TESIS – KS142501

MOTIVASI PENGGUNA DALAM MENGGUNAKAN METODE C*ROWDSOURCING* PADA PEMBUATAN PERANGKAT LUNAK

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PEOPLE'S MOTIVATION FOR JOINING CROWDSOURCING ON SOFTWARE DEVELOPMENT

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MOTIVASI PENGGUNA DALAM MENGGUNAKAN METODE *CROWDSOURCING* PADA PEMBUATAN PERANGKAT LUNAK

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ABSTRAK

Perkembangan metode pada pengembangan perangkat lunak telah meningkat pada akhir-akhir ini, dengan meningkatnya teknologi dan kebutuhan pasar, metode *crowdsourcing* telah berkembang dan mendapat tingkat popularitas yang tinggi dikalangan masyarakat. Metode *crowdsourcing* lebih condong mengandalkan kekuatan orang banyak sebagai kemampuan utama dalam produksinya. Meskipun begitu, sejak *crowdsourcing* menjadi kekuatan utama baru dan merambah ke dunia pembuatan perangkat lunak, kualitas pada perangkat lunak menjadi dipertanyakan. *Crowdsourcing* memiliki perbedaan dengan alur pembuatan perangkat lunak secara tradisional seperti *Software Life Development Cycle* maupun *Waterfall Model*, selain itu metode crowdsourcing mengandalkan kekuatan keramaian pada saat pembuatanya. Beberapa studi dan jurnal sebelumnya beranggapan bahwa motivasi merupakan kunci utama kesuksesan ketika metode crowdsourcing digunakan untuk memproduksi sebuah produk. Pada studi ini diajukan model yang dikombinasikan dari dua teori utama untuk menjawab pertanyaan tentang motivasi penggunaan crowdsourcing untuk pembuatan software yaitu teori *self-determination*, dan *IS success model* untuk lebih mengerti tentang hubunganya intensitas pengguna dengan kepuasan pada pengguna pada kasus pengembangan perangkat lunak dengan metode *crowdsourcing*.

Kata Kunci : Pembuatan Perangkat Lunak, Motivasi, riset kuantitatif.

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PEOPLE'S MOTIVATION FOR JOINING CROWDSOURCING ON SOFTWARE DEVELOPMENT

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ABSTRACT

Software Development has increased emerging new methods in its development, with the advancement of digitalization, technology and global networking, Crowdsourcing has been developed and gaining popularity among the people. Unlike the outsourcing, crowdsourcing is more emphasis on the power of crowds as major power production. This study will discuss crowdsourcing activity that focused on software development. Software engineering is a process which software is written a complex process without compromising the quality of the software. However, since crowdsourcing software engineering relies on its robust method to produce a software and entirely different from traditional software engineering, their quality are questionable. A major issue in of crowdsourcing is how to attract and to sustain for development. Motivation is a matter that should be investigated further by the researchers for better crowdsourcing development to bring right crowds to the table so it can sustain the crowdsourcing activity. This study discusses more a several factors motivation that can be an impact, an influence to the development of crowdsourcing in software development. To improve these study findings, this study also combines two major theories about self-determination and IS Success Model to investigate further about motivation the users joined crowdsourcing on software development and to understand the impact of user satisfaction in case of crowdsourcing on software development.

Keywords: *Crowdsourcing; Software Engineering; Software Development; Motivation; Structural Equation Model;*

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Special gratitude to Allah, because of the love and mercy that Allah gives to me, I have been finally able to finish my master degree in National Taiwan University of Science and Technology (NTUST). Thank you very much NTUST and Information Management Department for allowing me to pursue my study so that I can get such wonderful experience, knowledge, and new family in Taiwan. Thank you very much Institut Teknologi Sepuluh Nopember Surabaya (ITS) for opening this wonderful opportunity. I would like to thank my parents Waras Budiman, Neneng Eny Sulistyowati and my sister Amalia Kusuma Wardhani for endlessly giving me all support, prayer, priceless love, and sacrifices. Because of my family, I can get through all the obstacles and difficulties. Professor 黃世禎博士，and Dr. Apol Pribadi Subriadi Thank You very much for accepting me as your student under your supervision. To be your student in our laboratory is a great achievement for me. Thank you very much for the warm hearted support, kindness, knowledge, and encouragement you gave to me. Also thank you very much for taking care of me like your own family. I am very grateful for being part of our lab, thank you very much, Garry, Nana, Jean, Chloe, Alice, Vinda, Joanne and all the members. You all have been very nice to me and help me a lot during my research. I never forget your kindness, and I will always cherish our moments. Big gratitude for Professor 盧希鵬 and 羅天一 who gave me the opportunity to learn more and get the suggestions for my research as my oral defense committee, Thank You very much. To all my roommates, Nur Wahyu Alam, Harwahyu, Pak Sani, Saide and also my friend all of Fall 104 Student from Indonesia. I am so grateful for having all of you as my family in Taiwan. Finally, I would like to thank everyone who contributes to my research.

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CHAPTER I
INTRODUCTION

1.1 Research Background

"*More than 1.000 Developers Build Web Browser from Scratch in One Weekend*," "*Major Software Company Fixes Core Vulnerability across 100 systems in Two Hours*" (LaToza & Hoek, 2016), thanks to crowdsourcing because it is a robust method to solve another problem of effectiveness from software engineering nowadays. Jeff Howe introduces crowdsourcing method in 2006 (Howe, 2006). Crowdsourcing on Software Development is a new way to use benefit from the Internet to build on software development (Li, et al., 2013). Crowdsourcing on Software Development appears based approach of Software Engineering (Tsai, et al., 2014). However, crowdsourcing software engineering is entirely different from traditional software engineering (Hasteer, et al., 2015). Crowdsourcing is a new method of outsourcing for software engineering and development that still need to learn more (Mao, et al., 2015).

There are many platforms brings the concept of crowdsourcing, such as TopCoder, Facebook, Sribulancer, Freelancer, Wikipedia, rentacoder, eLance, oDesk, upworker, Stackoverflow, TaskCity (Li, et al., 2013) (Tsai, et al., 2014) (Mao, et al., 2015) (Tajedin & Nevo, 2014). With the advent of digitalization and global networking, recent years have seen the emergence of new production in the pattern when everybody can do some work on a mass scale without having to collocate with his or her workforce (Tajedin & Nevo, 2014). This condition will make Crowdsourcing become a trend future of software development. However, prior research (Mao, et al., 2015) (Olson & Rosacker, 2013-12) mentioned about the issues and problem about Crowdsourcing. Crowdsourcing can be wisdom to solve the complex issue (Martinez, 2013). Attracting participants to join crowdsourcing contest is an effective way to improve the contest outcome, hence, more people joining the crowdsourcing platform, many chances to get higher quality and save cost time (Martinez, 2013). What they said about the motivation

is affecting of Crowdsourcing activity and development. (Mao, et al., 2015) Motivation can be a critical factor in the success of software project on the participation of software development using crowdsourcing involves several important roles (Tajedin & Nevo, 2014).

The challenge of Crowdsourcing as a new way to solve the social and economic problem is how to attract, sustain, motivate and guide the crowd into the complete task (Puah, et al., 2011). Crowdsourcing offers high creativity needed for quick work, but its cost has variability in quality (Olson & Rosacker, 2013-12). Crowdsourcing sustained participation are crucial things crowdsourcing became a large part, more and more people are joining this activity, sharing knowledge through the community (Martinez, 2015). Bring the right problem to the table, targeting right crowds and attract, encourages their attention to join crowdsourcing platform may one of success factors for online communities. Hence, This study is focusing on crowds motivation area that is affecting intention to use crowdsourcing platform for software development.

1.2 Research Question

Software Development is the process of structuring, planning & controlling the development of information system (Hasteer, et al., 2015). Most of the previous study mentioned about the key role of software development process on software engineering lies on their developers (Johnson & Ekstedt, 2016). Crowdsourcing Software Development are different from the Traditional Method (Hasteer, et al., 2015). The crowd is the main vital role in here some of the project sponsors are thrown their project into crowds on crowdsourcing platforms such as TopCode, MTurk, Facebook, Kaskus, and Sribulancer. Crowds will notice and start to promote their abilities to solve client problems, and it seems project sponsors depend on crowds (Stol & Fitzgerald, 2014).

In this situation software quality, schedule and cost can be a considered things on Crowdsourcing Software Development (Hasteer, et al., 2015) (Gefen, et al., 2015). (Beecham, et al., 2008) Mentioned about the Motivation in Software Engineering have the single largest impact on practical things such as software

quality and productivity. Motivation is view as a critical success factor that Crowdsourcing must be understood (Mao, et al., 2015) (Stol & Fitzgerald, 2014). Motivation arises through interaction among different motives and incentives in a particular situation (Hossain, 2012).

Project manager and crowdsourcing platform provider must prepare a something to attract developer and programmer to finish their project more quickly and get their attention to using crowdsourcing platform. (Olson & Rosacker, 2013-12) (Ramakrishnan & Srinivasaraghavan, 2014) Mentioned about the Social Reward, and monetary is the motivation Developer and People participate the Crowd and do some Crowdsourcing Project. There are many studies of people motivation people join OSS (Open Source Software) (Wu, et al., 2007) (Shah, 2006). They determine the intention of the developer to do or join a collaborative open source software it has several factors can be an impact for the people who want to join crowdsourcing. This study argues develop OSS are not the same situation as crowdsourcing, in the case of crowdsourcing there is competitive, peer production and m-turk and they have a different standard of procedure, this study has the aim to look on the bigger picture of crowdsourcing activity. Nowadays crowdsourcing became a potential activity, more and more people are joining crowdsourcing platform. The study to sustain crowdsourcing is necessary (Stol & Fitzgerald, 2014).

Research Question 1: What factor that makes developer has the intention to join crowdsourcing on software engineering?

This study also combines its model with user satisfaction from crowdsourcing platform users perspective. (Petter & McLean, 2009) Studies found there is a correlation between system use has a significant correlation with user satisfaction, and the recursive path between user satisfaction has a correlation with the Intention to re-use. The purpose of crowdsourcing from the client perspective is cost reduction, help organizes to respond demand fluctuations, and access to diverse, fresh mind leading to innovation (Ramakrishnan & Srinivasaraghavan, 2014).

(Thomas, et al., 1996) Determines the key to improved productivity and quality by their employee or crowd workers. The crowd is the important point that must learn for crowdsourcing development. In the case of crowdsourcing, crowds must satisfy with the crowdsourcing platform system while they use the system that makes they have the intention to re-use the system again besides the motivation. Reference (Ives, et al., 1983) if anybody want to evaluate the effectiveness of an information system based he or she need to consider the degree of decision making and productivity benefits.

(Ives, et al., 1983) "*Satisfaction of users with his or her information systems is a potentially measurable, and acceptable, surrogate for utility in decision-making*." This research purpose also wants to know about the effectiveness of crowdsourcing platform as a new platform for crowds.

Research Question 2: Does actual using of crowdsourcing platform on software development impact on the satisfying level of developers and programmers?

1.3 Research Importance or Purpose

This study has a purpose of understanding about the motivation developers and programmers do crowdsource. (Mao, et al., 2015) Mentioned there is still need more findings of some problem and issues in crowdsourcing, and one of the problem and issues is talking about the Motivation about developers and programmers joining Crowdsourcing. (Ramakrishnan & Srinivasaraghavan, 2014) Studies have proven about the intention of developers among student, and their model proved there is an intention among their participant. Geological issues, literature study, and findings from previous research and scope of the research is the importance things to consider about the research. Indonesia has some a huge number of internet users among the world internet users (Internet World Stats, 2015). It is possible that Indonesia can be a high potential resource of crowdsourcing participant and market.

Another purpose of these studies is to give the understanding about the user satisfaction from doing crowdsourcing through Indonesian developer and

programmer perspective as a target of this research. This study will provide understanding about knowledge of crowdsourcing methodology to everyone

(Hossain, 2012) (Stol & Fitzgerald, 2014) Argued Integrating community members in innovation process bring substantial benefits for companies. Their studies argued there be eight benefits that can get on crowdsourcing.

1. Less Marketing Cost
2. Easier access to higher number of customers
3. Easier information sharing
4. Less risk on newly launched products
5. Shorter innovation cycle
6. More loyal customers
7. More innovative products
8. Lower production cost
9. Changing fixed cost into variable cost

This study can be a most important issue to being considered for bringing benefit to individual, community and organizational scope.

1.4 Anticipated Difficulties

Every research has a different difficulties. Difficulties of this research are:

1. Crowdsourcing still lacks research. Literature Study and Creating Models Framework was the biggest challenge to determine each factor that has been chosen to representative main ideas of this research.
2. Gathering data from respondent from Indonesia, especially know about crowdsourcing.
3. Developing Model for this research needs to compare previous studies about motivation crowdsourcing.
4. Build a questionnaire design. This study has nine indicators that represent the research framework or model that must be tested to responses, each variable has some indicators that represent a variable, and each indicator

has minimum two items of the question. This study has some difficulties in designing a good question and that must be valid for this research.

For that problem this study has solution to anticipated difficulties:

1. Try to get information to determine the concept. Access multiple access journals such as IEEE, Sciencedirect, and journals from Google scholar to get interesting references that related to with this study. This study uses the keywords as follows: "*Motivation for joining Crowdsourcing*,"" *Crowdsourcing as a Platform*" and "*Motivation for joining OSS*" to find a right journal about the motivation people join crowdsourcing.
2. This study must determine the target respondents ranging from the early formation of the model so that the research can be more accurate and by this research objectives. Respondents will take in two ways taking surveys online.
3. Study many of previous studies, journals and try to combine possibilities to build a new model. This study adapts previous studies of Open Source Software and Crowdsourcing about people join motivation because previous studies mentioned they have a common platform that depends on individuals and individual approach.

1.5 Research Outcomes

Key results of this research are an empirical study about the motivation of Indonesian Crowds as potential crowds for developing Crowdsourcing Technology through internet access and analytical evidence about how effective crowdsourcing technology that poured into the level of user satisfaction. As potential users, Indonesia has a big chance to be a representative country that is using Crowdsourcing.

This research developed a research model and purposed some variable to be tested so there is a significant impact that will prove with an empirical way for further studies. This research has an objective to know about behavior on crowd workers in Indonesia, especially in software engineering area. This research can be a guide for Crowdsourcing Platform to improve their development and

innovation about their system or give some information for further development of Crowdsourcing in Indonesia as well as World Crowdsourcing Technology.

1.6 Progress Plan

Figure 1.1 shows research progress plan. These advances plan based on research task. This research spends total 190 days from 10/1/2015 until 4/18/2016 to do a research activity.

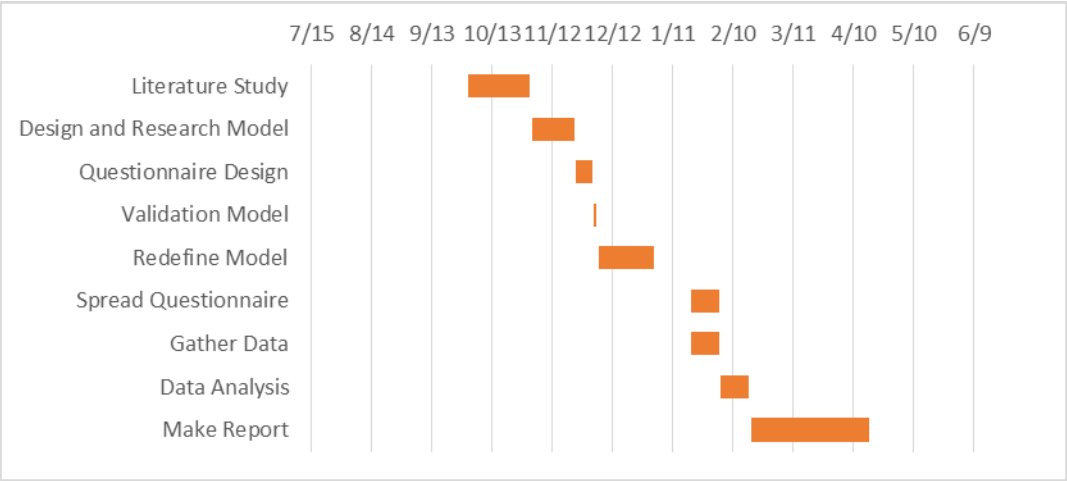

Figure 1. 1: Research Progress Plan

Table 1. 1: Research Plan

Research Plan Details			Duration (days)
Start Date	End Date	Description	
10/1/2015	11/1/2015	Literature Study	31
11/2/2015	11/23/2015	Design and Research Model	21
11/24/2015	12/2/2015	Questionnaire Design	8
12/3/2015	12/4/2015	Validation Model	1
12/5/2015	1/2/2016	Redefine Model	28
1/20/2016	2/3/2016	Spread Questionnaire	14
1/20/2016	2/3/2016	Gather Data	14
2/4/2016	2/18/2016	Data Analysis	14

Research Plan Details			Duration (days)
Start Date	End Date	Description	
2/19/2016	4/18/2016	Make Report	59

CHAPTER II
THEORETICAL BACKGROUND

In this chapter will discuss the literature review. This study literature takes from previous research studies relevant. This literature review will use as the basis for this study.

2.1 Crowdsourcing

Crowdsourcing introduced by Howe in 2006 when he write an article on Wired Magazine (Howe, 2006). Crowdsourcing is an emerging form of outsourcing (Hasteer, et al., 2015). Crowdsourcing describe as the act of individual, a company or institution taking a function once performed by employees and outsourcing it to an undefined network of people in the form an open call (Howe, 2006) (Zhao & Qinghua, 2014). Crowdsourcing is a business model that permits the business holder or project sponsor are depend on crowds power (Hasteer, et al., 2015).

Crowdsourcing has three roles in their implements there is project sponsor (Tsai, et al., 2014) (Stol & Fitzgerald, 2014), project sponsor can describe as the people, company or institution who give or throw the project into the crowds. Moreover, there is a crowd who offer the solution for the business. Crowds roles have a significant impact on crowdsourcing activity development. The power of crowds can give different solution and better development for project sponsor (Tsai, et al., 2014). The third roles is a platform provider who becomes a bridge for project sponsors and crowds (Stol & Fitzgerald, 2014). In this case, the platform must understand about both side needs. The platform must understand about a feature that brings crowds to a table and join its collaborate system or competition system. The other end platform must understand about a feature that project sponsors can use for crowdsourcing service for example rewards system.

