Author(s): Peltola, Tero; Samoilenko, Nataliia; Nahar, Nazmun

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Perceived reason to hinder ACAP increase

Tero Peltola*

CITER Center for Innovation and Technology Research
Department of Industrial Management
Tampere University of Technology
Korkeakoulunkatu 8, 33720 Tampere, Finland
E-mail tero.peltola@tut.fi

Nataliia Samoilenko

Department of Computer Science and Information Systems,
University of Jyvaskyla
Agora, Mattilanniemi 2, 40100 Jyvaskyla, Finland
E-mail nataliia.samoilenko@jyu.fi

Nazmun Nahar

Department of Computer Science and Information Systems,
University of Jyvaskyla
E-mail nazmun.n.nahar@jyu.fi

* Corresponding author

Abstract: We derive through literature review that lack of internal R&D investment, lack of contribution into absorptive capacity (ACAP) nurturing at the initial phase of a project, and lack of adequate training prevent ACAP improvement. We conduct 41 interviews using a case study method on four organizations. Based on the empirical findings, it is revealed that most of practitioners know how ACAP can be improved. But still, they do not offer the important incentives and follow some traditional ways of performing their tasks. We further explore what prevents practitioners from implementing practices towards ACAP improvement. From our empirical findings we identify and analyze perceived reasons that hinder ACAP increase. The implications of the findings are discussed for both practice and research.

Keywords: Absorptive capacity; Online collaboration tools; Other IT tools; Perceived reasons for hindrance; Case studies

1 Introduction

The important role and positive impact of absorptive capacity (ACAP) in new technological innovations development, new products and services development, new manufacturing process development or improvement, management and marketing process improvement, business process improvement, absorptive capacity enhancement of employees, to name a few, have attracted both practitioners and academic researchers

alike. However, there is a paucity of research especially on the factors that prevent organizational members from enhancing their ACAP. Some of these factors can be technological/technical, organizational, financial, cultural, level of absorptive capacity, complexity of the projects, etc. The reluctance to change working practices and utilize online collaborative tools (OCT) might be connected to organization stupidity –theory discussed recently in management literature (Alvesson & Spicer, 2012). To fill in this void in academic literature, the first question we addressed in this study is: what are the perceived reasons and attributes that create hindrance from increasing ACAP of the organizational members?

The main reason for varying level of absorption capacity can be due to the fact that the individuals hold different background educations, level of educations, work experiences, and cultural and social backgrounds. An organization's ACAP is built upon the ACAP of individuals and groups of individuals as well as how well the communication is performed among them. For example, OCT can work as an instrument that can facilitate efficient communication and collaboration among individuals within the groups, among groups and other stakeholders. The problem is encountered in identifying the roles and effectiveness of IT tools for communication, collaboration, knowledge exchanges and decrease/increase of ACAP. Thus the second problem we addressed here includes: identifying, examining and analyzing what major roles the IT tools can play for effective communication, collaboration, knowledge exchanges and why organizational members are not utilizing those roles to increase absorption capacity.

To deal with the research questions we conduct 41 semi-structured interviews. Interviewees included employees, managers, and senior managers in high-tech companies located in Finland, The Netherlands, and Spain. We briefly describe each of the cases and analyze the findings. The research results are summarized as a framework (see Table 3).

The paper is structured as follows: first we discuss background literature, followed by the discussion about the research methodology. After that we describe and analyze four cases present the research results and finally we explain the conclusions and implications of this research.

2 Background Literature

Definitions of key concepts

Based on the seminal works of Cohen & Levinthal (1990) and Zahra&George (2002), we conceptualize ***absorptive capacity*** as the ability to identify and acquire *valuable* knowledge from external resources by using appropriate IT tools (see Table 1) and properly applying this newly obtained knowledge to achieve organizational goals. *Trustful* relationships among team members is essential and it should be established through transparent cooperation and facilitating continuous communication. In turn, this can create an atmosphere for friendly and frequent interactions which can help in transforming personal tacit knowledge into explicit knowledge. This is needed for assimilating each individual's knowledge into knowledge of a team for benefitting the organization. With the help of trustful relationships among team members and collaborative IT tools, senior managers will be in a position in maintaining ACAP level of the team members more efficiently.

