



The Effects of Intuition and Analysis on High-Tech Opportunity Exploitation Decisions

Leonie Baldacchino¹ and Nadia Boffa

The Edward de Bono Institute for Creative Thinking and Innovation, University of Malta, Malta

Abstract. In the dynamic high-tech industry, entrepreneurs need to make timely decisions on various matters including opportunity identification and exploitation. Past research found intuition to positively predict the number and innovativeness of opportunities identified by high-tech entrepreneurs. However, insufficient research has been published on intuition in opportunity exploitation, which is necessary for business creation and growth. Guided by dual-process theory, which posits that intuition should be studied together with analysis, this study addresses the above-mentioned gap in the literature through the following research question: *How are intuition and analysis related to entrepreneurs' decisions to exploit high-tech opportunities?* Data was gathered from 74 entrepreneurs using a mixed-methods approach comprising an online survey and verbal protocol analysis. A key finding of this study is that there was a greater amount of analytical than intuitive processing during high-tech opportunity exploitation decision-making, suggesting that entrepreneurs engage in more deliberate processes such as interpreting, convergent thinking and mental simulation at this stage, in an attempt to select the most promising option. Nevertheless, intuition was positively associated, while analysis was negatively associated, with the number of opportunities that participants decided they would exploit. This suggests that intuition plays an important role in opportunity exploitation, as it enables entrepreneurs to make decisions to pursue promising avenues, thereby counteracting the so-called 'paralysis by analysis'.

Keywords: Intuition, Analysis, Dual-Process Theory, Opportunity Exploitation, High-Tech Entrepreneurship.

1. Introduction

In rapidly changing and uncertain environments, such as the dynamic and competitive high-tech industry (Covin et al., 1999; Khatri and Ng, 2000), entrepreneurs face challenges and opportunities that require timely and effective decisions and actions. Digital technologies are considered enablers of entrepreneurship as they offer opportunities to start up new ventures (Elia et al., 2020; Von Briel et al., 2018) as well as to enhance established businesses (Ferguson and Henrekson, 2019; Kraus et al., 2019). For such technologies to bear

1. Corresponding author: Leonie Baldacchino, The Edward de Bono Institute for Creative Thinking and Innovation, University of Malta, Msida, MSD 2080, Malta. Tel: +356 2340 3912. Email: leonie.baldacchino@um.edu.mt

fruit, however, entrepreneurs must be capable of identifying, evaluating and, if deemed promising, exploiting the opportunities they offer.

The identification, evaluation, and exploitation of opportunities are widely considered to form an integral part of the venture creation process. Identifying opportunities and generating new venture ideas are fundamental in entrepreneurship (Shane and Venkataraman, 2000) and considerable research has focused on these early stages of the entrepreneurial process (e.g., Baldacchino et al., 2022; Baron, 2006; Gaglio and Katz, 2001; Grégoire et al., 2010; Gruber et al., 2008; 2012; 2013; Shepherd and DeTienne, 2005; Wang and Gibb, 2020). However, these are only the first steps, and further action is required for opportunities and new venture ideas to result in business creation. Not all identified opportunities and ideas are exploited, as entrepreneurs must evaluate them to assess market potential, make decisions on whether or not to pursue them, and engage in appropriate implementation activities to see them to fruition.

Opportunity exploitation is therefore “a necessary step in creating a successful business” (Choi and Shepherd, 2004, p. 377), and understanding how entrepreneurs arrive at decisions regarding whether or not to exploit opportunities – including in relation to new digital technologies – is critical to further knowledge in the field of entrepreneurship (Shepherd et al., 2015). Opportunity exploitation has received some scholarly attention, but considerably fewer studies have focused on this stage of the process (e.g., Choi and Shepherd, 2004; Grichnik et al., 2010; Welppe et al., 2012). This research addresses the underexplored area of opportunity exploitation through an entrepreneurial cognition perspective, in order to shed light on the processes underlying entrepreneurs’ decisions to exploit opportunities regarding new digital technologies.

In recent times, a growing number of entrepreneurship researchers have turned their attention towards the role of intuition as an influential cognitive process in entrepreneurship (Baldacchino et al., 2015). Intuition, commonly referred to as ‘gut feeling’ and defined as “affectively-charged judgments that arise through rapid, nonconscious, and holistic associations” (Dane and Pratt, 2007, p. 40), has been hailed as “the seed of entrepreneurial action” (Dutta and Crossan, 2005, p. 436). Research indicates that intuition is more prevalent and effective in tasks that lack structure, rules, guidelines or information, such as those commonly performed by entrepreneurs; as well as in novel, uncertain, complex, volatile, and time-pressured environments, such as the high-tech industry (Baldacchino, 2022; Covin et al., 1999; Khatri and Ng, 2000). Intuition has indeed been found to be positively associated with the number and innovativeness of new venture ideas, which are regarded as precursors to entrepreneurial action, that were identified by high-tech entrepreneurs (Baldacchino et al., 2022). However, insufficient research has been published on the role of intuition in the opportunity exploitation stage, with the consequence that little is known about the extent to which entrepreneurs rely on intuition when

making decisions regarding opportunity exploitation. Given that decisions to exploit opportunities must be made for entrepreneurship to occur (Choi and Shepherd, 2004), entrepreneurship is crucial for generating employment opportunities, economic growth and innovation (Wymenga et al., 2012), and digital technologies add complexity to decision-making with respect to their adoption (Pappas et al., 2021), further research is needed to better understand entrepreneurs' decisions regarding high-tech opportunity exploitation.

This study extends earlier work which investigated the role of intuition in the prior stage of new venture ideation in high-tech entrepreneurship (Baldacchino et al., 2022). In line with this earlier work, the current study is underpinned by the dual-process Cognitive-Experiential Self-Theory (CEST: Epstein et al., 1996; Pacini and Epstein, 1999), which states that human information processing takes place through the independent yet interactive processes of intuition and analysis, with the latter referring to a slower, conscious and controlled process of "trying to understand a problem by breaking it down into its components and then performing logical and/or mathematical operations on these components" (Klein, 2004, p. 74). Scholars ascribing to dual-process theories (e.g., Epstein, 2003) maintain that intuition should not be studied in isolation but together with analysis. In view of the above, the aim of this study is to address the identified gaps in the literature by exploring the following research question: *How are intuition and analysis related to entrepreneurs' decisions to exploit high-tech opportunities?*

This paper proceeds as follows: The next section outlines dual-process theory as the study's theoretical background, distinguishes cognitive style from cognitive strategy, reviews literature concerning the role of intuition and analysis in opportunity exploitation, and lays out the theoretical framework underpinning the study. The methods are described next, including the research design, sample, data collection and data analysis. The findings are then presented, followed by their discussion, an acknowledgement of the study's limitations, suggestions for future research, and recommendations for practice.

2. Theoretical Background

2.1. Dual-Process Theory

The dual-process perspective encompasses a collection of cognitive theories which affirm that human beings process information by means of two independent but interactive cognitive systems. The first, broadly referred to as 'System 1', is rapid, holistic, affective, automatic and involuntary. The second, referred to as 'System 2', is slow, detail-focused, rational, deliberate and controlled (Stanovich and West, 2000). Intuition arises from System 1, which is

older in evolutionary terms, while analysis emerges from the more recently developed System 2.

The Cognitive-Experiential Self-Theory (CEST) underpinning this study is one such dual-process model, in which the intuitive system is referred to as 'experiential' (as it is derived from experience), and the analytical system is labelled 'rational' (Epstein, 2003, 2010). According to this theory, the two systems are interrelated but distinct, and may operate independently of one another (Hodgkinson and Sadler-Smith, 2003). This implies that the intuitive system and the analytical system may be activated to varying degrees at the same time, and that a judgement could at once be both intuitive and analytical. Similarly, individuals vary in their preference for – and use of – intuition and analysis, with some being inclined predominantly towards one system or the other, while others may be more balanced.

