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JOIN THE ICO CLUB: SOCIAL IDENTITY CONSTRUCTION AND NODE
EMERGENCE

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1 Introduction

"While exogenous factors may suffice to determine whether an organization should enter alliances, they may not provide enough cues to decide with whom to build those ties. Where do organizations find those cues? And how do the particular cues they use shape the formation of interorganizational networks?" Gulati and Gargiulo (1999) seek answers to these two questions in terms of tie formation and suggest that the network offers information and security in choosing strategic partners; as such, they seek the answer in the networks themselves. In this paper, I turn the scope away from the internal network structure as antecedent conditions of tie formation, and I focus on the process that an entity (individual, group or team) goes through to be considered at all as a potential partner for ties; I look at where the nodes comes from.

Following Gulati and Gargiulo (1999) and network forms of organization (Podolny and Page, 1998), which are defined as "any collection of actors ($N \geq 2$) that pursue repeated, enduring exchange relations with one another and, at the same time, lack a legitimate organizational authority to arbitrate and resolve disputes that may arise during the exchange", a network is considered as an audience with the authority to assign categorical membership to external actors. While the "lack of organizational authority" in the network leads to the freedom of each network participant to exercise their authority to assign categorical membership, the reliance on extensive information/knowledge exchange and trust (Gulati and Gargiulo, 1999) leads to a coherent understanding of the category demarcated by the network itself, or more specifically the self-category. As such, any entity seeking membership in a network has to first seek membership in the self-category of the network.

The necessity of a category membership for any subsequent outcomes, such as higher returns, higher quality perception etc., has been identified by many researchers (e.g. Zuckerman, 1999; Hsu and Hannan, 2005, Negro et al. 2014). However, it was not considered by social network scholars as a mechanism of network growth, of node emergence, which is likely to influence subsequent tie formation patterns. Here, I take identity as the central construct of interest and investigate the process of identity attainment, or social identity construction, leading to higher likelihood of joining a network. As White (1992) indicates, the nodes of a network are not persons, but rather identities. Following his work, I determine the identities through the individual entities' network positions, stories they tell and their self-presentations/demographics. With this study, I aim at contributing mainly to social networks literature by empirically delineating the process of an entity joining a network while relying on notion of identity which is traced also through social networks. This also resonates with the assertion of Ibarra et al. (2005), that "network research that studies processes of self-reinvention and examines transitional states between clearly articulated identities and well-established network roles may be particularly valuable." In the next section, I develop the theory and hypotheses that follow from social identity construction. Next, I discuss the empirical setting. Finally, I conclude with limitations, contributions and possibilities of extension.

2 Theory and Hypotheses

Social networks have been frequently used to identify communities, to understand their evolution and their properties. Clearly, the added value of social networks comes from its relational nature (Brass, 2003) and the quantitative traceability; the questions "what kind of ties exist" or "how the ties come together", as well as their consequences become very important and measurable (see e.g., Borgatti and Halgin, 2011). However, the extensive study of tie formation left node formation under shadow; generally, the nodes of a network are taken for granted in network analysis. While a canonical argument could suggest that the existence of a node without a tie to another node is irrelevant or even ill-defined, such an approach hinders the consideration of tie and node formation as separate processes. For example, many intra-organizational studies study the implications of friendship networks in organizations (e.g. Lincoln

and Miller, 1979; Morrison, 2002; Rank et al. 2010). However, an on-going process of employees joining and leaving is often not taken into account. Especially, the absence of a tie in the time from the first day of an employee at work till the formation of his/her first friendship tie with another employee indicates that node formation requires separate attention from tie formation.

