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Building Social Capital in Online Communities: a Perspective of Information and System Quality

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ABSTRACT

An Online Community (OC) is an IT-based social space where people are connected and access various resources during virtual social interaction. Previous IS research reveals that social capital can be a salient determinant of user participation and contribution to OCs. However, most such research assumes that social capital is given and has been built; limited attention has been paid on how social capital is developed within an OC. To bridge the gap, grounded on the Social Capital Theory (SCT) and IS quality literature, we argue that information quality and system quality influence social capital building in an OC from a multi-dimensional perspective in terms of cognitive, relational and structural capital. The potential results of this study will shed light on the design and management of OCs.

Keywords

Online communities, social capital, information quality, system quality.

INTRODUCTION

The development of OCs is an influential social phenomenon that have attracted millions of individuals. For example, MSN has more than 300,000 communities; Google Groups host more than 54,000 forums (Ma and Agarwal, 2007). Facebook has more than 400 million active users (Facebook.com, 2010), YouTube attracted 100 million U.S. online video viewers in October 2008 (ComScore.com, 2008).There is no universal definition of an OC in the IS field. For the purpose of this study, an OC is defined as an IT-based social space where people are connected and access various resources during social interaction (Gu, Konana and Rajagopalan, 2007; Jones, Ravid and Rafaeli, 2004). This definition highlights the role of IT-based OC as social platforms that allow strangers to share information and interact virtually (Butler, Sproull, Kiesler and Kraut, 2002; Blanchard and Markus, 2004).

Since an OC is a virtual society, it is interesting to know how social capital of an OC is developed. The Social Capital Theory (SCT) is a classic sociological theory that helps to explain why people contribute to a group in terms of structural, cognitive and relational social capital. The premise is that in order to facilitate knowledge sharing, it is crucial to develop appropriate social structure, shared understanding and attitude attachment to an OC (Chiu, Hsu and Wang, 2006; Wasko and Faraj, 2005). Although SCT has been empirically proven to be a legitimate theory to understand participation behaviors in an OC, research on what factors affect social capital in OCs is limited. To bridge the gap, we intend to investigate social capital building of OCs in this proposed study. The understanding of social capital building in OCs is crucial, because it is related to user active participation and contribution to the community, and sustainable development of an OC over time.

In particular, we plan to examine social capital from an IS perspective. Information quality is a concern in an OC, given the fact that most OC contents are user-generated. As Gu et al. (2007) and Zheng, Zhao and Stylianou (2009) highlight, the importance of information quality is non-negligible. What's more, low information quality increases information overload for individual users and by doing so discourages their participation (Jones et al., 2004). Similarly, system quality provides a platform for user interaction through content consumption and generation. Interestingly, the majority of existing IS research takes system quality of an OC as granted, without considering how it may affect user participation. However, based on Zheng et al.'s work (2009), we do believe that quality of IT artifact matters. Based on prior literature on IS quality in OCs (e.g., Lin and Lee, 2006; Zhang and Watts, 2008; Zheng et al., 2009), we consider both information and system quality as multi-dimensional concepts.

The specific research question is: *How information and system quality influence social capital building in OCs?*

THEORETICAL BACKGROUNDS

To answer the question, we draw on the following three research streams to develop the research model.

Social Capital Theory

The Social Capital Theory (SCT) originates in sociology and has been widely used to investigate social phenomena such as education, community life and collective action (Adler and Kwon, 2000) and inter-firm resource exchange (Hansen, 1998), cross-functional team effectiveness (Rosenthal, 1996) in the business contexts.

Social capital can be understood from both the external and internal views (Adler and Kwon, 2000). The external view primarily focuses on social capital as a resource embedded in the social network. The social capital allows individuals to be directly or indirectly connected with others, and thus gain access to external resources that would otherwise be out of reach (Portes, 1998). The internal view focuses on collective actors' internal characteristics that may facilitate group cohesiveness and the pursuit of collective goals through coordination and cooperation (Putnam, 1995a). In fact, the external and internal views are not mutually exclusive but complementary, as they address two different aspects of social capital (Nahapiet and Ghoshal, 1998). In this regard, we think that social capital needs to be understood from both perspectives.

