Improving recurring cycle of observe-orient-decide-act decision-making model

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Security Management
Master's Thesis
October, 2017

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Year	2017		Pages	87

How do we illustrate the mental concepts to support decision-making and action? Mental concepts observed reality, orient for upcoming circumstances, complete the decision and act. OODA-loop, recurring cycle of observe-orient-decide-act, decision-making model described aptly the decision-making process of human being.

Theme of the master's thesis is to descript and construct the model of decision-making. Aim of the research is to develop operational model, which describe wholeness of decision making process and working of cognitive system. Research improves OODA-loop, which provides critical intelligence, analysis and insight on global security, technology and business issues. Operational model describes decision-making process and elements, which effect on final decision. Improved model organizes decision-making elements on places of their own in decision-making process. Model is modified combination of existing knowledge and results of the research. Wholeness is a model of decision-making, which should clarify and improve decision-making process among personnel of the company and individual human being.

Constructive research model has used as research method. Constructive research is an effective information provider in complex issues, culturally specific behaviours, values, opinions and contexts. Research business co-operation and sample in field of security was done with PPO-Elektroniikka Oy. The data collection was done by theory review, survey and interviews. Interviews and inquiry have managed on May and September 2017.

Main research results are placements of affective elements of decision-making process. Every single function has the place of their own and for a good reason. Improved model illustrates aptly causal connections of elements in decision-making process. Research also found that biases are not biases, but systematic errors and error messages. System errors and cognitive messages are links between time based structural scenery and strategic thinking, cognitive system and human being. It is not even amazing that messages have significant role in evolution: manipulating, forgetting, removing, adding, changing and transferring data, information and knowledge to base of our decision-making. Cognitive messages must be motivation (desire/believe)-justification-action guide to more meaningful life.

Conclusions of the improved model of decision-making and interviewing's results support model of decision-making (OODA), biases (Daniel Kahneman) and cognitive system (Daniel Kahneman). Further, research found supportive elements for claims, that highly intelligent people may be even ordinary people more prone to fall on their cognitive biases. Talent and verbally talent people explain even the worst things better way for everyone, no less himself.

Results of the research as well as question pattern have various usage possibilities. Recognizing of weaknesses and strengths in decision-making, especially in complex situations, is essential in security business. Thesis material can be used for clarifying and improving decision-making process among personnel of the company, interviews for work; sport and entertainment professionals and everybody of us who want to develop oneself and know better, who I am.

Keywords: Decision-making, Knowledge, Motivation, Bias

Ari Luoma

Tarkkailu-suuntautuminen-päätöksenteko-toiminta päätöksentekomallin parantaminen

Year	2017	Pages	87

Miten kuvaamme päätöksenteonmallin tukemaan päätöksentekoamme ja toimintaamme? Ihmisen kognitiivinen järjestelmä havainnoi todellisuutta, suuntautuu tuleviin olosuhteisiin ja tekee päätöksen, joka ilmentyy toimintana. OODA-loop, tarkkailu-suuntautuminen-päätöksenteko-toiminta, päätöksentekomalli kuvaa optimaalisesti ihmisen päätöksentekoprosessia.

Tutkimus mallintaa ja rakentaa päätöksenteon mallin. Tutkimuksen tarkoituksena on kehittää toiminnallinen malli, joka kuvaa päätöksentekoprosessin kokonaisuutta. Tutkimus parantaa OODA-loopia, joka tarjoaa kriittistä älykkyyttä, analysointia ja näkemystä maailmanlaajuisesta turvallisuudesta, teknologiasta ja liiketoiminnasta. Paranneltu malli on muokattu yhdistelmä olemassa olevasta tiedosta ja tutkimuksen haastatteluista ja kyselyistä. Malli kuvaa tiedon rakennetta ja hierarkiaa sekä vinoumien tarkoitusta päätöksentekoprosessissamme. Malli selkeyttää ja parantaa yrityksen henkilöstön ja yksittäisen ihmisen päätöksentekoa.

Tutkimuksessa konstruktiivista tutkimusotetta käytetään tutkimusmetodina. Konstruktiivinen tutkimusmetodi on tehokas tiedontuottaja kompleksisissa yhteyksissä, kulttuuristen e-rityispiirteiden esiintuomisessa käytöksessä, arvoissa, mielipiteissä ja kontekstissa. Tutkimustoiminnan yhteistyö ja otanta turvallisuusalalta toteutettiin PPO-Elektroniika Oy:n kanssa. Tietojenkeruu tehtiin teoriakatselmuksella, kyselyillä ja haastatteluilla. Haastattelut ja kyselyt on toteutettu toukokuussa ja syyskuussa 2017.

Tutkimuksen tuloksena päätöksentekoon vaikuttavat elementit on järjestetty omille paikoilleen päätöksentekoprosessissa. Jokainen elementti on löytänyt paikkansa ja hyvästä syystä. Paranneltu malli kuvaa osuvasti päätöksentekoprosessimme syy-seuraus suhteita elementtien yhteydessä ja välillä. Tutkielma löysi, että kognitiiviset vinoumat eivät ole vinoumia vaan systemaattisia järjestelmävirheitä ja virheviestejä. Virheviestit ja kognitiiviset viestit ovat linkki aikaan pohjautuvan rakenteellisen skenaarion, strategisen ajattelun, kognitiivisen järjestelmän ja ihmisyyden välillä. Ei ole erikoista, että viesteillä on tärkeä rooli evoluutiossa: manipuloida, unohtaa, poistaa, lisätä, muuttaa, tuoda dataa, informaatiota ja tietoa päätöksentekomme pohjalle. Viestit ovat siis motivaatio-toiminta-oikeutus opas tarkoituksenmukaisempaan elämään.

Johtopäätöksenä haastattelujen ja kyselyn tuloksista löydetään päätöksenteon (OODA), vinoumien (Daniel Kuhneman) ja kognitiivisen järjestelmän (Daniel Kahneman) teorioita tukevaa aineistoa. Lisäksi tukevaa aineisto löytyi väitteille, että älykkäät ihmiset ovat jopa tavallisia ihmisiä alttiimpia olla tunnistamatta vinoumiaan. Älykkäät ja verbaalisesti älykkäät ihmiset selittävät huonoimmatkin asiat parhaiten asialleen sopiviksi, myös parhaiten sopiviksi omille ajatuksilleen.

Tutkimuksen tuloksilla ja kysymysosioilla on monia vaihtoehtoisia käyttömahdollisuuksia. Turvallisuustoimialalla päätöksenteon heikkouksien ja vahvuuksien, etenkin kompleksisissa tilanteissa, tunnistaminen on oleellista. Tutkimuksen materiaalia voidaan käyttää selkeyttämään ja parantamaan henkilöstön päätöksentekoa työpaikoilla, työpaikkahaastatteluissa, urheilijoiden ja vapaa-ajan ammattilaisten tutkimisessa sekä kaikkien meidän, jotka haluamme tietää e-nemmän itsestämme, tutkimisessa.

Avainsanat: päätöksenteko, tieto, motivaatio, vinouma

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1   Thesis introduction

Clear stories, that people manages in their thinking, they find compelling for action. It's no matter are these clear stories concrete or abstract they judge behaviour of human being. Decision-making process is continuous attempt to realize and make sense of the existing circumstances, face and solve another upcoming story of decision-making for action.

Every day we rely on singular psychological mechanisms that can lead us to biases. Biases is one of our reasoning with which we justify our decisions and actions. In order to realize human model of decision-making, observe-orient-decide-act, judgment we should illustrate the operational model of decision-making.

Aspiration of enterprise, and human being, decision-making strategy is efficiency, consistency and achieving the aims by using selected tactics. Non-logical strategy is processing in extreme conditions. Aspiration of non-logical strategy is maximum efficiency even in the most extreme conditions, meaning usually managing competitor disable to act in existing conditions. In all possible conditions, you act to win a competitive factor, it is good to be aware, that substances' common and the biggest winning factor is condition itself. In other words, you should win existing conditions, not your competitor.

Satisfaction of conditions is an individual experience. There are many ontological and epistemological questions about conditions. Purpose of this thesis is to improve and draw a model of decision-making process on the base of OODA, recurring cycle of observe-orient-decide-act, loop. Purpose of the thesis is also to illustrate decision-making process and describe the structure and hierarchy of decision-making, meaning and placement of biases in decision-making process.

The usage of knowledge is individual and subjective. This is because of meaning to be human: structure of brains, autonomous systems of human body, biases, individual competences, and individual limitations of ability to process, sense, transfer, run, work, handle, and store, save the data, information and knowledge.

Philosophy and psychology represent key roles in the research of thesis. Concerning some definitions and model's differences between philosophy and psychology can be found narrowly. At the same time human cognitive system, open its most attractive dispositions. While philosophy, psychology and cognitive system talk each other through the research, there are space for biases and reflection.

Model and formula of decision-making process based on constructive research. Every single function of decision-making process has found their places, for a good reason based on theoretical material, and confirmed by the constructive research. Research highlight model and formula of the decision-making process.

Chapters 2-7 clarify decision-making, motives, biases and the model of decision-making process. Concept of the decision-making process have build-up little by little. In the end of thesis concept of decision-making has build-up the final model of decision-making process. Chapter 8 consists testing and test results of the constructed and improved model of decision-making. Chapter 9 is reserved for reliability of the research. Finally in chapter 10 research conclusions are presented.

1.1 Backround of the thesis

The need for the thesis was description of human decision-making process in security business. There are several and various usage possibilities of description of human decision-making process. It is essential to recognize one's weaknesses and strengths in decision-making, especially in complex, suddenly changing, security situations.

Theme of the master's thesis is to improve, draw and illustrate human decision-making process and describe the time-based structure and hierarchy of decision-making process. Research improves and develops OODA-loop, which provides critical intelligence, analysis and insight on global security, technology, and business issues.

1.2 Research objectives and limitations in the thesis

The researchers set issues and interpret things from their or principals point of view (Hirsjärvi, Sinivuori, Remes & Sajavaara 2009, 160). Research object is decision-making process of human being. Research model of human decision-making process based on accepted perceptions, qualitative research and empire material of answerer's drawings.

Daniel Kahneman's System one includes innate skills, which are inherited and modified received by evolution, is that we human being share with other animals (Kahneman 2012, 23). There was opportunity to link Luomus' professor Saurola and researcher Raimo Uusitalo Osprays' (Pandion haliaetus) satellite tracking research (Saurola 2014, 22-24) to wholeness of decision-making process, but animals were limited out of research scope.

There are sixteen basic desires of human being. In animals, there are only nine basic motivations. Animals nine desires are common with human being. Animals are our nearest relatives in

the world (Reiss 2001, 19). There was another opportunity to link Stewen Reiss' (2001) motivation theory to wholeness of decision-making process. Beside constructive research there have created quantitative question pattern of which questions and desires can illustrate both biases and motivation. Purpose of quantitative research is to collect, analyses, recognize and report theory supportive material, exceptions, or deviations. It can be used to person profiling and educational purposes after testing period. Quantitate question pattern and research were limited out of research scope.

1.3   Research data and information collection methods in the thesis

Research may produce different results depending on the point of view. The material of the literature is not necessarily valid but does not engage directly in the research. The researcher must become aware of the criticality of both the choice and the source of the research. (Hirsjärvi etc. 2009, 113)

Theoretical framework create base for the research. Definitions define base of the research. Through the theoretical framework, conceptual model and formula of cognitive decision-making process of human being develop until its end to the model of decision-making. Empire research of biases verify placements of functions of cognitive system. Motives, desires and attitude are steering elements of cognitive system and decision-making process. Biases, systematic errors, as Daniel Kahneman calls them, give empire perspective for the research. Cognitive system is wholeness, which related to time and internal clock of human being, as well as animal. Empire research describes complexity of cognitive system and give thought to final model of decision-making process.

A constructive research has been developed specifically in the field of business economics, but its potential scope is wide (Lukka & Tuomela 1998, 23). Constructive research means design, conceptual modelling, model implementation and testing. Structural research resembles a lot of creating innovation or service design. Constructive research applies perfectly for concrete outputs such as measuring instruments, models and designs. (Lukka & Tuomela 1998, 23)

The core concept of the research product, new construct, is an abstract concept with a large, in fact, endless number of possible realizations. All manufactured artefacts, such as designs, diagrams, plans, organizational structures, commercial products, and information system models, are constructs. They are characterized by the fact that they are not found, but are invented and developed. Developing a structure that differs from everything already in existence creates something completely new - new types of constructions themselves evolve into a new reality. (Lukka & Tuomela 1998, 23)

Structural research leads to real activity in the target organization and thorough analysis of this activity. This setting differs greatly from the design of a theoretical model in laboratory conditions or listening to the interviewees when they tell their thoughts or actions. The constructive research article has common features such as the researcher's activity on the field, the use of small material sizes and ethnographic methods, e.g. observation and interviews, in the empirical part of the research, with other case studies like case study, field study, and ethnographic research. (Lukka & Tuomela 1998, 23)
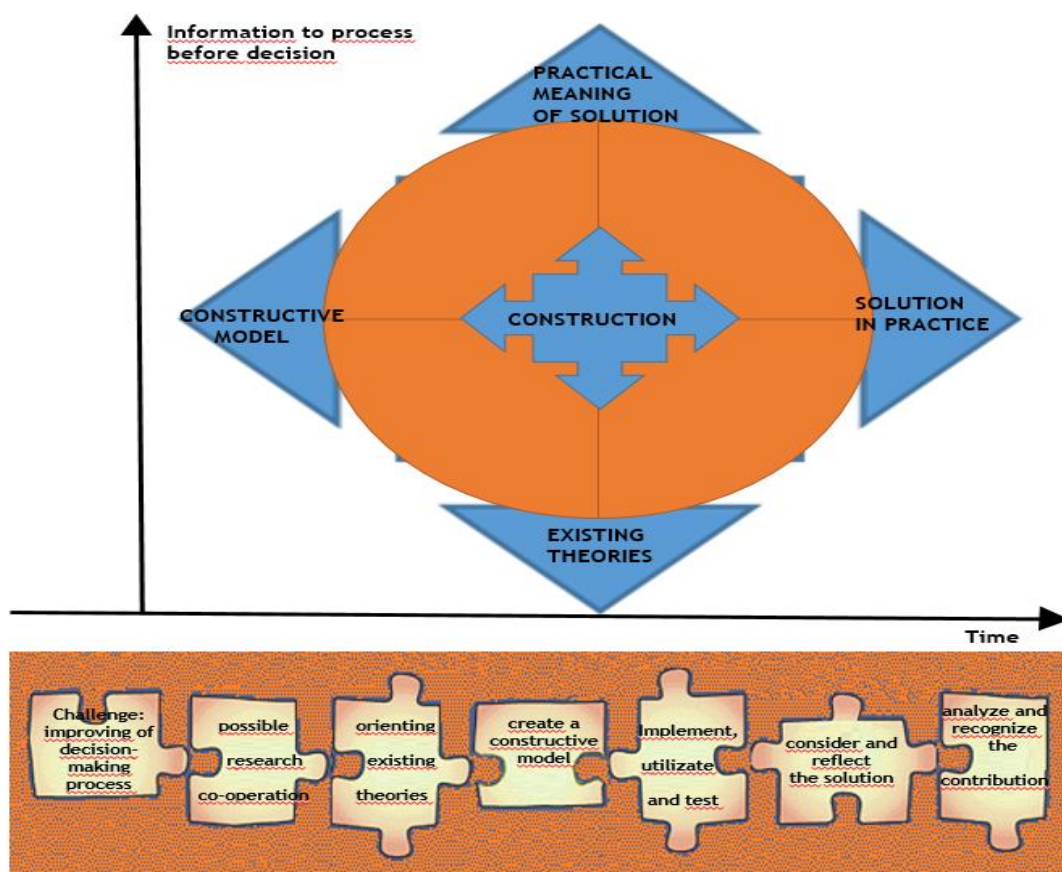
Figure 1: Constructive research model

Through the thesis philosophy, psychology and cognitive system talk each other. Thesis describes, improves and create a new model and formula of decision-making process based OODA-loop, theoretical framework, empire and constructive research. The new created model of decision-making process to be presented and reflected. Feedback and reflection analysis are base for the final model and formula of decision-making process. Thesis have managed according to constructive research model description (figure 1).

1.4 Research business co-operation in the thesis

When choosing a research problem, and when defining it, it is consideration related to the implementation of the research. A novice scientist is wise to avoid research situations that take time to collect the material of the research. If the project is not large then the size of the sample material must be adjusted so that the collecting data is not too time-consuming or unreasonably expensive. (Hirsjärvi etc. 2009, 179) The more specific the goal is to describe the number of the population, the larger the sample is (Hirsjärvi etc. 2009, 180). The research aims to provide indicative results of the population, with a homogeneous sampling of one actor in the security business.

This thesis to be delivered to PPO-Elektroniikka Oy. Company designs and manufactures of professional electronics and imports equipment in field of security and safety. The company represents a sample of the security business. The number of people participating in the sample is small. Therefore, the questionnaire and questionnaire replies did not meet all the requirements for a successful survey. Results of the research can be used for clarifying and improving decision-making process among personnel of the company and interviews for work of new employees.

PPO-Elektroniikka Oy is one of the micro enterprises. Family owned company has run safety and security business since 1983, already for 35 years. Company produces and develops isolation monitoring system for hospitals, explosive sensitive EX-rooms, ammunition factories, chemical laboratories, production and service areas. The system is mandatory in hospital operating rooms in Finland from 1993 onwards and new EU Directive requires it in all hospitals in Europe. Company has delivered over 24 000 monitoring systems since 1983.

1.5 Research crucial elements to improve decision-making loop in the thesis

Operational model illustrates and describes decision-making process and its elements. Illustrated a described elements effect on final decision and action. Research crucial elements to improve loop chapter collects the most important definitions of the research. History shows a lot of ontological and epistemological terminology around the decision-making. Terminology based on existed and verified sources. The definition of terminologies of consequences used in the research open the consideration of the research. Definition chapter systematically lead research closer and closer into the heart of decision-making process.

The written model can be defined as an imaginary of reality. The purpose of the modelling is to simplify whole vision by clarifying essential elements of the research (Hirsjärvi etc. 2009, 145). The starting point is to build a research on selected elements. Defined elements help the reader to illustrate issues, which to be dealt at the theoretical level (Hirsjärvi etc. 2009, 146).

1.5.1 Researcher's realism as crucial element of the research

Nominalism cannot be on the base of research. Nominalism based on universals determinations. Universals determinations are like nature classes, repeatability and linguistics expressions. Nominalism thinks have the same feature. It combines thinks in the same class. Conceptualism consists both universal determinations and objects. Conceptualism consists cognitive capabilities and mind, but have not external or substantial reality i.e. objects. Research cannot have based on conceptualism either. Research based on realism, which accept all earlier explanations, concepts, have independent universals of all forms of concrete existence and object. (Aaltonen 2010, 5)

1.5.2 Object according to Kant as crucial element of the research

Object, on existing circumstances, effect on the human's cognitive system by certain manner. Sensibility determination describes human capacity to attention effects of the object. Human receiving effects of the object through the attention. Depending of human's sensibility, he or she can sense not all but various kind of effects of the objects. (Kant 1990, 21).