Generally, ***absorptive capacity of globally distributed teams*** relies on each individual team member's ability to acquire knowledge from outside of their own organization (or from external environment), bring this knowledge inside a team, transform it into valuable resources/assets, share it among team members (which is internal environment) and apply it for achieving organization's goals (e.g. new product or process development, etc.). If ***"interface"*** is a poorly designed interface it may then significantly affect the quality of interaction process and hinder ACAP level increase. (Sampedro & Vera-Cruz 2008). *Interface* serves as a mechanism which connects hardware and/or physical devices with software and human. It can be referred to as *user interface* which should be designed with maximally convenient buttons and options to use the system and/or IT tool without misinterpretation and frustration. It should be user-friendly and accurately perform assigned functions. (Sampedro & Vera-Cruz 2008)

Earlier studies (e.g. Zahra & George 2002, Flatten et al. 2011, Jimenez-Barrionuevo et al. 2011 and others) have aimed at ***measuring ACAP*** in different ways. Various authors applied different approaches (for example, Wal 2011; Vega et al. 2007, etc.) using dependent and independent variables. In this study, the measurement of ACAP quantitatively is beyond the scope of this study.

Absorptive capacity (ACAP)

Various bodies of literature (e.g. financial (Buzzacchi, Colombo, & Mariotti, 1995), logistics (Corrales 2010, Arnulf et al. 2005), manufacturing (Kneller & Stevens 2006, Sánchez-Sellero 2013) , technology licensing (Nicholls-Nixon & Woo, 2003), development (Stock, Greis, & Fischer, 2001), strategic alliances (Lane & Lubatkin, 1998), networks (K. Tsai, 2009), psychology (Knoppen et al. 2011) , etc.) have consciously or unintentionally deal with ACAP. Earlier studies have defined, measured, and developed various frameworks or models concerning ACAP (Cohen & Levinthal, 1990; Flatten, Engelen, Zahra, & Brettel, 2011; Zahra & George, 2002). Cohen and Levinthal (1990) explained that organizations with greater ACAP would have higher potential to recognize new information, further assimilate and apply it for achieving organization's goals. Therefore, organizations with greater ACAP outperform in innovations, new product development, manufacturing, profitability, compatibility, adaptability to external/internal changes, etc. comparing to organizations with lower ACAP (Jansen, Bosch, & Volberda, 2005; Lane & Lubatkin, 1998; W. Tsai, 2001). Prior knowledge and experience of each individual which should be well explored and communicated among organizational members constitutes organizational ACAP. However, there is a lack of research that has dealt with the reasons that hinder from improving or enhancing ACAP. We argue that by knowing the reasons that impede increasing ACAP, both organizations and academic institutions can get a better understanding of these issues and make preventive measures that can help them in succeeding in their endeavor.

ACAP can be considered at international/global, national/local, organizational, team and individual levels. The level of absorptive capacity depends on the organization's engagement with the external environment and efficient support and management of team members. Here, we strive to cover absorptive capacity at individual, team and organizational levels.

Absorptive capacity of an organization entails four dimensions: knowledge acquisition, assimilation, transformation and exploitation (Zahra & George 2002). They divide ACAP into two groups: 1) potential capacity which relates to identifying, acquiring and assimilating new information and 2) realized capacity when newly acquired information can be transformed, communicated and exploited internally for achieving organization's goals.

Personal motivation, each individual's capacity, prior experiences and *continuous communication* are prerequisites for increasing the level of absorptive capacity of a team member or a group. Difficulties in accessing prior organizational knowledge prevent increasing of absorptive capacity due to additional time and work required to spend on it. Prior organizational knowledge can be managed, stored and transferred by deploying various IT tools (e.g. web 2.0, knowledge bases, expert systems, etc. as mentioned in Table 1).

We refine the concept and extend the absorptive capacity model of Zahra and George (2002) and summarize our analysis into a conceptual model, see Figure 1.

Figure 1 A conceptual model

Reasons that hinder ACAP increase and how they can be eliminated

Hindrance of absorptive capacity among dispersed teams can be identified on the early phases of new product development in various ways. For example, arranging the essential meetings with team members on a daily or weekly or monthly basis depending on the complexity, scope and resources requirement of a project and discussing what were done, what need to be done, what problems were encountered and how to avoid them later, etc. This can allow identifying mistakes early on and reduce them immediately. Managers often do not administer and apply enough know-how and best practices of the company to enhance the existing and new members' capacity. Moreover, many participants of a project even may ignore what occur behind the accomplishment of their tasks. Team members often do not pay attention to how they communicate and can communicate their best experiences among each other. Therefore, there is need for arranging certain incentives that can help in utilizing ACAP of a team and creating a friendly working environment inside and among teams and successful working environment inside and among teams.

