

Social Media-Enabled Individual Dynamic Capabilities: The Boundary Spanning Perspective

Completed Research Paper

Wei He

Xiaobo Ke

Helen S. Du

Wu Liu

Abstract

Individuals perform various activities such as information acquisition, sharing, coordination and collaboration on social media more easily and frequently than ever before, which indeed enables them to become more adaptable and competent in changing environments. However, there are limited research and empirical evidence regarding the use of social media on the development of users' individual capabilities. Drawing upon media system dependency, boundary spanning and dynamic capabilities literature, this study proposes the concept of individual dynamic capabilities and argues that diverse use of social media can help developing an individual's dynamic capabilities through two important mechanisms: information processing and external representation. By unfolding whether and how social media use is beneficial to individual dynamic capabilities, this study contributes to several streams of IS research.

Keywords: Individual dynamic capabilities, social media use, information processing, external representation

Introduction

Social media have fundamentally changed the ways of communication, collaboration, and consumption today (Aral, Dellarocas, and Godes 2013). The increasing adoption of various social media affords individuals a repertoire of uses in work, social and personal situations (Ali-Hassan, Nevo, and Wade 2015). As a result, individuals are leveraging social media as integrated and convenient platforms to help them achieve various goals. Many bright sides of using social media have been documented, such as instant communication (Wang, Pauleen, and Zhang 2016), maintaining online and offline social relationship (Thong, Lowry, Wallace, and Warkentin 2017; Wang, Lee, and Hua 2015), online shopping (Cheung, Liu, and Lee 2015) and work collaboration (Ou and Davison 2016). However, little research concerns the impact of social media on individual abilities. Specifically, we yet know little about whether, or how, using social media could help shaping individuals' capabilities in coping with this rapid-changing world.

The necessity of this research lies in the fact that accelerated social life and excessive work stress (Windeler, Maruping, and Venkatesh 2017) have enforced dynamic capabilities a far more critical and essential ability than ever before for individuals to deal with rapid changes in the environment (e.g., new job tasks, diverse emerging problems). The concept of dynamic capabilities originates in the strategy and organization literature and has become well-known for decades, mostly on the firm level, referring to an ability to help firms to adjust their operating routines, cope with changing environment and create market advantages (Teece, Pisano, and Shuen 1997; Wilden and Gudergan 2015). However, fundamentally it is the micro-level individuals who scan the external environment, assimilate new knowledge into a firm and collectively form the organizational capabilities (Wollersheim and Heimeriks 2016). Although recent research attention starts turning to the individual-level manifestation of dynamic capabilities (Wilden, Devinney, and Dowling 2016), studies are still limited on the managerial cognitive capabilities of top or middle level managers (Adner and Helfat 2003; Helfat and Peteraf 2015; Martin 2011). In the new era enabled by fast-growing information technologies such as social media, there is an emerging need for exploring and answering research questions that have not been examined before, such as whether ordinary individuals need to dynamically sense opportunities and adapt themselves to come up with unprecedented changes from the external environment? How do various social media use could help shape individuals' dynamic capabilities in coping with this rapid-changing world? The lack of nuanced understanding of different roles of diverse use behaviors on individual social media user represents a research gap, which motivates us to examine what individual dynamic capabilities should be and how social media use affects the development of individual dynamic capabilities.

Social media enables individuals to better deal with abundant external information by screening and processing useful information for own use or transferring relevant information to other social contacts (Limaj, Bernroider, and Choudrie 2016). The immediate communication with other social actors further facilitates individuals to establish strong social ties, mutual trust and beneficial cooperation with their social connections, which ultimately helps them to resolve conflict and be more adaptable (Huang et al. 2016; Limaj et al. 2016). Drawing upon boundary spanning perspective, we argue that individuals could be regarded as an independent entity with a "boundary" distinguishing one's own information resources and self from external informational as well as social resources and environments. We further propose that diverse social media use enhances individuals' dynamic capabilities by facilitating their information processing and external representation, two critical boundary spanning activities (Aldrich and Herker 1977; Marrone, Tesluk, and Carson 2007). Information processing includes the searching, filtering, transmission and interpretation of information from the external environment, mainly for internal uses; external representation involves communication, coordination and conflict resolution with external actors to establish and maintain a better image of individuals and organizations (Aldrich and Herker 1977).

In summary, this paper aims to answer three research questions: (1) Whether the diverse use of social media can enable the development of individual dynamic capabilities? (2) What are theoretical pathways by which social media use drives individual dynamic capabilities? (3) Whether the types of social media use matter in this process?

Theoretical Background and Research Hypotheses

Media system dependency (MSD) describes how the capacity of individuals to attain their goals is contingent upon the abilities of media systems to create, gather, process and disseminate information (Ball-Rokeach 1985). According to the MSD theory, individuals have three different goals of using media: understanding, orientation and play (Ball-Rokeach and DeFleur 1976). The understanding goal focuses on individuals' needs to comprehend and explain the world around them; the orientation goal centers on the need to behave effectively and appropriately in situation of personal decision-making and interpersonal interactions; the play goal relates to escapism and enjoyment (Ali-Hassan et al. 2015; Chiu and Huang 2015). Each of these dimensions can be further classified into personal or social (interpersonal) perspective, thus yielding six sub-types of MSD relationship (Ball-Rokeach 1985). Recently, these relationships defined by MSD are extended to the context of social networking sites, reflected as motivations for media use (Chiu and Huang 2015). Based on this important work,

we build our research by reframing six motives to be distinct use behaviors, namely, self-understanding use, social understanding use, action orientation use, interaction orientation use, solitary play use and social play use.

Research on dynamic capabilities mostly stems from a resource-based view and centers on the firm level (see Barreto 2010). A typical definition of dynamic capabilities would be a firm's ability to address rapidly changing environment (Teece et al. 1997). Given that individuals are the valid cores that construct organizational capabilities (Winter 2013), recent research pays attention to the micro-foundational or the individual level of dynamic capabilities (Wilden et al. 2016; Wollersheim and Heimeriks 2016), but still lies on the dynamic capabilities of high-level managers (e.g., Adner and Helfat 2003; Martin 2011). These studies have added valuable insights to the dynamic capability literature.

We believe that, much like business executives' sensing opportunities and coping with business environment, individuals constantly process available information to perform various tasks, lead their personal lives, and engage in social bonds. Based on prior research (Teece et al. 1997; Wollersheim and Heimeriks 2016), we define individual dynamic capabilities as *an individual's ability to sense opportunities, acquire and utilize new information and resources in external environment so as to adjust oneself toward coping with the dynamically changing environment*. We argue that diverse social media uses are related to individual dynamic capabilities through two mechanism: information processing and external representation (See Figure 1). The theoretical hypotheses are discussed below.

