Does Personality Matter for Contributions to Online Communities?

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Abstract--**Many high-technology business models would not be scalable and profitable without online communities that provide user support, foster technology adoption, offer product feedback, solve technical problems, and to co-develop products. However, only a relatively small number of all community members are actively contributing content and their attention is increasingly divided between a rapidly growing number of personal and professional online communities. Companies therefore strive to convert "lurkers", who observe the community, into active content providers. This paper investigates to what extent this is possible across different community members. Specifically, it asks how personality traits impact online behavior. To this end, the paper develops a research framework for online participation that is based on the Theory of Planned Behavior (TPB) and Big-Five personality factors and outlines future research directions.**

I. INTRODUCTION

With the increasing popularity of networked technologies, the Internet has the capability to connect users from one place to other places via e-mail, chat, and blogs. It has allowed users to extend their social networks through contribution in online communities (OCs) such as Microsoft, IBM, Sony, Dicati, Facebook, LinkedIn, Wikipedia, and YouTube [1]–[5]. Clearly, online communities allow people to create a range of new social spaces in which people can meet and interact with their network [2]. Online communities are social networks for users who build their networks by sharing similar interests and practices [3]. Previous research has shown that the communities use contributed information to create additional new information and exchange information [6]. Activities within online communities can be seen as Customer support, Solicit ideas, or Co-creation. For instance, Geek Squad teams, Best Buy technical support service, contribute to their online community to learn and exchange technical skills among themselves. These activities increase the value of the communities' information. InnoCentive post technical challenges of their community to gather idea solutions. IBM has been joining Linux online community to be a part of cocreation to open source software [6]. Companies try to contribute to online communities because they want to obtain business results and design communities to serve their objectives. However, the contributed information will become the property of the communities. This property is considered as a public good because the information is freely available for consumption without requiring participants to contribute [7].

Previous studies have examined the impacts of personality and behavior on online communities. The studies show that different personalities behave differently in online communities. For example, extroverted people are more likely to engage in social activities or belong to a social group such as Facebook groups [8]. However, differences between users and how they will contribute to online communities are poorly understood. These raise questions on does personality impact how people behave online? How do people contribute to online communities behave? Are they behaving different between an online community to others? Therefore, links between personality, behavior and contribution to an online community needs to be understood.

The purpose of this paper is to define the relationship between personality, behavior and contribution to an online community [9], [10]. Although, there are many personalities-trait measures available in the literature, Big-Five personality factors are a popular personality measure [11]–[13]. In previous research has shown an individual's past behavior has a positive impact on his or her contributing to perform the behavior [14]. Therefore, the Big-Five Factors is incorporated in the proposed research model.

We adopt the Theory of Planned Behavior (TPB) as part of the proposed model because it has been known as a model to define and understand linking between intention to specific behavior and individual factors which are behavioral attitude, subjective norm, and perceived behavioral control [15]. In this paper, behavioral attitude is defined as an individual having a favorable or an unfavorable evaluation of contributing an online community. Subjective norm is defined as an individual perceives contributing to the online community as a norm for people who are important to him. Perceived behavioral control is defined as the perceived level of ease or difficulty by an individual with respect to contributing to the online community.

We believed that the proposed model will assist online community designers, online community managers, and participants understand determinants of online contribution. Understanding the determinants will identify what factors should be improved in an online community.

II. LITERATURE REVIEW

A. Online communities

The Internet enables global meeting spaces where groups of individual can connect online. As effective relationships among participants, an online community will be formed as a portal for online communication [16]. Online communities have been characterized as people with shared similar interests or goals or resources with one another [3], [17]. People have a need to belong and be affiliated with others. Communities provide a sense of belonging to a group or social status and help in achieving their goals [18].

In the past ten years [3], [17]–[20], the amount of research on online communities has been growing. Many previous studies have explored the relation between online contribution and online communities. A study by Ridings and Gefen [18] showed people contribute to online communities for various reasons depending on community types that meet participants' need. Their findings also showed that the reasons can be categorized into four main reasons; exchange of information, social support, friendship, and entertainment [18].