Crowdsourcing has various types in their implement; there is competitive crowdsourcing, collaboration crowdsourcing, and online marketing development

(Tsai, et al., 2014). Competitive Crowdsourcing describes as a job search database, competitive crowdsourcing offer some project into the crowds; crowds will compete for each other to solve the client (Project Sponsor). A website that applies this terms is such as Topcoder, Freelancer, Sribulancer, and Mturk.

Second is collaborative crowdsourcing is entirely different from competitive crowdsourcing. (Puah, et al., 2011) (Sohibani, et al., 2015) Collaborative crowdsourcing is more as well as social contribution mindset. Collaboration crowdsourcing more as well as altruism of some crowds to share something and give. There is collaboration crowdsourcing provided on the internet; there are Wikipedia and StackOverflow.

Third previous research mentioned about market online crowdsourcing (Li, et al., 2015). Apple Store and Playstore have implemented it. Some people build apps for looks the potential client who access online market on Apple store or Playstore (Li, et al., 2015). Crowds make their apps and upload it into apps markets such as apps store and Android play store. They compete for each other to get buyer attention with their promotion. They are like to know what the trends is on the market and start to compete to build their design, their rules, and apps to pull the market; they crowd the market.

Crowdsourcing on software development are entirely different from traditional software engineering. The software relies on the crowds when project is throw to crowds; everybody offers his or her solution and the best solution will be pick by project sponsor or client as a winner in case of competition crowdsourcing (Hasteer, et al., 2015). (LaToza & Hoek, 2016) Determine there is three types method that is crowdsourcing on software engineering. First, one is peer production method; peer method has collaborative crowdsourcing characteristics where people are gathered to build the software. Their studies mentioned individuals who join this method are typically people who want to seek the social relationship, partner and experience seekers. There is much peer production crowdsourcing platform nowadays. Stackoverflow, a crowdsourcing platform where people can ask what their software, programming problem,

approximately need 11 minutes people will answer about programming question (LaToza & Hoek, 2016). The other side is people who contribute a platform such as Linux and Mozilla Firefox where people are gathering build their features contributes to the program without getting paid by the company; they just get around to build a new software to satisfy the market. Peer to peer crowdsourcing refer to collaboration networks in equal terms and to denominate collaboration communities; sometimes their production has no intellectual rights (Albors, et al., 2008).

Second is Competition software engineering methods has a competitive crowdsourcing characteristics. Competition software engineering platform such as TopCoders, they treat participants of crowds to compete each others. The project sponsor will give the project by online bidding; every contestant will provide their solution to them, and the project sponsor will pick the best option (Lakhani, et al., 2010). Competitions were particularly popular for software tasks because it has most valuable (LaToza & Hoek, 2016).

The third method of crowdsourcing is micro-tasking. Micro-tasking method is the same approach as competition software engineering, but it is different on the scale of the project. This method usually gives a solution to the simple problem and need only set for the self-contained micro-task. Because the task is small and self-contained work can be distributed to arbitrarily large crowds to complete large tasks example of this platform can be found on the most is Amazon Mechanical Turk, trymyui, usertesting.com.

2.2 Self-Determination Theory

Deci and Ryan have purposed self-determination theory on 1985 (Ryan & Deci, 2000). Self-Determination theory discusses the motivation for someone to do something (Ryan & Deci, 2000). Self-determination theory has two types of motivation. The first category is extrinsic motivation and the second is the intrinsic motivation.

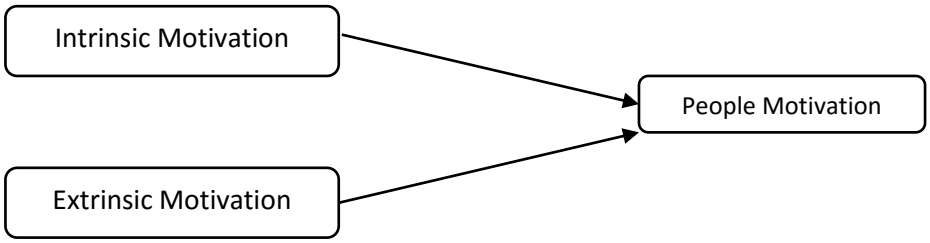

Figure 2. 1: Self-Determination Theory

Intrinsic motivation describes as a motivation by people themselves or other individuals who come from their desires. Examples of intrinsic motivation are a Social contribution, Altruism, Enjoyment (Hossain, 2012) (Ryan & Deci, 2000) (Piliavin & Charng, 1990).

Extrinsic motivation is the opposite of intrinsic motivation. Extrinsic motivation is more about encouragement from external parties or others (Ryan & Deci, 2000). Motivation is critical to someone when they face the situation when they try to adapt the new system like crowdsourcing platform.

Crowdsourcing is a system that has not been widely recognized by society in general. Crowdsourcing will be predicted to be a high strength when compared to outsourcing. Motivation users have a strong relationship with the intensity of the users of the system as described in previous studies of motivation and its relation to the intensity of use.

Previous studies mentioned that the motivation is related to the behavior of the user while they want to use their system. (Fagan, et al., 2008) The intention of use, extrinsic motivation and intrinsic motivation have a strong point of correlation. Their study adapts TAM (Technology Acceptance Model).

2.3 Information Success Model

DeLone and McLean developed IS success model (DeLone & McLean, 1992). IS Success model provides a comprehensive understanding of the successful implementation of information systems (DeLone & McLean, 1992) (DeLone & McLean, 2003). IS success model has six dimensions critical to a

successful model of success. IS success model upgraded into a complete unity variable that explains the relationship the relationship between one another. IS Success Model is the Variable: Information Quality, System Quality, Service Quality, Usage Intentions, User Satisfaction, Net System Benefit (DeLone & McLean, 2003).

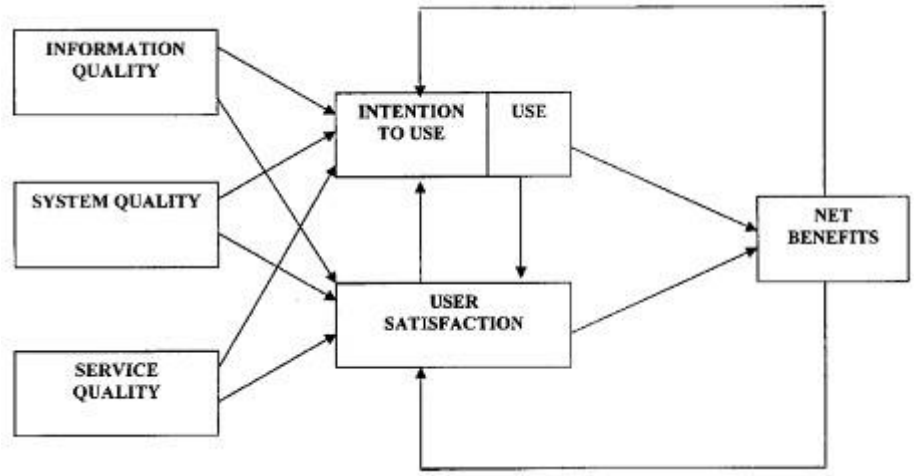

Figure 2. 2: Information Success Model by DeLone and McLean after ten years upgrade

This study will focus on the correlation of intention to use or system use and their correlation with user satisfaction. The previous research mentioned when a person has been using the system intention to use variables will turn into actual use (Mardiana, et al., 2015). (DeLone & McLean, 2003) Determine intention to use is an attitude and actual use as a behavior. It is hard to be measured between intention and system use (actual use) since it has very closer meaning. Hence, they also agree to merge into one variable.

The intention of use can interpret as a desire to use the system. Previous studies point to the relationship how the intention of use associated with motivational model use Technology Acceptance Model and UTAUT as main based theory (Davis, et al., 1992) (Venkatesh, et al., 2003). There is a similar meaning between Behavioral Intention to use in TAM with Intention to use in IS Success Model. The difference is TAM is affecting by perceived of usefulness and perceived of ease to use (Mardiana, et al., 2015). Previous Studies also mention has an opinion that the intention of use the IS Success model is equally

appropriate to the model TAM (Technology Acceptance Model). TAM and IS Success model ended in a intention to use the system (Mardiana, et al., 2015) (Mardiana, et al., 2015).

User Satisfaction can be described into a satisfaction of user while they are using the system (DeLone & McLean, 2003). User satisfaction has a correlation with net benefit and intention to use since this study has a purpose of testing level satisfy of crowdsourcing users, this study only adapt their correlation between intention to use, user satisfaction and its recursive path.

2.3.1 Self-Determination Theory and IS Success Model

The relationship between the intention of use and self-determination theory has been already in the previous research. (Fagan, et al., 2008). There is a correlation between intention to use describe as a behavioral intention to use and self-determination theory which is described into two items variable extrinsic motivation and intrinsic motivation by Deci and Ryan Motivation theory. Their result found that there is a positive correlation or relation extrinsic motivation and intrinsic motivation with the intention of use. (Venkatesh & Speier, 2002), (Davis, et al., 1992) found extrinsic motivation operationalized as perceived usefulness and intrinsic motivation operationalized as enjoyment influence usages intentions. (Teo, et al., 1998) (Chintakovid, 2007) Argued perceived usefulness is a form of extrinsic motivation and perceived enjoyment is a form of intrinsic motivation. Their findings of the intrinsic and extrinsic motivation on internet usage found they are a positive correlation between them.

(Mardiana, et al., 2015) Mentioned in their literature study about the intention of use and system use in DeLone and McLean Model, Intention to use is an attitude user before they using a system and system use is a behavior when the user uses the system. They mentioned there is the same definition TAM and IS Success Model about the description about the intention of use, and they purposed a new model to combine this two model into one piece model. Figure 2.3 shows Mardiana research model.

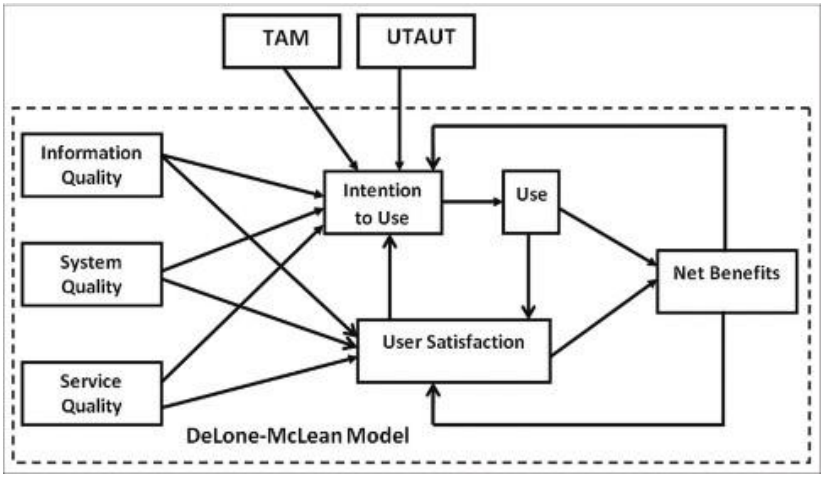

Figure 2. 3: Purposed Model by Mardiana

Based on their purpose model and literature study indicate there is a correlation between intrinsic motivation and extrinsic motivation that have been investigated previous research. (Fagan, et al., 2008) (Davis, et al., 1992) (Venkatesh & Speier, 2002). Their correlation with the intention to use that IS success model by DeLone and McLean because they have the same definition as TAM model. Figure 2.4 shows how intrinsic motivation and extrinsic motivation impacts to BI (Behavioral Intention to Use). Behavioral Intention to Use have the same definition as Intention to use in IS Success Model by DeLone and McLean (Mardiana, et al., 2015).

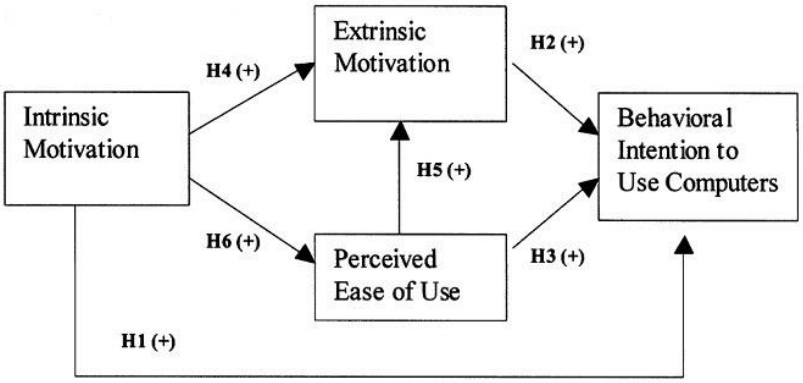

Figure 2. 4: (Fagan, et al., 2008) Research Model

(Hossain, 2012). (Kaufmann, et al., 2011) Argued there be two types of Motivation Intrinsic and Extrinsic based on Self-Determination Theory by Deci

and Ryan (1985). (Ryan & Deci, 2000) Argued Intrinsic motivation refers to the motivations that driven by task and individual. The other one is an extrinsic motivation; extrinsic motivation is the one who driven by external pressure. (Xu, et al., 2009).

There are two categories of type there are individual and community reasons based on combination intrinsic motivation and extrinsic motivation. This study separates the motivations into two categories there is an Individual Reasons and Community Reasons (Xu, et al., 2009) this category will Self-Determination Theory by Deci and Ryan perspective. Our studies will discuss crowds platform that refers to individual and community motivation. Our literature based on previous studies argued there be many factors for Intrinsic and Extrinsic motivation factor for crowdsourcing and OSS (Hossain, 2012).

CHAPTER III
RESEARCH MODEL AND HYPOTHESIS

In this chapter will discuss the conceptual framework that includes conceptual models, domain analysis, and definitions of the elements in the domain.

3.1 Individual Reasons

Individual Reasons described as a motivation which comes from by individuals (Xu, et al., 2009). In Individual Reasons, there is a Prize or Award Personal Need (Extrinsic Award), Reputation and Skills, Enjoyment and Altruism.

3.1.1 Relationship between Reputation and intentional to use

(Lakhani, et al., 2010) Mentioned in their articles about what is the motivation people join crowdsourcing with their perspective and informant. Their findings explain about the prize can be the most attractive for the crowd to bidding the project in TopCoder. Moreover, even they got a cheaper prize. Instead, they can get continual learning opportunities with the crowd. (Xu, et al., 2009) People got their reputation when they are joining on some project; their participation may help their future work.

(Tsai, et al., 2014) In Crowdsourcing Software Platform such as TopCoder, Freelancer and oDesk are always doing their completion to win their project then they got the rating or even feedback comment from project sponsors. One of important thing that they must have is rating for their account. (Lakhani, et al., 2010) Their rating is one of the factors that considered when they are bidding the project that offers by the client. The client can see who is bidding their project and programmers reputation. Programmers or developers reputation can be seen in their profile, and it can help the customer to maximize their cost for using crowdsourcing. The developer gets their reputation and rating from their performance.

Crowdsourcing involves the management of a community via web-based collaborative technologies to elicit the community's knowledge and or skills set to fulfill business goal (Saxton, et al., 2013). The place for the crowd to meet each other and do discussion for collaboration crowdsourcing. (Ramakrishnan & Srinivasaraghavan, 2014) Their findings of Gen Y and Z explain their behavior, collaborating, sharing and distributing information is a way of life. Their behavior indicates that reputation and skills give them the opportunity to build their career indirectly. Moreover, in competition crowdsourcing they can get improve their skill by discussion and sharing even platform such as TopCoder is competition based crowdsourcing the people liked to help each other (Lakhani, et al., 2010).

H1: There is a positive relationship between reputation, skill experience and intention to use crowdsourcing

Table 3.1 shows the indicator that reputation variable have:

Table 3. 1: Reputation Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Reputation	Career opportunities development	Refer to motivation that user can get they using crowdsourcing they can develop their career opportunities, to get a better job prospect and position; the career opportunities gained from project participation may help the developer's answer future work challenges	(Tsai, et al., 2014) (Zhao & Qinghua, 2014) (Xu, et al., 2009)
	Marketing oneself	Refers to motivation that user can get when they using crowdsourcing they can have their market based on their skills and work performance, so they have a chance to get a wider market	(Zhao & Qinghua, 2014) (Hossain, 2012)

3.1.2 Relationship between Reward and intentional to use

(Mao, et al., 2013) Mentioned that the prize of crowdsourcing project is one factor attract the crowd to do some competition in a crowdsourcing project. The reward is categorized into two parts first is monetary reasons and second is non-monetary reasons (Puah, et al., 2011). (Faridani, et al., 2011) The low prize of

some project may cause low capital efficiency or task starvation. That conclude the prize or reward that published by Project Manager on crowdsourcing software platform can be the one of a factor that motivates the crowd workers to apply their intention of deal with the project through crowdsourcing platform such as TopCoder. (Hasteer, et al., 2015) Rewards can attract many people among the crowd to complete the project and best worker among the crowd will get the rewards

(Antin & Shaw, 2012) Findings mentioned that money issue is the reason they must do Human Intelligence Task (HIT) on MTurk (Amazon Mechanical Turk). (Saxton, et al., 2013) Mentioned in their studies on previous studies by (Kirsch, 2004) (Lakhani et al., 2007) the compensation scheme is a fundamental element of any managerial control system, and their evidence proves that compensation is the factor who encourage user participation. (Lakhani, et al., 2010) One of member TopCoder named Wu said that money is the most attractive thing when people using TopCoder platform even TopCoder reducing their prize. Some people do crowdsourcing for fun, or it is hisorher passion, some people join crowdsourcing for prize and rewards of competition (Ford, et al., 2015). (Trow, et al., 2014) Suggest there is payment transparent to make sure all workers are equal to get paid so it may attract crowds to get down into the business, their studies also mentioned payment can be success factors that need to be considered to get crowds attention. They argued prize have a significant impact on people doing Open Source things.

H2: There is a positive relationship between reward and intention of using crowdsourcing

Table 3.2 shows indicators of reward variable based on previous studies.

