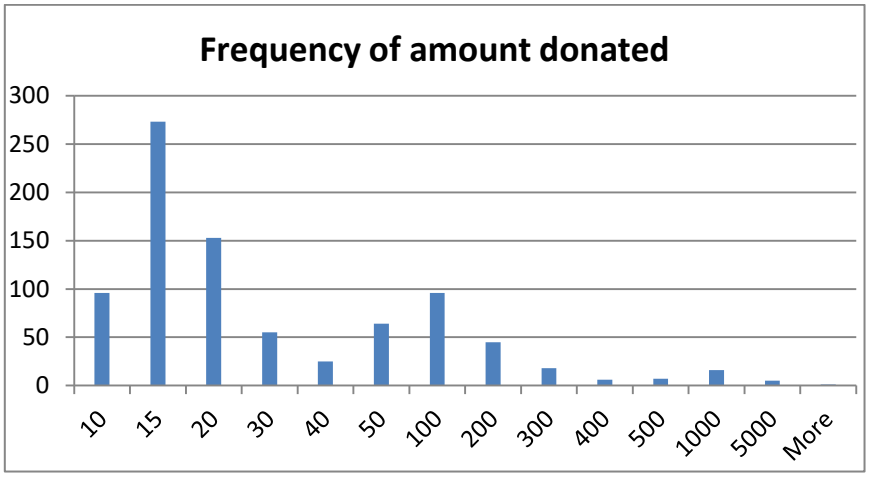

Figure 4

The frequency of the amount donated (Figure 4) looks bimodal, with a peak of donations between € 10 and € 15 and one between € 50 and € 100. A total of € 90,398 was raised over the period; the highest donation was of € 30,870 followed by 5 donations between € 1000 and € 5000 while the lowest was € 0.95. The average donation was € 105 but since there is one observation that is clearly an outlier, we decided to calculate the mean excluding

the largest donation; by doing so average donation for the period was brought back to almost € 70. The maximum amount donated in a single day was € 31031 and the average daily amount was € 198 but after controlling for the outlier, they were respectively € 6280 and € 130.

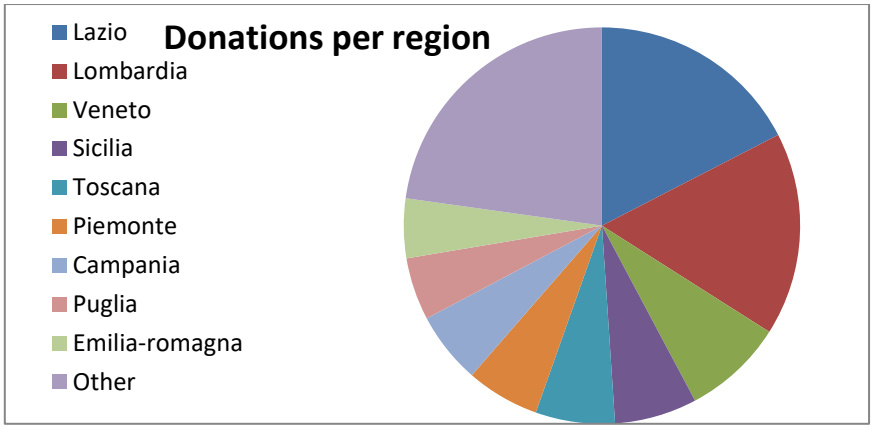

Figure 5

The majority of observations are from Italy except 57, which are from 18 foreign cities; the city of Calan alone accounts for 30 observations, followed by Cork 5, Edinburgh 3. The remaining 803 Italian donations are from 317 cities; mainly from Lazio 17.43%, followed by Lombardia 16.56%, Veneto 8.22% and Sicilia 6.72%; there are no observations from Valle d'Aosta. The cities with more observations are: Roma 11.46%, Milano 3.49%, Venezia 2.99%, Umbertide 2.37% and Palermo 1.99%. When considering the percentage of the total amount received for each city we find (numbers in parenthesis are results when controlling for the outlier): Venezia 35% (0.45%), Roma 15% (23%), Massa Lubrense 6% (8%) and Ardea 3% (4%).

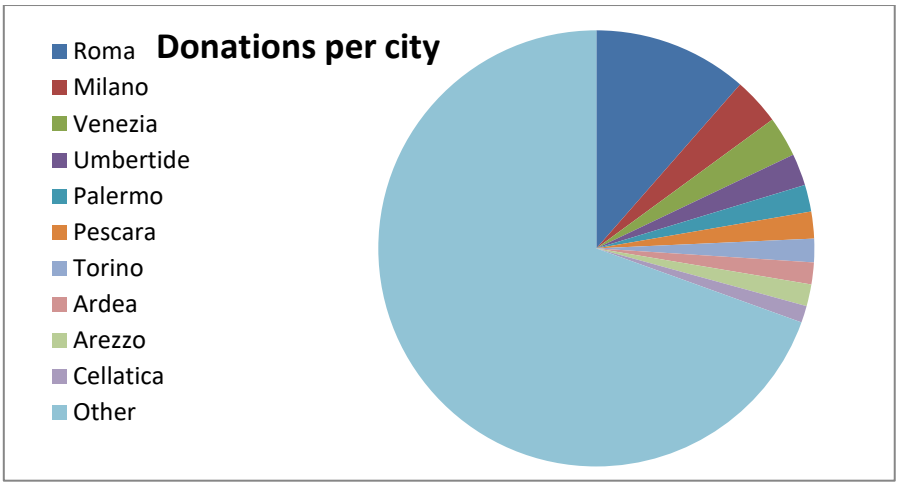

Figure 6

3.3 - Independent variables - Other data statistics

In this section, we will explain what data was collected from the three sources, Mary's Meals, ISTAT, and Facebook, which will help us determine the appropriate predictor for our four independent variables. We will consider two main IVs, which are: digital divide and digital literacy; and two secondary IVs, which are: social media activity and date. For each IV we chose several predictors in the attempt to find which one was more suited for our purpose.

3.3.1 - Digital divide

In order to have a snapshot of the digital divide in Italy we followed the framework of the European Commission when choosing the indicators for the phenomenon. We were able to retrieve the data regarding most of the EU Commission indicators on the ISTAT online database[14]. While it is true that digital literacy is present in one of the categories that influence digital divide, we will refer to digital divide when talking about the difference in the infrastructure and to digital literacy when referring to differences in human capital. To investigate on the connectivity dimension (digital divide) and its sub-categories, which identify the quality of connections present or used in a given area, we identified two indicators, which are suitable for addressing the extent to which individuals use a broadband connection and the extent to which individuals use a mobile broadband connection:

1) Type of connection families utilize to get online: reports data about the percentage of families that use a) fixed and mobile broadband connection, b) fixed broadband connection, c) mobile broadband connection, d) fixed or mobile narrow-band connection.

2) Type of digital technologies that families possess: this indicator reports the percentage of families that possess a) personal computer; b) web enabled mobile phone; c) broadband connection.

3.3.2 - Digital literacy

To investigate on the digital literacy dimension we tried to capture the skill level of individuals based on the frequency they use digital technologies. Since a minimum level of skills is required in order to take advantage of the internet, we think that a good indicator of whether the subject is skilled or not is the frequency they use the PC or internet. Since this

[14] http://dati.istat.it/

paper is not businesses oriented, we will just cover the basic skills sub-category leaving aside the advanced skills one. The indicators we choose are:

3) Frequency of use of personal computer for individuals aged three or more: this indicator reports the percentage of individuals a) using a personal computer, b) using a personal computer every day, c) using a PC at least once a week, d)some times in a month, e) some times in a year and f) do not use a PC.

4) Frequency of use of the internet for individuals aged six or more: this indicator reports the percentage of individuals that a) use the internet, b) use the internet every day, c) use the internet at least once a week, d) some times in a month, e) some times in a year and f) do not use the internet.

Another indication of digital literacy is how and for which activities the instrument of the net is used; since the activities carried out on the web can be divided in active and passive ones, we suggest that a good indication of digital literacy is the degree to which individuals engage in such activities. Slightly diverging from the EU commission framework but using the same categories, we found two indicators that address the use of the internet:

5) People aged fourteen or more who engaged in e-commerce: this indicator reports the percentage of individuals that used the internet for shopping a) during the previous three months, b) from three months to one year before, c) more than a year before, d) never.