1) Exchange of information

In general, online information is considered a valuable knowledge or social resource. People go to online communities because they expect to gather relevant information or answers [20]. Since participants in a community have similar interests, they are more likely to share appropriate information. Some complex problems can be solved quickly through posting a question or searching on online forums [7]. However, the quality of the information exchange has both positive and negative effects on people in a particular online community. For example, Adjei, S. Noble, and C. Noble studied the influence of customer-to-customer (C2C) communications on customer purchase behavior [21]. Their findings confirm that the positive quality of the communication exchange between customers in an online brand community decrease the level of uncertainty regarding the firm and products. As a result, the firm's products are purchased more related to high customers' purchase intentions [21]. However, the finding of C. Wiertz from the study on a balancing act in a Virtual P3 Community [22], shows that participants who have high-status gain control and dominate other low-status members in exchanging information. Consequently, lower-status members likely reduce their contributions or leave the community because they feel intimidated.

2) Social support

People join online communities because the communities can provide the sense of belonging, respond to the need for self-identity, support a flow of emotional concern, and provide encouragement [18]. With computer and internet technology, social support can be done through online communication without having physical face-to-face interaction. From the research of White and Dorman[23], participants in online groups have access 24 hours a day, 7 days a week, or anytime that is most convenient to them. Geographic and transportation barriers can be eliminated by the Internet. People who have mobility problems, health concerns, speech and hearing difficulties or caregiving responsibilities can get online social support with ease [23].

Chen and Choi studied the relationship between the Internet and social support [24]. According to many Chinese migrants to Singapore, they moved there because of work status. Due to long-distance working conditions, the migrants seek the sense of belonging and social support to fulfill their needs. The findings showed that the greater use of computer-mediated social support among Chinese migrants in Singapore, the higher satisfaction is.

3) Friendship

Besides information exchange and social support reasons, people join online communities because they want to mingle with friends and find new friends with common interest. Friendship in this paper is defined as spending time and being together [25]. The Internet creates new communication through social networks. Research from Wang and Wellman [26] shows that the average number of friends in adult friendship networks constantly increased from 2002 to 2007 as internet use grew. With usefulness of the Internet, users can easily meet friends and make new friends; even though, they live on different geography [26], [27].

4) Recreation or Entertainment

Recreation is one of the reasons that people decide to participate in online communities such as game online World of Warcraft forum - us.battle.net/wow/en/forum or cycling forum - www.bikeradar.com/forums. The entertainment value of the Internet can be applied to online communities as well [18]. Games online is one of the recreation examples, players can play together from different locations. In a study of Chin-Lung Hsu and Hsi-Peng Lu, their research on factors that relate to consumer behavior in online game communities. They found that more than 70 percent of their sample participates in the online game because of entertainment purpose [28]. Jin and Chee mentioned that Korean youths participate in gaming activities as part of everyday life. They have used online games to engage themselves in gaming communities [29]. Consequently, game developers see the potential to maintain and promote their game through online communities [30].

B. Online behavior

Online communities have become a broadly used for facilitating conversations across a wide range of topics and contexts. Content generated by a wide range of behaviors help sustain online communities [31]. Keys to have successful online communities depend on participants' willingness to spend their time and energy in doing the voluntary work. To understand what people do in online communities, what motivated them, or what attracts people to participate, the Theory of Planned Behavior and Big-Five personality traits can be explained relationship between online behaviors and online communities[13], [15], [32].

C. Theory of planned behavior (TPB)

The theory of planned behavior (TPB) is an extension of the Theory of Reasoned Action [33], [34]. Figure1, the TPB is based on three factors, which are attitude, subjective norm, and perceived behavioral control, to form a behavioral intention. A person who believes that performing a behavior will lead to positive outcomes will have a favorable attitude

toward the behavior. On the other hand, a person who believes that performing the behavior will lead to negative outcomes will have an unfavorable attitude toward the behavior [34]. Next, Subjective norm refers to a person believes that he should perform the behavior. This person will perceive social pressure to perform or not to perform the behavior [34]. Last, Perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior [15]. The general rule of the TPB is "the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention" [35].