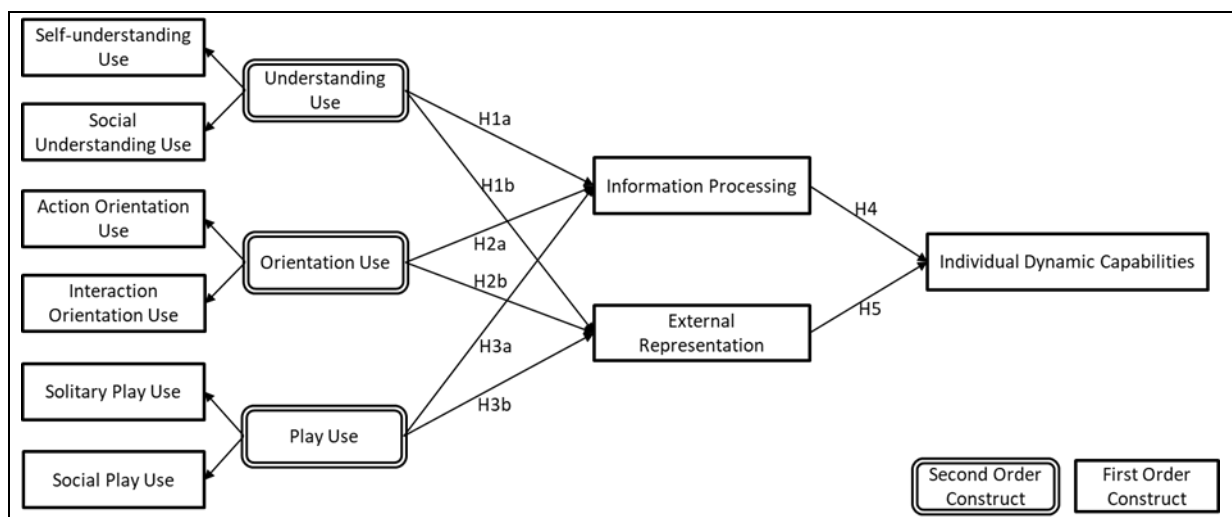


Figure 1. Research Model

Understanding Use of Social Media

The understanding use of social media is to obtain information from external environments for self-assessing and learning about what is happening outside (Chiu and Huang 2015). On one hand, seeking information and feedback via social media may help individuals to form, define and elaborate on one's own preference, tastes, and values, mainly focusing on intrinsic concerns (Dholakia, Bagozzi, and Pearo 2004). On the other hand, social media is a pervasive means for attracting broad attentions to disasters and emergency management (Yates and Paquette 2011), thus understanding of significant topics outside of one's self may trigger information transmission within one's social network (Oh, Agrawal, and Rao 2013). Gaining information is the prerequisite for interpretation, assimilation, and utilization of information resources (Cohen and Levinthal 1990). The understanding use of social media can empower individuals to acquire new information and enable them to further process the newly acquired information (Limaj et al. 2016; Stieglitz and Linh 2013).

Individuals may particularly send information or knowledge to others for social bond or a sense of social belongingness (Cui 2017; James et al. 2017). Using Web 2.0 applications facilitates people to

share web resources, which consequently establish social relationships among various interlocutors (Davison, Ou, Martinsons, Zhao, and Du 2014). In a study based on U.S. national data, researchers described that individuals use social networking sites to keep up with news about public affairs or about their community, and this specific way of using media positively affects their social capital and social engagement (Gil de Zúñiga, Jung, and Valenzuela 2012). Therefore, we hypothesize:

H1: An individual's understanding use of social media is positively associated with his/her behaviors of (a) information processing and (b) external representation.

Orientation Use of Social Media

The orientation use of social media is action-oriented (e.g., acquiring problem-solving knowledge and skills) or interaction-oriented (e.g., learning social skills about how to behave and interact with others) (Chiu and Huang 2015). Previously, individuals access other's knowledge, experience, and opinions proactively from available knowledge sources such as meetings, presentations, documentations, knowledge repositories, or online communities. Social media increases the likelihood that individuals actively and passively draw on much broader knowledge with largely reduced search and transfer costs (Ou and Davison 2016). In other words, attentive use of social media for orientation purposes makes users quickly locate solutions to unfamiliar tasks, which encourages further transmission of the instrumental information by personal publishing (e.g., retweeting) (Stieglitz and Linh 2013) and information assimilation for taking personal actions (Lane et al. 2006).

Socially connected with people is an essential psychological need (Deci and Ryan 2000; Pee, Koh, and Goh 2018). External representation consists of activities such as negotiation, cooperation, and conflict resolution (Huang et al. 2016). The interactive capabilities of social media particularly enable individuals to develop their presence and reputation and form social relationships (Wang et al. 2015). Using the instant messaging tools of social media benefits individuals by compensating for the lack of face-to-face interaction in scenarios such as quick question and clarification, coordination and scheduling, and discussions of complex issues (Davison et al. 2014), such actions typically recognized as external representation. With useful action- or negotiation-guidance obtained from the orientation use of social media, individuals are able to perform better communication and coordination with their social connections (Dholakia et al. 2004; Ray, Kim, and Morris 2014). Therefore, we hypothesize:

H2: An individual's orientation use of social media is positively associated with his/her behaviors of (a) information processing and (b) external representation.

Play Use of Social Media

Individuals use social media for both utilitarian and hedonic purposes, the latter serving as a channel for reducing stress or simply for fun (Jin, Lee, and Cheung 2010; Van der Heijden 2004). People today increasingly use social media as a means of redefining their lifestyles or showcasing their values and tastes (Vasalou et al. 2008). Devoted customers would like to keep informed of the news and events of their favorite brands on social media and provide their comments on products and services in brand communities, known as crowdsourcing or value co-creation (Dong and Wu 2015; Pee et al. 2018; Phang, Zhang, and Sutanto 2013). Similarly, participation in online communities for entertainment purpose is always associated with users' exchanges of experiences, useful information and other valuable resources shared among the communities of members (Laroche et al. 2013).

Hedonic use of social media often bears some expectations on social norm or emotional involvement in a group (Jin et al. 2010). For example, when playing an online game with others on the social media, users are also fond of chatting with other players (Liu, Santhanam, and Webster 2017). Such interactions can help them to make new friends or fulfill their need for belongingness (Longman, O'Connor, and Obst 2009). In most cases, strong social ties serve as a relationship lubricant, facilitating cooperation and conflict resolution (Park and Luo 2001). Thus, we hypothesize:

H3: An individual's play use of social media is positively associated with his/her behaviors of (a) information processing and (b) external representation.

