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BEHAVIOURAL ASPECTS OF ABSORPTIVE CAPACITY

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ABSTRACT

Absorptive capacity is a fascinating phenomenon for all innovators helping in understanding how companies learn and in following the best-practices of learning. Despite of its importance, no researcher has been able to tame the phenomenon, there is no fully accepted definition and construct, neither is there enough empirics. The true nature of phenomenon has remained under disclosure, its intangible nature indicates deep psychological core. This paper is an attempt to open up the phenomenon from a psychological perspective. Psychological factors – traits and values – were combined with absorptive capacity in a quantitative setting with 1509 respondents. Findings indicate that soft factors do not describe the performance well, but they do describe well the absorptive capacity. Traits influence how we learn more than values. Soft factors explain especially well the assimilation component, but also the other components of absorptive capacity. Sex and speciality of people determine profile to have good absorptive capacity.

Keywords: absorptive capacity, behavioural strategy

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Abstract

Absorptive capacity is a fascinating phenomenon for all innovators helping in understanding how companies learn and in following the best-practices of learning. Despite of its importance, no researcher has been able to tame the phenomenon, there is no fully accepted definition and construct, neither is there enough empirics. The true nature of phenomenon has remained under disclosure, its intangible nature indicates deep psychological core. This paper is an attempt to open up the phenomenon from a psychological perspective. Psychological factors – traits and values – were combined with absorptive capacity in a quantitative setting with 1509 respondents. Findings indicate that soft factors do not describe the performance well, but they do describe well the absorptive capacity. Traits influence how we learn more than values. Soft factors explain especially well the assimilation component, but also the other components of absorptive capacity. Sex and speciality of people determine profile to have good absorptive capacity.

Keywords: absorptive capacity, behavioural strategy, traits, values.

1. Introduction

General strategic management. Early works of strategic management emphasize it to be “the analysis of internal and external environments of a firm to maximize the utilization of resources in relation to objectives” (Bracker, 1980: 221), not just objectives but usually the emphasis and pursuit of long term goals has been related with the term (see Ackoff, 1974: 29). Initial development of strategic management was holistic (see Rumelt, 1974 & 1984; Porter, 1980; Mintzberg, 1994; Mintzberg et al., 1998) – it is common that everything new starts with a descriptive overview. Then the strategic management detailed down to several descendent branches such as resource-based view (Barney, 1991) and dynamic capabilities (Teece et al., 1992). The “traditional strategy ... about building long-term defensible positions” turned to continuous keep changing strategy (Eisenhardt and Brown, 1998: 787). During the development, these branches have crossed with several other theories, like organizational learning (e.g. Crossan et al., 1999; March, 1991), though these movements have not “diminish[ed] the construct’s fundamental value and importance”, on the contrary, have enhanced it (Lane et al., 2006: 833).

The lengthy history of research on strategic management and the need to go deeper have given rise for in-depth behavioural strategy stream. The emerging ‘behavioural strategy’ field calls for incorporating psychodynamic and neuroscientific aspects into management studies, like in Laureiro-Martinez et al. (2015) work. The parallel stream about micro-foundation of dynamic capabilities aims the same as well (e.g. Teece, 2007; Argote and Ren, 2012). Similarities and roots of this direction can also be found in sense-making theory (see Weick, 1993), leadership theory (Kirkpatrick and Locke, 1991) or behavioural theory (for its key psychological terms, such as bounded rationality, opportunistic behaviour etc. see Cyert and March, 1992).

Absorptive capacity. Branch of strategic management – dynamic capabilities – contains also several promising inner avenues, one of them is absorptive capacity (ACAP) (Cohen and Levinthal, 1992), which has developed and matured throughout recent decades. ACAP is defined as “the ability of an organization to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal, 1990: 128).

Empirical issues. As seen from definition, ACAP is largely a mental process, which should be therefore researched and measured by using psychological factors. Unfortunately, only few works indirectly indicate them (e.g. Szulanski, 1996), according to Flatten et al. (2011: 99) more pragmatic measures and distant proxies prevail instead (e.g. number of patents and publications) and the use of most of these proxies is questionable (Lane et al., 2006: 844). Hopefully, behavioural strategy stream has some outcome here as well. Despite of artificial maturity of ACAP phenomenon from decades old development, there are several operationalization-related problems with ACAP phenomenon: it exists at a very conceptual level (Knoppen et al., 2011: 420; Volberda et al., 2010), the mechanisms are debated (Todorova and Durisin, 2007), the nature of the phenomenon is intangible (Jimenez-Barrionuevo et al., 2011), it is difficult to measure (Kraatz and Zajac, 2001), it relies on proxies (Murovec and Prodan, 2009) being just some.

Matter that **process perspective** is mostly followed in ACAP descriptions (see Cohen and Levinthal, 1992; Zahra and George, 2002; Easterby-Smith et al., 2008) is perhaps also too one-sided (e.g. in light of uni-dimensional static measuring (Flatten et al., 2011: 98)), despite that taken process perspective might come from definitions of ACAP (for example, see definition by Cohen and Levinthal, 1990: 128) and from activity/routine centric definition of the root term – dynamic capability by Eisenhardt and Martin (2000). Generally, the theorization in the field is currently prevailing and empirical work is lagging behind (Bosch et

al., 2002). Absorptive capacity phenomenon is calling for more empirical research (Barreto, 2010).

This research aims to respond to these phenomenological and epistemological calls, and as appropriate to a new behavioural field it does so by providing an initial descriptive overview of “an early and a broad understanding” (Brown and Eisenhardt, 1995: 353). Therefore, the next **research questions** (RQ) are posed for the study:

1. What construct describes ACAP phenomenon (process or factor model)?
2. Which behavioural soft factors and at what extent influence ACAP and performance?
3. Is ACAP phenomenon context specific (sex, speciality, environment)?

It is reasonable to study ACAP in context where it is well presented, even if leaving out worse representatives put research to suffer balanced neutral stand. The level of ACAP differs by several factors (e.g. size of the company, industry, and country). For example, Barge-Gil (2010) emphasizes the importance of SMEs. ICT and biotechnology are the industries often used in innovation research (see Shan et al., 1994; Narasimhan et al., 2006). Several international institutions rank countries by their innovation orientation and achievements (Karis and Rungi, unpublished), where clear differences are seen country-by-country. These posed RQs are planned to be researched in a small European Union member country, which is characterized by high start-up concentration and ICT orientation. While some first works of behavioural strategy have emphasized the managerial role (e.g. Laureiro-Martinez et al., 2015; Piórkowska, 2015; Löwik, 2013: 33; Hayton and Zahra, 2005), this research is more interested in and considers important another stakeholder for ACAP – specialists. This is justified by those works of ACAP that emphasize rather bottom-up, not managerial top-down approach (Stulova and Rungi, unpublished). Respondents of quantitative survey are chosen to be related with university to increase the validity even more. In total, 1509 survey responses received.

2. Literature review

2.1 Absorptive capacity

General ACAP. Absorptive capacity is often seen from the process perspective, sometimes as being strictly sequential (Cohen and Levinthal, 1990; Zahra and George, 2002), sometimes partly overlapping (Todorova and Durisin, 2007; Patterson and Ambrosini, 2015: 88), and seldom from a non-process perspective (Stulova and Rungi, unpublished). The main process of absorptive capacity is very simple, first there is a need to acquire information, then make it clear for yourself, and finally use it (Cohen and Levinthal, 1990). Making it clear (i.e. assimilation) is one of the most important components (Wall et al., 2011), more influential than acquisition. High-level ACAP will involve company more with innovation, not depending so much on opportunities from environment (Nieto and Quevedo, 2005: 1154). There are several ways how to reach high-level ACAP, some of them curious such as used in Hyundai (Korean carmaker) – they artificially constructed an internal crisis to turn from learning-by-doing to learning-by-research (Kim, 1998: 506, 518); or information from distant fields (i.e. tie diversity) as in BMW (German carmaker) (referred by Enkel and Heil, 2014). Complexity helps to increase and prior knowledge to reduce ACAP (Winkelbach and Walter, 2015). Wales et al. (2013) indicate that companies have to be reasonable with learning, neither too much nor too little are good for financial performance (inverted U-shape).