The TPB has been applied in varieties of research areas such as organization management, information technology, human behavior, and online gaming. For instance, Yang and Lai used the TPB to studied intention to share knowledge through Wikipedia [36]. Lee and Tsai used the technology acceptance model (TAM) and the TPB to study why people continue to play online games [37]. Herrero Crespo and Rodriguez del Bosque analyzed the factors that can illustrate relationship between consumers' intention to shop online and lead Internet user to become online buyers. Their result showed that attitude to the system has positive relationship on the future intention to purchase online [38].

Obviously, the Theory of Planned Behavior has the ability to predict human behavior; it has been applied in the engineering and technology management area as well. Hsu, Yen, Chiu, and Chang used the model of Expectation Disconfirmation Theory (EDT) to extend the TPB on user' intention to continue using online shopping [39]. The result of Hsu verified that the TPB determined the key factors of user intention to accept and use various Information Technologies. Furthermore, the findings support the Expectation Disconfirmation Theory that a user satisfied with online shopping is likely to have a strong intention to continue. Hong et al. adopted the TPB to study the behavior of mobile data services consumers [40]. They found that consumers' attitude is the critical factor that influences a customer continuing to use mobile data services. Moreover, purchasing a product can be influenced from professional representatives. Kowatsch and Maass adapted the TPB, the TAM, and the Innovation Diffusion Theory to study how the use of in-store mobile recommendation agents (MRAs) influences usage intentions, product purchases, and store preferences [41].

D. Personality and contribution

There are many personality-traits measures available in literatures. Among those measurements, the Big-Five Model is popular and has been applied by many researchers [8], [10], [11], [42]. Ross, S. Orr, Sisic, Arseneault, Simmering, and R. Orr studied the influence of personality and competency factors for Facebook use. In this study, the Big-Five personality framework is used to investigate the relationship between personality and intention. They results demonstrated partial support to links between personality and behavior on Facebook [8]. Tracii and Sophia also found that individuals who were Extroversion and Narcissism show significant communication on Facebook [43]. In a study of personality on online discussion, Sue-Jen and Edward showed a strong relationship between personality and online discussion in particular that participants who are outgoing and engaging with communication tend collaborative on online discussion. Their result also demonstrated that personality factors should be considered to foster online communication efficiency [42]. Guadagno, Okdie, and Eno found individuals who are high in openness had high characteristic to be a blogger – a form of self-expression [44]. However, bloggers increase their self-awareness when communicate through online media since some of their personal lives are exposed on the blog page.

Thus, the Big-Five Model from previous research is composed of five factors; Extroversion, Agreeableness, Conscientious, Neuroticism , and Openness [8], [12], [32], [44].

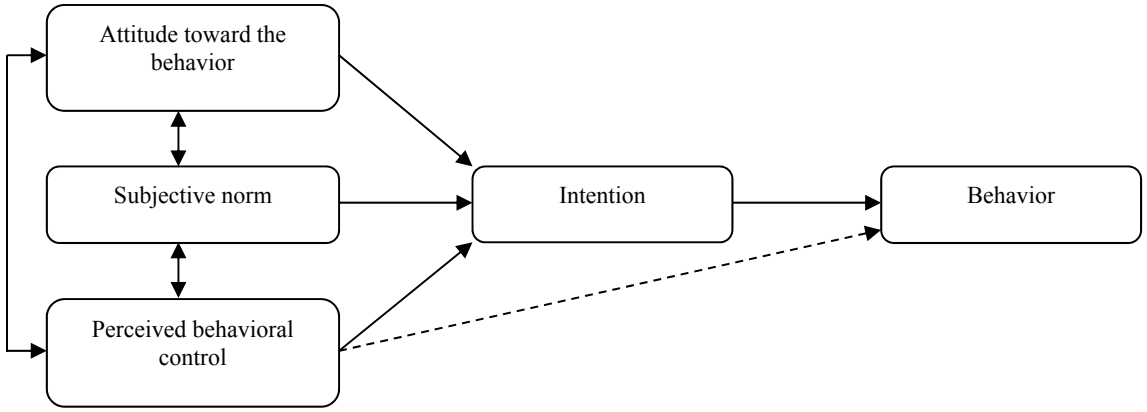

Figure 1. Theory of Planned Behavior [15].