Information Processing, External Representation, and Individual Dynamic Capabilities

Effective and efficient recognition, understanding, assimilation and application of new external knowledge is a critical part of a firm's ability to respond to and co-evolve with its environment (Zahra and George 2002). Extending this argument, an individual's dynamic capabilities should similarly be resource-based. The ability of individuals to search, filter and seize, assimilate, and exploit information, knowledge, experiences and skills from external sources enables them to build up their own knowledge and skills pool, better "shape" themselves, and alter how they function in rapidly changing environments (Wollersheim and Heimeriks 2016; Wright, Coff, and Moliterno 2014). Meantime, information processing is a main mechanism of defending against information overload (Aldrich and Herker 1977), an issue especially pervasive in the social media era. As evidenced in prior studies, the more attention invested in processing work-related information, the more competent an individual would be in developing cognitive structures and performing tasks (Gray and Meister 2004; Helfat and Martin 2015). Several recent studies on dynamic managerial capabilities (Kor and Mesko 2013) and managerial cognitive capabilities (Helfat and Martin 2015) lend support to the informational view of a generalized individual dynamic capability. Information seeking, exchange and processing may also act as a means of coping with uncertainties in external environment, for example, contributing to individual well-being (Cao et al. 2013; Oh et al. 2013). Thus, we hypothesize:

H4: An individual's information processing enabled by social media use is positively associated with his/her individual dynamic capabilities.

External representation function in the organizational context involves resource acquisition and disposal, maintaining an organization's image and enhancing its social legitimacy (Aldrich and Herker 1977), performed by boundary spanners who act as the agents of the relationship lubricant for cooperation and conflict resolution between business exchange parties (Huang et al. 2016). In the context of individual use of social media, external representation could be a mix of representing one's self in a favorable manner and being visible in his or her social network, coordinating with people in ways that benefit the focal person, and interacting with others with an expectation of accessing social resources or attaining one's goals for the future (Dholakia et al., 2004). All these behaviors help individuals to achieve mutual understanding and trust with other social actors (Ou and Davison 2016). The friendship and reciprocity inherent in social ties will induce cooperative behaviors in general (Granovetter 1985) and confer advantageous power over various resources on the focal individual (Beck, Pahlke, and Seebach 2014; Helfat and Martin 2015), which are useful for individuals to seize opportunities when dealing with the changeable environment. Hence, we hypothesize:

H5: An individual's external representation enabled by social media use is positively associated with his/her individual dynamic capabilities.

Research Methodology

We tested the proposed research model and hypotheses using data from a cross-sectional survey. Whenever possible, we used previously validated measures in our data collection. We reframed Chiu and Huang's (2015) instruments to measure three types of social media use. Information processing was measured using two items from Huang et al. (2016) and three self-developed items based on the conceptual definition of information processing by Aldrich and Herker (1977). The measures of external representation were based on Huang et al. (2016) and Jemison (1984), with necessary adaptation to the individual-level context. Due to the lack of existing measure for individual dynamic capabilities and the fact that dynamic capabilities remain hard to observe, we developed an instrument based on our conceptualization and related literature (Wollersheim and Heimeriks 2016).

Following Moore and Benbasat's (1991) procedures, we conducted card-sorting exercises to test the reliability and validity of the measures of individual dynamic capabilities, information processing and external representation. Two research assistants worked two rounds of card-sorting which achieved a 92.9% correct hit ratio, indicating a satisfactory level of reliability of the measurement items. We summarized the items and reference sources in the Appendix A. All items were measured via a seven-point Likert scale ranging from strongly disagree 1 to strongly agree 7.

A pilot study was then conducted to pre-test the proposed measurements using a sample of 68 employees in a Chinese firm in the educational industry. The pilot testing exhibited satisfactory level of goodness of fit, suggesting that we can proceed to a large-scale main survey.

We collected survey data from the undergraduate students of business school in a university in China on a voluntary basis. Business-major students were invited to complete a questionnaire regarding their social media use in daily life. Out of 300 distributed questionnaires, 257 valid responses were collected, representing an 85.67% response rate. The demographics are summarized in Table 1.

Table 1. Demographic Summary (N = 257)

Variable	Category	Frequency	Total (%)	Variable	Category	Frequency	Total (%)
Gender	Male	88	34.24	Level of Expert	Beginner	3	1.17
	Female	153	59.53		General User	201	78.21
	Undisclosed	16	6.23		Expert User	36	14.01
Age	18~19	56	21.79	History of Use	Undisclosed	17	6.61
	20~21	99	38.52		Under 1 Year	4	1.56
	22~23	36	14.01		[1, 2) Years	26	10.12
	Undisclosed	66	25.68		[2, 3) Years	41	15.95
Platform	PC	1	0.39		[3, 4) Years	36	14.01
	Mobile Device	103	40.08		[4, 5) Years	25	9.73
	Both	144	56.03		Over 5 Years	109	42.41
	Undisclosed	9	3.50		Undisclosed	16	6.23

Data Analysis and Results

Measurement Model

We assessed the reliability and validity of reflective measures using SPSS22.0. The factor loading scores on their expected factors are all above 0.70, with the factor loading scores much higher on their expected factors than on other factors, indicating acceptable indicator reliability and convergent validity (Barclay and Higgins 1995; Hulland 1999) (see Table 2).

Another criterion for evaluating convergent validity is that the average variance extracted (AVE) for each construct should be equal to 0.50 or greater (Fornell and Larcker 1981). Table 3 displays that all of the AVE values range from 0.561 to 0.761. The square roots of AVE on the diagonal are all above 0.70, which are greater than all other cross-correlations. This shows that all constructs capture more construct-related variance than error variance. Taken together, these results demonstrate adequate convergent and discriminant validity for all items used in this study (Fornell and Bookstein 1982).

Further, construct reliability was assessed by identifying the composite reliability scores, all of which are above 0.80 (also in Table 3), suggesting acceptable internal consistency. To ensure that multicollinearity did not pose a problem, collinearity diagnostics for constructs were conducted. The analysis results show that the scores of tolerance values and variance inflation factors are all well within the recommended area (Hair et al. 1995). Thus, we conclude that multicollinearity problem is unlikely to be a serious concern in this study.