In general, social capital has the following characteristics (Coleman, 1988). First, it involves not a single actor but a variety of different actors. Second, different actors form the social structure and facilitate certain actions. Third, social capital cannot be developed without social interaction. In other words, social capital inherits in the relationships among individuals and connections with the network as a whole (Putnam, 1995b).

According to Coleman (1988), there are three forms of social capital: obligations and trustworthiness of the social structure, information channels, and norms and effective sanctions. Alternatively, Nahapiet and Ghoshal (1998) differentiate three types of social capital: structural, cognitive and relational. This study follows Nahapiet and Ghoshal's framework, because it has been recently validated in the research on knowledge sharing in OCs (Chiu et al., 2006; Wasko and Faraj, 2005). As our inquiry is to investigate what factors facilitate social capital building in OCs, we believe that following the same framework will generate comparable results with the earlier research.

Grounded on Social Capital Theory (Coleman, 1988; Nahapiet and Ghoshal, 1998), a number of IS researcher investigate how social structure determines knowledge sharing and contribution in an OC. This issue is important because the majority of OC contents and activities are user-generated and user-driven through virtual social interaction. Wasko and Faraj (2005) argue that in a community of practice, people are more willing to contribute when they have social interaction with a number of other users, when they have experiences or when they feel themselves the experts in the field. Similarly, in a study of a professional OC, Chiu et al. (2006) have suggested that individuals' knowledge sharing is influenced by social interaction ties, shared vision and shared language, identification, trust and reciprocity.

This study attempts to take one step back by examining *how* social capital is built up in an OC. In particular, we are trying to examine what quality factors may facilitate social capital building and how, which is still not clear. The purpose is to enrich our understanding of how an OC develops social capital and enhances social interaction via high-quality IT artifacts. Answering these questions will also provide meaningful insights for OC design and management.

The Role of Quality in Online Communities

Given the increasing popularity of OCs for information sharing and exchange, more and more individuals become OC users. Consequently, the amount of information has been increasing and interaction among strangers has been greatly facilitated in an OC. In the IS field, researchers are interested in how community characteristics influence user participation behaviors such as membership size and information volume. Constant, Sproull and Kiesler (1996) explore E-mail-based OCs in searching for technical advice. They reveal that the E-mail network establishes weak ties among employees through which they can not only obtain useful information from relative strangers instead of their direct colleagues and friends, but also facilitate social interaction. Butler (2001) found that the size of an OC positively affects communication volume and topic variety. With the large membership size, users are able to access a great amount of resources, leading to more benefits. However, the large OC size may also bring negative effects to users. For example, users will incur higher cost for locating useful information and interacting with others. Gu et al. (2007) confirm that the value of an OC increases with quality postings, instead of the total number of postings. Similarly, the value of an OC will be negatively affected by information processing cost to users. Because high information processing cost may lead to the likelihood of information overload (Rogers and Agarwala-Rogers, 1975), a user's participation behaviors will change accordingly (e.g., less complex messages or fewer replies) (Jones et al., 2004).

As a result, we believe that quality plays an influential role in OCs. As Butler (1999; 2001) comments, a sustainable social structure of an OC requires resources to be transformed into benefits. High information and system quality help users obtain individual benefits in an OC. With high-quality information, users will be connected with those offering superior information resources and get useful information (Constant et al., 1996). With high-quality systems, users will be able to search for information effectively, participate in topic discussion and have social interaction with each other easily. Recent research has suggested that both information and system quality affect users' individual benefits from participating in an OC and their future participation intention in the long run (Zheng et al., 2009)

IS Quality

Information quality is measured by multiple dimensions such as usefulness, understandability, timeliness etc. (e.g., Wang and Strong, 1996; Lee et al., 2002; Kahn, Strong and Wang, 2002; Nelson, Todd and Barbara, 2005). Wang and Strong (1996) develop a comprehensive conceptual framework of data quality evaluation with sub-dimensions and detailed item scales. Agarwal and Prasad (1997) include information quality (usefulness, relevancy) as an IT innovation characteristic to predict future use of the web at work. Nelson et al. (2005) apply four aspects of information quality (completeness, accuracy, format, and currency) as important determinants of information satisfaction with data warehousing projects.

