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Influencing factors of horizontal leaders' role identity in projects: A sequential mixed method approach

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Abstract: Horizontal leadership is temporary and often short-term compared with vertical leadership. Therefore, the role identity of horizontal leaders is more difficult to be legitimated. The present study investigated how different factors interact and work in concert to influence horizontal leaders' (HLs') role identity. A sequential mixed method approach was chosen for this study. 24 interviews were analyzed to identify eleven influencing factors associated with HLs' role identity. Subsequently a sample of 150 questionnaires was analyzed using fuzzy-set qualitative comparative analysis (fsQCA), to ascertain the collective effect of different influencing factors on HLs' strong and weak role identity. Results show that high job complexity, intrinsic reward, self-efficacy and personal expectation are necessary conditions for HLs' strong role identity. The lack of expectations from other team members is the only necessary condition that leads to weak role identity. Based on the 13 configurations for HLs' strong and weak role identity obtained, a HLs' role identity model is

formed. It's found that expectations of other project team members together with empowerment by project manager is the most common and effective way leading to a strong role identity. Through comparison, experienced and less experienced team members take different paths to strong or weak role identity. Theoretical and managerial implications are discussed.

1. Introduction

In the past 100 years, the field of leadership has been a fast-growing area of management research (Crevani et al., 2010), various classic leadership theories were developed, including situational leadership theory (Fieldler, 1964), transactional and transformational leadership (Bass, 1990), Leader-Member Exchange theory (Graen and Uhlbien, 1995), etc. Most of these leadership theories consider leadership as vertical (Pearce and Sims, 2002), in other words, leadership as command and control from managers to subordinates, exercised by a single person who is formally designated with leadership authority by the organization (Bass and Bass, 2008). However, with the increasing use of teams in the workplace, researchers and practitioners started to realize leadership is not necessarily tied to designated hierarchical positions. Hence, theories of team-based leadership emerged, such as shared leadership (Pearce and Conger, 2003), or distributed leadership (Bolden, 2011). Both streams of literature, the former people-centric and the latter team-centric miss the interaction between the two types of leadership, such as in projects, where leadership is rarely executed solely by a project manager. Instead, it is exercised by those team members who are most appropriate at any point in time to lead the project (Müller et al., 2017). This new leadership concept is termed as "horizontal" leadership and is defined as one or a few project team members become a temporary leader within the boundaries of the project, while being steered or governed by the project

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manager (vertical leader) (Pilkiene et al., 2018). Compared with vertical leadership, horizontal leadership is no longer leader-centered, instead it becomes team-centered. Studies showed that leadership provided by team members can have a positive influence on teamwork results, as it not only improves informal leaders' individual performance (Zhang et al., 2012), but also contributes significantly to team effectiveness (Friedrich et al., 2009; Nicolaides et al., 2014). Therefore, if management wants to improve project performance, it might be appropriate to not only rely on formal leadership from project managers, but also make full use of the leadership potential of team members (D'Innocenzo et al., 2016).

However, as horizontal leaders are not officially and formally appointed with authority through an organization's structures, the role legitimacy of horizontal leaders is usually lower than formal and permanent roles. Individuals are more likely to have negative emotions due to lack of formality, which affects their role identity, which is one's "imaginative view of himself as he likes to think of himself being and acting as an occupant" (McCall and Simmons, 1978, p65) of a particular social position. As suggested by Callero et al. (1987), a strong role identity is a robust determinant of corresponding behaviors. Therefore, a strong HLs' role identity guides individuals to behave in accordance with this role identity, which is most likely beneficial to the team. Contrarily, research on leadership role identity also reveals that when individuals cannot match their role identities, they become less satisfied with their roles and are less inclined to remain in their group (Riley and Burke, 1995), which may pose negative effects on the team. Therefore, it is important to study and analyze the influencing factors associated with HLs' role identity. This helps to understand why some team members have strong role identities while others do not. In view of the above, the first research question we address is:

RQ1: What are the factors that influence HLs' role identity in projects?

Role identity is a complex result of activities, resources and meanings, which can be internal or external (Stryker and Burke, 2000) and is investigated at different levels of analysis including macro-, meso- and microlevel (Stets and Cast, 2007). Therefore, role identity is best understood as a combination of interconnected factors (Stryker and Burke, 2000). The vast majority of studies investigated role identity quantitatively and focused on estimating whether or not the "net effect" of each hypothesized independent variable associate significantly with a certain role identity, such as in Farmer et al. (2003), Zhang and Bartol (2010). Although such correlation-based approaches are useful for examining the relative contribution of individual influencing factors, they face considerable challenges in modeling the ways in which factors may combine rather than compete in bringing about the outcome of interest (Frambach et al., 2016). In contrast, a qualitative comparative analysis approach is uniquely suited to analyze this kind of complex configurational relationship because this approach explicitly focuses on combinations of attributes and allows for a sophisticated analysis of complex causal relationships through configurations (Ragin, 2000; 2008). Hence, the second research question is:

RQ2: What are the configurations of factors that associate with HLs' strong and weak role identity?

The Unit of Analysis in the present study is the individual project team member as horizontal leader. The study takes the ontological stance of Critical Realism, thereby aiming for explaining the phenomenon, but not claiming that this explanation is the only possible one (Bhaskar, 2016). In line with the qualitative comparative analysis approach, configurational theory (Fiss et al., 2013) is taken as the theoretical lens.

The study deploys a sequential mixed method approach. 24 semi-structured interviews were conducted to explore influencing factors of HLs' role identity in projects and to identify potential causal relationships between combinations of influencing factors and outcomes. This was followed by a fuzzy-set qualitative comparative analysis (fsQCA) with a data sample of 150 questionnaires. Configurations were grouped based on HLs' work experience and analyzed to identify how different influencing factors interact and jointly relate to HLs' role identity.

The study contributes to a holistic understanding of the collective effect of influencing factors on HLs' role identity in projects. As horizontal leadership can greatly improve individual and team performance, this study reveals configurations that lead to HLs' strong and weak role identity, which serve as good references for practitioners to design environments for temporal leaders and make it possible to strengthen their role identity or to intervene for overcoming weak role identity.

Academics benefit from a contribution to the emerging stream of literature on horizontal leadership. The present study is also an attempt to introduce fuzzy set qualitative comparative analysis - a data analysis technique for identifying the combinations of factors that bring about the particular outcome (Bell et al., 2014) - into leadership research in a project context. Thereby it relooks at role identity theory by considering influences from various processes and different levels of analysis simultaneously.

The paper is structured as follows. In Section 2, literature and previous research are discussed, explaining the main concepts of this research which form the theoretical framework for the analysis. Section 3 presents the research methods. The results and analysis are provided in Section 4. Section 5 comprises the discussion of the results. The paper finishes with the conclusions section, where, among others, the two research questions are answered.

2. Literature review

This section describes the main concepts that formed the framework of the research. We first review the literature on horizontal leadership in projects in Section 2.1. Followed by a review on role identity and its influencing factors in Section 2.2. Section 2.3 describes the theoretical framework underlying the study.

