

# Exploring the Entrepreneurial Antecedents of Absorptive Capacity and Its Impact on Open, Radical and Incremental Innovation

Nader Salehi, Assoc. Prof. Dr. Rozeyta Bt Omar & Assoc. Prof. Dr. Kamariah Bt Ismail

Faculty of Management and Human Resource Development (FPPSM), Universiti Teknologi Malaysia (UTM)

---

## ABSTRACT

A critical aspect of Absorptive Capacity (AC) is the successful process of absorbing and applying new external knowledge, which drives enterprise to develop and has a continuous flow of innovation. The capability to identify the value of knowledge, acquire, assimilate, transform, and exploit knowledge is called AC. AC is dynamic capability that allows the enterprise deal with knowledge from the external environment. This capability enables enterprises to internalize knowledge and innovation to commercial ends. In the past decades, there have been studies about organizational characteristics, which may have positive or negative effects on the capability of AC, but insights about the development of AC in perspective of entrepreneurship are still limited. According to studies in entrepreneurship, in this research explore the influence of four entrepreneurial aspects on AC. Prior knowledge, alertness, intention, and orientation are four entrepreneurial aspects, which identify their relationships with AC in this research. They effect on enterprise activity and behavior to absorb external knowledge and innovation. Enterprises need to develop innovation for survival in the market such as open, radical and incremental innovation. Indeed, each type of innovation needs different type and levels of technological knowledge. The purpose of this research is attempting operationally exploring the influence of entrepreneurial antecedents on AC. Second, analyze precision and accuracy in capability of AC. Third; analyze the mediating effects of AC on open, radical, and incremental innovation. Fourth, analyze the collaboration of R&D unit within AC to develop types of innovation. The findings come from survey questionnaires of 400 managers and semi-structural interview of 15 managers in auto industrial of Iran. This research approved that organization for developing open, radical, and incremental innovation need to external knowledge form out of organization' boundaries. In addition, the higher level of AC and its abilities achieve through positively higher level of entrepreneurial antecedents with collaboration higher positively level of R&D activity, which leads enterprise to higher open, radical, and incremental innovation.

**KEY WORDS:** Absorptive Capacity; Entrepreneurial Prior knowledge; Entrepreneurial Alertness; Entrepreneurial Orientation; Entrepreneurial Intention; Open Innovation; Radical Innovation; Incremental Innovation; R&D

---

## INTRODUCTION

Researchers converge on this idea that knowledge is essential to apply new opportunities for innovation (Shane, 2000; Zahra and George, 2002; McKelvie et al., 2008). To develop innovation, enterprises invest heavily in the building of technological capability that offers the skills and abilities to deploy and utilize various resources and know-how (Zhou and Wu, 2010). Cohen and Levinthal (1989, 1990) highlighted the fact that external knowledge does not equally benefit all enterprises, and that the benefit enjoyed by the enterprise are determined in part by the enterprise's own actions and resources. Because is sum of innovation integration of new ideas and practices in enterprise. Fabrizio (2009) explained that to "develop innovation, an enterprise must first search, identify, and evaluate alternative knowledge from different sources after identifying potentially useful knowledge, the enterprise must transfer that knowledge from the source and edit it to make it understandable to the enterprise." "Then, the enterprise must use and transform the knowledge into specific product designs that constitute product innovation" (Fabrizio, 2009). Innovation is critical for enterprises to adapt to turbulent environments and achieve a sustainable competitive advantage. Lin et al. (2008) mentioned that nowadays, technological knowledge is the crucial asset for enterprises in the competitive environment. Cohen and Levinthal (1990) mentioned that enterprises acquire knowledge by last experiences from out of enterprise's boundaries. They stated that enterprises acquire technological knowledge to apply on innovation and development of technological knowledge. Enterprises usually absorb knowledge for promote the competitive ability and intelligence property.

On the other hand, researchers stated that entrepreneurship is an attitude to discover and start the new venture (Qiao and Chen, 2010). New venture relies on past experience of discovery; therefore, they are based on their prior knowledge, which has been created through past training and investment (Shane, 2000). Li and Qian (2009) described learning capability in entrepreneurial firms as managing individuals, which recognize, generate, adjust and

---

\*Corresponding Author: Nader Salehi, PhD Student, Faculty of Management and Human Resource Development (FPPSM), Universiti Teknologi Malaysia (UTM) Email: snader2@live.utm.my Tel: (+60)173093922.  
E-mail address: nader.salehi1970@gmail.com

maintain knowledge timely to promote the organization to facing turbulent environment. Entrepreneurial firms that have sufficient members who are skillful will enable to create and use knowledge to new venture and development product (Sharabati and Thiruchelvam, 2009). Learning in entrepreneurial firms is a behavior to generate and apply new external knowledge to promote the capability of innovation (Zahra *et al.*, 1999, 2000).

Nowadays, enterprises face threats and responses from turbulent environment (Drucker, 1999; Skerlavaj, 2010) such as customer demand, global competition, new and high technology, rapidly changing market, new opportunities, market reaction, explosion and cost of innovation, enormous risks and absorbing shareholders. Business environment is depending on the level of knowledge more than other production factors as; 1) land, 2) labor, and 3) capital (Davenport and Prusak, 1998; Murovec and Prodan, 2009). Many researchers mentioned that “in dynamic and turbulent environment, knowledge represents a critical resource to create value and sustain competitive advantages” (Teece *et al.*, 1997; Camison and Fores, 2010). Therefore, business relies on the level of knowledge more than other factors (Davenport and Prusak, 1998; Murovec and Prodan, 2009). Nonaka and Teece (2001); Libing and Rong (2007) mentioned that knowledge transformation depends on capability of enterprise, which is the knowledge receiver.

In the past decades, the phenomenon how enterprises organize, appropriate and apply new external knowledge for development of technological innovations is called Absorptive Capacity (AC) (Cohen and Levinthal, 1990; Lane and Lubatkin, 1990; Zahra and George, 2002; Liao *et al.*, 2002; Xiao and Qin, 2010; Zhou and Wu, 2010). “AC is primarily a function of a firm’s prior related knowledge; a firm’s knowledge base underpins how well it can use new knowledge to achieve desired innovation outcomes” (Cohen and Levinthal, 1990). “AC is the dynamic capacity that allows enterprise to create value and to gain and sustain a competitive advantage through the management of the external knowledge” (Zhou and Wu, 2010; Camison and Fores, 2010). Capability of AC is the sum of abilities that enables enterprise does acquisition, absorption, transformation and utilization new external knowledge (Xiao and Qin, 2010). Therefore, AC is an enterprise’s capability to deal with external knowledge and a routine and strategic process, which an enterprise reconstructs, owns knowledge building and applies it to sustain competitive advantage. “In a highly turbulent business environment, a greater deal of the relevant knowledge required for exploration activity is found outside an enterprise’s boundaries, external knowledge flows become more important than usual, and the absorptive ability to benefit from these flows plays a crucial role in securing the sustained competitive advantage” (Liu, *et al.*, 2009).

However, capability of AC considers that knowledge and information in and outside of enterprise’s boundaries is not open and free to be simply absorbed without any effort by enterprises in order to acquire and utilized it in technology (Fabrizo, 2009). Successful innovations are not created in vacuum and its require a significant level of organizational determinants, which support resource commitment (Jeong *et al.*, 2006). AC described as dynamic capability, which allows enterprise to do innovation through, manage new external knowledge (Zahra and George, 2002; Camison and Fores, 2010). Researchers mentioned to conceptual of AC in different fields such as organizational learning, industrial organization, strategic management, and innovation management (Zahra and George, 2002; Camison and Fores, 2010).