We briefly list some problems that may hinder increasing ACAP and suggest their solutions below.

- Difficulties come across in accessing prior organizational knowledge (Cohen & Levinthal 1990). For example, time and efforts needed for creating documentation, transforming best practices, norms, organization's routines, etc
- Challenges in establishing *trustful* relationships without meeting team members in person (Arnulf et al. 2005).
- *Individual benefits*: It is important to discuss and take into account the preferences of each member of a team (Ter Wal et al. 2011)
- *Insufficient user interface*: It may slow down interaction among dispersed team members, distract and cause obscuration concerning some issues (Sampedro & Vera-Cruz 2008).
- *Commitment* among senior managers: Continuous participation in organizational activities and coordination of various tasks and teams are essential for assuring correctness and concurrency of the execution of assigned chores (Gao et al. 2008).
- *Overlapping functionalities*: It is necessary to avoid redundant properties of an interface (or user interface as a connector between computer and a human) by aiming at concise options or functionalities and providing relevant and easy to use IT tools (Sampedro & Vera-Cruz 2008).

Relevance of IT tools and ACAP

This is an era when rapid advancement of IT is taking place in terms of functionality, capacity, speed, mobility, etc (e.g. Avram 2014, Egbetokun & Savin 2014, Tseng 2008 and others).. It is increasingly becoming easier and cheaper for companies to afford and use IT (e.g. Avram 2014, Esayas 2012, etc. . IT has become a necessity for companies which desire to survive and grow in this highly competitive business world. Thus usage of IT tools is becoming inevitable when we are dealing with absorptive capacity. By identifying and deploying the most germane IT tools for acquisition, assimilation, transformation and exploitation phases – each individual's absorptive capacity can be supported and increased significantly. With the help of IT tools organizations can establish continuous communication and encourage knowledge exchange among individuals which can positively affect overall team's absorptive capacity and increase its level. For example, by means of online collaboration tools (e.g. social media, company blogs, forums, etc.) team members can interact with each other on a daily basis or at a time of convenience and necessity as well as arrange videoconferencing with multiple participants or communicate via less official (informal) settings. Nonetheless, identifying most germane IT tools from various existing methodologies and technologies and using them properly at different phases of absorptive capacity cycle still remain a challenge and enough attention has not been paid in earlier studies. When we are dealing particularly with the globally distributed settings, the identification and delivery of IT tools is not sufficient, rather how to use the tools efficiently is vital.

Among globally distributed teams absorptive capacity can be supported and communicated by using various IT tools. For example, with the help of Web 2.0 technologies, such as wikis, web conferencing, blogs, e-mails, mashups, corporate social

networks, social bookmarks, etc. knowledge can be acquired and assimilated (Limaj & Bernroider 2013). Building trust is important for utilizing prior organizational knowledgeamong team members. However, it becomes challenging to establish trust without personal meetings with team members through using only IT tools. Therefore, issues of trust remain critical when discussing ACAP. Previous studies have dealt with the topic of trust to some extent; see for example, Qureshi & Evans (2013), De Noni et al. (2013), Ratten (2004), etc.

Roles of IT tools at different dimensions of ACAP

Since IT has a wide range of capacities, this study mainly focuses on those capacities that can support and increase ACAP level of an organization. We briefly describe a list of most relevant tools that can help in knowledge acquisition, assimilation, transformation and exploitation to a greater extent, below. It should be noted that earlier studies did not discuss the role of IT in different stages of absorptive capacity cycle.

Knowledge acquisition. *Knowledge acquisition* involves identifying new knowledge, processing it using IT tools or analyzing it by team members (Samoilenko & Nahar 2013). Knowledge can be acquired by using various IT tools presented in Table 1. Through using online collaboration tools, such as chat rooms, videoconferencing, intra-organizational virtual communities, wiki platforms, forums, company blogs, etc., team members can exchange their ideas, share experiences, obtain missing or the required information, work simultaneously and continuously on the common projects or files, etc. However, due to an absence of face-to-face meetings it can be very challenging to establish trust among participants (Lohikoski & Haapasalo, 2013).