Human could have attached symbols from the objects. Symbols may change and manipulate effect of the object. A symbol is a sign automatically fit to declare that the set of objects. Object is denoted by whatever set of indices may be in certain ways attached to it, is represented by an icon associated with it. (Houser 1998, 17)

1.5.3 Attention as crucial element of the research

Attention of the object lead notice. Aristoteles first illustrated the model as a framework for understanding how discussion works in persuading large audiences. Today the model is called AIDA-concept (attention, interest, desire, action) for marketing purposes (figure 2). (Tanner 2014, 89)

Philosopher C.S. Peirce (1894) demonstrates that attention affects thought were the positive correlation of risen attention with risen capacity to inscribe accuracy of logical recall sequences of thought. Attention even makes objects as reputable. Attention changes over a single lifetime from early spontaneous reactive to sense objects to habituated late permanent interests. If we think attention pedagogically, it is wondering attention. Wondering attention achieve exist interest. (Lachs & Talisse 2008, 63)

The group may become a key source of consolation. Attention in groupthink does not easily appear in routine situations. Chances of groupthink markedly increase when decision-makers are under stress or dealing with a crisis. Conditions lead decision-makers to think threats to their self-esteem because of complex thinks. (Hart 1991, 256) Attention as crucial element

presented in Aristoteles' model of persuasion. Go with as corresponding state refers to passive attitude (table 1). (Aaltonen 2010, 122)
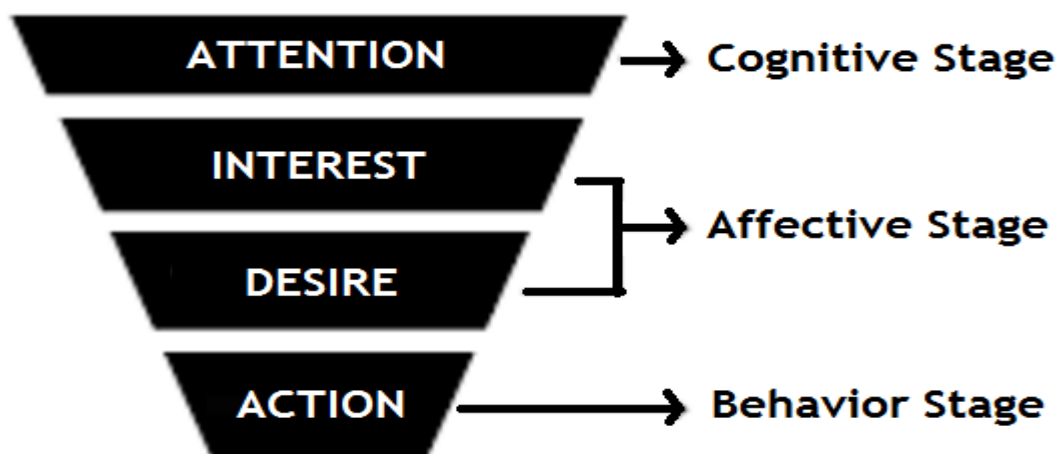
Figure 2: Aristoteles' model of persuasion

1.5.4   Interest as result of attitude as crucial element of the research

Attitude is one of the crucial idea of the research. This research recognizes interest as result of attitude. Interest follow attitude's favour or unfavour. Attitude is a human character to respond favourably or unfavourably to an object, human, organization, or event (Ajzen 2005, 3). Attitude is an internal character appear as interest. Interest is oriented character of decision-making process. Interest's responses categories by Icek Ajzen (2005) are cognition, affect and conation. (Ajzen Icek 2005. 4)

On the other hand, attitudes, scenarios and strategies illustrated by Aristoteles's model of persuasion (table 1). Cardinal Richelieu's Testament is telling the philosophy of future. It also illustrates how attitudes and interest affect both scenarios and strategies. (Aaltonen 2010, 122)

Attitudes towards the future	Corresponding scenarios	Corresponding strategies
Passive	None	Go with
Reactive	None	Adaptive
Preactive	Trend-based	Preventive
Proactive	Desirable alternatives	Innovative

Table 1: Attitudes, scenarios and strategies, Aristoteles' model of persuasion

1.5.5 Desires by Steven Reiss as crucial element of the research

Human being is a wanting animal and seldom reaches a state of manage satisfaction except for a brief period. As one desire is satisfied and managed, another come up to take its place. Then this is satisfied, another comes into the foreground, etc. It is a characteristic of the people throughout their whole life that they practically always desire something. (Maslow 1954, 24) Motivation appears as various formals of desire. We assume that desire shows human motivations to other people. Desires may show motivations partly, but not everything. Even human heself or herself does not know every effect of his or her desires. Understanding desires and desires affects human understand his or her behaviour and happiness. (Reiss 2001, 17)

Reiss (2001) has found 16 single basic desires (appendices 1 and 2) in order of the motivation is not any importance: force is the desire to influence others, independence is the desire for self-reliance, curiosity is the desire for knowledge, acceptance is the desire for inclusion, order is the desire for organization, saving is the desire to collect things, honour is the desire to be loyal to one's parents and heritage, idealism is the desire for social justice, social contact is the desire for companionship, family is the desire to raise one's own children, status is the desire for social standing, vengeance is the desire to get even, romance is the desire for sex and fairness, eating is the desire to consume food, physical activity is the desire for exercise of muscles and tranquillity is the motive for emotional peace (appendices 1-2). (Reiss 2001, 17)

Motives and desires (believe/will) are great human statements. It is no matter how illogical our ideas may be at first, they will be managed for time being. Illogical ideas can be corrected if they are in human cognitive system and not moved forward to action. Desires may change the ideas on the half way through to action. Desires as motivation source takeover of all others and could change the action on half way through to action. (Houser 1998, 47)

1.5.6 Cause and manipulated properties as crucial element of the research

The father of western causally thinking, Aristoteles, offers solution how the thinks increase three basic properties and physical objects element substance consists. Scheme goes from material cause corresponding to element, with efficient cause relating the processes used for changing an element. (Aaltonen 2010, 17) Every one of us has some awareness of the limited capacity of attention. People's social behaviour makes allowances for these limitations. (Kahneman 2012, 25)

There are always many causes in existing conditions that together influence on the future. Each cause manipulates, something in object's property and affect (table 2). Material as cause manipulates physical matters, efficiency manipulates energy, formal manipulates information and final cause is desire. (Aaltonen 2010, 17).

Cause	Manipulated property
Material	Physical matter
Efficience	Energy
Formal	Information
Final	Desire

Table 2: Aristotelian causes and manipulated properties

1.5.7 Action and behaviour as crucial element of the research

Action as behaviour stage illustrates people's cognitive system response towards noticed effect of object in existing circumstances. Thinking about belief in decision-action-oriented terms leads to pragmatic voluntarism about belief. The will to believe, which counsels each human's right within obvious elements to adapt those beliefs that guide her or him to a more meaningful life. (Lachs & Talisse 2008, 9)

Janis Irwing (1972) was a psychologist analysing and evaluating political decision-making processes. He claimed that basically decision-making is rational problem-solving to act (Hart 1991, 271). He found that the higher scores on reasons of defective decision-making were related both to more unfavourable fast outcomes to vital interests and to more unfavourable fast outcomes for international conflict. Correlation is not allowing reports about causality. (Hart 1991, 270) Decision-making process does matter in defining outcomes, groupthink. Groupthink is an ongoing hazard to effective decision-making and action (Hart 1991, 271).

1.5.8 Truth is subjective point of view as crucial element of the research

People try to find the truth. For many of us it is necessary to know it is true. True may mean something we known. It is not necessary to find the truth. (Alcoff 1998, 20) Philosophers have found thoughts that security messages of human cognitive system are more clear than other messages. They have assumed that security statements may be certain and detailed. Particular detailed message of cognitive system is easier to sense when necessary. These messages are known in everywhere in human body not only in human cognitive system. Security goal of justification illustrates the truth. (Habermas 2003, 40).

Peirce (1894) claims that the truth has two meanings. One of the meaning is practical holding for true, which alone is entitled to the name of belief. The second meaning is the acceptance

of a suggestion. Acceptance of pure suggestion illustrates intention of acceptance of pure truth. (Houser 1998, 57)

Research avoid definition of the truth due to its subjective point of view, all have the truth of his or her or its own. The model of decision making process recognizes that (common) knowledge is available to all of us through Kant's (1900) philosophy that communication can be thought of as an enabling condition for undertaking, or renewing, as process of structured self-questioning. However, the usage of (common) knowledge is because one's limitations. (Kahneman 2012, 25)

1.5.9   Justification and judgment as crucial element of the research

The main statement of justification and judgment is the ground on which the decision have settled and managed. It does not matter is the judgment true or false the matter is to complete the decision. It is not even matter how bigger decision we complete the main problem is stable. (Alcoff 1998, 23). The truth should be judged rationally that human recognize and accept the object. Human decision-making process need a clear or sufficient justification of object. Sufficient acceptance leads the truth to sense and action. Authorized action illustrates justification and judgment of human cognitive system. (Habermas 2003, 40)

The automatic state of human mind is that we have intuitive feelings. We have intuitive feeling about everything that illustrates our behaviour. Human usually have answers to questions that he or she does not completely understand. Human relies on evidence. Evidence can explain or defend the ideas. How we found clear intuitive opinions on complex conditions. If a satisfactory judgment to a hard question is not found quickly, system one will find a related experience or question that illustrate the answer and will answer it. Kahneman searches the operation of answering one question in place of another element. (Kahneman 2012, 97)

Research recognizes that human justify his or her desires (beliefs/wills/truths) as base of decision-making process. As Kahneman's (2012) though of satisfactory answering to one question in place of another substitution shows justification is an essential part of motivation (desire/believe)-justification-action guide to more meaningful life. (Lachs & Talisse 2008, 9)

1.5.10   Memory in cognitive system as crucial element of the research

Action as behaviour stage illustrates our cognitive system (figure 4) response towards noticed effect of object in existing circumstances (Lachs & Talisse 2008, 9). Memory is a part of cognitive system, which save, file and store information and knowledge. It is good to recognize that memory data has stored not only one place but also several places in the brain. (Hudson 2003, 18).

Knowledge is thinking and understanding of real things or abstract thoughts (Habermas 2003, 12). In evolution, both remembering and forgetting are important mission of human brains. Object's information has manipulated many ways, before them stored in memory, the cognitive system, for usage of human being. Additionally, imagination and hierarchy of cognitive system create false memory messages. Research recognize memory as part of cognitive system and placement of memory based biases. The dynamics of memory help explain and concern. (Kahneman 2012, 136)

1.5.11 Data, information and knowledge as crucial elements of the research

Intelligence consists three different definition: Data express saved, filed, stored information and knowledge. It is good to pay attention to data property that is partly manipulated, forgot, removed, added, changed, transfer damaged and maintenance. Everyone has some awareness of the limited capacity of attention, and our social behaviour makes allowances for these limitations. (Kahneman 2012, 25) Attention manages all the time additional information about existing conditions and environment. Part of information pass the cognitive system, part work out but abandoned, part processes in cognitive system, utilized and stored, reutilized and restored etc. OODA decision-making process claims that 80% of information is produced by attention. (Aaltonen 2010, 100)

Amount of knowledge in our cognitive system is limited. In scope in existing circumstances it is significant to realize that we behaviour and act based on our experiences and desires. Humanly speaking we know only uncertain and inexact way to behaviour and act. (Houser 1998, 51) Data, information and knowledge are thinking and understanding of right things or abstract thoughts. Knowledge is a function of learning process. (Habermas 2003, 12) Researcher's learning processes are managed by the dynamics of self-controlling. Self-controlling problems exist every day in the world of the researcher. Self-controlling pressures decision making. (Habermas 2003, 13)

1.5.12 Loop decision-making model as crucial element of the research

One of the most popular and used decision-making model designed for complex conditions is OODA-loop. There are involved multiple levels of actors and different time-scales is the OODA-loop. OODA means Observe, Orient, Decide and Act. Decision maker observes the environment and collect relevant information; Orient himself in the conditions by marking sense of it and by comparing the current state to the sense making; and finally decide. Act follows the decision. (Aaltonen 2010, 99)

OODA-loop can be illustrated as picture (figure 3). In the figure of OODA-loop the trajectory of a point lying on a circle of radius *a* rolling along an x-axis. This represent current time. The solution wave has a wavelength. Wavelength is 2π*a*. Along the time decision-making moves in axis and an amplitude along the y-axis. Y-axis refers to the amount of information that decision-maker demands before to manage the final decision. The highest point of the curve means observing. Observing point is point at which the decision-maker observes the outcomes of his or her action. The following downturn illustrated the orientation process. Orientation process divides attention to the unique environment and coming circumstances. Orienting phase processing maximum amount to incurve 2*a*. This lead to a decision point at the base of curve. In the end, the rising of the curve represents acting on the decision. (Aaltonen 2010, 100)

OODA-decision making model is a crucial idea of the research. Research improves and illustrates OODA-loop, which provides analysis on global security and technology, critical intelligence and business issues. Research used and modified OODA-decision making model in empirical research. Empirical research confirms the idea of the OODA-model. Research recognizes OODA-decision making model as model of motivation (desire/believe)-justification-action guide to more meaningful life. A new model of decision-making process is base for quantitative research of decision-making.
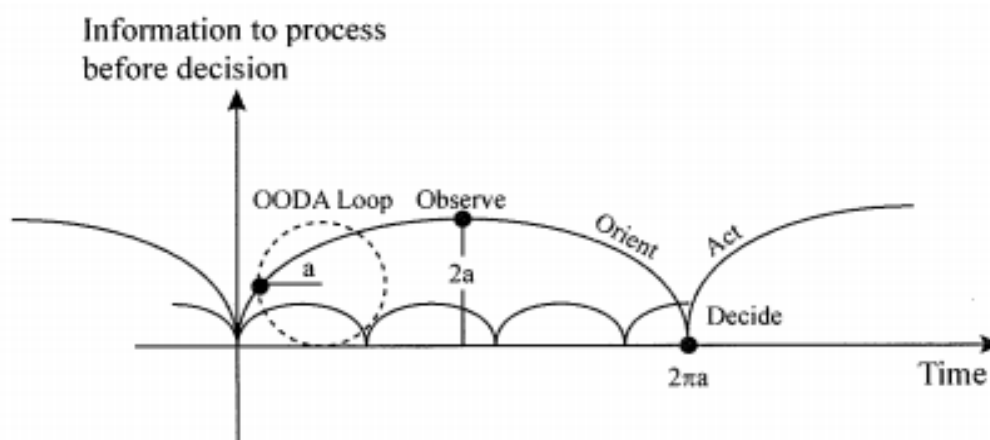
Figure 3: OODA-Decision-making process

1.5.13 Time is not empirical conception as crucial element of the research

Most of us realize that we live the same timeframe as other people. Different things have different natural time scales. Time is found in life processes like mechanical, biological and social interactions, but also events, identities, memories, social histories. Traditionally we, as human being, have used the time determination of past, present and future. Time determination makes sense to people's lives. Through time concept people recognize continuity. (Aaltonen 2010, 6) People should figure out that time is not empirical conception. Time is a subjective

condition of our human intuition. Time is sensitive and sensuous as far as the objects affect us. (Kant 1990, 31)

Augustine's (354–430) illustrative philosophy of knowledge based on causality in the nature (Juti 2013, 262). St. Augustine's found out that the past and the future not locate outside of human mind. Human mind performs three functions: those are memory, attention and expectation (table 3). The future is human expectation, passes goes through the present, to which it attends, is not the past, which human remembers. The understanding of past, present and future as present past, present present and present future are complemented with past past, past present and past future as well as future past, future present and future future. (Aaltonen 2010, 7)

		Future future
	Present future	Future present
Past future	Present present	Future past
Past present	Present past	
Past past		

Table 3: St. Augustine's time classification

Grammatical aspect is a linguistically category that express how verb to be denoted over the time. Categories give linguistically meaning to past, present and future. Present illustrates existence here and now (present), imperfect illustrates past, perfect and pluperfect illustrate occurred earlier than the time under consideration. (Haapala, V. etc. 2016, 308) These grammatical aspects of time fit and fulfil Augustine's time classification and the aim of the research. Research recognizes Augustine's time philosophy as timeframe of OODA-decision making process and base of the model of decision-making process. Research also recognizes Augustine's timeframes as part of motivation (desire/believe)-justification-action guide to more meaningful life.

1.5.14 Common knowledge as crucial element of the research

Common knowledge is not a new determination. Common knowledge has attached to the truth, but it does not connect anyhow or support anyway to the truth in this research. Common knowledge as the truth refers to soul. The soul is not separate immaterial element of cognitive system. In the nature, the soul is its universal as well as the common knowledge is. Common knowledge simple illustrates ideal life. Soul as absolute basis of common knowledge is without location in cognitive system. Particular location cannot be individual location of human mind.

Hegel (1894) recognized soul as part of cognitive process. Religion has also given some explanation to exist of common knowledge. (Hegel 2001, 5)

Mathematics and computer researchers have an interest in the element of epistemic logic. David Kellogg Lewis first illustrated the research in the philosophical literature in his study theory of convention (1969). The sociologist Morris Friedell (1969) determined common knowledge as meaning common knowledge among a group of people. He found that if everyone knows it, everyone knows that everyone knows. (Morris 1969, 28) Robert Aumann (1976) determined it as math formula in a self-theoretical framework. (Osborne & Rubinstein 1994, 84)

Common knowledge adopts a critical statement of our own judgment. Human judgment and communication trigger the cognitive process. Common knowledge needs also judgments. Available common knowledges or that particular common knowledge human have contact surface to be adapted to cognitive system. Universalist perspective cognitive system adapt common knowledge by communication in existing circumstances. Common knowledge to be undertake and process as normal way in human cognitive system. (Deligiorgi 2005, 84)

Common knowledge in existing conditions is used as meaning of consensus. Consensus and common conception can be determined as common knowledge. Some determined common knowledge as general knowledge or understanding the point of view. In this research meaning of common knowledge, differ from earlier mentioned meanings. Research recognizes that common knowledge is available to all of us through Kant's (1900) philosophy that communication can be thought of as an enabling condition for undertaking, or renewing, as process of structured self-questioning. Research also recognized that common knowledge is as part of motivation (desire/believe)-justification-action guide to more meaningful life.

Because of many levels of sensitivity and limitations of cognitive system of human being we are not able to use all exist knowledge. Studying confirms that common knowledge grow, develop and open frames for further knowledge during the lifetime (Habermas 2003). Human being is no exception. Animals have also common knowledge. (Kahneman 2012, 23)

1.5.15 Cognitive system as crucial element of the research

Cognitive system (figure 4) is human's mental system consisting all earlier mentioned activities like knowledge, time perception, intelligence (data, information, knowledge), memory, mind, desire-justification-action, reality, subject motivation (desire, beliefs, will, truth), ideas (intuition, innovation), reality, subject etc. Cognitive system comprises an individual's worldview to world around the person in existing conditions. Binary system theory of the cognitive system claims that processing occurs in system one and system two. System one is process, which

process occurs through a fast, unconscious and intuitive process. System two is a slow, conceptual and analytical process. (Kahneman 2012, 22)

Complex cognitive system (figure 4) has illustrated by Hudson (Hudson 2003, 18). Explaining the cognitive system and marking that decision-making locate on top left in human brain. Hudson's (2003) figure (figure 4) refers usage of Kahneman's (2012) system one. Cognitive system can be illustrated also as apriori and aposteriori. Apriori described logical knowledge. Logical and arithmetic system, where sense experience is irrelevant refers to system two. Aposteriori described intuition knowledge. Intuition knowledge of cognitive system consists thought, self-evidence and intuition. Intuition knowledge refers usage of system two. Extant of apriori and aposteriori support Kahneman's binary system thought. (Lachs & Talisse 2008, 1)

Keith Stanovich and Richard West (2000) refer to two systems in the mind. Researchers named the two systems as system one and system two. (Stanovich & West 2000, 645-726) Daniel Kahneman adapted system thinking from Stanovich and West. System one operates automatically and quickly. System one needs a little or no effort at all to sense of self-controlling. System two allocates attention. Attention of system two is effortful mental activity. System two is demanding and can handle complex computations systematically. The operations of system two are often associated to consideration, but it consists memory data, experiences and choice of desires. (Kahneman 2012, 22)

It is amazing that one binary system of human being have multiple aspects. Infinity characters of cognitive system are wonderful. Cognitive system determinate things, consider, be wary and concern, analyse, settle judgement and decide. Emphasis on clear messages, which are among all messages. (Strathern 2011, 91) Some of the crucial work of binary system is to maintain determinations and communication inside and outside cognitive system. There are rules and hierarchies in cognitive system (figure 4). Cognitive system includes terms. Terms can be conditional or unconditional. In and between terms are order. Simultaneously keeping terms connected to prior desires and relation experiences. They use the binary system as common ground to handle the existing circumstances. Binary system operations are particularly powerful. They judgment and justify the decisions. Judgment of behaviour and action of human being illustrates how powerful binary system is. (Strathern 2011, 100)
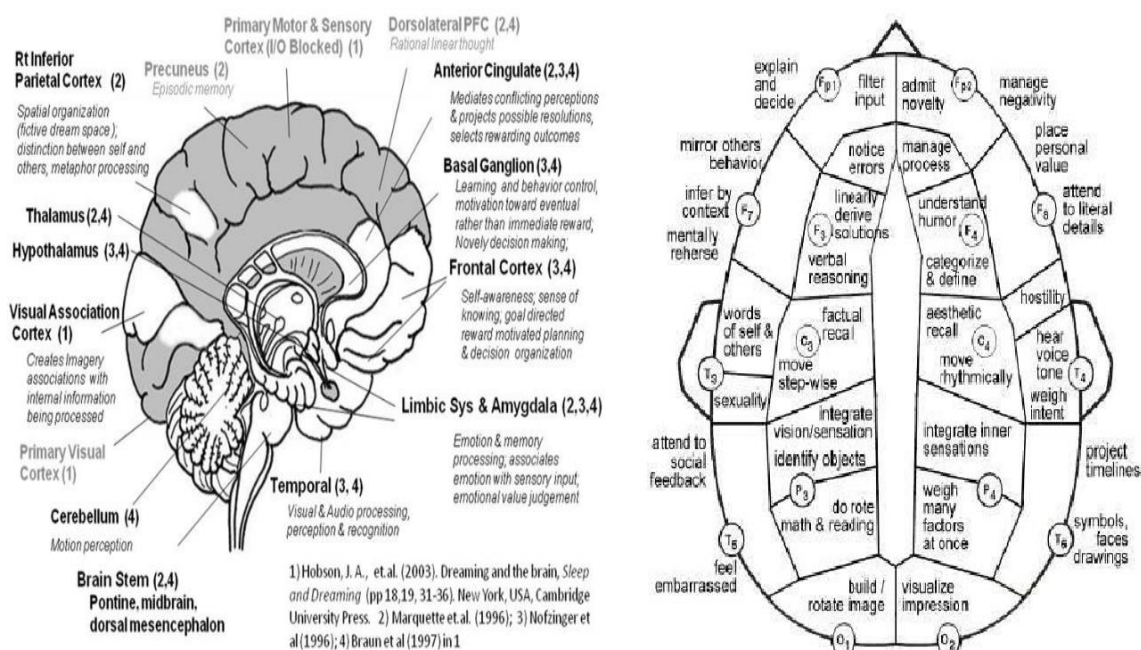
Figure 4: Cognitive system

1.6 Daniel Kahneman's research of decision-making as base of thesis research

We believe that we know what is going on in our binary system. We believe that binary systems' one thought leads another. Another thought of binary system leads action. Anyway, it is only the way we believe the binary system works and it is not indeed the one and right way. (Kahneman 2012, 7) Psychologist have been interested in many illustrations of the multiple models of thinking. Daniel Kahneman named thinking models as system one and system two. He adapted working terms of binary system thinking from psychologist. (Kahneman 2012, 22)

In unexpected and unusual conditions, we are feeling a lot of wary. Observing the circumstances, we get self-control, which provide information of inside and outside conditions. These operations demand little effort. (Kahneman 2012, 33) Cognitive system automatically searches causal connections and supportive messages for decision-making. However, human binary system has manipulated, forgot, removed, added, changed and transferred data, information and knowledge from beginning. It is suggested that people believe their conclusions for the decision-making and action are true. Emotional changes are now expected, and because they are unsurprising they are not linked causally to the words. (Kahneman 2012, 71)

Kahneman claims that all illusions are not visual. There are invisible cognitive illusions of binary system. (Kahneman 2012, 25) Kahneman found that people can be mental sprint, but effectively blind. Michael Shermer (1997) in his book Why People Believe Weird Things, describes that

strongly intelligent individuals may be even ordinary people more minded to fall on their cognitive illusions. Potential and verbally talent people explain the worst things better way for everyone even himself (Shermer 1997, 283).