Table 2. 2: Reward Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Reward	Monetary Rewards	Refer to Motivation by the monetary or remuneration things and will be received for after people have already completed their task	(Puah, et al., 2011) (Zhao & Qinghua, 2014) (Kaufmann, et al., 2011)
	Non-Monetary Rewards	Refer to Motivation because they will earn non-monetary rewards from Crowdsourcing, for example, they got experience, skills, appreciation or recognition by project sponsor	(Tajedin & Nevo, 2014) (Puah, et al., 2011)

3.1.3 Relationship between Enjoyment and intention to use

(Xu, et al., 2009) Argued psychological things, such as enjoyment also affect human behavior. Enjoyment can describe as satisfying personal needs. (Wu, et al., 2007) Many people of OSS development arise to satisfy a work-related demand: to "*fill an unfilled market*". (Ford, et al., 2015) There are three factors to attract and motivate a crowd. There is a readiness of the crowd, willingness of the crowd and able. Some of the crowd members work for fun; others work for payments such as winning some contest and tournaments or piecework and still other tasks for the prestige of successful authorship of a solution or for getting credited for innovation.

(Shah, 2006) Fun and Enjoyment can drive of Code Creation. Their findings determine some programmers write a code for open source based on their hobbyist to fulfill their satisfaction; hobbyist described many instances where they identified interesting challenges in the course of scanning or even write a code. Someone such as professionals may respond to financial incentives; a scientist may strive to increase their status, and enjoyment may largely drive hobbyist. They believe enjoyment of doing involvement for open sourcing software development is one of the reasons why they are doing open sourcing.

H3: There is a positive relationship between enjoyment motivation and intention to use crowdsourcing.

Table 3.3 shows indicators of enjoyment variable based on previous studies.

Table 3. 3: Enjoyment Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Enjoyment	Skill Variety	Usage of a diversity of competencies that are needed for solving a specific task and fit with the skill set of the worker. The higher the variety of appropriate skills is, the greater should be his motivation to choose a specific task	(Hossain, 2012)
	Task Autonomy	Refers to the degree of freedom that is allowed to the worker during task execution. If more own decisions and creativity are permitted, the employee's motivation will be better	(Kaufmann, et al., 2011)
	Direct Feedback	Covers to which extent a sense of achievement can be perceived during or after task execution. Explicitly limited to direct feedback from the work on a task, not by other persons	(Kaufmann, et al., 2011)

3.1.4 Relationship between Altruism and Intention to use

Altruism described as an action to help social dilemma. As individuals who give more weight to others (Piliavin & Charng, 1990). Crowdsourcing was built for open calls project. One of an example of implicit crowdsourcing is Google Maps traffic information or Waze traffic information (Goncalves, et al., 2013). They argued that public displays present themselves as ideal vehicles for both altruistic crowdsourcing during their everyday use or with crowdsourcing tasks.

(Wu, et al., 2007) Argued helping behavior happen in individuals when they collaborate making OSS, they will lend a hand and simultaneously give something back to each other. (Olson & Rosacker, 2013-12) Altruistic is one of the motivations for participation people intent on using crowdsourcing platform.

(Choi & Pruett, 2015) Altruism and fun can be the highest factor of motivation for people doing Linux LOSS developers. Their findings explain about programmers are join Library Open Source because they proud to be a part of the open-source community, and they enjoy helping each others. Prior research categorized Altruism as a form of intrinsic motivation (Piliavin & Charng, 1990). Altruistic can impact people joining some platform such as Crowdsourcing.

H4: There is a positive relationship between Altruism Motivation and Intention of use crowdsourcing platform.

Table 3.4 shows indicators of altruism variable based on previous studies.

Table 3. 4: Altruism Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Altruism	Charity	Refers to Charity events, to serve some people or events without expectation of reward, act of charity on crowdsourcing in software engineering can describe such as workers writing article on Wikipedia about code problem, or published some articles on crowdsourcing forum about code problem	(Benkler & Helen, 2006) (Heylighen, 2007)
	Helping behavior	Refers to action help each other to solve others problem and sharing kind of information, an example of helping behavior is a worker will answer a question from the other workers such as stack overflow website.	(Wu, et al., 2007)

3.2 Community Reasons

Crowdsourcing is not just about competition. Crowdsourcing is also a collaborative and communication tool, such as a distributed blackboard system where each party can write and participate in a discussion (Tsai, et al., 2014). When they are doing a collaborative thing to do a crowdsourcing activity project they create a connection, they interact with others members of the crowd and some of them build a community.

Community-based on Cambridge Advanced Learner Dictionary as "*the people living in one particular area or individuals who are considered as a unit because of their common interests, social group or nationality*" (Puah, et al., 2011). The community is about a group of people living in the same boundary with interactions, through internet and crowdsourcing space, There is a community reason behind people join a crowdsourcing activity. This section will discuss the previous findings of their motivation for doing crowdsourcing and OSS based on community reasons.

3.2.1 Relationship between Social Relationship and Intention to use

Crowdsourcing basically about knowledge sharing people to another (Puah, et al., 2011). It can an instant and free access place with information. It creates knowledge abundance. (Hossain, 2012) People are socially bounded, and social motivations are also prevailing in an online platform. (Xu, et al., 2009) In virtual communities, the formation of an interpersonal relationship between members is essential in generation positive attitudes. People will interact one with each other's and make a bond. This relationship with others would influence his or her feelings of importance and relevance of the project (Tajedin & Nevo, 2014). (Wang, et al., 2007) Mentioned there is a bond between reviewer and Crowdsourcing developer, the reviewer will help developer improve their works, it is as well as a social boundary that keeps crowdsourcing activity well. Reference (Choi & Pruett, 2015) mentioned people who work in Open Source program are proud of some part of the community, this is mean people are looking for being part of some social and make some relationship, contact with each other's and make some connection between them.

H5: There is a positive relationship between social relationship and intention of use crowdsourcing.

Table 3.5 shows indicators of social relationship variable based on previous studies.

Table 3. 5: Social Relationship Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Social Relationship	Action Significance by External Values	Captures the significance of an action concerning the compliance with values from outside the crowdsourcing community that is perceived by the worker when contributing to the community or working on a task or duty	(Kaufmann, et al., 2011)
	Indirect Feedback from the Job	Covers motivation caused by the prospect of feedback about the delivered working results by other individuals	(Kaufmann, et al., 2011)
	Belongingness	Refer to the individual approval to a particular group, causing a sense of emotional to someone	(Kaufmann, et al., 2011)

3.2.2 Relationship between Community Based and Intention to Use

Community-Based described as an action empowering by individual to know the capacity of the community, to be able to recognize, and take the initiative to solve the existing problem independently. Community-based has two factors of measurement (Kaufmann, et al., 2011). There are Community identification and Social Contact (Kaufmann, et al., 2011). Community identification refers to act of workers guided by the subconscious adoption of norms and values from the community. Moreover, the second is social contact; these factors refer to motivation by every people that offer the possibility to get a social contact, to meet new people and have a relationship with them or discuss with them.

H6: There is a positive relationship between community-based and intention of use crowdsourcing.

Table 3.6 shows indicators of the community-based variable based on previous studies.

Table 3. 6: Community-Based Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Community Based	Community Identification	Refers motivation to identifies a crowdsourcing platform is a gathering place for a community access reliable and secure, workers are unconsciously define crowdsourcing platform as a place where trusted project sponsored gathered, and they can get attention to them	(Kaufmann, et al., 2011)
	Social Contact	Refers to the motivation of workers needs to find a new community, get new friends on a crowdsourcing platform	(Kaufmann, et al., 2011)

3.3 Intention to Use or System Use

Based on the development of DeLone and McLean theory, of IS success model. "*Intention to use is attitude whereas 'use' is a behavior"* (DeLone & McLean, 2003). The intention for the use described as the degree and manner (attitude) some people to use an information system technology where this study focus on Crowdsourcing. (Mardiana, et al., 2015) mentioned that the intention of use described as a willingness of the user to use the system, Intention of use will turn into actual use (Mardiana, et al., 2015) and it has a correlation with user satisfaction if the user starts to use the system or using the platform.

(Petter, et al., 2008) in their studies argued that Frequency of use can measure system use, Intention to re-use, Number of the transaction. (Urbach & Müller, 2012)

Table 3. 7: Intention to use or System use Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
Use (Intention to Use and Actual Use)	Frequency of Use	Refer to the frequency they are used Crowdsourcing Platform in their daily activities	(Urbach & Müller, 2012)
	Intention to Re-use	Refer degree of intention to re-use Crowdsourcing Platform after they have already used crowdsourcing platform	(Urbach & Müller, 2012)
	Number of transaction	Refer to a statement from the workers on some projects being done or has been done, leading to how often they had an existing deal on a crowdsourcing platform	(Urbach & Müller, 2012)

3.3.1 Relationship between Actual Use and User Satisfaction

User satisfaction defined as *"the extent to which users believe that the information system available to them meets their information requirement"* (Ives, et al., 1983) (Hou, 2012). (Petter, et al., 2008) Argued the example of system use, it can describe as the most widely used multi-attribute instrument for measuring user information satisfaction can be found.

They mentioned in their literature studies 4 of 5 studies said that they have a significant impact on system use and user satisfaction, and 17 of 21 studies mentioned user satisfaction have a correlation with the intention of use.

Actual use is a behavior of users when users start to using Information System technology (Mardiana, et al., 2015). When the user starts using information system service, the intention of use will be turned into system use variable and will give impact to user satisfaction, and also user satisfaction will provide an impact on intention to re-using the system or platform.

(DeLone & McLean, 1992) There is a correlation between user satisfaction and intention to re-use the system. If the user satisfaction leads to a higher intention to use it will affect the utilization of the system or re-use the system. The other side, if the dissatisfied user might discontinue using the platform. (Hou,

2012) Finding there is a relationship between user satisfaction is positively impact to re-use the system. Their study is support what DeLone and McLean argued.

H7: There is a positive relationship between actual use and user satisfaction.

H8: There is a positive relationship between user satisfaction and intention of re-use.

The success dimension user satisfaction constitutes the user level of satisfaction when utilizing an IS. User satisfaction can measure by some parameters, For example (Bailey & Pearson, 1983) argued there be a several factor that must be considered to measure user satisfaction, there are 38 factors could a significant role.

Another literature study by (Urbach & Müller, 2012) mentioned in there is several things that to be considered to measure user satisfaction, there is Adequacy, Effectiveness, Efficiency, Overall satisfaction. Based on the previous study there are several factors to gauge the degree of satisfaction when people using information system. This study adapts literature study by (Urbach & Müller, 2012) as indicators to measure User Satisfaction variable. Their literature studies involve the previous study about User Satisfaction like (Ives, et al., 1983) . Table 3.8 shows the indicators for user satisfaction variable.

Table 3. 8: User Satisfaction Indicator Measurement

Variable	Indicator	Operation Description	Previous Study
User Satisfaction	Adequacy	Refers to how the suitability of the system, in this case, is crowdsourcing, the adjustment to the needs of users, user needs can be assisted workers in finding employment by the interest or skill that they have	(Urbach & Müller, 2012)

Variable	Indicator	Operation Description	Previous Study
	Effectiveness	Refer to the resulting output crowdsourcing platform can help workers to improve performance produced by the expectations expected. An example of the effectiveness of the work is crowdsourcing can be a mediator where workers can improve work performance	(Urbach & Müller, 2012)
	Efficiency	Referring to the efficiency of the services that have an impact on service users, more efficiency spoke to the work and obtained, expected crowdsourcing can help workers to find a more efficient way of working, an example of efficiency savings can be in the form of working time	(Urbach & Müller, 2012)
	Overall satisfaction	Refers to the overall satisfaction for the use of services that have been used in the case of this study was the service crowdsourcing, overall satisfaction mean pure satisfaction by user when they using the system	(Urbach & Müller, 2012)

3.4 Control Variable

In a previous study also mentioned that there are several variables associated control intention of use. Previous research on OSS and Crowdsourcing say that there are four variables are control variables. Previous research on the motivation of crowdsourcing stated that the age, gender (Kosonen, et al., 2014) is a variable control member is influential to their intention to use the system.

Other control variables derived from motivational research on OSS. Since previous studies found motivation in crowdsourcing has a similar character on motivation in OSS, this study raised the other control variables, namely education of response (Olson & Rosacker, 2013-12) .

Table 3.9 shows the previous research for control variable.

Table 3. 9: Control Variable

Control Variable	Previous Studies
Age	(Kosonen, et al., 2014)
Total Team Member	(LaToza & Hoek, 2016)
Gender	(Kosonen, et al., 2014)
Education	(Olson & Rosacker, 2013-12)

Crowdsourcing Software can provide a company with an advantage and save costs and improve efficiency (Li, et al., 2013). Moreover, also Crowdsourcing advantages are expected when high creativity needed for quick work, but it has a different cost and variability in quality (Olson & Rosacker, 2013-12) this indicates that some of the control items have a potential enough to encourage some of individual that using crowdsourcing, to re-use crowdsourcing. In this research was proposed new control variable called the sum of a total member that they work together.

(LaToza & Hoek, 2016) Argued three of methods Peer production, competition, and micro-tasking have important differences. Of their dimensions is Crowd size, this mean different crowds size of project development that gives by the project sponsor to crowds have a different impact on people using crowdsourcing. The Tarpit – a general theory of Software Engineering theory mentioned about the importance of team member, about how they communicate each others with a different language of programming (Johnson & Ekstedt, 2016). Coordination of team member is the key role of Software Development.

3.5 Proposed Research Model

Based on out literature study and reviews from the previous journal and research, this study purposed a research model (Figure 3.1). Figure 3.1 shows in this study research model there are six variables independent for main motivations split it into two categories, there are an individual motivation and community motivation, and also the correlation between intention to use and user satisfaction variable that based on Information Success Model by Delone and Mclean. This

study combines this two methods self-determination theory and part of IS Success model into one model and tests it using proposed analysis.

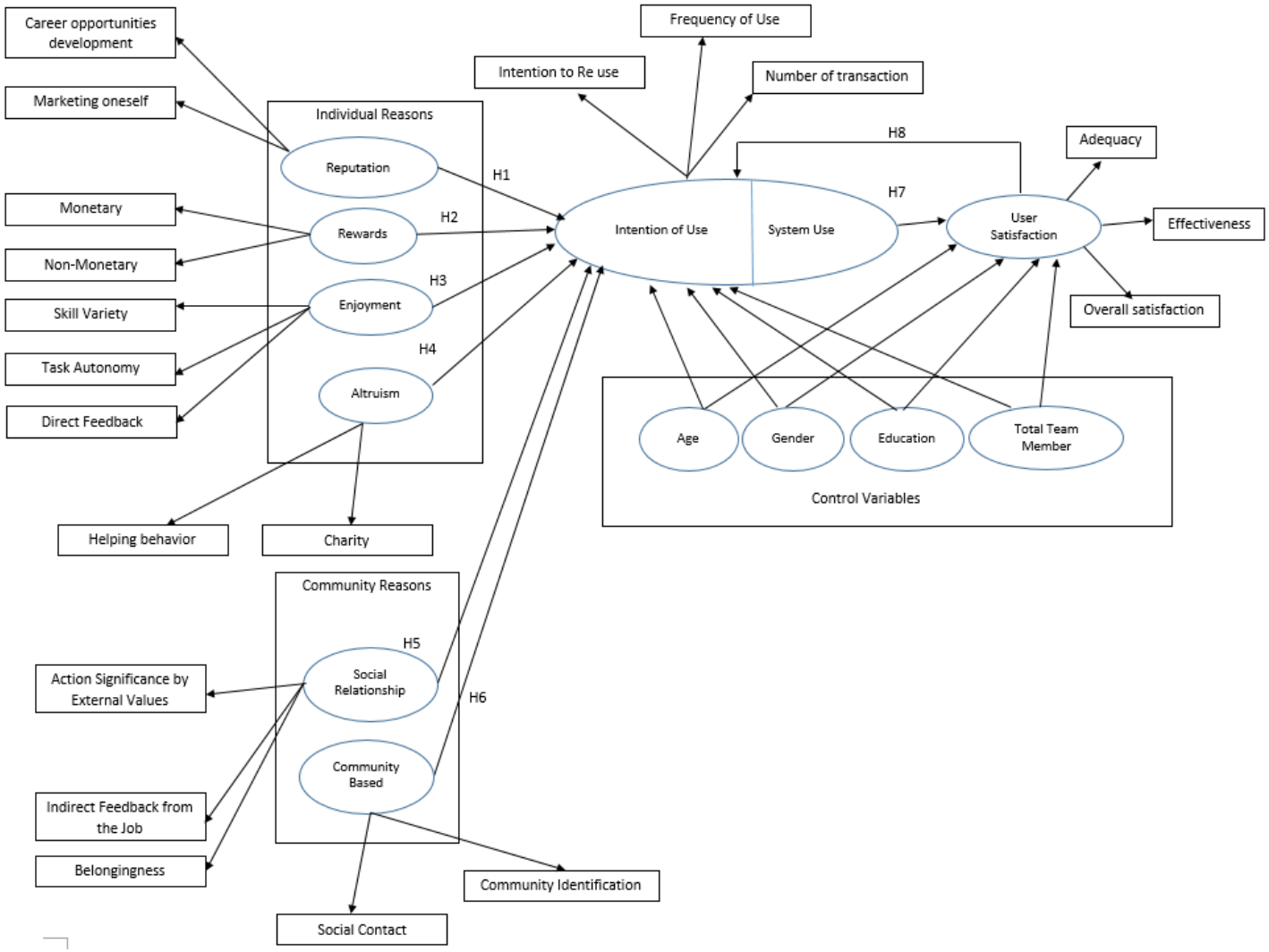

Figure 3. 1: Research Model

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CHAPTER IV
RESEARCH METHOD

Scientific research is a research method structured with clear steps, phase and systematic. Here are the stages of research which are illustrated by the following explanation:

4.1 Research Tasks

This research has a standard of procedure to follow. Figure 4.1 shows about this study SOP (Standard of Procedure), the first phase of this investigation is this study are a concern for literature study to purpose a model, find a right journal, books or proceedings that support this study research question is necessary. In a second phase this research categorized their independent variable, dependent variable, and indicator for each variable, this study has designed a research modelorframework include independent variable, dependent variable and indicator or factors, also, hypothesize based on previous journal, research article, or proceedings.