6) People aged 14 or more that used the internet as a mean of communication with the public administration: this indicator reports the percentage of individuals that a) gathered information, b) downloaded forms, c) sent filled in forms, through the internet from/to public administration offices.

3.3.3 - Social media activity

Data regarding the presence on social media was collected from the page of the Italian division of Mary's Meals[15]. It was manually harvested from the front end of the page thus is not exhaustive, but will serve to our purpose of measuring social media presence of the organization. The first post present on the page is from 1 January 2012 but virtually no activity is present until August 2014. Unfortunately, no data is available on the evolution of Facebook likes of the page over time as it could have been useful to better understand the online behavior of the organization. The page now has 4084 likes as of 19 January 2017 with an average of 65 people "talking about it" (multiple observations made from December 24 2016

[15] https://www.facebook.com/MarysMealsItalia

to the previously stated day). Despite the name of the indicator, it does not represent the number of people that mention the page on their posts but rather the number of users that create an interaction with the page, being it in the form of a like to a post, a share, etc. in the previous week.

Recorded data covers the period from 7 January 2015 to 10 January 2017. During this time were published 160 posts that totaled 5117 likes, 1448 shares and 111 comments. Of these, 74 posts were made in 2015 and 83 in 2016, total Facebook posts likes for the years 2015 and 2016 were 2612 and 2438 respectively, total Facebook posts shares were 741 and 688 respectively and Facebook posts comments were 56 and 54. Even though the absolute values for the indicators are greater in 2016 suggesting positive growth of the page, the averages of each category for the years show very light decrease of -5.9 for post likes, -1.7 for post shares and -0.1 for post comments suggesting lower user interaction for the period. It should be noted though that older posts might have gathered more likes than newer ones since more time has elapsed from their publication and thus more people may have seen and interacted with them.

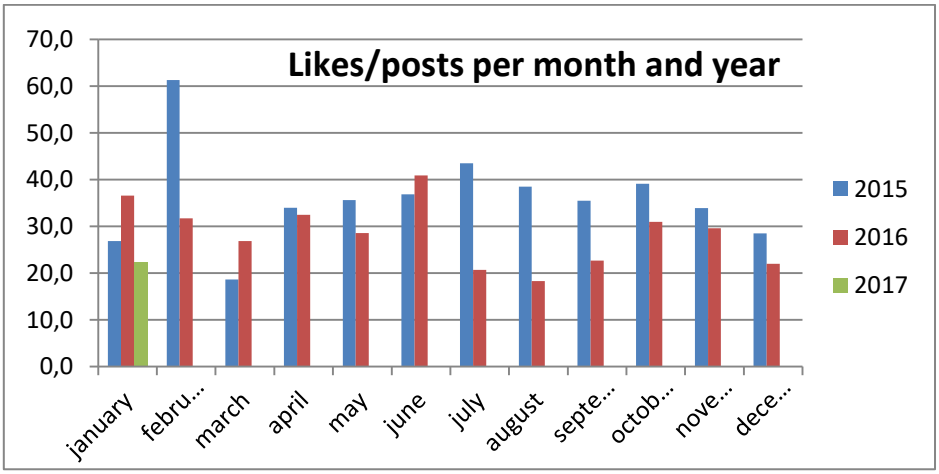

Figure 7

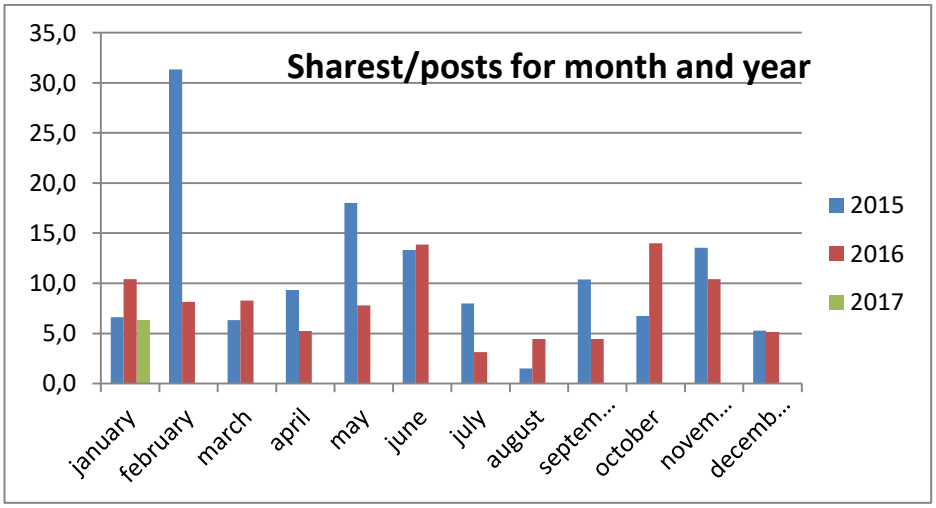

Figure 8

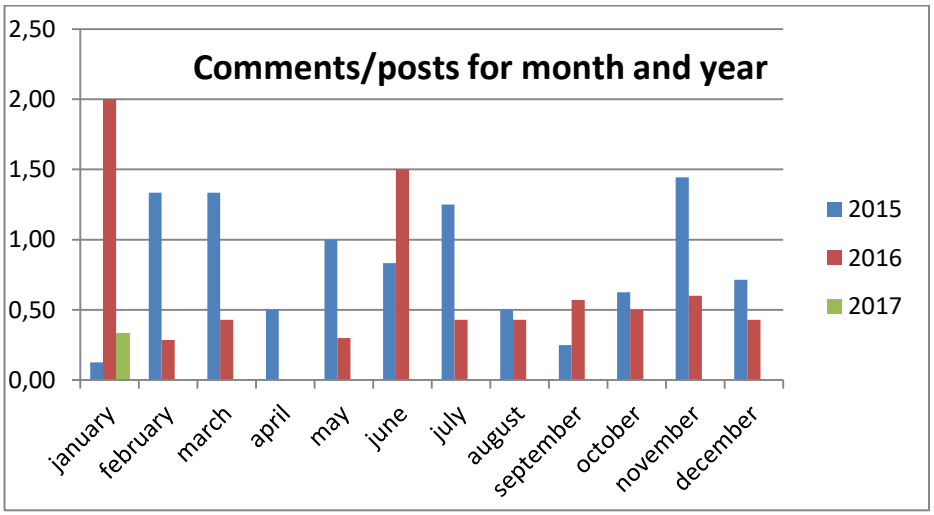

Figure 9

On a monthly basis, Mary's Meals Italia made and average of six post per month in 2015 and seven for 2016. There are clear differences between the years; throughout 2016, the number of Facebook posts per month is particularly even across the year, while it is possible to notice that in 2015 there were different peaks in January and December and troughs in February, March, May and August. For 2015, the organization has been the most social during December with fourteen posts and the least social in august with only two posts, while for 2016 were respectively May and November with ten posts, and April and October with four posts. The difference in number of post likes per month over posts per month is tangible from 2015 to 2016 with the former resulting in greater numbers nine out of twelve times with February, July and August resulting in double the numbers of 2016; on the other hand, 2016 has a slight edge just in January, March and June.