I investigate node formation as the attainment of an identity (White, 1992) and membership of a category granted by corresponding audiences (Hsu and Hannan, 2005), in this case the incumbents of the network. I suggest that incumbents with the authority to accept newcomers into a network first have to consider another actor eligible in terms of belonging to a certain category from which the group makes choices. A concrete example can be drawn from employment practices where human resources and several other members of an organization decide to admit an applicant from an applicant pool. Job descriptions define some boundaries of a category. The applicants self-select into the applicant pool. Only after admission into the organization, the tie formation process involving the newcomer begins. Although this example requires an admissions process and crossing the boundary of an organization, it delineates two important factors that could be generalized to network forms of organization (Podolny and Page, 1998) in general sense: 1) A network has decentralized authority to admit actors into the network, 2) The participants of the network observe a risk set (e.g. an applicant pool) to consider outsiders for inclusion in the network. Here, I focus especially on how actors enter a risk set; I leave the investigation of constraints and mechanisms of authority exercise for admission to networks for future work. Constraints on authority exercise is alleviated in market-like open networks, where risk of malfeasance in business transactions overweighs the risk of sanctions from the network, as it will be the case in this work.

To study the entry to risk set and movement towards the core of the risk set (where the chances of being recruited is higher), I refer to the connection between social networks and social identity construction, which has been investigated in a micro-level from the point of view of an individual (Ibarra and Deshpande, 2007). On the other hand, from macro perspective, the perceived identity of an entity is determined by some authoritative audiences (Hsu and Hannan, 2005. As such, the risk set becomes the categorical network (catnet), a term coined by White (2008) and developed later by other sociologists such as Tilly (1977, among many others), which attracts those individuals who aim at matching their intended identity with the perceived one, to eventually become part of another network. The process is illustrated in Figure 1.
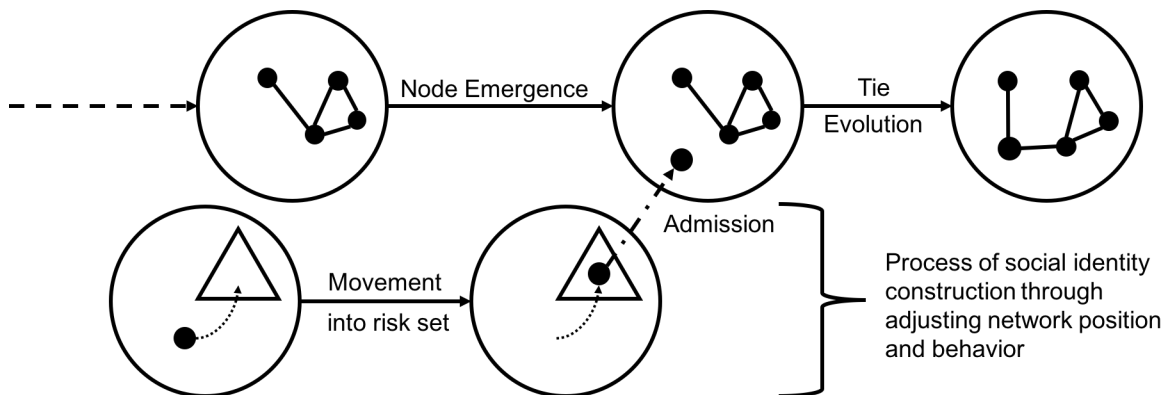

Figure 1: During the evolution of a network, individuals moving into a risk set in another network observed by the former one have higher likelihood of emerging as a node. In this work, I focus on the movement into a risk set and its subsequent impact on the likelihood of being admitted into another network.

Here, I focus on the mechanisms through which the focal actor can move into the risk set and its impact on the likelihood of admittance to a network, as shown in the second row of Figure 1. I refer to three different channels that lead to the risk set that are elaborated in the literature. First, I look at

identity as network position and risk set as a network cluster ("-net" of catnet). White (2002) elaborates on how the identity of a product market emerges as the result of its specific relationships with buyers and suppliers, operating through the mechanisms of embedding and decoupling. Second, I look at identity as story-telling. Once again, White (1992) discusses how story-telling is the glue of networks, the way of "establishing footing" with others. As such, a risk set will revolve around a particular set of stories, which the individuals have to adopt and spread. Finally, I look at identity as accumulation of attributes and aspirations. As Jonsson et al. (2009) indicate, "categories are schemas (Taylor and Crocker, 1981) applied to social actors and are based on abstract prototypes and recalled exemplars of individual actors viewed as typical of the category." Hence, attributes of the prototype member will determine the attributes expected from the members of the risk set, thus define the risk set ("cat-" of catnet). Below, the corresponding theories are presented and hypotheses are constructed.