Individual vs. group/organizational level ACAP. Majority of recent work have emphasized company's ACAP (see Rungi and Stulova, 2015), while organizational learning as such begun from individual level, reaching later on group and organization level (4I) (Crossan et al., 1999). Actually 4I and ACAP has been successfully integrated together (Sun and Andreson, 2010: 130). For the same reason, Da Silva and Davis (2011) propose that ACAP can also be used on individual level. Few say that organizational ACAP is more important than individual ACAP (e.g. Zhao and Anand, 2009: 968-969, 975), some other clarify that both are needed,

but for different purposes, individual for idea creation and organizational for “building stocks of knowledge” (Matusik and Heeley; 2005: 567). Only few works cover either both – organizational and individual levels (Zhao and Anand, 2009; Matusik and Heeley; 2005; Wang and Ahmed, 2003: 9-11) – or concentrate on individual level (e.g. Allen, 1977; Volberda et al., 2010; Foss et al., 2011; Wall et al., 2011), which is strange since the individual learning has been much longer under interest (Shrivastava, 1983: 8) and the first seminal work of ACAP brought in individual level (Cohen and Levinthal, 1990: 131), later became forgotten. Löwik (2013: 21-23) summarizes history of individual level approaches for ACAP during the last 10 years and its importance for phenomenon. Although “firm’s absorptive capacity is not, however, simply the sum of the absorptive capacities of its employees” (Cohen and Levinthal, 1990: 131), but individual still initiates ACAP (Zahra and George, 2002) being therefore a definite precondition (Löwik, 2013: 143). There can be several perspectives for individuality, Löwik’s (2013: 50-53) work concentrates more on owner-manager perspective, not to the perspective of employee. Liu et al. (2011) showed that organizational absorptive capacity can be brought to the individual level, at least its assimilation element. Zahra and George’s (2002) ACAP model with four elements has also close similarities with Nonaka’s (1991, 1994) model for individual’s SECI learning: 1) socialization – acquiring knowledge (=ACAP’s acquisition), 2) externalization – communication with teammates (=assimilation), 3) combination – combining different pieces of knowledge (=transformation), and 4) internalization – sharing & learning-by-doing (=exploitation).

The need for more research on individual level has been emphasized earlier (Löwik, 2013: 23). The importance of individual has been stressed out in the works mentioned before and is continued in the current work, where university students’ ACAP is in focus (unit of analysis).

2.2 Soft factors

There are numerous psychological factors, such as traits, values, beliefs, emotions, motives, moods, cognitive bias, temperament and many others. For example, Kirkpatrick and Locke (1991: 48) name traits such as ambition, energy, initiative, motivation, honesty, integrity, and self-confidence to be very important for leadership. Nagel (2015: 21) summarises several cognitive biases, including several simple, but clever ones, some interesting: overoptimism (seeing positive, diminishing negative), overconfidence (overestimating personal skills), champion (introducer's personality determines how it is perceived and accepted), status quo (preferring "the current situation"), and loss aversion (avoiding losses). Mayer and Gaschke (1988) measure tens of moods, such as being lively, drowsy, jittery, gloomy, fed up, grouchy, and content. Mehrabian and Russel (1974) bring out several emotions in their study, emotions are approached through three dimensions: pleasure (e.g. "happy-unhappy", "pleased-annoyed"), arousal (e.g. "excited-calm", "wide-awake-sleepy"), and dominance (e.g. "controlling-controlled", "influential-influenced"). Emotional intelligence received popularity since Goleman (1995) work. Pekrun et al. (2004) worked out a study to test/examination emotions questionnaire. Mullola et al. (2014) have looked at temperament's influence on learning and its results in education.

Altogether, over 50 sources were examined to select the most basic and widely used psychological factors. In fact, several overlaps and relations were revealed these psychological factors. For example, Schwartz (2003a) analyses connections among psychological factors, demonstrating that values, beliefs, behaviour and attitudes are related. Rohan (2000: 256) refers to study indicating that tens of phenomena include "value, attitude, and motive".

Queries in scientific databases show dominance of traits and values in related literature (for seeing proportions, corresponding terms were searched in EBSCO, term 'values' gave nearly

2 m. replies (1,83 m.), 'traits' 163 thousands, 'moods' 63 thousands, 'emotions' 101 thousands, 'cognitive biases' 1 thousand, 'beliefs' 180 thousands). Of course, these results must be taken with certain reservation, since some of these words are often abused, i.e. used not in relation with their psychological meaning (Rohan, 2000: 255). Traits and values were selected as the most basic and widely used attributes.

Traits. The list of possible traits is very long, there has been several attempts to reduce and cluster the traits to reduce the final number of traits from 4'500 (Allport, 1954) to 16 traits (Catell (1978) and colleagues) and 3 traits (Eyseneck and Eyseneck, 1975). Some named earlier lists too wide and latter too short, the most often used scale is Big Five (5 traits) (Goldberg, 1990).

Goldberg (1990) was the one who brought personality traits (in form of Big-Five) to the organizational level. There are lists of traits needed for good leadership (Kirkpatrick and Locke, 1991; Stogdill, 1948), for innovative CEO-s in SME-s (Marcati et al., 2008) etc. The usual lists of traits are long, while big-five means that all personality traits can categorized into five dimensions: 1) openness to experience, 2) conscientiousness, 3) extraversion, 4) agreeableness, and 5) neuroticism (OCEAN) (Goldberg, 1990).

There are different opinions how big-five traits influence learning and/or learning result:

- extraversion influences positively in younger age (Furnham and Chamorro-Premuzic, 2004: 946) but can also be negative – impulsiveness, distractedness (Hakimi et al., 2011: 843). Furnham and Chamorro-Premuzic (2004: 946) summarize peculiarities and reasons for introverts success in competitive contexts, in written assignments and older ages. According to Vedel's (2014: 70-71) meta-analysis, the extraversion's influence on academic result/grade varies between -11...+16% (negative in six studies and close to zero in eight studies out of 20 studies);

- agreeableness influences positively (Hakimi et al., 2011; Schniederjan and Kim, 2005: 213 and 215). Agreeableness is strong influencer for transformational leadership (Judge and Bono, 2000). Vedel (2014: 70-71) demonstrates that agreeableness influences result/grade +2...+25% (with exception in one study -18%);
- neuroticism influences negatively – having “fears and doubts”, examination caused stress (Hakimi et al., 2011: 843; Furnham et al., 2009: 771; Schniederjan and Kim, 2005: 213 and 215), wish for “special treatments” (Furnham and Chamorro-Premuzic, 2004: 946) etc. Chamorro-Premuzic et al. (2003: 51). Neurotic people avoid evaluation events such as examinations (not attending them), therefore they receive worse results than their stable counterparts (Chamorro-Premuzic et al., 2003: 54). Neuroticism influences result/grade very much -36...+22% (negative ones were prevailing) (Vedel, 2014: 70-71). **Emotional stability**, as opposite to neuroticism, is used as a term in this research;
- conscientiousness influences positively – “achievement-oriented”, “hard-working”, responsible (Hakimi et al., 2011: 843; Furnham et al., 2009: 771; Schniederjan and Kim, 2005: 213 and 215), careful (Furnham and Chamorro-Premuzic, 2004). Dollinger and Orf (1991: 276) found that high conscientiousness leads to early completion of academic tasks and to higher results (grades) (Chamorro-Premuzic et al., 2003: 54). According to Vedel’s (2014: 70-71) meta-analysis, conscientiousness’ influence on result/grade varies between +9...+42%;
- openness influences positively – “self-report ability” (Furnham et al., 2009: 779; Hakimi et al., 2011; Chamorro-Premuzic and Furnham, 2009; Noblet et al., 2001; Schniederjan and Kim, 2005: 213 and 215), especially in artistic majors where novelty is required and less in majors where reproduction is required (De Fruyt and Mervielde, 1996: 421). According to Vedel’s (2014: 70-71) meta-analysis, openness’ influence on result/grade varies between -15...+26%.

Values. Similarly to traits, values are also an old concept, as a noun reaching back to the 14th century (Rohan, 2000). Schwartz (1999: 24) defines “values as conceptions of the desirable that guide the way social actors ... select actions, evaluate people and events, and explain their actions and evaluations”. Values “are ordered by relative importance” (Schwartz and Bilsky, 1987: 554). On the basis of underlying motivation, 10 basic values can be drawn, Schwartz’ (1994) values including achievement (wish to gain personal success), benevolence (concern of others), conformity (following rules and having “right” expectations), hedonism (pursuit of pleasure), power (dominance over others and pursuit of economic richness), self-direction (independent decision-making), security (concern for safety and protection, stability in country), stimulation (adventurous life and challenges), tradition (preservation of old/culture/religion), and universalism (welfare of people and environment), all together they construct circular continuum. Each person has all these values, just extension of value differ, which makes us all different.