III. DEVELOPING THEORETICAL FRAMEWORK AND PROPOSITIONS

Researches have shown the widely practicality of the theory of planned behavior in predicting and explaining the person's intention [39], [45], [46]. Increasing of online businesses, online community developers, online community managers, and online community marketers should understand the determinants of participants in online communities. Thus, we draw on the theory of planned behavior and Big-Five personality-trait to propose an integrated framework for understanding why community members contribute to online communities.

A. Intention

Ajzen said that "a behavioral intention can best be interpreted as an intention to try performing a certain behavior" [47]. Therefore, a person's intention is defined as the individual's willingness to perform or not to perform a behavior. Previous research has illustrated the validity between behavior and intention [35], [39], [40], [46]. Thus, studying intention is important because the greater the intention, the more likely to perform the behavior [34], [39]. In this case, the behavior is contributing to an online community.

B. Behavioral Attitude

According to studies on the TPB, attitude indicate to the degree that a contributor has a favorable or unfavorable evaluation or appraisal of contributing to an online community. For instance, Sergio and their team research on an individual providing an online review. Their result demonstrated that attitude had a positive impact as a predictor of intention to provide an online review [46]. In addition, Lin's research illustrated behavior intention to participate in virtual communities. His findings showed that attitudes were significantly in predicting behavior intention in virtual communities. Members like the idea of participation to get information and share knowledge with community members. The results, however, might not be generalized since the sample was collected only in Taiwan [45]. Moreover, research of Chin-Lung Hsu and Hsi-Peng Lu showed that perceived enjoyment - an extended of attitude, play an important role in predicting participants' behavior of participating in online game communities [28]. The previous research showed that attitude has positive impact on participant's intention to perform a specific behavior. However, their results did not demonstrate whether an individual participant was performing the same in other types of communities or not.

Even though, absence of research to demonstrate how a participant perform in different online communities. The positive impact from previous studies indicate to positive attitude regarding contributing to online communities tend to have the same favorable intention to contribute to different types of online communities.

Proposition 1: Attitude of an individual participant will have a positive effect on intention to contribute across online communities.

C. Subjective norm

When people gather together, their expected behavior is inferred from what others are doing as norms. Norms is defined as rules and standards understood by members of a group that guide and/or constrain behavior without the force of laws [48]. Therefore, Subjective norm refers to the perceived social pressure to contribute to an online community. Subjective norm has been found as a positive antecedent of intention. Baker and White used the TPB to understand the influences on adolescent use of social networking sites (SNSs). They found that friends what they believe significant other, had significant positive relation to adolescents' intentions to use SNS. The findings found that the more favorable attitudes towards engaging in frequent SNS use, the stronger the intentions to engage in frequent SNS use will be. Their result, however, was not demonstrated how adolescents behave or what contribution they performed on SNSs [49]. Pelling and White applied an extension of the TPB to predict addition use of social networking web sites of young people ages between 17 to 24 years. They found that young people who making 4 or more visits per day have high-level of attitude and subjective norm. Young people who sensed more pressure from significant others were more likely to use social networking web sites[50].

Accordingly, previous studies have shown the positive relationship between subjective norm and intention, we propose that positive levels of subjective norm will lead to positive levels of intention to contribute online communities.

Proposition 2: Subjective Norm of an individual participant will have a positive effect on intention to contribute across online communities.

D. Perceived behavioral control (PBC)

Perceived behavioral control refers to the perceived ease or difficulty of contributing to an online community. It is also assumed to reflect past experience and impediments. Wu and Chen [51] proposed the TPB with an extension of Trust and the TAM model to understand the influence of on-line tax service with behavior intention. The resulted data showed that three factors; attitude, subjective norm, and perceived behavioral control, have a significant positive effect on behavioral intention to use online tax. Lin's research illustrated behavior intention to participate in virtual communities. His findings showed that member attitudes were significantly in predicting behavior intention in virtual communities. The result also indicated the significant positive influence of perceived behavioral control on intention; however, attitude has stronger influence on intention than perceived behavioral control [45]. In the study of Pavlou and Fygenson, they adopted the TPB to understand the process of e-commerce adoption by consumers' behaviors of getting information and purchasing products. They believed that

perceived behavioral control has positive relationship with intended behavior. Results presented that online participants who believe they have capability to get online information will has a significant impact on online purchasing [52].