2.1 Horizontal leadership in projects

The realm of leadership studies has traditionally been leader-centered, focusing on individual leaders' traits, abilities and behaviors (Wood, 2005), and conceptualizes group structure as stable and the leadership structure as fixed (DeRue et al., 2015). However, in the context of projects, leadership is no longer a fixed group structure and group members can engage in leadership behaviors as well. Two types of leadership coexist in the project context (shown in Fig. 1), namely vertical leadership and horizontal leadership. Vertical leadership is the traditional leader-centered, top-down leadership provided by project managers to influence the team to carry the project forward (Pearce, 2004). On the other hand, horizontal leadership is the dynamic and temporary leadership provided by one or a few project team members and governed by project manager for the accomplishment of project results (Müller et al., 2017). Scenarios of horizontal leadership include: when a technical issue arises, and the project manager is no longer the best person for decision making, one or some of the specialists with critical skills and knowledge from the team are empowered to lead the team temporarily; or when a project manager leads multiple projects simultaneously, he or she has to rely on one or several in-advance identified team members to carry the project forward for a while. Therefore, leadership in a project context is no longer stable or fixed but moves dynamically among project manager and project team members, and increases project

team's capacity of handling a wider range of situations and tasks (Crevani et al., 2007). Horizontal

leaders are typically identified and temporarily empowered by project managers, not officially

appointed upfront by the wider organization. Therefore, they are often not able to lead with the same

official authority of formally appointed leaders but have to influence the team indirectly through

personality traits and individual performance (Paunova, 2015). Hence, horizontal leadership is

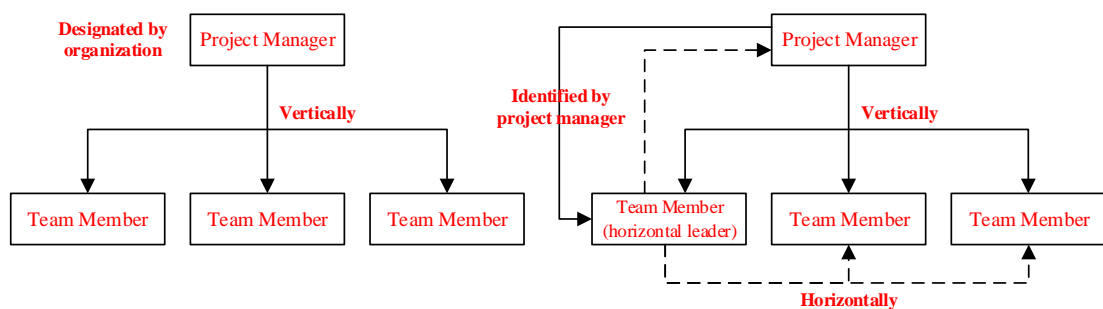relatively informal and temporary, compared with vertical leadership.

Fig. 1 Vertical leadership and horizontal leadership

With the global developments towards more projectified ways of working (Lundin et al., 2015),

projects and project teams have become increasingly common, followed by a growing attention paid

on horizontal leadership in recent project management literature. Since horizontal leadership is

viewed as a team-based collective phenomenon, most of prior research on this topic is at the team

level of analysis (Serban and Roberts, 2016), which is from a management point of view at the

macro level. Existing studies proved that horizontal leadership has a positive effect on team

performance and effectiveness (Wang et al., 2014; Zhang et al., 2012), team creativity (Lee et al.,

2015; Wu and Cormican, 2016) and innovative behaviors (Hoch, 2013). Apart from the outcomes

of horizontal leadership, scholars also examined the antecedents for emergence of informal leaders

in teams (DeRue et al., 2015; Serban and Roberts, 2016) and the recommendations on how to

maintain a good balance between the two types of leadership in teams (Müller et al., 2017). In fact, very few studies were performed with the horizontal leader as the unit of analysis at a micro level. These studies left a number of questions still to be explored. Examples include: whether horizontal leaders understand and accept their specific role, or the research questions outlined in the introduction section of this article. Hence, existing studies, as discussed above, do not answer the research questions.

This study is embedded in the *Theory Framework for Balanced Leadership*, which is an empirically developed cyclical model of the interaction between vertical and horizontal leadership (Müller et al., 2017). The cycle consists of five events, namely nomination, identification, selection, horizontal leadership and governance, and transition. This study focuses on the fourth event - horizontal leadership and governance where the team member(s) executes the leadership task, governed by the project manager.

In the next section we review briefly the concept of role identity and its influencing factors.

2.2 Role identity and its influencing factors

A role identity is a self-view attributed to oneself of a particular social position (Burke, 1991), that is generated reflexively through perceived appearance to self or others, self-judgment of that appearance, and affect based on that judgment (McCall and Simmons, 1978). As a specific role becomes closely bonded with an individual's sense of self or identity, the individual tends to behave in accordance with this role identity (Callero et al., 1987), in order to gain verification of the identity (Burke and Stets, 2009; Petkus, 1996).

Role identity theory has evolved into two directions (Stryker and Burke, 2000), the first aspect is represented by work of Stryker (1980), who believes society is made up of patterns of interactions

and relationships, and people live in small networks of social relationships by playing out roles that support their membership while these networks are embedded in larger social structures (Burke and Stets, 2009). Stryker's identity theory focuses on investigating how social structures, which comprise large, intermediate and proximate structures (Stryker et al., 2005), affect the self and one's identity salience. Once an identity is salient, people behave in manners consistent with the meanings attached to that identity (Serpe and Stryker, 2011; Stryker, 2008). The second aspect is represented by the work of Burke (1991), who conceptualizes identity process as a cybernetic feedback loop composed of four basic components: an input, an identity standard, a comparator and an output. Burke's work is built on the assumption that people hold an internalized set of meanings connected to each of their identities and they act and behave to have others view them in a way that is consistent with these meanings. Compared with Stryker's identity theory which emphasizes the external, social structural sources of identity and salience of identity, Burke's work focuses more on internal, cognitive identity process and dynamics. These two views also represent two research levels in role identity research, social structures level and individual dynamics level (Burke and Stets, 2009), and two perspectives namely external and internal (Stryker and Burke, 2000).

In order to study HLs' role identity, we need to identify influencing factors playing a part in the role identity process, therefore a systematic selection and review of exiting role identity literature is needed. With the aim of ensuring the inclusiveness of the influencing factors, we followed the literature selecting steps of Pawson et al. (2005) to reassure the inclusiveness of literature selection process. Almost forty influencing factors were identified at this stage. Here we also follow the above-mentioned two aspects of social structures and individual dynamics to categorize these factors. In addition, existing literature also reveals that factors including resources such as education,

occupation, income (Stets and Cast, 2007), job tenure, job complexity (Tierney and Farmer, 2002) and individual's skills and performance (Stryker and Burke, 2000) contribute to role identity as well. However, it is difficult to classify these factors into the categories of social structures or individual dynamics, therefore in this study we classified them into the third category – context. Representative influencing factors of role identity identified in the existing role identity literature are summarized and listed in Table 1.

Table 1 Representative influencing factors of role identity identified in the existing literature

Category	Influencing factor	Author
Social structures	Institutional logic	Reay et al. (2017)
	Empowering leadership	Zhang and Bartol (2010)
	Extrinsic reward，role support，expectations by others	Siebert and Siebert (2007)
	Interpersonal resources (understood, accepted and trusted in relationship)，verification from others	Stets and Cast (2007)
	Feedback, role model	Pratt et al. (2006)
	Coworker expectations, culture	Farmer et al. (2003)
	Status, respect, esteem	Stryker and Burke (2000)
	Training	Blau (1999)
	Socialization practices, role modeling	Ibarra (1999)
	Commitment	Stryker (1980)
	Support, commitment, reward	McCall and Simmons (1978)
Individual dynamics	Distress, self-esteem	Burke and Stets (2009)
	Personal role expectation，intrinsic reward	Siebert and Siebert (2007)
	Personal resources (self-worth and self-efficacy)	Stets and Cast (2007)
	Self-view of behavior	Farmer et al. (2003)
	Self-efficacy	Tierney and Farmer (2002)
	Religious role expectations	Weaver and Agle (2002)
	Self-conceptions, past experiences	Ibarra (1999)
	Support (self-support and experience support)，intrinsic rewards	McCall and Simmons (1978)
Context	Professional education	Siebert and Siebert (2007)
	Structural resources such as education, occupation and income	Stets and Cast (2007)
	Job tenure, job complexity	Tierney and Farmer (2002)
	Skill，performance	Stryker and Burke (2000)
	Job requirements	Ibarra (1999)