2.2. Cognitive Style, Cognitive Strategy and Opportunity Exploitation

Most of the extant research on intuition in entrepreneurship (as well as in other fields) has focused on cognitive style, which refers to an individual's dispositional preference for intuition or analysis (Hodgkinson and Clarke, 2007). In recent years, however, calls have been made to study cognitive strategy, which refers to the actual use of intuition and analysis in response to particular circumstances (Hodgkinson and Clarke, 2007). Cognitive strategy may be influenced by cognitive style (Sinclair and Ashkanasy, 2005) but they are not necessarily analogous to one another, as various other factors such as task characteristics may come into play to determine the type of processing actually employed (Blume and Covin, 2011; Hodgkinson and Sadler-Smith, 2011).

Researchers largely agree that the impacts of intuitive and analytical cognitive styles and strategies vary according to the situation and stage of the entrepreneurial process, with most suggesting that intuitive styles are favoured in the formation of opportunities, while analytical styles are preferred in the exploitation of opportunities (Bounfour and Langström, 2008; Kickul et al., 2009). Opportunity identification generally involves divergent thinking, which refers to the generation of multiple ideas or solutions though novel, unexpected, and remote connections, and forms part of the intuitive system. This contrasts with convergent thinking, which involves deducing or selecting an optimal answer or solution through logic and reasoning, and is therefore an analytical process (Cropley, 2006; Sadler-Smith, 2004). The 4I Organisational Learning Framework (Crossan et al., 1999), which has been applied to explain the identification and development of entrepreneurial opportunities (Dimov, 2007a, 2007b; Dutta and Crossan, 2005), suggests that opportunities are identified in an initial intuiting stage, and that this is followed by a process of interpreting the opportunity to oneself and others, which takes place at a conscious level and

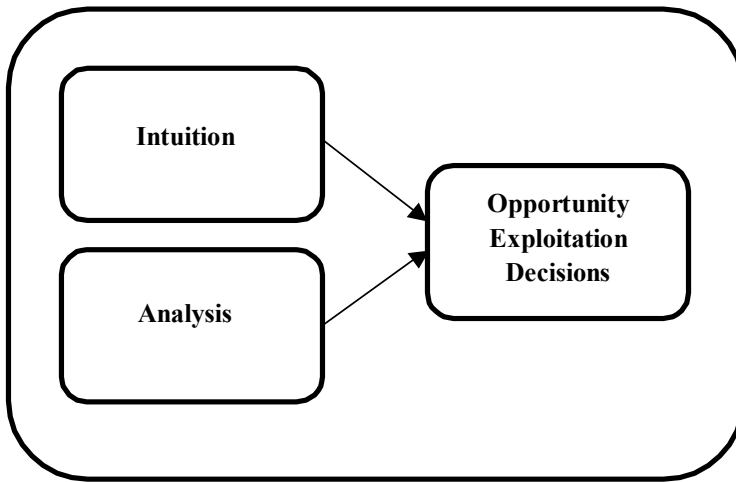
involves analysis and reasoning. Along similar lines, Klein (2004) maintains that once a course of action has been intuitively identified, individuals then evaluate its appropriateness by “consciously imagining what would happen when they carried it out” (p. 26). This resonates with what Gaglio (2004) refers to as mental simulation, where entrepreneurs consciously “mull over what will happen” or “mentally rehearse” (p. 537) what might take place if a business idea is implemented. These processes enable entrepreneurs to envision the potential costs and benefits that may be involved in pursuing an opportunity, and may lead to a decision to exploit or reject it.

Notwithstanding the above, it may be argued that entrepreneurial intuition plays a significant role throughout the stages of the venture founding process including exploitation. Intuition is more prevalent and effective in situations where there is a high degree of novelty, complexity and uncertainty, and where time and information are limited – which are very often the sort of environments that entrepreneurs operate in (Covin et al., 1999; Khatri and Ng, 2000). Intuition may also offset ‘paralysis by analysis’, which occurs when individuals overthink situations and fail to make decisions or take action (Langley, 1995). Due to this, Allinson et al. (2000) argued that intuitive cognitive styles are more likely to facilitate critical aspects of entrepreneurship, including both opportunity identification and exploitation. Baldacchino et al. (2022) studied the use of intuition and analysis during opportunity identification and new venture ideation, and found that higher levels of intuition, as well as an above-average concurrent use of both intuition and analysis (i.e., cognitive versatility), were significant positive predictors of the number and innovativeness of new venture ideas. That study did not extend into the opportunity exploitation stage, which is the focus of the present research.

2.3. Conceptual Framework

The literature reviewed above provides limited and mixed evidence on whether decision-making in opportunity exploitation is likely to be determined by intuition, analysis, or both. However, there are indications that both intuition and analysis could be useful at all stages of the entrepreneurial process, including exploitation. As stated by Blume and Covin (2011), “the decision to found a new venture is typically made based on some combination of formal analysis and an intuitive judgement that justifies the choice” (p. 137).

In view of the above, and in line with the dual-process view that intuition and analysis may be concurrently employed, it is plausible to expect them to both play a role in opportunity exploitation decision-making, as depicted in Figure 1:

Figure 1: Conceptual Framework

3. Methods

3.1. Research Design

Past research on intuition in entrepreneurship has often been criticised for being descriptive, based on anecdotal evidence, or over-reliant on self-report measures (Khatri and Ng, 2000). Lohrke et al. (2010) argue that the disadvantage of using the latter types of measures is that they involve post hoc data collection, which may result in recall bias and an inability to explain complex decision processes. Various authors (e.g., Blume and Covin, 2011; Hodgkinson and Sadler-Smith, 2011) argue that researchers should combine different assessment methods to capture the actual use of intuition with the previously used traditional self-report techniques.

This study therefore adopted a mixed-methods research design consisting of: a) An online survey that measured cognitive style, risk perception, risk propensity, experience and expertise; and b) A scenario-based concurrent protocol analysis exercise (Ericsson and Simon, 1993) in which participants were asked to think aloud to reveal their use of intuitive and analytical processing during hypothetical but realistic high-tech opportunity identification and exploitation scenarios. This paper focuses only on the opportunity exploitation stage, as the role of intuition in opportunity identification and new venture ideation has been addressed in earlier work.

3.2. Research Participants

Participants were 74 entrepreneurs operating in at least one of the following ICT (Information and Communication Technologies) industry categories in Malta: 1) ICT Manufacturing Industries; 2) ICT Trade Industries; and 3) ICT Services Industries (European Commission, 2008; United Nations Statistics Division, 2008). This was considered to be an appropriate context for the study, because the ICT sector in Malta is rapidly growing and highly competitive (Malta Enterprise, n.d.), which suggested that intuition would likely be prevalent and effective (Covin et al., 1999; Khatri and Ng, 2000), and that opportunity identification and exploitation would be a priority for entrepreneurs.

Similar to previous studies on opportunity identification (e.g., Gruber et al., 2008; 2012; 2013; Ucbasaran et al., 2003), entrepreneurs were defined as owner-managers of one or more businesses. An email invitation was sent to a total of 289 entrepreneurs, who were purposively sampled from several ICT business registers and trade directories. Of these, 99 accepted to participate, but 25 participants failed to complete the study, leaving a sample of 74 and a final response rate of 25.6%. This is similar to response rates in other studies with entrepreneur samples (e.g., 27.4% in Chaston and Sadler-Smith, 2012; 23% in Gruber et al., 2013). Mann-Whitney U tests revealed no significant differences between early responders (who responded to their invitation within the first month: $n = 35$) and late responders (who responded during the second and third months: $n = 38$) on any of the independent and dependent variables, indicating that non-response bias was not present in this study.

All participants were required to be at least 18 years of age to ensure that they could legally consent to take part in the study. Gender was not a selection criterion, but descriptive statistics revealed that females were underrepresented in this sample ($n = 5$; 6.8%), which is typical of the male-dominated ICT industry. Further demographic data about the research participants are provided in the Results section.