2   Improving research concept in time

Research framework is important to figure what for the research have managed. When existence theory concepts are clear as well as the aim of the research, it is good to go forward for improving the loop and modelling the concept. Research based on time, information and attitude concepts. Motivations as form of desires reflect personality through the cognitive system of human being and lead personality behaviour in existing circumstances. In complex security situation, the time frame is limited. Because of limited timeframe decision-making should be managed quickly and behaviour should have met existing circumstances. (Kahneman 2012, 22)

Time as attribute of human being concentrates internal clock. Every one of us have synchronized internal clock and we behaviour based on sensation of time of our own. Time is a subjective condition of our (human) intuition, which always sensuous as far as the objects affect us. In fact, our synchronized internal clock leads us to sensation of attitude. Interest as attribute of attitude describes our favour or unfavour objects, therefore also corresponding scenarios and strategies. Time and attitude concepts work together. (Kant 1990, 31)

In OODA-decision-making process, recurring cycle of observe-orient-decide-act, claims that decision maker observes the environment and collect relevant information for base of decision. Relevant information is collected by senses. Observe, Orient, Decision and Action, of which orient need sensation of time. Therefore, when you are observing and orienting for decision-making process you realize and combine time, attitude and information (figure 5). Research concept relationship between time and decision-making (appendix 3). (Aaltonen 2010, 100)

	TIME		INFORMATION		ATTITUDE	
M O T I V E S	FUTURE	FUTURE	EXPECTATION	COMMON KNOWLEDGE	INNOVATION PROACTIVE	**CONATION ACTION**
	FUTURE	PRESENT	EXPECTATION	PREINFORMATION	INNOVATION PROACTIVE	
	FUTURE	PAST	EXPECTATION	INFORMATION	PREACTIVE	
	PRESENT	FUTURE	ATTENTION	EXPECTATION	AFFECT PREACTIVE	
	PRESENT	PRESENT	ATTENTION	KNOWLEDGE	JUDGEMENT REACTIVE	
	PRESENT	PAST	ATTENTION	INFORMATION	COGNITION	
	PAST	FUTURE	MEMORY	EXPECTATION	AFFECT ACTIVE	
	PAST	PRESENT	MEMORY	ATTENTION	GOGNITION ADAPTIVE	
	PAST	PAST	MEMORY	DATA	PASSIVE	

Figure 5: Research concept relationship between time and decision-making.

2.1 Improving research concept in past and memory data

Time classification base cognitive system is structured and described in figure above. System one works, by programming the normally automatic functions of attention and memory. System two, which provide information from attention and search memory to find the replies to questions (Kahneman 2012, 89). Considering of memory based data deliver us to past, past past, as result passive and adaptive attitude. Passive and adaptive attitude is conscious message, but can be also emotional. Past present deliver us to memory attention in which cognitive process actively process and produce memory attention based messages for decision-making. Memory attention messages can be rational thinking or emotions. Memory expectations deliver us to past future time class, where are psychological reactions towards objects. Memory expectations are active part of cognitive process and messages. (Kahneman 2012, 41)

2.2 Improving research concept in present and information

Present past consists attention information, which shows us as reactive attitude. We react object's stimulus noticed by attention. Stimulus is transferred actively as information into cognitive system, adapted, analysed and selected passive or active corresponding scenario and strategy, reflect as personality behaviour in existing circumstances out of the cognitive system. It is also the ability to find relevant material in memory and to deploy attention when needed. Present present shows as attention knowledge. OODA judgement on its final state before conation and action. Now attitude is spitted out of the cognitive system, based on decision-making process and best possible judgement knowledge now in existing circumstances. Preactive attitude is waiting for responding stimulus of the object to delivery message to the cognitive system. Attention expectation affect can be both rational and emotional. (Kahneman 2012, 43)

2.3 Improving research concept in future and preinformation

Future past delivers us to expectation information, which lead to preactive and proactive attitude of which as result become ideas. The right thoughts we try to catch not usually appear to our mind in case we need them the most. Expectation preinformation represents future present time class. Ideas take their shapes here as part of human mind and cognitive system. Ideas are transferred, processed and analysed in cognitive system to passively adapt or actively react them. Future future represents expectation knowledge where all the data, information and knowledge are available to all of us through Kant's (1900) philosophy that communication can be thought of as an enabling condition by undertaking, renewing and self-questioning (Deligiorgi 2005, 22). As illustrated here the usage of knowledge is problematical because one's limitations. Once we get connection, link, message with knowledge proactive attitude get its prize as format of innovation. Ability control emotions, innovation is transferred, processed and analysed in cognitive system to passively adapt or actively react them. (Kahneman 2012, 47).

3   Improving research concept by Daniel Kahneman's cognitive system

Obviously, the cognitive needs are of most concern to the philosopher of science. It is human being's persistent curiosity. Curiosity is responsible for natural-history science. It is equally with desire and motivation to understand, explain, and produce that manages science in its more technical and abstract levels. Curiosity, attention and theoretical thinking is essential for human being, but curiosity and attention are recognized in animals. (Maslow 1954, 2)

3.1   Cognitive system by Daniel Kahneman based on sensibility

Cognitive system of human being based on sensibility. Human's cognitive system capacity for receiving stimulations through the channel we are affected by objects is called sensibility. (Kant 1990, 21) System one operates usually as automatic functions of attention and memory. Memorizing and repeating messages of cognitive system lead system two on behaviour. System one has major influence on behaviour when system two is occupied. (Kahneman 2012, 43) System two has some ability to change the way because of desires (Kahneman 2012, 25).

System two, which will direct attention and search memory to find the replies. System two receives questions or manages them. System two leads attention and find memory to search the answers. System one operates differently. It continuously monitors what is going on inside and outside the mind. It continuously manages statements of different elements of the conditions without any specific order or without any effort. (Kahneman 2012, 89)

System one runs into difficulty it calls system two to support more detailed and specific processing that may solve the problem of the moment. System two is mobilized when a question arises for which system one does not offer an answer. These obviously happened to us encountered the many difficulties. People may feel attention as surprised. (Kahneman 2012, 26)

Systems one and two are both active when human being is awake. System one manages automatically and system two is usually in a comfortable lower mode. Lower mode is only a save stage of human cognitive capacity. System one continuously manages solutions for system two. Solutions may be impressions, intuitions, intentions and feelings. System two manages impressions and intuitions into beliefs, which turn cognitive system to actions. In case all goes well, as business as usual, system two manages the suggestions of system one with a few or no changes. People usually believe their impressions and act as they desire. (Kahneman 2012, 26)

3.1.1   Cognitive system one by Daniel Kahneman

The major operation of system one is to manage and govern human decision-making process. Decision-making process of human being represents human behaviour. Cognitive system messages link thoughts and ideas of existing conditions, objects behaviours and actions. Happened

events in brief time of period or at the same time construct the decision-making model. (Kahneman 2012, 72) However, system one is supposed to affect more in fast decisions (Kahneman 2012, 85). Evolution has developed system one to provide statements of existing difficulties continuously. This evolution is called survival (Kahneman 2012, 89).

Human cognitive system competences and resources are innate skills. These innate skills human share with all animals. Based on Daniel Kahneman's thoughts these innate skills locate in system one. Normally people are thinking in two systems. They have personal abilities, individual limitations and behaviours. System one links attention messages of the object and ideas that lead to behaviour. These are learned skills and they can be developed along lifetime. Learned skills are social situations, reading and understanding of conditions. (Kahneman 2012, 23)

Complexity is continuous circumstances. Automatic elements and activities of system one manages fast mathematical calculations as 2 + 2 and give results as form of human behaviour. Usage of system one is learned and routine work in this mathematical example. It illustrates aptly fast decision-making behaviours. (Kahneman 2012, 23)

3.1.2   Cognitive system two by Daniel Kahneman

System two try to recognize theoretically the existing conditions (Kahneman 2012, 57). Humans' system two is systematic and careful to search evidences for decision-making and behaviour. These evidences tickers mobilization of the system two, which judgment the behaviour. Binary system can learn. Learning may have happened by think, though theoretically and statistically and by analytic mode. Binary system recognizes impression for a right and wrong judgment. (Kahneman 2012, 64) System two produce various heuristic beliefs and initiative thoughts (Kahneman 2012, 85).

System two need control. Self-control of human being is not effective. Human feel self-control unpleased and unsatisfied. Self-control is not motivating because of lazy system. (Kahneman 2012, 44) System two need attention to provide information on the base of decision-making process (Kahneman 2012, 24).

In case to present some examples of system two functions. Attention requirement games, races and conditions are good examples. Additionally, focusing of human voice, noisy room or look at and exactly point or detail. Function example of system two is also to find something in the memory, recognize the noise or sound. Further example of function of system two is to keep going walking speed or faster run, monitor individual behaviour in social situations, remember somebody's phone number or street address, fulfil tax and application forms and control arguments and critical thinking. (Kahneman 2012, 25)

3.1.3   Cognitive binary system by Daniel Kahneman

Training of attention not only develop controls of cognitive system, but both system one and system two operations. Developing of cognitive system may improve knowledge and intelligence as well as maintain skills for longer in lifetime. (Kahneman 2012, 49) Memory store concerns. System two manage important development of preinformation receiving and accuracy in existing conditions. Earlier sentences are example that Kahneman as his binary cognitive system recognized memory, attention and expectation. (Kahneman 2012, 150)

Recognized functions memory, attention and expectation evidence that there is time sensation by internal clock and attitudes with corresponding scenarios and strategies. Attention plays key role in binary system as well as OODA-loop for decision-making. Kahneman (2012) also found judgement in both systems, which lead to decision-making, behaviour, conation and action. (Kahneman 2012, 150)

Cognitive system supports decision-making process between system one and system two. Attention takes controlling energy out of system two rational thinking. System two is also sensitive for intuitive beliefs and biases. The model of decision-making process recognizes biases and point the place and meaning of the biases. Additionally, Daniel Hahnemann's (2012) System one includes innate skills, which are inherited and modified received by evolution, is that we share with other animals. (Kahneman 2012, 23)

3.2   Daniel Kahneman's binary system adjusted research concept

Now research concept has modified research concept with human binary system. Binary system has recognized timeframe thinking and attitude, therefore Augustine's timeframe and Cardinal Richelieu's Testament of attitudes affect both scenarios and strategies have modified to concept of decision-making process. (Aaltonen 2010, 122)

Binary system adjusted research concept of the decision-making (figure 6). Binary system improved research concept of decision making (appendix 4). Evolution has developed system one to provide statements of existing difficulties continuously. This evolution is called survival. (Kahneman 2012, 89)
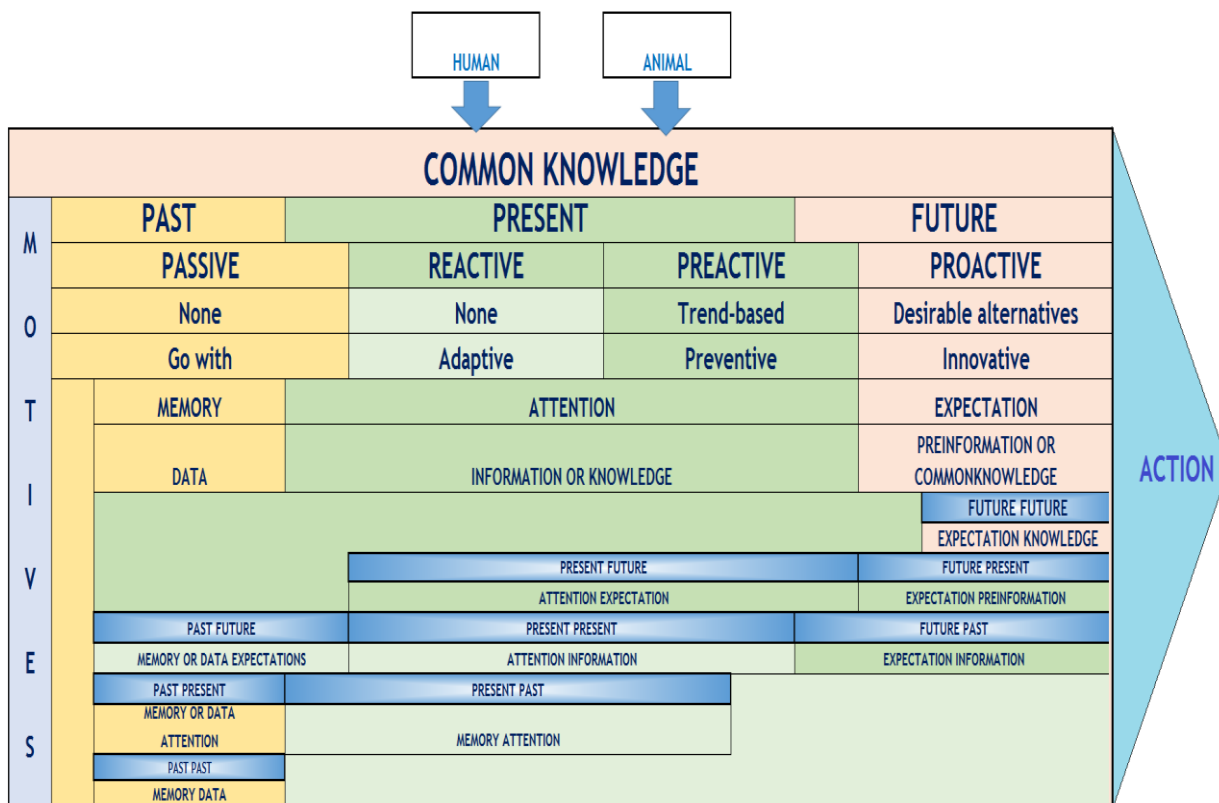
Figure 6: Binary system adjusted research concept of decision-making.

4   Biases improved research concept

In case you want to change your habit or belief. Habit is easier to change then belief. Belief is innate skill, hardy innate skill. Developing the belief to habit we can change it. It's demanding to get rid of belief and transfer it to habit. But once you have managed it, it easier to get rid of habit than hardy belief. In case of habit you able to choose to keep it or abandon it. Beliefs occur automatically and they are not real. Habits surrounding us, but we are able choose to keep them or get rid of them. (Duhigg 2012, 111)

A cognitive psychologist Wason (1972) made his career to understand and learn more about ways how people attend, find detailed evidence and information. He faced that some ninety percent of all information people are attending and finding support their own aims, targets and beliefs. (Mintzberg, Ahlstrand & Lampel 2005, 127)

Magic rise people beliefs even so that existing condition becomes unstable and more unpredictable. Magic beliefs increase hazard conditions and orienting environment. A social anthologist B. Malinowski (1951) claims that magic belief can change existing conditions. Orienting conditions and circumstances change, because they are not any longer fully controlled by human mind and decision-making. (Mintzberg etc. 2005, 67)

Cognitive barriers such as biases and heuristics are a threat for decision-making process. Rational-decision process face problems only when decision-makers face difficulties. Normally these decision-making problems occur in unstable conditions. (Hart 1991, 279)

One of todays' superstition is economic statistics. Economic statistics are used by managers to justify illogical behaviour and market action. Many of superstitions of economic statistics are illogical. Illogical statistics decrease wary and build confidence for coming times of uncertainly. Managers simply provide judgment for continuing practice of their own. To manage illogical economic statistics presents heuristics and biased thinking. Unfortunately, they are used daily. (Mintzberg etc. 2005, 128)

People may think they have too much or too less information to complete the decision. Situation of conflict between more and less information may be at the same moment. Usually we do not have interest to use the information, we used to act fast. Normally we as well do not have enough time to complete the decision-making process or we produce decision-making information shortage of information or too much information. Information symbolizes feeling of security. Security of suffice information on the base of decision-making make us feel self-controlled and strong. It's no mather is information true or false it legitimates the decision and behaviour. (Alvesson & Spicer 2012, 8)

On other way, our memory is not perfect. Usually we trust information that based on our experiences and beliefs. Even so that these memory experiences and beliefs do not have any confluence of existing conditions. We assume we remember experiments with one hundred percent accuracy. In negative memories accuracy is only about forty percent. Sceptics tend to remember both positive and negative memories and experiences equally well. Sceptics accuracy is ninety percent in both cases. (Mintzberg etc. 2005, 127)

To judge heuristic and biases on decision-making is threat for efficiency. This concern both, inside and outside processes. There are cultural differences in this stage. Cultures, where people used to approve reports as true, there are not threat of efficiency. (Mintzberg etc. 2005, 128) System two operates with memory data. Data have stored in many memory location of cognitive system, wherefrom system two picked-up the data. System one operates automatically. This means that system two more exposed the heuristic and biasing influence. Additionally, system two has not any control over the behaviour and data to which behaviour based on. This lead biases. (Kahneman 2012, 126).

Individual human feelings and skills like jealousy and ambitions lead to illogical behaviour. Communicational breaks and irrational behaviour based on biases. Human and orienting environment such as organization can decline negative effects of the biases as low as possible. Biases influence can be neutralized. (Mintzberg etc. 2005, 127)

There has found functional stupidity in organizations. Organizational stupidity means unwillingness to use human own cognitive system. Therefore human adapt organizational beliefs and biases. Orienting circumstances are narrow and lead odd behaviour. Organizational stupid lead lack of reflexivity. Required or provided judgment have adapted from organization. Functional stupid is a good example of organizational commitment. (Alvesson & Spicer 2012, 8) Cognitive system scans requires things or things, which are useful for the base of decision-making. It's partly the same process because of beliefs and experiments we have in our cognitive system. Existing patters helps human to understand the basement of decision-making, judgment and automatic behaviour. (Duhigg 2012, 4)

4.1 Segmentation of biases in research concept

There are named over two hundred (221) biases in codex of cognitive biases, appendix 5. Some of them have the same meaning, description and cause. Therefore, they are combined for segments. Biases are segmented based on cause as follow (189): Need to act fast (53), Not enough meaning (63), Too much information (42) and what we should remember (31). Biases can also have segmented by behavioural situation (181) as Decision-making / belief / behavioural biases (105), Social biases (27) and Memory errors and biases (49). Research focus on Decision making, belief and behavioural biases. (Benson & Manoogian 2016, 1)

There are named 105 decision-making, belief and behavioural biases (Benson & Manoogian 2016, 1). Decision making biases can be divided in four segments based on their cause: Need to act fast, not enough information, too much information and what we should remember. The research consists description and explanation of biases i.e. codex of cognitive biases (appendix 5).