Values have been used in managerial literature (e.g. Adams et al., 2011; Egri and Herman, 2000; Van Vianen et al., 2004). For example, Adams et al. (2011: 1331, 1348) found that Swedish CEOs, whose achievement, power, stimulation and self-direction are high and universalism and benevolence are low, are more concerned about shareholders wealth. This is surprising in a sense that wouldn’t have expected that kind of behaviour from high power and achievement, but as they say (Adams et al., 2011: 1335) power “reflect[s] appreciation for wealth attainment and control” and achievement “for success in competitive settings through hard work, self-challenge, and persistence”. Egri and Herman (2000: 574, 585) also analysed top managers and found that Canadian and US environmentally oriented managers value higher hedonism, self-direction, stimulation, benevolence and universalism than other values. Van Vianen et al. (2004: 707) found that expatriates with high values in benevolence and universalism may disappoint strongly, while host country employees do not value them at the

same level. While it is generally known that high motivation leads to better results (Tuan et al., 2005), then in-depth it might not be so evident which factors and values will lead to it. Rather, the reasons of failures are fragmented such as lack of responsibility, low self-esteem, lack of interest, low self-efficacy as emphasized by Tuan et al. (2005: 642).

Values have not been researched extensively in the context of learning (i.e. on the basis on EBSCO query). Still, Canadian MBA students showed better results in moral reasoning while having high value in universalism and hedonism, and low value in stimulation and security (Lan et al., 2010: 195). Knafo and Sagiv (2004: 255) examined what values prevail in Israeli workers in different specialities. For example, enterprising specialities (e.g. management, sales, advertisement) are influenced negatively with universalism value; social specialities (e.g. social workers, teachers) are “correlated positively with benevolence and universalism” and “negatively with power and achievement”; artistic workplaces (e.g. actors, musicians) are “correlated negatively with conformity”; and investigative workplaces (e.g. scientists, doctors) are “correlated positively with self-direction values and negatively with tradition” (Knafo and Sagiv, 2004: 255, 258-259). Miller et al. (1983) saw differences in values between real life and experimental life, latter could be described also by student sample (used here).

2.3 Absorptive capacity and soft factors

In case of human resources, employees are not similar to each other at level as machines and other resources are, psychological factors guide our behaviour (Schwartz, 1999). ‘Behavioural strategy’ is emerging in journals (see Laureiro-Martinez et al., 2015) and conferences (see Nagel, 2015; Graf-Vlachy, 2015; Piórkowska, 2015), but this far there are limited number of works which try to combine psychological factors with dynamic capabilities. The same is true for one representative of dynamic capabilities – ACAP, for example, combining psychological factors with absorptive capacity can be seen in works of Siachou and Gkorezis (2014) and Löwik (2013: 103).

Psychological factors (e.g. motivation, openness, trust) together form organizational culture, which is a known influencer in knowledge management related questions, including ACAP (Gold et al., 2001: 189-190; Zhao and Anand, 2009: 967). However, Szulanski (1996: 36) points out that psychological factor – motivation – doesn't influence knowledge transfer as much as lack of the ACAP does. Psychological leadership style and ACAP have been combined by study of Sun and Anderson (2011), where transformative leadership was found to be related with explorative learning and transactional with exploitive learning (for transformative and transactional styles see Avolio et al., 2003). Both, big-five (Gosling et al., 2003) and 10 dimension of values (Schwartz et al., 2001) have included the openness, and openness is clearly having with a link to ACAP – higher openness of company and managers leads to higher ACAP (Noblet et al., 2001). The opposite is true as well, good absorptive capacity enhances openness (Barge-Gil, 2010: 581). Wales et al. (2013: 622) also emphasized entrepreneurial mindset (psychological factor) as a balancing factor while ACAP is at a lower level: when ACAP is in full force then entrepreneurial mindset may diminish financial performance. One of the Schwartz's (2011) basic values is 'tradition', which is defined as "preservation of old", although according to Winkelbach and Walter (2015) prior knowledge is not good for ACAP.

2.4 The impact of factors on result

In management studies performance indicator is often studied as a dependent variable (23-29% of occurrences) (March and Sutton, 1997; Richards et al., 2009: 719). It is always hard to select appropriate dependent variable from large set of possibilities – there are more than 200 different performance variables from accounting, financial market, mixed etc. (Richards et al., 2009). Considering the research context – academic absorptive capacity – there exist also wide variety of performance indicators, for example, Flatten et al. (2011: 99) summarize some 15 indicators for ACAP performance from R&D intensity to labour quality. ACAP's impact

on different performance indicators is noticed, for example, its effect on competitiveness (Zahra and George, 2002), innovation (Cohen and Levinthal, 1990), interorganizational learning (Tsai, 2001) and performance of production line (Mukherjee et al., 2000). The focus on last two components of ACAP (transformation & exploitation) is leading to short-term performance (Ahuja and Lampert, 2001). According to Komarraju et al. (2011: 472) traits explain results (grade) by 14%, according to Paunonen and Ashton (2013: 781) 24%, etc. To sum up, the total impact of traits on results (grades) is considerable (Vedel, 2014), but still not explaining more variance than one fourth (25%), it is differing by country, academic level etc. Different ratios such as weighted average grade were found most appropriate for several reasons for this research. Average grade is very often used in literature (e.g. Chowdhury, 2006; Masgrave-Marquart et al., 1997). It is easily measurable, since this indicator is easily available from central study information system (ÕIS) in target country – Estonia and this indicator is then needed by students for several purposes (for applying study grants etc.).

Several research sources (Masgrave-Marquart et al., 1997; De Raad and Schouwenburg, 1996) have found positive relationship between big-five components and academic performance (former is a source for conscientiousness, openness, and neuroticism; latter source supports extraversion, conscientiousness, and openness). Schniederjans and Kim (2005: 208) show that 10% of best- and worst-performers can be differentiated on the basis on big-five elements. However, it is worth noting that there are certain limitations between academic and business contexts, for example, Van Der Zee et al. (2002: 110-111, 119 and 121-122) found social and academic success to be different from each-other. Black and Kassaye (2014: 38-39, 45) brought out that learning styles affect academic result only a little bit, for example, active experimentation design (e.g. projects, practicing, groupwork) helps a bit more as compared to traditional design (e.g. lectures).

3. Methodology

3.1 Questionnaire

Major, phenomenological part of questionnaire was constructed on the basis of pre-validated and well known questionnaires, for this purpose over 50 different questionnaires were looked through. The criteria to select questionnaires were: being pre-validated, short length, and wide popularity. The size of questionnaire is always problematic, too long questionnaires reduce response rate significantly (Churchill, 1995: 399), therefore short versions of Schwartz and Big-Five questionnaires were used. In final version of questionnaire, three pre-validated and well known questionnaires were used (see Appendix). Final number of used questionnaires in survey was reduced due to size limits, similarities among questionnaires and relatedness among soft psychological factors. The components of the final survey include **soft factors (traits and values), ACAP, result and profile.**

ACAP questionnaire. Flatten et al. (2011) made extensive research on existing ACAP measures to construct and test new scales. For ACAP, there are some other questionnaires on ACAP which base on Flatten et al. (2011), such as Chauvet (2014). However, there were few differences, e.g. Chauvet's orientation to knowledge sharing aspect while Flatten emphasized the managerial role in acquisition (Chauvet, 2014: 117). They also had different opinion to which ACAP component internal and/or external should be included. In assimilation, Flatten focuses only on external sources and Chauvet on both internal and external (Chauvet, 2014: 117-118). Chauvet (2014) model was tested on French companies, which are less close to the sample of this work in comparison to Flatten's et al. (2011) German sample, due to cultural reasons. Flatten et al. (2011) survey was chosen.