3.3. Online Survey

Participants were first invited via email to complete the online survey which gathered data related to a number of control variables that could not be captured through protocol analysis. As mentioned above, cognitive style does not necessarily determine cognitive strategy, yet past research has indicated that there may be a link in certain situations. Cognitive style was measured by means of the Rational-Experiential Inventory (REI: Pacini and Epstein, 1999), which was developed on the basis of CEST (Epstein, 2003) and recommended by proponents of dual-process theory (e.g., Hodgkinson et al., 2009). This measure consists of 40 items rated on a 5-point Likert scale. Risk perception and risk propensity have

been associated with decision making and entrepreneurship (Keh et al., 2002; Mullins and Forlani, 2005; Simon et al., 2003), as well as with one's preference for innovative technologies and opportunities (Keh et al., 2002). In view of the above, risk perception and risk propensity were also measured as control variables, using instruments developed by Forlani and Mullins (2000), who operationalised risk perception in terms of new venture creation, and risk propensity in terms of financial risk. The risk perception scale is composed of four different venture options, each bearing three items that are rated on a 7-point Likert scale, while the risk propensity scale comprises five dichotomous items. Cronbach's alpha values for the cognitive style and risk perception variables were above the 0.7 recommended level (Pallant, 2005). Risk propensity had a lower Cronbach's alpha, therefore conclusions based on its effects are to be made with caution.

Prior knowledge, which may be derived from various sources including education and experience (Shepherd and DeTienne, 2005), is considered as an important factor during the decision-making process of entrepreneurs, and may facilitate opportunity identification and exploitation. Shane (2000) argues that prior knowledge of a specific market increases the chances of discovering an opportunity in that market, while Gruber et al. (2015) found that individuals with experience in particular domains will have particular views of what constitutes an attractive business opportunity. Data on participants' educational background, employment history, and business ownership experience were gathered by means of tailor-made survey questions.

3.4. Protocol Analysis

After participants had completed and submitted their online survey, they were contacted to schedule a meeting to conduct their think-aloud protocol analysis exercise. Protocol analysis, which is derived from psychological research, is a method that elicits verbal data from research participants by asking them to think aloud as they work on a particular task (Austin and Delaney, 1998; Ericsson and Simon, 1993), thereby vocalising their 'inner speech' and exposing their internal cognitive processing (Ericsson and Simon, 1993; Wittman and Van Geenen, 2009). Protocol analysis was selected as the main method for recording intuition in this study because it allows researchers to capture intuitive processing in real time without relying on research participants' potentially inaccurate reports of and attributions to intuition. Critics of the protocol analysis technique have claimed that thinking aloud may potentially disrupt the cognitive processes that take place under silent conditions. However, there is no evidence for such effects except that some additional time may be required to verbalise one's thoughts, provided that the recommended procedures for conducting protocol analysis are adhered to (see Ericsson and Simon, 1993, for a critical review). All of the

relevant procedures were indeed closely adhered to in this study. These included reading a set of instructions to the participants prior to commencement of the tasks, avoiding social interaction between the researcher and participants, avoiding the use of intrusive prompts during the task, and minimising the delay between task performance and production of verbal reports. There is therefore no reason to believe that thinking aloud triggered different cognitive processing to what would normally be activated.

In order to gather data on whether entrepreneurs utilise intuitive or analytical processes during opportunity identification and exploitation, a hypothetical but realistic scenario-based exercise was designed in line with the general principles of protocol analysis established by authors such as Green (1998) and Witteman and Van Geenen (2009). Participants were asked to imagine that they were at a technology fair and that they were looking around for new business ideas for an ICT start-up. They were then presented with descriptions of three innovative technologies that were exhibited at this hypothetical fair, and asked to think aloud as they attempted to identify entrepreneurial opportunities related to each of them. They were then asked (while still thinking aloud) whether they would exploit the opportunities that they identified, and to explain the reasons for their choice.

3.5. Data Analysis

Several methods were used to analyse the different kinds of data gathered in study. The verbalisations produced by participants during the audio-recorded think-aloud opportunity exploitation tasks were first transcribed and analysed qualitatively by dividing them into segments (i.e., phrases or sentences) that conveyed a single specific ‘complete thought’ (Trickett and Trafton, 2009) or ‘thought unit’ (Hensman and Sadler-Smith, 2011). Each segment was then coded as intuition or analysis based on predefined indicators of these cognitive processes derived from the literature (Baldacchino et al., 2014). Any processing that occurred rapidly (quickly, automatically), non-consciously (originating beyond conscious thought) and holistically (pattern-recognition, big-picture view) was coded as intuitive (e.g., Dane and Pratt, 2007). Conversely, processing which was carried out in a logical, deliberate manner with due attention to the relevant information was coded as analytical (e.g., Sadler-Smith, 2008). The following are examples of intuitive segments obtained from the verbal protocols:

//Yes, I would definitely go for this//
//I don’t know how to explain it// It’s a gut feeling//
//I can see this working//

The following are examples of analytical segments obtained from the verbal protocols:

//I don't have enough information//what about the cost of incorporating it into current systems?//
//I need to read through this again//
//this is not really my sector// our company focuses on software development, and this is not something we can add to our portfolio//

The segmenting and coding of the full dataset was carried out by the second author of this paper, while inter-coder reliability was established through the independent segmenting and coding of 37 of the 74 protocols (i.e., 50% of the sample) by the first author. Pearson's r for agreement between the coders was .707 for the intuitive segments, and .882 for the analytical segments ($p < .01$), indicating strong inter-coder reliability. Following segmenting and coding, the protocols were 'quantified' by counting the intuitive and analytical segments, in order to determine the extent of intuitive and analytical processing during opportunity exploitation decision-making. Next, the verbal protocols were further analysed to determine the exploitation decisions of participants. As outlined above, participants were asked whether they would exploit the opportunities that they identified in the think-aloud tasks, and the opportunities that each participant decided they would exploit were counted.

The literature suggests that decisions to exploit opportunities may be influenced by the innovativeness (or rarity) of those opportunities, as this may be taken as an indicator of market potential (Fiet, 2002; Haynie et al., 2009). Opportunities were therefore rated by the first author on a 7-point Likert scale, ranging from (1) 'not very innovative' (neither original nor useful) to (7) 'very innovative' (very original and with significant potential for profitable commercial application). Inter-rater reliability was assessed at this stage by engaging a research assistant with an ICT background to rate the innovativeness of all the opportunities in the dataset on the same 7-point Likert scale (rather than just a subset, as this task was less time consuming than segmenting, coding and content analysing the protocols). High levels of inter-rater agreement were again achieved, with a Pearson's r of .834 ($p < .001$).

The verbal protocol numeric data were then integrated with the survey data, and SPSS was used to conduct several statistical tests. These included Spearman's correlations and regression analysis, where the main independent variables were the number of intuitive and analytical segments in the opportunity exploitation tasks and the dependent variable was the number of high-tech opportunities which participants decided they would exploit. The appropriate form of regression for this dependent variable is the Negative Binomial Regression, which is used when the dependent variable is made up of overdispersed count data (Cameron and Trivedi, 2013), as was the case in this study.

3.6. Ethical Considerations

This research was conducted in line with the University of Malta's Research Ethics Review Procedures, as well as the ethical standards stipulated by the American Psychological Association. These include safeguarding participants' rights to voluntary participation, informed consent, and anonymity in research outputs.

4. Results

4.1. Socio Demographic and Descriptive Data

Of the 74 participants who completed this study, 93.2% were male, which reflects the under-representation of females in entrepreneurship, particularly in technology-based sectors. Participants' ages ranged from 22 to 64 years of age, with a mean of 42 years. Participants had an average of 15.7 years of formal education and an average of 11.3 years of work experience before setting up their own enterprise. Before becoming business owners, 68.9% had worked in the ICT sector. The entrepreneurs reported owning, at the time of or prior to the study, a total of 172 businesses, which is an average of 2.32 businesses each. Most of the businesses owned ($n = 139$, 80.8%) were in the ICT industry. The mean number of years of business ownership experience in this sample was 11.51 years, of which 10.46 were ICT-related.