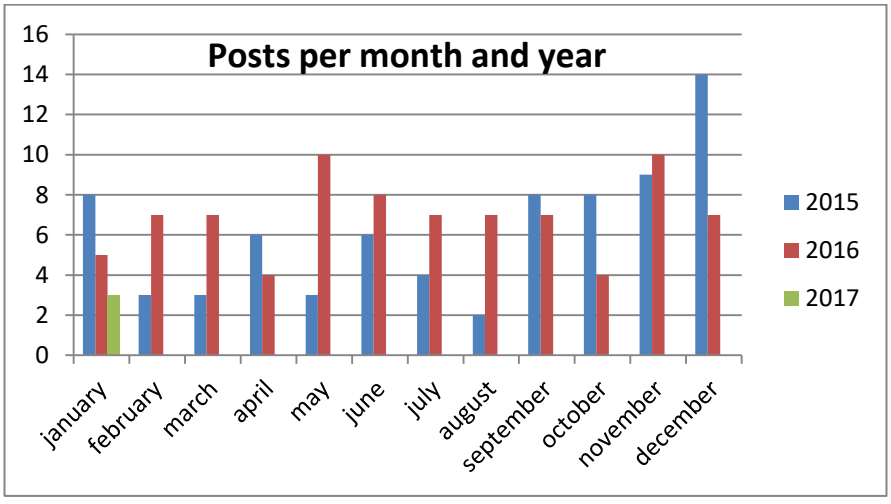

Figure 10

3.3.4 - External events - timing

The timespan covered is 627 days or just a little short of 22 months, in fact it should be noticed that April 2015 and January 2017 are not completely covered. Even if the period is quite short, the usability of data is not compromised for our purpose, although having a longer time frame upon which to operate would have been of great help. The day with the most donations counts 18 of them and is 31 August 2015. December is clearly the month when the most donations are made totaling 130 for 2015 and 84 for 2016 and donations sum up to over €4000 for both years; this is expected because donations to charities increase when it's Christmas time. Observations in August are in line for 2015/2016, totaling 49 and 48 respectively, the consistency of the number of observations suggests that the period is favorable. November and September and May on the other hand show a clear divergence between the years, September of 2015 differs from 2016 by 74 donations and the difference of November 2016 with 2015 is 37 and the difference for May is 27, an indication that something influenced public participation for those months.

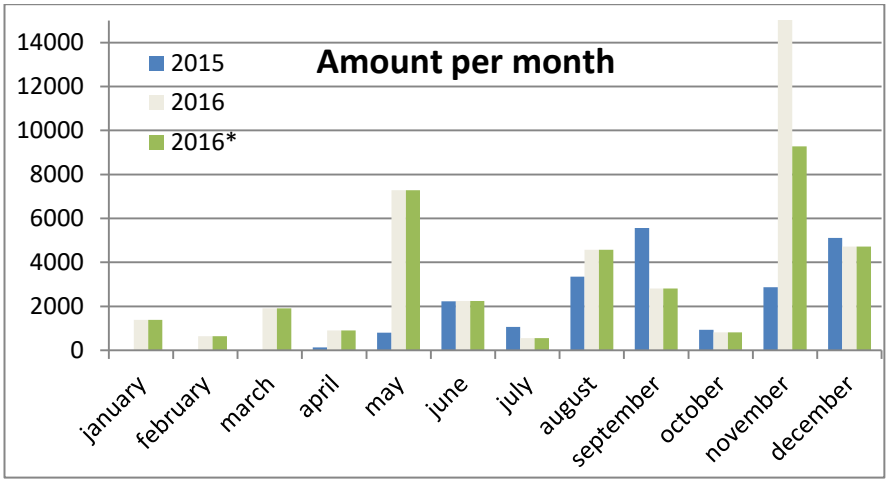

Figure 11

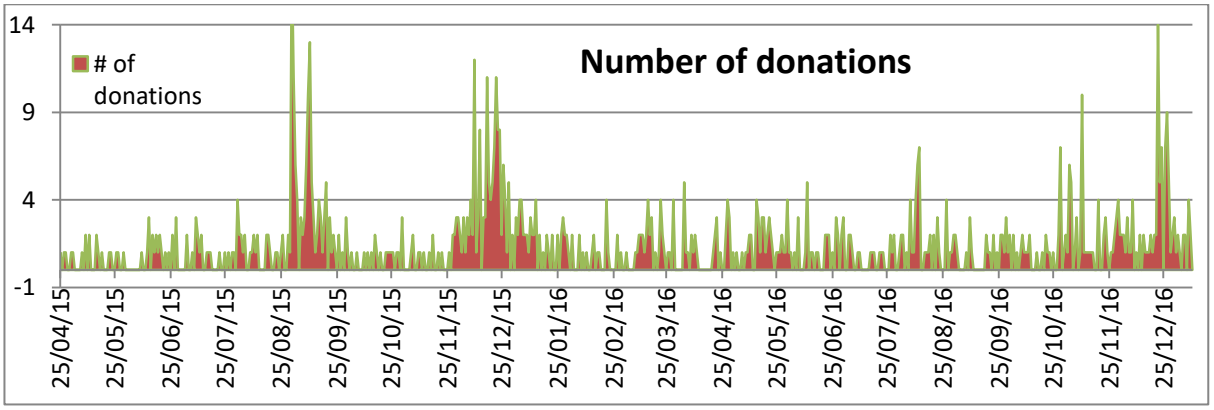

Figure 12

When considering the amounts donated we notice mild uniformity between the years with a tendency for 2016 to be more rewarding than the previous year; the only months that

tend to deviate the most from one year to the other are September for 2015 and May and November for 2016. In September 2015, roughly four times more donors than the following year donated reaching just a little bit more of two times the total amount for 2016 thus follows that the average donation in 2016 was higher. May 2016 shows a clear increase of both the number of donation and the average donation from 2015; a 2.5 times increase in the number of donations is responsible for a 9 times increase in the amount received by the company. The month of November is the one where the outlier donation is present; this makes the average amount of donation for the month as high as € 717 but excluding the outlier brings it back to € 168 juts a little higher than the previous year. A three times increase in the number of donors from year to year equaled a three times increase in the total amount made from donations.

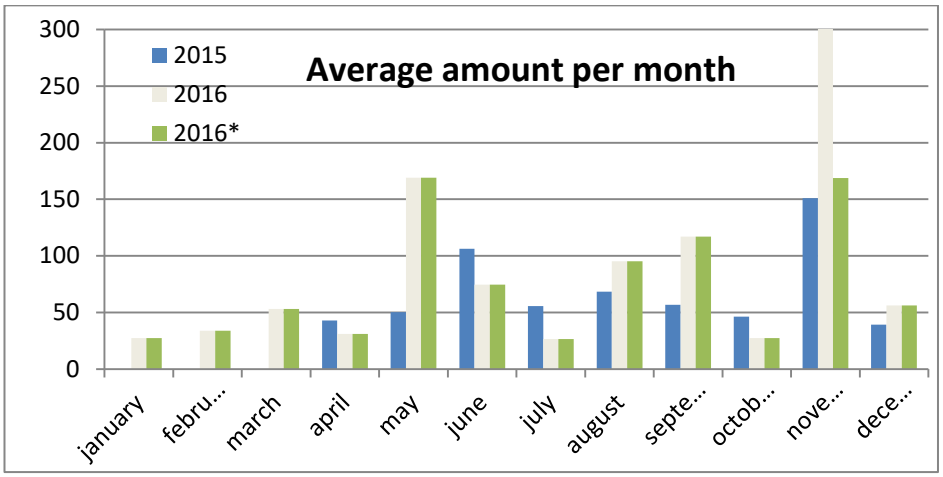

Figure 13

From the three data sources taken into consideration were extrapolated 30 variables covering the four areas of interest of the study, it should be clear that this data is an elaboration of data collected by ISTAT and thus the populations may not be representative of one another. This is an exploratory study so extreme precision is not our focus. All variables are summarized in the following table (Table 2):

Table 2

Variable name	Variable description	Variable area of interest
---	---	---
Amount	Amount donated per observation	Dependent variable
acquistinegliultimi3mesi	Purchases in previous 3 months	Digital literacy
acquistida3mesia1annofa	- from 3 months to 1 year	-
acquistipidi1annofa	- more than 1 year	-
acquistimai	- never	-
usanoInternet	use internet	-
usanoInternettuttiigiorni	- everyday	-
usanoInternetunaopivoltea	- more than once a week	-
usanoInternetqualchevoltaal	- sometimes in a month	-
usanoInternetqualchevoltaall	- sometimes in a year	-
PAspediremoduli	Communicate with public administration	-
usanoilpc	Use PC	-
usanoilpctuttiigiorni	- every day	-
usanoilpcunaopivoltealla	- more than once a week	-
usanoilpcqualchevoltaalmes	- sometimes in a month	-
bandalarga	Broadband connection	Digital infrastructures
fissaabandalarga	Fixed broadband connection	-
mobileabandalargatramiteret	Mobile broadband connection	-
connessioneabandastrettafiss	Fixed narrow-band connection	-
Cellulareabilitato	Possess smartphone	-
Personalcomputer	- PC	-
Connessioneabandalarga	- broadband	-
FBpostlikes	Facebook likes	Social media activities
FBpostshares	Facebook shares	-
FBpostcomments	Facebook comments	-
date	Day in the year	Offline events
sex2	Gender w/ distinction group and couples	Control variable
pilprocapiteregione	Regional GDP	-
popolazioneregione	Regional population	-

4 - Empirical model

4.1 - Correlation analysis and bivariate regression.