The importance of system quality can be evaluated in both organizational and individual contexts. For an organization, Goodhue and Thompson (1995) highlights the positive impacts of IT characteristics (e.g., authorized accessibility, compatibility, system reliability, ease of use) on individual work performance. Wixom and Watson (2001) confirm the success factors of data warehouse implementation by investigating system dimensions (e.g., flexible response, data integration). For an individual user, system quality is evaluated by the design issues of a website, such as navigation, accessibility, content organization, etc (e.g., Agarwal and Venkatesh, 2002; McKinney, Yooh and Zahedi, 2002; Zhang and von Dran, 2000). In addition to system dimensions that have been identified, we add another system dimension that is unique to OCs *interactivity* to capture interactive IT features that facilitate user interaction in the OC context (Ma and Agarwal, 2007).

Table 1 summarizes the quality dimensions we intend to investigate in this study.

Information Quality			System Quality		
Dimension	**Definition**	**Reference**	**Dimension**	**Definition**	**Reference**
Reliability	The extent to which information is regarded as true, believable and credible	McKinney *et al.*, 2002; Wang and Strong, 1996; Wand and Wang, 1996	Navigation	The degree to which a user can easily go back and forth between pages of the system	McKinney *et al.*, 2002; Yang, Cai, Zhou and Zhou, 2005
Usefulness	The extent to which information is beneficial and provides advantages from its use	Kahn *et al.*, 2002; McKinney *et al.*, 2002; Yang *et al.*, 2005	Accessibility	The degree to which a system and the information it contains can be accessed with relatively low effort	Lee *et al.*, 2002; McKinney *et al.*, 2002; Nelson *et al.*, 2005
Timeliness	The extent to which information is sufficiently up-to-date for the task at hand	Lee *et al.*, 2002; Lee, 2003-4; Liu and Arnett, 2000	Appearance	The degree to which the system is visually attractive and appropriate	McKinney *et al.*, 2002; von Dran, Zhang and Small, 1999
Richness	The extent to which information is enough for fulfilling a specific need	Wang and Strong, 1996; Wand and Wang, 1996; Lee *et al.*, 2002;	Communication Media	The channels' relative ability to convey messages that communicate rich information	Daft et al., 1987; Dennis and Kinney, 1998; Dennis and Valacich, 1999
Format	The extent to which information is presented in a way that is easy to read	Kahn *et al.*, 2002; Lee *et al.*, 2002; Wand and Wang, 1996	Interactivity	The degree to which the system can facilitate user interaction in an OC	Ma and Agarwal, 2007; McKinney *et al.*, 2002
Table 1. IS Quality in the Research Model					

HYPOTHESES DEVELOPMENT

Based on the Social Capital Theory, IS quality literature and existing research on OC, our model is proposed in Figure 1. We develop hypotheses based on the three forms of social capital: cognitive, relational and structural (Nahapiet and Ghoshal, 1998).

Figure 1. Research Model
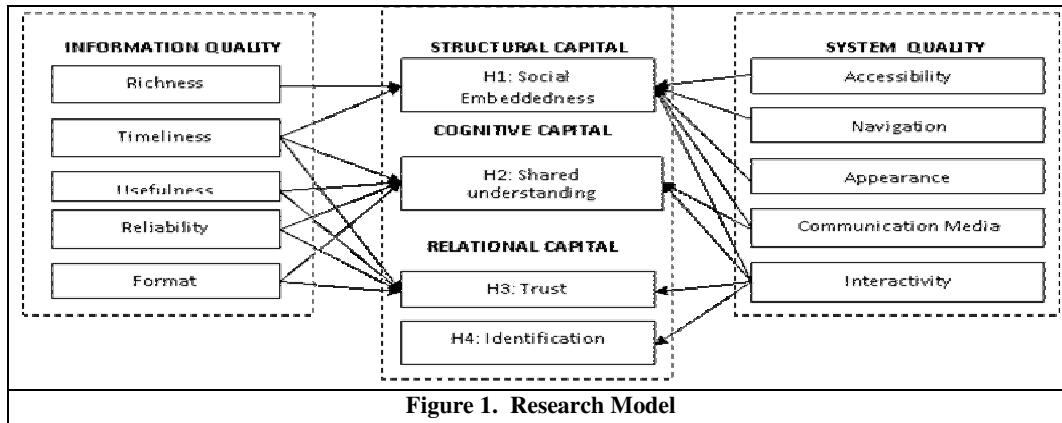
Building Structural Capital: Social Embeddedness

Structural capital is related to the overall pattern of connections between actors (Nahapiet and Ghoshal, 1998). It describes the impersonal configuration of linkages between people or units (Granovetter, 1992). In contrast to relational capital that focuses on inter-personal relationships, structural capital emphasizes the network structure that connects people in the network. Following Chiu et al. (2006), we denote *social embeddedness* as structural social capital. It represents how users are easily connected within an OC to access resources and are encouraged to interact with others (Coleman, 1988).