## 2. LITERATURE REVIEW

During the past decades, rapid development of business information and growth in the quantity of accessible information and technological knowledge was given considerable momentum with the development of information and knowledge. Since, technological knowledge is the crucial asset to adapt in turbulent environment (Cohen and Levinthal, 1990; Zahra and George, 2002; Lin *et al.*, 2008; Camison and Fores, 2010). This phenomenon allows enterprises to interact with the environment through market, exhibition, internet, conference and other communication instruments to achieve new knowledge. In sum, the acquisition new technological knowledge allows the enterprise to create innovation or respond to new external threats (McKelvie *et al.*, 2008). This process seems relatively easily, but it needs to manage effectively to identify the practical value and capacity to absorb new knowledge to response challenges in the business market.

On the other hand, information and knowledge have increased in popularity and credibility as the important management tool over the past decade. AC as enterprise capability to digest external knowledge mentioned to establish the process for innovation (Zahra and George, 2002). Despite the growing use of the construct of AC, the study of this subject remains difficult because of the diversity and ambiguity of its components (Cohen and Levinthal, 1990; Zahra and George, 2002; Schmidt, 2010), antecedents (Bosch *et al.* 1999; Zahra and George, 2002; Jansen *et al.*, 2005; Vega-Jurado *et al.*, 2008; Peters and Johnston, 2009) and consequences (Dewar and Dutton, 1986; Zahra and George, 2002; Chesbrough, 2003; Fasnacht, 2009). Therefore, these reasons highlighted a need for greater clarity about the domain and operationalization of this capability.

Hence, fostering external knowledge improves innovation capability (Svetina and Prodan, 2008). Enterprises cannot rely on the internal research and innovating activities only and needed to be faster than before in absorbing external knowledge and innovation to challenges of environment (Cohen and Levinthal, 1990). Enterprises should

access to new external knowledge in and out of their boundaries (Chesbrough, 2003). Many industries, incumbents do not face the problem of insufficient opportunities and external knowledge (Roijakkers et al., 2005) but rather suffer from the ability to benefit from them (Eisenhardt and Schoonhoven, 1996; Zhang et al., 2007). Enterprises that do not pay attention to the process of AC and the value of new external knowledge, will be “locked out” in the market because AC is not simply a process that enterprises can immediately have access to it (Cohen and Levinthal, 1990). AC is an internal capability, which has the external function to absorb new external knowledge (Cohen and Levinthal, 1990; Bosch et al. 1999; Zahra and George, 2002; Zhou and Wu, 2010). The greater availability of this dynamic capability enables enterprises to target, absorb and deploy the external knowledge which necessary to feed the innovation process. AC plays two roles; protect shareholder and create wealth, also decrease potential strategic errors (Zahra and George et al., 2009).

Therefore, this research provides analysis of AC to explore its different antecedents and outcomes. Hence, viewing on AC as dynamic capability to make it amenable through managerial actions that effectively deploy the enterprise’ knowledge-based assets. In addition, this research identifies entrepreneurial conditions under which the components of AC create new values. The relationships between implementation components of AC and it influence on an enterprise’s strategic choices. Dixon and Day (2007) mentioned that constraints on organisational learning derive from path dependencies. Therefore, in this way must clarify and evaluate dynamic capability of AC and the pathway.

Many scholars mentioned that AC may lead to the different outcome (Fasnacht, 2009; Chesbrough, 2003; Dewar and Dutton, 1986). In this research will be to address this gap by analyzing the effects of AC on radical, open and incremental innovation. Indeed, each type of innovation need to different levels of external knowledge and technological process (Dewar and Dutton, 1986). In addition, each type has different routes and competitive consequences since they necessitate different organizational capabilities (Fasnacht, 2009). Enterprises also need to several innovations to have survival into market and achieve higher income, achieve maximum customer satisfaction, and ensure the effective use of all enterprise’s capacities such as open innovation, radical innovation, and incremental innovation (Fasnacht, 2009). According to last studies, researchers have treated that AC may be derived from different antecedents which determinants AC (Bosch et al. 1999; Jansen et al., 2005; Vega-Jurado et al., 2008; Peters and Johnston, 2009). Although there are literature about influence of organizational antecedents on AC and innovation, but still limited insights about AC in perspective of entrepreneurship. Figure 1 shows the framework of this research.

**2.1 Research Questions:**

In this research, we attempted to answer the following questions; first, what are the relationships between the entrepreneurial antecedents and AC in absorbing the new external knowledge? Second; how the selected firms implement a mechanism of AC in dealing with the new external knowledge? Next; what are the effects of AC on open, radical, and incremental innovation? Finally; what are the roles of R&D activities on open, radical, and incremental innovation?

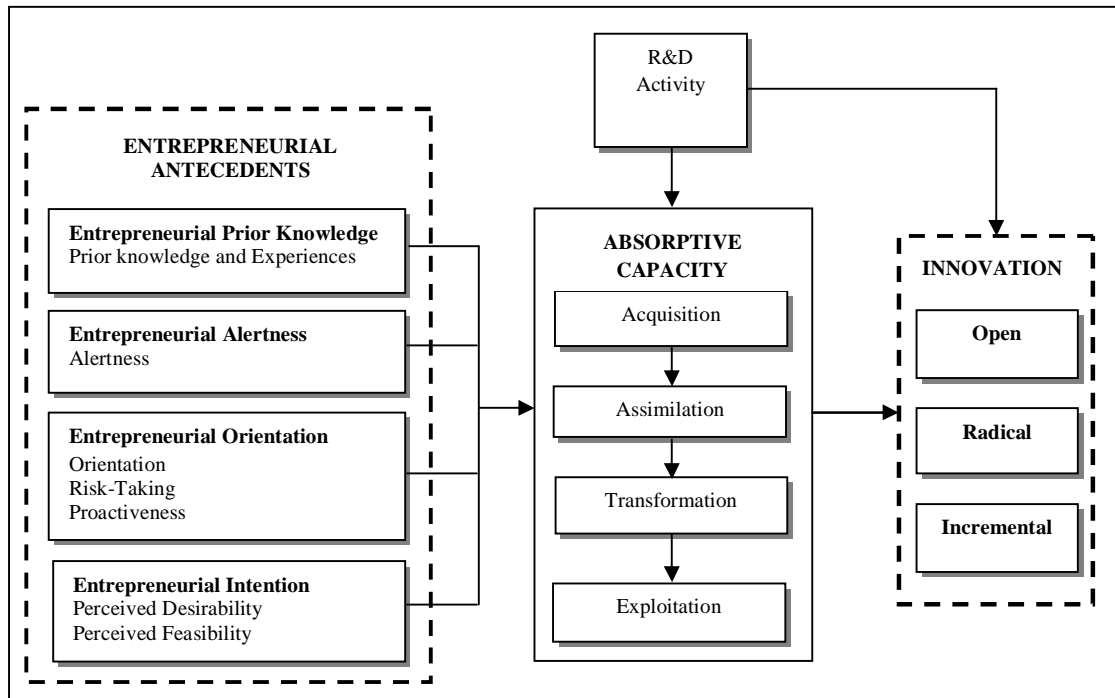


Figure 1: The Framework of Research

### 3. METHODS

This research used a sample from the auto industry of Iran. The unit of analysis was managerial levels in mixed method research. Totally, 440 questionnaires were distributed and returned 400 questionnaires, which respond to rate of sample size. The semi-structural interview includes 15 managers in the sample of study.