From the previous research demonstrated that positive relationship of perceived behavioral control will have high affect on behavior. We propose that positive levels of perceived behavioral control will lead to positive levels of intention to contribute online communities

Proposition 3: Perceived Behavioral Control of an individual participant will have a positive effect on intention to contribute across online communities.

E. Personality-trait: Extroversion

Generally, extroverted people are cheerfulness, optimism, sociable, energetic, talkative, outgoing, enthusiastic, and able to experience positive emotions [8], [13], [32]. Thus, they are more likely to cooperate in an online community. The relationship between social network use and personality were studied by Amichai-Hamburger and Vinitzky [53] showed that individuals who are highly extroverted have a higher number of online friends than those who have low extroversion. Their study also presumed that extroverted personality would use more personal information profile on online social sites compare to introverted behavior. The results, however, demonstrated that introverted people use the personal information feature more than extroverted people. This can be implied that extroverted people consider less need to use online personal information profile and believe more in their social skill. Likewise, results of a study of Ryan and Xenos support positive relationship between extroverted personality and social networking site [43]. Thus, we propose that positive levels of extroversion will lead to contribute online communities.

Proposition 4: Extroversion of an individual participant will have a positive effect to contribute across online communities

F. Personality-trait: Agreeableness

Agreeableness people tend to be good-natured, trusting, sympathetic, cooperative, forgiving, friendly, helpful, altruistic, and straightforward [32]. Due to the nature of this trail, people seem to have more friends and have more cooperation with friends. However, the study of Amichai-Hamburger and Vinitzky found that individuals who have scored high on agreeableness have less interaction between friends [53]. The studied of Picazo-Vela, Chou, Melcher, and Pearson on the behavior intention of personality traits and an online review found no significant relationship between providing an online review and individual's intention of people who tend to be agreeableness [46]. Similarly, the results of a study of Ryan and Xenos showed no significant relation between agreeableness and social networking site usage [43]. Therefore, we can be inferred that people who have high level of agreeableness may have positive or negative influences to contribute to online communities.

Proposition 5: Agreeableness of an individual participant will have either positive or negative effect to contribute across online communities.

G. Personality-trait: Conscientiousness

Conscientious people tend to be self-disciplined, deliberate, diligent, scrupulous, reliable, responsible, and organized [32], [53]. Accordingly, Cullen and Morse found that conscientious people will spend less time on the internet for unproductive activity [32]. Their findings can be referred that this personality trait will contribute depending on the degree of information usefulness. In addition, Amichai-Hamburger and Vinitzky also hypothesized that individuals who have a high level of conscientiousness would have a higher number of friends on social networking sites when compare to other personality traits [53]. Their result demonstrated support their assumptions, however, a high number of friends cannot be represented to high or positive impact to contribute to online communities. Also, the results of Ryan and Xenos study showed significant low score on conscientiousness related to usage of social networking site [43]. Then, we can be inferred that people who have high level of conscientiousness may have positive or negative influences to contribute to online communities.

Proposition 6: Conscientious of an individual participant will have either positive or negative effect to contribute across online communities.

H. Personality-trait: Neuroticism (Emotional Stability)

Neuroticism can be seen as a lack of psychological adjustment and emotional stability. People who are neurotic will be fearful, sad, embarrassed, distrustful, and have a stress problem [53]. Cullen and Morse [32] adopted the five-factor model to understand the influence of personality traits toward the degree of participation in online communities. They found that both men and women who are high in neuroticism provide less opinion or information, ask fewer questions, and lack seeking friendship. This finding on providing less information is aligned with the study of both Ross and Ryan research teams. People who tend to be neurotic are more likely to control shared information on the Wall posting on Facebook [8], [43]. Due to the nature of neuroticism, their characteristic tend to have negative influence on online contribution as shown in the study of Picazo-Vela and his team [46]. Then, we can be inferred that people who have high level of neuroticism may have negative influences to contribute to online communities.