Nahapiet and Ghoshal (1998) point out that the primary condition for building structural capital is whether the network provides access to resources, called "network tie". The network tie constitutes a source of information benefits. In order to obtain benefits, we need to ensure the role of the network in providing a sound information-screening and distribution process for network users (Burt, 1992). Coleman (1988) argues that social capital builds up an information channel for people to interact. Individuals can leverage the information channel to gather information quickly and effectively, and for other purposes (Nahapiet and Ghoshal, 1998).

Information richness means volume of information available and topic diversity in an OC. A user is more likely to obtain information benefits in a larger network than a smaller one, because he is connected to a group of people with stranger ties or weak ties that facilitate information diffusion (Burt, 1992; Constant et al., 1996). A user will have more freedom to decide which topic he wants to join for discussion in a larger OC. Another dimension that is related to social embeddedness is information timeliness (Nahapiet and Ghoshal, 1998). If he perceives that information is up-to-date, a user will be more likely to browse and participate in the discussion. Thus,

H1a*: Information richness is positively associated with social embeddedness.*
H1b*: Information timeliness is positively associated with social embeddedness.*

Based on the system quality literature, we believe that accessibility, navigation and appearance are related to how efficiently a user can quickly locate resources and become an active participant without spending much time and effort in searching. First of all, it is necessary to ensure that an OC is in normal operation, accessible to users at all times. Given a certain amount of new information being posted every day, especially in large OCs (Gu et al., 2007), navigation tools are necessary to allow users to control where they are and where they want to go in an OC. With effective navigation aids, users can easily identify the resources to initiate further participation. For system appearance, when an online forum is organized by topic and highlights new or hot postings, users are able to target their destination and start their participation quickly (Zheng et al., 2009). In these regards, we hypothesize:

H1c*: Accessibility is positively associated with social embeddedness.*
H1d*: Navigation is positively associated with social embeddedness.*
H1e*: Appearance is positively associated with social embeddedness.*

The presence of multiple communication media is another factor that influences a user's interaction within an OC. According to Media Richness Theory (Daft, Lengel and Trevino, 1987), communication richness refers to a channel's relative ability to convey messages that communicate rich information. Nowadays, different types of communication media are available in OCs to deliver contents to users, such as text-based messaging, video and images. The use of multiple communication media, especially video and images, presents information in a much more meaningful way than ever before. It helps users develop a better understanding of the information they are looking for, thus motivate their active participation within an OC. Accordingly, we hypothesize:

H1f: Richness of communication media is positively associated with social embeddedness.

However, it is not guaranteed that users will get sufficient benefits if they do not actively participate and interact with others (Butler 2001). In order to promote interaction among users, OCs should provide solid IT features to enhance interaction and connectivity among users (e.g., public or private, rating and feedback mechanisms). For example, the OC provide users multiple ways (e.g., discussion forum, email, IM) to interact with each other. Another example could be allowing users to check others' profiles and participation history. Knowing more about others increases users' willingness to actively participate in the community and interaction with each other (Chiu et al., 2006; Ma and Agarwal, 2007). Thus, we expect:

H1g: Interactivity is positively associated with social embeddedness.

Building Cognitive Capital: Shared Understanding

According to Nahapiet and Ghoshal (1998), cognitive capital refers to those resources providing shared representations, interpretations and meanings among individuals. We use shared understanding to denote cognitive capital in an OC. It mainly comes in two ways: through the existence of shared language and vocabulary, and the sharing of collective narratives (e.g., stories, metaphors), which help individuals to know each other and enhance the efficiency of communication (Chiu et al., 2006).