### 4. RESULTS

#### 4.1 Quantitative Method:

The pilot study was conducted by gathering data from 75 managers in the sample of study. The questionnaires of this research selected and justified in individual level for managerial level. Cronbach's Alpha for each group's variable was more than 0.7, which indicates in following table. The Cronbach's Alpha for 79 items in the reliability statistics is 0.797. All the values of Cronbach's Alpha for each component also are more than 0.7, suggesting that the scales are highly internal reliability. After collecting data to verify the variables' factor analysis, using the principal components' Extraction technique and Varimax factor rotation procedure. Exploratory Factor Analysis (EFA) was applied to identify the underlying dimensions or constructs for each of the aspects mentions above. Furthermore, factors which were below 0.5 were dropped for the factor loading to ensure that the items that load into the same factor or construct are, in fact, truly related. In factor analysis, nine questions dropped from analysis. In this research, for improving representativeness of sample and in order to make sure the sample size is completed and avoiding any missing value 440 questionnaires distributed. A total of 400 managers participated that completed questionnaires and returned without failure in the survey. Data analyzed in SPSS on Pearson correlation, regression in order to achieve the objectives of study. In addition before each test in regression model, Durbin Watson (DW), One-Sample Kolmogorov-Smirnov Test for normality test of data and Variance Inflation Factor (VIF) have done as the prerequisite of regression analysis.

Multiple regression analysis was used for the relationship between entrepreneurial antecedents with R&D activity on AC for test the first research question. Table 1 in next page shows the result of impact of entrepreneurial antecedents on the abilities of AC in multiple regression models. After that, Table 2 shows analysis the dimensions of each variable in relationship with AC.

Table 1: Summary of Multiple Regression Analysis for Variables of Entrepreneurial Antecedents with R&D

Variable	Acquisition (Model 1)			Assimilation (Model 2)			Transformation (Model 3)			Exploitation (Model 4)			AC (Model 5)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	0.625			1.757			-1.302			0.902			0.413		
Entrepreneurial Prior Knowledge	0.245	0.046	0.270	0.203	0.043	0.259	0.286	0.048	0.265	0.278	0.039	0.375	0.249	0.030	0.341
Entrepreneurial Alertness	-	-	-	-	-	-	-	-	-	0.146	0.026	0.210	0.044	0.019	0.066
Entrepreneurial Orientation	0.121	0.061	0.084	0.209	0.060	0.168	0.526	0.063	0.307	-	-	-	0.215	0.039	0.186
Entrepreneurial Intention	0.171	0.050	0.144	-	-	-	0.193	0.052	0.136	0.149	0.043	0.148	0.147	0.032	0.154
R&D Activity	0.332	0.042	0.365	0.197	0.042	0.252	0.318	0.043	0.294	0.187	0.036	0.244	0.257	0.027	0.353
$R^2$	0.486			0.312			0.613			0.451			0.672		
F for change in $R^2$	93.326			61.201			156.109			81.116			161.391		
Sig (2 tailed)	0.000			0.000			0.000			0.000			0.000		

Note: (N = 400), P Value < 0.05.

Table 2: Summary of Multiple Regression Analysis for Dimensions of Entrepreneurial Antecedents with R&D

Variable	Acquisition (Model 1)			Assimilation (Model 2)			Transformation (Model 3)			Exploitation (Model 4)			AC (Model 5)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	0.835			1.599			-0.758			1.795			0.695		
Prior Knowledge	0.221	0.043	0.243	0.160	0.043	0.205	0.275	0.047	0.255	0.260	0.037	0.340	0.223	0.028	0.306
Alertness	-	-	-	-	-	-	-	-	-	0.066	0.028	0.095	-	-	-
Innovativeness	-	-	-	-	-	-	0.178	0.036	0.183	-	-	-	0.072	0.021	0.110
Proactiveness	-	-	-	-	-	-	-	-	-	-0.216	0.045	-0.237	-	-	-
Risk-Taking	-	-	-	0.191	0.043	0.206	0.287	0.045	0.224	0.162	0.047	0.178	0.153	0.027	0.176
Perceived Desirability	0.233	0.042	0.229	0.142	0.042	0.161	0.184	0.045	0.152	0.161	0.037	0.187	0.190	0.027	0.233
Perceived Feasibility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R&D Activity	0.276	0.042	0.304	0.159	0.041	0.203	0.265	0.044	0.245	0.123	0.036	0.161	0.210	0.026	0.287
$R^2$	0.523			0.352			0.616			0.499			0.708		
F for change in $R^2$	86.238			53.731			126.575			65.206			191.236		
Sig (2 tailed)	0.000			0.000			0.000			0.000			0.000		

Note: (N = 400), P Value < 0.05.

Table 3 shows the next models were set to testing research question two.

Table 3: Summary of Regression Analysis the Dimensions of AC

Variable	Assimilation (Model 1)			Transformation (Model 2)			Exploitation (Model 3)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	1.207			1.034	-	-	2.551	-	-
Acquisition	0.573	0.032	0.664	-	-	-	-	-	-
Assimilation	-	-	-	0.737	0.058	0.535	-	-	-
Transformation	-	-	-	-	-	-	0.379	0.030	0.533
R <sup>2</sup>	0.440			0.287			0.284		
F for change in R <sup>2</sup>	313.157			159.989			158.244		
Sig (2 tailed)	0.000			0.000			0.000		

Note: (N = 400), P Value < 0.05

Table 4 in next page shows the result of mediator effects of AC on the types of innovation in linear regression model base on research question 3. In this regression model, AC is mediator and open, radical, and incremental innovation as dependent variables.

Table 4: Summary of Regression Analysis the Impact of AC on Types of Innovation

Variable	Innov-Inc (Model 1)			Innov-Rad (Model 2)			Innov-Ope (Model 3)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	0.254			1.526			-0.177		
AC	0.944	0.050	0.688	0.624	0.045	0.568	1.29	0.030	0.864
R <sup>2</sup>	0.473			0.322			0.764		
F for change in R <sup>2</sup>	357.238			189.126			1171.101		
Sig (2 tailed)	0.000			0.000			0.000		

Note: (N = 400), P Value < 0.05.

Table 5 in next page shows the result in the relationship between R&D activity and type of innovation base on research question 4.

Table 5: Summary of Regression Analysis the Impact of R&D on Types of Innovation

Variable	Innov- Inc (Model 1)			Innov-Rad (Model2)			Innov-Ope (Model 3)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
(Constant)	0.379			2.598			1.840		
R&D Activity	0.929	0.019	0.929	0.376	0.036	0.469	0.561	0.033	0.645
R <sup>2</sup>	0.861			0.220			0.416		
F for change in R <sup>2</sup>	2473.550			112.197			283.935		
Sig (2 tailed)	0.000			0.000			0.000		

Note: (N = 400), P Value < 0.05.

#### 4.2 Qualitative method:

In semi-structured interviews through open-ended questions, researcher can address more specific issues in depth. The perspectives and perceptions of the managers were gathered and summarize in tables or as point presented in this section. In this research, data will analysis with Creswell (2009) method. In this research, from the population size purposive sampling of 15 managers from top to middle level who were interested to be interviewed were selected.

The result of the semi-structural interviews in this research as themes elaborates in tables 6, 7, and 8 to link the quantitative research. In next section, we discussed about these findings. Data analysis was on asking questions and developing an analysis from the information of participants.