Proposition 7: Neuroticism of an individual participant will have a negative effect to contribute across online communities

I. Personality-trait: Openness to experience

Openness to experience indicates individual's curiosity, willing to try new technology and willing to explore novel ideas [32]. Open people are more likely to contribute to an online community because of their curiosity. The finding of

Amichai-Hamburger and Vinitzky showed a positive correlation between openness to experience and the use of Facebook as a communication tool [53]. Picazo-Vela and his team found no significant relation between openness and online contribution [46]. Moreover, microblog users who are high level openness have significant connection to other users [54]. Then, we can be inferred that people who have high level of openness may have positive influences to contribute to online communities.

Proposition 8: Openness of an individual participant will have a positive effect to contribute across online communities.

IV. PROPOSED RESEARCH MODEL

In our research model, an individual's intention to contribute to online communities is determined by the individual's personality - conceptualized with the so-called "Big Five" dimensions of personality - and his/her attitude, subjective norm, and perceived behavioral control. The proposed research model and relationships are shown in Figure 2.

The model proposes that a positive relationship exists between online contributions and behavioral attitude (P1), subjective norm (P2), perceived behavioral control (P3), extroversion (P4) and openness (P8). It furthermore suggests that the relationship between agreeableness (P5) and consciencousness (P6) and online behavior can be negative or positive. The relationship between neuroticism (P7) and online contributions is negative.

V. DISCUSSION AND FUTURE RESEARCH

Our proposed model provides the foundations for investigating the determinants on online contribution to help online community providers, designers, and participants understand what factors encourage or discourage members to get involved in the online communities.

While earlier research on the Theory of Planned Behavior considers personality to be an external factor that impacts attitudes, norms, and behavioral control, but not directly the actual behavior [34], this model assumes that personality traits (P4-P8) *directly* impact online behavior. This is in line with empirical research that shows that some personality traits, namely extroversion and openness, have a strong relationships with online activities [32], [43], [53], [54]. Future research, however, will have to show which personality traits have strong or weak relations to online contribution and which online contributions – exchange of information, social support, friendship, and recreation – are personality dependent. If personality turns out to be and important determinant of online behavior, several insights can be gained that are relevant for developers and managers of online communities: First, the active contributors may not be representative of everybody that the community is intended for but a subset of people with a distinct personality profile.