4.1.1 Need to act fast biases in research concept

Most common bias in decision-making belongs to segment of Need to act fast (64). Nearly half of them, 31 biases, occur in expectation time mode, 25 occur in attention and 7 in memory time mode. (Benson & Manoogian 2016, 1) In research this means that primarily in hurry our biases refer to our expectations and future, and attention and present. In hurry and in case of fast decision-making is needed we tend to trust desires, experimental internalizations and emotions, stereotypes, existing beliefs and habits (appendix 6).

Research found that need to act fast biases mainly influence on both information and knowledge. Need to act fast bias locates in attention, present future, future present and future past, reactive and preactive, adaptive and preventive areas of the cognitive decision-making process in the model of decision-making process (appendix 6).

4.1.2 Not enough meaning biases in research concept

There are 22 biases in decision-making segment of not enough meaning. Half of them, 13 biases, occur in expectation time mode, 7 occur in attention and none in memory time mode. (Benson & Manoogian 2016, 1) In research this means that primarily in case of not enough meaning bias occur it refers to our expectations and future, and attention and present. When decision making is needed in mean less information we tend to trust desires, experimental internalizations and emotions, stereotypes, imagines, willingness and illusions (appendix 7).

Research found that not enough meaning biases mainly influence on both preinformation and common knowledge. Not enough meaning locates in expectation, future present and future future. Preactive and proactive, preventive and innovative areas of the cognitive decision-making process in the model of decision-making process (appendix 7).

4.1.3 Too much information biases in research concept

There are 28 biases in decision making segment of too much information. Number of attention related biases are 12, 7 expectations and 5 memory related biases. (Benson & Manoogian 2016, 1) Too much information biases occur in present past, present present and past future time modes. In research, this means that primarily in case of too much information is available in decision making we tend to trust desires, general information, focus on two possibilities and ignore others, mental qualities, experimental internalizations and emotions (appendix 8).

Research found that too much information biases mainly influence on memory data and expectations/memory attention and attention information. Too much information locates in past future, present past and present present. Reactive and preactive, adaptive and preventive areas of the cognitive decision-making process in the model of decision-making process (appendix 8).

4.1.4 What should we remember biases in research concept

There are only 2 biases in decision making segment of what we should remember (Benson & Manoogian 2016, 1). In research, what we should remember biases occur in past present and past past. This means that primarily in case of what we should remember biases in decision making we tend to trust desires, psychological and sensitive experience, and key element of listed events (appendix 9).

Research found that what we should remember biases mainly influence on data, memory data and memory data attention. Based on research what should we remember biases locate in past present and past past, passive and go with areas of the cognitive decision-making process in the model of decision-making process (appendix 9).

It makes sense that there are only few memory biases among decision-making biases (Benson & Manoogian 2016, 1). Naturally recalling the saved data may also cause some harm to message of cognitive system based on memory based biases. As mentioned earlier memory data have stored not in one place, but several places in human cognitive system. Object's information has already gone through many manipulating causes and properties, filters and biases, which have left influence of their own on data to be saved in the memory. Manipulating causes and properties are: Material-Physical matter, Effiency-Energy, Formal-Information and Final-Desire (Aaltonen 2010, 17).

4.2   Biases adjusted research concept

Concept of decision-making as research model recognized and presented that biases are not biases. Biases are systematic errors and error messages. Research recognizes and confirms Daniel Kahneman's (2012) conclusion of biases as systematic errors. Errol messages have significant role in evolution: manipulating, forgetting, removing, adding, changing and transferring data, information and knowledge to base of our decision-making. Cognitive messages are, as Kahneman's (2012) though of satisfactory answering to one question in place of another substitution shows, justification is an essential part of motivation (desire/believe)-justification-action guide to more meaningful life. They have placement and time of their own in decision-making process. Although biases have negative reputation, naturally, they are a rational part of individual cognitive process of human being. Due to hierarchy, autonomy, personality limited, time sectors, message priority, desire, attitude etc. they show us as biases and our action and behaviour look like biases. (Kahneman 2012, 25)

Heuristics and biases are showing us as error messages. When human action and behaviour look like biases, there can found meaning. Although possible negative impact heuristics and biases are part of learning process. There are various forms of heuristics and biases. They can show us as form of knowledge, messages of action. When biases have recognized and classified starts learning process. Everyone has some awareness of the limited capacity of attention, and our social behaviour makes allowances for these limitations. Biases limit availability of data, information and knowledge. Systematic errors may cause also something positive. In evolution process, they have a good impact and positive outcome. Biases show us to be human being. (Kahneman 2012, 25)

Heuristics and biases have often negative consequences. Because of these negative conse-
quences heuristics and biases have bad reputation. It's not matter occur heuristics and biases
in human being or organisation the reputation is the same. Consequences of biases in organiza-
tion have determined as decreased individual autonomy and organizational mistakes. It is good
keep in mind that the hole organization supported stupidity. There are not only negative con-
sequences in biases. Heuristics and biases can also have benefits in human cognitive process as
well as in organization. Biases ensure that organizations operate smoothly. Stupidity can be
blessing for organizations, because of smoothly operations. Employees follows the organization.
Organizational stupidity is called as functional stupidity. Functional stupidity manages positive
outcomes when critical thinking is low. Because luck of critical thinking there is no development
found in organization. Luck of development in organization illustrates functional stupidity.
However, there is found that functional stupidity organizations are committed to organizational
knowledge. (Alvesson & Spicer 2012, 12)

The heuristics and biases study program has focused on representativeness and availability.
Two versatile elements, representativeness and availability, are naturally produced in human
answers to many various questions. It has focused on thinking under uncertainty. In uncertainty
representativeness and availability are limited. Biases and heuristics have specific context. It
is suggested that judgment is produced by a heuristic and biases. In case of judgment as pro-
ducer of heuristic and biases individual have these elements in all judgments. It is more naturel
that there is several locations of heuristic and biases. It is obvious that biases affect widely in
cognitive system. Binary system produces messages and other property of object ready, which
is natural location of heuristic and biases. (Gilovich 2002, 70)

Additionally, the concept of decision-making point out where the biases locate in the cognitive
process and decision-making process (Appendix 10). Research point out also the reasons why
biases are located there where they are. Additionally, based on research biases can be timed
during the decision-making process. Biases adjusted and improved research concept of the de-
cision-making (figure 7). Now biases have found their place and explanations. Therefore, logi-
cally, next chapter describes and explains how decision-making process fulfil and locate in the
concept of decision-making process.
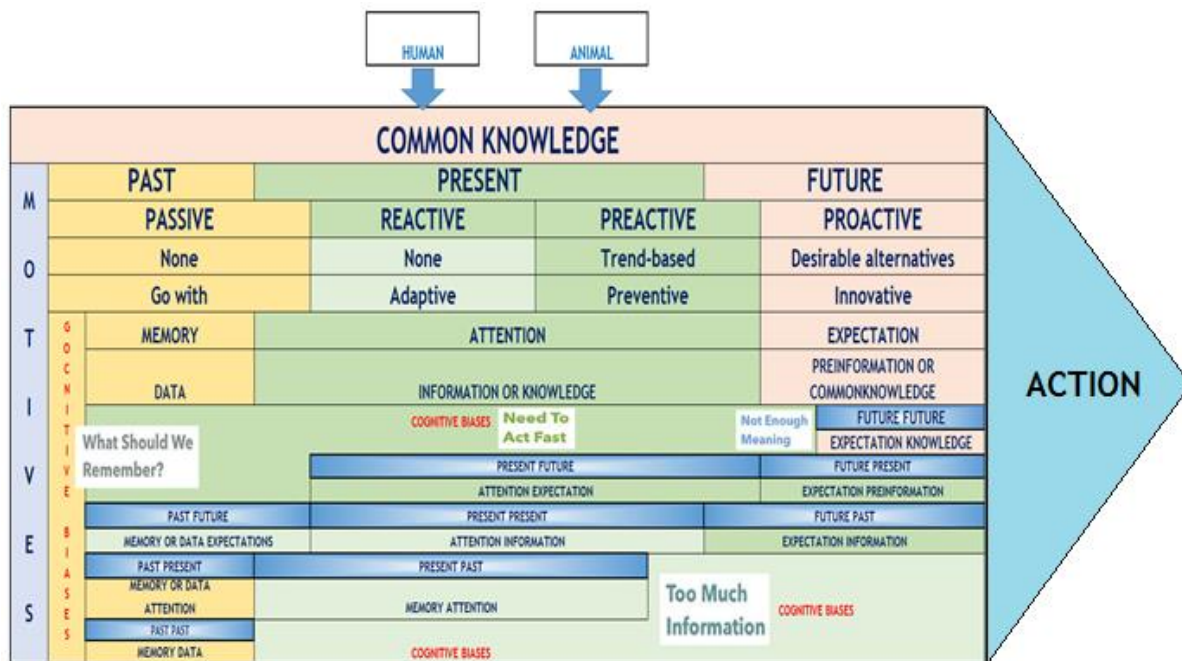
Figure 7: Biases adjusted research concept of decision-making.

5   Loop improved research concept

Research improves OODA-loop, recurring cycle of observe-orient-decide-act, which provides critical intelligence, analysis on global business, security, and technology issues. OODA-loop determines amount of information that the decision-maker needs before he or she manage the decision (Aaltonen 2010, 99).

There is on the highest point (2*a*) of the OODA-loop the place at which the decision-maker observes the outcomes of his action. The following downturn curve represents the orientation process to the new conditions and environment. Orienting processing needs maximum amount to incurve 2*a*. Decision to be made and action realize based on the provided information. (Aaltonen 2010, 100)

This lead to a decision point, as cause of behaviour, at the end base stage of curve. The rising of the curve represents acting on the decision. Research of decision-making recognize consequence of OODA-loop that claims 80% of information is received through attention (figure 8). OODA-loop adjusted and improved research concept of the decision-making (appendix 11).
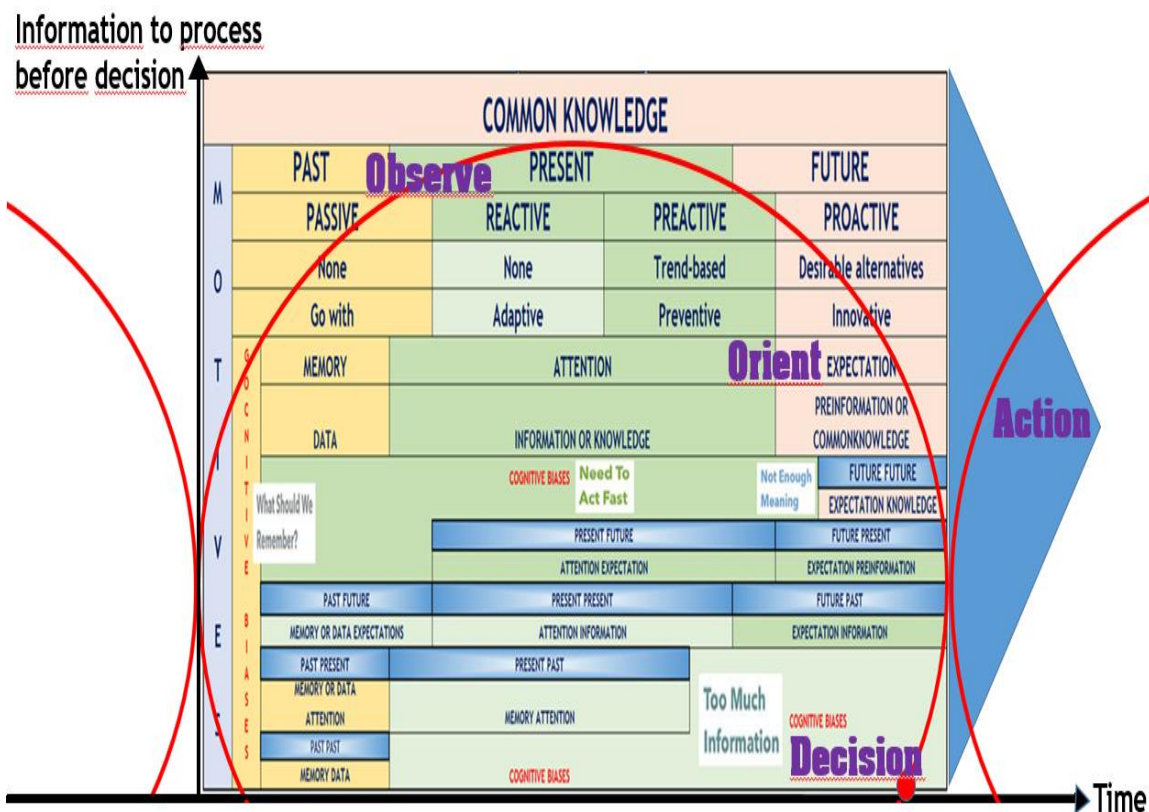
Figure 8: OODA-loop adjusted research concept of decision-making.

6   Euler's identity improved research concept

It could be one of the best and the most right mathematical formula to realize complex cognitive system is Euler's formula. Leonhard Euler born in Basel, Switzerland, in 1707 (O'Connor & Robertson 2008, 1). Leonhard Euler (1707–83) was genius and he found and knew the exponential connection to complex numbers. (Nathin 2007, 142)

Euler sent a note, dated October 18, 1740, to his professor John Bernoulli. Euler wrote that the solution to the symmetrical equation $\frac{d^2y}{dx^2} + y = 0, \quad y(0) = 2, \text{ and } y'(0) = 0$, where the prime notation denotes symmetrical, can be figure out in two ways $\begin{aligned} y(x) &= 2\cos(x), \\ y(x) &= e^{x\sqrt{-1}} + e^{-x\sqrt{-1}} \end{aligned}$. The right of Euler's report is evident by direct substitution into the symmetrical equation. There is also the evaluation of every y(x) for the given x = 0 circumstances. Euler shows the root that these two formulas are obviously so unlike the other, but factually are equal. On the other words $2\cos(x) = e^{ix} + e^{-ix}$. Mathematical formula is evident from the same note sent by Euler. In the note Euler also describes that $2i\sin(x) = e^{ix} - e^{-ix}$. (Nathin 2007, 143)

6.1   Euler's identity in research concept

Euler's formula and identity is eiθ = cos(θ) + i sin(θ). Mathematical formula is the standard for mathematical fairness. Throught the mathematical formulas, its easier to get to the heart of complex number analysis. In complex number analysis i = √−1. In the particular case of θ = π gives eiπ = −1 or, as it is often written, eiπ + 1 = 0. eiπ + 1 = 0 is fairness. Math formula is fairness because it is right even in the face of massive potential constraint. Formula is equality and is exact on the left, where is not almost to zero, but exactly zero. It is fairness. Unlike the physics or chemistry or engineering of today, which will nearly surely appear classical to technicians of the future. Euler's mathematical formula will still live for ten thousand years, because of it's fairness. Additionally formula is amazing and pure by time. (Nathin 2006, 33)

Euler's formula consists five invariable elements. Formula is eiπ + 1 = 0. The first element is number 0. The second element is number 1. The third element is the number π. π is an illogical number. π notes the ratio of the conditions of a circle to its diameter. The number π is about Number serie 3.14159 illustrates number π. The fourth number is e. e is illogical number. e notes the base of classic logarithms. e increases naturally through research of element interest and arithmetic. The fourth number e spread mathematics. It appears obviously from nowhere in a many number of significant equations. The number e is about 2.71828. The fifth number is the square root of negative one: √(-1). The fifth number is most essential of the fictional numbers. In fact there is no number, which can be made multiple by itself and manage a negative number. Negative numbers have no factual square roots. In math, there are various conditions where one is enforced to take the square root of a negative. The note is therefore used as a various of stand-in to mark conditions where this was done. (Nathin 2006, 38)

Euler's identity can be illustrated as picture (figure 9 and 10). In the picture, half circle is illustrated, when eiπ equals point of the circle (-1,0) because eiφ, 0 ≤ φ < 2π. Exponent function e^z as limit value of function (1+z/N)^N, when N come on infite. In picture N gets value points between 1 and 100, where N grow (1+iπ/N)^N to come on value point -1.
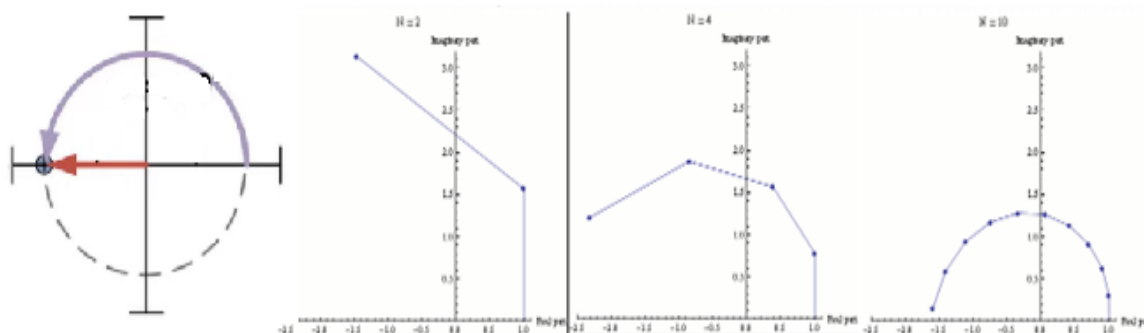
Figure 9: Euler's identity illustrated as picture

Actually eiπ + 1 = 0 is a matter of fact not an equation. An equation is a math expression of the formula f(x) = 0, for example, x2 + x – 2 = 0, which is right only for particular conditions of the variable. Math formula is the solutions of the equation. For the referred quadratic equation f(x) equals zero for the two values of x = –2 and x = 1. There is no x to solve for in eiπ + 1 = 0. This means that it is not an equation. It is not identically. Euler's formula eiθ = cos(θ) + i sin(θ) is identically, where θ is any angle, not just π radians. That's math formula with few variables. Statement of the formula is factually right for any value of the variable. There is not any changing. There is changing nowhere in eiπ + 1 = 0, because of five elememts. (Nathin 2006, 38)
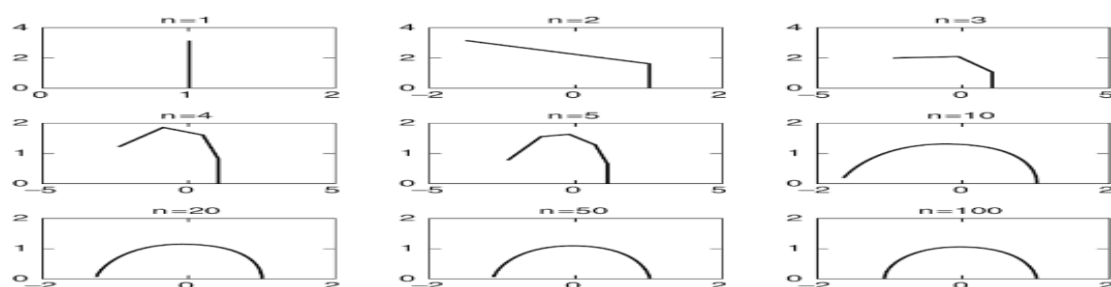
Figure 10: Euler's Identity as a limiting process