Since there are no published studies regarding the influence of digital divide on charitable donations, before we will be able to construct a model for the variables to be tested, but we must explore which variables are actually helpful in explaining the variation on the amount donated. To do so we will perform a bivariate analysis and a correlation analysis to understand how the phenomena are correlated; that will in turn lead us to the definition of a multivariate model. After all the testing will be done we will choose which model we think is the most explanatory so that it will be possible to test the previously defined hypothesis.

Since my aim is to select the best subset of predictors and explain the data in the simplest and most direct way, we will follow the principle of Occam's razor (lex parsimoniae). This heuristic technique states that among all plausible explanation for a phenomenon the one that is the simplest is to be preferred. In order to do so we will try to remove all unnecessary predictors that may add noise to the estimation we are trying to achieve.

Collinearity is another important factor that the data we collected may present; many of the variables present in the data, although being measures of different phenomena, aim at representing the same indicator. My objective is, however, to understand which of the independent variables is the most suitable in describing changes in the dependent variable and thus produce a robust model. Moreover, given the exploratory nature of this study and the small size of the dataset, we will use a P cut-off value of 0.1 but we will not be too strict, we will consider that increasingly strong evidence against the null hypothesis is present as the P becomes smaller.

From the analysis of the data on the amount donated, it is possible to notice an outlier in the amount variable. The removal of an outlier is considered an acceptable practice only if it is thought to be an illegitimate observation; this is unlikely to be our case since the observations are the result of an automated process of the platform that registers payments received by the organization. From the available data, it is not possible to infer anything except that a single user made the payment thus we cannot exclude that it could be just a generous gift by some individual that is unlikely to happen in the future. Whichever the case it happens to be, the aim of this research is not trying to quantify the change but rather to

understand if any relation among the variables exists. Since excluding observations is not an advisable practice, we will keep it in order to follow best practices.

I will perform the correlation analysis first, to understand which variables is worth keeping and to control for variables that are excessively correlated with each other. We will focus on the main hypothesis that we are testing, digital literacy and digital divide; we will later start the bivariate analysis and conclude with a regression of the chosen variables with control variables to test the soundness of the model.

Regarding the digital literacy area of interest, we observe the following situation:

```
. corr Amount acquistinegliultimi3mesi acquistida3mesia1annofa acquistipidi1annofa acquistimai usanoInternet usanoInternettuttiigiorni usanoInternetuna
> ualchevoltaal usanoInternetqualchevoltaall PAspediremoduli usanoilpc usanoilpctuttiigiorni usanoilpcunaopivoltealla usanoilpcqualchevoltaalmes
(obs=803)
```

	Amount	acqui~si	a~da3m~a	a~pidi~a	acqui~ai	usanoI~t	usanoI~i	usanoI~a	usano~al	usano~ll	PAsped~i	usanoi~c	usanoi~i	usanoi~a	usanoi~s
Amount	1.0000														
acquistine~i	0.0020	1.0000													
acquistida~a	-0.0113	0.5982	1.0000												
acquistipi~a	-0.0293	0.0009	0.1483	1.0000											
acquistimai	0.0094	-0.9539	-0.7691	-0.2069	1.0000										
usanoInter~t	0.0261	0.8857	0.3297	-0.0501	-0.7715	1.0000									
usanoInter~i	0.0181	0.9270	0.4135	-0.0882	-0.8243	0.9491	1.0000								
usanoInter~a	0.0324	0.1200	-0.2203	0.1009	-0.0383	0.4101	0.1097	1.0000							
usanoInte~al	-0.0107	0.6080	0.4304	0.0386	-0.6171	0.6028	0.6332	-0.0508	1.0000						
usanoInte~ll	0.0223	0.3882	0.4184	-0.2316	-0.3557	0.4331	0.4328	0.0217	0.1715	1.0000					
PAspedirem~i	0.0312	0.7631	0.7115	0.0274	-0.7893	0.6502	0.6593	0.0923	0.4893	0.5479	1.0000				
usanoilpc	0.0265	0.9101	0.4057	-0.0642	-0.8090	0.9926	0.9570	0.3624	0.6037	0.4598	0.6886	1.0000			
usanoilpct~i	0.0063	0.9205	0.4202	0.0576	-0.8446	0.9247	0.9640	0.1402	0.6165	0.3757	0.6816	0.9333	1.0000		
usanoilpcu~a	0.0651	0.4453	0.1459	-0.1781	-0.3446	0.6687	0.4956	0.6891	0.1762	0.3367	0.3347	0.6726	0.3822	1.0000	
usanoilpcq~s	-0.0117	0.5697	0.2894	-0.4338	-0.4668	0.5782	0.5665	0.1010	0.6214	0.4567	0.4500	0.5775	0.4787	0.2856	1.0000

Figure 14

We observe that the higher correlation, even if small, for the variable amount is 0.0651 given by use of the PC more than once a week (usanoilpcu~a), this is a useful indication that the two phenomena interact with each other. More generally, high level of correlation among independent variables is present. This ultimately results in collinearity when trying to estimate the model since the variables try to explain the same phenomenon. We will consider "usanoilpcunaopivoltealla" a worthy candidate for the bivariate analysis.

Regarding the digital divide (infrastructure) area of interest, we observe:

```
. corr Amount bandalarga fissaabandalarga mobileabandalargatramiteret connessioneabandast
> rettafiss Cellulareabilitato Personalcomputer Connessioneabandalarga
(obs=803)
```

	Amount	bandal~a	fissaa~a	mobile~t	connes~s	Cellul~o	Person~r	Connes~a
Amount	1.0000							
bandalarga	0.0108	1.0000						
fissaaband~a	-0.0084	0.8877	1.0000					
mobileaban~t	0.0381	-0.1830	-0.5624	1.0000				
connession~s	0.0662	0.1347	-0.0206	0.4099	1.0000			
Cellularea~o	0.0285	0.7402	0.7877	-0.4219	0.0939	1.0000		
Personalco~r	0.0255	0.6866	0.7930	-0.4553	0.1252	0.9115	1.0000	
Connession~a	0.0158	0.7663	0.8411	-0.4778	0.0583	0.9451	0.9655	1.0000

Figure 15

The situation we find here is comparable to what we saw before, a great amount of correlation values greater than 0.6. The variable that is correlated the most with our

dependent variable is fixed narrow-band connection (connession~s). This can be interpreted as an early sign that infrastructures do not play an important role in the amount received by charities. However, more testing is needed.

Regarding the social media area of interest:

```
. corr Amount FBpostlikes FBpostshares FBpostcomments
(obs=860)
```

	Amount	FBpo~kes	FBpo~res	FBpos~ts
Amount	1.0000			
FBpostlikes	0.0655	1.0000		
FBpostshares	0.2317	0.7317	1.0000	
FBpostcomm~s	-0.0165	0.5141	0.4607	1.0000

Figure 16

Here we find the number of post shares to be positively correlated with the amount donated by 0.2 and at the same time is has correlation close to 0.6 for all other variables. This indicates that excluding the other variables from the regression may decrease noise.

Bivariate analysis confirmed the presence of correlation between the digital literacy variable we identified before, following the regression results:

```
. reg  Amount usanoilpcunaopivoltealla
```

Source	SS	df	MS		
Model	4199036.87	1	4199036.87	Number of obs	= 803
Residual	987004121	801	1232214.88	F(1, 801)	= 3.41
				Prob > F	= 0.0653
Total	991203158	802	1235914.16	R-squared	= 0.0042
				Adj R-squared	= 0.0030
				Root MSE	= 1110.1

Amount	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
usanoilpcunaopivolte~a	38.83637	21.03813	1.85	0.065	-2.459996	80.13274
_cons	-600.7227	386.7092	-1.55	0.121	-1359.806	158.3603

Figure 17

Here we find more evidence that using the PC at least once a week (digital literacy) has a sizable effect on the amount donated. The p value of .065 is well below our 0.1 threshold but the R-squared is very low. This is not unexpected as just one variable will hardly be able to predict a great amount on variability in the dependent variable. At this point we should consider the variable “usanoilpcunaopivolte~a” an eligible candidate for the final regression.