Table 6: Dimensions and Themes of Entrepreneurial Antecedents

Variables	Dimensions	Themes
Entrepreneurial Prior knowledge	<ul style="list-style-type: none"> <li>• Prior Knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Skillful and qualified</li> <li>• Common language</li> <li>• Knowledge sharing</li> <li>• Entrepreneurial experience</li> <li>• Planning training</li> <li>• Knowledgeable employee</li> <li>• Knowledge integration</li> <li>• Social integration</li> <li>• Knowledge capital</li> <li>• Prior investment</li> </ul>
Entrepreneurial Alertness	<ul style="list-style-type: none"> <li>• Alertness</li> </ul>	<ul style="list-style-type: none"> <li>• Advertisement</li> <li>• Customers</li> <li>• Research centers</li> <li>• Universities</li> <li>• Foreign technology centers</li> <li>• Magazine</li> <li>• Professional members</li> <li>• Commercial information</li> <li>• Catalogs</li> </ul>
Entrepreneurial Orientation	<ul style="list-style-type: none"> <li>• Innovativeness</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage employee</li> <li>• Support new ideas</li> <li>• Imitate triumphantly innovation</li> </ul>
	<ul style="list-style-type: none"> <li>• Risk-Taking</li> </ul>	<ul style="list-style-type: none"> <li>• Entrepreneurial structure</li> <li>• Willing to risk</li> <li>• Financial risk</li> <li>• Spirit &amp; sense of responsibility</li> <li>• Venture capital</li> <li>• Supporting</li> <li>• Entrepreneurial spirit</li> <li>• Commitment</li> <li>• Advantage of rapid action</li> </ul>
	<ul style="list-style-type: none"> <li>• Proactiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Customer demand</li> <li>• Market creation &amp; development</li> <li>• Competition</li> <li>• Leader in market</li> <li>• Increase R&amp;D investment</li> <li>• Customer loyalty</li> <li>• Customer satisfaction</li> <li>• Higher quality goods</li> <li>• Monitor market</li> <li>• Suitable price</li> <li>• Evaluate &amp; predict future</li> </ul>
Entrepreneurial Intention	<ul style="list-style-type: none"> <li>• Perceived Feasibility</li> </ul>	<ul style="list-style-type: none"> <li>• Hard work</li> <li>• Successful work</li> <li>• Enthusiastic</li> <li>• Practical</li> <li>• Workload</li> </ul>
	<ul style="list-style-type: none"> <li>• Perceived Desirability</li> </ul>	<ul style="list-style-type: none"> <li>• Good filling</li> <li>• Attractive</li> </ul>

Table 7: Dimensions and Themes of Absorptive Capacity

Variables	Themes
Acquisition	<ul style="list-style-type: none"> <li>• Journals</li> <li>• Business magazine</li> <li>• Catalogs</li> <li>• Universities scientists</li> <li>• Science Park</li> <li>• Conference</li> <li>• Communication</li> <li>• Effectual analysis as condition</li> <li>• Economic analysis factor</li> <li>• Firm's capability and competency</li> </ul>
Assimilation	<ul style="list-style-type: none"> <li>• Analysis opportunity</li> <li>• Effectual analysis</li> <li>• Customer feedback</li> <li>• FDI method</li> </ul>

	<ul style="list-style-type: none"> <li>• Absorption under license</li> <li>• Joint venture</li> <li>• Turn key contracts</li> <li>• Reverse engineering</li> <li>• Sub-contracts</li> <li>• Cooperation contracts</li> <li>• Education and skills</li> <li>• Share purchase</li> <li>• Import of machinery and capital goods</li> <li>• R&amp;D contracts</li> <li>• Commercial advertisement</li> <li>• Book, article, catalog, magazine</li> <li>• Industrial international exhibition</li> </ul>
Transformation	<ul style="list-style-type: none"> <li>• Economic analysis</li> <li>• Customer demand analysis</li> <li>• Market analysis</li> <li>• Revision of product design</li> <li>• Change in project line</li> <li>• Change in project line</li> <li>• Re-engineering method and technique</li> <li>• Skill workers</li> <li>• Planning</li> <li>• Motivation</li> <li>• Insufficient resource</li> <li>• Adapt new technology</li> <li>• Release previous technology</li> <li>• Familiarity with new technology</li> <li>• Management support</li> </ul>
Exploitation	<ul style="list-style-type: none"> <li>• Assess attractiveness projects</li> <li>• Assess firm's capability</li> <li>• Condition and necessary modification</li> <li>• Engineering knowledge</li> <li>• Socialization and common language</li> <li>• Individual capacity in all levels</li> </ul>

Table 8: Dimensions and Themes of Absorptive Capacity

Variables	Themes
Absorptive Capacity	<ul style="list-style-type: none"> <li>• Educated human resource</li> <li>• Customer satisfaction</li> <li>• Knowledge background</li> <li>• Economic knowledge</li> <li>• Financial knowledge</li> <li>• Engineering knowledge</li> <li>• Managerial knowledge</li> <li>• R&amp;D center</li> <li>• Internal market</li> <li>• Growing demand</li> <li>• Strategy of production development base on wisdom</li> <li>• Using universities scientific capacity</li> <li>• Connecting with informational international network</li> <li>• Internal and external R&amp;D staff</li> <li>• Action to quality and efficiency</li> <li>• Using experiences</li> <li>• Full awareness</li> <li>• Identify the technology and guidelines</li> <li>• Increasing investment in target market</li> <li>• Production under license</li> <li>• Improving and expanding R&amp;D</li> <li>• Attending in seminars</li> <li>• Foreign fairs</li> <li>• Investing in new technology</li> <li>• Acquire information about rival on customers</li> <li>• Vast effort to understanding</li> <li>• Firm capability</li> <li>• Market feedback</li> <li>• Commercialization market prediction</li> <li>• Financing</li> <li>• Direction finding alternative and solution</li> </ul>

## 5. DISCUSSION

The purpose of this research was to use both quantitative and qualitative methods to exploring the entrepreneurial antecedents of AC and its impact on open, radical and incremental innovation. The objectives of this research were; to identify the differing relationships between entrepreneurial antecedents and capability of AC and its abilities; to measure enterprise's implement mechanisms of components and dimensions of AC in dealing with new external knowledge; also to identify the impact of AC on open, radical, and incremental innovation. Another objective of this research was to investigate the role of R&D activity towards open, radical, and incremental innovation.

Enterprises were found that they must rely on knowledge acquired from the environment to facilitate the development of new products. On the basis, Cohen and Levinthal (1990) mentioned to AC then, Zahra and George (2002) briefed first theoretical framework of AC in conceptual articles. They defined "AC as dynamic capability pertaining to knowledge creation and utilization that enhance an enterprise's ability to gain sustain a competitive advantage". After that, several researchers have analyzed particularly the relationship between organizational antecedents and AC also innovation or performance as consequences of AC. Most of them mentioned to prior knowledge as antecedents of AC or pay little attention to some attributes as organizational antecedents. Zahra et al (2009) again in another conceptual article mentioned about the role of AC on firms sustain corporate entrepreneurship. Hence, there is a gap about AC in perspective of entrepreneurship, R&D activity how abilities of AC implement knowledge absorption. Cohen and Levinthal (1990) and Schmidt (2010) in their studies used AC as a conceptual tool to determine the incentives for R&D investment and R&D expenditure, but they did not measuring these abilities directly. Vega-Jurado et al (2008) in their studies also only measure R&D activity and two aspects of AC as potential (acquisition and assimilation) and realized (transformation and exploitation). This research presented improved version of the framework of AC based on mixed method research analysis in perspective of entrepreneurship in the large firm. Past research mentioned studied about AC only in quantitative models and in small and medium enterprises. Last research also studied about organizational antecedents as determinants of AC.