However, there are often an even figure of complex solutions. This means our third common observation about the solutions to zn – 1 = 0. There are often an even figure of complex roots, and since those roots are obviously timed a circle focuced on the origin, then by circle half the complex roots are on the top half of the circle, and half are on the bottom half. Likewise by circle, we can lead that each root on the top half is the conjugate of a root on the bottom half. For instance, presume n = 5 and we are discussing about the roots of $z^5 - 1 = 0$ (figure 11). Since n is approximately, the only right root is +1, and the other four roots are complex. Those four roots are $z_1 = e^{i360° \cdot 1/5} = e^{i72°}$, $z_2 = e^{i360° \cdot 2/5} = e^{i144°}$, $z_3 = e^{i360° \cdot 3/5} = e^{i216°}$, $z_4 = e^{i360° \cdot 4/5} = e^{i288°}$. (Nathin 2006, 80)
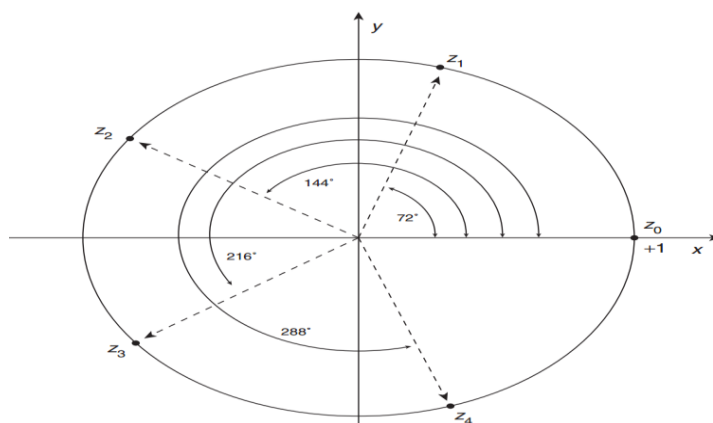
Figure 11: The solutions to $z^5 - 1 = 0$

6.2   Euler's identity adjusted research concept

It is found that the most beautiful math solution is not absolute (figure 10). Despite of limitations the formula is usefull to illustrate functions in complex circumstances. Euler's mathemathical formula and identity fullfill perfectly the concept of the decision-making process. Euler's identity can be replaced with a solution $z^5 - 1 = 0$ (figure 11). Euler's identity show us the idea how complex things like thoughs, data, memory, attention, information, knowledge, expectation, innovation, common knowledge have picked up and collected in our cognitive system for analysing, solving, reasoning, messaging, decision-making, judgement, and finally action and behaviour in decision making process of human being. (Nathin 2006, 33)

One of the most interesting found in Eulers's formula is that ability of information collection is infinity. Infinity common knowledge means that data, information and knowledge are available to all of us, has been existed evermore and to be existed for ever from today onwards through. Based on Kant's (1900) philosophy the communication in existing conditions can be undertaking and renewing. Kant adviced that communication process is producted by self-questioning. The usage of (common) knowledge is individual and subjective due to one's limitations. Euler's identity confirms that data, information, knowledge and common knowledge are available and it's limited available to us like exponent function e^z as limit value of function (1+z/N)^N, when N come on infite, shows us. In that picture (figure 12) N gets value points between one and hundret. In the picture N grow (1+iπ/N)^N to come on value point -1. (Nathin 2006, 38)

Single or a few picked information points may lead biase messaging, not enough meaning, or analogously picked up huge number to infinity information points can lead biase messaging, too much information. As described earlier, picked up information points have manipulated many ways, before them stored in the cognitive system for usage of human being. Concerning memory based information the question is not do one's have manipulated memory rather how much manipulated memory one's have. (Aaltonen 2010, 122)

Euler's idetity confirm and fullfill also OODA-loop and it's principles. The resulting wave has a wave length. It is calculated to be 2πa. Wave goes along the time in axis and along the information in y-axis. Y-axis basically refers to the amount of information. Decision-maker needs to collect sufficient amount of inforamtion before to making the final decision. The highest point of the curve of the OODA-loop is the observing point. At observing point decision-maker observes the outcomes of his action. The following downturn instead represents the orientation process. Orienting process illustrates orienting to existing circumstancea and coming environment. Orienting process phase at it's maximum amount is 2a. Orienting process at it's end lead to a decision point at the base of curve. There is the rising curve of behaviour and action in the end of OODA-loop. (Aaltonen 2010, 100)

Decision making process, observe, orient, decide and act, is real. Decision-making model can be confirmed by mathematical formula of Euler's identity. OODA-loop information points are limited available to us like exponent function e^z as limit value of function (1+z/N)^N, when N come on infite, shows us. In that picture N gets value points between 1 and 100, where N grow (1+iπ/N)^N to come on value point -1. (Nathin 2006, 38)
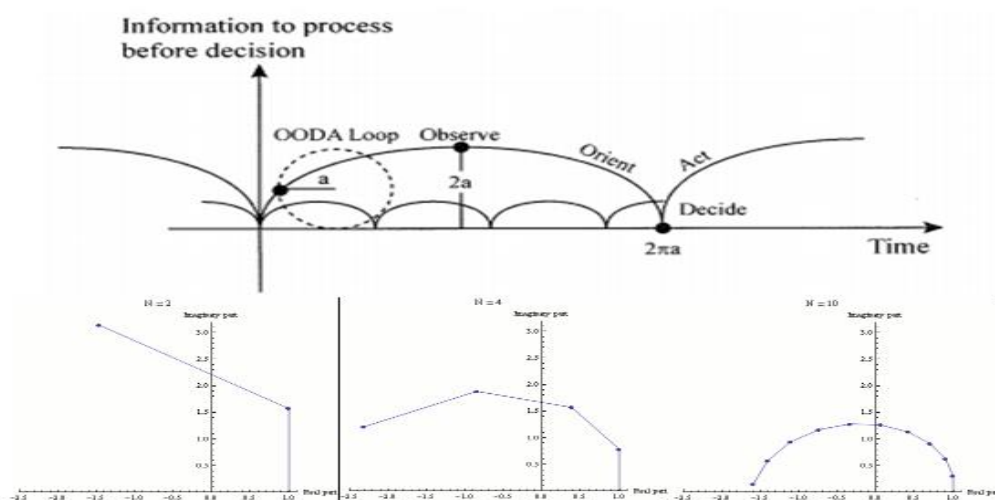

Figure 12: Euler's identity and OODA-loop

Euler's identity (figure 12) get its circle format in the solution $z^5 - 1 = 0$ (figure 11). OODA-loop mixed Euler's identity, fulfil and improve the concept of decision-making process with the solution for complex situations (figure 13).
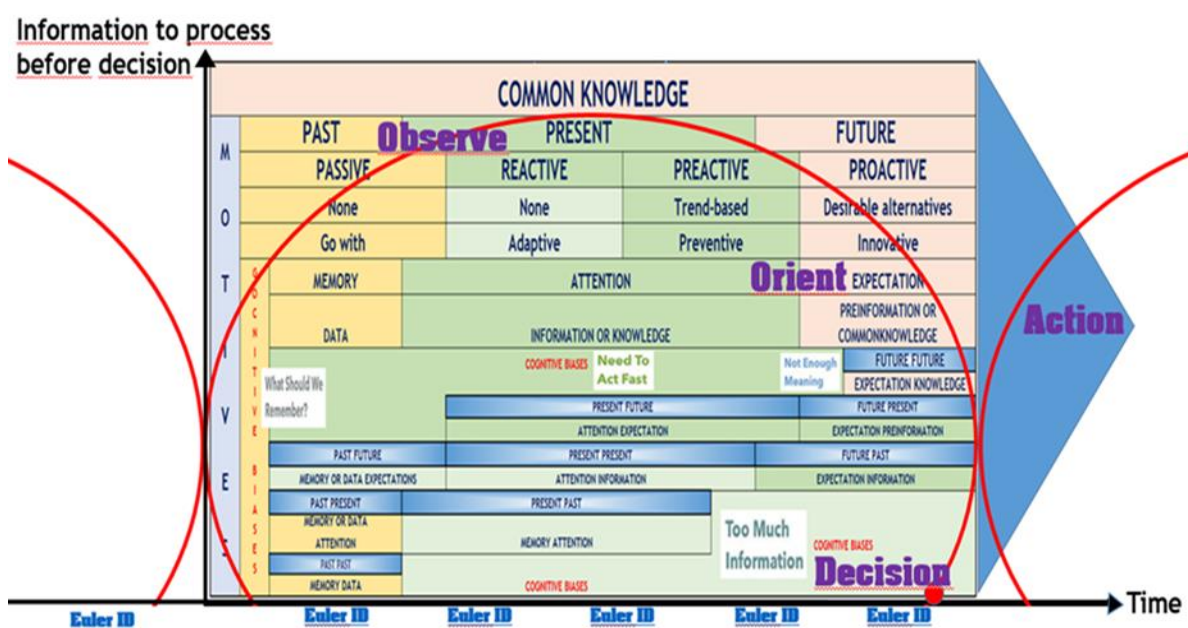
Figure 13: Euler's identity adjusted research concept of decision-making.

Research improved OODA-loop to its final format (figure 14). Now the research model can provide better critical intelligence, analysis and insight on global security, technology, and business issues (appendices 12-13). In the next phase constructed loop to be improved in practice.
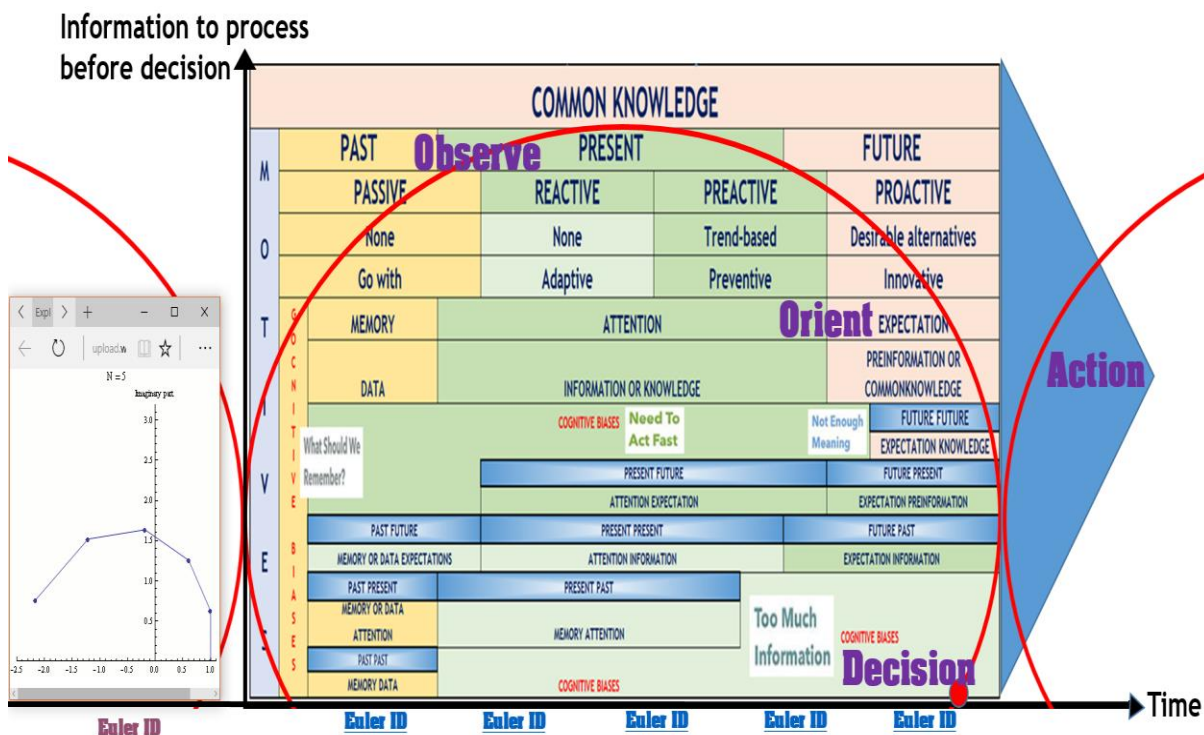
Figure 14: The improved model of decision-making process.

7   Improving research concept in practice by theme interviewing

Constructive research has developed for business economics and business model planning. Constructive research method can be illustrated as creating innovation or service design. Constructive research consists designing, conceptual modelling, implementation of constructed model and practice testing of the model. Research method can be applied widely.

Questionnaire form with planned questions to be managed ready. The form should be easily completed. An open space should be reserved for open answers. The greatest advantage of the interview is the flexibility in collecting the material. (Hirsjärvi etc. 2009, 204) Theme interviewing implements constructed model in practice, in corporate decision-making. Research probes and concentrates individual decision-making process.

7.1   Theme interview based on decision-making loop

Key results of the empirical decision-making research are described and illustrated in this chapter. Empirical research of decision-making based on OODA, recurring cycle of observe-orient-decide-act, decision-making model. Research have managed by interviewing people in different

age. In interviewing people described their knowledge about cognitive biases and decision-making process. Finally, they have drawn and written key elements of their decision-making process in layout adapted from OODA-loop. Interviews and inquire have managed in May 2017. Decision-making inquiry, interviewing form and some of drownings have attached in appendices (appendices 14-18).

7.1.1 Theme interview of individual decision-making

Decision-making is an individual process, which lead wanted action and behaviour. However, there are similarities in decision-making process between man and women, but especially in among answerers of the same sex. Both sex is interested in decision-making. Some women impress that they are slow or very slow in their decision-making process or need friend to support in their decision-making process. Anyway, final decision of both sex has done independently.

As part of interviewing and inquiry, answerers have listed key elements of their decision-making process. There has not found any delay to find key elements effect on people's decision-making process. This is simple evidence that people justify their action and behaviour immediately in most of cases, meaning that judgement is autonomous and based on structural, experienced, motivated, attitude, secured way of thinking. Usage of system1.

Answerers mentioned that considering of costly decisions like buying luxury foodstuff, clothes, insurance, furniture, car or residence takes longer time of period. Some object's negative or threatening effect on subject cause deeper analysing. This refers usage of system2 (appendix 18).

It is good to keep in mind that messages of basic motives are more clear and stronger. Object's negative or threatening effects influence on security basic needs, which messages are more clear and stronger and are not depending welter system, system1 or system2, it comes from. This also influence on action and behaviour. Here listed some key elements of decision-making process: time, self-interest, benefit, and money, and feeling, state of mind, experience, history, collected information, knowledge and intuition.

7.1.2 Theme interview of individual observing and orienting phases

Both sex have described observing phase carefully. They have mentioned to collect a lot of data, information and knowledge based on their decision-making process. Normally data, information and knowledge phase have drawn upward trend. Decision-makers, especially women, have described up warding trend of observing phase with words strong feeling, feeling of emotion or sensation. This confirm and fulfil description of OODA-decision making process.

Women illustrated beginning of observing phase in many options, alternatives and fragments, which lead to one outcome, the highest point of her decision-making process. Older women have drawn more fragments beginning of observing phase than young women. Meaning of this is that woman trust-observing outcome as result of her decision-making process.

Normally, in drownings' upward trend highest point have illustrated in middle of decision-making process. As told earlier the highest point of the curve is the point at which the decision-maker observes the outcomes of his or her action. This means that people recognize his or her outcome of coming decision.

Almost in every women's drownings, decision-making process end in the highest point of the decision-making process. Woman judgment her action and behaviour based on observed outcome result. Orienting in unique environment and existing conditions have ignored not totally but subconsciously.

Men illustrated observing phase as linear line. Men have described to collect data, information and knowledge for their decision-making, which equate women's description. Men's upward line have highest point, but line continues in decision-making point at close of action without any cut. Most of men's drownings illustrate that after highest point start unstable downward trend. Men have recognized observing outcome and decision as separate function. Men's decision-making process have illustrated straightforward, generalized and simplified. Men observe coming environment and existing conditions, which affect significantly on final decision.

7.1.3   Theme interview of individual bias phase

Research found that almost everyone has named biases and recognized them. Common, folksy, names for biases are person's own benefit, fallacy or interpretation.

Women have recognized biases better than men do. Based on interviewing women feels better in social behaviour and recognizing herself, but also accept non-logical thinking and behaviour. Biases may be also, still, cultural and society more allowed for women than men.

Alarming is that all have recognized meaning of biases, but not have recognized own ones in themselves (figure 15). Some one of third men, one of seven answerers, have not recognized any cognitive biases in his behaviour or action. This research result is alarming. Unrecognized biases and non-reflection action and behaviour may lead to problematic behaviour or Machiavelli's, where aims sanctify actions and behaviours. Result illustrates working environment in which interviews and inquiry have managed.

Women's ignoring of orienting phase in decision-making process can also be recognized unrecognized biases and non-reflection actions and behaviours. Result illustrates working environment in which interviews and inquiry have managed.

Further all answerers have noticed biases on other people. There has not found any difference between men and women, both equally have not recognized biases on other people. Result illustrates working environment in which interviews and inquiry have managed.
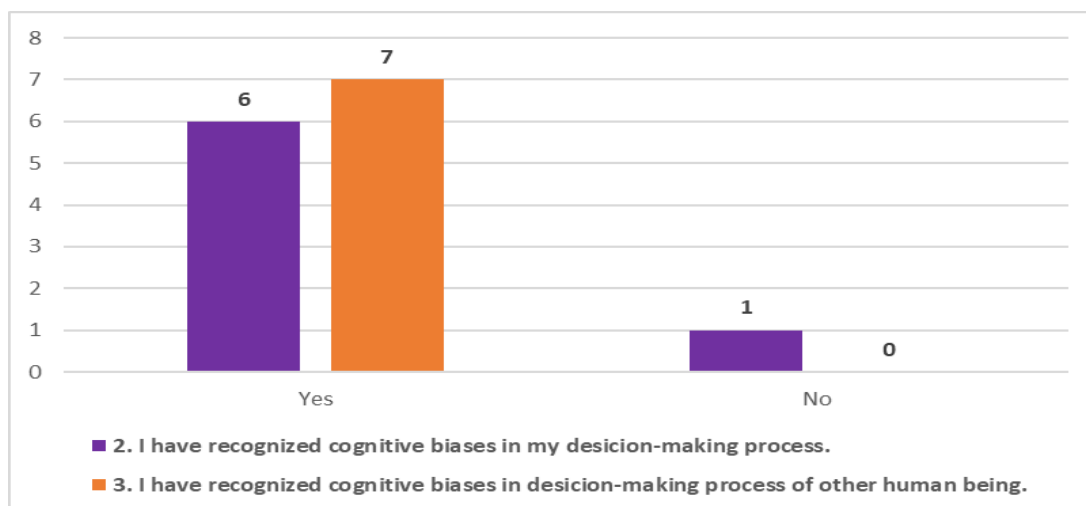
Figure 15: Theme interview in practice found biases in individual decision-making

US-sceptic Michael Shermer (1997) argues in his book Why People Believe Weird Things, that highly intelligent people may be even ordinary people more prone to fall on their cognitive biases (Hamilo 2013, 1). Smart people are in fact the most adapt to come up with good reasons for their beliefs, which they have originally ended up just for reasons other than through rational reflection and a balance of interests - for example, childhood home, peer pressure or extraordinary life experiences (Hamilo 2013, 1).

Even worse can be, because of many irrational company and organization. There found a lot of non-rationality in organizations. We should be concern of these organizations due to limitations to think as individual. Functional stupid organization waste cognitive capacities. According to the researchers' documents because of cognitive limitations the company may be labelled semi rational or irrational organization. Serious forms of irrationality illustrate unconscious elements etc. groupthink. Groupthink increases dreaming in organization. Semi rational companies and organizations can move to rational or irrational direction. Purely stupid organization is lost. In purely stupid organization processes do not work because of lazy employees. Common name for organization stupidity and groupthink can be functional stupidity. (Alvesson & Spicer 2012, 12)

Subsequent research has confirmed the existence of the phenomenon, at least in the American culture of the management. Ignorant remain ignorant of their own ignorance, because they do not recognize the feedback, to show them are wrong. This phenomenon is now known as the Dunning-Kruger (1999) effect. (Hamilo 2013, 1)

None of answerer's have illustrated biases on their decision-making process. Some men illustrated that from point of observe to point of decision linear line is unstable. Meaning of this is that uncertainly or adapting new objects have taking account in decision-making process in close of decision point.

7.1.4 Theme interview of individual judgement and action phases

Both sex have not mentioned or described judgment as part of their decision-making process. This means that judgment is automatic function of people's decision-making process, when they use system1. Usage of system2 based on analysis and therefore judgment based on justifiable and reasoning analysis.

Earlier stated that women judgment action on the highest point of decision-making process, which means that judgement based on observing outcome (Aaltonen 2010, 100). Men judgment have illustrated close to action meaning that judgement based on observing, but longer time of period observing side by side orienting environment and existing conditions. Environment and existing conditions affect significantly on men's final decision.

Men have illustrated that orienting phase is down warding trend. Down warding trend have also curves or turnings, which means feeling of uncertainly or influenced of new object on close of decision-making point. Men adjust final decision on environ and existing conditions. There are also found some divergent drownings in among answerers. Drownings illustrate more problem-solving process than decision-making process. Drownings related to arts, which may mean more imaginary and fictional decision-making process than real and factual decision-making process.