Structural Model

The structural model was examined using SmartPLS 2.0. All hypotheses except for H1b was supported. The understanding use, orientation use and play use of social media positively affected information processing ($B_{H1a} = 0.242, p < 0.001$; $B_{H2a} = 0.180, p < 0.01$; $B_{H3a} = 0.277, p < 0.01$), thus supporting H1a, H2a and H3a. The orientation use ($B = 0.321, p < 0.001$) and play use ($B = 0.251, p < 0.01$) had significant impact on external representation, verifying H2b and H3b. As hypothesized, both information processing and external representation had significantly positive effects on individual dynamic capabilities. The results indicated that external representation ($B = 0.468, p < 0.001$) was a stronger predictor of individual dynamic capabilities than information processing ($B = 0.237, p < 0.001$). The variances explained (R-square) of information processing, external representation

Table 2. Principal Component Factor Analysis

Construct Items	1	2	3	4	5	6	7	8	9
Self-understandingUse1	.8340	.2066	.3902	.4195	.2730	.3509	.2805	.2655	.3282
Self-understandingUse2	.7951	.3798	.3806	.4436	.3588	.3390	.2623	.1646	.3159
Self-understandingUse3	.8643	.1989	.4029	.4825	.2727	.2918	.2736	.2838	.3883
Self-understandingUse4	.8372	.1852	.4483	.4427	.2213	.3312	.2650	.2729	.3542
SocialUnderstandingUse1	.1946	.7562	.2243	.1772	.4315	.2978	.4132	.2680	.3641
SocialUnderstandingUse2	.2565	.9067	.2081	.1679	.4502	.2938	.3128	.3037	.3642
SocialUnderstandingUse3	.2445	.8977	.2311	.1343	.3833	.2984	.3708	.2956	.3696
SocialUnderstandingUse4	.2764	.8931	.2017	.2326	.3793	.2296	.3791	.3042	.3827
ActionOrientationUse2	.3572	.2166	.8446	.4428	.2743	.3471	.3578	.4640	.4869
ActionOrientationUse3	.4056	.1909	.8424	.4706	.3055	.4061	.3280	.3930	.4497
ActionOrientationUse4	.4710	.2261	.8451	.5350	.3445	.4633	.3532	.4566	.5074
InteractionOrientationUse1	.3768	.1089	.4268	.8087	.2846	.3478	.2589	.3430	.3689
InteractionOrientationUse2	.5202	.2491	.5466	.9156	.3686	.4459	.3717	.3554	.4538
InteractionOrientationUse3	.4943	.1735	.5162	.8890	.3049	.4093	.3507	.3626	.4637
SolitaryPlayUse1	.2977	.4338	.3182	.3833	.8472	.5425	.3719	.3964	.4572
SolitaryPlayUse2	.1843	.3971	.2111	.2251	.7770	.3773	.2526	.2961	.2627
SolitaryPlayUse3	.2414	.3309	.2099	.1683	.8276	.4330	.2601	.2906	.3363
SolitaryPlayUse4	.3464	.4063	.4223	.3852	.8633	.6403	.3657	.4141	.4951
SocialPlayUse1	.3331	.1081	.3861	.4099	.3525	.7276	.3305	.3503	.3543
SocialPlayUse2	.3683	.3010	.4919	.4548	.5303	.8763	.4226	.4162	.5021
SocialPlayUse3	.2920	.2498	.3437	.3385	.5790	.8653	.4261	.3951	.4333
SocialPlayUse4	.3112	.3818	.3712	.3385	.5575	.8347	.4677	.4149	.4794
InformationProcessing1	.3163	.3625	.4572	.3357	.2759	.4250	.8015	.4383	.4359
InformationProcessing2	.2493	.2479	.2921	.2560	.1884	.3111	.7588	.3177	.3289
InformationProcessing3	.1559	.2298	.2031	.1743	.2158	.2502	.7005	.3326	.2226
InformationProcessing4	.2153	.4004	.2267	.3203	.4365	.4567	.7316	.4403	.3713
ExternalRepresentation2	.2396	.2518	.4562	.3169	.3320	.3640	.4487	.7727	.5098
ExternalRepresentation3	.2090	.2586	.3855	.2784	.3586	.3063	.3970	.8044	.4075
ExternalRepresentation4	.2970	.3362	.4195	.3751	.3483	.4055	.4297	.8504	.5382
IdiviudualDynamicCapabilities1	.3473	.3991	.4439	.3768	.4747	.4486	.5261	.4704	.7574
IdiviudualDynamicCapabilities2	.3289	.4069	.4018	.3764	.4161	.4102	.3345	.5041	.8491
IdiviudualDynamicCapabilities3	.2984	.2415	.5315	.4153	.3131	.3847	.3452	.4803	.7866
IdiviudualDynamicCapabilities4	.3552	.3126	.4477	.4089	.3238	.4722	.2817	.4828	.7965

Table 3. Reliability, Correlation Matrix, and Average Variance Extracted

High order Construct	Low order Construct	CR	AVE	SeUU	SoUU	IOU	AOU	SIPU	ScPU	IP	ER	DC
Understanding Use	SeUU	.901	.694	.833	—	—	—	—	—	—	—	—
	SoUU	.923	.749	.283**	.865	—	—	—	—	—	—	—
Orientation Use	AOU	.881	.712	.536**	.207**	.844	—	—	—	—	—	—
	IOU	.905	.761	.485**	.251**	.571**	.872	—	—	—	—	—
Play Use	SIPU	.898	.688	.334**	.476**	.368**	.207**	.829	—	—	—	—
	ScPU	.897	.686	.392**	.325**	.462**	.251**	.571**	.828	—	—	—
IP		.836	.561	.325**	.430**	.378**	.476**	.368**	.207**	.749	—	—
ER		.876	.702	.299**	.339**	.390**	.325**	.462**	.251**	.571**	.837	—
IDC		.875	.637	.417**	.429**	.494**	.430**	.378**	.476**	.368**	.584**	.798

Note: ** Correlation is significant at the $p < .01$ level (2-tailed). Diagonal elements are the square root of the AVE from their indicators. Off-diagonal elements are correlations between constructs. SeUU: Self-understanding Use; SoUU: Social Understanding Use; AOU: Action Orientation Use; IOU: Interaction Orientation Use; SIPU: Solitary Play Use; ScPU: Social Play Use; IP: Information Processing; ER: External Representation; IDC: Individual Dynamic Capabilities.

and individual dynamic capabilities were 33.5%, 33.4% and 38.5%, respectively. The R-square scores for all dependent variables, together with the factor loading, yielded an excellent goodness-of-fit for the whole research model (Chin 1998). All the control variables were insignificant (Figure 2).