Values questionnaire is based on Schwartz (2001). Since the focus is on students, then Schwartz et al. (2001) PVQ questionnaire was used, which was tested and used originally for younger people. PVQ questionnaire is also much shorter (21 questions) than Schwartz's

(1992) earlier well-known version Schwartz Values Survey (SVS) (56 questions). There is also Short Schwartz's Value Survey (SSVS) with ten questions, each directly measuring one value in nine point scale (Lindeman and Verkasalo, 2005: 172), despite having quality indicators this scale was not used due to preference to multi-item scales. Values in Schwartz questionnaire's theoretical model construct circle, which make possible to abandon opposite poles, plan was to remove security, conformity, tradition, benevolence, and universalism (candidates for removal due to competition and conflict with opposing), finally not used. PVQ questionnaire has been used in earlier strategic literature (e.g. Adams et al., 2011).

Traits questionnaire. Initially, when the selection of psychological factors was open and decision was not yet made to use big-five, more entrepreneurial oriented list of traits was planned to be used (Kirkpatrick and Locke, 1991; Judge et al., 2002), there was also plan to remove three leadership traits: charisma, creativity, and flexibility, all candidates for removal due to rare existence in real life. Finally, big-five was chosen for traits due to its wide usage. The length of questionnaire was important. Intentionally, short traits questionnaire was used (Gosling et al., 2003). The quality of both (traits & values) questionnaires has been tested in earlier, for example, short version of big-five traits was tested by Gosling et al. (2003).

Profile. It is believed that traits depend on situation, field (Stodgill, 1948) and age of a person (Specht et al., 2011: 880; Laureiro-Martinez et al., 2015: 333), therefore corresponding control variables were included. 'Time pressure' scale was added on the basis of Williams et al. (2013) study on student learning.

Translation. Estonian translation was performed and validated where it was necessary, the translation was carried out by 20 groups of 2-3 persons who worked independently in parallel. Translations were talked through in meetings, compared to each-other, found differences were analysed and discussed until solution was agreed upon. Traits 10-item questionnaire (Gosling et al., 2003: 525) is rather short, approximately 25 words – names of the traits, easy

translation was presumed, however, the translation of certain traits e.g. ‘quarrelsome’ & ‘complex’ caused disagreements. Due to different contexts: learning in companies (Flatten et al., 2011) and adults learning in academia, the original Flatten et al. (2011) questionnaire was slightly modified to academic context, see conversion (Table 1) and final result in Appendix.

Table 1: Conversion of ACAP from economic context (Flatten et al., 2011) to academic context

Original version (economic context)	Converted version (student context)
'industry'	'speciality'
'company'	'course'
'cross-departmental'	'within groups'
'employees'	'students'
'management'	'lecturer'
'business unit'	'group'
'technology'	'way of learning'
'prototype'	'stepwise', 'step-by-step', 'part-by-part'

In other occurrences, where pre-validated Estonian translation was already available, it was used instead of own translation. For example, for Schwartz PVQ (Schwartz et al., 2001; Schwartz, 2003b), the Estonian version was used from Tart (2008).

3.2 Sample

Students from different faculties (=industry), levels (bachelor, master, doctoral), universities in Estonia and Estonians in foreign universities (e.g. Ireland, Latvia, Finland, Russia, Great Britain, Sweden) were used. Students have been used in management research (e.g. MBA students used by Devers et al., 2007: 197). Graf-Vlachy (2015) summarizes several advantages and disadvantages of using student sample. For example, disadvantages cover beliefs of poor generalisation/external validity and negative attitude from journal editors and reviewers (Graf-Vlachy, 2015: 3, 4). Somewhat contradicting are findings about psychological attitudes and decision making, while some see differences among manager and student respondents, then others not (Graf-Vlachy, 2015: 9). Student sample are found appropriate when aim is on testing, on internal validity and on exploratory research (Graf-Vlachy, 2015: 10) as here. Graf-Vlachy (2015: 12) emphasises the precondition to use student sample to have similar skills and knowledge as managers. Actually, it is even simpler, student

sample is found reasonable in low level psychological subjects (Bono and McNamara, 2011; Colquitt, 2008) as in current research.

Current research covers sample not only from production oriented fields (engineering fields, technical specialities), but also service oriented fields, where learning is equally important, especially due to non-technical business model innovation. For example, Hoarau (2014) has investigated ACAP in a service-oriented field, where absorption and sense-making/interpretation of tacit knowledge are especially important.

3.3 Data gathering

Some 30 groups with 2-3 undergraduate students in group worked under supervision of author in 2015, they were helping to select and contact sample. Online survey was out from October 8 to November 2, 2015. A criterion was to use only students from public and private universities, not accepting participants from educational facilities, which do not provide higher education. University affiliation of all students was known and randomly checked. Participating students, students of the same 'course' from previous years, were not allowed to participate to avoid biases (e.g. researcher bias and desirable answers bias). In target country – Estonia there are approximately 60 thousand students. Sample was selected on the basis of individual contacts and later on the basis of snowball effect – the use of convenience samples is very high, also in top journals (Bono and McNamara, 2011). Invitations were mostly sent by using social media, mainly by Facebook.com and VK.com. Both, individual contacts and groups in social media were used, number of individual contacts reached to 1949 and through groups 6145 students were approached. Overlap of individual and group contacts is not known, but most probably it is not zero. Altogether, max. 8094 students constructed the sample (not considering possible overlaps between individual and group contacts). Unfortunately, there were also some mistakes in sample, e.g. participation of some students from previous years, less than 1% in sample, however, it is not sure how well they

remembered the subject and whether they were able to link previous year's study on organizational ACAP to this time study aspects.

In result, 1509 students participated in the survey (response rate 19%). The sample consisted of social science students 32% (n=477), engineering 22% (n=339), natural science 11% (n=171), humanities 9% (n=142), medicine 8% (n=124), agriculture 1% (n=19) and unidentified other 16% (n=237). It is not exactly known what constructed 'other', but considering the background of participating students there is reason to believe that under 'other' there are military, police, civil aeronautical and navy students. Women participation was much higher 64% (n=964) than men participation 36% (n=545). Two biggest ethnical groups gave majority of responses – Estonians 78% (n=1140), Russians 20% (n=297), Ukrainians 1% (n=10) and other 1% (n=17). In educational level, bachelor students prevailed at 89% (n=1336), followed by master 10% (n=155), doctoral 1% (n=16) and post-doctoral students 0% (n=2), which made the mean age also rather low $M=21,4$ (s.d.=3,58). Due to possibilities of social media and feedback from participating individual contacts, affiliation of most students was known. Some 94% of respondents were from Estonian universities, rest 6% were from Great Britain 2% (n=31), Russia 1% (n=17), Danish 1% (n=11) and 12 other countries from Europe. In Estonia, majority of participants were from the Tallinn University of Technology 29% (n=568), the University of Tartu 13% (n=253), the University of Tallinn 8% (n=160), rest 13% were from 17 other high educational facilities in Estonia.

4. Results and discussion

4.1 Descriptive overview of ACAP and soft factors

SPSS 22 was used for data analysis. Internal consistency indicator, Cronbach's Alpha was measured, unfortunately it showed low reliability in seven multi-item scales out of 14. Low α values were expected, since it is known that Cronbach's Alpha is dependent on scale length, problematic in situations where the scale is short (Garson, 2012: 31), short scales of 2-4 items

were used in this research. However, all scales were extensively pre-validated by several prior research (Gosling et al., 2003; Schwartz, 2001; Flatten et al., 2011).

Highest trait is 'conscientiousness' (M=5,38; s.d.=1,091) and lowest 'agreeableness' (M=4,39; s.d.=0,988), but as seen from numbers both are above average (7-point Likert scale) and quite close to each other in absolute numbers (Table 2). 'Benevolence' was highest value (M=2,33; s.d.=0,986; opposite 6-point scale) and 'power' the lowest (M=3,74; s.d.=1,166), here the difference is bigger, both the interval is bigger and scale shorter. Prevalence of benevolence is surprising in world where people less and less seem to care about others.

Correlations showed no multi-collinearity. Average correlations were among values, which is expected due to their neighbouring effect from circular continuum (Schwartz, 2001). ACAP components showed also correlations indicating that process might not be so sequential, but overlapping (to be seen in-depth in factor analysis, see below).

Estonia is characterized as a very innovation oriented country. Tallinn, the capital of Estonia is called one of the start-up capitals in Europe by Wired and Sir Richard Branson (Karis and Rungi, unpublished). It is home country for many famous start-ups such as Skype, TransferWise, GrabCAD (ibid.).