Next phase is to design a questionnaire for respondent based on this study research framework or research model; considering there are many variables in this study some of the indicators have only one item question. After questionnaire design phase next step is made validity and reliability test of research model with 30 test response to ensure questionnaire design model is valid and reliable. In this stage, an item that has lower factor loading than the others, some of the items must be eliminated with on purpose to increase AVE and Cronbach-Alpha.

Next Step is the questionnaire will be spread to the public, this study targeting a specific response to get a better result and recap the result of reply on

excel table. After got the data the next phase is made analysis data using tools to conclude these study findings on the field then make some conclusion to out hypothesize. The final step of this research is to write a report about this study findings and give a conclusion, suggestion for future research based on this research topics area.

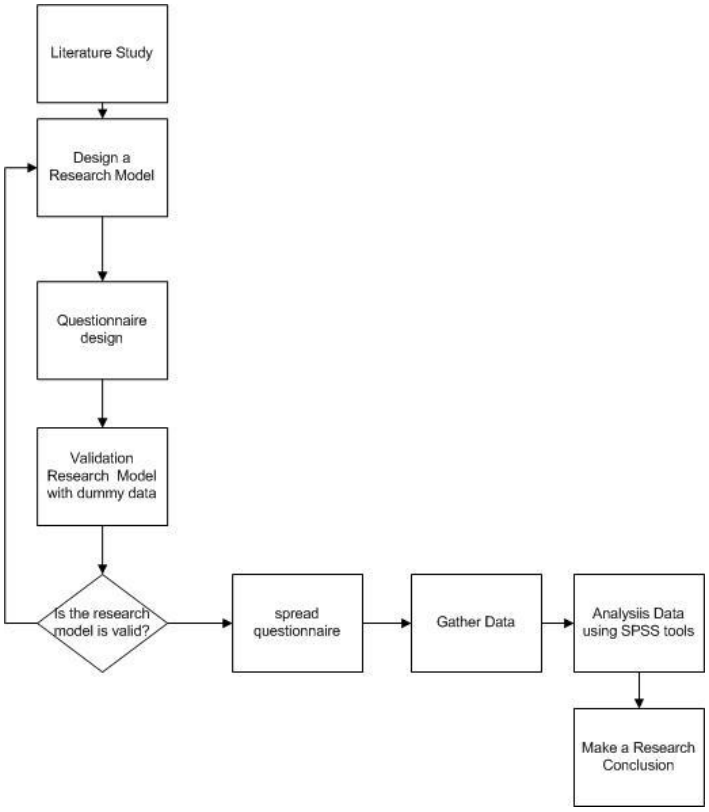

Figure 4. 1: Research Steps

4.2 Data Collection and Sample

This study uses Survey methods. (Warwick & Lininger, 1975) The surveys are highly valuable for study some problems such as public opinions and almost worthless for others. The decision about research methods involves many considerations, including cost, the researchers own experience and qualification and the availability of trained staff and facilities.

(Warwick & Lininger, 1975) Survey will be helpful which some criteria. :

1. Survey is appropriateness to the objectives of the research. This method will produce the kinds of data needed to answer the questions posed by the study. The purpose of the research is to generate hypotheses, to test the hypothesis to generate projections to evaluate an action program.
2. The survey can be an accuracy of measurement. Several factors contribute to accuracy. The first factor is quantification or the availability of reliable and valid empirical indicators. Statistical measures need income scores, prestige rating, and attitude scales allow for the objective comparison to individuals, communities even humane society.
3. Survey is a way to do administrative convenience. Decisions about research methods often hinge on three administrative cost, speed, and organizational complexity

It is particular favored by those whose prime criterion of explanation is a logically interrelated set of hypotheses leading to accurate prediction. A hypothesis is, in essence, an empirically testable statement, that is one which can be refuted or supported by empirical data and survey can provide it well. Sample survey has many uses it can describe of populations, hypothesis-testing and another form of causal explanation, the prediction of future conditions, the evaluation of social programs and the development of social indicators. This research uses Probability Sampling methods. Probability sampling is a process of sample selection in which elements are chosen by chance methods such as flipping coins. There are several variations in probability sampling, but all shares a common trait: the selection of the unit for the sample is carried out by chance procedures and with known probabilities of selection. Simple random sampling will be chosen the methodology for this research. Simple random sampling is a process of sample selection in which the units are selected individually and directly through a random process in which each unselected unit has the same chance of being chosen as every other unit on each draw.

(Wolf, et al., 2013) Mentioned about the sampling requirements on SEM (Structural Equation Model) on their study, the sample size ranging from 30 up to 450 are acceptable for SEM. Consider limitation of time in this study only use 226 sample.

4.3 Research Approach

This research is using Post-positivism and Pragmatism approach. It means this research is using empirical observation and measurement, theory verification and using real-world practice-oriented (Creswell, 2014). Motivation and Remuneration need to be deeply investigated in the real world and different cases (Mao, et al., 2015). This research uses Quantitative research method with survey design. Survey Design provides a quantitative or numeric of trends, attitudes, or opinions of a population by studying sample of that population (Creswell, 2014). This study purposed a conceptual model as a framework for the previous study (see Figure 4.2).

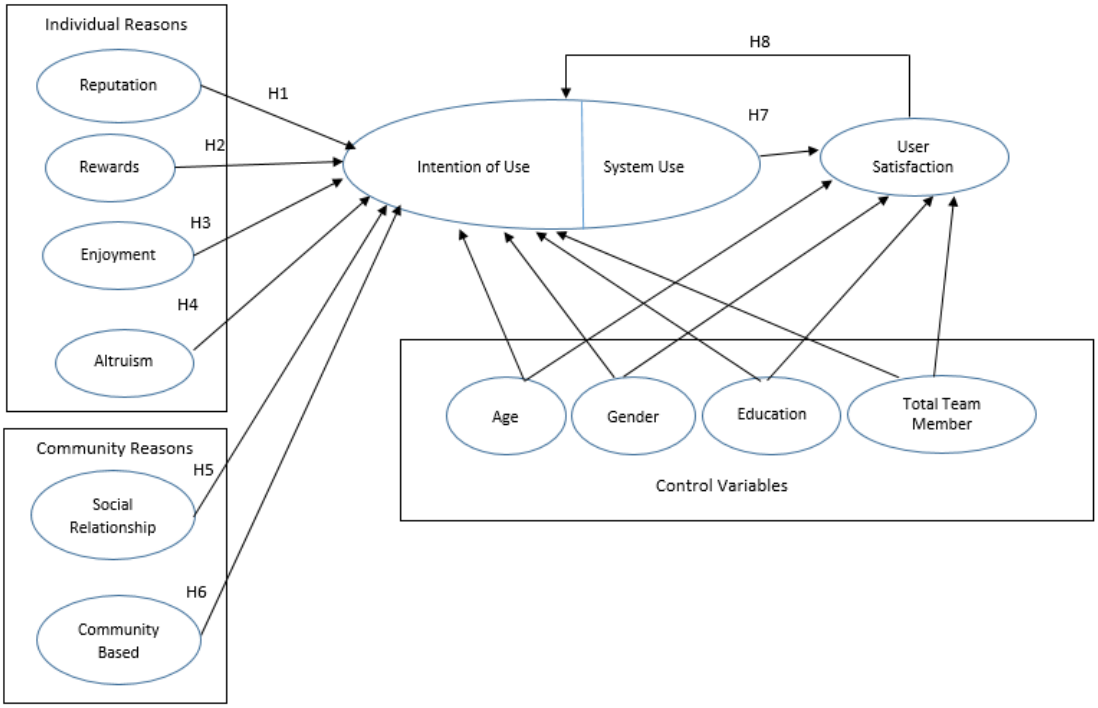

Figure 4. 2: Conceptual Model

This model was build based on the earlier study, theories, and research about people motivation joining crowdsourcing, open source and also IS Success model. This research model will prove an empirical result based on this model and test their correlation which can conclude significant correlative based on its result. This study use SEM (Structural Equation Model) a Multivariate Regression Analysis as a statistical method to measure research model.

4.4 Research Instrument

This study uses the online questionnaire as the research instrument. This research has minimum two items of the question for each indicator or factor. The respondent of this research must choose 1 among 5 points of Likert scale: 1) point 1 for 'Strongly Disagree', 2) point 2 for 'Disagree', 3) point 3 for 'Neither agree nor disagree', 4) point 4 for 'Agree'; 5) point 5 for 'Strongly Agree'.

4.5 Data Analysis

This study adapts Structure Equation Model (SEM) methodology. SEM is a comprehensive statistical approach to test a hypothesis regarding the relationship between observed variables and latent variables (Hoyle, 1995). SEM is used as the methodology to represent, estimate and test a theoretical network of linear relationships between variables. SEM tests the hypothesis patterns of direct and indirect relationships between a set of observed variables and unobserved variables. The purpose of SEM is to understand the patterns of correlation or covariance between numbers of variables and explain all of the possible variances on a model (Kline, 2005).

This research will be used tools SPSS for descriptive analysis and GeSCA useful as a tool of SEM (Solimun, 2012) explain that GeSCA has advantages than the other instruments such as PLS. GeSCA excess can analyze models that are recursive, where other tools such as SmartPLS is unable to perform this analysis. Also, GeSCA has a complete analysis of the concept of Structural Equation Model. Also

performing SEM analysis, this study also conducted several other analyses such as descriptive statistics, Pearson Test, Reliability Test and ANOVA for the control variable. This study uses statistical analysis tools SPSS and Minitab for statistical testing as mentioned earlier.

This study uses SPSS and GeSCA because:

1. SPSS help this research data into electronically storing questionnaire data with their feature.
2. SPSS and GeSCA help process the statistical data for question responses.
3. GeSCA helps analyses quickly with correct calculation and methodology with a meaningful answer which is this study purpose.
4. GeSCA supports recursive path. This study has a recursive path on Intention to use or Actual Use and User Satisfaction, which others tools like SmartPLS are not supported with this correlation.

CHAPTER V
RESULT AND ANALYSIS

This chapter explains the result of data processing within this study. It consists of data collection process, respondent demographics, descriptive statistics, validity test result, reliability test result, linearity test result, measurement model analysis, hypothesis testing result, and variability of variables.

5.1 Data Collection Process

Data were collected at the beginning of March 2016 and ended the End of April 2016 by spreading online questionnaire survey on the Internet. The survey was conducted online only because this study limitation. The online survey was written in the Indonesian language so it can make easier this study target response which is Indonesian people to fill the questionnaire. This study provides online questionnaire on this link: http:ororbit.lyorcrwdsourcingsurvey. To attract response to fill the questionnaire this study provide a gift to fill the survey to get 1 Unit HDD WD Elements Portable Hard Drive USB 3.0 - 1 TB – Black and 5 Unit SanDisk Cruzer Blade = ISN Flash Drive 32 GB. Online Questionnaire spread based researcher relationship and social media; Online questionnaire was posted it on Facebook, Kaskus (the largest community forum in Indonesia) and reach one by one worker on Sribulancer to get their attention. Total sample of this research is 226 people. (Wolf, et al., 2013) sample up from 30 - 460 are acceptable for SEM and (Lei & Lomax, 2014) also agree, on their study they use 100, 250, 500 samples**.**

5.2 Respondent Demographics

There are eight introduction questions on research or studies opener, this time; the opening question consists of five open-ended questions and one closed questions. Open Question contains the name, email, age, gender. Closed questions

asked about how often they use crowdsourcing. Introduction question is useful for the current process control variables at the time of data analysis.

Table 5.1 is explaining about the demographics people who fill this questionnaire. This questionnaire dominate by individuals who participate in crowdsourcing at the age of 18-25, there are 145 people in total. Followed by 26-35 years as many as 66 people and 15 of them were between the ages of less than 18 years, 36-45 years and over 45 years old. The distribution of the percentage of respondents can see on Table 5.1.

Table 5. 1: Respondent Age Recap

Age	Total Number	Percentage (%)
>18	4	1.77%
18-25	145	64.16%
26-35	66	29.20%
36-45	7	3.10%
<45	4	1.77%
Total	226	100 %

Table 5.2 will explain the distribution of gender for people who fill research questionnaire. Table 5.2 shows a total number of this study questionnaire Male is more dominant response than female responses. The total number for male response is 160 people where female are just 66 replies.

Table 5. 2: Respondent Gender Recap

Gender	Total Number	Percentage (%)
Male	160	71%
Female	66	33%
Total	226	100%

Table 5.3 shows the distribution of education of people who fill the questionnaire. As seen in Table 5.3, Bachelor degree has dominate this study there are 150 response in total, followed by Master Degree 48 people in total, Senior High

School 23 people in total, and higher education than master it means Professor or Ph.D. student are five people. For education senior high school below has 0 % percentage.

Table 5. 3: Respondent Education Recap

Education	Total Number	Percentage (%)
< Senior High School	0	0%
Senior High School	23	10%
Bachelor	150	66%
Master	48	21%
> Master	5	2%
	226	100%

Table 5.4 shows the frequency of users using crowdsourcing. The responses in this study is dominate by people who do the crowdsourcing activity on software development more than nine times per week, there are 75 people in total, followed by 2-4 times per week 56 people, 5-7 times per week 44 people, less than two times per week 38 people and 7-9 times per week 13 people.

Table 5. 4: Respondent Frequency Recap

Frequency per week	Total Number	Percentage (%)
< 2 times	38	17%
2-4 times	56	25%
5-7 times	43	19%
7-9 times	14	6%
more than nine times	75	33%
Total	226	100%

Table 5.5 shows about the platform, web service that provides a crowd to do crowdsourcing activities. In this questionnaire section asks response about the platform they used, many response answers with Facebook, followed by Kaskus, Stackoverflow, Freelancer, Wikipedia, Another Crowdsourcing site, Sribulancer, and Topcoder. This result shows that Facebook is the top platform that response use the most. Followed by Kaskus the largest Indonesian Community crowdsourcing

platform based on the forum that provides a feature to do some interaction between users even project sponsors can directly contact the users to do crowdsourcing activity.

Table 5. 5: Respondent Crowdsourcing Platform Recap

Platform	Total Number	Percentage
Facebook	154	68%
Kaskus	114	50%
Wikipedia	73	32%
Stackoverflow	69	31%
Freelancer	68	30%
Sribulancer	35	15%
Topcoder	18	8%
Another Crowdsourcing site	48	21%

Table 5.6 shows how many team members they have when they are doing Crowdsourcing Activity. Most of them are working alone to do some crowdsourcing (164 people) followed by small group 2-4 people (45 people) and 5-7 people (10 people), some of them are working on large team members 7-9 people (1 people) and more than nine people (6 people). Distributions of this question dominate by individuals who work alone for Crowdsourcing activity (162 people) fill this form.

Table 5. 6: Respondent Total Team Member Recap

Total Team Member	Total Number	Percentage (%)
I work alone	164	72.3%
2-4 people	45	20.1%
5-7 people	10	4.5%
7-9 people	1	0.4%
more than nine people	6	2.7%
Total	226	100%

5.3 Descriptive Statistics

This study used SPSS as a tool to provide descriptive statistics for data analysis. Table 5. 7 explained about the mean value of each item. Total items in this study are

46 items. On average response give 3.32 – 4.09 value for a questionnaire about their motivation to join crowdsourcing on software development. Several elements such as career development, marketing on-self, and skill variance on crowdsourcing and helping behavior have a good rate; most people would agree that motivation is to encourage them to use crowdsourcing platform. Table 5.7 also explains about the mean value of user satisfaction, for user satisfaction on average people give value is on between 3.68 – 4.03. This result shows average responses are satisfying with crowdsourcing on some point of questionnaire item such as Overall Satisfaction. For Intention of use, the average value is on between 3.20 - 3.83 which mean this study response are occasionally using crowdsourcing.

Table 5.7 also shows about Kurtosis and Skewness. Skewness was calculated to determine data normality and Kurtosis was calculated to identify the peak of distribution, (West, et al., 1995) mentioned Skewness are acceptable departure value is on between -2.1 and 2.1. Table 5.7 shows value Skewness is in the middle of acceptable value. Moreover, for kurtosis (West, et al., 1995) acceptable departure value is on between -7.1 and 7.1. This study lowest Kurtosis is -1.057 and highest Kurtosis is 0.752, for Skewness the lowest value is -0.823 and highest value is 0.076. That value means the data are normally distributed.

The value of Z-Skewness describes Skewness of the distribution of data. Z-Skewness calculated by dividing Skewness value with Standard Error (SE) of Skewness (Skewor SE Skew). Most of the study said if z-skewness are in between -1.96 and 1.96. It means the data are close to the symmetric data if z-skewness value is < -1.96 it mean the data have skew on the right side, and if the data < 1.96 the data have skew on the left side. As seen on Table 5.7 most items in this study are symmetric except career development, marketing on-self, monetary, non-monetary, skill variance, charity, Action significance by external values, and overall satisfaction that have skew on right side

Values of Z-Kurtosis describe distributed type on data. If Z-Kurtosis value in between -1.96 and +1.96 it means the data are mesokurtic distributed if z-kurtosis are less than -1.96 it means the data are leptokurtic if z-kurtosis are more than +1.96 it means the data are platykurtic. Table 5.7 shows z-kurtosis in this study has mesokurtic style except direct feedback, the frequency of use and a number of transaction.

