

# Examining the Effects of Intellectual Capital on Dynamic Capabilities in Emerging Economy Context: Knowledge Management Processes as a Mediator

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## Abstract

This study aims to examine the effects of intellectual capital on dynamic capabilities and the mediating role of knowledge management processes. Based on the review of literature, a research model was proposed to examine this quantitative relationship. The model was empirically tested using 679 responses from the banking industry in India and applying Structural equation modeling analysis. It was found that intellectual capital with its three dimensions has significant effect on dynamic capabilities. Concerning to mediating role of knowledge management process, two patterns of association was found: Knowledge management process partially mediates the effect of organizational capital on dynamic capabilities and fully mediates the effect of human capital and social capital on dynamic capabilities. Based on these empirical insights, inferences and future avenues are further discussed in detail.

## Keywords

Intellectual Capital, human capital, social capital, organizational capital, knowledge management process, dynamic capabilities

## Introduction

With the increasing market dynamism and global competition, the topic of dynamic capability has carved a significant place for itself in the research domain. It has become a need of the hour rather

than an option to ensure firms growth and competitiveness (Chien & Tsai, 2012; Eisenhardt & Martin, 2000; Helfat & Peteraf, 2009; Lin & Wu, 2014; Teece, Pisano, & Schuen, 1997; Tseng & Lee, 2014; Zahra, Sapienza, & Davidsson, 2006).

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This intensifying need has garnered the strategic concern of research folks and practitioners towards the question: What facilitates dynamic capabilities? And improving the understanding of the precursors of dynamic capability has been the subject of numerous contributions, which recognized the role of knowledge management (e.g., Prieto & Easterby-Smith, 2006; Tseng & Lee, 2014; Van Reijnsen, Helms, Batenburg, & Foorthuis, 2014), organizational learning-culture, organizational-process-alignment (Hung, Yang, Lien, McLean, & Kuo, 2010; Hung, Lien, & McLean, 2009), knowledge-resources (Ambrosini & Bowman, 2009; Chien & Tsai, 2012; Eisenhardt & Martin, 2000; Griffith, Noble, & Chen, 2006; Lin & Wu, 2014; McKelvie & Davidsson, 2009; Nieves & Haller, 2014; Verona & Ravasi, 2003; Wang & Ahmed, 2007; Wu, 2006; Zollo & Winter, 2002) and others.

Interestingly, in spite of this much consideration on what factors stimulate the development of dynamic capabilities, little empirical inquiry had explored the effects of intellectual capital (Hsu & Sabherwal, 2012; Hsu & Chao-Hung Wang, 2012) defined as the sum of organizational knowledge resources (Youndt, Subramaniam, & Snell, 2004). Often, inquiries had to rely upon high-technology firms to infer this linkage. Studies addressing this subject in the banking are limited. Besides, rarely the facets of intellectual capital have been examined, even when inquiries have cited these (Hsu & Sabherwal, 2012). From this, the effects of intellectual capital with its facets is still open for investigation and linkages of different knowledge-based resources and dynamic capability has yet waiting for clarification (Easterby-Smith, Lyles, & Peteraf, 2009; Nieves & Haller, 2014; Prieto & Easterby-Smith, 2006).

Knowledge-based-view (KBV) and dynamic-capability-view (DCV) maintain that knowledge-based resources act as a base for facilitating knowledge flow in organizational learning processes, which forms an essential mechanism for building dynamic

capabilities (Ambrosini, Bowman, & Collier, 2009; Chien & Tsai, 2012; Grant, 1996a, 1996b; Kogut & Zander, 1992; Lin & Wu, 2014; Nieves & Haller, 2014; Nonaka & Takeuchi, 1995; Teece et al., 1997). These thoughts emphasize the role of knowledge management process in leveraging, integrating, and reconfiguring knowledge-based-assets that is significantly associated with dynamic capabilities (Nielsen, 2006). This thought is constant with Pandza, Horsburgh, Gorton, and Polajnar (2003) submission that the process through which firm gains its abilities cannot be disconnected from how it obtains its knowledge. From this, the effect of intellectual capital on dynamic capabilities is far from immediate and it is through a mechanism, that is, knowledge management process. However, it is disappointing to annotate that the role of knowledge management process as an intervening mechanism between intellectual capital and dynamic capabilities is still underscored in the literature. In fact, there is hardly any research examining the processes that explain the path of dynamic capabilities development through the deployment of firm resources and execution of knowledge processes (Easterby-Smith et al., 2009). This continues the subsequent questions unanswered: Does intellectual capital effect the development of dynamic capabilities? Is the effect of intellectual capital is mediated by knowledge management process?

To address these gaps, from the theoretical foundation of resource-based view (RBV), KBV and DCV, this study theorizes the notion that the intellectual capital will affect dynamic capabilities both directly and indirectly by facilitating and strengthening firms' knowledge management process.

This study tested the research model in the banking industry in India. Being a knowledge-intensive sector, banking industry entails a higher stock of knowledge primarily in terms of competence and skills (human capital), network relations between employees and clients (social capital) and technological knowledge (organizational capital) to make competitive strategies, create value, and sustain their competitiveness (Kamath, 2008;

Mondal & Ghosh, 2012). These resources epitomize dynamic capabilities which create, integrate as well as reconfigure resources base to address changing business milieus (Teece et al., 1997) and can be developed through learning, repetitive practice, specific knowledge process and codified knowledge stored into formal procedures (Eisenhardt & Martin, 2000). Thus considering the significance of knowledge (intellectual capital), knowledge process (knowledge management process) for building dynamic capabilities, the examination of intellectual capital, and knowledge management with reference to evolution of dynamic capabilities is vital for banking industry. As India has become unified into the global economy and has been constantly evolving and diversifying, the economic and financial milieu in which the Indian banking firm is operating is also changing dynamically and in turn generates fierce global and domestic competition. They need directions how to integrate their assets and improve their ability to achieve sustainable operations (Kamath, 2007; Mondal & Ghosh, 2012). Here, dynamic capability emerged as a vital driver for corporate growth and for sustaining competitive advantage. It is indispensable for the banks to focus and invest in dynamic capabilities for addressing environmental fluctuations and in turn sustaining their competitiveness. Additionally prior studies were conducted specifically in developed economies, and, therefore, limit the applicability of findings in emerging economies like India. From this Indian context offers a robust setting for examining aforesaid research questions and such models.