Creation and usage rate of smartphones, internet, e-banking, e-taxation and e-voting is very high (ibid.). Despite of fact that typical start-upper in Estonia is characterized by being middle-aged (ibid.), the majority of teams there are still very young, from this perspective it is surprising and contradicting that similarly young sample is characterized being disciplined and not opened to new.

4.2 Confirmation of the model of absorptive capacity (factor analysis)

Before analysing how soft behavioural factors and ACAP influence each-other and output there is need to check how appropriate ACAP model on the basis of student sample is. Factor analysis was performed to see whether any of the earlier ACAP model stands well here, either

three-step Cohen and Levinthal's (1990), four-step Zahra and George's (2002) or any other model. Since the multi-item questionnaire proposed by Flatten et al. (2011) was taken as a basis here, and as they followed Zahra and George's (2002) four-step model, the construction validity preference is in favour of that model.

Table 2: Correlation between dependent and independent variables

Variables		N	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26			
No.					Extraversion	Agreeableness	Conscientiousness	Emotional stability	Openness to new experiences	Universalism	Benevolence	Tradition	Conformity	Security	Power	Achievement	Hedonism	Stimulation	Self-direction	Acquisition	Assimilation	Transformation	Exploitation	Complexity of speciality	Level of groupwork	Time pressure	Average grade	Age	Years in uni	Level of education			
1	Extraversion	1508	5,04	1,276	1																												
2	Agreeableness	1508	4,39	0,988	-.048	1																											
3	Conscientiousness	1508	5,38	1,091	,186***	,117***	1																										
4	Emotional stability	1508	4,53	1,221	-.027	,174***	,186***	1																									
5	Openness to new experiences	1507	4,95	1,044	,347***	,034	,150***	,034	1																								
6	Universalism	1506	2,75	0,978	-.100***	-.180***	-.180***	-.036	-.179***	1																							
7	Benevolence	1504	2,33	0,986	-.191***	-.203***	-.249***	-.075	-.181***	,540***	1																						
8	Tradition	1499	3,71	1,083	,254***	-.145***	-.042	-.049	,126***	,246***	,228***	1																					
9	Conformity	1502	3,67	1,089	,093***	,011	-.093***	-.044	,170***	,143***	,325***	,325***	1																				
10	Security	1501	3,22	1,146	,067***	-.071***	-.081***	,098***	,122***	,266***	,281***	,340***	,432***	1																			
11	Power	1505	3,74	1,166	-.082***	,276***	,103***	,173***	,039	-.102***	-.025	-.032	,239***	,166***	1																		
12	Achievement	1505	2,87	1,139	-.176***	-.128***	-.029	,141***	-.112***	,147***	-.039	,149***	,227***	,533***	,339***	1																	
13	Hedonism	1503	2,51	1,055	-.251***	-.039	-.079***	,046	-.175***	,288***	,409***	,078	-.005	,161***	,225***	,339***	1																
14	Stimulation	1505	2,80	1,154	-.344***	,032	-.040	,017	-.383***	,280***	,362***	-.017	-.089***	,000	,188***	,347***	,482***	1															
15	Self-direction	1506	2,61	0,932	-.245***	,087	-.079***	-.029	-.401***	,262***	,365***	-.010	-.012	,062	,221***	,304***	,351***	,483***	1														
16	Acquisition	1503	4,76	1,146	,103***	,061	,111***	,035	,171***	-.081***	-.099***	-.005	,012	-.051	,096***	,002	-.068***	-.032	-.041	1													
17	Assimilation	1502	4,67	1,275	,197***	,125***	,093***	,057	,196***	-.065	-.067***	,013	,037	-.024	,075***	,021	-.065***	-.063***	-.027	,513***	1												
18	Transformation	1489	5,24	1,096	,162***	,158***	,187***	,072	,195***	-.112***	-.121***	,002	,055	-.029	,104***	-.017	-.106***	-.041	-.004	,487***	,538***	1											
19	Exploitation	1492	4,76	1,199	,098***	,112***	,116***	,098***	,139***	-.084***	-.087***	-.057	,012	-.069***	,072***	,020	-.077***	-.033	-.015	,490***	,593***	,587***	1										
20	Complexity of speciality	1480	4,81	1,264	-.015	,065	,078***	-.014	,028	-.070***	-.056	-.035	,026	-.042	,060	-.002	,009	,033	,024	,202***	,049	,202***	,132***	1									
21	Level of groupwork	1470	3,72	1,325	,164***	,018	,053	-.037	,119	-.011	-.035	,041	,027	-.013	,004	-.042	-.031	,244***	,436***	,204***	,225***	-.052	-.052	1									
22	Time pressure	1461	4,57	1,374	,028	,014	,081***	-.039	,089***	-.052	-.047	,023	,041	-.036	,051	-.020	,041	-.005	-.050	,217***	,066	,124***	,048	,425***	,105***	1							
23	Average grade	1291	3,74	0,699	-.041	-.006	,153***	,008	,036	-.031	-.003	,025	-.038	-.042	,050	-.077***	,069	,013	,008	,104***	,099***	,082***	,027	-.120***	,089	-.079***	1						
24	Age	1473	21,39	3,581	,093***	,006	,095***	,018	,112***	-.046	,031	,055	,019	,026	,072***	,032	,103***	,033	-.102***	,035	,025	,062	-.031	-.045	,091***	,135***	,042	1					
25	Years in uni	1459	1,90	1,595	,020	,005	,007	,009	-.010	,049	,109***	,049	,030	,084***	,015	,012	,101***	,070***	-.014	,031	,015	,055	-.061	,009	,081***	,088***	,042	,491***	1				
26	Level of education	1509	1,13	0,375	-.019	,014	,029	,001	,027	-.053	,040	-.013	-.060	-.008	-.005	-.049	,073	,011	-.020	,029	,038	,051	-.035	,004	,075	,091***	,143***	,443***	,461***	1			

*** p<0,001; ** p<0,01; * p<0,05; moderate & large effect sizes are marked yellow; result related correlations are marked pink.

Table 3: Two-factor model of ACAP

Multi-item variables		Component	
		1	2
Mental	Transformation - applying new knowledge (q 11)	,852	
	Transformation - linking existing-and-new (q 10)	,845	
	Transformation - absorption of new knowledge (q 9)	,836	
	Transformation - structuring knowledge (q 8)	,769	
Practical	Assimilation - cross-unit meetings (q 7)		,767
	Assimilation - cross-unit support (q 5)		,761
	Assimilation - cross-unit communication (q 4)		,729
	Exploitation - regular reconsideration (q 13)	,358	,588
	Acquisition - within industry sources (q 2)	,378	,546
	Exploitation - more effective working (q 14)	,483	,536
	Acquisition - beyond industry sources (q 3)		,513
	Exploitation - support of stepwise solution (q 12)	,490	,492
	Acquisition - search for relevant information (q 1)		,464
	Assimilation - quick information flow (q 6)	,417	,440

Varimax with Kaiser Normalization, 3 iterations.

While using criteria (eigenvalue over one and elbow position on scree plot) two factors were able to be found for ACAP, transformation formed the first factor and rest of dimensions (i.e. acquisition, assimilation, exploitation) formed another (Table 3). One possible reasoning could be that transformation is more mental in comparison to more practical and “mechanical” acquisition, assimilation and exploitation. Another easy and simple interpretation can be drawn on the basis of internal-and-external dimension, internal activities grouped together and same way the external ones. External ones have collective ACAP nature.

Table 4: Three-factor model of ACAP

Multi-item variables		Component		
		1	2	3
Transform.	Transformation - applying new knowledge (q 11)	,845		
	Transformation - linking existing-and-new (q 10)	,830		
	Transformation - absorption of new knowledge (q 9)	,820		
	Transformation - structuring knowledge (q 8)	,754		
Information exchange	Assimilation - cross-unit support (q 5)		,790	
	Assimilation - cross-unit meetings (q 7)		,747	
	Assimilation - cross-unit communication (q 4)		,730	
	Exploitation - regular reconsideration (q 13)	,347	,613	
	Exploitation - more effective working (q 14)	,466	,528	
	Exploitation - support of stepwise solution (q 12)	,475	,488	
	Assimilation - quick information flow (q 6)	,406	,454	
Acquis.	Acquisition - search for relevant information (q 1)			,768
	Acquisition - beyond industry sources (q 3)			,696
	Acquisition - within industry sources (q 2)	,319		,640

Varimax with Kaiser Normalization, 5 iterations.