According to first research question, enterprises to increase its AC need to boost its abilities to acquire, assimilate, transform, and implement external knowledge, so they need to enhance its core competencies (Daghfous, 2004; Noblet et al., 2011). Enterprises that want to make effective use of the sources that can boost its AC needs to focus strongly on improve the effectiveness of the transfer process (Noblet et al., 2011).

The abovementioned findings indicate that knowledge is indeed adding perception and memory to information, which eventually causes its natural development. Knowledge is a kind of perception, and understanding, which is obtained through experience, reasoning, direct understanding and learning. Managers' knowledge will increase when they share it, and even a new knowledge may be produced by sharing and integrating their knowledge. The finding also shows that entrepreneurial prior knowledge associated with business is one of the crucial antecedents, which influences and determines the AC. Through this antecedent, managers can increase their ability to apply new technological knowledge. Therefore, the higher level of managers' previous knowledge leads organization to understand, absorb, transform, and exploit external technological knowledge. The related study about prior knowledge and AC reveal that prior knowledge is the main antecedent of AC and develop it (Cohen and Levinthal, 1990; Van den Bosch et al., 1990; Zahra and George, 2002; Vega-Jurado et al., 2008). Zahra et al (2009) mentioned that enterprises nurture their entrepreneurial activities through knowledge and skills, imagination, creativity, and alertness to opportunities. Dixon and Day (2007) also mentioned that The AC of enterprises in transition economies is limited by their experience in a different economic system.

The finding about entrepreneurial alertness pointed out the expansion of the AC requires correct recognition and analysis of the environmental conditions. In other words, the processes of knowledge recognition, absorption and implementation are strategic in nature. Therefore, managers must smartly pay attention to technological events, conditions and knowledge. The findings also show that entrepreneurial alertness as the antecedent to make evaluation and judgment about the new knowledge and ideas which commercialize influence on AC and its abilities. The related study about alertness reveals that only some people can recognize new opportunities in market, and merely some people can take action to apply opportunities which they recognized (Valliere, 2012). Hou (2008) also mentioned that individuals with prior knowledge and skills can alertness and trigger value related knowledge. Kirzner et al. (1979); Foss and Klein (2010); Yu (2001); Tang et al (2010) mentioned to conceptual of alertness and awareness to find gap and new opportunity to scan and search in the environment for new knowledge.

The aforementioned findings show the partial hypothesis about entrepreneurial orientation on AC, knowledge acquisition, and knowledge exploitation can be rejected. Entrepreneurial orientation defined as a process of strategy making to entrepreneurial actions and decisions (Lumpkin and Dess, 1996, Bolton and Lane, 2012). Entrepreneurial orientation defined as behaviors and characteristics such as decision making and practice, which lead enterprise to new entry (Lumpkin and Dess, 1996; Stam and Elfring, 2008; Zhang and Yang, 2010). Lumpkin and Dess (1996) and Lee and Lim (2009) mentioned that each dimension of entrepreneurial orientation can be independently from each other. Although in the semi-structural interview between dimensions of entrepreneurial orientation shows that only tendency to risk-taking among managers was low. Many researchers mentioned that risk taking to rely on the



level of willingness of enterprise and managers to take bold actions (Lumpkin and Dess, 1996; Lee and Lim, 2009; Zhang and Yang, 2010; Feng, 2010). Entrepreneurial orientation demonstrates an enterprise's innovativeness, risk-taking, and proactiveness (Covin and Slevin, 1989; Miller, 1983).

The finding about entrepreneurial intention point out this antecedent is the factor that creates the necessary incentives for entrepreneurial action. In fact, entrepreneurial intention is an action or actions specified goal. It is expected that the outcome depend on the action and entrepreneur interested to that. This is the interaction of individual's feels and position in the firm which appear as innovative processes. The finding also showed that entrepreneurial intention associated with business is another crucial antecedent, which influences and determines the AC and its abilities. Through this antecedent, managers can configure their abilities to acquire, assimilate, transform, and exploit new technological knowledge toward enterprise goals. Therefore, the higher level of managers' entrepreneurial intention leads organization to higher level of AC and its abilities. The related studies mentioned that entrepreneurship intention knows as fix enterprise's abilities and configuration toward the conceptualization of entrepreneurship (Alsaaty, 2007). Alsaaty (2007); Li (2008) posited that entrepreneurial intention is the perspective of an entrepreneur toward enterprise goals in creating new value. Fitzsimmons and Douglas (2011) entrepreneurial intention defined as the intention of an individual to set up a new business venture for the future.

Some possible explanation for this finding can be as; 1) the resulting can be the difference in vision and visual harmony and perspectives of top, mid, and low managers in two companies about organizational strategies. 2) The companies are public companies, which listed on a stock exchange and organize by government also called as government-own corporations. Therefore, entrepreneurial antecedents could be influenced by government strategies. 3) Possibly, in the large company after reach to successfully projects or profit decrease tendency to innovative and proactiveness or alertness. This reason is reinforced because 94 percent of Iran's auto productions and sales belong to these companies and intentions of managers are under policy of government. 4) Evidences of last research shows that some organizational antecedents such as connectedness, socialization, formalization, reutilization, participation in decision making, job rotation, and crosses functional may have difference effect on acquisition, assimilation, transformation, and exploitation (Jansen et al., 2005). 5) McKelvie et al (2008) stated that sometimes in fast-changing environments, customers lacked foresight enterprise may not be able accurately describe what their needs are going to be in the future.

The related studies about that public policy can formulate 'rules of the game' which facilitate the formation of the innovation process (Beerepoota and Beerepoot, 2007). Talkea, et al (2010) stated that innovation largely influenced by corporate governance and enterprise's outcome is resulted of idiosyncrasies of top managers. They promoted that managers decide about the overall strategic direction of enterprise and determine the project portfolio composition, and innovation projects. Talkea et al (2010) posited that top managers have cognitive frames, about enterprises, which are a function of their experiences, education, and functional background. Beerepoota and Beerepoot (2007) mentioned that government regulation through standards and norms stimulate innovation. Enterprises that are under the stricter government regulation tendency to apply incremental innovation, and this stricter regulation is necessary for radical innovation (Beerepoota and Beerepoot, 2007). They described that government in these enterprises facilitate innovation support such as R&D subsidies and funding in public research institutes.

According to second research question, this research question is important how abilities of AC participate and interact to recognize, absorb, change, and apply new external knowledge. Because in each stage knowledge which acquired must permit to assimilate, transform, and exploit to the new technological way. Knowledge in each step develops and accumulates for future step. Therefore, implement of each subsets are important. Vega-Jurado et al (2008) posited that AC is sum of abilities that cumulative knowledge in character in the sense that is the development in each ability and will permit for more efficient accumulation in the future. They mentioned that this aspect of AC indicates that its development is path or history dependent. Jansen et al (2005); Zahra and George (2002) in their theoretical framework stated that enterprise cannot possibly exploit new external knowledge without first acquire, assimilate, and transform it. They pointed that sometimes the enterprise enables to acquire, assimilate, transform knowledge but is not able to exploit it to the technological way. Therefore, cannot say enterprise has the capability of AC. Vega-Jurado et al (2008) also mentioned sometimes cannot immediately applicable external knowledge because there are difficulties to assimilate and transform it, even though the enterprise might recognize that it has value.