Table 5. 7: Descriptive Analysis Table

	Mean	Skewness (SD: 0.162)	Z-skewness	Kurtosis	Z-kurtosis (SD:0.322)
Career Development	3.90	-0.46	-2.87	-0.17	-0.54
Marketing on-self	4.09	-0.72	-4.42	-0.21	-0.66
Monetary	3.38	-0.39	-2.44	-0.23	-0.70
Non-Monetary	3.87	-0.43	-2.67	-0.05	-0.14
Skill Variance	3.90	-0.59	-3.62	0.42	1.30
Task Autonomy	3.80	-0.21	-1.30	-0.42	-1.31
Direct Feedback	3.61	-0.10	-0.64	-0.68	-2.11
Charity	3.71	-0.40	-2.46	-0.07	-0.20
Helping Behavior	3.96	-0.31	-1.89	-0.38	-1.19
Community Identification	3.58	-0.15	-0.90	-0.35	-1.08
Social Contact	3.67	-0.30	-1.85	-0.16	-0.51
Action Significance Value	3.78	-0.54	-3.34	0.21	0.65
Indirect Feedback	3.39	0.17	1.04	-0.62	-1.92
Belongingness	3.32	-0.01	-0.08	-0.48	-1.48
Adequacy	3.68	-0.14	-0.89	-0.22	-0.67
Effectiveness	3.80	-0.11	-0.66	-0.46	-1.43
Efficiency	3.70	-0.20	-1.26	0.13	0.41
Overall Satisfaction	4.03	-0.34	-2.11	-0.32	-1.01
Frequency in Use	3.20	-0.09	-0.54	-0.66	-2.03
Intention to Re-Use	3.83	-0.49	-3.01	-0.36	-1.11
Number of Transaction	3.24	0.04	0.27	-0.72	-2.25

5.4 Validity Test Result

Validity and reliability of tests performed to determine the level of validity of the model and the reliability of the model. This study uses SPSS version 17 tools to determine validity level of this study research model and questionnaire, where Pearson Correlation test has been used to the verify the validity of this research. Pearson Correlation assesses any relationship with the indicator variable. At SPSS tools given the significant level is 95 % or 0.05 (Table 5.8). Based on significance value obtained from analysis on SPSS all of the items are valid because their value is 0.00 < 0.05.

Table 5. 8: Pearson Correlation Table

Measure	Pearson Correlation	Valid
Career Development		
cd1	0.893*	yes
cd2	0.886*	yes
Marketing On-Self		
mo1	0.882*	yes
mo2	0.882*	yes
Monetary Rewards		
mr1	0.870*	yes
mr2	0.879*	yes
mr3	0.847*	yes
Non-Monetary Rewards		
nmr1	0.855*	yes
nmr2	0.876*	yes
Skill Variance		
sv1	0.924*	yes
sv2	0.922*	yes
sv3	0.728*	yes
Task Autonomy		
ta1	0.789*	yes
ta2	0.720*	yes
ta3	0.793*	yes
Direct Feedback		

Measure	Pearson Correlation	Valid
df1	1*	yes
Charity		
ch1	0.889*	yes
ch2	0.838*	yes
Helping Behavior		
hb1	0.894*	yes
hb2	0.884*	yes
Community Identification		
ci1	0.906*	yes
ci2	0.907*	yes
Social Relationship		
sr1	0.874*	yes
sr2	0.862*	yes
Action Significance by External Values		
asv1	0.876*	yes
asv2	0.863*	yes
Indirect Feedback		
if1	0.699*	yes
if2	0.864*	yes
Belongingness		
b1	0.913*	yes
b2	0.892*	yes
Frequency of Use		
fu1	0.871*	yes
fu2	0.902*	yes
Intention to Re-Use		
inr1	1*	yes
Number of Transaction		
nt1	0.879*	yes
nt2	0.809*	yes
nt3	0.877*	yes
Adequacy		
ad1	0.893*	yes
ad2	0.867*	yes
Effectiveness		
ef1	0.931*	yes
ef2	0.934*	yes
Efficiency		

Measure	Pearson Correlation	Valid
efi1	0.815*	yes
efi2	0.813*	yes
Efi3	0.805*	yes
Overall Satisfaction		
Os1	0.860*	yes
Os2	0.878*	yes
Os3	0.811*	yes

5.5 Reliability Test Result

The next phase is to verify the reliability of this study research model, reliability tests conducted to determine the reliability of research models. This study use SPSS version 17 tools to determine reliability level of research model and questionnaire, a research model have a good degree of reliability if the Cronbach-alpha was above 0.6 (Bonnet, 2002).

Table 5. 9: Reliability Test Result

Variable	Reliability Test Results	Reliable
Reputation	0.789	yes
Rewards	0.783	yes
Enjoyment	0.789	yes
Altruism	0.792	yes
Community-Based	0.781	yes
Social Relationship	0.792	yes
Intention to use	0.862	yes
User Satisfaction	0.882	yes

5.6 Linearity Research Model

Linearity test result is performed to predict the significance value of a variable based on the value of the relationship between independent variable and dependent variable. Significance value and p-value can see linearity test result in each relation of the variable. This study does linearity test on every relationship separately between variable. Table 5. 10 shows the results of linearity test perform by regression analysis from SPSS. It can conclude that all the variables of significance for any relationship

between the independent and dependent variables because every relation has significance value below 0.05.

Table 5. 10: Linearity Test Result

Variable	t-value	sig
Reputation->Intention to use	11.955	.000
Rewards->Intention to use	11.865	.000
Enjoyment->Intention to use	8.821	.000
Altruism->Intention to use	4.656	.000
Community-Based->Intention to use	9.799	.000
Social Relationship->Intention to use	10.236	.000
Intention to use->User Satisfaction	16.197	.000
User Satisfaction->Intention to use	16.197	.000

5.7 Measurement Model

There are three measurements results are provide by GeSCA, First measurement fit model, second the measurement model and the structural fit of the whole model, in this study will be discussed one by one measurement to be performed.

5.7.1 Measure of Fit Measurement Model

On the measurement of the fit, the model is needed to measure the validity and reliability of a model made by each indicator. Hence, the research model is made by reflective variable, a value meaning on each variable can be seen from the loading value generated by GeSCA. GeSCA result provides Average Variance Extracted and Alpha on the result. Moreover, discriminant validity should be a considered things in this study, the value of the discriminant validity obtained from square root on the Average Variance Extracted (AVE) on each latent variable then compare with the results of each latent variable correlation.

Table 5. 11: Correlation of Latent Variable Table

Correlations of Latent Variables (Standard Error)				
	Reputation	**Rewards**	**Enjoyment**	**Altruism**
Reputation	1	0.650 (0.032)*	0.456 (0.050)*	0.269 (0.068)*
Rewards	0.650 (0.032)*	1	0.586 (0.050)*	0.334 (0.066)*
Enjoyment	0.456 (0.050)*	0.586 (0.050)*	1	0.521 (0.053)*
Altruism	0.269 (0.068)*	0.334 (0.066)*	0.521 (0.053)*	1
Community-Based	0.506 (0.048)*	0.614 (0.041)*	0.643 (0.049)*	0.522 (0.053)*
Social Relationship	0.435 (0.046)*	0.454 (0.052)*	0.528 (0.050)*	0.497 (0.058)*
Intention to Use	0.635 (0.033)*	0.633 (0.033)*	0.509 (0.046)*	0.291 (0.061)*
User Satisfaction	0.561 (0.040)*	0.634 (0.045)*	0.574 (0.048)*	0.423 (0.062)*
	Community-Based	**Social Relationship**	**Intention to Use**	**User Satisfaction**
Reputation	0.506 (0.048)*	0.435 (0.046)*	0.635 (0.033)*	0.561 (0.040)*
Rewards	0.614 (0.041)*	0.454 (0.052)*	0.633 (0.033)*	0.634 (0.045)*
Enjoyment	0.643 (0.049)*	0.528 (0.050)*	0.509 (0.046)*	0.574 (0.048)*
Altruism	0.522 (0.053)*	0.497 (0.058)*	0.291 (0.061)*	0.423 (0.062)*
Community-Based	1	0.663 (0.041)*	0.552 (0.049)*	0.595 (0.047)*
Social Relationship	0.663 (0.041)*	1	0.569 (0.054)*	0.607 (0.054)*
Intention to Use	0.552 (0.049)*	0.569 (0.054)*	1	0.742 (0.029)*
User Satisfaction	0.595 (0.047)*	0.607 (0.054)*	0.742 (0.029)*	1

Table 5.12 explains about Model FIT of this study model; FIT indicates the total variance of all variables explained by a particular model specification. The values of FIT range from 0 to 1, the larger this value, the more variance in the variables is accounted for by the specified model (Heungsun Hwang, 2004). Table 5.12 show FIT value of this research model is 0.552 considered it is a good model, and this model also have a good model to compare because AFIT of this model have 0.547, and also GFI value of this research model have 0.973 indicates it is a good model.

Table 5. 12: Structural Model Conformity Assessment

Model Fit	
FIT	0.552
AFIT	0.547
GFI	0.973

GeSCA provides a model measurement result for each variable. (Solimun, 2012) Mentioned this measurement model result shows the indicators that represent-ate the latent variable based on their critical ratio and estimated value. Measurement model also provides Average Variance Extracted (AVE) and Cronbach-alpha on every latent variable. (Zait & Bertea, 2011) "*to establish discriminant validity, there is a need for an appropriate AVE (Average Variance Extracted) analysis. In an AVE analysis, we test to see if the square root of every AVE value belonging to each latent construct is much larger than any correlation among any pair of latent constructs*". Next analysis will show about comparison value on square root for each AVE are necessary to prove discriminant validity on every latent variable is good.

1. **Measurement on Reputation Variable**

   Table 5. 13 shows about reputation conformity assessment result; Table 5. 13 indicates that the value AVE reputation has value 0.794, and the square root of 0.794 is 0.891. This result shows that reputation has a good

value of discriminant validity because the square root of AVE has a better value than any correlation.

On Table 5. 13, career development has estimate value 0.896, Standard Error: 0.013 and Critical Ratio: 68.46 and Marketing On-Self has estimate value: 0.886, Standard Error: 0.014 and Critical Ratio amounted to 64.02. Table 5. 13shows the value of estimate loading value from that two indicators, Career Development, and Marketing On-Self are more than 0.5 or 0.6, the conclusion of this measurement is these two indicators are valid and reliable for Reputation Variable. Based on scale measurement of each indicator can be concluded that build career development on an individual can be an indicator that indicates reputation. Table 5. 13 shows comparison value on the critical ratio for each variable Career Development have a significant value at 95% confident level and have a higher value than the others indicator 68.46*.

Table 5. 13: Reputation Conformity Assessment Result

Variable	**Loading**		
	Estimate	Standard Error	Critical Ratio
Reputation	**AVE = 0.794, Alpha =0.740**		
Career Development	0.896	0.013	68.46*
Marketing On-self	0.886	0.014	64.02*

2. Measurement on Rewards Variable

Table 5.14 shows about rewards conformity assessment result; Table 5.14 shows that the value AVE rewards have value 0.697, and the square root of 0.697 is 0.834. This result means the discriminant validity of rewards variable is good because for the square root of the AVE has a better value than any correlation.

On Table 5.14, monetary rewards have estimate loading value 0.841, Standard Error: 0.019 and Critical Ratio: 45.43 and Non-monetary rewards have estimate loading value: 0.828, Standard Error: 0.019 and Critical Ratio: 43.54. Table 5.14 shows their estimate loading value from that two indicators, Monetary Rewards, and Non-Monetary Rewards are more than 0.5 or 0.6, the conclusion of this measurement is, this mean that these two indicators are valid and reliable for Rewards Variable. Based on scale measurement of each indicator can be concluded that get monetary rewards on an individual can be an indicator that indicates rewards variable. Table 5.14 shows comparison value on the critical ratio for each variable monetary rewards have a significant value at 95% confident level and have a higher value than the others indicator 45.43*.

Table 5. 14: Rewards Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Rewards	**AVE = 0.697, Alpha =0.552**		
Monetary Rewards	0.841	0.019	45.43*
Non-Monetary Rewards	0.828	0.019	43.54*

3. Measurement on Enjoyment Variable

Table 5.15 shows about enjoyment conformity assessment result; Table 5.15 indicates that the value AVE rewards have value 0.634, and the square root of its value is 0.796. This result means the discriminant validity of enjoyment variable is good because for the square root of the AVE has a better value than any correlation.

On Table 5.15, skill variety has estimate loading value 0.800, Standard Error: 0.037 and Critical Ratio: 21.89, Task autonomy has estimated loading value: 0.813, Standard Error: 0.025 and Critical Ratio: 32.24 and Direct Feedback has estimate loading value: 0.777, Standard Error: 0.032 and

Critical Ratio: 24.46. Table 5.15 shows their estimate loading value from that three indicators, Skill Variety, Task Autonomy and Direct Feedback are more than 0.5 or 0.6, the conclusion of this measurement is, these three indicators are valid and reliable for Enjoyment Variable. Based on scale measurement of each indicator concluded that Task Autonomy on each person can indicate or describe enjoyment variable. Table 5.15 shows comparison value on the critical ratio for each variable task autonomy have a significant value on 95% confident level and have a higher value than the others indicator 32.24*.

Table 5. 15: Enjoyment Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Enjoyment	**AVE = 0.634, Alpha =0.706**		
Skill Variance	0.800	0.037	21.89*
Task Autonomy	0.813	0.025	32.24*
Direct Feedback	0.777	0.032	24.46*

4. Measurement on Altruism Variable

Table 5.16 shows about enjoyment conformity assessment result; Table 5.16 indicates that the AVE value rewards have value 0.809, and the square root of its value is 0.899. This result means the discriminant validity of altruism variable is good because for the square root of the AVE has a better value than any correlation.

On Table 5.16, the charity has estimate loading value 0.894, Standard Error: 0.012 and Critical Ratio: 71.75, helping behavior has estimated loading value: 0.905, Standard Error: 0.011 and Critical Ratio: 79.14. Table 5.16 shows their estimate loading value from that three indicators, Helping Behavior, and Charity are more than 0.5 or 0.6, the conclusion of this measurement is, these two indicators are valid and reliable for Altruism Variable. Based on scale measurement of each indicator can be concluded that

helping behavior on each person can indicate or describe altruism variable. Table 5.16 shows a comparison of critical ratio value for each variable helping behavior have a significant value at 95% confident level and have a higher value than the others indicator 79.14*.

Table 5. 16: Altruism Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Altruism	**AVE = 0.809, Alpha =0.761**		
Charity	0.894	0.012	71.75*
Helping Behaviour	0.905	0.011	79.14*

5. Measurement on Community-Based Variable

Table 5.17 shows about community-based conformity assessment result; Table 5.17 indicates that the AVE value rewards have value 0.767, and the square root of its value is 0.875. This result means the discriminant validity of community-based variable is good because for the square root of the AVE has a better value than any correlation.

On the Table 5.17, community-identification has estimate loading value 0.876, Standard Error: 0.017 and Critical Ratio: 52.19, social contacts have estimated loading value: 0.876, Standard Error: 0.016 and Critical Ratio: 56.24. Table 5.17 shows community-based estimate loading value from that three indicators, Helping Behavior, and Charity are more than 0.5 or 0.6, the conclusion of this measurement is, these two indicators above are valid and reliable for the community-based variable. Based on scale measurement of each indicator can be concluded that needed for social contact on each person can indicate or describe community-based variable. Table 5.17 also shows the comparison on the critical ratio for each variable social contact have a significant value on 95% confident level and have a higher value than the others indicator 56.24*.

Table 5. 17: Community-Based Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Community-Based	**AVE = 0.767, Alpha =0.697**		
Community Identification	0.876	0.017	52.19*
Social Contact	0.876	0.016	56.24*

6. Measurement on Social Relationship Variable

Table 5.18 shows the social relationship conformity assessment result; Table 5.18 indicates that the AVE value rewards have value 0.674, and the square root of its value is 0.820. This result means the discriminant validity of social relationship variable is good because for the square root of the AVE has a better value than any correlation.

On Table 5.18, Action Significance by External Values has estimate loading value 0.776, Standard Error: 0.030 and Critical Ratio: 25.55. Indirect feedback has estimated loading value: 0.854, Standard Error: 0.022 and Critical Ratio: 38.53 and belongingness have estimated loading value: 0.830, Standard Error: 0.020 and Critical Ratio: 40.69. Table 5.18 shows the estimate loading value from that three indicators, Helping Behavior and Charity are more than 0.5 or 0.6, the conclusion of this measurement is, these two indicators above are valid and reliable for social relationship variable. Based on scale measurement of each indicator can be concluded that belongingness on each person can indicate or describe social relationship variable. Table 5.18 shows comparison value on the critical ratio for each variable belongingness have a significant value on 95% confident level and have a higher value than the others indicator 40.69*.

Table 5. 18: Social Relationship Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Social-Relationship	**AVE = 0.674, Alpha =0.755**		
Action Significance by External Values	0.776	0.030	25.55*
Indirect Feedback	0.854	0.022	38.53*
Belongingness	0.830	0.020	40.69*

7. Measurement on Intention to use Variable

Table 5.19 shows the intention to use conformity assessment result; Table 5.19 indicates that the AVE value rewards have value 0.711, and the square root of its value is 0.843. This result means the discriminant validity of intention to use variable are good because for the square root of the AVE has a better value than any correlation.

On Table 5.19, Frequency of use has estimate loading value 0.812, Standard Error: 0.036 and Critical Ratio: 22.82. Intention to re-use has estimated loading value: 0.820, Standard Error: 0.022 and Critical Ratio: 36.52 and number of the transaction have estimated loading value: 0.895, Standard Error: 0.018 and Critical Ratio: 49.08. Table 5.19 shows the estimate loading value from that three indicators, Helping Behavior and Charity are more than 0.5 or 0.6, the conclusion of this measurement is, these two indicators above are valid and reliable for the intention to use or system use variable. Based on scale measurement of each indicator can be concluded that some the transaction can indicate or describe intention to use or system use variable. Table 5.19 shows comparison value on the critical ratio for each variable number of the transaction have a significant value on 95% confident level and have a higher value than the others indicator 49.08*.

Table 5. 19: Intention to use Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
Intention to Use	**AVE = 0.711, Alpha =0.799**		
Frequency of use	0.812	0.036	22.82*
Intention to Re-Use	0.820	0.022	36.52*
Number of transaction	0.895	0.018	49.08*

8. Measurement of User Satisfaction

Table 5.20 shows about user satisfaction conformity assessment result. Table 5.20 indicates that the AVE value rewards have value 0.656, and the square root of its value is 0.809. This result means the discriminant validity of user satisfaction variable is good because for the square root of the AVE has a better value than any correlation.