Table 1. IT tools for maintaining ACAP*

	Knowledge acquisition	**Knowledge assimilation**	**Knowledge transformation**	**Knowledge exploitation**
IT tools	Knowledge-based systems, Online collaboration tools, data mining, web mining, e-learning, simulation software, etc.	Knowledge bases, wiki platforms, forums/electronic bulletin boards, company blogs, Online collaboration tools,	Visual tools; online collaboration tools: wiki platforms, forums/ electronic bulletin boards, company blogs; social media	Expert systems, simulation software, decision support systems, online collaboration tools

*Only the most important IT tools that can be used for maintaining knowledge acquisition, assimilation, transformation and exploitation. Other tools that have minor functionalities in performing the above tasks are excluded from the above table. More detailed descriptions of tools can be found in (Samoilenko & Nahar 2013) and (Samoilenko & Nahar 2012)

Knowledge assimilation. Organization can help assimilation process through IT-tools. It tools can facilitate processing or analyzing the acquired knowledge and adding it into personal and organizational knowledge. It may include transforming tacit knowledge into explicit knowledge and further combining knowledge of many individuals into knowledge of a team. *Knowledge bases* provide users with the space where different kinds of data, information and knowledge can be placed, organized, rearranged, stored,

searched and retrieved. By using various filters and search options users can simplify coordination and management of increasing amount of data. It requires administrators to maintain and update the knowledge base continuously as changes in data, information and knowledge occur frequently and thus making them obsolete quickly. Additionally, knowledge assimilation relates on online collaboration tools that allow users easily communicating and collaborating with each other, for solving common problems. Yet, the issues of trust and reliability may restrain team members from open communication and willingness to share personal thoughts or ideas.

Knowledge transformation. It implies processing of **assimilated** knowledge by changing the cognitive/knowledge structure of the organizational member with the help of various IT tools (Todorova & Durisin, 2007). For example *Online collaboration tools* can be used to help transforming tacit knowledge possessed by each person into explicit knowledge that can be belonged to a team and accessed by any member of an organization. In daily work and organizational routines, such tools as wikis, forums, company blogs, etc. can be used for communication, discussion and jointly execution of the assigned tasks for achieving common objectives. Nevertheless, the usage of OCT may be required to correct mistakes made by junior employees and find ways to avoid much time spent on understanding and editing biased or incomplete information added by less experienced participants.

Knowledge exploitation. It implies applying diverse types of useful knowledge (e.g. existing knowledge, newly obtained knowledge, analyzed and assimilated knowledge, new cognitive/knowledge structures, routines, etc.) for achieving organization's goals with the help of various collaborative IT tools that can be the same than previously discussed. Organizations can significantly take advantage of using best practices and effectively communicating them among team members while taking into account and maintaining absorptive capacity level of teams and their members. In addition to online collaboration tools described previously on the study, knowledge exploitation can be based on for example expert systems, simulation softwares, and decision support systems.

3 Methodology

The research methodology applied in this study is qualitative and the empirical evidence is based on four case organizations. All these case organizations were large enterprises (eurostat) and three of those were contacted twice for a data collection.

Data collection and analysis. The main data collection approach was semi-structured interview having the adapted structure based on literature (Sim & Edward 2007). These semi-structured interviews included three primary partitions: 1) background of the interviewee, 2) current working practices in the organization, and 3) summary. The second primary partition (2) contained the main discussion about the perceived challenges that hinder organizational members to utilize OCT. Interviews were recorded and transcribed and to relief concerns towards reliability and validity of the data member checks are used (Lincoln, 1985). Data was coded and analyzed with ATLAS.ti –software. Contextual validation of the data is based on supporting informal discussions between researchers and the representatives of organizations (Lincoln, 1985). Absorptive capacity was measured indirectly, through communication and collaboration practices (Flatten,

Tessa 2011). The study relies on the existing literature (Peltola & Mäkinen, 2013; Peltola, 2014) on the positive connection between online collaboration tools and absorptive capacity.

The qualitative data contains 41 semi-structured interviews with totally 24 organizational members located in Finland, The Netherlands, and Spain. Interviewees were from various organizational levels and all interviews took place between December 2011 and May 2013 (see Figure 2). Majority (17/24) of the interviewees were interviewed twice either in person or via phone. 34/41 interviews were in person and each interview took approximately 45 minutes to an hour. Each of the case organizations was considered as forerunner in utilization of the online collaboration, and therefore the hindrance had been able to be identified and measured.