According to third research question, the above-mentioned finding indicated that AC as necessarily capability promotes external knowledge to produce new products. The related studies about open, radical, and incremental innovation mentioned that; in the open model in contrast to close innovation lunch through valuable ideas and knowledge, which can be internal or external or combinative therefore both aspects of internal and external knowledge for new product are important (Chesbrough, 2003; Chesbrough et al., 2006; Lazzarotti et al., 2010; Gassmann et al., 2010). In open innovation technological knowledge can accomplish through other technologies available in the market. Enterprises through this strategy take action to promote internal car industry via common investment projects, parallel acquire external knowledge and achieve foreign markets in economic and technological fields, and improve its AC.

Leifer *et al.* (2000) pointed that “radical innovation concerns the development of new businesses or product lines based on new ideas or technologies or substantial cost reductions that transform the economics of a business and therefore, require exploration competencies.” They explained that in radical innovation enterprises concept feasibility product to introduce as innovation in the market. It may takes 10 years to successfully process because radical innovation has long and difficult process and complex process (Leifer *et al.*, 2000). Radical innovations can be the key to firms opening new markets (Henderson and Clark, 1990; Green, *et al.*, 1995; Liefer *et al.*, 2000). Managers know the significance of radical innovation in a long time (Liefer *et al.*, 2000; Benedetto *et al.*, 2008; Xin *et al.*, 2008). In fact, the idea of relying on radical innovation leads to an emphasis on domestic production.

The incremental innovation has concerned to improve products and introduce into the market. Finding in both methods indicates that managers know incremental innovation as the important move to survival in the market. Managers also believed that incremental innovation is profitable and in each time has been a suit requirement with its their technology strategy. Related studies also briefed incremental innovation as the process which required knowledge to build and improve existing product for customer satisfaction also stated that incremental innovation appear when enterprise wants to add benefits through enhance, adapt, refine, expand line, or incorporate existing product (Varadarajan, 2009). Herrmann (1999) described incremental innovation as some changes in new product, which have some features: 1) promote the capability in a product, 2) small change in a product, 3) promote quality in a product, and 4) change design of product.

According to forth research question, finding implied that R&D activity and those parts of R&D expenditures that expectation typically on reasonable way lead enterprise to new technological knowledge, or processes of production. The related studies also mentioned that R&D unit established in enterprise for: 1) for extend technological knowledge which in environment is not developed, 2) to monitor, evaluate and understand new external knowledge, 3) effort to integration knowledge, 4) to contribute with other enterprises and selling research results (Chesbrough, 2003). Cohen and Levinthal (1989, 1990); Schmidt (2010) described twofold roles of R&D, its mean in one hand R&D build up new knowledge and in another hand, it expands abilities of enterprise to identification, assimilation and exploitation new knowledge absorbed to adopts and disseminates innovation.

Chesbrough (2006) mentioned that new idea or knowledge can be absorbed or generated by enterprise through external channels sent to market or another enterprise and create the new products. Therefore, the R&D unit should be active as an open system which recognizes and generates new knowledge. In addition, open innovation relies on collaboration with R&D (Chesbrough *et al.*, 2006; Marcet, 2008; Lee *et al.*, 2010). R&D labs traditionally known as the source of radical innovation and redirect collaborates with operational units (Leifer *et al.*, 2000). Developing radical innovation is not only by R&D, and it depends on risk-taking and enterprise investment (Xin *et al.*, 2008). Generally, the role of R&D is to handle emerging technological knowledge, which has an impact on innovation, but it is not yet ready for commercial ends (Cohen and Levinthal, 1990; Chesbrough, 2003).

### **5.1 Implication of research:**

Hence, the entrepreneurial antecedents can enhance and promote knowledge absorption’ trend by having higher level of AC. This operation can develop the enterprise’s ability to produce new technological knowledge and finally survival into the market. The finding of this research approved that the higher level of AC and its abilities achieve through higher level of entrepreneurial antecedents with collaboration higher level of R&D activity, which leads enterprise to higher open, radical, and incremental innovation. In addition, enterprise’s capability of AC depends on the enterprise’s background in past venture and previous knowledge and experiences. On the other hand, the quality of consequences of AC depends on how abilities of AC acquire, assimilate, transform, and exploit knowledge. Furthermore, enterprise with low levels of prior knowledge and experiences also aware about environment changes, orient to innovativeness, risk-taking, proactiveness, or intent; perceived desirability and perceived feasibility will achieve the low level of technological knowledge and capacity. Therefore, this research guide the enterprise’s AC to promote and improve own abilities. Literature review and findings reveal that enterprise may differ in their ability to manage levels of AC so it follows different path and differs in their antecedents to lead innovation.

The findings indicate that enterprise in terms of knowledge absorption and R&D collaboration enable to innovation will benefit from stable policies. Entrepreneurial antecedents may be affected by government and availability founding in this section because enterprises cannot immediately access to this dynamic capability. This means entrepreneurial approach is needed to promote dynamic capability of AC. Findings also indicate that basically managers that do not have entrepreneurial spirit will fail in this process and there is no place for them. Therefore, enterprise should improve spirit of sense of responsibility to promote innovativeness, risk-taking, and become proactive in the market. The finding of this research also mentioned that the conditions governing on enterprises affected by government. Its mean enterprise may lead to radical innovation and domestic products or open innovation by foreigner partners. Government also should give attention balance of technological knowledge in compare other countries and companies also pay attention to stimulate knowledge absorption and spirit of entrepreneurship.

This finding aroused from the perspective of managers. In managers’ perspectives also can understand they believed that with focus on entrepreneurship and facilitate mechanisms of AC will be able to gain innovation. Study

about AC in perspective of entrepreneurship indicates that managers with characteristics of entrepreneurship such as entrepreneurial prior knowledge, entrepreneurial alertness, entrepreneurial orientation, and entrepreneurial intention are more likely considered to abilities of AC. When enterprise increase and set entrepreneurial antecedents will have to consider knowledge absorption and apply it on innovation. As finding show abilities to acquire, assimilate, transform, and exploit external knowledge need and benefit from entrepreneurial antecedents. Hence, as can be seen Iran Khodro and Saipa suffering from lack of entrepreneurial intention and entrepreneurial orientation as motivation in terms of the knowledge absorption process. Although the findings show abilities to produce open, radical, and incremental innovation in terms of AC but clearly, this condition affected by entrepreneurial antecedents in the face to environment and enterprise strategies, which governing by government. Next point is to development of AC enterprise requires managers with the capacity to manage the diverse way of thinking and acting and provide effective direction to new form of technological knowledge and condition that can come out as a result. Furthermore, today environment and industrial in all the worlds increasingly change and complicated. Therefore, the organizational management faced to special complexities and difficulties. In this situation enterprise' managers need to learn and absorb new technological knowledge, which is critical and essential for their new products. Managers only with applying modern knowledge can direct the enterprise towards organizational goals to successfully embrace innovation. Finally, each type of innovation need to different levels of external knowledge and technological process; in addition, the nature of knowledge is different. Therefore, managers need to provide a condition to apply different type of knowledge.