Since two-factor model described just 54.43% of variance (not enough), three- and four-factor models were analysed as well. Three-factors model explained 61,38% of variance (Table 4), unfortunately, with the information acquisition activities grouped together – they are indeed somehow different than others. Same way mental transformation activities, which are very individual, are grouped together, but the third group explains mostly the information exchange among teammates and top-down information flow in form of managerial support. All together, they do not match with Cohen and Levinthal’s (1990) three-step model. There is high match between acquisition and recognition, but assimilation and exploitation do not come out at all.

Table 5: Four-factor model of ACAP

Multi-item variables		Component			
		1	2	3	4
Transform.	Transformation - absorption of new knowledge (q 9)	,823			
	Transformation - applying new knowledge (q 11)	,822			
	Transformation - linking existing-and-new (q 10)	,810			
	Transformation - structuring knowledge (q 8)	,758			
Assimilation	Assimilation - cross-unit support (q 5)		,782		
	Assimilation - cross-unit communication (q 4)		,772		
	Assimilation - cross-unit meetings (q 7)		,738		
	Assimilation - quick information flow (q 6)	,421	,460		
Exploit.	Exploitation - regular reconsideration (q 13)			,840	
	Exploitation - more effective working (q 14)	,331		,675	
	Exploitation - support of stepwise solution (q 12)	,341		,659	
Acquis.	Acquisition - search for relevant information (q 1)				,766
	Acquisition - beyond industry sources (q 3)				,692
	Acquisition - within industry sources (q 2)				,637

Varimax with Kaiser Normalization, 5 iterations.

In case of four factors (explains 67.40% of variance) (Table 5), initial factors from questionnaire were formed with some cross-loadings, which means that Zahra and George (2002) model for absorptive capacity found to be proven.

4.3 The impact of ACAP and soft factors on result (regression)

Traits, values and ACAP do not describe the variance in average grade much (respectively 4%, 3% and 2%) (Table 6), however, epistemologically there are opinions where 5% of variance is already very good in fields with high competition, so the given numbers still

Table 6: Impact of ACAP and soft factors on result

No.	Variable	Average grade				
		Model 1	Model 2	Model 3	Model 4	Model 5
1	Extraversion	0,007				0,008
2	Agreeableness	-0,021				-0,027
3	Conscientiousness	0,156 ***				0,153 ***
4	Emotional stability	-0,018				-0,017
5	Openness to new experiences	0,012				0,002
6	Universalism		-0,024			-0,016
7	Benevolence		0,016			0,034
8	Tradition		0,044			0,025
9	Conformity		-0,042			-0,008
10	Security		-0,038			-0,045
11	Power		0,130 ***			0,111 **
12	Achievement		-0,162 ***			-0,149 ***
13	Hedonism		0,100 **			0,117 **
14	Stimulation		-0,005			0,003
15	Self-direction		-0,002			-0,001
16	Acquisition			0,081 *		0,110 **
17	Assimilation			0,085 *		0,041
18	Transformation			0,051		0,051
19	Exploitation			-0,093 *		-0,078 *
20	Complexity of speciality				-0,093 **	-0,125 ***
21	Level of groupwork				0,082 **	0,044
22	Time pressure				-0,058	-0,092 **
23	Age				-0,024	-0,055
24	Years in uni				-0,022	-0,018
25	Level of education				0,163 ***	0,149 ***
	R²	0,025	0,031	0,019	0,044	0,114
	F	6,456 ***	4,049 ***	5,999 ***	9,619 ***	6,313 ***

*** p<0,001; ** p<0,01 ; *p<0,05; standardized coefficients

provide a valuable insight. Biggest coefficient that influence average grade comes from ‘conscientiousness’ (trait) ($\beta=0,179$; $p<0,001$), biggest negative effect comes from ‘achievement’ (value) ($\beta=-0,144$; $p<0,001$), most insignificant one is surprisingly ‘openness’ ($\beta=-0,003$) (model 5). Traits’ coefficients match largely Vedel (2014) and other literature review, but R^2 is significantly lower than in Komarraju et al. (2011) and Paunonen and Ashton (2013). Considering opposite scale of values (high positive coefficients indicate the need for low value for value domination); power, hedonism, and tradition need to be low for good performance, which surprisingly well match with teacher profile (Knafo and Sagiv,

2004). ACAP components are at average level as suggested by Wales et al. (2013). Finding information (acquisition) has highest coefficient ($\beta=0,110$; $p<0,01$), acquisition determines whether information is looked within or outside the industry domain.

4.4 The impact of soft factors on ACAP (regression)

While performance indicator is mostly used as outcome, then in current research it showed only low effect (Table 6) and there was need for something else. Barreto (2010: 257) indicate that not always the performance has to be outcome by saying “some researchers have used firm performance as the relevant outcome, whereas others have explored processes or organizational outcomes instead”, influence on ACAP was chosen (Table 7).

The impact of traits and values on ACAP components is significantly higher than traits/values influence on result. Traits ability to describe is lowest for acquisition (4% of variance) and exploitation (5%), highest for assimilation (8%) and transformation (9%) – impact is expectedly lower in pragmatic processes than in mental processes. While for performance, the ‘conscientiousness’ was most important ($\beta=0,156$, $p<0,001$) then for ACAP the ‘openness’ prevail ($0,104<\beta<0,152$). Also, while ‘neurotic’ may receive better performance ($\beta=-0,018$), ‘emotional stability’ is needed for learning ($0,009<\beta<0,092$). Values describe even less, 2% of assimilation and exploitation, 3% of acquisition and 4% of transformation.

Total impact of soft factors together varies between 13-25%. Throughout models, the biggest impact comes from ‘groupwork’ ($0,216<\beta<0,409$), negative ones from ‘security’ ($-0,077<\beta<-0,036$) and ‘hedonism’ values ($-0,092<\beta<-0,062$), most insignificantly influence some traits.

‘Conformity’ as best-practices ($0,006<\beta<0,023$) and ‘self-direction’ as own decision-making ($-0,024<\beta<0,006$) are needed for potential ACAP (acquisition & assimilation) (PACAP) and ‘stimulation’ as challenges ($-0,005<\beta<0,024$) and ‘self-direction’ ($0,012<\beta<0,051$) are needed for realized ACAP (transformation & exploitation) (RACAP) (Zahra and George, 2002).

Table 7: Impact of soft factors on ACAP

No.	Variables		ACAP - acquisition				ACAP - assimilation				ACAP - transformation				ACAP - exploitation			
			Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
1	Traits	Extraversion	,041			,028	,152 ***			,120 ***	,098 ***			,085 **	,055 *			,055
2		Agreeableness	,048			-,002	,119 ***			,086 **	,140 ***			,088 **	,092 ***			,052
3		Conscientiousness	,075 **			,029	,025			-,010	,128 ***			,094 ***	,067 *			,045
4		Emotional stability	,009			,033	,032			,056	,021			,050	,068 *			,092 **
5		Openness to new experiences	,144 ***			,135 ***	,134 ***			,130 ***	,137 ***			,152 ***	,104 ***			,114 ***
6	Values	Universalism		-,014		,006			-,023	-,010			-,053				-,027	-,014
7		Benevolence		-,051		-,023			-,021				-,074 *				-,031	,022
8		Tradition		,035		,003			,039				,034				-,024	-,051
9		Conformity		,006		-,016			,023				,053				,036	,032
10		Security		-,053		-,052			-,046				-,025				-,067 *	-,077 *
11		Power		,128 ***		,087 **			,081 **				,123 ***				,072 *	,023
12		Achievement		-,018		-,006			,028				-,050				,023	,017
13		Hedonism		-,058		-,062 *			-,051				-,100 **				-,070 *	-,048
14		Stimulation		,014		,044			-,050				,024				-,005	,030
15		Self-direction		-,024		,023			,006				,039				,012	,036
16	Environment	Complexity of speciality			,163 ***	,149 ***			,077 **	,062 *			,213 ***	,184 ***			,162 ***	,144 ***
17		Level of groupwork			,240 ***	,216 ***			,442 ***	,409 ***			,209 ***	,170 ***			,245 ***	,222 ***
18		Time pressure			,122 ***	,115 ***			-,011	-,013			,004	,000			-,039	-,040
19		Age			,006	-,023			-,006	-,041			,042	,009			,002	-,024
20		Years in uni			-,002	,022			-,027	-,010			,010	,035			-,071 *	-,050
21		Level of education			-,002	,002			,021	,030			,011	,019			-,018	-,015
		R ²	,040	,026	,118	,153	,075	,018	,196	,247	,090	,042	,090	,174	,045	,022	,080	,125
		F	12,620 ***	3,893 ***	31,460 ***	11,986 ***	24,291 ***	2,766 **	57,315 ***	21,756 ***	29,335 ***	6,395 ***	23,247 ***	14,022 ***	13,860 ***	3,377 ***	20,327 ***	9,474 ***

*p<0,05; **p<0,01; ***p<0,001; standardized coefficients

While we expected traits to influence behaviour at large extent, up to 59% (Zaccaro et al. 1991), then in our case it influenced just few percents.