Bivariate analysis for the infrastructure variables did confirm that there is not much relation between them and the dependent variable. We were curious to find out if the removal of the outlier measure in the “Amount” variable would have had any effect on the results; thus, we generated a new variable (Amount1) to exclude that observation and found

that the results did not vary by much at all. The only exception was for the "mobileabandalargatramiteret" variable that showed a significant but negligible negative correlation. We will consider this as stronger evidence that second level digital divide does not have a sizable effect on the amount donated.

Bivariate analysis for the social media variable shows a sizable positive effect on the amount of donations. The t value of 6.98 indicates that this effect is definitely present. However we must pay particular attention, since correlation does not imply causation, we cannot be sure whether it is the amount of shares on social media that causes the increase in the donated amount or the other way around. Either way it is interesting to notice a connection between the two; this is an indication that further research is needed on the subject. Follows the bivariate regression:

```
. reg  Amount FBpostshares
```

Source	SS	df	MS	Number of obs =	860
				F(1, 858) =	48.68
Model	53259208.8	1	53259208.8	Prob > F =	0.0000
Residual	938725307	858	1094085.44	R-squared =	0.0537
				Adj R-squared =	0.0526
Total	991984516	859	1154813.17	Root MSE =	1046

Amount	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
FBpostshares	45.31913	6.495458	6.98	0.000	32.57028	58.06797
_cons	7.519404	38.31258	0.20	0.844	-67.67794	82.71675

Figure 18

Possible effect of the influence of grassroots culture on the donations received by the charity can be captured by the date variable. Stata handles dates as a numeric string, thus it is possible to regress them without any problem. From the grassroots organization point of view the period of Christmas (high number in the variable date) is an extremely beneficial period since more charity events are held. From the analysis of data emerged that there is a very light influence of offline events on donation amount as shown in the bivariate regression:

```
. reg Amount date
```

Source	SS	df	MS	Number of obs =	860
				F(1, 858) =	2.89
Model	3328567.51	1	3328567.51	Prob > F =	0.0896
Residual	988655949	858	1152279.66	R-squared =	0.0034
				Adj R-squared =	0.0022
Total	991984516	859	1154813.17	Root MSE =	1073.4

Amount	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
date	.3495066	.2056391	1.70	0.090	-.0541079	.7531211
_cons	-7071.128	4222.441	-1.67	0.094	-15358.65	1216.396

Figure 19

4.2 - Multivariate regression analysis

Now that we analyzed the four areas of interest and found the variables to describe them (usano il pc una o più volte alla settimana, Connessione a banda larga, FB post shares, date), we will move on to a multivariate analysis by putting the selected variables in a single model. Human behavior cannot be predicted by just four variables, and to rule out the possibility that the variables we identified are correlated just by chance to the amount donated we will add 3 control variables for gender (with distinction among groups and couples), regional GDP and regional population.

Results from the controlled regression are promising. We see that by adding controls to the regression not only we get a higher R-squared, meaning that an higher percentage of the variance of the dependent variable is explained by the independent variables, but also obtain a substantial reduction in the P values of the variables of interest. Although the R-squared of both models is substantially low, meaning that the model does not look at the full picture we are trying to investigate, we obtain some results useful at addressing our hypothesis testing.

According to our results, using a computer several times a week (usano il pc una o più volte alla settimana) may influence the amount donated through the online platform. Its p value of 0.99 makes it barely significant but as we explained before we are interested in exploration rather than precision. The size of its effect is appreciable with a standard error of 29, thus we will accept the hypothesis that digital literacy has an effect on charitable donations.

A completely different scenario is found regarding the effect of second level digital divide on donations to the charity. We used the variable describing the use of a broadband connection by the family (Connessione a banda larga). Not only we found a (minimal) negative effect; its P value went from .359 in the uncontrolled test to .919 in the controlled one. This is probably due to its correlation to the regional GDP control variable (pil pro-capite regione). Since, however, in both cases the P value is greater than 0.1 by a considerable amount, we fail to reject the null hypothesis and thus conclude that second level digital divide does not play a significant role on the amount donated to the charity.

```
. reg Amount usanoilpcunaopivoltealla Connessioneabandalarga FBpostshares date sex2 popol
> azioneregione pilprocapiteregione
```

Source	SS	df	MS		
Model	63998141.3	7	9142591.61	Number of obs	803
Residual	927205017	795	1166295.62	F(7, 795)	7.84
				Prob > F	0.0000
				R-squared	0.0646
				Adj R-squared	0.0563
Total	991203158	802	1235914.16	Root MSE	1080

Amount	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
usanoilpcunaopivolte~a	48.15454	29.14771	1.65	0.099	-9.06103	105.3701
Connessioneabandalarga	-1.70324	16.68556	-0.10	0.919	-34.4562	31.04972
FBpostshares	47.17286	6.917237	6.82	0.000	33.59466	60.75107
date	.3419335	.2169356	1.58	0.115	-.0839008	.7677678
sex2	27.11508	38.31264	0.71	0.479	-48.09081	102.321
popolazioneregione	.0000209	.0000186	1.12	0.262	-.0000157	.0000575
pilprocapiteregione	-.0107698	.0139694	-0.77	0.441	-.038191	.0166514
_cons	-7671.907	4560.954	-1.68	0.093	-16624.84	1281.029

Figure 20 – Multivariate regression results.

Regarding the “date” variable that we used to represent the effect of offline events on our dependent variable. Since STATA handles dates as numbers from a given origin and since there surely is a correlation between the date and the amount donated because of Christmas celebrations, we are able to understand if there is an increase in the amount donated as the date increases. Our model however reports a very small coefficient of 0.3 and a P value of 0.115, barely over the 0.1 threshold, thus suggesting that the null hypothesis cannot be rejected.

The effect of Facebook post’s shares on donation, although being statistically significant and of sizable entity is misleading. In fact, we would say that it is a false positive. We say so since we cannot be sure on whether the share spikes registered caused the donations or the other way around. When situation like these happen it usually is because the

variable is not a good indicator for the phenomenon we are trying to describe. However, it was not expected to find such a high correlation among the variables.

Results are summarized in the following table:

Table 3

Relation	Evidence
H1: Net infrastructure availability positively influences the amount donated.	Not supported
H2: Digital literacy of users positively influences the amount donated.	Supported
H3: Activities on social networks positively influence the amount donated.	Correlated
H4: Date positively influences the amount donated.	Not supported

5 – Conclusions

I have always been interested in digital divide since I am from Sicily and suffered first hand second level digital divide in everyday life. I was interested in the effect of digital literacy especially because I am part of an educational project where we teach children math using videogames. I am helping the digital branch of the startup taking part of a crowdfunding process to proceed in the development of the project. We developed a prototype of the platform and tested it in a school in Rome; it turned out to work extremely well. Crowdfunding will help us to: 1) proceed to the development of the platform by adapting one already existing, 2) understand the market potential of the idea and 3) build a community around the project. Right now, second level digital divide is affecting the project since it requires the deployment of a dedicated server. Unfortunately, unlike other parts of Italy where the upload speed is not a constraint, the area where we have our office suffers from limited connection capabilities and thus impedes us to easily deploy it.

I believe this is not the only situation of a potentially new business development opportunity unable to be exploited due to contextual factors. This thesis covers two main areas: Crowdfunding and Digital Divide. While being topics that stroke me, I have never really looked into them. Being a management student, for all the time-spent writing I could not stop looking at things through the glasses of an entrepreneur who wanted to understand its surroundings. I therefore think that this work will be useful to other people who find themselves in the situation of running a crowdfunding campaign and are interested in what to expect based on contextual factors.