The present study surveyed 679 managers of banking firms in India and employed structural-equation-modeling (SEM) to investigate the research hypothesis.

The remaining part of the study has the following arrangement. Theoretical background and hypothesis development are covered in this introductory section. Methodology and results are demonstrated next. Discussion along with implications deliberated

subsequently. Finally, limitations, research directions and conclusions have been pondered.

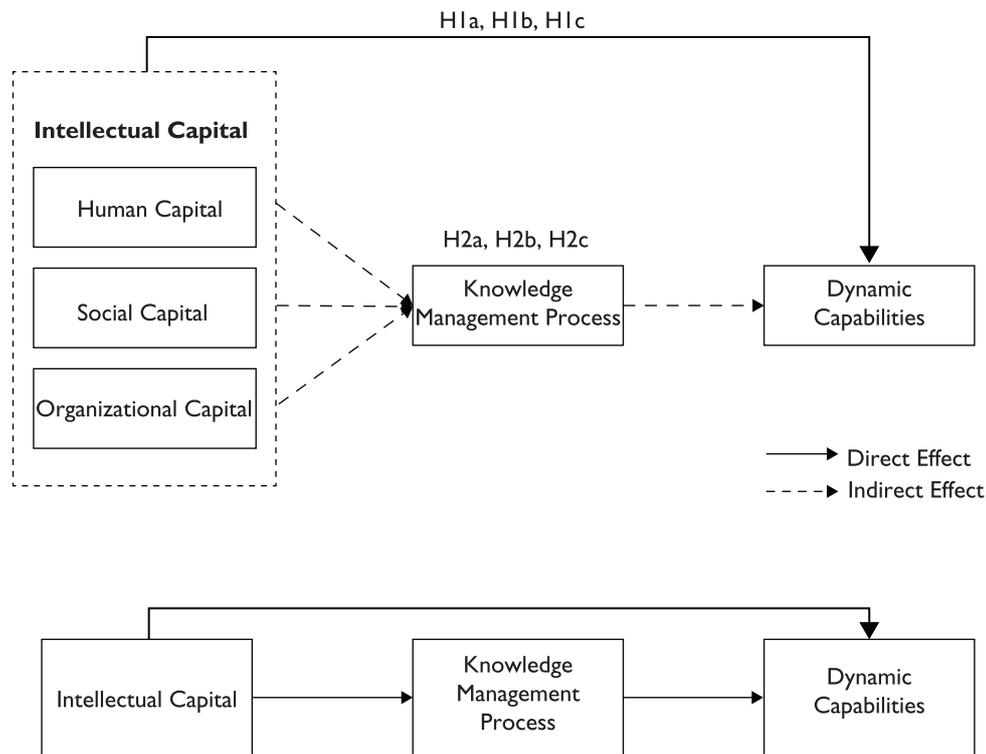
## Theoretical Perspectives

### *Research Framework and Hypothesis Development*

To realize the theorization of the study, research framework was developed that explains the linkages among the constructs to be studied. The research framework is illustrated in Figure 1. In fact, the framework elucidates that intellectual capital affects dynamic capabilities directly and via the mediation of via knowledge management process. In doing so, the study draws on the theoretical foundation of RBV, KBV and DCV. RBV and KBV paradigm offers the base for expecting intellectual capital to foster the knowledge management process; RBV and DCV recognize associations of resources and capabilities, whereas DCV and KBV identify knowledge-resources as the foundation for knowledge processes resulted in capability development.

### *Intellectual Capital and Dynamic Capabilities*

Researchers have defined dynamic capability as “organizational and strategic routines by which firms achieve new resource configuration” (Eisenhardt & Martin, 2000), “create, extend or modify its resource base” (Hefat et al., 2007), and “routines in the manner envisioned and deemed appropriate” (Zahra et al., 2006) in order to elevate “firm’s potential to systematically solve problems” (Barreto, 2010), and “seize opportunities quickly and proficiently” (Teece, 2000), to achieve firm’s effectiveness (Zollo & Winter, 2002) and competitiveness (Teece, 2007). All of these definitions suggest the nature of dynamic capability and highlight the process through which ultimate goal of firm, that is, sustained competitiveness can be achieved. In the present study, dynamic capability is the resource integration and reconfiguration



**Figure 1. Conceptual Model and Hypotheses**

ability of the firm to respond rapidly fluctuating business conditions (Teece et al., 1997) comprise integration and reconfiguration capability. Integration capability refers the capacity of the firm, to determine the existing resource value, integrate them, and thereby develop new resource base and capabilities. Reconfiguration capability refers the recombination and transformation of existing resources and assets to empower firm's to acclimatize fluctuating market conditions.

With increasing competition, dynamic capability has become an indispensable element in the success of the firm and one of the strategic driving forces for elevating their performance and sustaining competitiveness. Teece et al. (1997) cited knowledge as an impacting factor for nature and evolution of dynamic capabilities.