An OC is a place where people with common interests can gather together to share their opinions and experiences. Because users play a significant role in content generation, shared understanding will depend on how valuable user-generated contents are. When a user perceives that information is up-to-date, useful, relevant to his personal needs, his understanding will be influenced by other users in the OC (Zheng et al., 2009). On the other hand, when information provided by other users is out of date, meaningless and irrelevant, he will be less willing to participate and may simply ignore it or become less actively involved (Jones et al., 2004). This could deter the development of shared understanding among users and discourage active interaction. As users are the major contributors to an OC, the value of an OC also depends on the reliability of the contents. When a user is an expert in a particular topic, contents generated by him will be valued and recognized by others, thus facilitating others' understanding on the topic (Wasko and Faraj, 2005). When a user's opinions are easy to read and can be effectively understood by other users, they are more likely to facilitate follow-up discussion and interaction. Following these arguments, we think that shared understanding is achieved by the nature of contents generated by users themselves. Thus, we hypothesize:

H2a: Information timeliness is positively associated with shared understanding among OC users.
H2b: Information usefulness is positively associated with shared understanding among OC users.
H2c: Information reliability is positively associated with shared understanding among OC users.
H2d: Information format is positively associated with shared understanding among OC users.

Consistent with *H2b* hypothesized above, use of multiple media enables an OC to deliver information contents in a more interactive and meaningful way. It facilitates individuals' topic-specific understanding and follow-up discussion. What's more, shared understanding is expected to be improved when an OC provides effective IT tools for users to interact with each other. Accordingly,

H2e: Richness of communication media is positively associated with shared understanding among OC users.
H2f: Interactivity is positively associated with shared understanding among OC users.

Building Relational Capital: Trust and Identification

Relational capital refers to the personal relationship developed through interactions (Nahapiet and Ghoshal, 1998). There are two types of relational capital identified: trust and identification.

Trust. Trust is described as an individual's expectation that members in an OC will follow a generally accepted set of values and norms (Chiu et al., 2006). It is embedded in the concrete personal relations (Coleman, 1988). When trust is high, people are more willing to engage in social exchange and cooperative interaction (Putnam, 1993, 1995a). Trust is an important factor in developing sense of community and more engagement in an OC (Blanchard, 2008; Leimeister, Ebner and Krcmar, 2005). However, trust is not as likely to be developed as in the real world, because deception is so easy online (Joinson and Dietz Uhler, 2002). So, the question is where trust can be coming from. From the perspective of information quality, we argue that trust may come from valuable information generated by users. In their research on MSN groups, Blanchard and Markus (2004) show that posts are a good way to determine others' trustworthiness. When information is up-to-date, useful, reliable and understandable, a user's personal needs for information and social support will be met (Butler, 2001). As a result, trust is achieved by high-quality information during the interaction process. We propose:

H3a*: Information timeliness is positively associated with trust building among OC users.*
H3b*: Information usefulness is positively associated with trust building among OC users.*
H3c*: Information reliability is positively associated with trust building among OC users.*
H3d*: Information format is positively associated with trust building among OC users.*

Trust can also be enhanced by system quality. It will be developed during the process of personal social interaction (Coleman, 1988). In the course of interaction, a user can check other users' online/offline status, their personal profile, posting history and reputation or rankings (Ma and Agarwal, 2007). As a result, the quality of interactive IT features is expected to facilitate trust building among users when they interact (Blanchard, 2008).

H3e*: Interactivity is positively associated with trust building among OC users.*

Identification. Identification is the process in which individuals consider themselves as members in a group of people (Nahapiet and Ghoshal, 1998). In an OC for information exchange and social interaction, individuals are grouped together by common interests or needs. As group members interact with each other over time, they will take the values of the group as a comparative frame of reference and build a sense of belongings to the group (Blanchard, 2008; Merton, 1968). In the context of OCs, identification can be realized by information exchange and sharing among users for a common topic they are interested in. Thus, we expect that:

H4: *Interactivity is positively associated with user identification in OCs.*

RESEARCH METHODOLOGY

Sample Selection

We will use student responses to collect data via a web-based survey. There are two considerations for choosing students as targeted sample. First, the inclusion of student at different ages increases the coverage of population, which ensures the sample representativeness. Second, as the students will be asked to identify one of the OCs they participate in and then fill out the survey with respect to that OC, we will be able to include a broader spectrum of OCs in the research and ensures generalizability of the results. To statistically validate the model, sample size is expected to be at least 80 to obtain a power of 0.80, assuming a medium effect size (Chin, 2000; Cohen, 1988)