Following the segmentation and coding process as described above, a total of 731 intuitive segments ($SD = 6.324$, $\bar{x} = 9.88$) and 1398 analytical segments ($SD = 11.298$, $\bar{x} = 18.89$) were obtained in the opportunity exploitation stage. Table 1 outlines the descriptive statistics for the intuitive and analytical segments, together with the control variables (risk perception, risk propensity, rationality and experientiality).

Table 1: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Risk Perception	1.50	6.25	3.46	1.026
Risk Propensity	0	5	1.58	0.993
Rationality	2.70	4.95	4.04	0.515
Experientiality	1.95	4.70	3.37	0.559
Intuitive Segments	0	33	9.88	6.34
Analytical Segments	1	62	18.89	11.29
Total Segments	4	77	28.77	15.28

$N = 74$

On average, the entrepreneurs who participated in this study obtained higher scores on the rationality dimension than the experientiality dimension of cognitive style, with respective means of 4.04 and 3.37. A paired-samples *t*-test revealed that this difference is statistically significant, $t(73) = 6.83, p < .001$, which implies that these participants prefer to process information analytically rather than intuitively. This preference was reflected in the participants' actual use of intuition and analysis during their opportunity exploitation tasks, where Wilcoxon tests revealed a significantly larger number of analytical segments than intuitive segments at the opportunity exploitation stage ($z = -6.217, p < .001$). Together, these findings indicate that analytical processing outweighs intuitive processing in opportunity exploitation decision-making.

Eight (10.8%) participants decided that they would exploit two opportunities, 34 (45.9%) decided they would exploit one opportunity, while 32 (43.2%) decided they would not exploit any opportunities at all.

4.2. Correlation Analysis

Table 2 shows the Spearman's correlation matrix displaying the associations between the various control variables, independent variables, and dependent variables. There are no significant correlations between the control and independent variables, indicating that collinearity is not a concern (Pallant, 2005). However, a positive correlation was noted between the number of ICT businesses owned and the number of opportunities exploited, suggesting that this variable should be controlled for in the regressions. With regards to the association between the main independent and dependent variables, the number of intuitive segments is significantly positively correlated, and the number of analytical segments is negatively but not significantly correlated with the number of opportunities that participants decided they would exploit. Also interesting to note is that the opportunities' innovativeness rating is positively correlated with opportunity exploitation decision-making.

Table 2: Spearman’s Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1 Age															
2 Rationality		-.032													
3 Experientiality		.118	-.292												
4 Risk Perception		-.127	.063	.007											
5 Risk Propensity		-.279	-.110	-.068	-.002										
6 Years Education		.132	.292*	-.189	.094	.017									
7 Years Work Experience		.348**	.191	-.067	-.127	-.117	.064								
8 Years ICT Business Ownership Experience		.444**	.001	.084	.109	-.212	.101	-.157							
9 Years Non-ICT Business Ownership Experience		.244*	-.097	.159	-.116	.117	.056	.029	-.287						
10 No. of ICT Businesses Owned		.115	.278*	.074	-.003	-.034	.220	-.081	.353**	-.030					
11 No. of Non-ICT Businesses Owned		.204	.078	.078	-.133	.056	.123	.018	-.142	.682**	.160				
12 No. of Intuition Segments		-.003	.113	.015	-.078	.041	.160	.206	.047	.028	.202	.319**			
13 No. of Analysis Segments		-.013	.010	.047	.125	.074	.249*	.150	-.075	.062	.001	.455**	.400**		
14 Innovativeness Rating		-.029	.145	.155	-.046	.061	.166	.039	.042	.166	.460**	.412**	.432**	.216	
15 No. of Opportunities Exploited		-.028	-.051	.082	-.247*	.156	.033	.048	.014	.114	.309**	.110	.510**	-.040	.281*

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed

4.3. Regression Analysis

The following Negative Binomial regression models were run to explore the effect of this study’s control and independent variables on the total number of high-tech opportunities that participants decided they would exploit: Model 1 was a baseline model that explored the effect of the control variables, namely experientiality, rationality, risk propensity, risk perception, education, work experience and business ownership experience. The latter was measured as the number of ICT businesses owned, which was significantly correlated (Table 2) with the number of opportunity exploitation decisions. Model 2 added the independent variables of interest, namely the number of intuitive and analytical segments generated during the opportunity exploitation tasks, in order to demonstrate their incremental explanatory power. Model 3 added the opportunities’ innovativeness rating, which was also found to correlate (Table 2) with high-tech opportunity exploitation decision-making. All models are significant, but Models 2 and 3 were improved considerably as a result of adding the main independent variables (see Likelihood Ratio Chi-Square values). All the Tolerance values were well above 0.1 and the VIF values were well below 10,

indicating that there were no issues with multicollinearity in these models (Pallant, 2005). The full results of these regressions are presented in Table 3.

Table 3: Negative Binomial Regressions

	Model 1		Model 2		Model 3	
	B [SE]	Wald Chi-Square	B [SE]	Wald Chi-Square	B [SE]	Wald Chi-Square
(Intercept)	-0.938 [1.709]	0.301	-0.812 [1.477]	0.303	-0.792 [1.473]	0.289
Rationality	-0.218 [0.249]	0.762	-0.437 [0.243]	3.230	-0.444 [0.245]	3.277
Experientiality	0.230 [0.260]	0.780	0.243 [0.231]	1.099	0.224 [0.227]	0.981
Risk Perception	-0.269* [0.128]	4.433	-0.296** [0.114]	6.768	-0.290** [0.112]	6.681
Risk Propensity	0.229* [0.091]	6.327	0.124 [0.104]	1.419	0.117 [0.099]	1.398
Education	0.055 [0.050]	1.193	0.101 [0.053]	3.684	0.097 [0.052]	3.420
Work Experience	-0.003 [0.013]	0.050	-0.010 [0.014]	0.509	-0.009 [0.015]	0.374
No. of ICT Businesses owned	0.154** [0.050]	9.653	0.055 [0.058]	0.897	0.046 [0.057]	0.647
Intuition			0.087** [0.027]	10.068	0.083** [0.028]	8.858
Analysis			-0.023* [0.012]	4.431	-0.024* [0.011]	4.558
Innovativeness					0.037 [0.067]	0.311
Likelihood Ratio Chi-Square	15.614*		29.242***		29.581***	

Coefficients (B) are shown, with standard errors in parentheses;

$p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed

Rationality and experientiality were not significant predictors in any of the models, which implies that cognitive style (preference for intuition or analysis) had no effect on exploitation decisions in this study. Risk perception had a significant negative effect on the total number of opportunities participants decided they would exploit (Model 1: $B = -0.269$, $p < .05$; Model 2: $B = -0.296$, $p < .01$; Model 3: $B = -0.260$, $p < .01$). Conversely, risk propensity had a significant positive effect on opportunity exploitation decisions, but only in the baseline model (Model 1: $B = 0.229$, $p < .05$). When intuition, analysis and innovativeness were introduced, risk propensity became insignificant.

Education and work experience were not significantly associated with opportunity exploitation decisions in any of the models. Domain-specific experience in the form of prior ICT business ownership was a significant positive

predictor of the number of opportunities that participants decided they would exploit but, once again, this only applies to the baseline model (Model 1: $B = 0.154$, $p < .01$). When intuition, analysis and innovativeness were added, the number of ICT businesses owned did not remain a significant variable.

Intuition is a significant positive predictor of the number of exploitation decisions in both of the main models (Model 2: $B = 0.087$, $p < .01$; Model 3: $B = 0.083$, $p < .01$), indicating that intuition has a significant positive effect on decisions to exploit high-tech opportunities. Analysis is also a significant predictor, but its effect was negative (Model 2: $B = -0.023$, $p < .05$; Model 3: $B = -0.024$, $p < .05$), implying that analysis negatively impacts decisions to exploit high-tech opportunities. Innovativeness was not found to be a predictor of the total number of opportunities that participants decided they would exploit.