Along these lines, numerous studies have considered knowledge explanations towards this phenomenon (Lin & Wu, 2014; McKelvie & Davidsson, 2009; Nieves & Haller, 2014; Reijssen et al., 2014; Verona & Ravasi, 2003). However, provide a partial explanation (Nieves & Haller, 2014; Prieto & Easterby-Smith, 2006). Literature demands further research to clarify the linkage between different types of knowledge resources and dynamic capabilities (McKelvie & Davidson, 2009; Nieves & Haller, 2014; Prieto & Easerby-Smith, 2006).

Considering these shortcomings, this study expects that firms will be more likely to develop dynamic capabilities when they possess intellectual capital, defined as sum of organizational knowledge resources which lies inside as well as outside the

facets of the organization (Subramaniam & Youndt, 2005; Youndt et al., 2004). Intellectual capital in this study, is defined as a multifaceted concept, comprises three dimensions. First, human capital that represent knowledge, competencies, skills, and capabilities existed in and used by employees of the firm. Second, social capital that represents the knowledge vested in interactions of individuals and networks of relationships. Third, organizational capital that is institutionalized knowledge and experience which are codified and stored in systems, databases, manuals, structures, processes, routines, patents and alike (Subramaniam & Youndt, 2005; Youndt et al., 2004).

### *Human Capital and Dynamic Capabilities*

Human-capital theory recommends that personals having higher levels of knowledge, skills, and experiences are capable of identifying potential opportunities and threats (McKelvie & Davidsson, 2009), predicting their outcomes, and adapting new circumstances (Teece, 2007) by acquiring, applying, and transferring required valuable knowledge (Hitt, Bierman, Shimizu, & Kochhar, 2001) and effectively integrating, reconfiguring and reallocating resources and capabilities (Ambrosini et al., 2009; Teece, 2007). Human capital hence, emboldens the renewal of the resource base and ensures the realization of dynamic capabilities.

Macher and Mowery (2009) mentioned that dynamic capabilities reside in knowledge articulation and codification that is affected by management decisions. Ambrosini et al. (2009) mentioned top management's perception and vision for changes as a determining factor for reconfiguration of resources. Augier and Teece (2009) and Hsu and Chao-Hung Wang (2012) argued that combination, integration and reconfiguration of resources are contingent on human capital. Recently, Nieves and Haller (2014) also maintain that employees' knowledge and skills encourage the renewal of firm's resource base and augment

dynamic capabilities. All of these opinions suggest that firms with human capital stock will be capable enough to identify the need for change and develop their dynamic capabilities. Thus, human capital acts as a vital element for building dynamic capabilities. Therefore, the present study hypothesizes:

***H1a. Human Capital has an Effect on Dynamic Capabilities (Integration and Reconfiguration).***

### *Social Capital and Dynamic Capabilities*

Social exchange theory suggests that firm's possession of social capital supports organizational learning processes and elevates information and resource advantage among network cohorts (Kemper, Schilke, & Brettel, 2013; Nahapiet & Ghoshal, 1998). These processes facilitate integration and reconfiguration of firm's resources and make them enable to develop set of capabilities for faster response to environmental challenges (Blyler & Coff, 2003; Eisenhardt & Martin, 2000; Ethiraj, Kale, Krishnan, & Singh, 2005; Grant, 1996a; Jiang Tao, & Santoro, 2010; Zollo & Winter, 2002). It submits that social capital is crucial for developing dynamic capabilities.

Bruni and Verona (2009) promoted social network building, a contingent factor behind the occurrence of dynamic capabilities. Kemper et al. (2013) posit that top management's social capital facilitates key information and supports effective access to the resources indispensable for building organizational capabilities. Van Reijssen et al. (2014) declare that social capital is a mechanism to realize the potential influence of knowledge on dynamic capabilities. These thoughts advocate, as long as, firms possess a social capital; they can elevate their know-how to integrate and reconfigure resources. Thus, social capital and dynamic capabilities share a relationship. Therefore, the present study hypothesizes:

***H1b. Social Capital has an Effect on Dynamic Capabilities (Integration and Reconfiguration).***

### Organizational Capital and Dynamic Capabilities

Researchers maintain that organizational capital supports information exchange among network partners (Youndt et al., 2004) and accelerate the acquisition, internalization and articulation of new resource base (Zollo & Winter, 2002) thereby funds knowledge enhancement and utilization (Hsu & Chao-Hung Wang, 2012). It suggests that organizational capital supports the acquisition of capabilities required for sustainable competitiveness. Literature highlights the value of information technology for knowledge codification, in which dynamic capabilities are deeply rooted (Easterby-Smith et al., 2009; Macher & Mowery, 2009; Sher & Lee, 2004).

Subramaniam and Youndt (2005) stated that institutionalized knowledge empowers firm to reinforce its prevailing knowledge and facilitates innovative capabilities. Hsu & Chao-Hung Wang (2012) argued that organizational capital facilitates knowledge accumulation and utilization and further effect the creation of dynamic capabilities. Collating this discussion organizations possessing organizational capital will be in a position to build dynamic capabilities. Therefore, the present study hypothesizes:

***H1c. Organizational Capital has an Effect on Dynamic Capabilities (Integration and Reconfiguration).***

### Mediating Role of Knowledge Management Process

KBV and DCV theories underlie that firm's knowledge resource forms a basis for building capabilities through fostering knowledge management processes: that support new knowledge flows and constitute a basic mechanism for developing capabilities (Ambrosini et al., 2009; Grant 1996a and 1996b; Teece et al., 1997). Researchers advocated knowledge management as effective

predictor of dynamic capabilities (Cepeda & Vera, 2005; Gold, Malhotra, & Segars, 2001; Van Reijnsen et al., 2014; Sher & Lee, 2004; Tseng & Lee, 2014) and cited that firm's knowledge management process encapsulates learning mechanisms, supports the acquisition, exploration and exploitation of knowledge-based assets and provides input into activities, essential for dynamic capabilities (Prieto & Easterby-Smith, 2006). Likewise, numerous studies validated that intellectual capital influences knowledge management processes (Cohen & Levinthal, 1990; Hsu & Sabherwal, 2011 and 2012; Seleim & Khalil, 2011). These thoughts accentuate the role of knowledge management process in leveraging and reconfiguring knowledge assets (Nielsen, 2006). Hence, the knowledge management process, not only acts as an outcome of intellectual capital and a precursor for dynamic capabilities, but also can act as an intermediate between intellectual capital and dynamic capabilities of the firm. Despite this intensive notion, the role of knowledge management process as an intervening mechanism between is still underscored in the management literature. This study theorizes that apart from the simple, direct influence of intellectual capital on dynamic capabilities discussed above, dynamic capabilities may be developed through knowledge management process, induced by intellectual capital. This thought is constant with Pandza et al's (2003) submission that the process through which firm gains its abilities cannot be disconnected from how it obtains its knowledge.

This study conceptualizes knowledge management process construct as, the process of acquisition, application and transfer of knowledge-based-assets to achieve the firm's goal (Gold et al., 2001). Knowledge acquisition refers to the process of acquiring new knowledge by an organization from data, information, or knowledge available within organization. Knowledge application refers to the process focused on the actual usage of knowledge to perform certain tasks. Knowledge transfer refers to the process focused on the exchange of knowledge

from individuals to groups or from one individual to another or else from one group to another.

### *Human Capital, Knowledge Management Process, Dynamic Capabilities*

Literature maintains that knowledgeable and experienced employees support learning and empower firms to acquire, develop, transfer, and manage knowledge-related assets thereby elevate knowledge management process (Cohen & Levinthal, 1990; Grant, 1996a; Hsu & Sabherwal, 2011; Seleim & Khalil, 2011; Wiig, 1997) considered essential for resource base integration and reconfiguration (Grant, 1996a and 1996b; Prieto & Easterby-Smith, 2006; Tseng & Lee, 2014; Teece et al., 1997). This suggests that human capital could exert its influence on dynamic capabilities through cultivating knowledge management processes, apart from its direct impact.

These arguments are constant with the implicit influence of knowledge resources on knowledge management process and their influence on dynamic capabilities as per RBV, KBV, and DCV. It is summarized that knowledge management process constitutes the mechanism through which human capital provides input for creating, applying, and transferring newly acquired knowledge (Argote, Mcevily, & Reagans, 2003) and supports the renewal of the resource base that have bearing on dynamic capabilities. Therefore, this study hypothesizes:

***H2a. Knowledge Management Process Mediates the Positive Linkage between Human Capital and Dynamic Capabilities.***

### *Social Capital, Knowledge Management Process, Dynamic Capabilities*

Researchers posit that social capital builds social relationship and supports learning that encourages individuals, enhances their capabilities, and open prospects to create, acquire, apply, and transfer knowledge resources (Argote et al., 2003; Hsu &

Sabherwal, 2011 and 2012; Prieto & Easterby-Smith, 2006; Seleim & Khalil, 2011). These knowledge management processes enhance integration and reconfigure process of resources, internal and external both, and in turn develop dynamic capabilities as per KBV and DCV (Cepeda & Vera, 2007; Prieto & Easterby-Smith, 2006; Tseng & Lee, 2014). Thus, social capital shares positive association with knowledge management process that is positively associated with the cultivation of dynamic capabilities.

For instance, social capital associated with social ties (Tsai & Ghoshal, 1998) provides necessary input into knowledge flows and drives knowledge management processes (Manning, 2010) to support the utilization of extant knowledge and processes: that have significant bearing on dynamic capabilities (Eisenhardt & Martin, 2000). In consistent, social capital exert its impacts on dynamic capabilities through the knowledge management process channel. Therefore, this study hypothesizes:

***H2b. Knowledge Management Process Mediates the Positive Linkage between Social Capital and Dynamic Capabilities.***

### *Organizational Capital, Knowledge Management Process, Dynamic Capabilities*

In the form of systems, structure, and process, organizational capital facilitates knowledge leveraging and fosters effective acquisition, application and transfer of knowledge (Hsu & Sabherwal, 2012; Manning, 2010; Seleim & Khalil, 2011; Wu & Tsai, 2005) that further supports integration and reconfiguration of dynamic capabilities (Cepeda & Vera, 2007; Prieto & Easterby-Smith, 2006). This suggests an indirect effect view of organizational capital on dynamic capabilities via knowledge management process.

In this vein, knowledge management process has been theorized as 'managed learning', which explores and exploits organizational knowledge and provides explanations to knowledge-concomitant

processes: creation, acquisition, and application (Zollo & Winter, 2002) thereby support development of dynamic capabilities of the firm (Prieto & Easterby-Smith, 2006). These thoughts suggest that organizational capital supports the flow of knowledge in exploration and exploitation processes through a communication medium in the form of organizational structure, system, and processes thereby promote dynamic capabilities. Collecting all these rationalities, this study hypothesizes:

***H2c. Knowledge Management Process Mediates the Positive linkage between Organizational Capital and Dynamic Capabilities.***

## Research Approach

A wide variety of relevant literature has been reviewed to make the basis for identifying the measurement scales for this research. Slight amendments were made to align the scale. Further, draft questionnaire was administered to six strategic management academics for ensuring the content validity of the measures, subsequently, required changes were made. Soon after the pretesting, the effectiveness of the questionnaire in the investigated context was verified by the pilot study that targeted simple random samples of 42 managers. Throughout the questionnaire Seven-point Likert scale was used that ranges from “strongly-disagree” (1) to “strongly-agree” (7).