The study focuses just on a small part of a vast topic that we believe is of primary importance in modern society given the extensive use of digital devices in everyday life for both work and leisure. We posed particular attention to digitalization level of Italian provinces using the empirical context of a charity-crowdfunding online platform. Even though the study uses a flavor of crowdfunding that is not the most known, it is possible to extend the validity of the study to other adjacent areas of interest. Given the present lack of studies on the topic, we hope this research acts as a starting point for future debate on the issue.

We hypothesized various factors that influenced the amount received from donations on the online platform of the charity; two independent variables represent two sub-categories of digital divide: digital infrastructure development and digital literacy, the other two representing two sub-categories social media: social media activity and external events.

Thanks to our model, we found some interesting results; a rather large and significant effect of digital literacy suggests a strong link between the variables. This supports our hypothesis, confirming the presence of the causal relationship between the two. The indicator we used referred to the amount of time spent using digital devices. It suggests that we should explore more on the topic using more rigorous research settings and using larger datasets to increase representativeness. We also confirmed the existence of a strong link with social media activity. However, we could not establish a causation relationship. It is in fact impossible to understand which causes the other. It could be equally reasonable that an increase in the number of shares on the organization's Facebook page, leads to an increase in donations, as an increase in donations caused a response from the organization that posted more "sharable" (good news, goal reached) updates. Either way it is something to notice that may raise further insights of research on the topic.

Not all our hypotheses were accepted; our model suggests us that infrastructure development does not significantly influence donations. Of course, this is not a satisfactory answer; the indicator we chose represented the use of broadband connection thus can be interpreted as an indicator of second level digital divide (broadband vs narrowband). In fact, deeper investigation on the effects of second-level digital divides showed a different picture. Most of the research on the influence of digital infrastructures on users is business oriented and thus focuses on other indicators. Our finding is clearly counterintuitive and is surely wrong if interpreted from the business point of view. However, in our case effect from this variable are negligible. This study regards just one platform and it would be careless to conclude that one case is representative of the whole population. We suggest to pursue further research on the topic.

Date should have had a greater effect but the impossibility to reject the null hypothesis raised further questions. Closer inspection revealed an increase in the number of donations in December but such increase was offset by a lower average amount. To give a sense to the size of the phenomenon readers should recall that the annual average donation for the organization was € 105 (€ 70 controlling for the outlier), larger than the low fifties range for both 2015 and 2016. The bimodal distribution of donations suggests that there is some "external" influence on the amount donated. The first mode of donations is at € 15; one of the charity's main strength is its ability to feed a child for an entire year for that sum. By disclosing this information, the organization wants to underline its ability to maintain a light cost structure in order to increase the efficiency of the charity, which is of utmost importance in

the field. Moreover, for non-profit organization is beneficial being transparent about how the money is spent since it gives a credibility return that cannot be ignored.

Even though research on a topic always raises more questions than it answers, It is now clear to me that digital transformation is particularly important, especially today that many activities, being them for profit or nonprofit, are carried out with the use of computers. The result of this study shows a greater impact of digital literacy on the ability of the platform to generate “cash flow” than infrastructural development. Even if this seems something specific, it highlights the importance of digital transformation processes taking place right now. Digital literacy plays a fundamental role in this process because it delineates new ways in which innovation can be channeled, giving rise to novel business models, organizational patterns and policy measures. It is important to notice that this research focuses on the customer side of the market; if we look at the phenomenon from the business point of view, it creates unique marketplace conditions where barriers to entry are reduced for small competitors that use digital technology.

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Fundraising across digital divide: evidences from charity crowdfunding.

Summary

This thesis spans across two main areas of interest that may seem very distant, but in reality, they are not. Crowdfunding is a “modern” way to raise capital, at least its digital counterpart. Most of the studies on this topic focus on the commercial side and few on the human side. In this paper, we focused on donation-based crowdfunding. We wanted to understand if the effectiveness of this web-based fundraising method was correlated to several other contextual factors related to the degree of digitalization in different geographic areas and social media. These topics are of particular interest, especially for those working on a crowdfunding campaign who would like to foresee its dynamics based on the context.

We analyzed the topic with the help of charitable donations data from the Italian division of Mary’s Meals. The non-profit organization is embracing the grassroots culture and it is embracing it by empowering its backers (and itself) with a simple, crowdfunding-oriented, online platform. Digital divide data came from ISTAT and it is on a regional scale. Available data covers the period April 24 2015, January 10 2017. We measured the efficiency using the donations received through the online platform, identified one variable for each area of interest among the appropriate ones and performed correlation and bivariate analysis. We proposed a model to test the validity of our hypothesis based on four indicators. The purpose of this study is thus to act as a starting point for other scholars.

Analysis of data in our case showed a positive and significant effect of digital literacy (measured with time spent using a personal computer) on donations to the charity, confirming our hypothesis. Our model shows a great correlation among our dependent variable and social media activity (number of post shared on the Facebook page of the organization). The impossibility to establish a causal relationship opens up even more questions for research. It also shows us that digital infrastructure development (measured using the amount of families that uses broadband connections) does not interact with the dependent variable; while it is true in our case, we suggest that it may be different in others. Moreover, it shows that external events (measured using the date variable since holydays happen at the end of the year) do not seem to influence our dependent variable. Further research showed quantity increase but reduction in size of donation for year-end holydays.

Digital divide

Digital divide may be caused by multiple factors many of which are still being researched; in developing countries, for example, large part of the population simply does not have the means to afford a computer or a mobile data plan but this explanation alone cannot describe the full picture. In fact, other influencing factors can be easily identified:

1) Lack of basic networking infrastructure in poorer countries or lack of broadband coverage in developed countries.
2) Computer literacy of users, for both the use of the machine itself and the use of the internet as an instrument (Blau, 2002).
3) Other socio-economic factors such as age, education, gender and income may generate turbulences in the adoption of new technologies (Hilbert, M. 2010).

Digital divide can therefore bring the widening of existing economic gaps and have severe consequences on the capacity to access information; this can in turn trigger a vicious circle for poorer countries, which are excluded from new means of production based on the dematerialization of information. Different authors analyzed the variety of aspects that influences digital divide each of which is reasonable depending on the objective of the analysis. Martin Hilbert (2011) based on previous literature conceptualized four broad categories of variables which he resumes in the question “who, with which characteristics, connects how, to what?” follows a brief explanation of the categories.

4) Who: the subject of the analysis, it can be individuals, organizations, communities, societies, countries, etc.
5) Which characteristics: attributes of the subject such as education, age, gender, geography, size, profitability, etc.
6) How it interacts: the level of digital literacy of the subject, passive or active use of digital services.
7) What it interacts with: internet, computer, phone, etc.

This conceptualization is useful for our purpose since it defines the four aspects that one must focus on when analyzing such a complex topic.

Mary’s Meals

Like most charitable organizations Mary's Meals rises funds through both offline and online channels; they receive support mainly from the UK but have bases that help in the US, Austria, Germany, Croatia, Ireland, Italy and Bosnia-Herzegovina. In the UK Mary's Meals operates several charity shops and multiple parishes and businesses have adopted Mary's

meals as the charity of choice. Talking about offline fundraising, national affiliates promote awareness in the respective areas by organizing events and collecting donations. Online fundraising is what we focus on, since it resembles crowdfunding in many ways; on the company website there are two options for donating, one is the classic choose-an-amount donation while the other prompts the user to start his/her own fundraising campaign.

This last point is in our area of interest; and since this study is based on digital innovation it would be interesting to know how effectively the platform that Mary's Meals offers (https://www.marysmeals.org.uk) converges to or diverges from the three characteristics that most crowdfunding platforms share which Agrawal et al. (2010) presented. Here are the characteristics followed by a brief description of how the platform implements such functions:

The platform helps creators presenting their project in a clear and comprehensive way: since the projects that are proposed on Mary's Meals do not entail anything material, they are not for a product or service, the aim is to persuade potential donors in becoming effective donors. From the documentation that is possible to find in the UK division site it is clear that online campaigns must be carried forward offline, organizing events and spreading the word; in fact in the fundraising ideas section the presented initiatives are just offline ones (see "crowdfunding grassroots" section).