4.4. Qualitative Analysis

During the segmentation and coding of the verbal protocols, it was noted that various participants employed intuition, and even referred to their gut feeling, as they decided that they would exploit (rather than reject) an opportunity. In other words, qualitative analysis of the think-aloud protocol data indicated that decisions to exploit opportunities tended to be based more on intuitive than analytical processing. Two examples are illustrated in the following excerpts, where intuitive processing is denoted by italics and analytical processing is underlined:

//I see a lot of potential, // I think there is a market for this. // It's something new, I haven't seen it. // That's why, it could be good to see something like this, // but eemme, yes I've got a gut feeling, I put it that way, that yes this is something that I would be keen to, tooo ehh, to sell. // I can see a llllot of potential for this. // It's high high end. // I don't know how how expensive this will be. // but eh, it sounds like something high end, // and eemm innovative, for sure (pause) // ... And it's something that I would, do //;

//Yes, yes (I would exploit) // because I believe in it. // So qmmm, emm I don't know why // I cannot explain it (pause). // I don't try to think why. // It's not, I don't see it important that I try to understand why I think this way // because you'd be wasting a lot of your energy //.

Conversely, various participants were found to use analytical processing more extensively as they decided they would reject (rather than exploit) an opportunity. In other words, qualitative analysis of the think-aloud protocol data indicated that decisions not to exploit opportunities tended to be based more on analytical than intuitive processing. Two examples of rejection decisions where analytical processing (underlined) clearly outweighs intuitive processing (italics) are illustrated in the following excerpts:

Because, because there's already eh eh ehmm, a machine that, that does this thing//. In a, ehe it's in fact it's in (location)// it does souvenirs, you can eh, you can take photos// you can take them there or either he scans it on site// Or you send two pictures on thee eh// one from the front and one from the profile// and he'll turn it into a 3D, eh mesh//, and eh sketch it with the laser, laser filter, onto cubes or, ehhme, transparent cubes or glass cubes//, I don't know exactly// I think it's acrylic// But it's something that it wouldn't be of interest to me//;

//This would be one of those that unless you develop for people to invest, especially in times of depression, like that, unless you're getting a tangible benefit out of it ... ok? // People aren't going to buy it. // Now here the CEO has not given me any tangible benefit for having the screen so it's going to be very hard to sell it// I mean, touch screens have been around for ages but everyone uses them on the smart phones and the iPads//. How many offices do you see using a touch screen? // Unless your business is where you need to touch the screen and drag and drop and all this all the time, and it's really you need it ... ok? // But how many people are there like that? You know? // And if they're working well with a touch screen and there's a crisis, are you going to invest in a new technology just because you're not touching a screen?// If there's no added benefit to it? // So I always believe that if I'm going to sell something to somebody, I have to give him a good reason to fork out the money// I'm not seeing it here//.

The above provide qualitative support to the quantitative findings that decisions to exploit high-tech opportunities are guided by intuition, while decisions to reject opportunities were based on a greater amount of analytical thinking. However, it was also interesting to note that some participants suspended their decision-making during the research task as they said they would need more information (i.e., to explore further) before they could decide whether or not to exploit the opportunity. This delay in commitment to exploit or reject an opportunity is illustrated in the following excerpts from the verbal protocols:

//It's a difficult one because it is very interesting. // Eemmm I would look, definitely look into it further// I wouldn't leave it at that, // I wouldn't pass it and just not do anything about it// I would surely look into it further//;

//There's a potential, // but there isn't enough information obviously to make a final decision, // because like I said the most important thing is cost which will depend on the technology and how easy it is to manufacture and so on//.

5. Discussion and Conclusion

5.1. Discussion of Key Findings

A key finding of this study is that there was a significantly greater amount of analytical than intuitive processing during high-tech opportunity exploitation

decision-making. This contrasts with findings of earlier work on high-tech opportunity identification and new venture ideation, where intuition outweighed analysis (Baldacchino et al., 2022). These findings indicate that entrepreneurs use intuition to a lesser degree when making decisions regarding opportunity exploitation than they do when identifying opportunities related to new digital technologies. This may be explained through the 4I Organisational Learning Framework (Dutta and Crossan, 2005), which suggests that opportunities are identified in an initial intuiting stage, followed by an analytical process that includes interpreting the opportunity to oneself. Therefore, intuition was dominant in the opportunity identification stage (Baldacchino et al., 2022), while analysis dominated during the present study's opportunity exploitation decision-making tasks.

These findings are aligned with the literature reviewed above which indicates that intuitive cognitive styles and strategies are preferred in the opportunity identification stage, whilst analytical ones are favoured at the exploitation stage (Bounfour and Landström, 2008; Kickul et al., 2009). When identifying opportunities, entrepreneurs engage in divergent thinking – which is intuitive in nature (Cropley, 2006; Sadler-Smith, 2004) – to come up with new business ideas, but when making decisions regarding which of those ideas they would exploit, they engage in analytical processes such as convergent thinking (Cropley, 2006), conscious imagination (Gaglio, 2004) and mental simulation (Klein, 2004), in an attempt to select the most promising option.

Notwithstanding this, a greater use of intuition was found to be positively associated, and analysis negatively associated, with the number of opportunities that participants decided they would exploit. This suggests that decisions to exploit high-tech opportunities are guided by intuition, while decisions to reject them are shaped by a greater amount of analytical thinking, and that intuitive entrepreneurs may be more likely to exploit high-tech opportunities than their analytical counterparts. These results provide empirical support to the notion that intuition plays an important role throughout the entrepreneurial process including opportunity exploitation (Allinson et al., 2000; Blume and Covin, 2011), as it enables entrepreneurs to make decisions to pursue promising avenues, thereby counteracting the so-called 'paralysis by analysis' (Langley, 1995).

The finding that analysis is a negative predictor of high-tech opportunity exploitation could be explained by the fact that some entrepreneurs were more cautious in their approach, and deferred decision-making until they could obtain further information. Despite the above, one might argue that caution is not unwise at this stage of the process, as the exploitation of opportunities generally requires individuals to commit large amounts of resources including financial investment and social capital (Gruber et al., 2015). In fact, a period of opportunity exploration usually follows the identification of opportunities and involves consideration of what needs to be done in order to act upon them. Hence the use of analysis during opportunity exploration might be beneficial in gathering more

information prior to committing to exploit or reject the said opportunity (Ardichvili et al., 2003).

Risk perception was found to have a significant negative effect on the number of opportunities participants decided they would exploit, while risk propensity had a significant positive effect on opportunity exploitation decisions (in the baseline model). In other words, entrepreneurs who tend to perceive higher levels of risk were less likely to decide that they would exploit the opportunities they identified, such that high levels of risk perception are detrimental to high-tech opportunity exploitation. Conversely, entrepreneurs who are risk prone are more likely to decide that they would exploit their identified opportunities, such that risk propensity is conducive to high-tech opportunity exploitation. The above findings are not surprising, particularly since the opportunities were all related to the rapidly changing and high-risk ICT industry. Moreover, they support past research that associates risk perception and risk propensity with decision making and entrepreneurship (Keh et al., 2002; Mullins and Forlani, 2005; Simon et al., 2003), as well as with one's attraction or aversion to innovative technologies and opportunities (Keh et al., 2002).