2.1   Social Identity as Network Position

Network position has been a central component of social network analysis. Whether the actor is in a structural hole (Burt, 1995) or connected to many other actors that are connected to each other (Coleman, 1988) has implications regarding information sharing, safety and many others. While there has been many constructs that are interpreted and investigated in one way or another, in this work, the relevant network position is based on social distance (Krackhardt and Kilduff, 1999), hence it is a relative position. Although structural equivalence plays an important role in determining some outcomes, the relative position of individuals to certain people in a network could capture the more diverse nature of social systems.

Regarding identity, the network position is measured relative to a certain set of nodes in a network: "As the density of ties among a subset of persons reaches some threshold value, the subset may come to regard itself as having an identity." (White, 1992). Hence, we expect to find highly dense clusters, which either include the members of a network already, which becomes the network representation of the risk set. Figure 2 illustrates an example from a simulation, where initially mixed actors of two groups denoted by blue and red, sort themselves into two clusters. As such, an incumbent of a network paying attention to the red cluster will consider an actor only if that actor moves from blue cluster to the red one. The first hypothesis is as follows:

Hypothesis 1: *The relative network position, measured in shortest distance from the focal node to the boundary of the risk set, is inversely proportional to the likelihood of the focal actor to be acknowledged as a potential node in the network.*

In addition to this, we see that each category has core and peripheral members (Porac et al. 1995) just as each network cluster will have analogous members as well (Baum et al. 2003). Core members would be expected to have more ties with the other members of the cluster and peripheral ones with many other out of the cluster (as also can be seen in Figure 2). Defining the core and periphery through this construction, the next hypothesis would be:

Hypothesis 2: *The likelihood of joining a network from the core of the risk set is higher than that from the periphery of the risk set.*
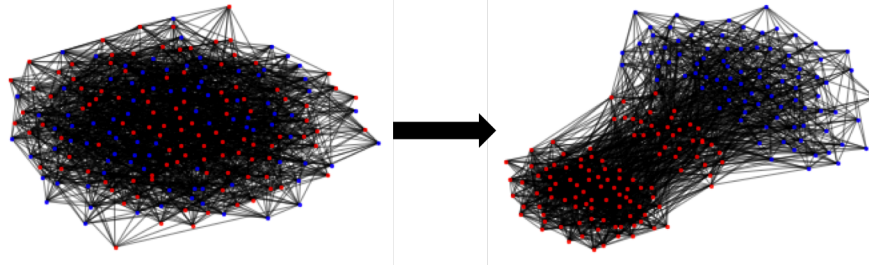
Figure 2: Initially mixed actors of identity "red" and "blue" sort themselves into two clusters, only based on preferential tie formation based on Schelling's (1971) tolerance-based segregation model. If a blue node decides to turn red, it would move slowly into the red cluster, which constitutes the risk set.

2.2 Social Identity as Story Telling

White and Godart (2007) suggests that "it may be that a whole set of sets of stories proves necessary to sustain the metabolism of a single general network, such as of acquaintance. Participants may induce and call on a broad array of excuses and disclaimers and allowances that legitimate and keep viable a network of acquaintanceship." Story-telling has been central to several works, where many times identities of entities are closely associated with them. In terms of emergence of new organizational forms, or identities, Fiol and Romanelli (2012) emphasize the importance of consistency of stories told by enthusiasts; it is necessary to build a similar world-view and a collective identity. Extending this argument, I suggest that the consistent stories are not only to be found in the beginning of the process of building a collective identity, but also through the lifetime of an identity, organizational form or an industry.