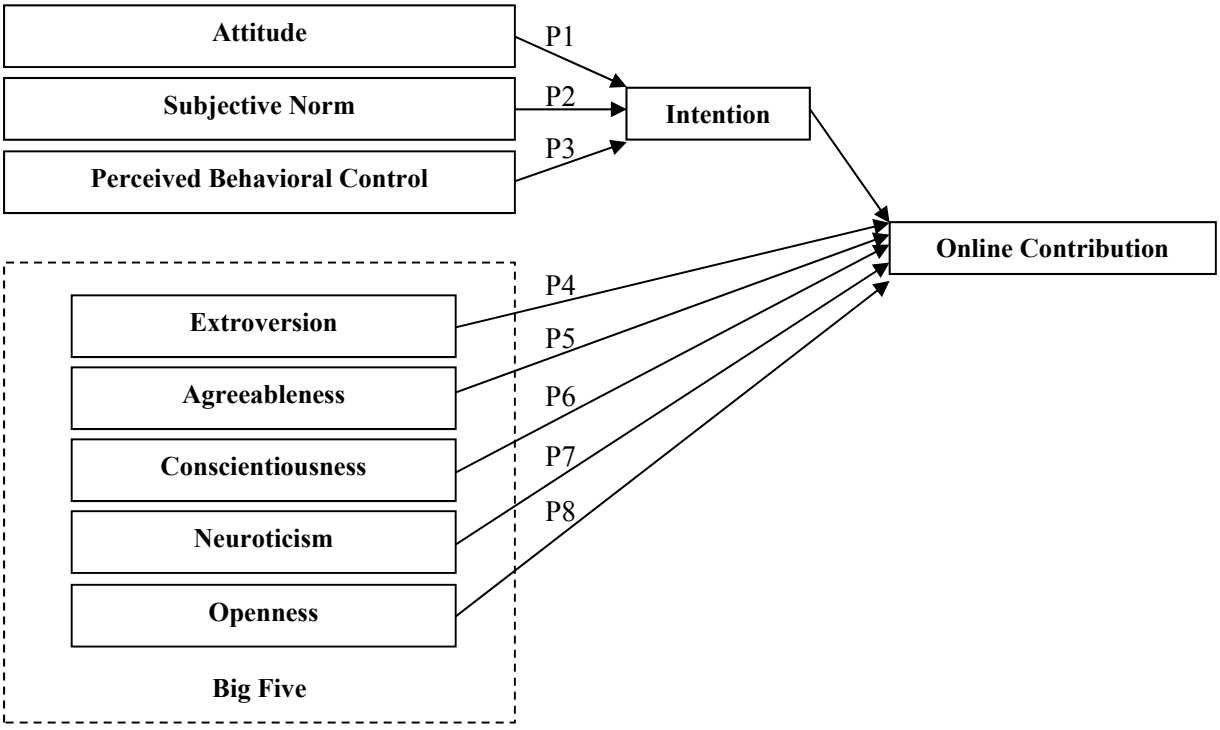

Figure 2: the proposed research model

These inherent biases should be considered when community comments or opinion polls are used to gain insights about a larger group of people. Customers who participate in online communities, for example, may be more open to new experiences than all customers and patients frequenting a health support site may be more or less emotionally stable than all patients suffering from the same conditions. Second, if personality plays an important role in online behavior, this may contribute to explaining the decline of online communities: unless they constantly add new members - which may be difficult in highly focused, technical communities - they may exhaust their supply of contributors with personalities that are conducive to online contributions. Moreover, engineers and scientists are known to have personalities that differ from those of the general population in that they are more conscientious, careful and self-controlled, slightly more conventional, inflexible and rigid, slightly more self-confident and power oriented, slightly less sociable and extraverted [55]. This may make them generally less prone to contribute online, at least for some forms of online interaction. More research that links specific online behaviors to specific personality traits is therefore a promising avenue for future research.

A second direction of future research is the investigation of the specific attitudes, norms, and drivers of perceived behavioral control that are linked to different forms of online behavior. Designers and managers of online communities often go to great length to create positive attitudes towards contributing to a community, for example, by inviting or even paying influencers to participate. They also have considerable leverage to design user interactions that enhance a sense of behavioral control, by tailoring the complexity of contribution tasks, allowing users to self-select forms of contributions, and by giving users some level of ownership and control over their contributions. Moreover, design decisions to either tightly manage and control forms of contribution or allow the community to self-govern in a meritocratic system create a set of norms for online behaviors that may entice some users to contribute and others to refrain from participating. Evolving research shows that design decisions, such as task design, provision of rules of conduct, and the creation of merit and other reward systems, have strong impacts on the nature and extent of online contributions, but they are still limited to a small number of communities and types of contributions and far from being generalizable [56]–[58].

VI. CONCLUSION

Technology firms increasingly rely on online communities to provide user support, foster technology adoption, offer product feedback, solve technical problems, and to co-develop products. The individual contributions that, collectively, enable these outcomes are focused at information exchange between users, social support, expressions of friendship, and a need for recreation. Surprisingly, very little is known about what determines the extent and nature of these individual contributions. The framework outlined above provides the theoretical foundation and a starting point to understand the link between personality, behavior and contribution to an online community. At this point, it is solely a theoretical framework, based on current research on online communities, the Theory of Planned Behavior (TPB) and the Big-Five Model of personality. Future empirical research, based on this model, is required. It will provide systematic insights into the determinants of different online contributions and will help online community providers to create conditions under which their communities are likely to thrive.

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