Although prior knowledge and experience are generally considered an important factor in decision-making, opportunity identification and exploitation (Gruber et al., 2015; Shane, 2000), they were not found to be key determinants of opportunity exploitation decisions in this study. Education and work experience had no effect, while the number of ICT businesses owned was a significant positive predictor of the number of opportunities participants decided they would exploit only in the base model. These findings imply that the most important form of experience for opportunity exploitation is domain-specific (in this case, prior ICT business ownership). They could be explained by the fact that experience gained in the ICT business field allows entrepreneurs to increase their knowledge in that particular area (Shane and Venkataraman, 2000; Gaglio and Katz, 2001), thereby allowing them to 'connect the dots' (Baron, 2006), in an intuitive manner. However, when intuition, analysis and innovativeness were added, ICT business ownership experience did not remain significant. These findings might suggest mediation, as business ownership experience may influence the use of intuition, which would in turn influence opportunity exploitation.

5.2. Limitations

The limitations of this study are mainly associated with the research design and the methods adopted. One relates to the sample size of 74 participants, which is relatively small for a quantitative study and does not allow generalisation of the findings. However, it is pertinent to note that previous studies using protocol analysis have used much smaller samples due to the voluminous data yielded by this method (e.g., 9 participants in Grégoire et al., 2010; 14 participants in Sukhov

et al., 2021; 27 participants in Sarasvathy, 2008). Moreover, all participants were high-tech entrepreneurs who carried out opportunity exploitation decision tasks related to the ICT industry in Malta. While this ensured that the sample was theoretically relevant (Davidsson, 2005) and well-suited for this special issue's 'Decide to Digitalise' theme, it is not clear whether the findings would apply in other sectors and countries.

The fact that the data was generated at one point in time from hypothetical scenarios (protocol analysis) raises a question of whether the cognitive processes used in this study coincide with those used in real-world settings. It is worth noting that various measures were taken to maximise ecological validity. The scenarios were designed in consultation with industry experts, and piloted and refined during the planning and preparation stage, which ensured that the 'technology fair' scenarios were realistic, familiar, and relevant to the study's participants. It may therefore be argued that the cognitive processes employed by participants as they made decisions concerning opportunity exploitation in this study were very similar to or the same as the ones they would use in real life.

5.3. Suggestions for Future Research

Due to the importance of opportunity exploitation in entrepreneurship, and the few empirical studies available in this area, it appears that this stage of the entrepreneurial process is a fertile area for further investigations. Further research is required to explore whether this study's findings concerning the effects of intuition and analysis on opportunity exploitation decisions may be generalised to different contexts, or if they are specific to the volatile and competitive ICT industry. Further research is also needed on opportunity exploitation in naturalistic settings, perhaps using other methods, and ideally adopting a longitudinal approach, to overcome the limitations posed by this study's hypothetical scenario-based protocol analysis methodology.

Future studies could also explore the role of cognitive versatility at this stage of the entrepreneurial process. Here, one could also explore the way entrepreneurs switch from one mode of processing to another in the opportunity exploitation stage, which is an integral part of cognitive versatility.

Further research is required to understand the decision to 'explore' an opportunity, as suggested by the findings presented above. One might investigate the various factors that contribute and predispose entrepreneurs to explore an opportunity further. In addition, researchers might also wish to investigate the cognitive processes that underlie opportunity exploration, and which would finally lead to opportunity exploitation. Furthermore, since the entrepreneurial process is a complex phenomenon, and is affected by several internal and external sources, attention should also be directed to factors at the individual level, such

as examining the motivation to exploit an opportunity and start a new business venture.

Beyond opportunity identification, evaluation and exploitation, future research could explore the role of intuition and analysis in strategic entrepreneurship, which is concerned with identifying and exploiting new opportunities in an entrepreneurial approach, while at the same time creating and sustaining competitive advantage in a strategic (i.e., planned and systematic) manner (Hitt et al., 2011). While some studies have been carried out on intuition in strategic management (e.g., Elbanna and Child, 2007; Khatri and Ng, 2000; Woiceshyn, 2009), none have explored the role of, and relationship between, intuition and analysis in strategic entrepreneurship. Duggan (2013) recognises intuition as an essential mode of cognition in strategic thinking and decision-making, while De Wit and Meyer (1998) maintain that strategic thinking is both intuitive and analytical. However, further research is required to determine how the dual modes of processing apply in strategic entrepreneurship.

5.4. Contributions

This study contributes to dual-process theory and the literature on entrepreneurial cognition and digital entrepreneurship by shedding light on the dual cognitive mechanisms of intuition and analysis that underlie decision-making in high-tech opportunity exploitation. Although there have been studies on intuition and analysis in entrepreneurship, this paper is the first to explore their role in the opportunity exploitation stage. It adopts a robust mixed-methods approach that captured the actual use of intuitive and analytical processing while controlling for dispositional preference, rather than relying exclusively on the latter, as advised by various researchers (Blume and Covin, 2011; Hodgkinson and Sadler-Smith, 2011). This paper therefore addresses a gap in the literature by adopting a dual-process approach to help complete the picture of the role of intuition and analysis throughout the entrepreneurial process. In so doing, it offers a better understanding of “why, when and how” (Shane and Venkataraman, 2000, p. 218) some individuals are able to exploit opportunities compared to others.

5.5. Implications and Recommendations

As noted earlier in this paper, entrepreneurs must not only identify opportunities, but they must also make decisions to exploit opportunities so that entrepreneurship – which is considered to be the engine of economic growth, job creation and innovation – may occur (Choi and Shepherd, 2004; Wymenga et al., 2012). Digital technologies enable entrepreneurship by offering opportunities to start up new ventures (Elia et al., 2020; Von Briel et al., 2018) and enhance established ones (Ferguson and Henrekson, 2019; Kraus et al., 2019). However,

digital technologies also increase complexity in decision-making concerning their adoption (Pappas et al., 2021). Consequently, this study's findings, which shed light on the processes underlying entrepreneurs' decisions to exploit high-tech opportunities, have practical relevance in addition to the theoretical contributions outlined above.

Due to the finding that intuition was positively associated with opportunity exploitation decisions, this study joins others in recommending that entrepreneurs should endeavour to develop their intuition, and emphasises that this may be particularly relevant in the high-tech sector. Although intuition is associated with domain-specific experience (Baldacchino et al., 2015, 2022; Hodgkinson et al., 2008), the literature suggests that entrepreneurs could actively enhance their ability to employ this mode of processing rather than wait until they gain experience. Guidelines on how intuition may be developed have been proposed by various authors, including Hogarth (2001), Klein (2004), Sadler-Smith (2010), and Sadler-Smith and Shefy (2004, 2007). Baldacchino (2019) consolidates much of the earlier work (cited above) into an entrepreneurial intuition training programme composed of six steps, namely (1) recognising intuition, (2) exploring intuition, (3) enabling intuition, (4) strengthening intuition, (5) challenging intuition, and (6) blending intuition with analysis.

The fact that analysis was found to negatively predict high-tech opportunity exploitation decision-making may imply that entrepreneurs should not be over-analytical as this may cause 'paralysis by analysis' (Langley, 1995) and lead them to miss opportunities. However, this claim is made with caution, as an appropriate amount of information-seeking and analysis is indispensable prior to exploitation in the real world. Entrepreneurs should therefore strive for a healthy balance of intuition and analysis when making decisions about whether or not to engage in opportunity exploitation.