While these two works describe the connection of stories and identities in the macro societal level, several other researchers focus on the point of view of the individual: McAdams (1999) connects identities directly to stories; identity is "the internalized and evolving story that results from a person's selective appropriation of past, present and future". Ibarra and Barbulescu (2010) build on the idea of self-narratives and on identity work, "defined as people's engagement in forming, repairing, maintaining, strengthening, or revising their identities" to introduce theoretically the narrative identity work. Especially, referring to legitimacy of the stories, the authors indicate that "people increase the legitimacy of their story [...] by using canonical themes - that is, archetypal character portrayals, settings, and story lines and institutionalized scripts drawn from collective narratives. (Gergen, 1994, McAdams, 1996, Somers, 1994)". Hence, combining the importance of stories in sustaining networks, in giving birth to new organizational identities and in crafting a personal identity, I suggest that the risk set consists of a set of consistent stories told about the nature of the network to be joined. Moreover, when external threats are present, the stories in the risk set will be more similar defining crispier boundaries for the risk set, which can be inferred from Tilly (2002) and Steinberg and Ewick (2013). Hence,

Hypothesis 3: **(a)** *The more consistent the stories told by an individual with those of the risk set, the more likely is that the focal actor will join the network.* **(b)** *In times of crisis, this effect is going to be more prevalent.*

2.3 Social Identity as Categories

So far, I have covered the network and story-based representations of the risk set. Finally, a risk set needs a categorical dimension to be complete, thus becoming a catnet. Building on the prototypical member of a category depicted by Taylor and Crocker (1981) utilized by Jonsson et al. (2012), I suggest that

the initially successful actors found already in the existing network will define a prototype of an ideal actor to initiate a tie with. As such, the actors in the network will pay more attention to those actors outside of the network who fit best to the description of this prototype. For example, Jonsson et al. (2012) show that "easily available characteristics" shared among the members of the category will suffer from the same consequences as the deviant organization belonging to the same category. Translating this to node emergence, easily available characteristics between the existing network and the risk set will be similar, especially considering the fundamental mechanism of homophily (McPherson et al. 2001). Just as illegitimacy discount applied to the out-of-category firms in Zuckermann's (1999) work, the actors of the network will similarly discount the non-members of the risk set accordingly.

Given that risk set is defined in such a way, those who present themselves as if they share the same easily available characteristics might have a higher likelihood of joining the network. To enter such a risk set, then, the actors have to craft an impression (Goffman, 1959) or communicate their true aspiration (Silver and Lee, 2012) of becoming a member of this category, eventually the network. On the other hand, some immutable and easily available characteristics such as past education, ethnicity and other factors will be influential as well. In an intraorganizational setting, Lau et al (2008) support the similarity based on norms, while Tsui and O'Reilly II (1989) support the demographic similarity effects. Hence,

Hypothesis 4: *The more similar an actor is to the prototypical member of the risk set through self-presentation and demographics, the more likely that the focal actor will join the network.*

3   Empirical Setting

The empirical setting to test these hypotheses are two-mode network of blockchain start-ups and ICO advisors and the Twitter/LinkedIn communication network. This setting is not only unique and appropriate, but also rather contemporary. Following, I explain both networks' properties, why they are uniquely appropriate for this study and the empirical methodology.