## **5.2 Conclusion**

This research has explored an analytical framework of the entrepreneurial antecedents of AC and its impact on innovation. The framework is design around the theoretical framework of Zahra and George (2002) but in perspective of entrepreneurship and types of innovation. This research mentioned to mediator effect and dimension of AC as enterprise' capability also entrepreneurial antecedents as drive path to lead on innovation. The findings of this research indicate the framework to appropriate successfully knowledge absorption and access technological knowledge. It means that capability of AC alone is not sufficient to digest and apply external knowledge, and it should derived by entrepreneurial factors. This research also expects higher level of AC and its abilities through higher level of entrepreneurial antecedents derived to higher impact on introduce technological knowledge. These influences on AC could be positive or negative which depend on enterprise' governing variables. Therefore, the strength of AC backs to their background and antecedents to successfully enable to innovation. In fact, base on finding of this research and last research enterprise and of course, their managers and strategies that are most open inspire to have strong AC, and in that way can develop a greater capacity for type of innovation.

This research found that entrepreneurial prior knowledge, entrepreneurial alertness, and entrepreneurial intention positively enhance acquisition, assimilation, transformation, and exploitation knowledge and AC as the whole. However, research shows that auto industrial of Iran suffer from some weakness. The findings also reveal that enterprise with higher level of AC through collaboration R&D activity enhance the enterprise's ability to open, radical and incremental innovation. This research also approved that organizations for developing open, radical, and incremental innovation need to external knowledge form out of organization' boundaries. Second, entrepreneurial characteristic' managers play the important role on implements and mechanisms of knowledge AC. Next, AC is dynamic capability for introduce open, radical, and incremental innovation in the market. Finally, the higher level of AC and its abilities achieve through positively higher level of entrepreneurial antecedents with collaboration higher positively level of R&D activity, which leads enterprise to higher open, radical, and incremental innovation.

Other conclusions of this research are; 1) to use dynamic capability of AC should be existing all influencing factors in the framework of AC such as R&D, entrepreneurial antecedents. Each factor as a determinant of AC could have difference effect on this capability. Therefore, the capability of AC alone is not sufficient to digest and apply external knowledge, and it should derived by entrepreneurial factors. 2) The enterprise' governing variables can be the positive or negative effect on the capability of AC. Therefore, the strength of AC backs to their background and antecedents to successfully enable to innovation. 3) Previous knowledge and how to use it also desire; orientation and awareness of managers are infrastructure and success factors that influence and on AC and enhance its abilities. 4) The higher level of AC and its abilities through higher level of entrepreneurial antecedents derived to higher impact on introduce technological knowledge. 5) There is not the possibility of designing a framework for all organizations, and it is possible commensurate with the status and characteristics of the each organization. 6) The achievement an operationally process to absorb knowledge in all abilities of AC is required for all commercial organizations. 7) The dynamic capability of AC helps to scientific progress and scientific gaps with other organizations. 8) Innovation is not a linear process. It's heavily influenced by the knowledge absorption process. 9) Organizations for developing open, radical, and incremental innovation need to external knowledge form out of their boundaries. AC is developing external knowledge form outside of enterprise's boundaries and seriously influence on the type of innovation. 10) The mediator effect and dimension of AC as enterprise' capability also entrepreneurial

antecedents as enterprise's drive path to lead on innovation. 11) Entrepreneurial characteristic' managers as the determinant of AC play the important role on implements and mechanisms of knowledge AC. 12) The higher level of AC and its abilities achieve through positively higher level of entrepreneurial antecedents with collaboration higher positively level of R&D activity, which leads enterprise to higher open, radical, and incremental innovation.

## REFERENCES

- Alsaaty, F. M. (2007). Entrepreneurs: Strategic Thinkers In Search Of Opportunities. *Journal of Business & Economics Research* 5(2), 65-71.
- Beerepoota, M., & Beerepoot, N. (2007). Government Regulation as an Impetus for Innovation: Evidence from Energy Performance Regulation in the Dutch Residential Building Sector. *Energy Policy* 35, 4812–4825.
- Benedetto, C. A. D., DeSarbo, W. S., & Song, M. (2008). Strategic Capabilities and Radical Innovation: An Empirical Study in Three Countries. *IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT*, 55(3), 420-433.
- Bolton, D. L., & Lane, M. D. (2012). Individual Entrepreneurial Orientation: Development of a Measurement Instrument. *Education + Training Journal*, 54(2/3), 219-233.
- Bosch, F. A. J. V. d., Volberda, H. W., & Boer, M. d. (1999). Coevolution of Firm Absorptive caacity and Knowledge Environment: Organizational Forms and Combinative Capabilities. *Organization Science*, 10(5), 551-658.
- Camison, C., & Fores, B. (2010). Knowledge Absorptive Capacity: New Insight for Its Conceptualization and Measurement. *Journal of Business Research*, 63, 707-715.
- Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.). (2006). *Open Innovation: Researching a New Paradigm*. New York: OXFORD UNIVERSITY PRESS.
- Chesbrough, H. W. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, Massachusetts: Harvard Business School Press.
- Cohen, W. M., & Levinthal, D. A. (1989). Innovation and Learning: The Two Faces of R & D. *The Economic Journal* 99(397), 569-596.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1), 128-152.
- Covin, J., & Slevin, D. (1989). Strategic Management of Small Firms in Hostile and Benign Environments. *Strategic Management Journal*, 10(1), 75-87.
- Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and mixed methods approches*. London: SAGE Publication, Inc.
- Daghfous, A. (2004). *Organizational Learning, Knowledge and Technology Transfer: a case study*.
- Davenport, T. H., & Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know*. Boston, Mass: Harvard Business School Press.
- Dewar, R. D., & Dutton, J. E. (1986). The Adoption of Radical and Incremental Innovations: An Empirical Analysis. *Management Science*, 32(11), 1422-1433.
- Dixon, S. E. A., & Day, M. (2007). Leadership, Administrative Heritage and Absorptive Capacity. *Leadership & Organization Development Journal*, 28(8), 727-748.
- Drucker, P. F. (1999). *Management Challenges for the 21st Century*: Harper collins Publishers.
- Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-Based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms. *Organization Science*, 7, 136-150.
- Fabrizio, K. R. (2009). Absorptive Capacity and the Search for Innovation. *Research Policy*, 38, 255-267.
- Fasnacht, D. (2009). *Open Innovation in the Financial Services Growing Through Openness, Flexibility, and Customer Integration*. Verlag Berlin Heidelberg: Springer.
- Feng, L. (2010). *Entrepreneurial Orientation and Organizational Performance: Exploring the Role of Internal Resources and External Environments*. Paper presented at the Management and Service Science (MASS).
- Fitzsimmons, J. R., & Douglas, E. J. (2011). Interaction between Feasibility and Desirability in the Formation of Entrepreneurial Intentions. *Journal of Business Venturing* 26, 431–440.
- Foss, N. J., & Klein, P. G. (2010). Alertness, Action, and the Antecedents of Entrepreneurship. *The Journal of Private Enterprise* 25(2), 145-164.
- Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The Future of Open Innovation. *R&D Management* 40(3), 213-221.