References:

- Allinson, C.W., Chell, E., and Hayes, J. (2000), "Intuition and entrepreneurial behaviour", *European Journal of Work and Organizational Psychology*, 9(1), 31-43.
- Ardichvili, A., Cardozo, R., and Ray, S. (2003), "A theory of entrepreneurial opportunity identification and development", *Journal of Business Venturing*, 18(1), 105-123.
- Austin, J. and Delaney, P.F. (1998), "Protocol analysis as a tool for behavior analysis", *Analysis of Verbal Behavior*, 15(1), 41-56.
- Baldacchino, L. (2019), "Intuition in entrepreneurial cognition", In: A. Caputo and M. Pellegrini (Eds.), *The Anatomy of Entrepreneurial Decisions: Past, Present and Future Research Directions*. Cham, Switzerland: Springer Nature, pp. 29-56.
- Baldacchino, L. (2022), "Cognitive versatility", In: V. Glaveanu (Ed.), *The Palgrave Encyclopedia of the Possible*. SpringerLink.
- Baldacchino, L., Ucbasaran, D., Lockett, A., and Cabantous, L. (2014), "Capturing intuition through concurrent protocol analysis", In: M. Sinclair (Ed.), *Handbook of Research Methods on Intuition*. Cheltenham, UK: Edward Elgar Publishing, pp. 160-175.
- Baldacchino, L., Ucbasaran, D., Cabantous, L., and Lockett, A. (2015), "Entrepreneurship research on intuition: A critical analysis and research agenda", *International Journal of Management Reviews*, 17(2), 212-231.
- Baldacchino, L., Ucbasaran, D. and Cabantous, L. (2022), "Linking experience to intuition and cognitive versatility in new venture ideation: A dual-process perspective", *Journal of Management Studies*. First published online 10 January 2022.
- Baron R.A. (2006), "Opportunity recognition as pattern recognition: How entrepreneurs 'connect the dots' to identify new business opportunities", *Academy of Management Perspectives*, 20(1), 104-119.
- Blume, B.D. and Covin, J.G. (2011), "Attributions to intuition in the venture founding process: Do entrepreneurs actually use intuition or just say that they do?", *Journal of Business Venturing*, 26(1), 137-151.
- Bounfour, A. and Landström, H. (2008), "Entrepreneurship research: A missing link in our understanding of the knowledge economy", *Journal of Intellectual Capital*, 9(2), 301-322.
- Cameron A.C. and Trivedi, P.K. (2013), *Regression Analysis of Count Data*. Cambridge, UK: Cambridge University Press.
- Chaston, I. and SadlerSmith, E. (2012), "Entrepreneurial cognition, entrepreneurial orientation and firm capability in the creative industries", *British Journal of Management*, 23(3), 415-432.
- Choi, Y.R. and Shepherd, D.A. (2004), "Entrepreneurs' decisions to exploit opportunities", *Journal of Management*, 30(3), 377-395.
- Covin, J.G., Slevin, D.P., and Heeley, M.B. (1999), "Strategic decision making in an intuitive vs. technocratic mode: Structural and environmental considerations", *Journal of Business Research*, 52(1), 51-67.
- Cropley, A. (2006), "In praise of convergent thinking", *Creativity Research Journal*, 18(3), 391-404.
- Crossan, M.M., Lane, H.W. and White, R.E. (1999), "An organizational learning framework: From intuition to institution", *Academy of Management Review*, 24(3), 522-537.
- Dane, E. and Pratt, M.G. (2007), "Exploring intuition and its role in managerial decision making", *Academy of Management Review*, 32(1), 33-54.
- Davidsson, P. (2005), *Researching Entrepreneurship*. New York: Springer.
- De Wit, B. and Meyer, R. (1998), *Strategy: Process, Content, Context*. London: ITP.
- Dimov, D. (2007a), "From opportunity insight to opportunity intention: The importance of person-situation learning match", *Entrepreneurship Theory and Practice*, 31(4), 561-583.
- Dimov, D. (2007b), "Beyond the single-person, single-insight attribution in understanding entrepreneurial opportunities", *Entrepreneurship Theory and Practice*, 31(5), 713-731.
- Duggan, W. (2013), *Strategic Intuition: The Creative Spark in Human Achievement*. New York: Columbia Business School.
- Dutta, D.K. and Crossan, M.M. (2005), "The nature of entrepreneurial opportunities: Understanding the process using the 4I organizational learning framework", *Entrepreneurship Theory and Practice*, 29(4), 425-449.

- Elbanna, S. and Child, J. (2007), "Influences on strategic decision effectiveness: Development and test of an integrative model", *Strategic Management Journal*, 28(4), 431-453.
- Elia, G., Margherita, A., and Passiante, G. (2020), "Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process", *Technological Forecasting and Social Change*, 150, article 119791.
- Epstein, S. (2003), "Cognitive-experiential self-theory of personality", In: T. Millon and M.J. Lerner (Eds), *Handbook of Psychology, Volume 5: Personality and Social Psychology*. Hoboken, NJ: John Wiley & Sons Inc, pp. 159-184.
- Epstein, S. (2010), "Demystifying intuition: What it is, what it does, and how it does it", *Psychological Inquiry*, 21(4), 295-312.
- Epstein, S., Pacini, R., Denes-Raj, V. and Heider, H. (1996), "Individual differences in intuitive-experiential and analytical-rational thinking styles", *Journal of Personality and Social Psychology*, 71(2), 390-405.
- Ericsson, K.A. and Simon, H.A. (1993), *Protocol Analysis*. Cambridge, MA: MIT Press.
- European Commission (2008), "NACE Revision 2: Statistical classification of economic activities in the European Community", *Eurostat Methodologies and Working Papers*.
- Ferguson, S. and Henrekson, M. (2019), "The long-run performance of born globals in computing: The role of digital platforms", *International Review of Entrepreneurship*, 17(3), 257-280.
- Fiet, J. (2002), *The Systematic Search for Entrepreneurial Discoveries*. London: Quorum Books.
- Forlani, D. and Mullins, J.W. (2000), "Perceived risks and choices in entrepreneurs' new venture decisions", *Journal of Business Venturing*, 15(4), 305-322.
- Gaglio, C.M. (2004), "The role of mental simulations and counterfactual thinking in the opportunity identification process", *Entrepreneurship Theory and Practice*, 28(6), 533-552.
- Gaglio, C.M., and Katz, J.A. (2001), "The psychological basis of opportunity identification: Entrepreneurial alertness", *Small Business Economics*, 16(2), 95-111.
- Green, A. (1998), *Verbal Protocol Analysis in Language Testing Research: A Handbook*. Cambridge, UK: Cambridge University Press.
- Grégoire, D., Barr, P. and Shepherd, D. (2010), "Cognitive processes of opportunity recognition", *Organization Science*, 21(2), 413-431.
- Grichnik, D., Smeja, A. and Welp, I. (2010), "The importance of being emotional: How do emotions affect entrepreneurial opportunity evaluation and exploitation?", *Journal of Economic Behavior & Organization*, 76(1), 15-29.
- Gruber, M., MacMillan, I.C. and Thompson, J.D. (2008), "Look before you leap: Market opportunity identification in emerging technology firms", *Management Science*, 54(9), 1652-1665.
- Gruber, M., MacMillan, I.C. and Thompson, J.D. (2012), "From minds to markets: How human capital endowments shape market opportunity identification of technology start-ups", *Journal of Management*, 38(5), 1421-1449.
- Gruber, M., MacMillan, I.C. and Thompson, J.D. (2013), "Escaping the prior knowledge corridor: What shapes the number and variety of market opportunities identified before market entry of technology start-ups?", *Organization Science*, 24(1), 280-300.
- Gruber, M., Kim, S.M. and Brinckmann, J. (2015), "What is an attractive business opportunity? An empirical study of opportunity evaluation decisions by technologists, managers, and entrepreneurs", *Strategic Entrepreneurship Journal*, 9(3), 205-225.
- Haynie, J.M., Shepherd, D.A., and McMullen, J.S. (2009), "An opportunity for me? The role of resources in opportunity evaluation decisions", *Journal of Management Studies*, 46(3), 337-361.
- Hensman, A. and Sadler-Smith, E. (2011), "Intuitive decision making in banking and finance", *European Management Journal*, 29(1), 51-66.
- Hitt, M.A., Ireland, D., Sirmon, D.G. and Trahms, C.A. (2011), "Strategic entrepreneurship: Creating value for individuals, organizations, and society", *Academy of Management Perspectives*, 25(2), 57-75.
- Hodgkinson, G.P. and Clarke, I. (2007), "Exploring the cognitive significance of organizational strategizing: A dual-process framework and research agenda", *Human Relations*, 60(1), 243-255.