Moreover, much of the material available in the fundraising resources section is suited for printing but still very usable in an online environment. These materials are of great help when trying to communicate the need of a donation; it can be both company oriented, when campaigning for a general cause, or personalized, when campaigning for a specific cause, in order to accommodate the majority of situations.

The platform facilitates small-scale financial transactions between the crowd and the creators thus enabling participation of the former; Mary's Meals platform provides a service for both sides of the market, we can say that it belongs to the category of two-sided platforms. By opening the possibility of creating a fundraising campaign the platform enables the participation of the crowd in fundraising activities. In order to do so it facilitates small-scale financial transactions with the use of a simple graphical interface where the user chooses the amount to pledge and is then guided towards the completion of the payment. Seen under an economic perspective we can say it eliminates the coordination costs that would otherwise arise without using the platform or offline.

Platforms provide a communication interface for crowd investors as well as basic fundraising information such as statistics; the online platform is of great help for

communications in general, it indicates the user to write frequent updates like many other platforms do. Besides this, while I was using the platform I noted that it was very hard if not impossible to find a list of all active, past or successful campaigns. It is not clear whether the company made this as a feature, i.e. the platform is not intended as a marketplace where to "shop" for a donation, or as a way of controlling the “marketplace” in order to increase the rate of click of interested funders of those campaigns that are already near the completion threshold (first page).

Method

Online interactions can be more clearly observed under the digital innovation lens; one area on which to focus is the effects that various aspects of the digital divide may have on the adoption and use of online platforms. It is clear that digital divide is a broad term, thus we decided to inspect more closely two particular aspects of it: the infrastructure development and the digital literacy of users. One challenge that arises is how infrastructure development and digital literacy of users can be measured. The European Commission provides a useful framework for the measurement of digital divide but there is no precise regional index on which to operate since the topic is so complex and influenced by so many factors. In the following research, we will explain which indicators we chose and how we chose them.

The availability of an online platform for an organization could be a tremendous source of data. Unfortunately, the organization did not provide us full access to its database, in fact it only provided us four variables on which to operate, the date of the donation, the amount, the origin and the gender of the donor with a distinction among groups and couples. It is true however that even though it would have been much more interesting to be able to study on a larger dataset, it would have shifted the focus outside the digital innovation field. Data form Mary’s Meals was then polished and other variables were added to construct the complete dataset. Other sources of data were the I.Stat platform from ISTAT and the Facebook page of the organization.

The rationale upon which Digital Divide was elected as a variable that could influence the amount donated is that it can be viewed as a sign that the users were able to navigate to the website and were familiar with online financial transactions. It is strait forward to understand the two sides of the coin: one infrastructural and one human. As we saw in the digital divide paragraph, the presence of a connection besides being a necessary condition to operate the platform is not enough to enable the user to make a donation. It is clear that the

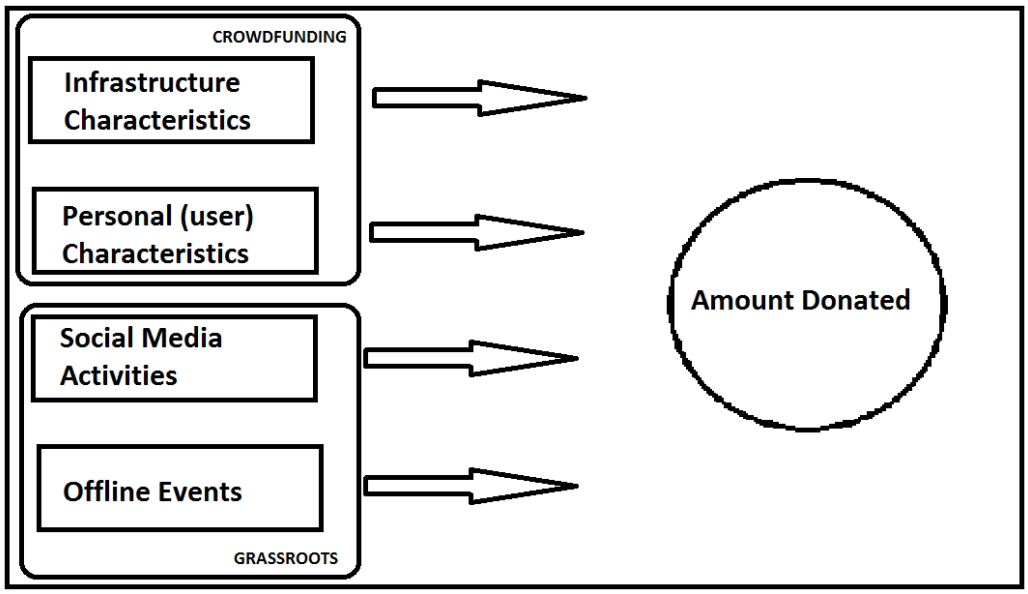
user must at least have an elementary understanding on how to use the platform and e-payments methods; and thus its digital literacy should play an important role.

Crowdfunding is an activity that is particularly tied to the use of the net; we can infer that low levels of human capital among users may consequently lead towards lower number of campaigns initiated and thus influence the overall amount received by the organization. From the infrastructure side we are able to draw a further division between different technologies users connect to the internet with (fixed line, mobile) and the effective device they do it with (mobile phone, computer). However, the data we will use does not indicate whether the donation was made directly to Mary's Meals or through a crowdfunding campaign started on the platform. This limitation severely hinders the possibilities of research on the effects of Digital Divide on the use of the platform.

Crowdfunding alone does not describe the full picture, we talked about the grassroots environment that Mary's Meals operates in; we discovered that grassroots campaigns are firmly related to offline action through marketing. In present days it is not advisable, if not counterproductive, to limit marketing efforts to the offline world; in other words a successful campaign must have an offline and an online complement. There might be interactions between the two worlds; and we intend to explore them starting from the fact that December is considered the most important part of the year for almost every fundraiser. Is it possible that offline campaigns affect online donation? Technically the bridging role of the platform, a faster way to make a donation, suggests us that they do. Unfortunately, we were not able to have enough data to be able to discern if donations were made for a specific campaign or for the charity in general and thus we will try to verify its existence. The link between amount donated and Facebook interactions is interesting as well. From the research conducted during the writing of this paper emerged that grassroots movements are embracing social network sites; this suggests that a link between social network activities and the amount donated could be present. Another point of view is that of peer effect on donated amount (Smith et al. 2014); could it be true that social network interactions may influence other users to donate?

Now that we have covered the main areas of interest of this research, the theoretical framework upon which we will operate is becoming clear; two groups of variables are starting to emerge. One group concerns digital divide and will help us investigate the possible interactions it has on the amount of charitable donations. It is composed by two sub-variables: an infrastructure indicator to measure the impact of infrastructural development and a human capital indicator to measure the impact of digital literacy. The other is more marketing-oriented let's say; the rationale upon which we build is that the organization could

leverage on a specific group of users, grassroots campaigners, we want to investigate possible connections with the amount donated. The two sub-variables that compose the grassroots group are: a social media activity indicator and an offline events indicator.



The core of this study is based on the theoretical framework we just illustrated. The goal of this thesis is to try to find what drives the amount donated to charity; of course, the focus is extremely narrow since we only have data regarding one specific organization but nevertheless the findings could be applied to other cases. We would also like to point out that this study was conducted on data retrieved from very distant sources that cover very different populations. There are several implications stemming from such a stretch in the use of the data, which could lead the results of the study to be different from completely reliable. Besides these obvious limitations the questions we will try to answer are:

1) Is the amount donated to the charity influenced by the net infrastructures present in various geographic areas?
To answer this question we will test hypothesis:
H1: Net infrastructure availability positively influences the amount donated.

2) Is the amount donated to the charity influenced by the digital literacy of users?
To answer this question we will test hypothesis:
H2: Digital literacy of users positively influences the amount donated.

3) Is the amount donated to the charity influenced by activities carried out on social networking sites?
To answer this question we will test hypothesis:
H3: Activities on social networks positively influence the amount donated.

4) Is the amount donated to the charity influenced by external events such as holydays and celebrations and so by the date?
To answer this question we will test hypothesis:
H4: Date positively influences the amount donated.