## Measurement Scale

*Intellectual Capital:* Intellectual capital was operationalized as a three dimensional constructs construct: human, social and organizational capital adopting Subramaniam and Youndt (2005) and Youndt et al’s. (2004) a 14 items. With the intention to determine the distinctive aspect of conceptual realm and quantify the association of each dimension with employed construct individually, human, social and organizational

capitals were quantified separately by five, five and four items successively.

*Knowledge Management Process:* Knowledge management process was operationalized by two dimensions; knowledge acquisition, application and transfer by employing 12 items of Gold et al.’s (2001).

*Dynamic Capability:* Dynamic capability was operationalized by two dimensions; integration and reconfiguration capabilities by employing four-four items, respectively. These items were validated by Lin and Lu (2013) and originally developed by Eisenhardt and Martin’s (2000) and Teece et al. (1997). Drawing on Law, Wong, and Mobley (1998) aggregate model on the taxonomy of multidimensional constructs dynamic capability was measured as the sum of integration and reconfiguration dimensions of dynamic capabilities. All items are shown in Appendix A.

## Sample and Data Collection Procedure

To test and verify the framework, this study selected 49 Indian banking firms as a sample of the study. Grounded on the constructs firm level emphasis top-level managers and departmental heads of the banking firm were contacted as a respondent with sample-random-sampling plan. A total of 1498 questionnaires (873-Field survey and 625-Mail survey), between the time periods of January–September 2014, were communicated to the respondents along with a cover letter. Follow-up mails and calls were employed to increase the response rate. Of the 1498 distributed questionnaires, 679 questionnaires were reverted valid and usable indicating a good response rate of 45.32 percent. Profile of the respondents is shown in Table 1. Of 679, 60.5 percent were male informants and 39.5 percent were female. From the job profile view point, Top management covers 31.9 percent of the sample and departmental heads captures 68.1 percent.

**Table 1. Respondents Profile**

Variable	Values	Frequency (%)
<b>Gender</b>	Male	61.3
	Female	38.7
<b>Age</b>	25–34	20.4
	35–44	39.5
	45–54	26.3
	55 & above	13.8
	Graduate	54.2
<b>Education</b>	Post-Graduate	42.8
	Doctorate	3.3
	Others	1.7
	5–12	24.1
<b>Experience</b>	13–20	36.2
	21–28	15.8
	29 & above	23.9
	<b>Job profile</b>	
<b>Top Management</b>		31.9
	AGM	21.2
	DGM	10.7
<b>Departmental Head</b>		68.1
	Planning and Development	16.5
	Human Resource Development	31.9
	Marketing	19.7

Source: Author's estimation.

### Data Appropriateness Test

Following Kline (1998), data normality was confirmed and the insignificance of outliers' issue was validated. No statistical differences between mail and field survey results was validated by the MANOVA test (Wilks' lambda = 0.77,  $p = 0.70$ ). A common method bias does not confound the

interpretations of the results was also revealed in Harman one-factor test that may arise due to cross-sectional research design for data collection. To reduce the probability of common method bias was also attempted previously while identifying informants. An additional check was maintained by fetching information from different managers under top-level managers' cadre as mentioned earlier.

No statistical differences (Wilks' lambda = 0.72,  $p = 0.42$ ) between early response (first three-month response) and late responses (last two-month response) was also ensured following Armstrong and Overton (1977). Hence, nonresponse biasness is not an issue in the study. Finally, the negligence of a position-bias was maintained as respondent's deals with two cadre top-management level and second, departmental heads. All the measures were compared across these two groups and three items at  $p \leq 0.05$  were found significantly different. To decide the inclusion of these three items in further analysis the chi-square test was employed. But these two items does not surpass the number significantly estimated (2.5) to be dissimilar based on chance.

### Data Analysis and Results

Descriptive statistics, reliability, and scale validity were estimated (Table 2 and Table 3), employing confirmatory factor analysis (CFA). Factor loadings were higher than 0.709. Composite reliabilities were above than 0.935, Average variance extracted (AVE) was higher than 0.548 and Cronbach's alpha (C-a) was higher than 0.935 for all dimensions (Anderson & Gerbing, 1988; Fornell & Larcker, 1981; Hair, Anderson, Tatham, & Black, 1998). Correlations among the constructs were below than 0.7 (Bagozzi & Baumgartner, 1994). AVE of the constructs was greater than the squared correlation of any respective inter-construct correlations (Fornell & Larcker, 1981) and maximum-shared variance and average-shared variance (Hair et al., 1998).

**Table 2. Descriptive Statistics and Correlation Values**

Constructs	M	SD	HC	SC	OC	KMP	DC
HC	3.57	1.19	1.00				
SC	3.57	1.02	0.47**	1.00			
OC	3.87	0.86	0.55**	0.61**	1.00		
KM	3.70	0.99	0.40**	0.47**	0.60**	1.00	
DC	3.73	1.04	0.04	0.15*	0.201*	0.14	1.00

**Source:** Author's estimation.

**Notes:** M is Mean, SD is Standard Deviation, HC is Human capital, OC is Organizational Capital, SC is Social Capital, KMP is Knowledge-management Process, DC is Dynamic Capability.

\*\* Correlation is significant at the 0.01 level (2-tailed), \* Correlation is significant at the 0.05 level (2-tailed).