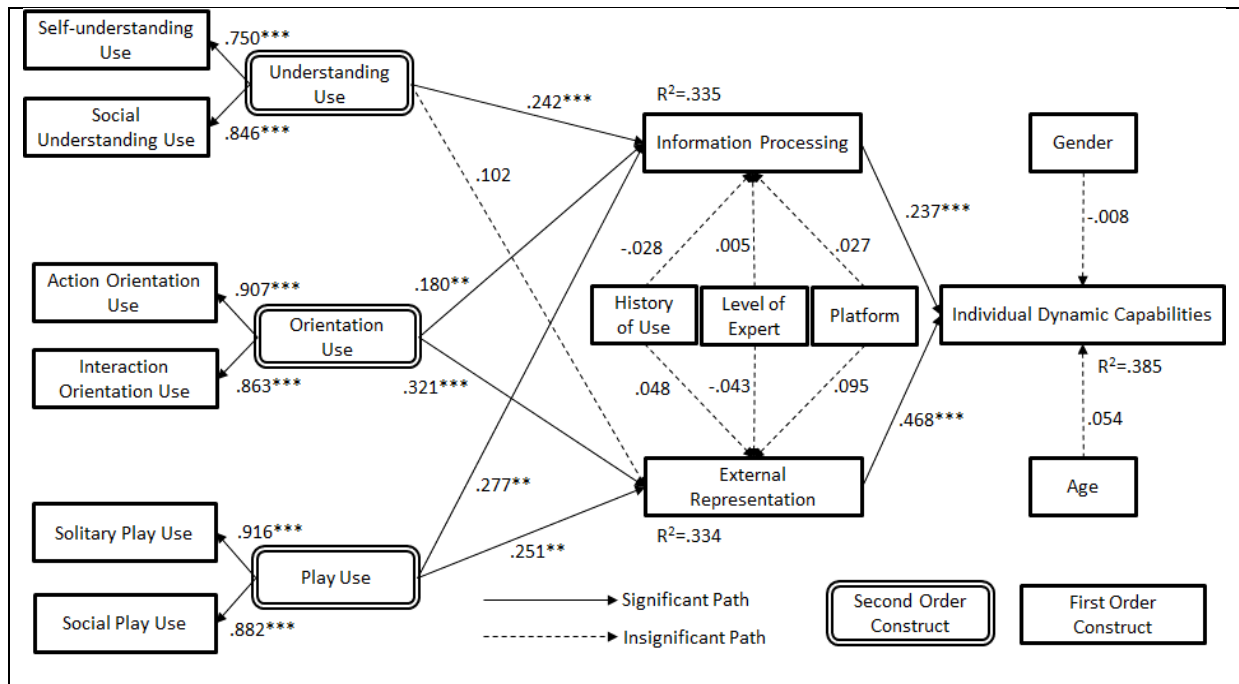


Figure 2. PLS Results of Structural Model

We further conducted a series of hierarchical regressions in SPSS 22.0 and found that the effect of understanding use on external representation is significant in ModelB1 and ModelB2 (as shown in Table 4), whereas this effect becomes insignificant in the ModelB3 (i.e., after play use is included into the model). This implies that the impact of play use on users’ external representation is so overwhelming that it shadows the effect of understanding use.

Table 4. Hierarchical regression analysis

Independent Variables in the Regression	Dependent Variables/Analysis Results								
	Information Processing			External Representation			Individual Dynamic Capabilities		
	ModelA1	ModelA2	ModelA3	ModelB1	ModelB2	ModelB3	ModelC1	ModelC2	ModelC3
Understanding Use	.476***	.336***	.239***	.391***	.173**	.070	.203***	.175**	.175**
Orientation Use	—	.278***	.180**	—	.434***	.330***	.358***	.337***	.255***
Play Use	—	—	.278***	—	—	.295***	.273***	.240***	.177**
Information Processing	—	—	—	—	—	—	—	.119*	—
External Representation	—	—	—	—	—	—	—	—	.294***
Model F	74.568	50.400	42.005	46.061	50.635	21.198	77.609	60.217	58.926
R ² (%)	22.6	28.4	33.2	15.3	29.4	34.8	47.9	48.9	54.0
Adjusted R ² (%)	22.3	27.8	32.5	15.0	28.8	34.1	47.3	48.1	53.1
ΔR ² (%)	22.6	5.8	4.8	15.3	14.1	5.5	47.9	0.9	5.1
Sig. of ΔR ²	.000	.000	.000	.000	.000	.000	.000	.032	.000
F Change	74.568	20.523	18.336	46.061	50.635	21.198	77.609	4.667	27.978

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

We also followed the approach of Baron and Kenny (1986) to examine if information processing and external representation mediated the effects of social media use on individual dynamic capabilities. First, all independent variables were significantly correlated with the mediators (see ModelA1-A3 and ModelB1-B3 in Table 4), except for the link between understanding use and external representation. Second, three types of social media use significantly influenced individual dynamic capabilities (ModelC1). Finally, when we controlled the effect of information processing (ModelC2), still, all independent variables significantly affected individual dynamic capabilities, indicating that the effect

of social media uses on individual dynamic capabilities was partially mediated by information processing. Similarly, when we controlled external representation in the regression, the results showed that all relationships are still significant, indicating partially mediating role of external representation.

Discussion

The objective of this research was to define individual dynamic capabilities and answer the questions of whether and how social media use helps forge an individual's dynamic capabilities. Our research model was largely supported by the empirical results. Firstly, the comprehensive use of social media (understanding use, orientation use and play use) benefits the development of individual dynamic capabilities. Secondly, the three types of social media use affect individual dynamic capabilities by facilitating the social media users' information processing and external representation behaviors. Thirdly, the underlying processes through which diverse social media use behaviors affect individual dynamic capabilities differ: understanding use contribute to individual dynamic capabilities through enhanced information processing, while action use and play use of social media affect individual dynamic capabilities through both information processing and external representation. We interpret this slight difference by highlighting the overwhelmingly positive effect of the play use of social media on external representation function, which is consistent with prior literature (Ali-Hassan et al. 2015). Finally, the path coefficient and effect size of information processing ($B = 0.237$, $p < 0.001$; $f^2 = 0.067$) and external representation ($B = 0.468$, $p < 0.001$; $f^2 = 0.262$) explicate that external representation is a stronger driver of individual dynamic capabilities than information processing.

Limitations and Future Research

We note that, as a very early trial of extending the concept of dynamic capabilities to individual level, this study relies on self-report data in a cross-sectional design. The concern on user privacy greatly limited possible access to individuals' behavioral data about their social media use. Although we have performed additional analyses to indicate that common method bias would not be a major concern in this study¹, future studies may include more objective instrument of the information processing and external representation behaviors. By combining perception and objective data and adopting a multi-wave and multi-source design, researchers can provide more persuasive evidence for the findings of this study. Observing and measuring individual dynamic capabilities from specific behaviors or cognitive processes (see Laureiro-Martínez et al., 2015) is another promising future direction.

Second, using students sample somewhat limits the generalizability of our findings. Although university students are typical social media users (Chen and Sharma 2015) and we did robustness check to avoid distorted pattern due to certain type of respondents, readers should be cautious when generalizing our findings to other contexts such as employees, professionals, or top managers. In particular, our respondents included more females than males, which may lead to some concern on the sample representativeness. Although we believe that our theoretical argument is generally applicable to a wide collection of population, future researchers are encouraged to recruit samples from different user segments and with equal gender distribution to test the proposed model and tease out the potential effects attributed to contextual or demographical factors in our sampling.