By reviewing the literature, we found that influencing factors are not completely isolated from each other but rather may be fully interactive and reciprocally embedded. For example, Farmer et al. (2003) suggested that culture experienced psychologically has a direct effect on self-construal and atmosphere provided by the organization that affirms the self-view of certain behaviors. Stryker and Burke (2000) pointed out that role identity implies a duality, whereby role is external and tied to social positions within social structures, while identity is internal and consists of internalized

meanings and personal expectations associated with a role, hence role identity is a process combined with activities, resources and meanings that are mutually or sequentially controlled. They called for scholars to design and conduct research examining how commitment to networks of social structures affect individuals' internal dynamics, and vice versa. Burke and Stets (2009) also recommended that the development of identity theory can be further enhanced and expanded by merging macro, meso and micro levels of analysis simultaneously, in order to better predict social behaviors. Researchers have pointed out some first influencing factors, their interaction and joint effect on role identity. However, in-depth investigations and analysis in this area are yet to be conducted.

2.3 The theoretical framework for this study

The theory framework builds on configurational theory (Fiss et al., 2013) and role identity theory (Stryker and Burke, 2000) in order to gain a deeper appreciation about influencing factors of HL's role identity in projects.

The notion of configuration - that the whole is best understood from a systematic perspective and should be viewed as a constellation of inter connected elements – can be traced back to the writings of founding fathers such as Max Weber (Fiss et al., 2013). Configurational theory suggests a clean break with the predominant linear paradigm. A configurational approach assumes complex causality and nonlinear relationships, rather than implying singular causation and linear relationships (Fiss, 2007). Evolving from the configurational theory, Qualitative Comparative Analysis (QCA) provides the researcher with a novel set of tools for disentangling complex causal relationships. QCA has its origins in a rich tradition of comparative case based sociology and has been systematized, further developed and transformed into a coherent approach by Charles C Ragin (1987; 2000). QCA's three main characteristics: conjunctural causation, equifinality, and causal

asymmetry (Schneider and Wagemann, 2012) motivate the choice for combining with role identity theory as the theoretical framework.

Firstly, QCA focuses on conjunctural causation which foresees the effect of a single condition unfolding only in combination with other precisely specified conditions. This is in line with the characteristic of role identity, which is a complex process associated with various factors including activities, resources and meanings. Moreover, during multilevel or cross-level analysis, the traditional multilevel regression analysis has to control for effects at other levels to measure the "net effects" at a given level (Lacey and Fiss, 2009), while QCA as a configurational approach is interested in the combined effects, which makes it particularly suitable for this study. Secondly, in QCA the assumption of equifinality allows for different, mutually non-exclusive explanations of the same phenomenon (Schneider and Wagemann, 2012). In other words, each configuration is also a causal path which can lead to the same outcome. This feature suits the requirement of present research as role identity is also a phenomenon that can be explained in various ways (Stryker and Burke, 2000). Thirdly, the assumption of causal asymmetry implies that if A→B, then ~A→~B is not necessarily true. In role identity research area, the causal relationship between variables is asymmetrical in many cases. For example, in Farmer et al. (2003) study of creative role identity, it is found that more extensive contact with U.S. culture is positively related to creative role identity. However, less contact or even no contact with U.S. culture not necessarily causes low creative role identity, as creative role identity can be positively influenced by other factors including coworker role expectations or self-view of past creative behaviors.

QCA overcomes the shortcoming of traditional multilevel regression analysis, as it always assumes that influencing factors are independent from each other, neglecting role identity in nature

is a complex process with various influencing factors combined. In contrast, QCA is uniquely suited for analyzing this kind of complex configurational relationship because this approach explicitly focuses on combinations of attributes and allows for a sophisticated analysis of complex causal relationships through configurations (Ragin, 2000; 2008).

3. Methodology

In following the research design process from Saunders et al. (2007), we started with the determination of the ontological stance for the study. Critical Realism was chosen for several reasons, the congruency with the researchers own ontology and Critical Realism's particular good fit for case study research. In Critical Realism, the researchers agree on the existence of a particular experienced phenomenon (such as horizontal leadership) and then seek to explain this phenomenon, well knowing that there are several possible explanations of the same experience/phenomenon (Bhaskar, 2016).

A sequential qualitative – quantitative mixed method approach was chosen (Saunders et al., 2007). In the first stage, we conducted 24 semi-structured interviews to identify influencing factors associated with HLs' role identity. Subsequently, in the second stage, a fuzzy-set QCA was deployed to assess 150 questionnaires systematically. In QCA, one often makes the distinction between crisp sets, which are dichotomous in nature (in or out) or fuzzy-sets, which range from 0 to 1, and allow for more fine-grained assessment of set membership. Fuzzy-sets can take different ranges across sets in analysis and identifies relationships between causal conditions and outcomes (for more details, please refer to Ragin (2008)). This method has advantages when causation is complex, and when different conditions produce identical results (Fiss, 2007).

A feature of this two-stage approach is feedback (Donal, 2010), as the interview evidence

serves to identify the influencing factors that are to be analyzed in the second stage. Configurations obtained from fuzzy-set analysis can be explained by interview evidences and used to verify the causal conditions identified in the first stage.

3.1 Semi-structured interviews

Semi-structured interview was chosen as research strategy to identify influencing factors associated with HLs' role identity. The sampling was done in China, to avoid effects through cultural differences, but aimed for maximum variation in the given culture, to understand the breadth of the phenomenon over several industries. Maximum variation sampling was used to identify the key characteristics of the phenomenon (Teddlie and Yu, 2007), by looking for variety in the sample in order to identify the most basic patterns across industries.

Therefore, we conducted 24 interviews in China, covering a wide range of projects, interviewees' age span, and work experience. We approached project managers of each company first, and asked them to provide a list of project team members who worked as horizontal leaders in projects in the past six months. Horizontal leaders were selected randomly from the list. All interviews were initially conducted in Chinese and then translated into English with help of two native English speakers to adjust the translation to the truthfulness and accuracy. Of the 24 interviews, 15 were with team members, who can provide opinions from a HLs' perspective. Nine were with project managers who worked as horizontal leaders before and also able to provide inputs from a management viewpoint. Their organizations are projectified in the sense of Midler (1995). Industries covered include engineering and construction, finance, business services outsourcing, etc. Table 2 provides an overview of the 24 semi-structured interviews.

Table 2 Overview of 24 semi-structured interviews

Company	Company 1	Company 2	Company 3	Company 4	Company 5
Industry	Engineering and Construction	Consulting	High-Tech	Natural Resources	Business Services Outsourcing
Employees	2000	800	1000	200	50
Scope of operations	International	International	National	Mainly national	International
Description	Specialized in coke-making and refractory-making plants	Scope covers audit, advisory and tax	Software development	Oil & Gas Engineering and manufacturing organization	Local branch of a US headquartered IT corporation, specialized in business process outsourcing
Interviewees (total 24)	4	5	5	4	6
Project managers (9)	1	2	3	1	2
Project team members (15)	3	3	2	3	4

Interviews were based on informed consent and lasted between 30 and 60 min. Three types of questions were asked during the interviews: a) general information about the interviewee, like role and tenure, b) examples for real cases of horizontal leadership and their own experiences and feelings, and c) the possible influencing factors of HLs' role identity. Interviews were conducted by teams of two researchers, where one took notes and the other led the discussion. All interviews were recorded and subsequently transcribed and then analyzed using NVivo 10. Analysis was done using Miles et al. (2014) process of initial coding, followed by a second-cycle coding for pattern identification. Thus, we followed the popular iterative cycle of data collection, data display, data reduction and conclusion finding. Analysis of the interviews yielded 47 codes extracted from the transcripts through in-vivo coding. As a first step to reduce the number of items, we omitted those with fewer than three text units, and this frequency-based approach retained 42 potential items.