- Green, S. G., Gavin, M. B., & Aiman-Smith, L. (1995). Assessing a Multidimensional Measure of Radical Technological Innovation. *IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT*, 42(3), 203-214.
- Henderson, R. M., & Clark, K. B. (1990). Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms. *Administrative Science Quarterly*, 35(1), 9-30.
- Herrmann, D. K. (1999). Tracking Systems as a Catalyst for Incremental Innovation. *Management Decision*, 37(10), 786-791.
- Hou, S.-T. (2008). Antecedents and Consequence of Entrepreneurial Alertness in Franchise Chain. Paper presented at the Management of Innovation and Technology IEEE.
- Jansen, J. J. P., Bosch, F. A. J. V. D., & Volberda, H. W. (2005). Managing Potential and Realized Absorptive Capacity: How Do Organizational Antecedents Matter? *Academy of Management Journal*, 48(6), 990-1015.
- Jeong, I., Pae, J. H., & Zhou, D. (2006). Antecedents and Consequences of the Strategic Orientations in New Product Development: The Case of Chinese Manufacturers. *Industrial Marketing Management*, 35, 348-358.
- Kirzner, I. M. (1997). Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *Journal of Economic Literature*, 35(1), 60-85.
- Lane, P. J., & Lubatkin, M. (1998). Relative Absorptive Capacity and Interorganizational Learning. *Strategic Management Journal*, 19, 461-477.
- Lazzarotti, V., Manzini, R., & Pellegrini, L. (2010). Open Innovation Models Adopted in Practice: an Extensive Study in Italy. *MEASURING BUSINESS EXCELLENCE*, 14(4), 11-23.
- Lee, S. M., & Lim, S. (2009). Entrepreneurial Orientation and the Performance of Service Business. *Springer Science*, 3, 1-13.
- Leifer, R., Mcdermott, C. M., O'Connor, G. C., Peters, L. S., Rice, M. P., & Veryzer, R. W. (2000). *Radical Innovation How Mature Companies Can Outsmart Upstarts*. Boston, Massachusetts: Harvard Business School Press
- Li, C., & Qian, W. (2009, September 14-16). Entrepreneurial Orientation, Learning Capability and Resource Leveraging. Paper presented at the International Conference on Management Science & Engineering (16th) Moscow, Russia.
- Li, J. (2008). The evolution of entrepreneurial intention in transition environment: Toward an entrepreneurial self-efficacy based model. Paper presented at the Wireless Communications, Networking and Mobile Computing, 2008. WiCOM '08. 4th International Conference on Dalian
- Liao, S.-h., Wu, C.-c., Hu, D.-c., & Tsui, K.-a. (2010). Relationships Between Knowledge Acquisition, Absorptive Capacity and Innovation Capability: an Empirical Study on Taiwan's Financial and Manufacturing Industries. *Journal of Information Science*, 36(1), 19-35.
- lin, W. h., li, H. d., & nan, W. c. (2008). A Study on Technological Knowledge Internalization of Enterprises. Paper presented at the Wireless Communications, Networking and Mobile Computing.
- Liu, H., Li, X., & Zhang, C. (2009). Why Absorptive Capacity Is More Essential in Some Situations? Paper presented at the International Conference on Information Management, Innovation Management and Industrial Engineering.
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. *The Academy of Management Review*, 21(1), 135-172.
- Marcet, X. (2008). Open Innovation: a New Paradigm Paper presented at the Eighth International Conference on Hybrid Intelligent Systems.
- McKelvie, A., Wiklund, J., & Bennett, L. (2008). Modes of Knowledge Acquisition and Innovation in Different Environments: An Examination of New Firms. *Frontiers of Entrepreneurship Research*, 28(19), 1-13.
- Miller, D. (1983). The Correlates of Entrepreneurship in Three Types of Firms. *Management Science*, 29(7), 770.
- Murovec, N., & Prodan, I. (2009). Absorptive Capacity, Its Determinants, and Influence on Innovation Output: Cross-cultural Validation of the Structural Model. *Technovation*, 29, 859-872.
- Noblet, J.-p., Simon, E., & Parent, R. (2011). Absorptive Capacity: a Proposed Operationalization. *Knowledge Management Research & Practice*, 9, 367-377.
- Nonaka, I., & Nishiguchi, T. (Eds.). (2001). *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation*. New York: Oxford University Press.
- Peters, L. D., & Johnston, W. J. (2009). Understanding Absorptive Capacity from a Network Perspective. *Journal Business Management*, 3(1), 29-50.
- Schmidt, T. (2010). Absorptive Capacity - One Size Fits All? A Firm-level Analysis of Absorptive Capacity for Different Kinds of Knowledge. *Managerial and Decision Economic*, 31(1), 1-18.

- Shane, S. (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organization Science*, 11(4), 448-469.
- Sharabati-Shahin, M., & Thiruchelvam, K. (2009). Diaspora Entrepreneurial Knowledge Networks: A Strategic Option for Medium and Low Income Countries. Paper presented at the International Association of Computer Science and Information Technology - Spring Conference.
- Skerlavaj, M., Song, J. H., & Lee, Y. (2010). Organizational Learning Culture, Innovative Culture and Innovations in South Korean Firms.
- Stam, W., & Elfring, T. (2008). Entrepreneurial Orientation and New Venture Performance: The Moderating Role of Intra- And Extraindustry Social Capital. *Academy of Management Journal*, 51(1), 97-111.
- Svetina, A. C., & Prodan, I. (2008). How Internal and External Sources of Knowledge Contribute to Firms' Innovation Performance. *Managing Global Transitions*, 6(3), 277-299.
- Talkea, K., Salomob, S., & Rostc, K. (2010). How Top Management Team Diversity Affects Innovativeness and Performance via the Strategic Choice to Focus on Innovation Fields. *Research Policy* 39, 907-918.
- Tang, J., Kacmar, M., & Busenitz, L. (2010). Entrepreneurial Alertness in the Pursuit of New Opportunities. *Journal of Business Venturing*, Article in Press, 1-18.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *The Unique Nature of Corporate Entrepreneurship*. (pp. 26-53).
- Valliere, D. (2012). Towards a Schematic Theory of Entrepreneurial Alertness. *Journal of Business Venturing*, ARTICLE IN PRESS, 13 pages.
- Varadarajan, R. (2009). Fortune at the Bottom of the Innovation Pyramid: The Strategic Logic of Incremental Innovations. *Business Horizons* 52, 21-29.
- Vega-Jurado, J., Gutierrez-Gracia, A., & Fernandez-de-Lucio, I. (2008). Analyzing the Determinants of Firm's Absorptive Capacity: Beyond R&D. *R&D Management*, 38(4), 392-405.
- Xin, J. Y., Yeung, A. C. L., & Cheng, T. C. E. (2008). Radical Innovations in New Product Development and Their Financial Performance Implications: An Event Study of US Manufacturing Firms. *Springer Science*, 1, 119-128.
- Yu, T. F.-L. (2001). Entrepreneurial Alertness and Discovery. *The Review of Austrian Economics*, 14(1), 47-63.
- Zahra, S. A., Filatotchev, I., & Wright, M. (2009). How Do Threshold Firms Sustain Corporate Entrepreneurship? The Role of Boards and Absorptive Capacity. *Journal of Business Venturing*, 24, 248-260.
- Zahra, S. A., & Geroge, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. *Academy of Management Review*, 27(2), 185-203.
- Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International Expansion by New Venture Firms: International Diversity, Mode of Market Entry, Technological Learning and Performance. *Academy of Management Journal*, 43, 925-950.
- Zahra, S. A., Nielsen, A. P., & Bogner, W. C. (1999). Corporate entrepreneurship, knowledge, and competence development. *Entrepreneurship Theory and Practice*, 169-189.
- Zhang, H.-y., & Yang, N.-d. (2010). Firm-level Perspective of Entrepreneurial Orientation: An Academic Debate and Discussion. Paper presented at the Advanced Management Science (ICAMS).
- Zhou, K. Z., & Wu, F. (2010). Technological Capability, Strategic Flexibility, and Product Innovation. *Strategic Management Journal*, 31, 547-561.