Action and behaviour illustrated wanted outcome of decision-making process. Always outcome of decision-making process is not same as wanted outcome. This lead frustrating and regret. In this point, it is good to realize that human can only be frustrated, disappointed and unsatisfied for his or her own desires. Theme interview in OODA-decision making process fulfil the concept of decision-making. Research have recognized and confirmed phases of theme interview in OODA-decision making process.

7.2 Theme interview in practice adjusted research concept

The connection between theory and empirics is essential. The research comes from the findings that are made of the real world. Theory is verified in the real world. The link between the theoretical starting points and the results obtained. (Hirsjärvi etc. 2009, 144) It more than clear that through individual decision-making human aim to more meaningful life. Cognitive messages act as part of motivation (desire/believe)-justification-action guide to more meaningful life. Human behavioural statement is mostly defined by what individual attend to, and what he or she normally orienting on current environment and existing conditions (table 4).

Speaking about individual well-being experience. The experience of the moment can easily represent happiness or sadness values. Experience of the moment depends primarily on the current situation and how the current situation has observed. Attention is the key! How we explain these decision for more meaningful life to ourselves? Normally simply explanation justify the action, satisfaction of basic needs and feeling of security continuity. Decision, simply, is an individual subjective statement about his or her security feelings, feelings of security continuity, in existing conditions. Individual security continuity feelings in existing conditions has essential effect on possibilities to manage next distraction barrier of effective action.

First of all, I want to hear opinions, ideas, and experience. I try to put together the facts for decision making: as much as possible to base and research data. If the decision affects people, really listen to the people involved. I can not draw that process without the help.

Different matters, different information, discussion-listening-information-justice-related issues to the end result

Feel the fairness of the matter and different facts

need-availability-quality research and decision-making

Design-ready idea-work steps implementation

First I'm looking for information and asking people. Then I'll figure out what would be reasonable and what would be useful. I make a questionnaire. Voting decisions are made by other members of the organization

I use the information obtained from different sources, but will not always think or control when this information or new information affects the final decision

Table 4: Individual description of decision-making data, information and knowledge

8 Testing and test results of improved model of decision-making

Reliability of the survey means the reliability of measurement results. Another concept related to evaluation of the research is qualification. Qualification means the ability of a research method or meter to measure just what is meant to measure. (Hirsjärvi etc. 2009, 231) Research participants were participated in questionnaire where research and theme interview reliability can be measured (appendix 19).

Interviewing participants compared OODA-loop and theme constructed decision-making model to their drawings. They inform separately compared similarities between their drawings and OODA-loop, theme constructed decision-making model, timeframe description and biases description in constructed model to questionnaire form. Reliability questionnaire was hold in September 2017.

8.1 Test free message field

Two of six answerers, never replied. Two of six answerers, replied that comparing their drawings to OODA and constructed model is too difficult or hard, that they are not able to manage it (table 5). They assumed that they know only few of the subject meaning the best reply would be: "I cannot say" or "I do not understand".

We saw with Tiina that it is so difficult and we can not say anything reasonable about this. I would have responded to that question "I can not say".

We looked at with Timo but I have to say it's so hard that we can not say anything sensible here. I would have responded to that "I can not say" or "I do not understand" questionnaire.

Table 5: Reliability free message field

8.2 Test comparing loop and improved model of decision-making

Some third of answerers see comparable things between their drawings and OODA-loop. Additionally, more than third of answerers met comparable things between their drawings and constructed model of decision-making process.

8.3 Test comparing timeframe in loop and improved model of decision-making

Further one of six of answerer figures comparable things in timeframe description between their drawings, OODA-loop and constructed model of decision-making model. Also, one of six of answerer didn't see any timeframe description similarities between his drawing, OODA-loop and constructed model of decision-making model.

8.4 Test comparing biases in loop and improved model of decision-making

Likewise, one of six of answerer see comparable things in biases description between their drawings and constructed model of decision-making model. As well one of six of answerer didn't see any timeframe description similarities between his drawing and constructed model of decision-making model.

9   Reliability of research and improved model of decision making

The study aims to avoid mistakes, but the qualifications and reliability of the research results vary. All studies aim to evaluate the reliability of the study. The reliability of the research can be established if two evaluators are in the same result. All the studies also attempt to evaluate the validity of the study. Validation can be seen by testing, for example, a constructive model in practice. The test results are compared to the original model and the study's perspective. The reliability of qualitative research is increased by the researcher's report on the implementation of the research. (Hirsjärvi etc. 2009, 231-232)

9.1   Reliability of progress of theme interviewing and test questionnaire

The survey interview and questionnaire are reserved for time. About the interview, the purpose and concepts of the research are summarized. The examinee fulfils the questionnaire and draws the OODA-loop, recurring cycle of observe-orient-decide-act, and base form with his own personal decision-making model. The questionnaire can also be fulfilled in as a network survey. Drawing from personal decision-making is returned to the researcher.

Example text of invented message: You are invited to fill in the form! Your answers are valuable! Please, give your answers online or by sending email to luomaar@gmail.com. Link to inquiry: https://sites.google.com/view/motivaatio-liiketoiminta-luoma/common-knowledge. This is inquiry for master degree thesis of security management at Laurea University of Applied Sciences. In case further information needed, please, do not hesitate to contact luomaar@gmail.com.

Testing questionnaire have managed like survey interview. Both webpage and personal test replies are possible. Example text of PPO-Elektroniikka Oy – comparison inquiry: I have invited you to fill out a form: PPO-Elektroniikka Oy – comparison. Hello, people of PPO, thank you for taking part in my master thesis at the Polytechnic of Security in my decision-making question section. Comparative data is also needed to complement the research material. I kindly ask you to answer any of the nominated questions. I will go through the questions with you tomorrow, 12.9.2017. You can also answer the questions on the websites that you have received a login link. The answer takes your time to five (5) minutes. Thanks for your help and co-operation!

9.2   Seminar feedback and reliability

During the research, both the students and the experts of the field may be heard by the researcher. The researcher may have to give oral explanations on the research process of the research, as well as information and feedback on the subject, problems and results. Seminar

or congress presentations: both describe the research briefly but informally, highlighting its most important aspects. (Hirsjärvi etc. 2009, 238)

As part of master thesis program there is one thesis seminar where researcher publicly presents his thesis. Master thesis seminar was hold on 7.9.2017 in Laurea Leppävaara campus, where were presented and represented master thesis tutor professor and master students of Security management and Leadership in decision-making programs.

Professor pointed out thesis formal requirements, which have now implemented into thesis. There was interesting discussion of thesis reliability in the seminal. Thesis constructed splendid model, but do answerers understand the wholeness or even single part of holiness, appeared thoughts. Students' opinion was that the answerers didn't understand the wholeness, because the model was complicated and need tight focus and concentration to understand the wholeness and every single part which affect to the wholeness, even for master Leadership in decision-making program students. Professor shared students' opinion that wholeness of constructed decision-making process is complex and need deep acquaintance to the subject. Idea of the model is great, but opening the secrets of the model need know-how and expertise.

Reliability questions support seminar audience's opinion that it is easy to draw a model of decision-making, but understanding the process and theory is difficult and hard. This was the reason why two of six answerers didn't reply to reliable questionnaire and another two of six answerers replied: "I cannot say" or I do not understand".

9.3   Corporate feedback and reliability

In many stages of the writing process, it would be important to have other views on the text. When discussing both the given and feedback received, and when discussing with others, the researcher learns to identify and evaluate the texts of the research. The researcher needs the skills of a critical, but reckless, feedback in the various phases of his research, especially when designing the theoretical background and writing conclusions. (Hirsjärvi etc. 2009, 49)

Corporate statement announced that: "You've done a lot of excellent work here". Thesis theory subject is not familiar with us; therefore, it is not worthwhile to comment the theory when we cannot say sensible words.

10   Conclusions

A constructive research has been developed specifically in the field of business economics (Lukka & Tuomela 1998, 23). Thesis demonstrating (figure 1) new value and innovation in format of constructed model of decision-making process (figure 5-8). The core concept of the

research product, new construct, is an abstract concept with a large, in fact, endless number of possible realizations (Lukka & Tuomela 1998, 23). Construction work has done independently with demanding expert skills and showing that theatrical knowledge and practice can be combined in one model (figure 13-14). Constructive method has characterized by the fact that researcher has not found, but has invented and developed (Lukka & Tuomela 1998, 23). Reliability questions support seminar audience's opinion that it is easy to draw a model of decision-making, but understanding the process and theory is difficult and hard. The constructed model endures critical analysis and opinions together with goal-oriented and communal way. However, the research wholeness and constructed model of decision-making is complicate, need tight focus and concentration to understand.

It's said that OODA-loop is one of the most perfect model of decision making. Model is designed for complex circumstances and used for profiling employees, workers and pilots. OODA-loop illustrates multiple elements and different time-scales. (Aaltonen 2010, 99) Because of this research, the elements (figures 2-4, tables 1-3) affecting decision-making have been arranged in their own place in the decision-making process (figure 14). Decision-making as part of cognitive system consists conscious elements and messages, which lead and order actions and behaviours to the way or another (Kahneman 2012, 7). In the research each element of decision-making has found their places and for the good reasons. Theme interviewing in practice claims that both sex is interested in decision-making and the final decision of both sex has done independently (appendices 15-17).

In complex circumstances, particularly in unusual conditions, people feel wary. Self-conscious in observing phase lead clear marks of conditions in surrounding environment. It demands attention inside human's binary system. (Kahneman 2012, 33) Cognitive messages have their own place in the human structure. It is not unusual for messages to play a key role in decision-making process: to manipulate, forget, remove, add, change, import data, information and knowledge to the bottom of our decision-making (figures 9-12). Go with as corresponding state refers to passive attitude (table 1) (Aaltonen 2010, 122). It found enormous amount of irrational decision-making in organizations and companies. This irrational decision-making to be recognized. It reminds us, all of us, of our limitations. Intelligent should be mobilized, not limited, in companies and organizations. (Alvesson & Spicer 2012, 12) As supportive element it's found that chances of groupthink increase rapidly when decision-makers are in crisis conditions or under stress. Circumstances lead decision-makers to think messages of threats. Threats refers to their self-esteem in complex circumstances. (Hart 1991, 256) Cognitive messages (figures 5-8, appendices 3-4, 10-11) are therefore a motivation-action-justification guide for more meaningful life (figures 13-14).

10.1   Research results support decision-making in practice

Conclusions of interviewing's results support theories of decision-making (OODA), biases (Daniel Kahneman) and cognitive system (Daniel Kahneman). Theories have practice base, tested in practice and currently in use in business. However, questionnaire and questionnaire replies did not meet all the requirements for a successful survey. Part of the reason is a small survey. Anyway, the results of the survey are indicative.

Invisible binary system illusions can be found through system messages (Kahneman 2012, 25). Concerning messages people may feel that they have too much or less information available at the same moment (Alvesson & Spicer 2012, 8). Motivation (appendices 1-2) appears as various formals of desire (Reiss 2001, 17). Among answerers of research inquiry alarming is that all have recognized meaning of biases, but not have recognized own ones in themselves. Some one third of men, one of seven answerers, have not recognized any cognitive biases in his behaviour or action (figure 15). In cognitive system, system two, has not control over heuristics and biases. System two don't recognize heuristics and biases, which lead messages to the biasing influence. (Kahneman 2012, 126) Binary system biases and heuristics, and another desire and cognitive limitations and barriers have influence on rational-decision and decision-making. All standard solutions in decision-makers cognitive system face difficulties, because of heuristics and biases. (Hart 1991, 279). Research found supportive elements for statements that even highly intelligent individuals are falling on their cognitive biases. It assumed that highly intelligent people explaining even the worst happenings and things better way for everybody. According to interview's highly educated people are doing well with their book data and explanations in routine situations, but not in rapidly changing problem situations where is not enough standardization, but practice solutions are needed.

Supportive results for OODA-loop are drawings (appendices 15-17), which adapt the figure of the loop. In research test experience part, some third of answerers see comparable things between their drawings and OODA-loop. In drawings can be found the highest point where the outcome of the decision-making process can be found (appendix 15). Especially drawings of men support orienting phase of the loop (appendix 16). Decision-maker observes the environment and collect relevant information. Orient himself to becoming circumstances and environments. Orienting phase effect on final decision and act follows the decision (Aaltonen 2010, 99). Seminar claims that wholeness of constructed decision-making process is complex and need deep acquaintance to the subject. Idea of the model is great, but opening the secrets of the model need know-how and expertise.

Cognitive system (figure 4) can be described as apriori and aposteriori (Lachs & Talisse 2008, 1). Daniel Kahneman (2012) suggested that human cognitive system is binary system, which is divided to system one and system two (Kahneman 2012, 26). There was not any mention of

judgment in the drawing (appendices 15-17), which refers usage of system one. Answerers mentioned that considering of costly decisions like buying luxury foodstuff, which refers usage of system two. Additionally, research found divergent drawings (appendix 17), which illustrate more problem-solving process than decision-making process. Usages of systems one and two are supportive result for Daniel Kahneman's researches.

Illusions can be visual or invisible (Kahneman 2012, 29). Research found that people have commonly recognized biases (appendix 5) as one's own benefit, fallacy or interpretation (appendix 18). This is only outside and visual part of biases. The thesis suggested that cognitive biases are systematic system errors and error messages (appendices 5-9). The system error message is the perfect determination for messages, because of the nature of biases. Observing, understanding and learning system error messages are possible after recognizing them. It is recognized that self-managed learning processes produce correction in habits, why not in biases. Both should have recognized and determined before self-managed learning process. (Habermas 2003, 13) Ignorant remain ignorant of their own ignorance, because they do not recognize the feedback, to show them are wrong (Hamilo 2013, 1). These are supportive results for Daniel Kahneman's researches of biases.

Time is a subjective condition of human intuition. Time sensuous demand attention of the objects affect to us (Kant 1990, 31). Many of us assume that people are living at the same timeframe with other people (Aaltonen 2010, 6). Time concept was crucial research element, but not the subject of the research. Unfortunately, research not found any supportive results for time classification (appendix 19). In research test experience part one of six answerers, one of six answerers didn't, figure comparable things in timeframe description between their drawings, OODA-loop and constructed model of decision-making model. However, it is possible to determinate timeframe mathematically in OODA-loop (figure 3) and research improved model of decision-making (figure 14).

Explanation and decision-making in human cognitive system (figure 4) has illustrated to locate on top left by Hudson (2003). This support Kahneman's (2012) understanding of system one. From researcher's point of view, the biggest achievement of the thesis is the constructed model of decision-making process (figure 14). Improving of decision-making model has been time and knowledge demanding design work and determined construction, where every single pieces and elements affection on the decision-making process are illustrated in one model phase by phase. Improves decision-making model has been worth of demanding work. Hope that innovative and informative constructed model of decision-making reach the audience and professionals, inspirits them and sprint their research works for success.

10.2   Findings of the research

There is speaking about individual well-being experience and how answerers explain clear stories on base of moving forward for more meaningful life in research test experience part (table 4-5)? Decision-making, observe-orient-decide-act, is continuous process attempt to recognize, realize and make sense of the existing conditions (figure 2-3), face and solve another upcoming barrier of effective action. Euler's statement is eventual evident of direct substitution into the differential equation. In differential equation the evaluation of each y(x) for the given x = 0 conditions (Nathin 2007, 143). In symmetry, which is circle, researcher can recognize each root on the top half of circle, but also conjugate of a root on the bottom half of circle in formula $z^5 - 1 = 0$ (Nathin 2006, 80). Thesis constructed model of decision-making is recurring cycle of observe-orient-decide-act as well the original OODA-loop is.

OODA-loop information points are limited available to all of us like Euler's formula suggest (figure 9, 10 and 12). Based on theme interview it's found that always when you manage a decision, you can move forward to face another need of decision. Decision, simply, is your subjective statement about your security feelings, feelings of security continuity, in existing conditions. Feelings of security continuity in existing conditions has essential effect on possibilities to manage next distraction barrier of effective action.

Another research finding is time scale. St Augustine found philosophy of time conscious, which based on causality in the nature (table 3). People recognize traditional timeframe as past, preset and future. (Aaltonen 2010, 6) Research illustrated aptly the understanding of past, present and future as present past, present present and present future are complemented with past past, past present and past future as well as future past, future present and future future. Euler's identity (figure 9-12), which illustrates complex situations, fulfil the time-based cognitive processing and decision-making processing of human being (figure 13-14).

Research improves OODA-loop with elements of decision-making process (figure 14) and Euler's identity (figure 12). Although even the most beautiful mathematical formula is not absolute, it is still useful to illustrate complex functions as it stands. The most beautiful mathematical formula, because of its limiting process, can be replace with the solution $z^5 - 1 = 0$, which correct Euler's formula evenly spaced around a circle centered on the origin, then by symmetry half the complex roots are on the top half of the circle, and half are on the bottom half (figure 11).

10.3   Evaluation of the research

The thesis has constructed and described the model of decision-making as presented in the research question. The grand new model of decision-making has been demanding work from the researcher. A lot of theoretical and empirical material have been combined for innovative and proactive model.

Existing conditions in security business are changing rapidly. Field operations' and emergency centre's (headquarter) employees need to manage right decisions based on individual's attention in existing conditions in limited time. Constructed solutions enable to find new capacity for immediately implementation in security business.

The model presented in the thesis can be universally applicable. Most of the model stages are in general level, but they can be opened and applied for the selected environments. The model has many open options left, because of the subject was limited to human decision-making process and motivation quantitate question patterns was out of scope. Overall, the research has been a success and it has provided additional information and improvement in the field of decision-making.

10.4   Future research opportunities

People are trying to make life more meaningful! Usually cognitive system of human being produces practical problems in working life. Recognizing the hiccups in early stage, everyone can participate in satisfaction and workplace spirit. Results of the research as well as question pattern have various usage possibilities. Recognizing of weaknesses and strengths in decision-making, especially in complex situations, is essential in security business.

Education and instruction of professionals and experts are one of the future research opportunities. Interviews for work is the most common usage of personality pattern. Sport and entertainment professionals have need to know deeply one's personality and potentials. Development of oneself is easier when knows better who I am.