Multivariate regression analysis

Results from the controlled regression are promising. We see that by adding controls to the regression not only we get a higher R-squared, meaning that an higher percentage of the variance of the dependent variable is explained by the independent variables, but also obtain a substantial reduction in the P values of the variables of interest. Although the R-squared of both models is substantially low, meaning that the model does not look at the full picture we are trying to investigate, we obtain some results useful at addressing our hypothesis testing.

According to our results, using a computer several times a week (usano il pc una o più volte alla settimana) may influence the amount donated through the online platform. Its p value of 0.99 makes it barely significant but as we explained before we are interested in exploration rather than precision. The size of its effect is appreciable with a standard error of 29, thus we will accept the hypothesis that digital literacy has an effect on charitable donations.

A completely different scenario is found regarding the effect of second level digital divide on donations to the charity. We used the variable describing the use of a broadband connection by the family (Connessione a banda larga). Not only we found a (minimal) negative effect; its P value went from .359 in the uncontrolled test to .919 in the controlled one. This is probably due to its correlation to the regional GDP control variable (pil pro-capite regione). Since, however, in both cases the P value is greater than 0.1 by a considerable amount, we fail to reject the null hypothesis and thus conclude that second level digital divide does not play a significant role on the amount donated to the charity.

Regarding the “date” variable that we used to represent the effect of offline events on our dependent variable. Since STATA handles dates as numbers from a given origin and since there surely is a correlation between the date and the amount donated as a result of Christmas celebrations, we are able to understand if there is an increase in the amount donated as the date increases. Our model however reports a very small coefficient of 0.3 and a P value of 0.115, barely over the 0.1 threshold, thus suggesting that the null hypothesis cannot be rejected.

```
. reg Amount usanoilpcunaopivoltealla Connessioneabandalarga FBpostshares date sex2 popol
> azioneregione pilprocapiteregione
```

Source	SS	df	MS		
Model	63998141.3	7	9142591.61	Number of obs	803
Residual	927205017	795	1166295.62	F(7, 795)	7.84
				Prob > F	0.0000
				R-squared	0.0646
				Adj R-squared	0.0563
Total	991203158	802	1235914.16	Root MSE	1080

Amount	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
usanoilpcunaopivolte~a	48.15454	29.14771	1.65	0.099	-9.06103	105.3701
Connessioneabandalarga	-1.70324	16.68556	-0.10	0.919	-34.4562	31.04972
FBpostshares	47.17286	6.917237	6.82	0.000	33.59466	60.75107
date	.3419335	.2169356	1.58	0.115	-.0839008	.7677678
sex2	27.11508	38.31264	0.71	0.479	-48.09081	102.321
popolazioneregione	.0000209	.0000186	1.12	0.262	-.0000157	.0000575
pilprocapiteregione	-.0107698	.0139694	-0.77	0.441	-.038191	.0166514
_cons	-7671.907	4560.954	-1.68	0.093	-16624.84	1281.029

Figure 21 – Multivariate regression results.

The effect of Facebook post's shares on donation, although being statistically significant and of sizable entity is misleading. In fact, we would say that it is a false positive. We say so since we cannot be sure on whether the share spikes registered caused the donations or the other way around. When situation like these happen it usually is because the variable is not a good indicator for the phenomenon we are trying to describe. However, it was not expected to find such a high correlation among the variables.

Results are summarized in the following table:

Relation	Evidence
H1: Net infrastructure availability positively influences the amount donated.	Not supported
H2: Digital literacy of users positively influences the amount donated.	Supported
H3: Activities on social networks positively influence the amount donated.	Correlated
H4: Date positively influences the amount donated.	Not supported

Conclusions

I have always been interested in digital divide since I am from Sicily and suffered first hand second level digital divide in everyday life. I was interested in the effect of digital literacy especially because I am part of an educational project where we teach children math using videogames. I am helping the digital branch of the startup taking part of a crowdfunding process to proceed in the development of the project. We developed a prototype of the platform and tested it in a school in Rome; it turned out to work extremely well. Crowdfunding will help us to: 1) proceed to the development of the platform by adapting one already existing, 2) understand the market potential of the idea and 3) build a community around the project. Right now, second level digital divide is affecting the project since it requires the deployment of a dedicated server. Unfortunately, unlike other parts of Italy where the upload speed is not a constraint, the area where we have our office suffers from limited connection capabilities and thus impedes us to easily deploy it.

I believe this is not the only situation of a potentially new business development opportunity unable to be exploited due to contextual factors. This thesis covers two main areas: Crowdfunding and Digital Divide. While being topics that stroke me, I have never really looked into them. Being a management student, for all the time-spent writing I could not stop looking at things through the glasses of an entrepreneur who wanted to understand its surroundings. I therefore think that this work will be useful to other people who find themselves in the situation of running a crowdfunding campaign and are interested in what to expect based on contextual factors.

The study focuses just on a small part of a vast topic that we believe is of primary importance in modern society given the extensive use of digital devices in everyday life for both work and leisure. We posed particular attention to digitalization level of Italian provinces using the empirical context of a charity-crowdfunding online platform. Even though the study uses a flavor of crowdfunding that is not the most known, it is possible to extend the validity of the study to other adjacent areas of interest. Given the present lack of studies on the topic, we hope this research acts as a starting point for future debate on the issue.

We hypothesized various factors that influenced the amount received from donations on the online platform of the charity; two independent variables represent two sub-categories of digital divide: digital infrastructure development and digital literacy, the other two representing two sub-categories social media: social media activity and external events. Thanks to our model, we found some interesting results; a rather large and significant effect of digital literacy suggests a strong link between the variables. This supports our hypothesis,

confirming the presence of the causal relationship between the two. The indicator we used referred to the amount of time spent using digital devices. It suggests that we should explore more on the topic using more rigorous research settings and using larger datasets to increase representativeness. We also confirmed the existence of a strong link with social media activity. However, we could not establish a causation relationship. It is in fact impossible to understand which causes the other. It could be equally reasonable that an increase in the number of shares on the organization's Facebook page, leads to an increase in donations, as an increase in donations caused a response from the organization that posted more "sharable" (good news, goal reached) updates. Either way it is something to notice that may raise further insights of research on the topic.

Not all our hypotheses were accepted; our model suggests us that infrastructure development does not significantly influence donations. Of course, this is not a satisfactory answer; the indicator we chose represented the use of broadband connection thus can be interpreted as an indicator of second level digital divide (broadband vs narrowband). In fact, deeper investigation on the effects of second-level digital divides showed a different picture. Most of the research on the influence of digital infrastructures on users is business oriented and thus focuses on other indicators. Our finding is clearly counterintuitive and is surely wrong if interpreted from the business point of view. However, in our case effect from this variable are negligible. This study regards just one platform and it would be careless to conclude that one case is representative of the whole population. We suggest to pursue further research on the topic.

Date should have had a greater effect but the impossibility to reject the null hypothesis raised further questions. Closer inspection revealed an increase in the number of donations in December but such increase was offset by a lower average amount. To give a sense to the size of the phenomenon readers should recall that the annual average donation for the organization was € 105 (€ 70 controlling for the outlier), larger than the low fifties range for both 2015 and 2016. The bimodal distribution of donations suggests that there is some "external" influence on the amount donated. The first mode of donations is at € 15; one of the charity's main strength is its ability to feed a child for an entire year for that sum. By disclosing this information, the organization wants to underline its ability to maintain a light cost structure in order to increase the efficiency of the charity, which is of utmost importance in the field. Moreover, for non-profit organization is beneficial being transparent about how the money is spent since it gives a credibility return that cannot be ignored.

Even though research on a topic always raises more questions than it answers, It is now clear to me that digital transformation is particularly important, especially today that many activities, being them for profit or nonprofit, are carried out with the use of computers. The result of this study shows a greater impact of digital literacy on the ability of the platform to generate “cash flow” than infrastructural development. Even if this seems something specific, it highlights the importance of digital transformation processes taking place right now. Digital literacy plays a fundamental role in this process because it delineates new ways in which innovation can be channeled, giving rise to novel business models, organizational patterns and policy measures. It is important to notice that this research focuses on the customer side of the market; if we look at the phenomenon from the business point of view, it creates unique marketplace conditions where barriers to entry are reduced for small competitors that use digital technology.