In addition, we did not focus on a specific type of social media in this study. To some extent, the general wording of social media might lead to perceived ambiguity on the respondents' side. We acknowledge that different social media tools or platforms could have some unique characteristics that have implications for users' information processing or external representation behaviors. Investigating such characteristics will enhance our understanding of social media use and its impact on the development of individual dynamic capabilities, which may be of interest to future researchers.

Theoretical and Practical Implications

This study makes contributions to the IS research in three aspects. First, organizational researchers

¹ The additional analysis was not included in this submission due to page limit. Available upon request.

started to question the traditional assumption that dynamic capabilities reside in firms alone more than a decade ago while overlooking of the role of individuals in developing this ability (Lane et al. 2006). However, the lack of theoretical advancement in the dynamic capabilities field has so far received little scholarly attention. We contribute to the stream of IS-enabled capability studies by exploring the concept of individual dynamic capabilities in the social media context, a significant yet under-studied theme. Building on the valuable insights from prior organizational studies (Helfat and Peteraf 2015; Wollersheim and Heimeriks 2016), we provide one of the first attempts in IS research to conceptualize and operationalize an individual's dynamic capability. Recognizing dynamic capability as a multilevel construct could have broader and fruitful implications in other IS research areas.

Second, following prior researchers' theory-guided categorization of social media use (Chiu & Huang, 2014), we provide additional argument and empirical support for the instrumental value of three types of social media use. A growing body of IS research has documented the beneficial role of social media in promoting job performance or achieving organizational effectiveness (e.g., Ali-Hassan et al. 2015; Beck et al. 2015; Davison et al. 2014), the marketing implications of social media (e.g., Phang et al. 2013; Xie and Lee 2015), and how different social media use would boost social communities participation (e.g., Chiu and Huang 2014; Oh and Syn 2015). We continue this important line of research by focusing specifically on the effects of social media on the development and advancement of individual dynamic capabilities. This attempt is timely and necessary because not only business employees but also the ordinary people in their daily life are required to become responsive and adaptive to the changing environment.

Third, recent IS research has investigated the phenomena of information seeking or knowledge sharing via enterprise social media (Beck et al. 2014; Leonardi 2015). In line with this focus, we take the theoretical lens of boundary spanning to explain the mechanisms by which social media use influences individual dynamic capabilities, thus contribute to the social media literature. Information processing is surely a significant value of social media applications, but external representation might be a vital function that people use most heavily on social media and that nobody would like to neglect if individual dynamic capabilities is concerned.

Finally, previous research on boundary spanning typically centers on the collective perspective, examining boundary spanners as the representative of a larger entity and in the context of performing for the sake of macro-level outcomes (e.g., Huang et al. 2016; Van Osch and Steinfield 2016). Our study conceptualizes information processing and external representation as the boundary spanning behaviors performed by individuals, for themselves. This conceptualization may be of interest to future researchers as a complement to the existing theoretical understanding of boundary spanning.

Our results also have implications for business managers and social media application developers. The instrumental value of social media use on cultivating individual dynamic capabilities suggests a positive reassessment toward people's dependence on social media (Wang et al. 2015). For example, managers may consider viable interfere measures to take advantages of employees' use of social media from the aspects of information processing and external representation, and to mitigate any potentially negative impact from the double-edged sword (Ali-Hassan et al. 2015; Ou and Davison 2011). Social media application designers may emphasize their instrumental values of their application on information seeking and external representation, even if in the niche market of gaming or entertainment.

Conclusion

Social media has brought the revolutionization in various aspects of our life, such as information seeking, communication, collaboration, and entertainment. This study presents a framework of social media enabled individual dynamic capabilities and empirically verifies that three types of social media use (i.e., understanding use, orientation use and play use) could be beneficial to individual users' information processing and external representation, which further help developing their individual dynamic capabilities for dealing with the rapid-changing environments. It provides a starting point for a more comprehensive understanding of developing individual abilities through social media use.

References

- Adner, R., and Helfat, C. E. 2003. "Corporate effects and dynamic managerial capabilities," *Strategic Management Journal* (24:10), pp. 1011-1025.
- Aldrich, H., and Herker, D. 1977. "Boundary spanning roles and organization structure," *Academy of Management Review* (2:2), pp. 217-230.
- Ali-Hassan, H., Nevo, D., and Wade, M. 2015. "Linking dimensions of social media use to job performance: the role of social capital," *Journal of Strategic Information Systems* (24:2), pp.65-89.
- Aral, S., Dellarocas, C., and Godes, D. 2013. "Introduction to the special issue—social media and business transformation: A framework for research," *Information Systems Research* (24:1), pp. 3-13.
- Ball-Rokeach, S. J. 1985. "The origins of individual media-system dependency a sociological framework," *Communication Research* (12:4), pp. 485-510.
- Ball-Rokeach, S. J., and DeFleur, M. L. 1976. "A dependency model of mass-media effects," *Communication Research* (3:1), pp. 3-21.
- Barclay, D., and Higgins, C. 1995. "The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration," *Technology Studies* (2:2), pp. 285-309.
- Barreto, I. 2010. "Dynamic capabilities: A review of past research and an agenda for the future," *Journal of Management* (36:1), pp. 256-280.
- Beck, R., Pahlke, I., and Seebach, C. 2014. "Knowledge exchange and symbolic action in social media-enabled electronic networks of practice: A multilevel perspective on knowledge seekers and contributors," *MIS Quarterly* (38:4), pp. 1245-1269.
- Cao, Q., Lu, Y., Dong, D., Tang, Z., and Li, Y. 2013. "The roles of bridging and bonding in social media communities," *Journal of the Association for Information Science and Technology* (64:8), pp. 1671-1681.
- Chen, R., and Sharma, S. K. 2015. "Learning and self-disclosure behavior on social networking sites: the case of Facebook users," *European Journal of Information Systems* (24:1), pp. 93-106.
- Cheung, C. M. K., Liu, I. L. B., and Lee, M. K. O. 2015. "How online social interactions influence customer information contribution behavior in online social shopping communities: a social learning theory perspective," *Journal of the Association for Information Science and Technology* (66:12), pp. 2511-2521.
- Chin, W. W. 1998. "Commentary: Issues and opinion on structural equation modeling," *MIS Quarterly* (22:1), pp. vii-xvi.
- Chiu, C. M., and Huang, H. Y. 2015. "Examining the antecedents of user gratification and its effects on individuals' social network services usage: the moderating role of habit," *European Journal of Information Systems* (24:4), pp. 411-430.
- Cohen, W. M. and Levinthal, D. A. 1990. "Absorptive capacity: A new perspective on learning and innovation," *Administrative Science Quarterly* (35), pp. 128-152.
- Cui, X. 2017. "In- and extra-role knowledge sharing among information technology professionals: The five-factor model perspective," *International Journal of Information Management* (37:5), pp. 380-389.
- Davison, R. M., Ou, C. X. J., Martinsons, M. G., Zhao, A. Y., and Du, R. 2014. "The communicative ecology of web 2.0 at work: social networking in the workspace," *Journal of the Association for Information Science and Technology* (65:10), pp. 2035-2047.
- Deci, E. L., and Ryan, R. M. 2000. "The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior," *Psychological inquiry* (11:4), pp. 227-268.
- Dholakia, U. M., Bagozzi, R. P., and Pearo, L. K. 2004. "A social influence model of consumer participation in network- and small-group-based virtual communities," *International Journal of Research in Marketing* (21:3), pp. 241-263.
- Dong, J. Q., and Wu, W. 2015. "Business value of social media technologies: evidence from online user innovation communities," *Journal of Strategic Information Systems* (24:2), pp. 113-127.
- Fornell, C., and Bookstein, F. L. 1982. "Two structural equation models: lisrel and pls applied to consumer exit-voice theory," *Journal of Marketing Research* (19:4), pp. 440-452.
- Fornell, C., and Larcker, D.F. 1981. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research* (18:1), pp. 39-50.