Then we discussed the list of items with a focus group of 10 project team members who had the experience of working as horizontal leaders. For each of the 42 items, participants were asked to vote if the item is important for HLs' role identity. And the item remained if more than half of the group agreed on it. 18 items remained after this process. Then the group took part in a discussion of the 18 items to convey the intended meaning. Two researchers reviewed the meanings and similar definitions were grouped together. Finally, eleven influencing factors were obtained, including extrinsic reward, intrinsic reward, empowerment, training, support from project manager, expectations from other team members, personal expectation, self-efficacy, job complexity, horizontal leadership culture and HLs' work experience. And these eleven influencing factors can be classified into three categories, which are social structures, individual dynamics, and context. Definitions of eleven influencing factors were given with reference to existing literature in role identity and modification based on the horizontal leadership context. The definitions of the influencing factors are listed in Table 3:

Table 3 Definitions of eleven influencing factors

Category	Influencing factor	Definition	Illustrative quotes	Reference
Social structures	Extrinsic reward	Extrinsic reward are material rewards such as extra bonus, monetary rewards or salary raise.	*He [project manager] promised that he would raise my year-end bonus after project delivery.*	Siebert and Siebert (2007)
	Expectations from other team members	Other team members' expectations about individuals being horizontal leader	*My colleagues [other team members] were expecting someone who knows how to fix the problem to take the lead, and they know I am qualified.*	Farmer et al. (2003)
	Empowerment	The role of horizontal leader is empowered or authorized officially by the project manager	*He [project manager] delegated his power to me for this "special mission" [being a horizontal leader].*	Zhang and Bartol (2010)
	Training	Training for particular work items related to horizontal leadership provided by project manager, team or organization.	*My project manager sat down with me and taught me how to deal with functional departments in our company.*	Blau (1999)
	Horizontal leadership culture	If there is a horizontal leadership culture or atmosphere in the team or organization where the respondent works,	*She [project manager] always encouraged us to take on extra responsibilities and take the lead in areas that we are good at.*	Farmer et al. (2003)
	Support from project manager	How much support is provided by the project manager for the horizontal leader.	*He said he would back me up and I could always turn to him for help.*	McCall and Simmons (1978)
Individual dynamics	Intrinsic reward	Intrinsic reward measures how satisfied the respondent was when working as horizontal leader, including the feeling of "I am competent for this role" or "I am carrying the project forward".	*Being the lead for the team certainly gave me a sense of achievement. Carry the entire team forward just feels great!*	McCall and Simmons (1978)
	Personal expectation	Personal expectation is respondent's own expectation for performance outcome and image outcome for working as horizontal leader.	*This role [horizontal leader] gave me more exposure in the company. I knew this could be an opportunity.*	Siebert and Siebert (2007)
	Self-efficacy	Self-efficacy is HLs' "beliefs" in his or her capabilities to mobilize the motivation cognitive resources and courses of action needed to work successfully as horizontal leader.	*Leading teams is my strength. I have strong communication and coordination skills. I wasn't surprised that I did a good job.*	Tierney and Farmer (2002)

Context	Job complexity	The complexity or difficulty of tasks and assignments faced by individuals when worked as horizontal leader.	*In this project, different functional departments needed to be coordinated. This was extremely demanding especially when we kept running into different problems…I can tell you, it's never easy to lead a project team.*	Tierney and Farmer (2002)
	Work experience	Respondent's tenure when working as a horizontal leader	*I have been working in this business for over 20 years, I have seen different strange things. Experience in fact helps you to lead the team.*	Tierney and Farmer (2002)

3.2 Fuzzy-set QCA

3.2.1 Data collection

The development of the sample frame for this study uses a list of corporations and firms with good project management performance in China. Project team members who worked as horizontal leaders in the past two years were potential respondents. They were targeted with a questionnaire available online and paper-based. 150 valid answers (92% response rate), including 109 online surveys and 41 paper-based questionnaires. Table 4 shows the demographics of 150 respondents.

Table 4 Sample characteristics

Category	N	Percentage
Gender		
Male	101	67.3%
Female	49	32.7%
Age		
<30	44	29.3%
30-35	54	36.0%
35-40	23	15.3%
>40	29	19.3%
Firm capital nature		
State holding	5	3.3%
State owned	94	62.7%
Joint venture	5	3.3%
Private	18	12.0%
Foreign funded	23	15.3%
Others	5	3.3%
Industry		
Information technology	12	8.0%
Construction and engineering	45	30.0%
Energy	28	18.7%
Education	5	3.3%
Industrial automation	12	8.0%
Financial	10	6.7%

Manufacturing	19	12.6%
Others	19	12.7%

3.2.2 Measurement

HLs' role identity is captured through Callero (1985) role identity scale, which measures the extent the role has been incorporated into self-identity. This well validated five-item scale uses five-point Likert scaling for responses. We modified the items' wording to reflect centrality of role identity as a horizontal leader. Cronbach alpha of 0.694 indicates reliability of the construct.

Of the eleven influencing factors, *extrinsic reward*, *training* and *empowerment* are dichotomous, and can be measured as "Yes" or "No". Work experience is measured as respondent's tenure when worked as a horizontal leader.

The measurement of the remaining seven conditions follows well-validated scales in existing research. Several items had modifications based on the horizontal leadership context. Measurement of all items used 5-point Likert-type scales, 1=totally disagree to 5=totally agree. Below are the details:

Intrinsic reward (alpha=0.685) regarding how satisfied the respondent was when working as horizontal leader were measured with the four-item scale developed by Thomas (2009). Example items are the followings: "When I work as the horizontal leader, I can feel I am doing good high-quality work", and "When I work as the horizontal leader, I can feel my work is moving forward".

Horizontal leadership culture (alpha=.727) is a two-item self-constructed scale of whether the team or organization where the respondent worked have horizontal leadership culture. An example item is "There is a horizontal leadership culture in my project team, my project manager supports me as the horizontal leader".

Project manager's support to horizontal leader (alpha=.815) was measured through adapting from manager support scale developed by Tymon et al. (2010). Example items are the followings: "My project manager leads by example" and "My project manager gives me the support I need to work well as the horizontal leader".

Perceived team member expectations for horizontal leaders (alpha=.795) were measured by adapting six items from others' expectations scale developed by Callero (1985). Examples items include "Many of my project team members think of me in terms of being a horizontal leader", and "Many of my project team members expect me to continue as a horizontal leader".

For *personal expectation* (alpha=.815), as with prior work, such as Yuan and Woodman (2010), outcome expectation was assessed by three items modified from House and Dessler (1974) outcome expectancy scale, and image gains were measured by two out of four items developed by Ashford et al. (1998).

Self-efficacy (alpha=.837) was measured using the eight-item new general self-efficacy scale developed by Chen et al. (2001). Example items are the following: "I will be able to achieve most of the goals that I have set for myself", and "When facing difficult tasks, I am certain that I will accomplish them".

And finally, for *job complexity* (alpha=.713), three-item scales developed by Cammann et al. (1983) were adapted. Example items are the following: "When I work as a horizontal leader, my job is very complex" and "When I work as a horizontal leader, my job requires a lot of skill".