**Table 3. Testing Results of CFA (Reliability and Discriminant Validity)**

Constructs	SFL	C- $\alpha$	CR	AVE	MSV	ASV	HC	SC	OC	KMP	DC
HC	0.77–0.90	0.96	0.96	0.81	0.30	0.17	0.90				
SC	0.77–0.80	0.94	0.94	0.74	0.37	0.21	0.47	0.86			
OC	0.81–0.87	0.94	0.95	0.79	0.37	0.27	0.55	0.61	0.89		
KMP	0.71–0.90	0.96	0.96	0.55	0.36	0.19	0.40	0.47	0.60	0.75	
DC	0.72–0.86	0.95	0.94	0.56	0.04	0.02	0.04	0.15	0.20	0.40	0.75

**Source:** Author's estimation.

**Notes:** SFL is standardized factor loading, C- $\alpha$  is Cronbach alpha, CR is composite reliability, AVE is Average Variance Extracted, MSV is Maximum shared variance, ASV is Average shared variance, HC is Human capital, OC is Organizational Capital, SC is Social Capital, KMP is Knowledge-management Process, DC is Dynamic Capability.

These results confirm convergent validity, internal reliability, and discriminant validity of the measures and ensure the meaningful statistical results from the proposed model.

Measurement model fitness results also satisfied an acceptable fit with data following Bagozzi and Yi (1988) and Hu and Bentler (1995). (Chi-square/degree of freedom( $X^2/df$ ) = 2.184, Goodness-of-Fit-Index (GFI) = 0.868, Adjusted-Goodness-of-Fit-Index (AGFI) = 0.835, Normed-Fit-Index (NFI) = 0.853, Confirmatory-Fit Index (CFI) = 0.914, Tucker-Lewis-Index (TLI) = 0.906, Parsimony-Goodness-of-Index (PGFI) = 0.674,

Parsimony-Normed-Fit-Index (PNFI) = 0.783, Root-Mean-Square-Error-of-Estimation (RMSEA) = 0.064, Root-Mean-Square-Residual (RMR) = 0.080.

The hypothesized models were further corroborated by SEM with a maximum likelihood estimation option. Structural model estimation results indicated good model fit ( $X^2/df$  = 3.346, GFI = 0.839, AGFI = 0.792, NFI = 0.853, CFI = 0.918, TFI = 0.905, PGFI = 0.651, PNFI = 0.762, RMSEA = 0.091, RMR = 0.057) and allow for further testing of the hypothesized relationship (Bagozzi & Yi, 1988; Hu & Bentler, 1995). Overall, results supported our research framework.

### Direct Effect: Relationship between Intellectual Capital and Dynamic Capability

The first group of hypotheses was tested by estimating three direct models: Model-1, Model-2, and Model-3. Analytical results demonstrated that the influence of human capital ( $\beta = 0.331$ ,  $\rho = 0.001$ ) and social capital ( $\beta = 0.234$ ,  $\rho = 0.001$ ) on dynamic capabilities were highly significant, whereas influences of organizational capital ( $\beta = 0.213$ ,  $\rho = 0.005$ ) on dynamic capabilities close to the significance level (Table 4). Therefore H1a, H1b, and H1c were accepted. The goodness-of-fit indicators of all three models satisfied the suggested threshold and indicated good model fitness. Model-1 reveals the best fit among the three direct models (Bagozzi & Yi, 1988; Hu & Bentler, 1995) and indicated strongest influence of human capital on dynamic capabilities (Table 4).

### Mediation Effect of Knowledge Management Process

The second group of hypothesis (H2a, H2b, and H2c) pertaining to mediating role of knowledge management process was tested through Model-4, Model-5, and Model-6 which were resulted by adding knowledge management process in Model-1, Model-2, and Model-3 successively.

Further, Baron and Kenny's (1986) mediation approach was applied and mediation amongst the variables was evaluated through four conditions (Table 5). The significant association between independent-dependent variables first, independent-mediating variables second, mediating-dependent variables third. Effect on the previous independent and dependent variable association after entering mediator into the model, fourth, for full mediation association should become insignificant and reduce

**Table 4. Testing Results (Direct and Mediation model)**

Fit Indices	Direct Model			Mediation model		
	HC-DC (Model 1)	SC-DC (Model 2)	OC-DC (Model 3)	HC-KMP-DC (Model 4)	SC-KMP-DC (Model 5)	OC-KMP-DC (Model 6)
$\chi^2/df$	2.72	1.83	2.97	1.90	2.56	2.28
GFI	1.00	0.99	0.99	1.00	0.98	0.98
AGFI	0.96	0.94	0.95	0.96	0.93	0.95
CFI	1.00	0.99	0.98	1.00	0.99	0.99
NFI	0.99	0.98	0.97	0.99	0.98	0.98
TLI	0.98	0.90	0.98	0.98	0.98	0.98
RMR	0.02	0.02	0.03	0.01	0.02	0.02
RMSEA	0.04	0.05	0.08	0.05	0.07	0.06
$\rho$	0.001	0.001	0.005	-	-	-
$\beta$	0.33	0.23	0.21	-	-	-

**Source:** Author's estimation.

**Notes:**  $\chi^2/df$  is chi-square/degree of freedom, GFI is Goodness of fit index, CFI is Confirmatory fit index, TLI is Tucker Lewis index, RMSEA is root mean square error of estimation, AGFI is Adjusted goodness of fit index, NFI is Normed fit index,  $\rho$  is significance value,  $\beta$  is Estimation value, HC is Human capital, OC is Organizational Capital, SC is Social Capital, KMP is Knowledge-management Process, DC is Dynamic Capability.

**Table 5. Mediation Analysis (Baron and Kenny's, 1986 Approach)**

Model 4 (HC-KMP-DC)			Model 5 (SC-KMP-DC)			Model 6 (OC-KMP-DC)		
Path	$\rho$	$\beta$	Path	$\rho$	$\beta$	Path	$\rho$	$\beta$
KMP-DC	0.001	0.21	KMP-DC	0.001	0.28	KMP-DC	0.001	0.22
HC-DC	0.312	0.06	SC-DC	0.468	0.05	OC-DC	0.005	0.15
HC-KMP	0.001	0.61	SC-KMP	0.001	0.57	OC-KMP	0.001	0.42

**Source:** Author's estimation.

**Notes:**  $\rho$  is significance value,  $\beta$  is Estimation value, HC is Human capital, OC is Organizational Capital, SC is Social Capital, KMP is Knowledge-management Process, DC is Dynamic Capability.

significantly for partial mediation. Results indicate that first three recommended conditions are satisfied for the second group of hypothesis (H2a, H2b, and H2c) and allows for testing fourth condition.