Construct Operationalization

We will draw on the literature on information quality (e.g., Lee et al., 2002; McKinney et al., 2002; Nelson et al., 2005; Wang and Strong, 1996) to operationalize five dimensions of information quality. All the dimensions are reflective except information "richness". Richness refers to the degree to which information is enough in terms of both volume and depth and is formative (Lee *et al.*, 2002; Zheng et al., 2009), so it is a formative construct.

The system quality and media richness literature provide theoretical foundations for developing scale items for system quality dimensions (e.g., Blanchard, 2004, 2008; McKinney et al., 2002; Zhang and von Dran, 2000). As an OC has some unique characteristics that are designed for social interaction, relative to traditional IS and websites, we are reviewing relevant research on OCs to develop new scale items for "interactivity" dimension of system quality (e.g., Ma and Agarwal, 2007; Zheng et al., 2009). As "interactivity" captures different interactive features (e.g., various methods of interaction; personal profile), it is considered as formative.

To measure the three forms of social capital identified, we refer to research on Social Capital Theory. SCT has been applied to IS research to investigate knowledge sharing in OCs (e.g., Chiu et al., 2006; Wasko and Faraj, 2005). We will refer to these existing studies develop reflective scale items for three types of social capital.

We will include a couple of control variables to account for the impact of user characteristics on social capital building enabled by IS quality. They are gender, age, years of membership, how long they spend time on an OC per week.

Status of the Study

We are currently finalizing the survey instrument and plan to proceed with a pilot test before running the survey by the end of June. After data collection, we will use SmartPLS to check construct reliability, discriminant and convergent validity and validate the overall structural model (Ringle, Wende and Will, 2005). The SmartPLS is appropriate when the model contains formative constructs (e.g., "richness" and "interactivity" in our study) and sample size is relative small (e.g., minimum size of 80) (Chin, 1998).

EXPECTED IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

Expected Theoretical Implications

Based on the relevant literature, the role of social capital has been found to influence user participation and contribution (Chiu et al., 2006; Wasko and Faraj, 2005). This study intends to extend our understanding on the impact of IS quality on building social capital in OCs. We are interested in how different dimensions of IS quality can stimulate social capital building in OCs.

Our study contributes to the IS research in two ways. First, SCT has helped us understand why people want to contribute to the OCs. The underlying assumption is the existence of social capital in OCs. However, we believe that social capital will not accumulate without proper IT artifacts embedded in an OC. In this regard, we go beyond the current research and take one step back to treat social capital as the outcome of IS quality in OCs, in addition to being the cause of participation behaviors as per existing research. Second, IS researchers have increasingly examined OCs in terms of membership size, information volume and their impact on user participation behavior and valuation of OCs. Information and system quality seem to have been treated as a black box, assuming that quality is given. The limited research on linking IS quality to user participation and interaction in OCs represents a research gap that we are attempting to bridge here.

Expected Managerial Implications

This study addresses the importance of IS quality on social interaction among people in OCs. It is expected that a well-designed OC will facilitate users' access to community resources and the development of social capital during social interaction among users. In addition, high-quality information and sound technological platforms enhance shared understanding, trust building and sense of belonging among OC users. These potential findings will shed light on how an OC should encourage users to contribute to social capital development in the community (e.g., information exchange, social support, reputation building). By focusing on the design and managerial issues, an OC will leverage social capital to attract and even lock-in users in the long run.

Limitations and Future Research

There are two major limitations that need to be addressed in the future. First, we think that social capital building in OCs can be investigated from multiple perspectives. The single study of IS quality here may not present a complete picture of what happens in social capital of OCs. That is to say, not all aspects of social capital in OCs can be covered simply by IS quality. So, one interesting potential would be exploring other perspectives (e.g., user characteristics) to capture the nature of social capital in OCs in a comprehensive manner. Second, although we include three types of social capital in the model, they are not exhaustive. So, future research might explore the relationships between three forms of social capital or other social capital dimensions that are likely to be built in OCs.

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