3.2.3 Reliability

Although there is no special requirement for the number of samples in QCA, Rihoux and Ragin (2009, p28) suggested that "altogether, a good balance must be reached between the number of

cases and the number of conditions. The ideal balance is not a purely numerical one and will most of the time be found by trial and error." Marx and Dusa (2011) developed benchmark tables for model specification (the number of conditions and the number of cases) to predict when crispy-set qualitative comparative analysis (csQCA) will generate contradictions, while there is no similar model developed for fuzzy-set QCA (fsQCA) so far. However, as csQCA can be considered as a special form of fsQCA (Schneider and Wagemann, 2012), we referred to Marx and Dusa (2011) model for verification. The benchmark table shows that when the number of conditions is eleven and the sample size is 139, the probability of generating results on random data is low (<10%). In the present study, the questionnaire size reached 150, the probability of generating results on random data is reduced to 5%, therefore the accuracy of the analysis can be ensured.

3.2.4 Calibration and solution generation

Calibrating the measures is the first step for fsQCA analysis, which is critical as the result strongly depends on the calibration (Ragin, 2008). In this study, calibration was performed following the recommendations by Rihoux and Ragin (2009). There are three types of data to be calibrated: (1) dichotomous data including extrinsic rewards, empowerment and training; (2) continuous data - work experience; (3) scale data including the rest of the seven conditions and the outcome. For dichotomous data, 0 stands for "No" and 1 stands for "Yes". However, in the process of questionnaire collection, some respondents mentioned that they were not sure if there was any extrinsic reward when they were working as horizontal leader. After a further discussion with these respondents, we believed that the result of "not sure of if there was any extrinsic reward" is similar to the result of "no extrinsic reward", therefore "Not sure" was calibrated as 0. The same calibration practice was applied for empowerment and training as well. For continuous data, work experience,

the direct method (Ragin, 2007) was employed and used three qualitative anchors to structure calibration: median (10 years) as cross-over point, and values around the 90% and 10% of the maximum possible value (38 years) to full membership and full non-membership. For scale data, the linguistic form of survey data lends itself to a direct translation into fuzzy sets, which helps to capture these qualitative differences. A direct assignment method was used, the Liker scales transform in fuzzy set membership scores: 1, 2, 3, 4, 5 (five-point scale) $\rightarrow$ 0, 0.2, 0.4, 0.8, 1 (fuzzy set membership) (Emmenegger et al., 2014).

After all measures had been calibrated and transformed into sets, we examined the necessary conditions for the outcome using fsQCA 2.5 software package (Ragin and Davey, 2008). A condition becomes necessary if its consistency exceeds 0.9 during the necessity test. Necessary conditions are critically important (Dul, 2016), as when the outcome occurs, the necessary condition is always in places, on the contrary without them, the outcome cannot occur and other conditions cannot compensate for this absence.

The final step is to generate solutions for configurations of HLs' strong and weak role identity. The lowest acceptable consistency for solutions is set at 0.80, which is above the minimum recommended threshold of 0.75 proposed by Ragin (2006) and should create robust results (Fiss, 2011; Rihoux and Ragin, 2009). For purpose of filtering extreme cases that only happened once in questionnaire results, the minimum acceptable solution frequency was set at 2. After all thresholds are set up in fsQCA 2.5, the solutions are generated.

4. Results and analysis

4.1 Semi-structured interviews

As discussed in the methodology part, analysis of the interview data reveals the eleven

influencing factors of HLs' role identity. In addition to this, some key features associated with HLs' role identity were revealed from interview evidence.

Firstly, job complexity and individual dynamics factors including intrinsic rewards, self-efficacy and personal expectations have been found critical for HLs' strong role identity as these four factors were mentioned by all 24 interviewees. For example, a senior engineer with 20-year work experience in Company 1 stated: *When I was working as a horizontal leader, the task was challenging, and sometimes I had to make tough decisions for them [project manager and project management office]. But I felt pretty good about it, as I can help the team to solve difficult problems, which means I am still valuable to the company. Besides, this helps me to further develop my technical skills.* On the contrary, a team member from Company 5 mentioned: *This [a strong role identity as horizontal leader] really depends on the task, if it's something challenging or meaningful, I will have a strong role identity as the temporary leader of the team. While if it's something routine or even boring, I just don't want to do it. There is no point doing it if there is nothing in it for me!* A young engineer from Company 4 stated: *You must like it, then you can do it well…To me, being a horizontal leader gives me a good exposure in the company. Certainly I will give my best try.*

Secondly, 13 out of 24 interviewees stated empowerment from the project manager and expectations from other team members are important for HLs' role identity. A project manager from Company 2 mentioned: *Usually I will try to find a guy who has a good performance and personality，and make him/her a horizontal leader. People usually have high expectations for this kind of person, then it will be relatively easier for him/her to lead the team. And also, most of the time I will try to empower him/her to make sure everyone knows this guy is leading on behalf of me. This works every time.* A project team member in Company 3 stated: *This really depends on my boss and my*

colleagues. If my boss authorizes me in the first place, and my other colleagues in the team feel comfortable about it, I will have a stronger role identity as the lead. A senior software developer in Company 3 mentioned: *Once I was tasked to guide a group of young guys to debug the system…They had different ways of thinking and they never listened to me! This experience sucks, I would love to lead people who really listen to me and support me.*

Thirdly, the interviews revealed that junior and senior team members may have different paths that lead to strong or weak role identity. A 28 years old consultant with five years of work experience in Company 2 stated: *The opportunity of working as a horizontal leader is very important to me, even more important than bonus! In our company, being identified as a horizontal leader is a kind of a special assignment for young people. I know if I perform well in this assignment, the management will offer me a further assignment and maybe one day I will be promoted to a real project manager. So no matter how tough it is, I still see myself as the lead, and give my best.* A senior engineer in Company 4 described: *"The support from the boss [project manager] is important. If my boss doesn't support me, I won't do it as I don't want him to lose face. […] Besides expectations from others are equally important. You know, in our team, every team member specializes in certain areas, if others don't listen to me, I'll just shut my mouth and do my own job. I don't want to lose my face either!"*

4.2 Fuzzy-set analysis

We follow the notation applied by Fiss (2011) and subsequent research, where "•" represents the presence of a condition, "⊗" represents its absence, and a blank space indicates a "don't care" situation, meaning that a given condition can be either present or absent (i.e., it is not assumed to be causally related to the outcome). We added a new notion "★" to represent a necessary condition.

4.2.1 Configurations of HLs' strong role identity

Table 5 shows the ten solutions that are sufficient for achieving HLs' strong role identity. The necessity test shows that when the outcome is HLs' strong role identity, the presence of intrinsic reward, self-efficacy, personal expectation and high job complexity are necessary as their consistency all exceed 0.9. With the presence of four necessary conditions, combinations of the rest of seven conditions with different status (presence, absence or don't care) could all possibly lead to the outcome of strong role identity, though consistency and coverage across solutions vary greatly across configurations.

The coverage score measures the importance of an individual configuration and indicates how many cases take this path to the outcome, however this path can be overlapped with other configurations. The net coverage score indicates the proportion of membership in outcome solely explained by individual configuration. Regarding overall coverage, the ten solutions account 84.5% of membership in the outcomes, thus presents acceptable fit. Further, all configurations show high consistency values between 0.92 and 0.99, with the overall solution consistency at 0.943 which indicates all configurations are sufficient to explain the outcome of HLs' strong role identity (Ragin, 2008).