In case of H2a, after adding the knowledge management process into human capital dynamic capabilities linkages, previous significant linkage become insignificant ( $\beta = 0.056$ ,  $\rho = 0.312$ ). Thus, H2a was accepted. In case of H2b, after entering knowledge management process into social capital dynamic capability linkage previous significant relationship ceases to be significant ( $\beta = 0.050$ ,  $\rho = 0.468$ ). Hence, H2b was accepted.

Finally, in case of H2c, results indicate that previous significant linkage of organizational capital and dynamic capabilities reduce significantly, after entering knowledge management process into the linkage ( $\beta = 0.141$ ,  $\rho = 0.005$ ). Thus, H2c was accepted.

The goodness-of-fit indicators of all three models exceed the suggested threshold and indicated good model fitness (Table 4) (Hu & Bentler, 1995; Bagozzi & Yi, 1988). Model-4 reveals the best fit among the three mediation models (Bagozzi & Yi, 1988; Hu & Bentler, 1995; Table 4) and indicated human capital most crucial to be transformed into dynamic capabilities through the knowledge management process.

This study also utilizes statistical inferential tests for an indirect influence without making sampling distribution suppositions. Grounded on

95 percent bootstrap confidence intervals, the PROCESS model of SEM (Hayes & Preacher, 2013) was conducted to test the mediation, for comparative purposes (Table 6). The PROCESS output indicates, the indirect effect of human ( $\beta = 0.289$ ,  $\rho = 0.005$ ) and social capital on dynamic capabilities ( $\beta = 0.276$ ,  $\rho = 0.005$ ) is statistically different from zero. Contrary to this, the direct and total effect of both relationships was not statistically different from zero. This result directs the full mediation role of knowledge management process in both relationships. Hence, H2a and H2b support was supported. In case of H2c, direct effect ( $\beta = 0.122$ ,  $\rho = 0.001$ ) and total effect ( $\beta = 0.325$ ,  $\rho = 0.000$ ) of organizational capital on dynamic capabilities was significant and indirect effect was also significant ( $\beta = 0.203$ ,  $\rho = 0$ ). It predicts that the positive association between organizational capital and dynamic capabilities is partially mediated by knowledge management process. Thus, H2c was also accepted.

Thus, the results derived from the Baron-Kenny model (1986) and the PROCESS model (Hayes & Preacher, 2013) suggest that the influence of human and social capital on dynamic capabilities is channeled through knowledge management processes. Hence, the knowledge management process could thus be a vital mechanism for building dynamic capabilities. Organizational capital can direct its influence on dynamic capabilities directly as well as indirectly.

**Table 6. Mediation Analysis (PROCESS Approach)**

Path	Total Effect	Direct Effect	Indirect Effect	Remarks
HC-DC	0.37***	0.08	0.29**	Full Mediation
SC-DC	0.34***	0.06	0.28**	Full Mediation
OC-DC	0.33***	0.13*	0.21**	Partial Mediation

**Source:** Author's estimation.

**Notes:** HC is Human capital, OC is Organizational Capital, SC is Social Capital, knowledge management is Knowledge-management, DC is Dynamic Capability, \*\*\*  $p < 0.001$ , \*\*  $p < 0.05$ .

## Discussion

The present inquiry has three key findings.

First, intellectual capital significantly affects the development of dynamic capabilities. Human, social, and organizational capital dimensions of intellectual capital plays a pivotal role in creating the dynamic capabilities which is consistent with prior studies (Barney, 1991; Grant, 1991; Hsu & Sabherwal, 2012; Hsu & Chao-Hung Wang, 2012; Wernerfelt, 1984). Second, relative variation exists between the intellectual capital dimensions and dynamic capabilities which is consistent with the view of Penrose (1959) that the generation and utilization of resources fluctuate with alterations in knowledge. More than social capital and organizational capital, human capital exerts an influence on the integration and reconfiguration of a firm's resources so as to grow along with market changes. Social capital also shows a greater influence on dynamic capabilities, relatively higher than organizational capital exert.

Third, knowledge management process mediates linkages of intellectual capital and dynamic capabilities. The effect of human and social capital on dynamic capabilities is fully mediated by knowledge management process, which is consistent with the conceptualization of Hung et al's

(2009) whereas the link between organizational capital and dynamic capabilities is partially mediated. Interestingly, organizational capital directly affects dynamic capabilities or might indirectly through the knowledge management process. These finding suggests provide an alternative mechanism for intellectual capital and dynamic capability relationship, where knowledge management process integrates knowledge elements resides at individual, processes, networks, alliances and technology and supports explorative and exploitative activities, for further development of dynamic capabilities. This result is consistent with RBV, KBV, and DCV paradigm. In addition, among three mediation effects, human capital has a greater contribution to dynamic capabilities than social and organizational capital. This may be due to the fact that human capital determines the development of social and organizational capital and regulate the creation, acquisition, transfer, and utilization of knowledge within an organization.

## Theoretical Contribution of the Study

The key contribution of this study is revealing how intellectual capital contributes for the development of dynamic capabilities directly and through the mediation of knowledge management. As yet, no inquiries have examined the intervening mechanism between the linkages of intellectual capital and dynamic capabilities. Very little inquiries also exist that explored the impact each specific dimension of intellectual capital has on dynamic capabilities. To fill this gap, this study set forth a model and validated that intellectual capital directly affects the development of dynamic capabilities and indirectly via knowledge management processes.