Groupwork turned out to be rather big influencer of absorptive capacity and result/grade, according to Chiriac (2014: 2-3) groupwork may have

positive (e.g. collaboration) and negative impact (e.g. free-rider issue). ‘Level of education’ has low influence on ACAP, which is surprising since it is a known antecedent for ACAP (Löwik, 2013: 50), in turn, it is the second biggest influencer for grade ($\beta=0,149$; $p<0,001$; Table 6).

Good groupwork requires collaboration (not just cooperation), clear goals, “role differentiation”, “clear leadership”, at some extent both homogeneity and heterogeneity (Chiriac, 2014), “social support” (Eby et al., 1999: 368), apparently positive aspects prevailed in current research. Different representatives of groupwork, such as social integration are known to be needed for good ACAP (Löwik, 2013: 53, 143).

4.5 Context peculiarities for ACAP (t-test and ANOVA)

Table 8: How men and women differ in ACAP

Variables		Sex	N	Mean	s.d.	Difference	
ACAP	Acquisition	Men	542	4,60	1,163	-0,24	***
		Women	961	4,84	1,129		
	Assimilation	Men	540	4,55	1,223	-0,20	**
		Women	962	4,74	1,299		
	Transformation	Men	535	5,06	1,053	-0,28	***
		Women	954	5,34	1,106		
Exploitation	Men	536	4,64	1,207	-0,18	***	
	Women	956	4,83	1,189			
Environment	Complexity of speciality	Men	532	4,67	1,352	-0,21	**
		Women	948	4,88	1,206		
	Level of groupwork	Men	528	3,62	1,276	-0,16	*
		Women	942	3,78	1,349		
	Time pressure	Men	521	4,34	1,376	-0,35	***
		Women	940	4,69	1,358		
Average grade	Men	461	3,61	0,711	-0,20	***	
	Women	830	3,81	0,681			
Age	Men	533	21,34	2,725	-0,08		
	Women	940	21,42	3,986			

*** p<0,001; ** p<0,01; *p<0,05; * (red) equal variance not assumed

T-test results show that women show better results in ACAP than men (Table 8). ACAP is especially important in a start-up context, where men are preferred for managerial role (Karis and Rungi, unpublished). Similarly, men have lower values in traits (in four out of five, only emotional stability is surprisingly better in men). In the same way, women have better average in values (in seven out of ten). Opposite tendencies were found from earlier works, for

example, Schwartz and Rubel (2005: 1010) found men to be better in “power, stimulation, hedonism, achievement, and self-direction values”, the reverse for benevolence, universalism and security, no difference for “tradition and conformity values”. Lan et al. (2010: 183) indicated that for Canadian MBA male students the “hedonism, achievement and self-direction” are most important and for females “benevolence, hedonism and security”. In current sample men were only significantly better in power ($p < 0,001$) and no significant difference for conformity and self-direction.

Table 9: How specialities differ in ACAP

Variables	Speciality	N	Mean	s.d.	Difference	sig.	
ACAP	Acquisition	Humanities	141	4,71	1,278	0,62	***
		Social science	475	4,91	1,121		
		Natural sciences	171	4,51	1,104		
		Engineering and technical sciences	339	4,54	1,113		
		Medicine	124	5,14	1,218		
		Agriculture	19	4,98	0,933		
		Other	234	4,74	1,074		
		Total	1503	4,76	1,146		
	Assimilation	Humanities	142	4,71	1,325	0,92	***
		Social science	474	5,00	1,180		
		Natural sciences	171	4,08	1,283		
		Engineering and technical sciences	338	4,30	1,205		
		Medicine	124	4,77	1,265		
		Agriculture	19	4,50	1,134		
		Other	234	4,90	1,272		
		Total	1502	4,67	1,275		
	Transformation	Humanities	141	5,15	1,204	0,44	***
		Social science	473	5,36	1,027		
		Natural sciences	168	5,11	1,108		
		Engineering and technical sciences	335	4,96	1,063		
		Medicine	122	5,59	1,179		
		Agriculture	18	4,93	1,077		
		Other	232	5,37	1,053		
		Total	1489	5,24	1,096		
	Exploitation	Humanities	141	4,83	1,248	0,37	***
		Social science	470	4,86	1,184		
		Natural sciences	170	4,46	1,193		
		Engineering and technical sciences	337	4,54	1,177		
Medicine		124	4,91	1,174			
Agriculture		19	4,97	1,103			
Other		231	4,97	1,173			
Total		1492	4,76	1,199			

Environment	Complexity of speciality	Humanities	138	4,30	1,288	1,20	***
		Social science	470	4,60	1,117		
		Natural sciences	169	5,23	1,323		
		Engineering and technical sciences	337	4,94	1,316		
		Medicine	123	5,50	1,148		
		Agriculture	18	4,33	1,188		
		Other	225	4,70	1,216		
		Total	1480	4,81	1,264		
	Level of groupwork	Humanities	137	3,42	1,270	1,32	***
		Social science	468	4,26	1,336		
		Natural sciences	167	2,93	1,082		
		Engineering and technical sciences	335	3,39	1,178		
		Medicine	123	3,83	1,206		
		Agriculture	18	3,50	0,857		
		Other	222	3,83	1,323		
		Total	1470	3,72	1,325		
	Time pressure	Humanities	134	4,22	1,564	0,72	**
		Social science	466	4,57	1,300		
		Natural sciences	167	4,54	1,459		
		Engineering and technical sciences	331	4,59	1,382		
		Medicine	121	4,96	1,393		
		Agriculture	17	4,24	0,970		
		Other	225	4,55	1,298		
		Total	1461	4,57	1,374		
	Average grade	Humanities	115	3,88	0,657	0,45	***
		Social science	413	3,77	0,649		
		Natural sciences	146	3,54	0,822		
		Engineering and technical sciences	306	3,61	0,704		
Medicine		103	3,99	0,747			
Agriculture		14	3,75	0,589			
Other		194	3,83	0,620			
Total		1291	3,74	0,699			
Age	Humanities	138	20,80	2,577	1,67	***	
	Social science	467	22,23	4,662			
	Natural sciences	170	20,74	2,019			
	Engineering and technical sciences	331	21,21	2,779			
	Medicine	120	20,57	1,767			
	Agriculture	18	21,22	2,487			
	Other	229	21,21	3,956			
	Total	1473	21,39	3,581			

*** p<0,001; ** p<0,01 ; *p<0,05; * (red) homogeneity of variance violated

Medicine students showed throughout variables most positive results (in 11 occurrences out of 19), then came social science students (in seven times) (Table 9). Students from agriculture specialities showed lowest values (seven times), followed by science and engineering students (five times).

Majority of innovation in Estonia is made in small start-up companies, where two fields prevail: ICT and biotechnology start-ups. Prevalence of medicine is not therefore surprising,

but low values of engineering field seem not to influence success of one of its subfields – ICT prevalence.

5. Conclusion

Strategy as a stream owns strong enough nature and status to go in-depth, behavioural strategy stream is about to emerge. Research was performed in behavioural strategy field by combining soft psychological factors (i.e. traits and values) with mental ACAP process. Students are considered equally good respondents as company employees in psychology-related questions (Bomo and McNamara, 2011), and student samples have been used in managerial research before (e.g. Devers et al., 2007).