- Hodgkinson, G.P. and Sadler-Smith, E. (2003), "Complex or unitary? A critique and empirical re-assessment of the Allinson-Hayes Cognitive Style Index", *Journal of Occupational and Organizational Psychology*, 76(2), 243-268.
- Hodgkinson, G.P. and Sadler-Smith, E. (2011), "Investigating intuition: Beyond self-report". In: M. Sinclair (Ed.), *Handbook of Intuition Research*. Cheltenham, UK: Edward Elgar Publishing, pp. 52-66.
- Hodgkinson, G.P., Langan-Fox, J. and Sadler-Smith, E. (2008), "Intuition: A fundamental bridging construct in the behavioural sciences", *British Journal of Psychology*, 99(1), 1-27.
- Hodgkinson, G.P., Sadler-Smith, E., Sinclair, M. and Ashkanasy, N.M. (2009), "More than meets the eye? Intuition and analysis revisited", *Personality and Individual Differences*, 47(4), 342-346.
- Hogarth, R.M. (2001), *Educating Intuition*. Chicago, IL: University of Chicago Press.
- Keh, H.T., Foo, M.D., and Lim, B.C. (2002), "Opportunity evaluation under risky conditions: The cognitive processes of entrepreneurs", *Entrepreneurship Theory and Practice*, 27(2), 125-148.
- Khatri, N. and Ng, H.A. (2000), "The role of intuition in strategic decision making", *Human Relations*, 53(1), 57-86.
- Kickul, J., Gundry, L.K., Barbosa, S.D., and Whitcanack, L. (2009), "Intuition versus analysis? Testing differential models of cognitive style on entrepreneurial self-efficacy and the new venture creation process", *Entrepreneurship Theory and Practice*, 33(2), 439-453.
- Klein, G. (2004), *The Power of Intuition: How to Use Your Gut Feelings to Make Better Decisions at Work*. New York: Currency Doubleday.
- Kraus, S., Roig-Tierno, N. and Bouncken, R.B. (2019), "Digital innovation and venturing: An introduction into the digitalization of entrepreneurship", *Review of Managerial Science*, 13(3), 519-528.
- Langley, A. (1995), "Between 'Paralysis by analysis' and 'Extinction by instinct' ", *Sloan Management Review*, 36(3), 63-76.
- Lohrke, F.T., Holloway, B.B., and Woolley, T.W. (2010), "Conjoint analysis in entrepreneurship research: A review and research agenda", *Organizational Research Methods*, 13(1), 16-30.
- Malta Enterprise (n.d.), *The ICT Sector in Malta: An Overview*. Retrieved on 21/11/2021 from <https://maltaenterprise.com/industries/ict-and-shared-services>.
- Mullins, J.W. and Forlani, D. (2005), "Missing the boat or sinking the boat: A study of new venture decision making", *Journal of Business Venturing*, 20(1), 47-69.
- Pacini, R. and Epstein, S. (1999), "The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon", *Journal of Personality and Social Psychology*, 76(6), 972-987.
- Pallant, J. (2005), *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS for Windows*. Maidenhead, UK: Open University Press.
- Pappas, N., Caputo, A., Pellegrini, M.M., Marzi, G. and Micholoupou, E. (2021), "The complexity of decision-making processes and IoT adoption in accommodation SMEs", *Journal of Business Research*, 131, 573-583.
- Sadler-Smith, E. (2004), "Cognitive style and the management of small and medium-sized enterprises", *Organization Studies*, 25(2), 155-181.
- Sadler-Smith, E. (2008), *Inside Intuition*. Abingdon, UK: Routledge.
- Sadler-Smith, E. (2010). *The Intuitive Mind: Profiting from the Power of Your Sixth Sense*. Chichester, UK: John Wiley & Sons Ltd.
- Sadler-Smith, E. and Shefy, E. (2004), "The intuitive executive: Understanding and applying 'gut feel' in decision-making", *Academy of Management Perspectives*, 18(4), 76-91.
- Sadler-Smith, E. and Shefy, E. (2007), "Developing intuitive awareness in management education", *Academy of Management Learning & Education*, 6(2), 186-205.
- Sarasvathy, S.D. (2008), *Effectuation: Elements of Entrepreneurial Expertise*. Cheltenham, UK: Edward Elgar Publishing.
- Shane, S. (2000), "Prior knowledge and the discovery of entrepreneurial opportunities", *Organization Science*, 11(4), 448-469.
- Shane, S. and Venkataraman, S. (2000), "The promise of entrepreneurship as a field of research", *Academy of Management Review*, 25(1), 217-226.

- Shepherd, D.A. and DeTienne, D.R. (2005), "Prior knowledge, potential financial reward, and opportunity identification", *Entrepreneurship Theory and Practice*, 29(1), 91-112.
- Shepherd, D.A., Williams, T.A., and Patzelt, H. (2015), "Thinking about entrepreneurial decision making: Review and research agenda", *Journal of Management*, 41(1), 11-46.
- Simon, M., Houghton, S.M. and Savelli, S. (2003), "Out of the frying pan...? Why small business managers introduce high-risk products", *Journal of Business Venturing*, 18(3), 419-440.
- Sinclair, M. and Ashkanasy, N.M. (2005), "Intuition: Myth or a decision-making tool?", *Management Learning*, 36(3), 353-370.
- Stanovich, K.E. and West, R.F. (2000), "Individual differences in reasoning: Implications for the rationality debate?", *Behavioral and Brain Sciences*, 23(5), 645-665.
- Sukhov, A., Sihvonen, A., Netz, J., Magnusson, P.R. and Olsson, L.E. (2021), "How experts screen ideas: The complex interplay of intuition, analysis, and sensemaking", *Journal of Product Innovation Management*, 38(2), 248-270.
- Trickett, S.B. and Trafton, J.G. (2009), "A primer on verbal protocol analysis", In: D. Schmorow, J. Cohn, and D. Nicholson (Eds.), *The PSI Handbook of Virtual Environments for Training and Education, Volume 1*. Westport, CT: Praeger Security International, pp. 332-346.
- Ucbasaran, D., Westhead, P., Wright, M. and Binks, M. (2003), "Does entrepreneurial experience influence opportunity identification?", *Journal of Private Equity*, 7(1), 7-14.
- United Nations Statistics Division (2008), "International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4 (2008)", *Statistical Papers Series M No. 4/Rev.4*. New York: United Nations.
- Von Briel, F., Davidsson, P., and Recker, J. (2018), "Digital technologies as external enablers of new venture creation in the IT hardware sector", *Entrepreneurship Theory and Practice*, 42(1), 47-69.
- Wang, M. and Gibb, J. (2020), "Uncovering opportunity: Expert vs. novice entrepreneurs' use of intuitive and analytical decision-making", In: M. Sinclair (Ed.), *Handbook of Intuition Research as Practice*. Cheltenham, UK: Edward Elgar Publishing, pp. 56-72.
- Welpe, I.M., Spörrle, M., Grichnik, D., Michl, T., and Audretsch, D.B. (2012), "Emotions and opportunities: The interplay of opportunity evaluation, fear, joy, and anger as antecedent of entrepreneurial exploitation", *Entrepreneurship Theory and Practice*, 36(1), 69-96.
- Witteman, C. and Van Geenen, E. (2009), "Cognitive process analysis", In: A. Glöckner and C. Witteman (Eds.), *Foundations for Tracing Intuition: Challenges and Methods*. London: Psychology Press, pp. 53-68.
- Woiceshyn, J. (2009), "Lessons from 'good minds': How CEOs use intuition, analysis and guiding principles to make strategic decisions", *Long Range Planning*, 42(3), 298-319.
- Wymenga, P., Spanikova, V., Barker, A., Konings, J. and Canton, E. (2012), *EU SMEs in 2012: At the Crossroads. Annual Report on Small and Medium-Sized Enterprises in the EU, 2011/12*. Report commissioned by the European Commission. Rotterdam: Ecorys. Retrieved from: https://www.ggb.gr/sites/default/files/basic-page-files/2012_annual-report_en.pdf