On the Table 5.20, Adequacy has estimate loading value 0.795, Standard Error: 0.029 and Critical Ratio: 27.69, Effectiveness has estimated loading value: 0.837, Standard Error: 0.025 and Critical Ratio: 34.04, Efficiency has estimated loading value: 0.812, Standard Error: 0.036 and Critical Ratio: 22.64 and Overall Satisfaction has estimated loading value: 0.796, Standard Error: 0.028 and Critical Ratio: 28.32. Table 5.20 shows the estimate loading value from that three indicators, Helping Behavior and Charity are more than 0.5 or 0.6, the conclusion of this measurement is, these four indicators above are valid and reliable for the user satisfaction variable. Based on scale measurement of each indicator can be concluded that Effectiveness on the system can indicate or describe intention to use or system use variable. Table 5.20 shows comparison value on the critical ratio for each variable Effectiveness have a significant value on 95% confident level and have a higher value than the others indicator 34.04*.

Table 5. 20: User Satisfaction Conformity Assessment Result

Variable	Loading		
	Estimate	Standard Error	Critical Ratio
User Satisfaction	**AVE = 0.656, Alpha =0.824**		
Adequacy	0.795	0.029	27.69*
Effectiveness	0.837	0.025	34.04*
Efficiency	0.812	0.036	22.64*
Overall Satisfaction	0.796	0.028	28.32*

5.8 Hypothesis Test Result

This study uses GeSCA to perform data analysis that provides hypothesis test. The result of GeSCA provide Path Coefficients table (Table 5.21) to determine every relation between variables, this study has eight variables that have relation with each others. The acceptance of each hypothesis carried by considering the value of path coefficient in the structural model.

Table 5. 21: Path Coefficients Table

Path Coefficients			
	Estimate	**Standard Error**	**Critical Ratio**
Reputation->Intention to Use	0.235	0.053	4.46*
Rewards->Intention to Use	0.133	0.063	2.12*
Enjoyment->Intention to Use	0.027	0.066	0.41
Altruism->Intention to Use	-0.110	0.047	2.33*
Community-Based->Intention to Use	0.017	0.066	0.25
Social Relationship->Intention to Use	0.163	0.073	2.23*
Intention to Use->User Satisfaction	0.742	0.029	25.69*
User Satisfaction->Intention to Use	0.447	0.064	7.01*

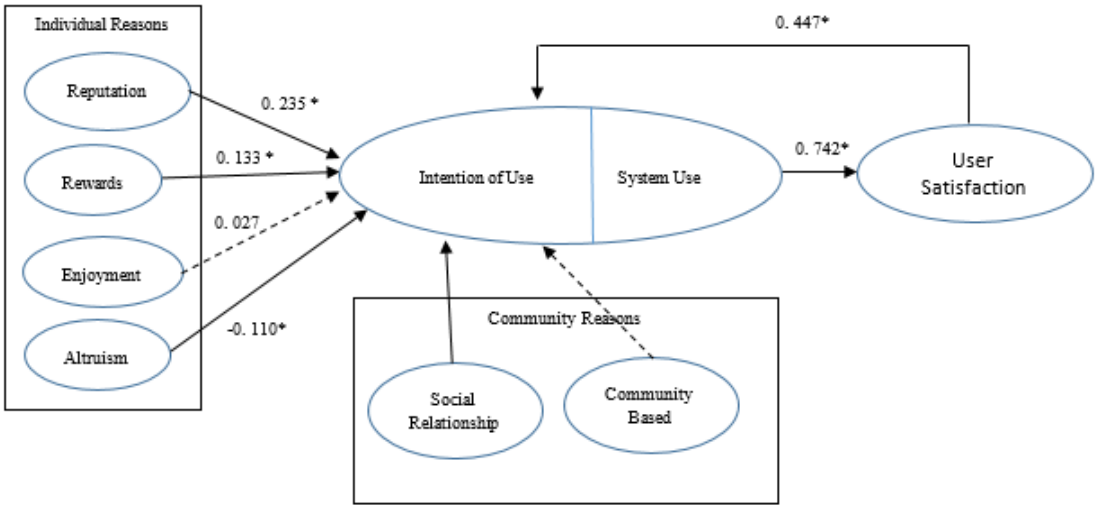

Figure 5. 1: Hypotheses Result

Hypothesis 1: There is a positive relationship between Reputation Motivation and Intention to use.

On the test results can be seen from the path coefficient table (Table 5.21) that reputation motivation influence the intention of the user. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Reputation and intention to use is 4.46* and significant at 95% confidence level. This result shows that the hypothesis of the influence of reputation has a positive impact because the value Estimate on the table path coefficient reputation has a positive value of 0.235, this hypothesis is accepted.

Hypothesis 2: There is a positive relationship between Rewards Motivation and Intention to use

On the test results can be seen from the path coefficient table (Table 5.21) that rewards motivation can influence the intention of the user to use crowdsourcing. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Rewards and intention to use is 2.12* and significant at 95% confidence level. This result shows that the hypothesis of the influence of rewards has

a positive impact because the value Estimate on the table path coefficient reputation has a positive value of 0.133, this hypothesis is accepted.

Hypothesis 3: There is a positive relationship between Enjoyment Motivation and Intention to use

On the test results can be seen from the path coefficient table (Table 5.21) that enjoyment motivation cannot influence the intention of the user to use crowdsourcing. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Enjoyment and intention to use is 0.41 and not significant at 95% confidence level. This result shows that the hypothesis of the influence of enjoyment motivation has a positive impact because the value Estimate on the table path coefficient reputation has a positive value of 0.027, but this hypothesis There is a positive relationship between Enjoyment Motivation and Intention to use are rejected.

Hypothesis 4: There is a positive relationship between Altruism Motivation and Intention to use

On the test results can be seen from the path coefficient table (Table 5.21) that altruism motivation can influence the intention of the user to use crowdsourcing. F the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Altruism and intention to use is 2.33* and significant at 95% confidence level, but for altruism motivation has a negative value for estimate value -0.110 (Table 31). This result proves that the direction of the path should be reverse from intention to use impact altruism, this result shows that altruism is caused after they using crowdsourcing.

Hypothesis 5: There is a positive relationship between Social Relationship and Intention to use

On the test results can be seen from the path coefficient table (Table 5.21) that Social Relationship motivation can influence the intention of the user to use

crowdsourcing. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Social Relationship and intention to use is 2.23* and significant at 95% confidence level. This result shows that the hypothesis of the influence of Social Relationship received a positive impact because the value Estimate on the table path coefficient Social Relationship has a positive value of 0.163, this hypothesis is accepted.

Hypothesis 6: There is a positive relationship between Community Based and Intention to use

On the test results can be seen from the path coefficient table (Table 5.21) that community-based motivation cannot influence the intention of the user to use crowdsourcing. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between community-based and intention to use is 0.35 and not significant at 95% confidence level. This result shows that the hypothesis of the influence of reputation received a positive impact because the value Estimate on the table path coefficient Community-Based has a positive value of 0.028, but this hypothesis, There is a positive relationship between Community-Based Motivation and Intention to use are rejected.

Hypothesis 7: There is a positive relationship between Actual Use and User Satisfaction

On the test results can be seen from the path coefficient table (Table 5.22) that intention of use can influence user satisfaction from use crowdsourcing. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between Intention to use with the user, satisfaction is 25.69* and significant at 95% confidence level. This result shows that the hypothesis of the influence of actual use received a positive impact on user satisfaction in crowdsourcing case because the value estimate on the table path coefficient reputation has a positive value of 0.742, this hypothesis is accepted.

Hypothesis 8: There is a positive relationship between User Satisfaction and Intention to re-use

On the test results can be seen from the path coefficient table (Table 5.21) that user satisfaction have a recursive path to intention to use. From the results issued by the tools GeSCA Critical Ratio values obtained for the correlation between user satisfaction with the intention to use is 7.01* and significant at 95% confidence level. This result shows that the hypothesis of the influence of user satisfaction received a positive impact intention to re-use because the value estimate on the table path coefficient reputation has a positive value of 0.447, this hypothesis is accepted.

Table 5. 22: Hypotheses Result

Hypothesis	Result
Hypothesis 1: There is a positive relationship between Reputation Motivation and Intention to use	ACCEPTED **(Positive Correlation)**
Hypothesis 2: There is a positive relationship between Rewards Motivation and Intention to use	ACCEPTED **(Positive Correlation)**
Hypothesis 3: There is a positive relationship between Enjoyment Motivation and Intention to use	REJECTED **(Positive Correlation)**
Hypothesis 4: There is a positive relationship between Altruism Motivation and Intention to use	ACCEPTED **(Negative Correlation)**
Hypothesis 5: There is a positive relationship between Social Relationship and Intention to use	ACCEPTED **(Positive Correlation)**

Hypothesis	Result
Hypothesis 6: There is a positive relationship between Community Based and Intention to use	REJECTED **(Positive Correlation)**
Hypothesis 7: There is a positive relationship between Actual Use and User Satisfaction	ACCEPTED **(Positive Correlation)**
Hypothesis 8: There is a positive relationship between User Satisfaction and Intention to re-use	ACCEPTED **(Positive Correlation)**

5.9 Variability of Variable

GeSCA also provides a result for R Square for every research model that tested by their tools. R-square is the point the representative of the model. Table 5.23 shows every dependent variable have r-square value. For the intention of useorsystem use have r-square value 0.663, it mean that this study research model represents for the intention of use as a dependent variable have 66.3%. For user satisfaction, it has 0.546 it means that this study research model representative value for the intention of use as a dependent variable has 54.6%.

Table 5. 23: GeSCA R square table

R-square of Latent Variable	
Reputation	0
Rewards	0
Enjoyment	0
Altruism	0
Community Based	0
Social Relationship	0
Intention to Use or System Use	0.663
User Satisfaction	0.546

5.10 Analysis on Control Variables

This study has four control variables. There is Age, Gender, Education, and Total Member. For control variables data analysis this study uses Minitab as software for data analysis. Minitab provides ANOVA test to show how all four of these variables impact on the dependent variable, the intention to use and user satisfaction variable. The significant influence of variable control can see through ANOVA results displayed on Minitab through the f-values and p values. Their values prove whether the control variables have an influence on the dependent variable or not.

Table 5.24 shows the test of age as a control variable. It can be seen from the f-value and p-value to indicate the influence of age as a control variable. For user satisfaction f-value obtained by age as a control, the variable is 3.12 and p-value 0.016. For intention to use variable f-value achieved by age as a control variable is 3.83 and p-value 0.005. Those results indicate that the age also has an effect on the perspective of intention to use and also age has an effect on user satisfaction.

Table 5. 24: Age as Control Variable - ANOVA Test

User Satisfaction			
Variable	DF	F-Value	P-Value
Age	4	3.12	0.016
Intention to Use			
Variable	DF	F-Value	P-Value
Age	4	3.83	0.005

For more details, this study provides Tukey test using Minitab to see the differences the level of satisfaction from every range of age. Tukey method contains information in the form of groups and ratings that effect on a dependent variable. Tukey test has been done twice to get a result from intention to use and user satisfaction. Table 5.26 provides information about who have a degree of preference on the intention to use to use crowdsourcing from the top rank to lowest ranking. Table 5.25 also gives information on some of the groups who have a preference level of use in crowdsourcing. At the top rank, 36-45 years old have a higher preference of

intention to use, followed by the less than 18 years, 26-35 years, more than 45 years and which has the lowest intensity level of preference is 18-25 users. In the column grouping shows the group classification.It indicates that group 36-45 have its group while for those responses which have age 26-35 and 18-25 have their perspective at the level of intention to use. For those responses which have age under 18 years and over 45 years old can get into both groups, A and B, so that prove that there is no problem with this two age category.

Table 5. 25: Tukey Pairwise Comparisons - Intention to Use and Age as Control Variable

Tukey Pairwise Comparisons		
Age	**Mean**	**Grouping**
36-45 Years Old	4.472	A
Below than 18 Years Old	3.759	AB
26-35 Years Old	3.4739	B
More Than 45 Years Old	3.431	AB
18-25 Years Old	3.3330	B

Tukey test will be run again for test on variable user satisfaction. Table 5.26 shows the respondents who are in the age of 36-45 have the highest satisfaction than other age and have separate groups. At the age of 26-35 have a slightly different level of satisfaction once and have the same group. People in the 18-25 age have satisfaction rate nearly equal to the age of 26-35, but at that age has its group, and the last is more than 45 have little-satisfied level compared to the others.

Table 5. 26: Tukey Pairwise Comparisons - User Satisfaction and Age as Control Variable

Tukey Pairwise Comparisons		
Age	**Mean**	**Grouping**
36-45 Years Old	4.365	A
26-35 Years Old	3.8965	AB
Below than 18 Years Old	3.764	AB

Tukey Pairwise Comparisons		
Age	**Mean**	**Grouping**
18-25 Years Old	3.7414	B
More Than 45 Years Old	3.396	AB

Table 5.27 explains about other control variables, Gender, Education and Total team member. The three control variables of this study were not significant impact towards an intention to use and user satisfaction. All p-value that owned by three control variables (Gender, Education, and Total team members) are exceeds 0.05, which means this not significant at the 95 percent confidence level. It can conclude that all those three of control variables, gender, education and a team member does not effect on the total perspective on the use of crowdsourcing and level of satisfaction.

Table 5. 27: ANOVA Test - Each Control Variable

User Satisfaction			
Variable	DF	F-Value	P-Value
Gender	1	1.8	0.181
Intention to Use			
Variable	DF	F-Value	P-Value
Gender	1	2.71	0.101
User Satisfaction			
Variable	DF	F-Value	P-Value
Education	3	0.98	0.405
Intention to Use			
Variable	DF	F-Value	P-Value
Education	3	0.35	0.786
User Satisfaction			
Variable	DF	F-Value	P-Value
Total Team Member	4	2.07	0.016
Intention to Use			
Variable	DF	F-Value	P-Value
Total Team Member	4	1.63	0.167

CHAPTER VI
DISCUSSION AND IMPLICATION

This chapter describes the relationship of each of the variables that affect the study and explanation of research

6.1 Discussion

6.1.1 The impact of Reputation and Intention to use

Based on this result has proven that Reputation and Intention to have a significant relationship between reputation and intention to use. This result is supported the previous study about reputation have a positive correlation with the intention to use (Lakhani, et al., 2010) (Xu, et al., 2009). People are use crowdsourcing to lift up their reputation and career development.

Extrinsic motivation can be reciprocity in the form of a reputation of a person. Reputation can be a something that is expected by users when they use crowdsourcing platform, especially in software engineering. In the case of software engineering or an even crowdsourcing case where a person who has a good reputation will have an excellent opportunity for them to a career, someone who can face the future challenge big challenge given by the project sponsor and the client will lift up their career. For example, answer a hard question in stack overflow or provide a solution for a complex programming. Additionally, reputation in the market itself is also essential for future career development. So this can be useful for them to obtain employment job or job appreciation.

6.1.2 The impact of Rewards and Intention to use

As predicted earlier by studies and research conducted by previous researchers, rewards become one of the main attraction when people do crowdsourcing activities (Puah, et al., 2011) (Faridani, et al., 2011) . Reward motivation can be a strong reason and motivation that people do crowdsourcing. Based on the results that have

demonstrated, it is proved that the most crowds who were in Indonesia consider rewards as their motivation to follow the activities of crowdsourcing.

Rewards can be measured by two indicators monetary and non-monetary (Puah, et al., 2011) (Faridani, et al., 2011). Table 5.7 shows the mean value of rewards; it can conclude that most of this study responses agree on both factors between money and non-monetary rewards, such as the award is an attraction they do crowdsourcing. This research dominate by the response on 18-25 years old. It can conclude that period is the period when they should find a job to makes money; it is possible for them to become Crowdsourcing users; it can assess for their new breakthrough with making money, getting appreciation and experience, although there should be more research on this subject. This study finding support about why project sponsors should make a better plan to give a reward for crowds worker when they held a crowdsourcing activity (Mao, et al., 2013).

6.1.3 The impact of enjoyment and intention to use

This study concluded that enjoyment, fun on the use of crowdsourcing and the intention to use crowdsourcing does not have a significant relationship but have a positive impact. Judging from the perspective of the respondents about enjoyment they would prefer the presence of something triggers them from outside (extrinsic motivation) as rewards previously mentioned is a special attraction or reputation from the outside even encourage them to crowdsource. Intention to use, sharing ideas and flexibility to work, show most of them are occasional, and also it can also be seen from the average user or respondents in this study were mostly teens that may not have thought of pleasure in use but expect about reciprocal that will give when using the platform. Enjoyment still can be a consideration in subsequent future research because this variable has a positive impact and may be significant in certain individual groups.

These findings also did not support the previous study about enjoyment are significant with the intention to use. Reference (Xu, et al., 2009) mentioned there is a

correlation between enjoyments while use or build on open source platform, many people join on OSS development because they think to build OSS are enjoyable for them. Previous studies by (Wang, et al., 2007) also mentioned enjoyment helping people behavior also significant when people do crowdsource to give a contribution to the online feedback system. These two studies are similar agree that enjoyment has a major impact towards an intention to use. This condition may occur in the study of OSS development, from previous study and research said that because OSS development does not have crowd puller such as rewards. People purely make OSS development from the people and for the people (Wang, et al., 2007).

6.1.4 The impact of altruism and intention to use

This study result proves that there is a significant correlation between Altruism and Intention to use. From the results, there is the linkage is different from the others motivation based on correlation path table (Table 5.21). Altruism motivation has a significant with a negative value on estimate loading, and this means the path for altruism should be reversed, intention to use towards altruism. This study proves a sense of want to help each other grow after they use the system. Compare to the previous studies about the motivation people join open source development, (Choi & Pruett, 2015) found that altruism and learning are an important motivation that encourages people to join open source development. Previous studies with crowdsourcing topic also revealed a significance impact from altruism with the intention to use (Wang, et al., 2007) (Kosonen, et al., 2014). In another side, prior studies by (Wu, et al., 2007) found that there is no significant between motivation helping people and intention to use.

Our study result may support prior studies about there is a significant correlation on altruism and intention to use but with some implication there should be a reverse path, this condition happens may because the difference area of research and region of response. OS recognizes individual authorship and sometimes community that have not intellectual rights (Albors, et al., 2008). Prior studies are a

focus on OSS development where this area people join because they have the willingness to help each other's, develop software based on personal needs and reputation (Choi & Pruett, 2015) which is more similar as collaboration crowdsourcing than competition crowdsourcing, or the characteristics of response.