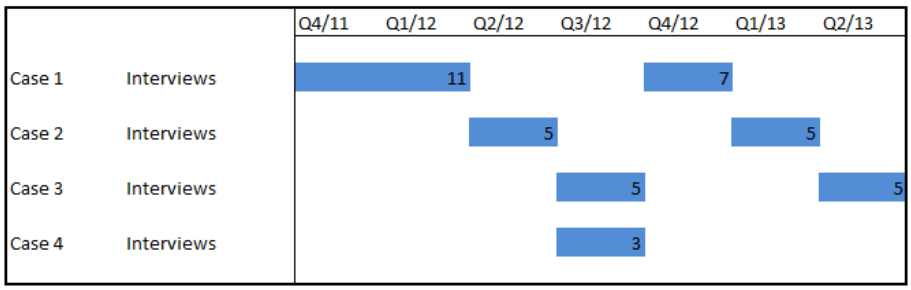

Figure 2 Data collection

4 Case Description and Analysis

Background of the case organizations

Case organization 1**.** The case 1 is a global organization offering mobile solutions and networks. On the NPD perspective, the company's resources are located in various sites; resulting scattered project's teams. During the research period, the case 1 company was rolling out the online collaboration application on a wider scale. The established virtual environment includes several kinds of possible online collaboration methods, such as communities, wikis, and personal "Mysite" areas.

Case organization 2**.** The case 2 company is a global manufacturer and supplier of flexible manufacturing systems and robot cells. On NPD resource perspective, the case 2 company does not have global resources located in various sites and therefore the NPD projects are typically local and the organization's members at each site are somewhat aware of local NPD activities.

Case organization 3**.** The third case organization is focusing on global IT solutions. The main research interest in the case was to focus on three pre-selected teams/communities and find the impact of the online collaboration to ACAP. One of those teams was located at two sites in Finland, but the other 2 teams/communities were globally scattered at various sites.

Case organization 4**.** The fourth case is actually a consortium of several companies in the same industry that work together or would like to work together to develop new business. They all share the mutual understanding that optic-cluster should be more unite and congruent. Case 4 is therefore more like business network-kind of case, with several companies involved. As the members of the group are all sharing the same area of interest, the quality of discussion in online communities was expected to be very high and congruently the group can acquire a huge amount of knowledge and develop it further.

The demographics of the interviewed persons

The demographics of the interviewed persons are presented in Table 2. According to Table 2, there is somewhat bias towards male and high academic degrees. However, it is based on the selected context as the case organizations are technology organizations, which further reflects on human resources in those organizations as the majority of technology students (especially in ICT) in universities are male (Teknologiateollisuus, 2011). Therefore, demographics represent typical properties for technology organizations and the sample is representative.

Table 2 Demographics of the interviewed persons

	N/pcs	%-share
Gender		
Male	17	71
Female	7	29
Highest degree		
University	20	83
Other	4	17
Organization level		
Senior manager	6	25
Manager	9	38
Employee	9	38
Organization		
NPD	11	46
Marketing & Sales	3	13
Consulting	4	17
Other	6	25

5 Empirical Results

Some of the main insights from the interviews can be addressed through a handful of quotations. The utilization of OCT should be a straightforward procedure as there are a clear need for that kind of tool to help knowledge management, for example interviewees mentioned that *"…we use email a lot… it's not always efficient, or I don't find it efficient."* and another continued*"[successful NPD] requires intra-organizational*

collaboration and sharing information" but also was mentioned that *"…one of the greatest challenges is resource allocation…".* Interestingly, at the same time interviewees do seem to be aware of the impact of the OCT and emphasized that *"…with [OCT] it is much faster to identify crucial expertise in-house...".* Even though the utilization of OCT has been identified to support the knowledge transfer and increased transparency, the adoption rate of the tool has not been saturated. Increased information transparency within the organization should relief concerns towards resource allocation and organizational members' vague understanding about the strategy (*"it would be good to know the reason why an idea or project was terminated")*.

Furthermore, the main findings are arranged according to the literature review discussed previously and presented in Table 3 below. Based on the amount of references addressing each of the key findings, it can be argued that those key findings were not perceived to be equally significant. Issues of trust are not among the significant perceptions due to the intra-organizational usage of online collaboration tools. Level of trust should be on the high level among organizational members. Interestingly, there are a few members that find some issues in that aspect. Therefore, the lack of trust was considered to be the least significant but on the other hand overlapping functionalities of some tools and the lack of individual benefits were the most significant ones. The results reveal that the perceived meaningfulness to invest time to use the tool is crucial. The usage has to result in individual level benefit and the tool should not be full of overlapping functions or functions that are hard to use. Senior managers should update processes along with implementing tools to minimize activities that might be considered useless. According to Table 3, the role of senior managers is clear and the result implies that they should act as a forerunner to keep the commitment visible for the rest of the organization. If the usage is more or less as scarce as monthly, then the rest organizational members cannot confirm the commitment of senior management and it will slow down the utilization of the online collaboration tools and therefore also hinder the ACAP increase.