Based on the interview data, we could group the ten solutions into three sub-groups based on the median of work experience (10 years) as cross-over point, namely, Solution 1(a, b, c) for all horizontal leaders (it has nothing to do with how many years of work experience horizontal leaders have), Solution 2(a, b, c, d) for senior horizontal leaders with more than 10 years' experience. Solution 3(a, b, c) apply to junior horizontal leaders with work experience less than 10 years.

Solution 1a, 1b and 1c: This group applies to all horizontal leaders and has nothing to do with

HLs' work experience, and has the highest sum of net coverage 0.153, much higher than the other two groups. This group is special in presence of both empowerment and expectations from other team members. This indicates that the leadership arises through expectations of others, once recognized officially through project manager's empowerment, can greatly strengthen individual's role identity as horizontal leader. With the highest sum of net coverage among all 3 groups, this group is the most common causal path lead to a strong HLs' role identity, which is also consistent with the finding from interviews.

Solution 2a to 2d: these four configurations are common in the presence of support from the project manager. This can be explained as project team members with rich work experience (more than 10 years) tend to have a strong role identity of horizontal leaders when being supported by their project manager.

Solution 3a to 3c: This group is only applicable for respondents with less than 10 years' work experience and the sum of net coverage for this group is only 0.017, which indicates these 3 configurations are the significant phenomenon under rare or extreme cases. Though other team members' expectations and training are absent in all three solutions, in configuration 3b and 3c, young horizontal leaders were empowered or authorized by their project manager. Even under above "adverse" circumstances, this small group of junior project team members still had a strong role identity, which in turn confirms that the four necessary conditions are playing a critical role in the process of strong role identity.

Table 5 Configurations for HLs' strong role identity

Configuration	Solution									
	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Context										

Work experience				•	•	•	•	⊗	⊗	⊗
Job complexity	★	★	★	★	★	★	★	★	★	★
Social Structure										
Extrinsic reward		⊗	•		⊗	⊗	⊗	⊗	⊗	
Empowerment	•	•	•	•	•				•	•
Training		•	⊗		⊗	⊗		⊗	⊗	⊗
Horizontal leadership culture	•	•		•		•	•	⊗		⊗
Support from project manager	•	•		•	•	•	•		⊗	⊗
Expectation from other team members	•	•	•		⊗		•	⊗	⊗	⊗
Individual dynamics										
Intrinsic reward	★	★	★	★	★	★	★	★	★	★
Personal expectation	★	★	★	★	★	★	★	★	★	★
Self-efficacy	★	★	★	★	★	★	★	★	★	★
Consistency	0.972	0.997	0.977	0.950	0.946	0.971	0.989	0.927	0.976	0.950
Coverage	0.641	0.162	0.127	0.389	0.088	0.174	0.283	0.070	0.095	0.129
Net coverage	0.126	0.011	0.016	0.021	0.001	0.006	0.015	0.005	0.008	0.004

Overall solution consistency	0.943
Overall solution coverage	0.845

4.2.2 Configurations of HLs' weak role identity

Table 6 shows the three solutions that are sufficient for leading to HLs' weak role identity. We also follow the same notation as Table 5, the only difference is "☆" indicates the absence of the condition is necessary.

The necessity test shows that when the outcome is HLs' weak role identity, only consistency of absence of expectations from other team members exceeds 0.90 and becomes the only necessary condition of HLs' weak role identity. The consistency score for the overall solution is 0.861, greater than the threshold 0.80 and the overall coverage is 0.732, which indicates overall causal paths explain 73.2% of the outcome. Solution 1 describes the configuration for senior horizontal leaders (work experience more than 10 years), while Solution 2 applies to junior horizontal leaders (work experience less than 10 years), and Solution 3 applies to all horizontal leaders with any years of work experience.

Solution 1: The net coverage score of this configuration is 0.328, highest among all three

solutions. Based on interview results, this configuration describes a scenario where a senior team member is acting as a horizontal leader but couldn't perceive the expectations from others.

Solution 2: This configuration is applicable for junior project team members; the scenario is a low complexity job with neither training nor extrinsic reward provided. This configuration has the highest consistency score 0.839 among all three solutions.

Solution 3: Both support from project manager and expectations from other team members are missing, in fact the horizontal leader is not recognized by the entire team. And there is no material reward as external motivation and no training provided, people may feel they are doing a thankless job and think *Why should I do this?* and *How should I do this?* which eventually will cause weak role identity.

Table 6 Configurations for HLs' weak role identity

	Solution		
Configuration	1	2	3
Context			
Work experience	•	⊗	
Job complexity		⊗	
Social Structure			
Extrinsic reward		⊗	⊗
Empowerment			
Training		⊗	⊗
Horizontal leadership culture			
Support from project manager			⊗
Expectations from other team members	☆	☆	☆
Individual dynamics			
Intrinsic reward			
Personal expectation			
Self-efficacy			
Consistency	0.800	0.839	0.832
Coverage	0.703	0.271	0.344
Net coverage	0.328	0.008	0.005
Overall solution consistency		0.861	
Overall solution coverage		0.732	

5. Discussion

A HLs' role identity model was developed in Section 5.1 based on patterns of 13 configurations generated to gain a holistic understanding of which and how influencing factors critically impact HLs' role identity, by synthesizing the results gained for both strong and weak role identity. The comparison between role identity of experienced and less experienced horizontal leaders is further discussed in Section 5.2.

5.1 HLs' role identity model

The HL's role identity model, which is shown in Fig.2, describes the key factors for horizontal leaders to achieve strong role identity or end up with weak role identity, with vertical axis indicating role identity status (strong or weak) and horizontal axis indicating level of work experience. Influencing factors of context, social structures and individual dynamics are demonstrated into four types of conditions, namely presence necessary, presence, absence necessary and absence. Factors across the entire horizontal axis indicate its applicability for all horizontal leaders. Factors across only half of the horizontal axis are related to HLs' work experience.

For the strong role identity quadrant, job complexity is necessary as the context factor; intrinsic reward, personal expectation and self-efficacy are necessary as individual dynamics factors. Our findings resonate with previous literatures that high complexity job can provide support and motivation for individuals (Deci et al., 1989), which further influences individuals' intrinsic reward and personal expectation. In addition, presence of self-efficacy indicates that individuals believe that there is a good fit between his or her capabilities and the role, and on this occasion individuals' outcome can be maximized and indirectly influences HLs' personal expectation (Boon et al., 2011). It's noteworthy that Burke and Stets (2009) suggested individuals with high self-efficacy tend to challenge complex job, therefore the interaction between self-efficacy and job complexity are

reciprocal. Empowerment and expectations from other team members are substantive factors for all horizontal leaders. This result was supported by previous studies on horizontal leadership indicating that empowerment is an essential element of horizontal leadership framework, which involves transferring leadership authority to horizontal leaders (Müller et al., 2017).

For the weak role identity quadrant, there is no universal factors as context or individual dynamics. But two social structures factors are critical to horizontal leaders in general, which are absence of expectations from other team members as necessary and absence of extrinsic reward, training and support from project manager.