Main findings and confirmations of the research are, first, confirmation of Zahra and George's (2002) four-step ACAP model. There are several competing ACAP models available (Cohen and Levinthal, 1991; Todorova and Durisin, 2007; Garud and Nayyar, 1994; Lichtenthaler, 2009; Stulova and Rungi, unpublished), none of them matched as well as Zahra and George's (2002) model (RQ1). Secondly, soft psychological factors (traits and values) and ACAP influence final performance (average grade) at a low extent (RQ2). This finding may be related to or influenced by the sample (students) and performance indicator (average grade) peculiarities, especially with performance indicator and not much with sample (see limitations). Thirdly, soft psychological factors (traits and values) have strong and statistically significant influence on ACAP (RQ2). Fourthly, female prevail over male in ACAP and soft factors' average scores (RQ3). This is opposite to Schwartz and Rubel (2005) findings. Fifthly, medicine students are better in most ACAP factors by making them good candidates for knowledge intense biotechnology start-ups (RQ3). In Estonia, ICT start-ups prevail so far, biotechnology related start-ups (e.g. pharmacy, gene technology) are considered to be the runner-ups.

For further developments it would be a promising avenue to discover relationships and influence of individual's ACAP on organizational ACAP, this far there are only few works about it (Hayton and Zahra, 2005; Löwik, 2013: 144). This influence is probably symmetrical, organizational ACAP influences also individual ACAP (Zhao and Anand, 2009; Löwik, 2013: 144).

5.1 Limitations

Student sample can be considered one of the main weaknesses from theoretical point of view. However, there are several diminishing factors. Several prominent authors have emphasized that in psychology-related research the student sample is equally good as employees' sample (Bomo and McNamara, 2011: 658). While sociological research is often psychological in general, then in this research it was in particular – combining psychological factors such as traits and values with mental process of learning. As an additional support, the student samples are successfully used in top journals (e.g. Devers et al., 2007). From practical point of view, sample effect is diminished by high students' employment rate indicators in Europe and particularly in target country – Estonia. In Europe, students' employment rate varies country-by-country from $\frac{1}{2}$ to $\frac{2}{3}$, mostly exceeding 50% (HIS, 2008: 119). Estonian students' employment rate figures have been especially high, 61-66% for years (Beerkens et al., 2011: 684; HIS 2008: 119). These figures indicate full-time work, but considering part-time and seasonal work would give an even higher number. Therefore, there is a strong reason to believe that **the sample illustrate young employees' opinions well**. Furthermore, working doesn't influence academic performance – grades – either (Beerkens et al., 2011: 679; Pullmann et al., 2013: 103). Also, unfortunately, nowadays universities resemble business companies very much anyway, with some of the indicators studied being more welcome than others (entrepreneurial nature doesn't help in academic progress and missions (Kalar and Bostjan, 2015; Salimi et al., 2015)), some similarities, there is high competition, constant bids

and fund applications, profit-orientation, university-business relationships, spin-offs etc. Therefore, some university departments see themselves very entrepreneurial (Kalar and Bostjan, 2015: 1), on the other hand, this resemblance makes universities a useful sample for research. As labour quality is often used to measure ACAP (Flatten et al., 2011: 99), suggesting that university students shall be a good base for ACAP-related studies.

Performance measure. Part of analysis investigated academic performance as an outcome/result, but unfortunately, social and academic success are different from each-other (Van Der Zee et al., 2002: 110-111, 119 and 121-122). Also, results of the current study showed that ACAP and other independent variables describe average grade at small extent 2-3%. However, there is reason to argue that in service-oriented world and in the world of growing number of knowledge workers, the academic performance is getting similar to business performance.

Individual vs. group. Despite the importance of individual (Löwik, 2013) and the fact that every organizational learning starts from individual level (Crossan et al., 1999), it must not be forgotten that individually very wise persons might not work well in group, collective stupidity may emerge (Albrecht, 2003: 3), therefore group aspects must not be forgotten. Current research combines also group aspect – ‘groupwork’ variable, but there is chance to go more into detail in this respect.

Descriptive nature. Descriptive research has been accused of providing “results without relying on well-defined constructs” (Brown and Eisenhardt, 1995: 353), this is partly true here, ACAP has decades old background, but still suffering definitional, construct and epistemological problems. Behavioural context is also completely new.

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Appendix – components of questionnaire

Questionnaire consisted of parts:

0. Cover letter
1. Soft factors
 - a. Traits (see below)
 - b. Values (see below)
2. ACAP (see below + ‘complexity of field’, ‘groupwork’, ‘time pressure’) (additional components were measured in 7-point Likert scale)
3. Performance (‘average grade’)
4. Profile (level of ‘age’, ‘nationality’, ‘sex’, ‘years in uni’, ‘educational level’, ‘speciality’)

No.	Ord.	Traits (big five) (translated from Gosling et al., 2003: 525)	Note
Extraversion			
1	1	Extraverted, enthusiastic	
2	6	Reserved, quiet	reverse scale
Conscientiousness			
3	3	Dependable, self-disciplined	
4	8	Disorganized, careless	reverse scale
Openness to new experiences			
5	5	Open to new experiences, complex	
6	10	Conventional, uncreative	reverse scale
Emotional stability			
7	9	Calm, emotionally stable	
8	4	Anxious, easily upset	reverse scale
Agreeableness			
9	7	Sympathetic, warm	
10	2	Critical, quarrelsome	reverse scale

Traits were measured in 7-point Likert scale (1 – strongly disagree ... 7 – strongly agree).

No.	Ord.	Values (Schwartz PVQ, in Estonian Tart, 2008)
Benevolence		
1	12	It's very important to him to help the people around him. He wants to care for other people.
2	18	It is important to him to be loyal to his friends. He wants to devote himself to people close to him.
Universalism		
3	3	He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn't know.
4	8	It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them.
5	19	He strongly believes that people should care for nature. Looking after the environment is important to him.
Self-direction		
6	1	Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.
7	11	It is important to him to make his own decisions about what he does. He likes to be free to plan and to choose his activities for himself.
Stimulation		
8	6	He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life.
9	15	He looks for adventures and likes to take risks. He wants to have an exciting life.
Hedonism		
10	10	Having a good time is important to him. He likes to “spoil” himself.
11	21	He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.
Achievement		

12	4	It is very important to him to show his abilities. He wants people to admire what he does.
13	13	Being very successful is important to him. He likes to impress other people.
		Power
14	2	It is important to him to be rich. He wants to have a lot of money and expensive things.
15	17	It is important to him to be in charge and tell others what to do. He wants people to do what he says.
		Security
16	5	It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.
17	14	It is very important to him that his country be safe from threats from within and without. He is concerned that social order be protected.
		Conformity
18	7	He believes that people should do what they're told. He thinks people should follow rules at all times, even when no-one is watching.
19	16	It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.
		Tradition
20	9	He thinks it's important not to ask for more than what you have. He believes that people should be satisfied with what they have.
21	20	Religious belief is important to him. He tries hard to do what his religion requires.

Values were measured in 6-point asymmetric bipolar categorical Likert scale (1 – very much like me ... 6 – not like me at all).

No.		ACAP (modified and translated from Flatten et al., 2011: 110)
		Acquisition
1		The search for relevant information concerning our speciality is every-day business in our course .
2		Our lecturer motivates the students to use information sources within our speciality .
3		Our lecturer expects that the students deal with information beyond our speciality .
		Assimilation
4		In our course ideas and concepts are communicated within-groups .
5		Our lecturer emphasizes within-groups support to solve problems.
6		In our course there is a quick information flow, e.g., if a group obtains important information it communicates this information promptly to all other groups .
7		Our lecturer demands periodical within-groups meetings to interchange new developments, problems, and achievements.
		Transformation
8		Our students have the ability to structure and to use collected knowledge.
9		Our students are used to absorb new knowledge as well as to prepare it for further purposes and to make it available.
10		Our students successfully link existing knowledge with new insights.
11		Our students are able to apply new knowledge in their practical work.
		Exploitation
12		Our lecturer supports the development of solutions part-by-part .
13		Our course regularly reconsiders way of learnings and adapts them accordant to new knowledge.
14		Our course has the ability to work more effective by adopting new ways of learnings .

ACAP components were measured in 7-point Likert scale (1 – strongly disagree ... 7 – strongly agree).

No.		Profile & environment
1	Complexity of speciality	1 – very simple ... 4 – average ... 7 – very complex
2	Level of groupwork	1 – never ... 4 – sometimes, in 50% of cases ... 7 – every time
3	Time pressure	1 – non-existent ... 4 – average ... 7 – extremely high
4	Average grade	Linear [0-5] (0 – not passed ... 5 – excellent)
5	Age	Linear: 17-...
6	Years in uni	Linear: 1-...
7	Level of education	Bachelor, master, doctoral, post-doctoral