Based on the distribution on this study responses, this study is dominate by young people or millennial generation. Millennial generation is the person who born between 1980-2000 (Kahle & Hansen , 2009). This generation is using technology as tools for learning rather than a cools things (Williams, et al., 2007). A crowdsourcing service platform can be tools for them to learn, to collaborate each others. The sense of altruism or helping each others allegedly will growth after they are using the platform. There still need to be more understanding about this situation.

6.1.5 The impact of community-based and intention to use

This study result did not find a significant relationship, but community-based have a positive value towards an intention to use based on correlation path table (Table 5.21). This result is contrary to previous research that mentioned the community-based motivation is the things that effect on intention to use crowdsourcing platform. Reference (Kaufmann, et al., 2011) found that social contact has a lower value than the others indicators; Based on this study result, social contact has mean 3.48 and 3.86 (Table. 5.7). This result proves people need some of the relationships with another individual, from giving an opinion on each other's, get some feedback from several others and belongingness in a particular community.

Reference (Goncalves, et al., 2015) the impact community-based only give an impact on a particular community where a person requires a level of trust where crowdsourcing will become a platform, where all project sponsors can be trusted. It has integrated, and crowdsourcing is a place where someone can become a place where one can find a new perspective, nevertheless community-based can be further explored in subsequent research because the result proves that it have a positive correlation with the intention to use.

6.1.6 The impact of social relationship and intention to use

This study result found that the relationship between social relationship motivation and intention to use are significant and has a positive correlation. In contrast to community-based, social relationship motivation more emphasis on extrinsic motivation. Based on the result, the mean value of the action of significance value by external has a mean value between 3.74 and 3.82 this value prove that response are do crowdsourcing based on encouragement from the outside such as people are using crowdsourcing because job duty. Although for indirect feedback and belongingness of this study responses have a neutral opinion.

A crowdsourcing platform such as Kaskus, Facebook, Wikipedia, StackOverflow provide features a community forum for every user to gather around, share something and give feedback from the others, so this situation from community indirectly gives a sense of belongings of each. In particular crowdsourcing platform such as Stackoverflow, Sribulancer, Freelancer and Facebook provide indirect comments from user crowdsourcing they shared inputs with one another between users or project sponsors with a software engineer. This interaction is considered to be critical to them because it gives a complicated feedback things for each who use crowdsourcing to be a better development of each. This result findings support that previous studies (Tajedin & Nevo, 2014), (Wang, et al., 2007) people interact each other's, and this is an important point for every software developers to make some bond with other individuals.

6.1.7 The impact of actual use and user satisfaction

The relationship between actual use and user satisfaction based on the IS success model (DeLone & McLean, 2003) that has been proposed earlier researchers DeLone and McLean, the filing of this hypothesis aim to determine the relation between the actual use and user satisfaction on the use of crowdsourcing. This study found that the relationship is adamant on the actual use and user satisfaction on the use of crowdsourcing and this result support of this relationship between system use

and user satisfaction. The existence of a relationship between actual use and user satisfaction prove for crowdsourcing developers to give due consideration when they develop crowdsourcing platform since the use of the platform will affect the satisfaction of the users.

6.1.8 The impact of user satisfaction and intention to use

The relationship between satisfaction and the intention to re-use is proposed based on the theory of IS Success Model by DeLone and McLean (DeLone & McLean, 2003). Described earlier regarding user satisfaction will affect the willingness to use or re-use. These study results show the existence of significant positive relationships between this two variable. These results summarized in the case of crowdsourcing user satisfaction will affect the intensity of the user, it can be used as a reference for developers crowdsourcing will be situations where the user satisfaction should be considered in the development phase of crowdsourcing, especially in software engineering. A user who satisfies with the system of crowdsourcing platform will come back again to use crowdsourcing platform, these findings can be a guidance for developers of crowdsourcing platform to be concern about crowdsourcing service for its users.

6.1.9 The impact of Control Variable

This study proposed four control variables to be tested on dependent variable intention to use and user satisfaction. The purpose of this control variable is to know if there is a different perception between Age, Gender, Total Team Member and Education with the intention to use and user satisfaction. The result proves that Gender, Total Team Member, and Education are not significant impacts the intention to use whether user satisfaction. Meanwhile, some of the previous research mentioned that those control variable may encourage people are joining OSS (Choi & Pruett, 2015) and some previous research by (Kosonen, et al., 2014) does not find any significance impact by the control variable (age, gender, member). Based on this

study result only Age Control Variable, there is an impact on Intention to use and user satisfaction variables.

This result proves that different age has a different perception about the intention to use or level of intention to use and different perspective of level satisfy. It can conclude that if anyone in next future want to build a crowdsourcing platform they must decide about the target market of their product because of every range of ages have a different perception of intention to use and different level of satisfying. These findings seem bias because the demographics table (Table 5.1 – Table 5.6) shows the distribution of age is not normal. This research is dominating by people on 18-25 with total respondent 145 people followed by 26-35, 66 people, and the other categories are less than ten people, there should be further research to investigate this condition to prove that control variable such as age may encourage citizens are join crowdsourcing.

6.2 Research Implication

Crowdsourcing on software development are different from traditional software engineering (Hasteer, et al., 2015). The crowd is working together to develop software or compete for each other to give a batter solution for project sponsors. Motivation can be considered one of the factors that are affecting the quality of software. This study purpose is to dig deeper people motivation joining crowdsourcing on software development.

Research model in this study refers to two major theories derived from the theory of self-determination by Deci and Ryan (Ryan & Deci, 2000) and IS Success models (DeLone & McLean, 2003). The relationship between the theory of self - determination and intention to use has been described in previous studies (Mardiana, et al., 2015) their relationship will be adapt in this study and tested between the motivation and intention to use in a case of users join the crowdsourcing activity.

Motivational theory divides into two major types of motivation. The first is the intrinsic motivation and extrinsic motivation. However, the models have been

created in this study will be categorized into two parts; it is Individual reasons and community reasons. This study categorizes both individual and community large part based on previous research that addresses the person's motivation to join the OSS (Xu, et al., 2009). Individual reasons refer about the point of view from users; their personal motivation joins crowdsourcing while community more reasons to discuss the person's view of the community. Both parts will be separated into a model that will have a relationship with the intention to use. This study was performed to expectations to prove there is a significant relationship between variables that has been purposed in research model and it can conclude by the purpose of the proposed study through testing.

The second theory that adapts in this research is the theory derived from DeLone and McLean IS Success Model. This study adapts two relationships between variables, namely intention to use and user satisfaction. Both of these variables convince there is a strong correlation between intention to use and user satisfaction. In previous research DeLone and McLean superbly describes the intention to use and actual use have in common that might be made into a variable (DeLone & McLean, 2003). This study was performed to expectations to prove there is a significant relationship between system use and user satisfaction and recursive path user satisfaction towards an intention to re-use in crowdsourcing of software development on crowds worker perspective.

6.2.1 Research Novelty

Despite the extensive applications for Crowdsourcing Software Engineering, the emerging model itself faces a series of issues that raise open problems for future work. These issues and open problems have been identified by previous studies. However, only a few researchers have discussed the solutions (Mao, et al., 2015). This Research has a valid purpose to be an improvement the Research of Crowdsourcing. Novelty of this investigation is:

1. This research focus is using Indonesian Programmers and Developers as the main object of the research.
2. The model that has been developing based on previous literature study about the motivation and intention doing OSS and Crowdsourcing as their activity; this also tries to adapt IS Success Model to know effectiveness for crowdsourcing platform in a different area of research.
3. Empirical Studies about Motivation issues and problem in Indonesia Region as a potentially significant number of internet users.
4. This study combines competition and collaboration crowdsourcing as one research area which is the most general perspective of crowdsourcing.
5. This study combines two theories about self-determination theory and Information System Success Model.
6. This study found that there is a reverse path between altruism and intention to use, which makes system use of crowdsourcing causes conclusion altruism.

6.2.2 Research Contribution

There is a theoretical contribution and practical contribution. For theoretical contribution, this study has adapted some Open Source Software literature study about the motivation of user joining open source software development and make some model to be tested in an empirical way with Crowdsourcing topic as the main subject. This study also adapt previous studies about the motivation of people join on collaboration and competition crowdsourcing which is it may content general findings of people perspective for crowdsourcing. Relationship and significant impact will be main purpose and discussion of this research. These results support and reject previous studies and research based on its result; it will give a different perspective for further research about variables consideration.

The second Contribution is Practical Contribution. Reference (Mao, et al., 2013) Project Manager have to build a planning with a correct budget to attract the crowd to solve their project. Project Manager will do planning for using Crowdsourcing

methods should know how to handle and anticipate the programmer and developer behavior, the factor can attract people doing crowdsourcing should be a prior consideration. This study concern to give descriptive, empirical studies for Project Management and give perspective about Crowdsourcing and it is a benefit to the organization. This study finding can be information for crowdsourcing platform provider to know about crowd's user behavior. Crowdsourcing platform providers also can use this research as a reference when they want to know about crowds behavior, and they may develop their platform based on this study findings.

6.2.3 Research Limitation

Every study has the limitation. Due to time constraints, only researchers obtained samples only 226 responses. This study only focuses on Indonesian people who have already used crowdsourcing rather than project sponsors who provide project against crowds. Different response targets will produce a different view and perspective with this research model and hypothesis. The study only concentrated on variables that have been read and conclude by the author probably still many other variables that can be explore causing new possibilities. The research limited to a quantitative study that researchers only get empirical data in the form of a questionnaire that has been filled by the respondent. This study only uses online questionnaires for data collection because of the number of respondents needed. Based on the age demographics table (Table 5.1) the distribution of responses on this study are dominate by young people due the limitation to reach the crowds worker participant, it will be a suggestion for future study to spread more distribute responses.

APPENDIX

QUESTIONNAIRE

PEOPLE'S MOTIVATION FOR JOINING CROWDSOURCING ON SOFTWARE DEVELOPMENT

An Empirical Study of Indonesian Crowds

Introduction

This questionnaire is a data collecting instrument for the purpose of research (master thesis) entitled: "Investigate the motivation of people doing crowdsourcing". This questionnaire aims to gain crowds perception about their motivation join crowdsourcing and satisfaction level of Indonesian crowds. The questionnaire voluntary and the data collected is strictly confidential. Participants' identity will remain anonymous and you have the option not to answer a particular question. The data collected will be analyzed and used to identify any educational needs which can then be implemented as appropriate. You agree to take part in this survey by completing questions below.

Respondent's Identity

1. Age :
   ☐ > 18 years old ☐ 18-25 years old ☐ 26-35 years old ☐ 36-45 years old ☐ <45 years old
2. Gender :
   ☐ Male ☐ Female
3. Highest Education :
   ☐ > Senior High School ☐ Senior High School ☐ Bachelor Degree ☐ Master Degree ☐ < Master Degree
4. How long you use crowdsourcing in a week
   ☐ <2 times ☐ 2-4 times ☐ 5-7 times ☐ 7-9 times ☐ more than 9 times
5. How many team members on your team when you are doing crowdsourcing activity (Software Development, Collaborating Crowdsourcing : Stackoverflow, GitHub, Open Source Development)
   ☐ I work alone ☐ 2-4 people ☐ 5-7 people ☐ 7-9 people ☐ more than 9 people
6. What Crowdsourcing Platform did you use?
   ☐ Facebook ☐ Topcoder ☐ Freelancer ☐ Sribulancer ☐ Kaskus ☐ Stackoverflow ☐ Wikipedia ☐ Others

Questionnaire

Give a cross (X) mark in the **RESPONSE** column that represents your approval level towards given statement.

Note:

SA : Strongly Agree
A : Agree
N : Neither
D : Disagree
SD : Strongly Disagree

	STATEMENT	RESPONSE				
		SA	A	N	D	SD
INDIVIDUAL MOTIVATION						
Reputation						
1	**Career opportunities development :** I use crowdsourcing platform to face future challenge of working career					
2	**Career opportunities development :** I use a crowdsourcing service to establish my working career opportunities					
3	**Marketing Oneself :** I use a crowdsourcing service because I can sell the expertise that I have					
4	**Marketing Oneself :** I use the service because Crowdsourcing has a wider market for the expertise that I have					
Rewards						
5	**Monetary Rewards** I use a crowdsourcing service because I get paid from the project that I received on the website crowdsourcing					
6	**Monetary Rewards** I use a crowdsourcing service because their salary offer is good					
7	**Monetary Rewards** I use a crowdsourcing service because they offer simplicity to get payment from project sponsor to workers					
8	**Non-Monetary Rewards** I use a crowdsourcing service because I want to improve my professional skills					

	STATEMENT	RESPONSE				
		SA	A	N	D	SD
9	**Non-Monetary Rewards** I use a crowdsourcing service because I wanted to get appreciation from project sponsor					
Enjoyment						
10	**Task Autonomy:** I use a crowdsourcing service because crowdsourcing services provide the freedom to schedule my hours					
11	**Task Autonomy:** I use a crowdsourcing service because of their job responsibilities are easier					
12	**Task Autonomy:** I use a crowdsourcing service because they offer flexibility in choosing a job					
13	**Skill Variety :** I use a crowdsourcing service because there is a lot variation in the ability that they offer for workers like (debugging, programming, design, UI test design) so i can pick the works when it suits me					
14	**Skill Variety :** I use a crowdsourcing service because a lot of work sectors that I can earn through crowdsourcing service					
15	**Skill Variety :** I use a crowdsourcing service because I can do a lot of things like answer and question a lot of subject from different perspective					
16	**Direct Feedback :** I am using crowdsourcing because I can evaluate my work directly when I working on that task like programming task (show error in their programing tools)					
Altruism						
17	**Charity:** I use a crowdsourcing service because I found crowdsourcing can be a platform for charity events.					
18	**Charity:** I use a crowdsourcing service because I like to share my knowledge to the world like writing articles in Wikipedia, create articles in the forum in crowdsourcing platform like stackoverflow etc.					
19	**Helping Behavior :** I use a crowdsourcing service because I found crowdsourcing is one method to help people to solve					

	STATEMENT	RESPONSE				
		SA	A	N	D	SD
	their problem.					
20	**Helping Behavior :** I am using crowdsourcing because crowdsourcing is a place where people gathered and discussed.					
COMMUNITY MOTIVATION						
Community Based						
21	**Community Identification :** I use crowdsourcing because I can find a trusted project sponsor in crowdsourcing platform					
22	**Community Identification :** I use crowdsourcing because I can get project from big community or company					
23	**Social Contact :** I use crowdsourcing because I want to join their community and interact with everyone in that community					
24	**Social Contact :** I use crowdsourcing because I want to meet new people with different skills and perspective					
Social Relationship						
25	**Action Significance by External Values :** I use a crowdsourcing service because I can give my opinion or arguments with clients or any community, or another crowd.					
26	**Action Significance by External Values :** I use a crowdsourcing service because Crowdsourcing is a free-speech forum in solving problems					
27	**Indirect Feedback from the Job :** I use crowdsourcing because crowdsourcing sites make it easy for my clients to give direct advice about my performance					
28	**Indirect Feedback from the Job :** I use crowdsourcing for seeks commendation of my work					
29	**Belongingness:** I am using crowdsourcing because I was accepted by the community crowdsourcing					

	STATEMENT	RESPONSE				
		SA	A	N	D	SD
30	**Belongingness:** I am using crowdsourcing because I feel comfortable working with the community crowdsourcing					
User Satisfaction						
31	**Adequacy:** With Crowdsourcing my needs fulfilled (social needs like social recognition, find new friends, personal needs like salary, improved personal skills, appreciation)					
32	**Adequacy:** With help of crowdsourcing service I achieved my goal					
33	**Effectiveness :** With help of crowdsourcing service, it is improved my work performance					
34	**Effectiveness :** With crowdsourcing service I can improve my productivity					
35	**Efficiency :** With crowdsourcing services more quickly finished my work					
36	**Efficiency:** With crowdsourcing services I can get more fee income with less effort					
37	**Efficiency:** Crowdsourcing activity helps to save my working time					
38	**Overall Satisfaction :** Overall , I satisfy with crowdsourcing platform system					
39	**Overall Satisfaction :** Overall , Crowdsourcing Service good for my use					
40	**Overall Satisfaction :** Overall , crowdsourcing services provide great influence to the needs of society					
SYSTEM USE (INTENTION AND ACTUAL USE)						
41	**Frequency of use :** On the average, I do work services bidding activity against my client in crowdsourcing site every day					
42	**Frequency of use :** I use Crowdsourcing with regular frequency like several times per day					
43	**Intention to Re-Use :**					

	STATEMENT	RESPONSE				
		SA	A	N	D	SD
	I would use the service again crowdsourcing for my further carrier					
44	**Number of transaction:** On the average, I often get the project through crowdsourcing sites					
45	**Number of transaction:** On the average, I often edit the content and contribute to the website crowdsourcing					
46	**Number of transaction:** On the average, I often conduct transactions through crowdsourcing					

~Thank You very much for your participation~

CHAPTER VII
CONCLUSION AND FUTURE WORK

This chapter describes the findings and recommendations that may take by the whole process of research that has been done to ensure the results had been able to answer the research question and research purposes.

7.1 Conclusion

Crowdsourcing has become a new trend nowadays. With the advancement of technology today, it is possible crowdsourcing method to be developed rapidly in the sectors of software development. However, crowdsourcing platform must be aware of crowd-puller to attract people joining crowdsourcing activity. Motivations on individuals believed can boost the quality of software since crowdsourcing is a robust method for the quality of software is still questionable. Strength crowds can be one of the benefits utilized by the company or individual. The more motivated someone to follow crowdsourcing possibilities generated by crowdsourcing quality could be better. This study aimed to dig deeper the motivation of the crowds user to monitor the activities of crowdsourcing in software engineering and also better understanding about the correlation between intention to use or system use and user satisfaction.