Expectation state theory (Berger, 1977) posits that expectations regarding team members' abilities to contribute to a task solution become self-fulfilling prophecies, and form a basis for dominance or status differences within teams (Paunova, 2015). Status characteristics, which are greater general competences (e.g. education, performance, etc.) and specific skills in goal-oriented groups (Ridgeway, 2004), systematically affect the likelihood that some categories of people will emerge as leaders largely through and because of higher expectations of others. And also, from the perspective of identity theory, people who view themselves as leader want to get feedback that they are perceived as leader. However, if they are not able to feel expectations from others, they become upset and suffer symptoms of stress (Stets and Burke, 2014; Zanna and Cooper, 1976). Moreover, with the missing of expectations from other team members as the only necessary condition, combinations of other causal conditions are rather dispersed as shown in Table 6, which also indicates that absence of expectations from others plays a decisive role in HLs' weak role identity.
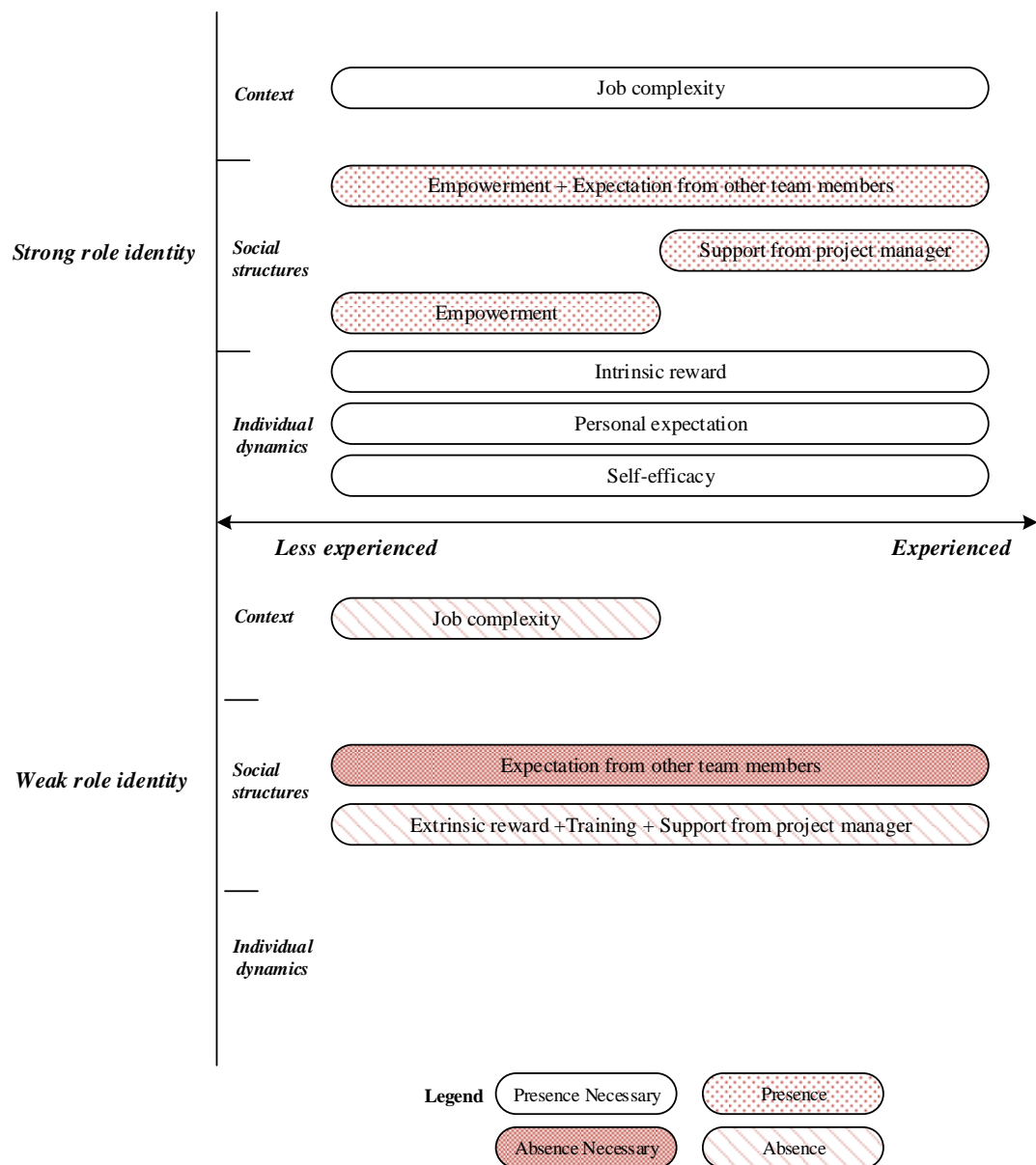
Fig. 2 HLs' role identity model

5.2 The comparison between role identity of experienced and less experienced HLs

It can be found from the data analysis that work experience becomes dominant when categorizing the results. Horizontal leaders with years of experience are subject to support from their project managers, which resonates with LMX's decreasing effects on role ambiguity and role conflict (Dulebohn et al., 2012). Experienced horizontal leaders are impacted by perceived organizational support to a large extent (Wayne et al., 1997), and other types of influencing factors

are less likely to boost up role identity without project manager's support. For an experienced horizontal leader, he or she is already the senior or expert in the team and might believe that he or she has the competency and influence to lead the team. However, when the situation is not the way it is "supposed to be", as they couldn't get the right feedback from the team, horizontal leaders become upset or distressed in varying degrees (Burke and Stets, 2009). If this situation continues, the horizontal leader will feel "face-loss" and low sense of presence in the team, which eventually leads to the result of weak role identity. Only under the circumstances of project manager's support and often along with appearance of several other social structure factors, such as empowerment and horizontal leadership culture (e.g. Solution 2 in Table 5), experienced horizontal leaders can build a strong role identity. However, their role identity can be sensitive to the absence of expectations from other team members, once the expectations are missing, experienced HLs' role identity will be impaired. Therefore, experienced HLs' role identity is "hard" to build and "easy" to break.

For less experienced horizontal leaders, empowerment is one of the positive factors that leads to a strong role identity, and absence of job complexity, extrinsic reward and training are negative factors that possibly lead to a weak role identity. Under some circumstances, once empowerment is available, not any other is required (e.g. Solution 3b and 3c in Table 5) to boost role identity for less experienced horizontal leaders. This indicates the importance of empowerment as a critical step to facilitate HLs' behaviors in projects (Yu et al., 2018). On the other hand, the absence of job complexity, extrinsic reward and training may demonstrate the lack of cultivation or trust. The weak role identity is caused only when these factors are absent jointly. Therefore, for less experienced horizontal leaders, a strong role identity can be achieved with fewer social structure factors, and not easily be weakened unless multiple factors are absent simultaneously. Comparatively, a strong role

identity is "easy" to build and "hard" to break for less experienced horizontal leaders.

Above comparison generates findings which are consistent with role identity studies in other fields of research. Since years of experience for team members increase along with their age, what we measured as years of experience reflects the general patterns of their age. Our studies resonate with previous findings that age-related or experience threats are challenging factors for role identity, where aging process is regarded as an essential identity threat (Bisdee et al., 2013). The horizontal leader, as a temporal position raises new requirements for identity accommodation, which is defined as a process of changing identity in response to experience (Sneed and Whitbourne, 2003). Identity accommodation is negatively related with age, which is further explained by our findings of fewer influencing factors are required to decrease the role identity of experienced horizontal leaders. On the contrary, young team members are more likely to hold strong role identity without being affected by external environment compared with seniors. Based on interview results, this can be understood as, for younger team members, an appointment to a temporary leadership role sometimes implies that it is an assignment for a subsequent appointment to a formal project manager role. Young team members tend to be free from external disturbances, since being a horizontal leader carries extra meanings and brings more opportunities, which motivates them to have a strong role identity.

Our findings are also consistent with Müller et al. (2017) unexpected finding of a preference for an age-gap between vertical and horizontal leaders: On one hand, the vertical leader avoids losing face from appointing someone of equal seniority who may challenges his or her way of managing the project. On the other hand, senior team members will only work as horizontal leaders and have strong role identity when being supported by project manager in order to avoid potential "face-loss" of the project manager.