Blockchain start-ups can be defined as start-ups that are developing a product based on blockchain technology. Due to the nature of blockchain technology, the products of these start-ups depend strongly on network effects, more specifically they are more successful the more people adopt. With the development of smart contracts that are built on Ethereum blockchain, the blockchain start-ups had the opportunity to come up with a unique crowdfunding method for their product, namely initial coin offerings (ICOs), which simultaneously ensures the adoption of the product ahead of time. In an ICO, a blockchain start-up offers cryptotokens, which are bought by investors in exchange of cryptocurrencies (or in some cases fiat currencies). However, running an ICO is not only a complicated task, but also many fraudulent cases have been encountered. Hence, the blockchain startups that would like to have an ICO hire several ICO advisors, who are knowledgeable about several aspects of cryptocurrency systems, marketing, demand for products and so on. These advisors simultaneously function as means of making sure that the ICO is not a scam and that the startup will not vanish with investors' money. As usual, start-ups might end up having advisors in common and a advisor-startup two-mode network emerges consequently. The information on ICOs and their advisors can be collected online, which are clearly presented thanks to the transparency required by investors.

However, the security concerns and underlying lack of trust due to ICO scams which at the same time look like legitimate ICOs, in other words crypto-lemons (extended from Akerlof, 1978), forces the investors to take any precautions possible to avoid them. As such, investors rely heavily on reputation and their perception whether an ICO or an advisor is legitimate. Their perception is, on the other hand, built mostly through the social media channels, such as Twitter, Facebook and LinkedIn, as well as forums and

5

mobile chat apps such as Reddit, BitcoinTalk and Telegram. Absence in any of these platforms as well as deviations from the profile of a reliable ICO/advisor might lead to penalties by the investors. In this work, I focus on Twitter and LinkedIn as communication networks, where the individuals and start-ups have to connect, communicate and present themselves under the constant scrutiny of investors. The investors' scrutiny on these platforms in turn forces the blockchain start-ups to pay attention to potential advisors' social media behavior, which have to conform to the ICO advisory category, to avoid the "categorical illegitimacy discount" (Zuckerman, 1999). Although their advisor preferences might be influenced by any social ties out of the boundaries of social media, their revealed preferences (exposed by creation of a tie) will necessarily focus on the risk set imposed by investors. It must be pointed out that any other network, where the potential candidates could be observed constantly (or frequently enough), would also suffice; in this case, Twitter and LinkedIn fulfil this condition.

As these two networks are strongly connected to each other, I suggest that on the communication network developed on Twitter and LinkedIn, we should find a catnet (White, 2008), a risk set demarcated by a network cluster, by similar content and similar self-attributes. This risk set will lead to a higher likelihood of the individual appearing as an ICO advisor in the near future. As such, the dependent variable of this work is the probability that an individual will become an ICO-advisor. This dependent variable and the research is especially well-suited for hazard models. As such, the independent variables should contribute to the hazard rate of becoming an ICO-advisor. Following, I discuss how the independent variables are constructed.

3.1   Network structure

The communication networks on social media can be built in several ways, each of which will have a particular implication. First, we look at people who follow others on Twitter, or those who are connected on LinkedIn. These ties show that the "news feed" of each social media will include information from these ties and makes them the most salient as well as most stable ties to be found in social media. Moreover, the necessity of taking an extra action of following or accepting a connection to achieve the tie implies that there is some meaningful connection between people. Another network that can be built is based on communication ways. As with any email exchange based network analysis, we can look at which tweets are referred to whom and retweeted by whom. The spreading of a message from one person to the other, especially if repeatedly, implies once again that this communication channel is robust and should be taken seriously. Similarly, on LinkedIn, this would follow from the posts and references to other users. Both of the networks are directional, as follows and retweets are not necessarily reciprocated.

There are many works identifying clusters on Twitter networks. As such, I would follow similar clustering algorithms with an optimized sensitivity, such that the crypto-community as well as ICO advisor community can be identified accordingly. For hypothesis 1, the distance to the cluster is measured as hypothesized through the geodesic distance to the boundary of the cluster. For hypothesis 2, the core of a cluster is determined by the ratio of connections which belong to the cluster versus which do not. Hence, having determined the core node, once again geodesic distance will indicate the distance to the proto-type of the risk set.