Table 3 Summary of the empirical findings

Key findings	**N/pcs**	**Example quote from interviews***
Lack of trust	3	"…Of course there are these trust or related issues…"
Lack of individual benefits	12	"…think if the group starts to be an advertising tool, then it gets less interesting…" "You can live without [OCT]"
Insufficient user interface	9	"…I keep receiving updates that I consider as spam, about activity of one community. And I don't want to have that." "it is not working properly"
Lack of commitment	10	"…at the beginning there was a huge interest to use but it has gradually decreased" "we don't have a habit to log in daily" "In every month one of the senior managers post something"
Overlapping functionalities of some tools	13	"Not all information is there" "…as a file repository it is nothing new…" "…I have uploaded documents into two places.

		I don’t know which one is used to access those”..

* Some quotes have been translated into English

Conclusions and Implications

Earlier scholars aimed at examining potential and realized capacities theoretically and empirically as well as the role of ACAP in innovations, product development, manufacturing, etc. in different industries and how the absorptive capacity can be improved (Cohen & Levinthal 1990). The existing literature dealt inadequately with the challenges to increase ACAP, and thus provides inadequate guidance for practitioners to overcome these challenges. Based on the research results derived from the literature review and empirical data collection and analysis, we develop a framework (see Table 3) which summarizes practical level challenges of ACAP increase. Further, we provide recommendations regarding how to overcome these challenges and avoid slowdown of ACAP increase. The present study address interesting aspect of management literature; theory is not always reach on the practical level and organizational members are not following insight and practices that theories are suggesting.

The present study provides several practical and theoretical implications. As theoretical implications, our research results addressed a number of perceived reasons that hinder ACAP increase. Here, we consider ACAP of an organization which consists of various groups of individuals with different backgrounds, skills, experiences, knowledge and level of intellectual capacity. Effectiveness of an organization’s ACAP depends on how well individual’s ACAP is communicated among other individuals and teams of an organization. Empirical findings show that commonly known practices for improving ACAP are recognized, but neglected by practitioners. Therefore as practical implications, for avoiding ACAP slow down organizations should take into account the following four perceived reasons that hinder ACAP increase. 1) Organizations should recognize the lack of trusts and proactively establish more incentives for improving relationships based on a friendly and productive working environment, trustworthiness among co-workers, seeing mutual interests and goals, solving common problems together, etc. 2) Organizations should focus on individuals to overcome the lack of individual benefits/purposes and guide them to observe the low-hanging fruits. Additionally, organization should recognize that perceived benefits might vary between organizational members. Utilizing new working practices requires individual drivers in addition to organization drivers. 3) In addition to instruction spreading in organizations and guidance among organizational members, the sufficient user interface should also be provided for collaboration tools. 4) Senior managers should lead the OCT implementation and show activeness in using new working practices to overcome the issues relating to the lack of commitment among senior managers. Therefore, the commitment should be visible both at strategy and operational level. 5) Maneuvering through overlapping functionalities of these IT tools requires clear working practices that are utilizing intrinsic motivations of organizational members but also recognizing strengths of various IT tools. By using the research results derived from empirical data collection and analysis can help organizations to better understand why ACAP slows down and how to avoid its delusion. The research results are summarized as a framework (see Table 3) which can be used by practitioners as well

as by academic researchers. Besides, we extend the absorptive capacity model of Zahra and George (2002) and summarize our analysis to propose a conceptual model (see Figure 1).

The present study contains some limitations but those limitations can be considered as seeds of further studies. All case organizations are from high-tech companies and results might not be convergent in other industry sectors. Also the results contain a short term findings, and further studies are required to argue whether those findings are good for a long term evaluations.

This study summarizes only the most appropriate IT tools that can be used for knowledge acquisition, assimilation, transformation and exploitation. However, there can be other IT tools that can enhance absorptive capacity level of an individual or a team. The empirical data was collected by interviewing people from companies located in Finland, The Netherlands and Spain. The research results may vary if a larger population is studied in other European and Asian countries. In our future work, we aim at conducting interviews with company people from Russia and Ukraine. Through a cross-case analysis we expect to compare the research results of this study with the interviews to be conducted with company people in Russia and Ukraine. Other issues such as new practices, methods and tools that can improve absorptive capacity should be investigated.

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