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Figures

Tables

Appendices

Appendix 1: Basic Desires

BASIC DESIRE	EVOLUTIONARY (INSTINCTUAL) BASIS	ASSOCIATED EMOTION	BEHAVIOR
Power	Dominant animals push others away from food	Competence, influence	Leadership, achievement
Independence	Animals leave nest, increasing area over which food is sought	Freedom	Self-reliance
Curiosity	Animals like to explore novel stimuli	Wonderment	Truth-seeking, problem-solving
Acceptance	Unclear	Self-confidence	Assertive behavior
Order	Animals have instincts to lick or clean themselves	Security, stability	Makes many rules, clean, "perfect," compulsive
Saving	Hoarding of food or essential supplies	Ownership	Collecting, frugality
Honor	Avoid being stared at or singled out—keeps animal close to herd	Loyalty	Character, morality, principled behavior
Idealism	Altruism	Compassion, sense of justice	Social causes, fair play
Social Contact	Herd instinct	Happiness, belonging	Party, join clubs/groups
Family	Maternal/paternal instincts	Love	Parent, homemaker
Status	Attention helps survival in nest	Self-importance, superiority	Concern with reputation, showing off
Vengeance	Aggression	Anger, hate	Revenge
Romance	Reproductive sex	Lust, appreciation of beauty	Sex, courting
Eating	Hunting instinct	Hunger	Eating, dining, cooking
Physical exercise	Strong animals survive	Vitality	Physical activity, participatory sports
Tranquility	Animals need to avoid danger to survive in wild	Safety, sense of peace	Avoids stressful situations

Appendix 2: Basic Desires and end goals

BASIC DESIRE	END GOALS
Power	Achievement, competence, leadership
Independence	Freedom, ego integrity
Curiosity	Knowledge, truth
Acceptance	Positive self-image, self-worth
Order	Cleanliness, stability, organization
Saving	Collection, property
Honor	Morality, character, loyalty
Idealism	Fairness, justice
Social contact	Friendship, fun
Family	Children
Status	Wealth, titles, attention, awards
Vengeance	Winning, aggression
Romance	Beauty, sex
Eating	Food, dining, hunting
Physical exercise	Fitness
Tranquility	Relaxation, safety

Appendix 3: Research concept of relationship between time and decision-making

MOTIVES	TIME		INFORMATION		ATTITUDE	
	FUTURE	FUTURE	EXPECTATION	COMMON KNOWLEDGE	INNOVATION	PROACTIVE
	FUTURE	PRESENT	EXPECTATION	PREINFORMATION	IDEA	PROACTIVE
	FUTURE	PAST	EXPECTATION	INFORMATION		PREACTIVE
	PRESENT	FUTURE	ATTENTION	EXPECTATION	AFFECT	PREACTIVE
	PRESENT	PRESENT	ATTENTION	KNOWLEDGE	JUDGEMENT	REACTIVE
	PRESENT	PAST	ATTENTION	INFORMATION		COGNITION
	PAST	FUTURE	MEMORY	EXPECTATION	AFFECT	ACTIVE
	PAST	PRESENT	MEMORY	ATTENTION		COGNITION
	PAST	PAST	MEMORY	DATA	ADAPTIVE	PASSIVE

CONATION / ACTION

Appendix 4: Binary system adjusted research concept of decision-making

Appendix 5: Codex of cognitive biases
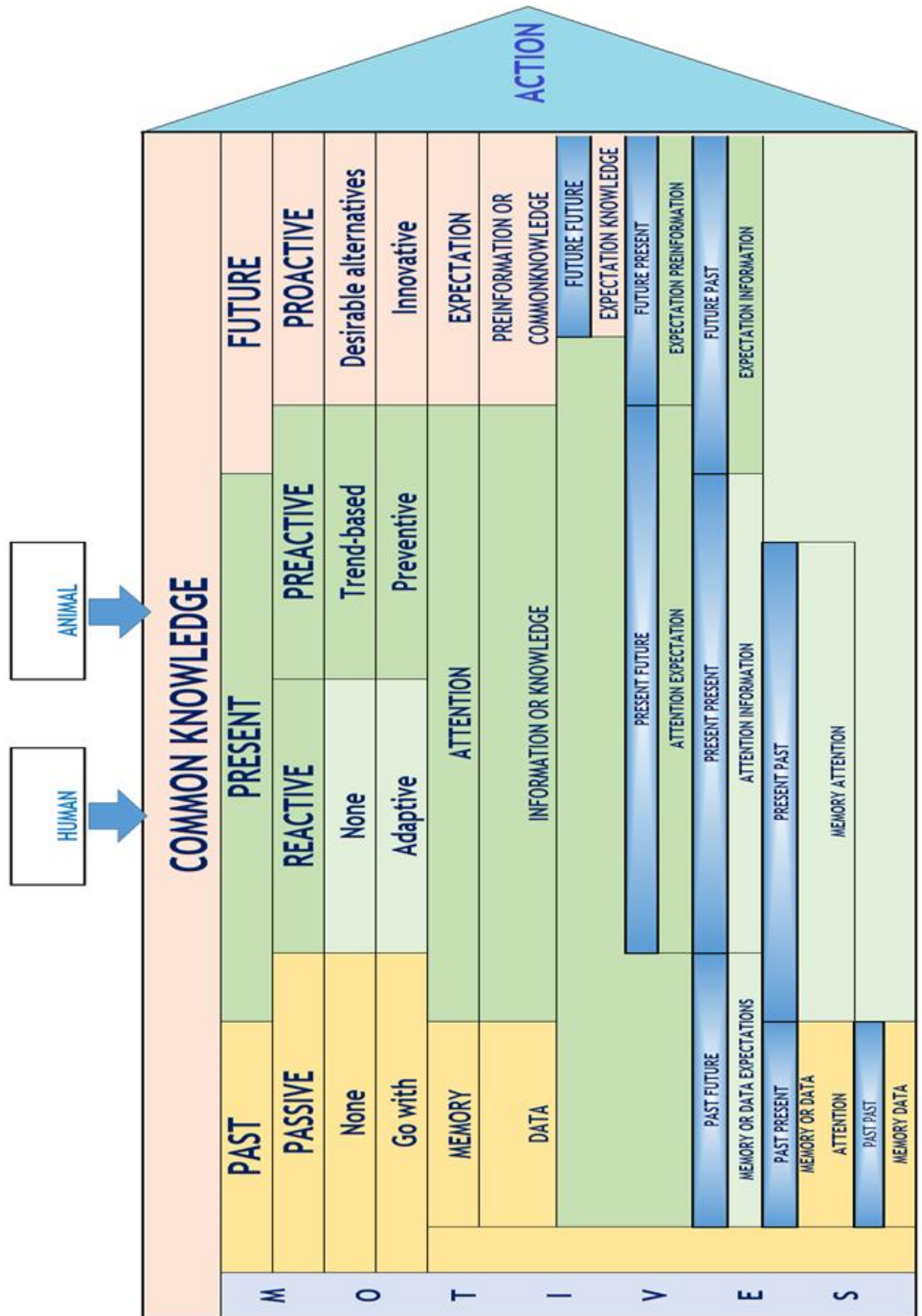
Appendix 6: Need to act fast biases

Name	Description	Reason1	Reason2	Time mode
Ambiguity effect	**We favour simple-looking options and complete informing over complex, ambiguous option**	luck of info	ambiguity	**Attention**
Anchoring or focalism	**We notice when something has change**	luck of info	ambiguity	**Attention**
Anthropomorphism or personification	**We tend to find stories and patterns even when looking at a few data**	religion and mythology	deities	**Expectation**
Attentional bias	**We notice things already primed in memory or repeated them**	focus on one or two possibilities, while ignoring the rest	does not examine all possible outcomes	**Attention**
Automation bias	**We fill in characteristics from stereotypes, generalities and prior histories**	human fails to notice an automation failure	overt redirection of attention away from the automated aid	**Expectation**
Availability heuristic	**We notice things already primed in memory or repeated them**	effective strategy of decision-making	overestimate the likelihood of events with greater "availability"	**Memory**
Illusory truth effect - Availability cascade	**We notice things already primed in memory or repeated them**	believe information to be correct	knew the correct answer in beginning, but swayed to believe otherwise	**Attention**
Backfire effect	**Get things done, we tend to complete things we have invested time energy in**	test ideas in a one-sided way, focusing on one possibility and ignoring alternatives	confirming existing beliefs	**Memory**

Bandwagon effect	We fill in characteristics from stereotypes, generalities and prior histories	people's preference for something, social pressure	overwhelming acceptance of unproved but popular ideas	**Expectation**
Base rate fallacy or Base rate neglect	We notice things already primed in memory or repeated often	general information, missing of exact information	Prefer individuating information over general information when the former is available.	**Expectation**
Belief bias	We favour simple-looking options and complete informing over complex, ambiguous option	lack of determining, plausibility of conclusion	lack of alternatives	**Memory**
Experimenter's or expectation bias Ben Franklin effect	We are drawn to details that confirm our own existing beliefs	internalize reasons	Emotions like love and hate	**Expectation**
Experiment or expectation bias Ben Franklin effect	We are drawn to details that confirm our own existing beliefs	internalize reasons	Emotions like love and hate	**Expectation**
Experiment or expectation bias Bergson's paradox	We are drawn to details that confirm our own existing beliefs	inherited error in examine plan	conditional probability	**Attention**
Bias blind spot	We notice other people faults more easily than faults of our own	failing to see your own impacts on your own judgment	Assume to have better self-knowledge than it is	**Expectation**
Cheerleader effect	We image things and people we are familiar with or figure them as better	selective attention	culture standards	**Attention**

Choice-supportive bias	**We are drawn to details that confirm our own existing beliefs**	mental experience of subjective qualities, knowledge and beliefs	remembered positive aspects as part of chosen and negative aspects as part of rejected chosen	**Memory**
Clustering illusion	**We tend to find stories and patterns even when looking at a few data**	error in considering, streams misunderstanding	too small data collection	**Expectation**
Confirmation bias Regressive bias	**We are drawn to details that confirm our own existing beliefs**	emotionally charged remembering	gather or remember information selectively	**Memory**
Congruence bias	**We are drawn to details that confirm our own existing beliefs**	person reliance on directly testing	inability to consider alternative hypotheses	**Attention**
Conjunction fallacy	**We favour simple-looking options and complete informing over complex, ambiguous option**	option is evaluated separately from its basic option	separate evaluation	**Attention**
Conservatism (belief revision)	**We notice when something has changed**	retrieval of information from memory	too less information updates and retrievals	**Memory**
Backfire effect - Continued influence effect	**we are drawn to details that confirm our own existing beliefs**	learned misinformation lives	retrieval of information from memory	**Memory**
Contrast effect	**We notice when something has changed**	perception relative to normal	stimulus influence in decision	**Attention**

Experimenter's or expectation bias Courtesy bias	**We are drawn to details that confirm our own existing beliefs**	How comfortable person feel received feedback, including criticisms and suggestions.	knowledge or results	**Expectation**
Curse of knowledge	**We think we know what other people are thinking**	unknown background and assumes	amount of information about situation	**Expectation**
Declinist	**We project our current mind set and assumptions onto the past and future**	emotional strategy	to best remember events happened at around the ages of 10-30	**Expectation**
Denomination effect	**We simplify probabilities and numbers to make them easier to think about**	We tend to isolate the cash in our minds.	tend to pay small invoices more easily, bye cheap thinks easily	**Expectation**
Denomination effect	**We simplify probabilities and numbers to make them easier to think about**	We tend to isolate the cash in our minds.	tend to pay small invoices more easily, bye cheap thinks easily	**Expectation**
Disposition effect	**Get things done, we tend to complete things we have invested time energy in**	avoid loss experience	minimize risks	**Expectation**
Distinction bias	**We notice when something has changed**	evaluation options	evaluation mode	**Attention**
Dunning-Kruger effect	**To act, we must be confident we can make an impact and feel what we do is important**	unknown level of own ability	mistakenly rated level of own ability	**Expectation**

Empathy gap	**We notice things already primed in memory or repeated often**	gap in empathy	sensitive gap	**Attention**
Endowment effect	**Get things done, we tend to complete things we have invested time energy in**	emotional added value for personal things in cash	recognition of background information	**Expectation**
Framing effect	**We notice when something has changed**	frame selection	context selection	**Expectation**
Functional fixedness	**We fill in characteristics from stereotypes, generalities, and prior histories**	mental block	usage of traditional habits	**Attention**
Hard-easy effect	**To act, we must be confident we can make an impact and feel what we do is important**	feel task easy	hard-easy feeling	**Expectation**
Hindsight bias	**We project our current mind set and assumptions onto the past and future**	shortage of knowledge, information or data	underrating of variable or little effects	**Expectation**
Hot-hand fallacy	**We tend to find stories and patterns even when looking at a few data**	experience of success	willing to success further	**Expectation**
Identifiable victim effect	**We stay focused, we favour the immediate, relatable thing in front of us**	punished experience	victim experience	**Attention**
IKEA effect	**Get things done, we tend to complete things we have invested time energy in**	prizing work of my own	prizing of self-assembling	**Attention**
Illusion of control	**To act, we must be confident we can make an impact and feel what we do is important**	lack of control observe and information	lack of observing external stimuluses	**Expectation**
Illusion of validity	**We tend to find stories and patterns even when looking at a few data**	superiors' influence	overestimate my ability	**Expectation**
Illusory correlation	**We tend to find stories and patterns even when looking at a few data**	not considering all variables	false association	**Attention**

Illusory truth effect	**We notice things already primed in memory or repeated often**	believing in updated statements	updated version of the statement presents actual situation	**Expectation**
Durability bias, Duration neglect Impact bias	**We reduce events and lists to their key elements**			
Information bias	**We favour simple-looking options and complete informing over complex, ambiguous option**	empower of information	selection of information	**Expectation**
Availability heuristic Clustering Illusion Insensitivity to sample size	**We tend to find stories and patterns even when looking at a few data**	Error in considering, streams misunderstanding	too small data collection	**Expectation**
Irrational escalation Sunk cost fallacy Lost aversion	**Get things done, we tend to complete things we have invested time energy in**	wrong decision	decision negative outcome	**Expectation**
Confirmation bias Law of the instrument	**We are drawn to details that confirm our own existing beliefs**	over-reliance on tools	over-reliance on technology	**Attention**
Less-is-better effect	**We favour simple-looking options and complete informing over complex, ambiguous option**	alone narrower perspective	alone lesser options	**Attention**
Irrational escalation Sunk cost fallacy Lost aversion	**Get things done, we tend to complete things we have invested time energy in**	avoiding losses	afraid of losses	**Expectation**
IKEA effect Mere exposure effect	**We notice when something has changed**	things familiarity	remain stabile	**Attention**
Money illusion	**We notice when something has changed**	valuating of things	valuating value	**Attention**
Moral credential effect	**We fill in characteristics from stereotypes, generalities and prior histories**	valuating of ethical or moral identity	identify error	**Attention**
Negativity bias or Negativity effect Negativity bias Positivity bias	**Bizarre, funny, visually-striking, or anthropomorphic things stick out more than non-bizarre/unfunny things**	negative attitude or nature	negative emotion	**Attention**

Neglect of probability	**We tend to find stories and patterns even when looking at a few data**	risk emotion under uncertainly	emotional feeling of possible success	**Expectation**
IKEA effect Not invented here	**Get things done, we tend to complete things we have invested time energy in**	cheap as passion	underrating of work of others	**Expectation**
Ostrich effect	**We are drawn to details that confirm our own existing beliefs**	fear of losses	fear of escalation	**Expectation**
Outcome bias	**We project our current and assumptions onto the past and future**	lack of evaluation error correction		**Attention**
Overconfidence effect Illusion of control Planning fallacy	**To act, we must be confident we can make an impact and feel what we do is important**	overestimation of own ability	over placement and herself-confidence of own ability	**Attention**
Pareidolia	**We tend to find stories and patterns even when looking at a few data**	imaginary		**Attention**
Planning fallacy	**We project our current and assumptions onto the past and future**	over or underestimation of time schedule		**Expectation**
Zero-risk bias	**Get things done, we tend to complete things we have invested time energy in**	complete risk elimination even when selected option cause overall lower risk		**Attention**
Zero-sum bias	**We simplify probabilities and numbers to make them easier to think about**	complete risk elimination even when selected option cause overall lower risk		**Attention**

Appendix 7: Not enough meaning biases

Name	Description	Reason1	Reason2	Time mode
Anthropomor-phism or person-ification	**We tend to find stories and patterns even when looking at a few data**	religion and mythology	Deities	**Expectation**
Automation bias	**We fill in characteristics from stereotypes, generalities and prior histories**	human fails to notice an automation failure	overt redirection of attention away from the automated aid	**Expectation**
Bandwagon effect	**We fill in characteristics from stereotypes, generalities and prior histories**	people's preference for something, social pressure	overwhelming acceptance of unproved but popular deals	**Expectation**
Cheerleader effect	**We image things and people we are familiar with or figure them as better**	selective attention	culture standards	**Attention**
Clustering illusion	**We tend to find stories and patterns even when looking at a few data**	Error in considering, streams misunderstanding	too small data collection	**Expectation**
Curse of knowledge	**We think we know what other people are thinking**	Unknown background and assumes	amount of information about situation	**Expectation**
Declinist	**We project our current mind set and assumptions onto the past and future**	Emotional strategy	to best remember events happened at around the ages of 10-30	**Expectation**
Denomination effect	**We simplify probabilities and numbers to make them easier to think about**	We tend to isolate the cash in our minds.	tend to pay small invoices more easily, bye cheap thinks easily	**Expectation**
Functional fixedness	**We fill in characteristics from stereotypes, generalities, and prior histories**	Mental block	usage of traditional habits	**Attention**
Gambler's fallacy	**We tend to find stories and patterns even when looking at a few data**			

Hindsight bias	**We project our current mind set and assumptions onto the past and future**	shortage of knowledge, information or data	underrating of variable or little effects	**Expectation**
Hot-hand fallacy	**We tend to find stories and patterns even when looking at a few data**	Experience of success	willing to success further	**Expectation**
Illusion of validity	**We tend to find stories and patterns even when looking at a few data**	superiors' influence	overestimate my ability	**Expectation**
Illusory correlation	**We tend to find stories and patterns even when looking at a few data**	not considering all variables	false association	**Attention**
Availability heuristic Clustering illusion Insensitivity to sample size	**We tend to find stories and patterns even when looking at a few data**	Error in considering, streams misunderstanding	too small data collection	**Expectation**
Moral credential effect	**We fill in characteristics from stereotypes, generalities and prior histories**	valuating of ethical or moral identity	identify error	**Attention**
Neglect of probability	**We tend to find stories and patterns even when looking at a few data**	risk emotion under uncertainly	emotional feeling of possible success	**Expectation**
Normalcy bias	**We simplify probabilities and numbers to make them easier to think about**			
Outcome bias	**We project our current and assumptions onto the past and future**	lack of evaluation error correction		**Attention**
Pareidolia	**We tend to find stories and patterns even when looking at a few data**	imaginary		**Attention**
Planning fallacy	**We project our current and assumptions onto the past and future**	over or underestimation of time schedule		**Expectation**
Zero-sum bias	**We simplify probabilities and numbers to make them easier to think about**	complete risk elimination even when selected option cause overall lower risk		**Attention**

Appendix 8: Too much information biases

| Name	Description	Reason1	Reason2	Time mode
Anchoring or focalism	**We notice when something has change**	luck of info	ambiguity	**Attention**
Attentional bias	**We notice things already primed in memory or repeated them**	Focus on one or two possibilities, while ignoring the rest	does not examine all possible outcomes	**Attention**
Availability heuristic	**We notice things already primed in memory or repeated them**	effective strategy of decision-making	overestimate the likelihood of events with greater "availability"	**Memory**
Illusory truth effect - Availability cascade	**We notice things already primed in memory or repeated them**	believe information to be correct	knew the correct answer in beginning, but swayed to believe otherwise through the repetition of a falsehood	**Attention**
Base rate fallacy or Base rate neglect	**We notice things already primed in memory or repeated often**	general information, missing of exact information	Prefer individuating information over general information when the former is available.	**Expectation**
Experimenter's or expectation bias Ben Franklin effect	**We are drawn to details that confirm our own existing beliefs**	Internalize reasons	emotions like love and hate	**Expectation**
Experimenter's or expectation bias Bergson's paradox	**We are drawn to details that confirm our own existing beliefs**	inherited error in examine plan	conditional probability	**Attention**

Bias blind spot	**We notice other people faults more easily than faults of our own**	failing to see your own impacts on your own judgment	assume to have better self-knowledge than it is	**Expectation**
Choice-supportive bias	**We are drawn to details that confirm our own existing beliefs**	mental experience of subjective qualities, knowledge and beliefs	remembered positive aspects as part of chosen and negative aspects as part of rejected chosen	**Memory**
Confirmation bias Regressive bias	**We are drawn to details that confirm our own existing beliefs**	emotionally charged remembering	gather or remember information selectively	**Memory**
Congruence bias	**We are drawn to details that confirm our own existing beliefs**	person reliance on directly testing	inability to consider alternative hypotheses	**Attention**
Conservatism (belief revision)	**We notice when something has changed**	retrieval of information from memory	too less information updates and retrievals	**Memory**
Backfire effect - Continued influence effect	**we are drawn to details that confirm our own existing beliefs**	learned misinformation lives	retrieval of information from memory	**Memory**
Contrast effect	**We notice when something has changed**	perception relative to normal	stimulus influence in decision	**Attention**
Experimenter's or expectation bias Courtesy bias	**We are drawn to details that confirm our own existing beliefs**	how comfortable person feels Received feedback, including criticisms and suggestions.	Knowledge or results	**Expectation**
Distinction bias	**We notice when something has changed**	evaluation options	evaluation mode	**Attention**
Empathy gap	**We notice things already primed in memory or repeated often**	gap in empathy	sensitive gap	**Attention**

Conservatism **bias** **Exaggerated expecta-tion**	**We notice when something has changed**			
Experimenter's or expectation **bias** **Courtesy bias**	**We are drawn to details that con-firm our own existing beliefs**			
Focusing effect	**We notice when something has changed**			
Framing effect	**We notice when something has changed**	frame selection	context selection	**Expectation**
Frequency **illusion** **known** **as** **Baader-Meinhof phenomenon**	**We notice things already primed in memory or repeated often**			
Illusory truth effect	**We notice things already primed in memory or repeated often**	believing in updated statements	updated version of the statement presents actual situation	**Expectation**
Confirmation **bias** **Law of the instrument**	**We are drawn to details that con-firm our own exist-ing beliefs**	over-reliance on tools	over-reliance on technology	**Attention**
IKEA **effect** **Mere exposure effect**	**We notice when something has changed**	things familiar-ity	remain stabile	**Attention**
Money illusion	**We notice when something has changed**	valuating of things	valuating value	**Attention**
Negativity bias or **Negativity** **effect** **Negativity** **bias** **Positivity bias**	**Bizarre, funny, visually-striking, or anthropomorphic things stick out more than non-bizarre/un-funny things**	negative attitude or nature	negative emotion	**Attention**
Ostrich effect	**We are drawn to details that con-firm our own exist-ing beliefs**	fear of losses	fear of escalation	**Expectation**