6. Conclusion

The present investigation uses a sequential mixed method approach in order to better understand the two research questions. In the first stage, we built on 24 interviews to identify influencing factors associated with HLs' role identity. 11 influencing factors were obtained, including extrinsic reward, intrinsic reward, empowerment, training, support from project manager, expectations from other team members, personal expectation, self-efficacy, job complexity, horizontal leadership culture and HLs' work experience, which answers *RQ1: What are influencing factors of HLs' role identity in projects?*

Subsequently in the second stage, a fuzzy-set analysis was deployed to assess all 150 questionnaires systematically. Ten solutions could be derived by interpreting the configurations of HLs' strong role identity by using fsQCA 2.5 software package. Results demonstrate that junior and senior team members have different paths that lead to HLs' strong and weak role identity, therefore we group the ten solutions based on the median of work experience (10 years) as cross-over point. Solution 1a, 1b and 1c apply to all horizontal leaders and have nothing to do with HLs' work experience. Solution 2a to 2d describe the configurations for senior horizontal leaders (work experience more than 10 years). Solution 3a, 3b and 3c apply to junior horizontal leaders (work experience less than 10 years). The results are summarized in Table 5. On the other hand, fsQCA 2.5 also generated three solutions for HLs' weak role identity. Solution 1 describes the configuration for senior horizontal leaders, Solution 2 applies to junior horizontal leaders, and Solution 3 applies to all horizontal leaders. Table 6 provides details of these three configurations. This answers *RQ2: What are configurations for HLs' strong role identity and weak role identity?*

Moreover, based on detailed analysis of each configuration and comparison cross different

configurations, interactions between influencing factors were identified. Important findings include: Firstly, the presence of intrinsic rewards, self-efficacy, personal expectations and high job complexity are necessary conditions for HLs' strong role identity, while absence of expectation from other team members is the only necessary condition for weak role identity. Informal leadership arises through expectations of other project team members, once recognized officially through empowerment from project manager is the most common and effective causal path leading to HLs' strong role identity. And this combination works for all horizontal leaders. Secondly, a HLs' role identity model was formed by identified influencing factors. And it's found that experienced and less experienced team members take different paths that lead to strong or weak role identity. Thirdly, "face" is important for senior project team members when they act as horizontal leaders. With the support from project manager, senior project team members usually tend to have a strong role identity as horizontal leader. Nevertheless, if the senior in project team cannot perceive expectations from peers, there is a high chance that they will have a weak role identity as horizontal leader. Lastly, young team members tend to be free from external disturbances, as being a horizontal leader carries extra meanings and brings more opportunities, which motivate them to have a strong role identity as horizontal leader. However, some junior can be bothered by low job complexity and absence of extrinsic rewards and training.

6.1 Theoretical implications

Theoretical implication of the study is three-fold. Firstly, with the individual horizontal leader as the unit of analysis, this study focuses on the fourth event - horizontal leadership and governance in the *Theory Framework for Balanced Leadership*. In combination with the empirical studies on the other events of this framework, the results provide a contribution to a larger theory on leadership

in project management. Secondly, through conducting fsQCA, this study identified various critical influencing factors and configurational paths for HL's role identity. By considering the macro, meso and micro levels of analysis simultaneously, the boundaries of identity theory are expanded (Burke and Stets, 2009). Thirdly, a comparison between experienced and less experienced horizontal leaders explores how junior and senior team members differ in factors leading to strong and weak role identity, which enriched the previous understanding of age-related threats (Bisdee et al., 2013).

6.2 Managerial implications

Managerial implications include awareness building among practitioners on possible combinations of influencing factors that could positively or negatively affect HLs' role identity. Our results provide references for project managers or project sponsors to specifically design horizontal leadership environment for different project team members. Suggested strategies include: (1) Once horizontal leaders are identified, project managers are recommended to empower them timely. This is to enhance the legitimacy of their roles, which help horizontal leaders to feel this special role is proper, appropriate and justifiable. It's noteworthy that empowerment is effective regardless of HLs' work experience, which means it works for all horizontal leaders; (2) Experienced and less experienced team members take different paths to strong or weak role identity, therefore they need to be managed differently. Project managers should pay more attention to experienced horizontal leaders as experienced HLs' role identity is "hard" to build and "easy" to break. They are subject to support from their project managers and sensitive to the absence of expectations from other team members. In order to tackle this problem, project managers are recommended to provide enough support to experienced horizontal leaders, and if necessary, guide other project team members to follow experienced HLs' lead, in order to maintain experienced HLs' role identity at a high level;

(3) On the contrary, project managers don't need to worry too much about junior project team members' role identity as temporary leaders. Being a horizontal leader carries extra meanings for the junior, as an appointment to a temporary leadership role often triggers a subsequent appointment to a first formal project manager role. Therefore, a strong role identity can be achieved with fewer social structure factors compared with the senior, and not easily be weakened unless multiple factors are absent simultaneously. However, empowerment from project managers is still critical for younger horizontal leaders.

6.3 Limitations and future research

The strength of the present study is its sequential mixed methods approach, which forms a loop between two research stages. Interview evidences from case studies serve to identify the influencing factors that are to be analyzed in the second stage. Configurations obtained from fuzzy-set analysis can be explained by interview evidences and used to validate the causal conditions identified in the first stage. This study has limitation too. There are 3 configurations, Solution 3a as a configuration for strong role identity and Solution 2 and 3 as configurations for weak role identity are having similar patterns, however the outcomes are totally different. Though the net coverage of each configuration is very low, which represent they are equivalent to extreme and rare cases in case study research (Eisenhardt and Graebner, 2007). It's worth exploring the fact that this "similar antecedents but different outcomes" phenomenon results from limitations of QCA method, or factors other than the eleven factors examined in this study. Certainly there are influencing factors missing in this research or even undiscovered in the existing body of knowledge. Another seemingly limitation is that our research results are based on data gained only in Chinese context. However, some of our samples cover large organizations headquartered worldwide, whose corporate culture

was largely dominated by headquarters' culture. Therefore, influence of Chinese context is minimized by selecting both national and international companies, and no apparent difference was discovered between western organizations and Chinese organizations from interviews. Future research should qualitatively investigate those cases with "similar antecedents but different outcome", which allows for exploring for improvement in the QCA method or discovering other influencing factors in role identity theory. Future research can also conduct an in-depth case study specifically addressing differences of western and eastern culture on HLs' role identity.

Research on horizontal and balanced leadership has so far established a theoretical base in form of a framework consisting of five events, of which each has been further investigated using dedicated studies. This provided a new insight by identifying a space between shared/distributed (which emerges from within the project team) and vertical leadership (which emerges from the project manager) as a practiced, but yet unknown form of leadership in projects. Hence, the contribution to knowledge so far was an extension of management theory into this newly identified space. The present paper extends this view by being the first to address questions of role identity of horizontal leaders. This should be deepened in further studies by addressing questions like the nature of the psychological contract between horizontal and vertical leader, or the psychological ownership of the leadership task, the project tasks, and/or the project per se during times of horizontal leadership, or the sense-making of horizontal and vertical leaders, as well as team members during times of horizontal leadership. Results from these studies will provide for comparisons between related theories derived from research in permanent organizations with the empirical findings in temporary organizations. Previous studies in horizontal leadership have shown that these differences exist, such as described by Yu et al (2018) for the difference between team maturity theories by

Hersey and Blanchard (1988) or Hackman (1987) and their substitute through horizontal leadership approaches in temporary settings, such is projects. Through that, future studies address the specifics of leadership in temporary organizations in general, and in the context of horizontal leadership in particular.

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