- Gil de Zúñiga, H., Jung, N., and Valenzuela, S. 2012. "Social media use for news and individuals' social capital, civic engagement and political participation," *Journal of Computer - Mediated Communication* (17:3), pp. 319-336.
- Granovetter, M. 1985. "Economic action and social structure: The problem of embeddedness," *American Journal of Sociology* (91:3), pp. 481-510.
- Gray, P. H., and Meister, D. B. 2004. "Knowledge sourcing effectiveness," *Management Science* (50:6), pp. 821-834.
- Hair, J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. 1995. *Multivariate data analysis with readings (4th ed.)*. Englewood Cliffs, USA: Prentice Hall.
- Helfat, C. E., and Martin, J. A. 2015. "Dynamic managerial capabilities: Review and assessment of managerial impact on strategic change," *Journal of Management* (41:5), pp. 1291-1312.
- Helfat, C. E., and Peteraf, M. A. 2015. "Managerial cognitive capabilities and the microfoundations of dynamic capabilities," *Strategic Management Journal* (36:6), pp. 831-850.
- Henseler, J., Ringle, C. M., and Sinkovics, R. R. 2009. "The use of partial least squares path modeling in international marketing," In Sinkovics, R. R., and Ghauri, P. N. (Eds.), *New challenges to international marketing* (pp. 277 – 319). Bingley, UK: Emerald Group Publishing Limited.
- Huang, Y., Luo, Y., Liu, Y., and Yang, Q. 2016. "An investigation of interpersonal ties in interorganizational exchanges in emerging markets: A boundary-spanning perspective," *Journal of Management* (42:6), pp. 1557-1587.
- Hulland, J. 1999. "Use of partial least squares (PLS) in strategic management research: A review of four recent studies," *Strategic Management Journal* (20:2), pp. 195-204.
- Thong, J. L., Lowry, P. B., Wallace, L., and Warkentin, M. 2017. "The effect of belongingness on obsessive-compulsive disorder in the use of online social networks," *Journal of Management Information Systems* (34:2), pp. 863-901.
- Jemison, D. B. 1984. "The importance of boundary spanning roles in strategic decision-making," *Journal of Management Studies* (21:2), pp. 131-152.
- Jin X. L., Lee, M. O., and Cheung, C. K. 2010. "Predicting continuance in online communities: model development and empirical test," *Behaviour and Information Technology* (29:4), pp. 383-394.
- Kane, G. C., Alavi, M., Labianca, G., and Borgatti, S. P. 2014. "What's different about social media networks? a framework and research agenda," *MIS Quarterly* (38:1), pp. 275-304.
- Kor, Y. Y., and Mesko, A. 2013. "Dynamic managerial capabilities: Configuration and orchestration of top executives' capabilities and the firm's dominant logic," *Strategic Management Journal* (34:2), pp. 233-244.
- Lane, P. J., Koka, B. R., and Pathak, S. 2006. "The reification of absorptive capacity: a critical review and rejuvenation of the construct," *Academy of Management Review* (31:4), pp. 833-863.
- Laroche, M., Habibi, M. R., and Richard, M. O. 2013. "To be or not to be in social media: How brand loyalty is affected by social media?" *International Journal of Information Management* (33:1), pp. 76-82.
- Leonardi, P. M. 2015. "Ambient awareness and knowledge acquisition: Using Social Media to learn 'who knows what' and 'who knows whom'," *MIS Quarterly* (39:4), pp. 747-762.
- Limaj, E., Bernroider, E. W., and Choudrie, J. 2016. "The impact of social information system governance, utilization, and capabilities on absorptive capacity and innovation: A case of Austrian SMEs," *Information & Management* (53:3), pp. 380-397.
- Liu, D., Santhanam, R., and Webster, J. 2017. "Toward meaningful engagement: A framework for design and research of gamified information systems," *MIS Quarterly* (41:4), pp. 1011-1034.
- Longman, H., O'Connor, E., and Obst, P. 2009. "The effect of social support derived from World of Warcraft on negative psychological symptoms," *CyberPsychology and Behavior* (12:5), pp. 563-566.
- Marrone, J. A., Tesluk, P. E., and Carson, J. B. 2007. "A multilevel investigation of antecedents and consequences of team member boundary-spanning behavior," *Academy of Management Journal* (50:6), pp. 1423-1439.
- Martin, J. A. 2011. "Dynamic managerial capabilities and the multibusiness team: The role of episodic teams in executive leadership groups," *Organization Science* (22:1), pp. 118-140.