The study also delivers new understandings into the development of dynamic capabilities. Prior studies maintain that the nascent stage of development aspect of dynamic capability domain has not been crossed yet (Helfat & Peteraf, 2009)

and the domain still experiences the lacuna of empirical studies and theoretical frameworks (Easterby-Smith et al., 2009; Prieto & Easterby-Smith, 2006). This study takes an endeavor to address these issues.

The statistical evidences on the linkages among the constructs, in this study also contribute into the methodological demand of dynamic capability literature (Easterby-Smith et al., 2009; Prieto & Easterby-Smith, 2006). This study also broadens the appeal of dynamic capabilities domain in new cultural context, geography and industry and addresses various calls for research suggested by prior investigators (Easterby-Smith et al., 2009; McKelvie & Davidsson, 2009). Overall, the arguments contributed to the richness of the literature.

### Implications of the Study

For banking management, the present study offers several intriguing insights. The study brings banking professionals closer to understand the role of intellectual capital to modify, extend, renew, or reconfigure knowledge resources to respond to the dynamic environment and seize opportunities available in the market. As different facets of intellectual capital have relative significance for dynamic capabilities, the study also outlines careful evaluation of knowledge resource implementation by banking professionals and recommends that higher value should be given to networks, alliances and personnel's knowledge, competence and skills, in terms of developing integration and reconfiguration dynamic capabilities. They should practice appropriate strategies to realize the anticipated outcomes.

Nevertheless, the study specifies a more explicit detail for building dynamic capabilities by providing further insights into the knowledge management process interventions for developing dynamic capabilities. It is knowledge management process that influences dynamic capabilities, in case of human and social capital. It also indicates that

banking professionals must employ knowledge processes as an intervening mechanism to develop bank's dynamic capabilities. It is likely that knowledge processes can be fostered through knowledge resources. Finally, strategies and programs for fostering intellectual capital and knowledge management processes were advised to strengthen dynamic capabilities.

### Limitations and Research Avenues

The study is restricted to Indian banking industry, this may limit the generalization of findings in other industries and countries. It is desirable to imitate this research in other context and geographies to determine whether the same association holds. This study may also limit because of the use of self-report and cross-sectional data. The probability of self-report biases cannot be excluded due to the fact that the objective reality might not coincide necessarily with the perceptions of the respondents. Here, further studies with multiple informants and industry are desirable. Longitudinal exploration of the highlighted linkages would also be desirable to offer more insights.

Some other priorities are also proposed for further examinations. It could be fascinating to include other precursors of dynamic capabilities as a moderator and mediator in developed framework. The potential mediating role of each process of knowledge management and another role such as moderating role of knowledge management process should also be investigated in more clarification. Identification of the strategies for knowledge management process and investigation of the specific mechanism other than knowledge management processes could be a next logical step in following up studies. Further consideration of linkages between intellectual capital and different types of dynamic capabilities could be valued for banking professionals, to offer explicit course of action.

## Appendix A

### Construct A.1. Intellectual Capital

#### Sub-Construct A.1.1. Human Capital

- 1) Employees are highly skilled.
- 2) Employees are widely considered the best in our industry.
- 3) Employees are creative and bright.
- 4) Employees are experts in their particular jobs and functions.
- 5) Employees develop new ideas and knowledge.

#### Sub-Construct A.1.2. Social Capital

- 1) Employees are skilled at collaborating with each other to diagnose and solve problems.
- 2) Employees share information and learn from one another.
- 3) Employees interact and exchange ideas with people from different areas of the company.
- 4) Employees interact with customers, suppliers, alliance partners, etc., to develop solutions.
- 5) Employees apply knowledge from one area of the company to problems and opportunities that arise in another.

#### Sub-Construct A.1.3. Organizational Capital

- 1) Organization uses patents and licenses as a way to store knowledge.
- 2) Organizational knowledge is contained in manuals, databases, etc.
- 3) Organization's culture (stories, rituals) contains valuable ideas, ways of doing business, etc.
- 4) Organization embeds much of its knowledge and information in structures, systems, and processes.

### Construct A.2. Knowledge Management Process

- 1) Organization has processes for acquiring knowledge about new products/services within our industry.
- 2) Organization has processes for acquiring knowledge about competitors in the industry.
- 3) Organization has processes for generating new knowledge from existing knowledge.

- 4) Organization has processes for transferring organizational knowledge to individuals.
- 5) Organization has processes for absorbing knowledge from individuals into the organization.
- 6) Organization has processes for absorbing knowledge from business partners into the organization.
- 7) Organization has processes for integrating different sources and types of knowledge.
- 8) Organization has processes for replacing outdated knowledge.
- 9) Organization has processes for converting competitive intelligence into plans of action.
- 10) Organization has processes for applying knowledge learned from mistakes.
- 11) Organization is able to locate and apply knowledge to changing competitive conditions.
- 12) Organization clearly communicates the importance of protecting knowledge.

### Construct A.3. Dynamic Capabilities

#### Sub-Construct A.3.1. Integration Capabilities

- 1) Focus on Customer information collection and potential market exploration.
- 2) Employ specialized firms to collect industry information for managerial decision.
- 3) Focus on integrating industry related technologies to develop new products.
- 4) Recording and integrating historical methods and experiences in handling firm issues.

#### Sub-Construct A.3.2. Reconfiguration Capabilities

- 1) Clear human resource re-allocation procedure.
- 2) Fast organizational response to market changes.
- 3) Fast organization response to competitor's actions.
- 4) Efficient and effective communication with cooperative organization.

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