3.2   Communicated content

Twitter and LinkedIn, fortunately, enable the detection of what people would like to tell and how. A semantic networks approach can detect what kind of words in the form of 1-grams or concepts in the form of n-grams co-occur frequently. An alignment of the content broadcasted by individuals on Twitter and LinkedIn with the content broadcasted by a typical member of the cluster. We can look at this by using bag-of-words and cosine similarity in the content or define several topics through LDA and look at

who belongs to which topics. An additional advantage of social media is also the existence of hashtags. Hashtags are chosen to broadcast a message in a concise manner. Hence, another similarity measure among individuals can be the cosine similarity of hashtag use of individuals. In terms of story-telling, we can treat hashtags as subjects or keywords and the content as the story itself. For hypothesis 3b, exogenous shocks, such as regulations and price increases and drops can be identified to observe changes in narratives.

3.3 Self-presentations

Twitter and LinkedIn, combined, offer a view of the aspired self of the individual (as presented to the public) and a view of the past (again as presented to the public). On Twitter, many users describe themselves in their profile descriptions and, for example, ICO advisors are highly recommended to indicate this on their profile description accordingly. Same feature exists on LinkedIn as well. Moreover, LinkedIn has extensive information about the individuals' backgrounds in terms of education, occupation and skills. Hence, once again the content similarity of the self-descriptions and the similarity of backgrounds can be compared through these sources.

4 Limitations, Conclusion and Outlook

In this work, I study the process of joining a network from a macro-perspective through the notion of risk set which has three representations: network, story and categorical. Coming together with previous works such as White (1992, 2008), determination of risk sets from which incumbents of a network considered future "partners" plays an important role for network growth, especially considering network forms of organization (Podolny and Page, 1998) lacking an authority assigning memberships and ties, and extends the work by Gulati and Gargiulo (1999) from intra-network to extra-network settings. Moreover, I contribute to the empirical studies regarding block-chain start-ups, cryptocurrencies and ICOs. These practices, communities and systems are so far understudied and most of the works focus on legal and economic implications, on technical details of blockchain technology or on the antecedents of success of an ICO. Unpacking the properties of the risk set of ICO advisors is an important step towards understanding the social dynamics concerning this new practice.

There are several limitations to this work, mostly on the empirical side. First, the moment of emergence of a node is not empirically detectable, except through extensive interviews and field work. In archival data, the emergence of a tie is the moment when the existence of a node is affirmed, however the moment when the advisors enter the radar of the startups cannot be measured. Another measurement issue is regarding the time when the advisor joins a startup and when it is announced. As we are relying on archival data, we can only look at the moment when ICO is announced, which are necessarily accompanied by advisor lists. As such, we might have reverse causality in the econometric model. While this limitation allows the inferences to be only correlational, it does not influence the novelty of the work. Future works might want to design quasi-experiments, RCTs or look for organizational settings, where causality might be easier to elicit. Third, we look at the hazard rate of becoming an ICO advisor, but not what happens after a person becomes one. While this limitation is chosen intentionally, it is a relevant question to ask whether the identity construction process continuing after entering the network influences the process before as well.

There are several implications and extension possibilities following from this work. First, we can look at how actors switch from one network to another through movements from one risk set to the other. For example, a fund manager aspiring to become an ICO advisor will necessarily change his/her behavior on social media (in public). Observing this evolution can inform us about how actors start to leave a network to join another one, or contingencies of participation in several networks at the same

time. Moreover, the network evolution might be influenced by the properties of a risk set, which is not internal to the network. Hence, the influence of risk set's properties on subsequent network growth could be investigated. Finally, from strategic management perspective, overlapping risk sets even in absence of overlapping networks will introduce interdependencies across industries; in terms of hiring, this will be mediated through competition for human capital for example[1]. As such, this work opens up new possibilities to approach network evolution and interdependencies across categories.

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[1]See Las Vegas Connection: $https://docs.wixstatic.com/ugd/2e8003_6a2cfe0aacc84e85bbea3de4d641b64e.pdf$

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