- Moore, G. C., and Benbasat, I. 1991. "Development of an instrument to measure the perceptions of adopting an information technology innovation," *Information Systems Research* (2:3), pp. 192-222.
- Oh, O., Agrawal, M., and Rao, H. R. 2013. "Community intelligence and social media services: A rumor theoretic analysis of tweets during social crises," *MIS Quarterly* (37:2), pp. 407-426.
- Oh, S., and Syn, S. Y. 2015. "Motivations for sharing information and social support in social media: A comparative analysis of Facebook, Twitter, Delicious, YouTube, and Flickr," *Journal of the Association for Information Science and Technology* (66:10), pp. 2045-2060.
- Ou, C. X., and Davison, R. M. 2011. "Interactive or interruptive? Instant messaging at work," *Decision Support Systems* (52:1), pp. 61-72.
- Ou, C. X., and Davison, R. M. 2016. "Shaping guanxi networks at work through instant messaging," *Journal of the Association for Information Science and Technology* (67:5), pp. 1153-1168.
- Park, S. H., and Luo, Y. 2001. "Guanxi and organizational dynamics: Organizational networking in Chinese firms," *Strategic Management Journal* (22:5), pp. 455-477.
- Pee, L. G., Koh, E., and Goh, M. 2018. "Trait motivations of crowdsourcing and task choice: A distal-proximal perspective," *International Journal of Information Management* (40), pp. 28-41.
- Phang, C. W., Zhang, C., and Sutanto, J. 2013. "The influence of user interaction and participation in social media on the consumption intention of niche products," *Information and Management* (50:8), pp. 661-672.
- Ray, S., Kim, S. S., and Morris, J. G. 2014. "The central role of engagement in online communities," *Information Systems Research* (25:3), pp. 528-546.
- Stieglitz, S., and Linh, D.-X. 2013. "Emotions and information diffusion in social media—sentiment of microblogs and sharing behavior," *Journal of Management Information Systems* (29:4), pp. 217-248.
- Teece, D. J., Pisano, G., and Shuen, A. 1997. "Dynamic capabilities and strategic management," *Strategic Management Journal* (18:7), pp. 509-533.
- Van der Heijden, H. 2004. "User acceptance of hedonic information systems," *MIS Quarterly* (28:4), pp. 695-704.
- Vasalou, A., Joinson, A., Bänziger, T., Goldie, P., and Pitt, J. 2008. "Avatars in social media: Balancing accuracy, playfulness and embodied messages," *International Journal of Human-Computer Studies* (66:11), pp. 801-811.
- Wang, C., Lee, M. K., and Hua, Z. 2015. "A theory of social media dependence: Evidence from microblog users," *Decision Support Systems* (69), pp. 40-49.
- Wang, W. Y., Pauleen, D. J., and Zhang, T. 2016. "How social media applications affect B2B communication and improve business performance in SMEs," *Industrial Marketing Management* (54), pp. 4-14.
- Wilden, R., and Gudergan, S. P. 2015. "The impact of dynamic capabilities on operational marketing and technological capabilities: Investigating the role of environmental turbulence," *Journal of the Academy of Marketing Science* (43:2), pp. 181-199.
- Wilden, R., Devinney, T. M., and Dowling, G. R. 2016. "The architecture of dynamic capability research identifying the building blocks of a configurational approach," *The Academy of Management Annals* (10:1), pp. 997-1076.
- Windeler, J. B., Maruping, L., and Venkatesh, V. 2017. "Technical systems development risk factors: The role of empowering leadership in lowering developers' stress," *Information Systems Research* (28:4), pp. 775-796.
- Winter, S. G. 2013. "Habit, deliberation, and action: Strengthening the microfoundations of routines and capabilities," *The Academy of Management Perspectives* (27:2), pp. 120-137.
- Wollersheim, J., and Heimeriks, K. H. 2016. "Dynamic capabilities and their characteristic qualities: Insights from a lab experiment," *Organization Science* (27:2), pp. 233-248.
- Wright, P. M., Coff, R., and Moliterno, T. P. 2014. "Strategic human capital: Crossing the great divide," *Journal of Management* (40:2), pp. 353-370.
- Xie, K., and Lee, Y. J. 2015. "Social media and brand purchase: Quantifying the effects of exposures to earned and owned social media activities in a two-stage decision making model," *Journal of Management Information Systems* (32:2), pp. 204-238.

- Yates, D., and Paquette, S. 2011. "Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake," *International journal of information management* (31:1), pp. 6-13.
- Zahra, S. A., and George, G. 2002. "Absorptive capacity: A review, reconceptualization, and extension," *Academy of Management Review* (27:2), pp. 185-203.

Appendix A. Measures

Self-understanding use (Adapted from Chiu and Huang 2015)
SeUU1: Using social media helps me gain insights into my own personality.
SeUU2: Using social media helps me gain insights into my own interests.
SeUU3: Using social media helps me gain insights into my own capacity.
SeUU4: Using social media helps me gain insights into my own values.
Social understanding use (Adapted from Chiu and Huang 2015)
SoUU1: The information obtained from social media helps me stay on top of what is happening in the world.
SoUU2: The information obtained from social media helps me find out how my country is doing.
SoUU3: The information obtained from social media helps me keep up with world events.
SoUU4: The information obtained from social media helps me immediately obtain information about big news.
Action orientation use (Adapted from Chiu and Huang 2015)
AOU1: The information obtained from social media helps me cope with everyday problems.
AOU2: The information obtained from social media helps me plan activities.
AOU3: Using social media helps me solve my problems.
AOU4: The information obtained from social media helps me understand how to behave in crises.
Interaction orientation use (Adapted from Chiu and Huang 2015)
IOU1: Using social media helps me discover better ways to communicate with others.
IOU2: Using social media helps me think about how to act with others.
IOU3: Using social media helps me get ideas about how to approach others in important or difficult situations.
IOU4: Using social media helps me find something interesting to say when starting a conversation.
Solitary play use (Adapted from Chiu and Huang 2015)
SIPU1: Using social media enables me to relax.
SIPU2: Using social media enables me to pass the time, especially when I'm bored.
SIPU3: I can amuse myself by using social media.
SIPU4: Using social media increases my enjoyment.
Social play use (Adapted from Chiu and Huang 2015)
SoPU1: Using social media gives me something to do with my friends.
SoPU2: Using social media lets me have fun with friends.
SoPU3: Using social media provides a leisure space for me and my friends.
SoPU4: Using social media gives me more topics to discuss with friends afterwards.
Information processing (Based on Huang et al. 2016; Aldrich and Herker 1977)
IP1: I inform my contacts on social media external information in advance of changing need.
IP2: I filter out unimportant information on social media by evaluating its value or importance.
IP3: I selectively act on relevant information from social media.
IP4: I keep my contacts on social media informed about information or events or changes that may affect them
IP5: I summarize and direct information to people who need it via social media.
External representation (Based on Huang et al. 2016; Jemison 1984)
ER1: I establish effective communication with people in different groups.
ER2: I can complete the cooperation with colleagues, customers, and friends.
ER3: When conflict occurs, I try my best to reach a joint solution to the problem representing both parties' interests.
ER4: I invite my social media contacts to post some information to conform to my needs.
Individual dynamic capabilities (Self developed based on Wollershsm and Heimeriks 2016)
IDC1: I can efficiently use new information and resources externally to enhance my adaptability.
IDC2: I can utilize and coordinate available resources to cope with changes in the external environment.
IDC3: I am able to sense opportunities and change my action sequences according.
IDC4: I display greater deliberation in action over time.