The results of this study concluded that there are several people motivations joining crowdsourcing activity; six motivations based on the previous study divided into two parts, the individual and the community have been tested. For individual motivation factors, the reputation and rewards are significant to have a correlation with the intention to use and based on their estimate loading value they have a positive impact. For altruism, it has a significant correlation with the intention to use, but this study found that this path should be reverse, this study conclude that altruism is a motivation caused by crowdsourcing use. For enjoyment motivation, this study found that there is not significant correlation but enjoyment motivation variable should be considered for further study because it had a positive impact on research.

For the community reasons, this study found that the social relationship has a significant correlation with the intention to use and have a positive impact based on their estimate loading on correlation path table (Table 5. 21). This result proved that social relationship has a positive correlation with the intention to use while the community-based result is not revealed any significant value in this study. However, community-based variable still can be a consideration for future research because it has a positive influence on this study.

This study also examines the relationship between the actual use and user satisfaction based DeLone and McLean IS Success Model concept on purpose to understanding about the correlation between intention to use or system use with user satisfaction and its impact in case of crowdsourcing. The study result proves to support this relationship both of correlation. This study result found that there is a positive correlation between system use with the intention to use; this study also finds a recursive path between user satisfaction and intention to use. Concluded based on the result that level satisfaction from the user can be assessed from they use the system, and if they satisfy with crowdsourcing platform, they may come back to re-use the crowdsourcing platform.

This study also proposed control variables such as Gender, Age, Education and Total Team Member to be analysis. This study found that Age is the one of control variables that have an influence towards an intention to use and user satisfaction. Most of the responses are in the range of age have a different perspective of intention to use and user satisfaction. This study result concludes that crowdsourcing platform providers should be aware of this situation since different age has a different level of intention of use and satisfaction perspective. At first researcher on this study believes that the team members also an important thinks to be a consideration variable control that controls how crowds worker use the system. Reference (Johnson & Ekstedt, 2016) Tarpit a General Theory of Software Development about how programmers and developers communicate each other's with

a different language can be an important key role in Software Development. However, still this result study does not support this condition about the assumption of total team members has an impact on the perspective of intention to use or satisfy level for using crowdsourcing platform.

7.2 Recommendation

7.2.1 Future Research Direction

For future research, this study suggests this model should examine with a larger number of the sample with specific control variables such as gender, total team member, education or specific age of response who use the crowdsourcing; different perspective may have a different result. Research objects can be changed such as different region, as well as the scope of the research project. As this study mentioned earlier crowdsourcing divided into three major parts, there is peer production, competitive and m-Turk, and also have a different characteristic there is a competitive crowdsourcing and collaborative crowdsourcing. Further research for this specific major parts or characteristic are necessary with different parts or characteristics will generate support various hypotheses and results. This research focus on the user of crowdsourcing perspective, Project sponsors also predicted give a different perspective on the larger scope of research. The demographics of this study are not quite distributed on every category because this study limitation to get a response for each person who has been using the crowdsourcing platform, especially for software development, for further research this study also need to spread the questionnaire more equally for the distribution of spreading questionnaire. This study also recommend future research make a rank model for each motivation. The rank model can help crowdsourcing platform to priority their development based on the rank of motivations that developer or programmer need.

This study demographics show that this study is dominate by Millennial Generation, the people who born between 1980-2000 (Kahle & Hansen , 2009). As a

dominating response of the research, there should be a more investigation about this generation. Considered they are a generation with potential users, and they learn through collaboration learning (Williams, et al., 2007), it will give a different perspective on many possibilities to finding.

7.2.2 Practical Recommendation

These study findings can be as a reference by the developers of crowdsourcing on the appropriate target market for the future. This study result concluded that most people motivation are similar with social crowdsourcing platforms concept, people can compete, have a reputation, rewards, interact with each other's and also build a community relationship. These study findings is a perfect suggestion for crowdsourcing apps to build based on this study. Finally, for future development of crowdsourcing platform can use a combination of the concept of social media and crowdsourcing. This research found that altruism should reverse path. It does not mean that altruism should be ignorance. Crowdsourcing providers should be aware of this situation because there is a sense of altruism after they use crowdsourcing. Providers should build a feature or place for them to gather around like Question and Ask forum on website or application. In addition to increasing traffic on website or apps, it should help sustain crowdsourcing platform.

Web Application such as Linked-In may be used as a reference that everyone understands the reputation of a person it will be guidance for the company, the project sponsor or client know about the reputation owned by the user. TopCoder also should be simplified so it can lift up the impression from user to use a crowdsourcing website. Based on the demographic of this study responses mentioned that most of the responses use Facebook as a crowdsourcing platform for sharing, for competition and collaboration among crowds. Hence, platforms such as Facebook do not have such a reputation; system rewards are evident Facebook more emphasis on peer production, and collaborative crowdsourcing share their knowledge with co-relation or wider sharing. This concept can be further developed formally such as a

Freelancer, Sribulancer, and TopCoder with competitive features crowdsourcing more attractive for users so it will be more interesting project sponsor to recruit people from the platform of crowdsourcing.

This research also gives perspective to project sponsors. Based on this study result crowd workers need indirect feedback to lift up their performance, rating to lift up their reputation and also plan to attract prize. The project sponsor should make a plan how to attract the crowd workers to finish their tasks with maximum quality.

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REFERENCES

Albors, J., Ramos, J. & Hervas, J., 2008. New learning network paradigms: Communities of objectives, crowdsourcing, wikis and open source. *International Journal of Information Management,* Volume 28(Issue 3), pp. 194-202.

Antin, J. & Shaw, A., 2012. *Social Desirability Bias and Self-Reports of Motivation: A Study of Amazon Mechanical Turk in the US and India.* Austin, Association for Computing Machinery, pp. 2925-2934.

Bailey, J. E. & Pearson, S. W., 1983. Development of a Tool for Measuring and Analyzing Computer User Satisfaction. *Management Science,* pp. 530-545.

Beecham, S. et al., 2008. Motivation in Software Engineering: A systematic literature review. *Information and Software Technology,* 50(9-10), p. 860–878.

Benkler, Y. & Helen, N., 2006. Commons-based Peer Production and Virtue*. *The Journal of Political Philosophy,* Volume 14, pp. 394-419.

Bonnet, D. G., 2002. Sample Size Requirements for Testing and Estimating Coefficient Alpha. *Journal of Educational and Behavioral Statistics,* pp. 335-340.

Chintakovid, T., 2007. Factors Affecting End Users' Intrinsic Motivation to Use Software. *IEEE Symposium on Visual Languages and Human-Centric Computing,* pp. 252 - 253.

Choi, N. & Pruett, J. A., 2015. The characteristics and motivations of library open source software developers: An empirical study. *Library & Information Science Research,* Volume 37(Issue 2), p. 109–117.

Creswell, J. W., 2014 . *Research Design.* USA: SAGE.

Davis, F. D., Bagozzi, R. P. & Warshaw, P. R., 1992. Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology,* 22(14), pp. 1111-1132.

DeLone, W. H. & McLean, E. R., 1992. Information Systems Success The Quest for the dependent variable. *Information System Research,* 3(1), pp. 60-95.

DeLone, W. H. & McLean, E. R., 2003. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information System,* 19(4), pp. 9-30.

Fagan, M. H., Neill, S. & Woolridge, B. R., 2008. Exploring the Intention to Use Computers: An Empirical Investigation of the Role of Intrinsic Motivation, Extrinsic Motivation, and Perceived Ease of Use. *Journal of Computer Information Systems,* 19(4), pp. 31-37.

Faridani, S., Hartmann, B. & Ipeirotis, P. G., 2011. *What's the Right Price? Pricing Tasks for Finishing on Time.* s.l., s.n.

Ford, R. C., Richard, B. & Ciuchta, M. P., 2015. Crowdsourcing: A new way of employing. *Business Horizons,* 58(4), pp. 377-388.

Gefen, D., Gefen, G. & Carmel, E., 2015. How project description length and expected duration affect bidding and project success in crowdsourcing software. *The Journal of System and Software,* Volume 116, pp. 1-10.

Goncalves, J. et al., 2013. Crowdsourcing on the Spot: Altruistic Use of Public Displays, Feasibility, Performance, and Behaviours. *2013 ACM international joint conference on Pervasive and ubiquitous computing (UbiComp'13),* pp. 753-762.

Goncalves, J., Hosio, S., Rogstadius, J. & Karapanos, E., 2015. Motivating participation and improving quality of contribution in ubiquitous crowdsourcing. *Computer Networks,* pp. 34-48.

Hasteer, N. et al., 2015. Crowdsourcing Software Development : Many Benefits Many Concerns. *Procedia Computer Science,* Volume 78, pp. 48-54.

Heungsun Hwang, H., 2004. *Generalized Structured Component Analysis.* s.l.:Psychometrica.

Heylighen, F., 2007. Why is Open Access Development so Successful? Stigmergic organization and the economics of information. pp. 1-12.

Hossain, M., 2012. *Crowdsourcing: Activities, Incentives and Users' Motivations to Participate.* Malacca, IEEE, pp. 501 - 506.

Hossain, M., 2012. Users' Motivation to Participate in Online Crowdsourcing Platforms. *ICIMTR 2012 - 2012 International Conference on Innovation, Management and Technology Research,* pp. 310 - 315.

Hou, C.-K., 2012. Examining the effect of user satisfaction on system usage and individual performance with business intelligence systems : An empirical study of Taiwan's electronics industry. *International Journal of Information Management,* 15(4), pp. 560-573.

Howe, J., 2006. The Rise of Crowdsourcing. *Wired*, Volume 14, pp. 1-4.

Hoyle, R., 1995. *Structural Equation Modeling: Concepts, Issues, and Applications.* Thousand Oaks, CA: Sage Publication.

Internet World Stats, 2015. *Internet World Stats.* [Online] Available at: http://www.internetworldstats.com/stats3.htm

Ives, B., Olson, M. H. & Baroudi, J. J., 1983. The Measurement of User Information Satisfaction. *Communications of the ACM,* Volume 26, pp. 785-793.

Johnson, P. & Ekstedt, M., 2016. The Tarpit - A general theory of software engineering. *Information and Software Technology,* Volume 70, pp. 181-203.

Kahle , L. & Hansen , K. H., 2009. *Work in progress - globalization and business innovation: How do we best prepare millennial-generation engineering students for complex challenges?.* San Antonio, TX , IEEE, pp. 1 - 2 .

Kaufmann, N., Schulze, T. & Veit, D., 2011. More than fun and money. Worker Motivation in Crowdsourcing – A Study on Mechanical Turk. *Proceedings of the Seventeenth Americas Conference on Information Systems,* Issue 2009, pp. 1-11.

Kline, R. B., 2005. *Principles and Practice of Structural Equation Modeling.* New York: Gilford Press.

Kosonen, M., Gan, C., Vanhala, M. & Blomqvist, K., 2014. User Motivation and Knowledge Sharing in Idea Crowdsourcing. *International Journal of Innovation Management,* 18(05), p. 23.

Lakhani, K. R., Garvin, D. A. & Lonstein, E., 2010. Topcoder(A) : Developing Software Through Crowdsourcing. *Harvard Business School.*

LaToza, T. D. & Hoek, A. v. d., 2016. Crowdsourcing in Software Engineering: Models, Motivation s and Challenges. *IEEE Software,* pp. 74 - 80.

Lei, M. & Lomax, R. G., 2014. The Effect of Varying Degrees of Nonnormality in Structural Equation Modelling. *Structural Equation Modeling: A Multidisciplinary Journal,* pp. 1-27.

Li, K., Xiao, J., Wang, Y. & Wang, Q., 2013. Analysis of the Key Factors for Software Quality in Crowdsourcing Development:. *2013 IEEE 37th Annual Computer Software and Applications Conference,* pp. 812 - 817.

Li, W., Tsai, W.-T. & Wu, W., 2015. Crowdsourcing for Large-Scale Software Development. In: *Crowdsourcing.* s.l.:Springer Berlin Heidelberg, pp. 3-23.

Mao, K., Capra, L., Harman, M. & Jia, Y., 2015. A Survey of the Use of Crowdsourcing in Software Engineering. *UCL,* Volume 15, p. .

Mao, K., Yang, Y., Li, M. & Harman, M., 2013. *Pricing Crowdsourcing-Based Software Development Task.* San Francisco, CA, IEEE, pp. 1205 - 1208.

Mardiana, S., Tjakraatmadja, J. H. & Aprianingsih, A., 2015. DeLone–McLean Information System Success Model Revisited: The Separation of Intention to Use - Use and the Integration of Technology of Acceptance Model. *International Journal of Economics and Financial,* 5(1979), pp. 172-182.

Mardiana, S., Tjakraatmadja, J. H. & Aprianingsih, A., 2015. Validating the Conceptual Model for Predicting Intention to Use as Part of Information System Success Model: The Case of an Indonesian Government Agency. *International Journal of Economics and Financial Issues,* 5(5), p. 353–360.

Martinez, M. G., 2013. Crowdsourcing: the potential of online communities as a tool for data analysis. In: M. G. Martinez, ed. *Open Innovation in the Food and Beverage Industry.* s.l.:Woodhead Publishing, pp. 332-342.

Martinez, M. G., 2015. Solver engagement in knowledge sharing in crowdsourcing communities: Exploring the link to creativity. *Research Policy,* Volume 44(Issue 8), p. 1419–1430.

Olson, D. L. & Rosacker, K., 2013-12. Crowdsourcing and open source software participation. *Service Business,* 7(4), pp. 499-511.

Petter, S., DeLone, W. & McLean, E., 2008. Measuring information systems success:. *European Journal Information System,* 17(3), p. 236–263.

Petter, S. & McLean, E. R., 2009. A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management,* 46(3), p. 159–166.

Piliavin, J. A. & Charng, H.-W., 1990. Altruism: A Review of Recent Theory and Research. *Annual Review of Sociology,* 16(1), pp. 27-65.

Puah, C., Bakar, A. Z. A. & Ching, C. W., 2011. *Strategies for community based crowdsourcing.* Kuala Lumpur, IEEE, pp. 1 - 4.

Ramakrishnan, S. & Srinivasaraghavan, V., 2014. Delivering software projects using captive university crowd. *Proceedings of the 7th International Workshop on Cooperative and Human Aspects of Software Engineering,* pp. 115-118.

Ryan, R. M. & Deci, E. L., 2000. *Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions.* s.l.:Elsevier - Academic Press.

Saxton, G. D., Oh, O. & Kishore, R., 2013. Rules of Crowdsourcing: Models, Issues, and Systems of Control. *Information Systems Management,* pp. 2-20.

Shah, S. K., 2006. Motivation, Governance, and the Viability of Hybrid Forms in Open Source Software Development. *Management Science,* pp. 1000 - 1014.

Sohibani, M. A. et al., 2015. Factors That Influence the Quality of Crowdsourcing. In: *New Trends in Database and Information Systems II.* s.l.:Springer International Publishing, pp. pp 287-300.

Solimun, 2012. *Pemodelan Struktural Generalized Structured Component Analysis GSCA.* Malang: Universitas Brawijaya.

Stol, K.-J. & Fitzgerald, B., 2014. Researching Crowdsourcing Software Development: Perspectives and Concerns. *Proceedings of the 1st International Workshop on CrowdSourcing in Software Engineering,* pp. 7-10.

Stol, K.-J. & Fitzgerald, B., 2014. *Two's Company, Three's a Crowd: A Case Study of Crowdsourcing Software Development.* Hyderabad, s.n.

Tajedin, H. & Nevo, D., 2014. *Value-Adding Intermediaries in Software Crowdsourcing.* Waikoloa, HI, IEEE, pp. 1396 - 1405.

Teo, T. S. H., Lim, V. K. G. & Lai, R. Y. C., 1998. Intrinsic and extrinsic motivation in Internet usage. *The International Journal of Management Science,* pp. 25-37.

Thomas, S., Hurley, S. & Barnes, D., 1996. *Looking for the human factors in software quality management.* Dunedin, IEEE, pp. 474 - 480.

Trow, J., Liu, L. & Li, Z., 2014. *An Investigation into Internet Crowdsourcing for.* Xi'an, IEEE, pp. 474 - 481.

Tsai, W.-T., Wu, W. & Huhns, M. N., 2014. *Cloud-Based SoftwareCrowdsourcing.* s.l., IEEE, pp. 78 - 83.

Urbach, N. & Müller, B., 2012. The Updated DeLone and McLean Model of Information Systems Success. *Information Systems Theory: Explaining and Predicting ,* Volume Vol. 1.

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D., 2003. User Acceptance of Information Technology: Toward a Unified View. *Management Information Systems Research Center,* pp. 425-478.

Venkatesh, V. & Speier, C., 2002. User Acceptance Enablers in Individual Decision Making About Technology: Toward an Integrated Model. *Journal of the decision science institute - Decision Science,* pp. 297-316.

Wang, X., Teo, H.-H. & Yu, T., 2007. *Understanding the Intention of Information Contribution to Online Feedback.* Waikoloa, HI, IEEE, p. 28.

Warwick, D. P. & Lininger, C. A., 1975. *The Sample Survey: Theory and Practice.* New York: McGraw-Hill.

West, S. G., Curran, P. J. & Finch, J. F., 1995. Structural Equation Models with nonnormal variables: problems and remedies. In: *Structural equation modeling: Concepts, issues, and applications..* s.l.:Sage Publications, pp. 56-75.

Williams, L. et al., 2007. *On the Impact of a Collaborative Pedagogy on African-American Millennial Students in Information Technology.* Minneapolis, MN, IEEE, pp. 677 - 687.

Wolf, E., Harrington, K., Clark, S. & Miller, M., 2013. Sample size requirements for structural equation models an evaluation of power, bias, and solution propriety. *Educational and Psychological Measurement,* 73(6), pp. 913-934.

Wu, C.-G., Gerlach, J. & Young, C., 2007. An empirical analysis of open source software developers' motivations and continuance intentions. *Information & Management,* p. 253–262.

Xu, B., Jones, D. R. & Shao, B., 2009. Volunteers' involvement in online community based software development. *Information & Management,* p. 151–158.

Zait, A. & Bertea, P. E., 2011. Method for testing Discrimant Validity. *Management Marekting volume ix,* pp. 218-224.

Zhao, Y. C. & Qinghua, Z., 2014. Effects of extrinsic and intrinsic motivation on participation in crowdsourcing contest : A perspective of self-determination theory. *Online Information Review,* pp. 896-917.

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