Appendix 9: What should we remember biases

Name	Description	Reason1	Reason2	Time mode
Duration neglect	**We reduce events and lists to their key elements**	psychological experience	sensitive experience	**Attention**
Durability bias, Duration neglect Impact bias	**We reduce events and lists to their key elements**			

Appendix 10: Biases adjusted research concept of the decision-making

Appendix 11: OODA-loop adjusted research concept of decision-making
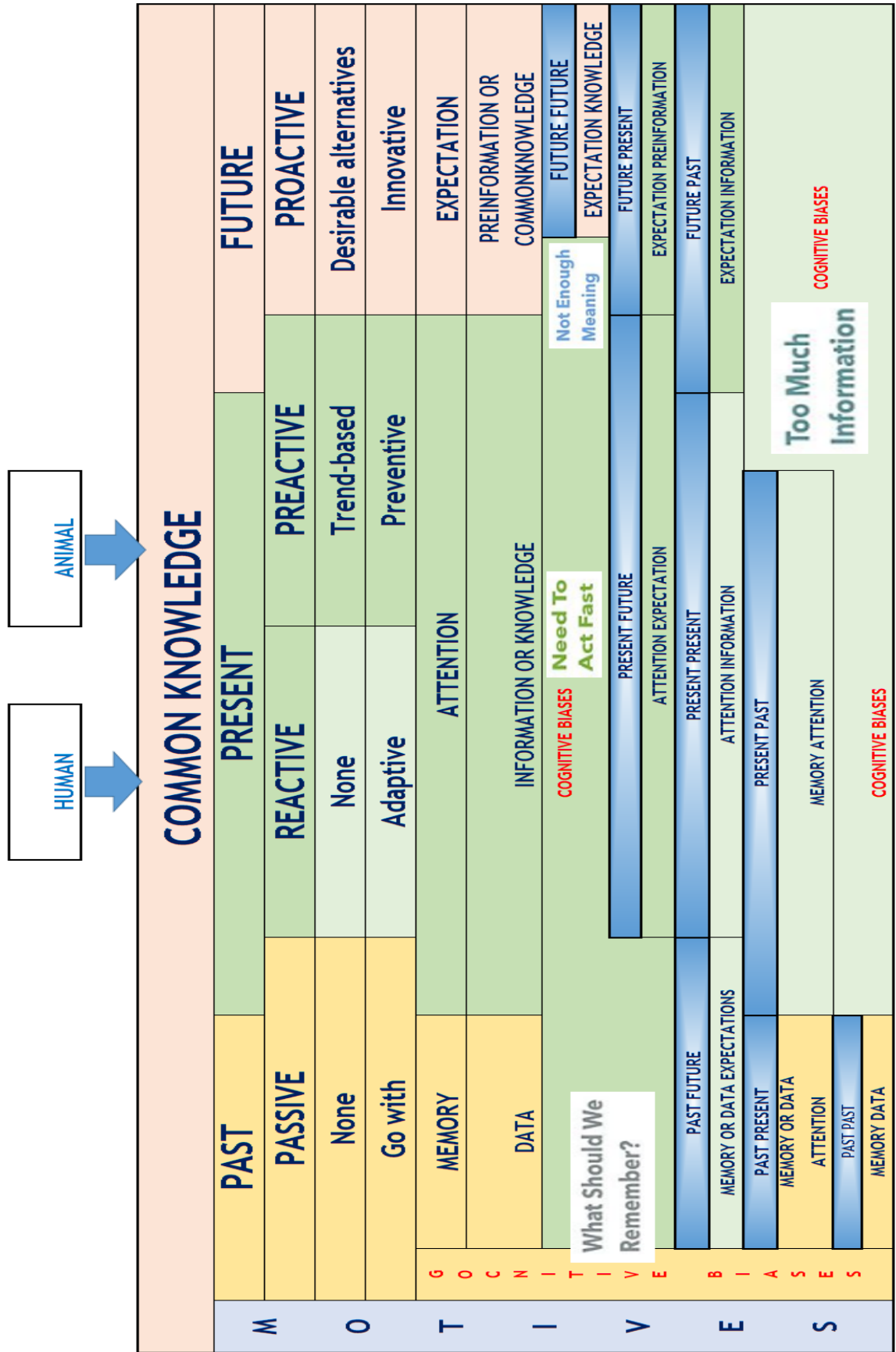
Appendix 12: Euler's identity adjusted research concept of decision-making process
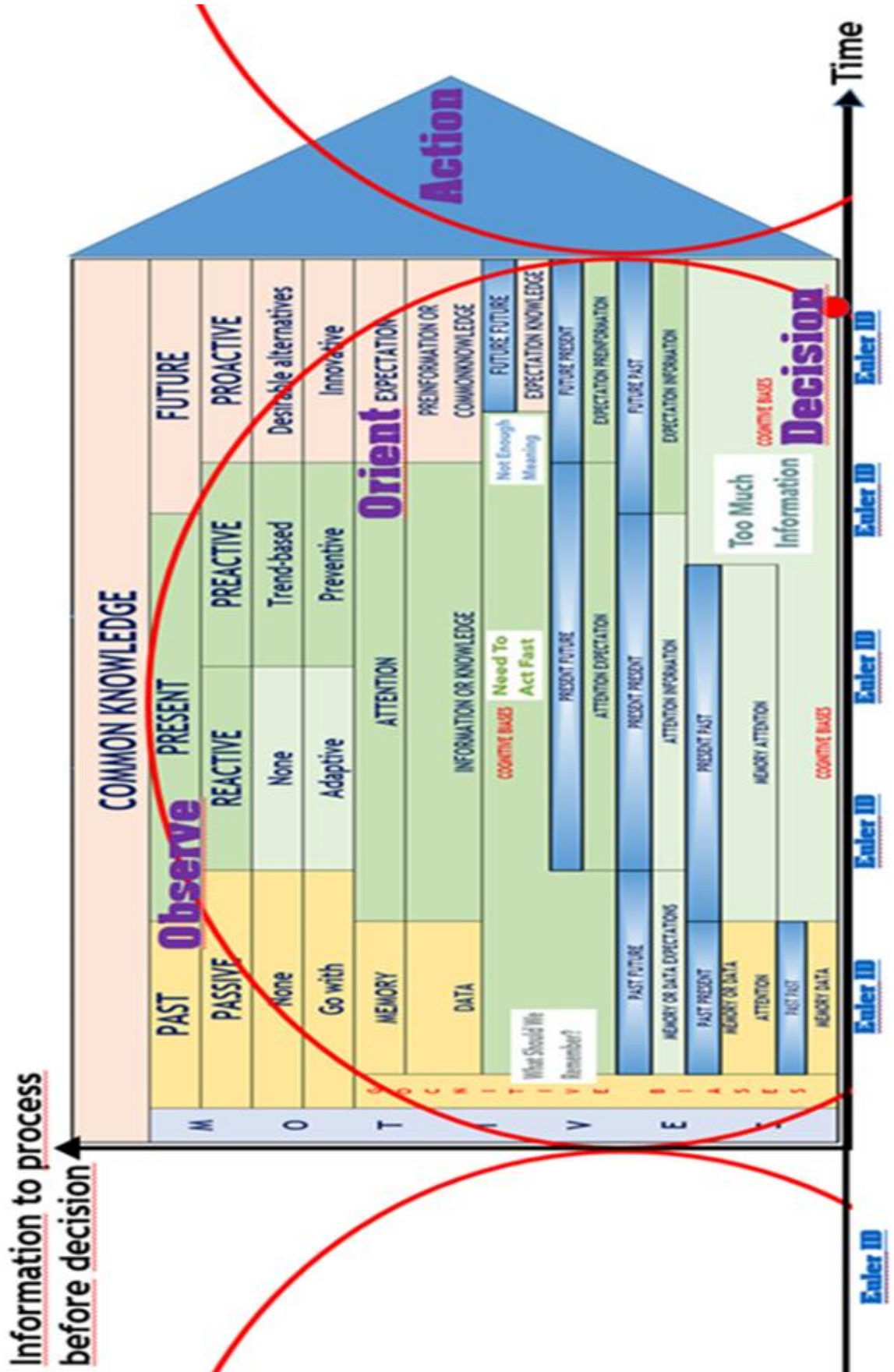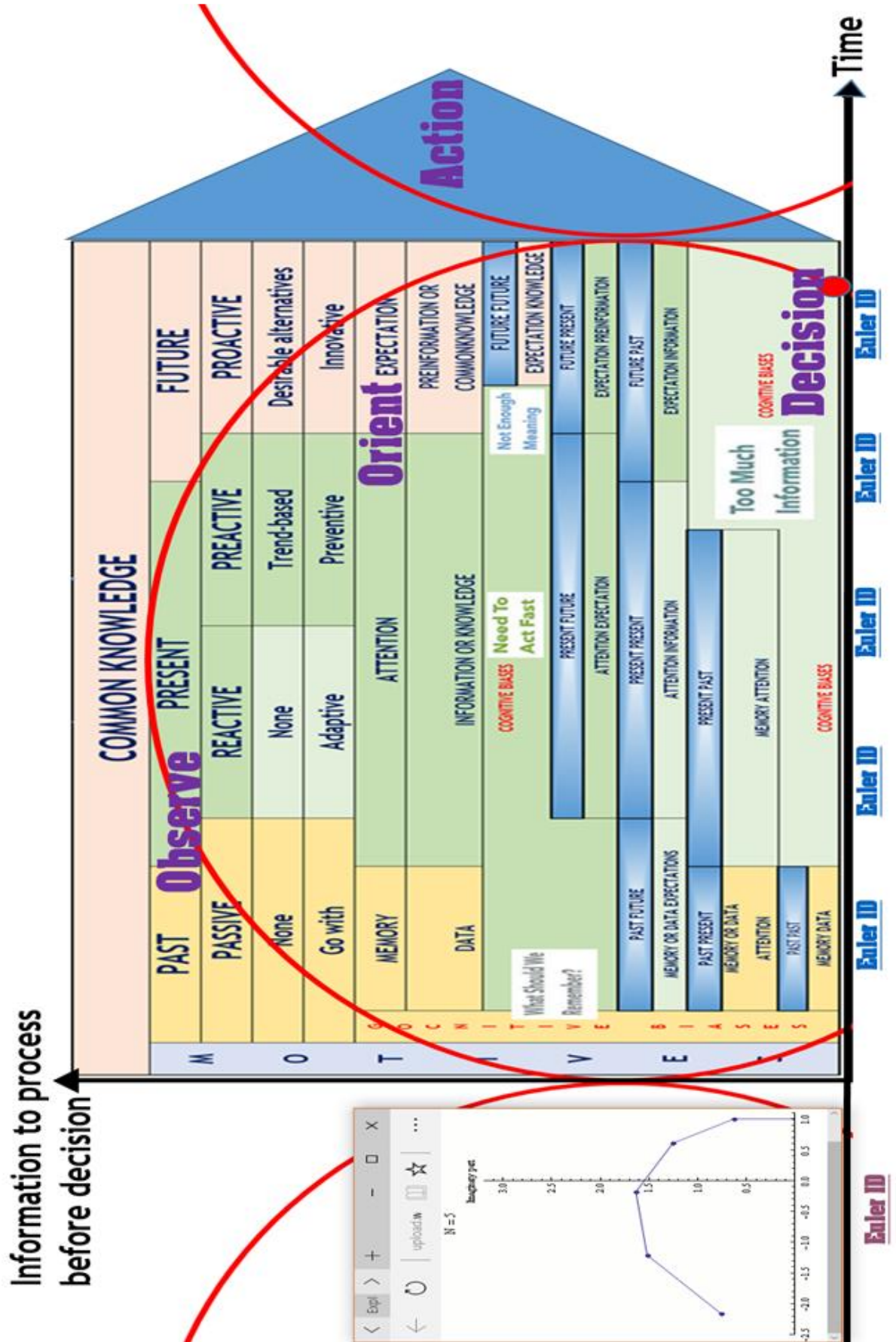
Appendix 13: The improved model of decision-making process

Appendix 14: Theme interview in practice inquiry form. Link to inquiry:

https://sites.google.com/view/motivaatio-liiketoiminta-luoma/common-knowledge

COMMON KNOWLEDGE -KYSELY

*Pakollinen

COMMON KNOWLEDGE -KYSELY

COMMON KNOWLEDGE INQUIRY - INQUIRE IS ANONYMOUS!

Vastauksesi on arvokas! Kysely ei kerää nimi tai yhteistietojasi. Vastauksesi voit antaa verkossa tai lähettämällä ne sähköpostiin luomaar@gmail.com. Verkko-osoite on: https://sites.google.com/view/motivaatio-liiketoiminta-luoma/common-knowledge

Your answers are valuable! Please, give your answers online or by sending email to luomaar@gmail.com. Link to inquiry: https://sites.google.com/view/motivaatio-liiketoiminta-luoma/common-knowledge

This is inquiry for master degree thesis of security management at Laurea University of Applied Sciences. In case further information needed, please, do not hesitate to contact luomaar@gmail.com.

Sukupuoli - Sex *

○ Nainen

○ Mies

○ Female

○ Male

Ikä - Age *

☐ 18 - 28

☐ 29 - 39

☐ 40 - 50

☐ 51- 61

☐ 62 -

1. Mikä on kognitiivinen harha/vinouma? What means cognitive bias? *

Oma vastauksesi

2. Olen tunnistanut päätöksenteossani kognitiivisia harhoja/vinoumia. I have recognized cognitive biases in my decision-making process. *

☐ Kyllä

☐ En

☐ Yes

☐ No

3. Olen huomannut kongitiivia harhoja/vinoumia ihmisten päätöksenteossa. I have recogniced cognitive biases in decision-making process of other human being. *

☐ Kyllä

☐ En

☐ Yes

☐ No

4. Mitkä elementit vaikuttavat päätöksentekoosi? What kind of elements affect on your decision-making? *

Oma vastauksesi

Oma vastauksesi

Oma vastauksesi

5. Kuvaa ja kerro päätöksentekoprosessisi ja mitä tietoa käytät päätöksenteossasi. Please, illustrate and describe your decision-making process and data, information and knowledge you are using for your decision. *
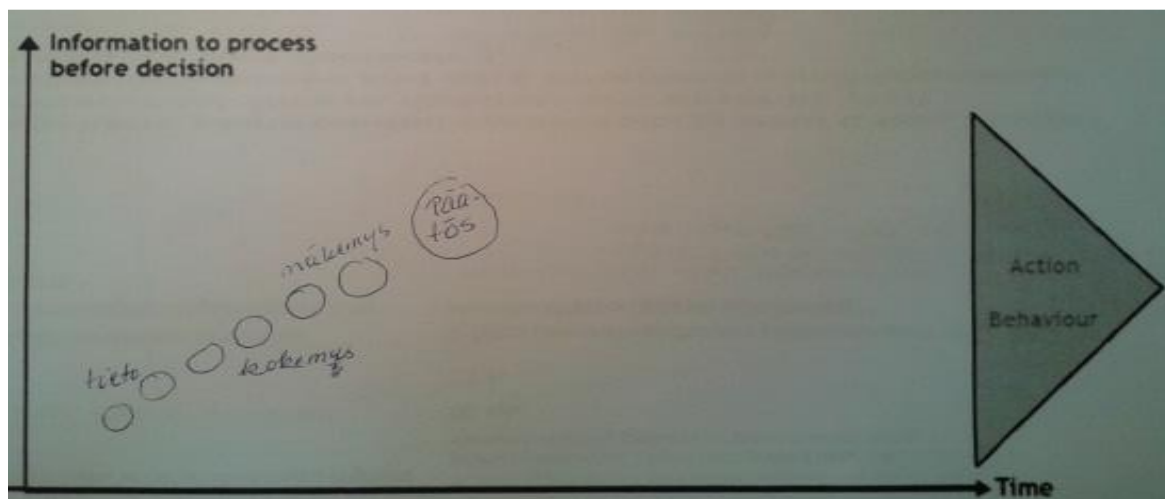
Oma vastauksesi

Oma vastauksesi

Oma vastauksesi

Piirrä päätöksentekoprosessisi. Draw your decision-making process.

Appendix 15: Theme interview in practice, drawings of women
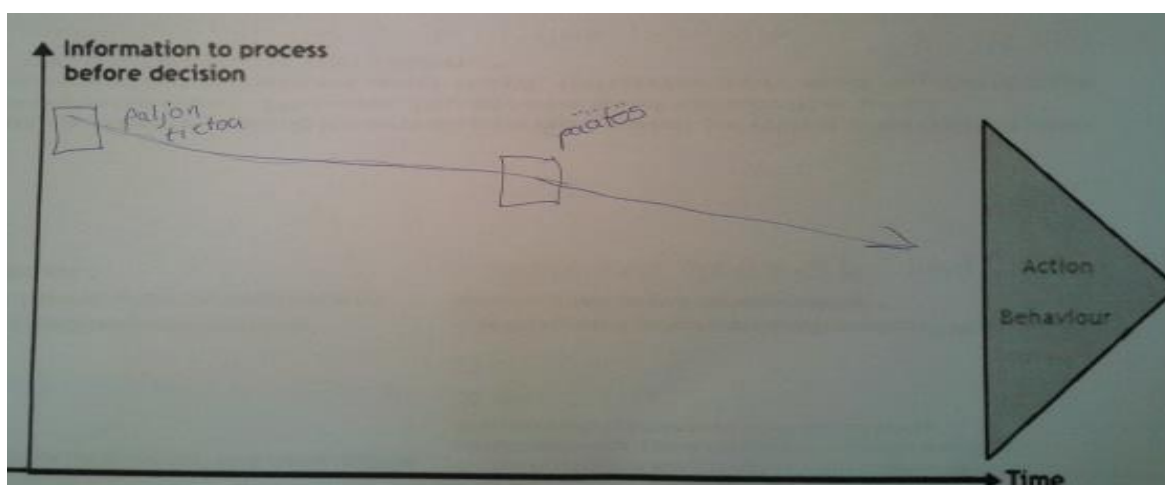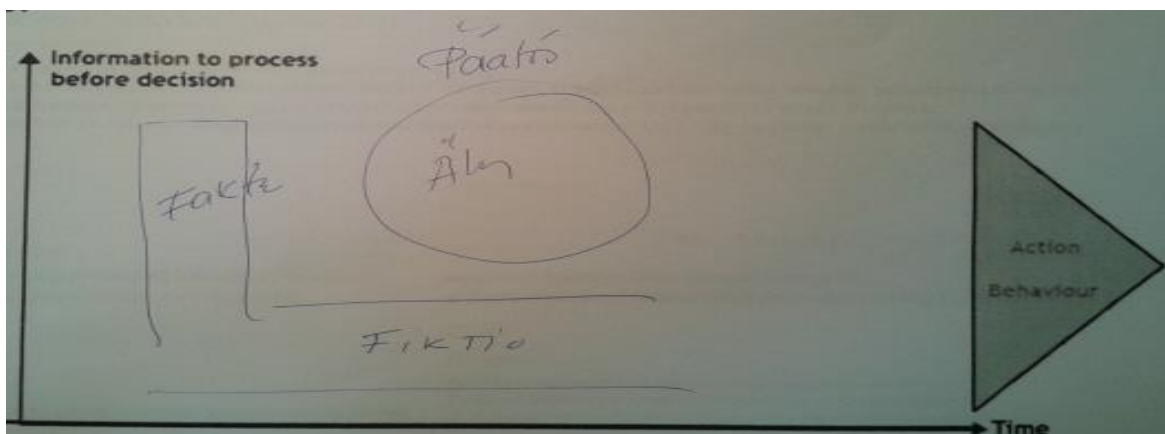
Appendix 16: Theme interview in practice, drawings of men

Appendix 17: Theme interview in practice, divergent drawing (M)

Appendix 18: Improving research concept in practice by theme interviewing

Sukupuoli / Sex 7 vastausta
- Nainen / Woman
- Mies / Man

57,1%
42,9%

Ikä / Age 7 vastausta
- 18 - 28
- 29 - 39
- 40 - 50
- 51 - 61
- 62 -

28,6%
14,3%
28,6%
14,3%
14,3%

Koulutus / Education 7 vastausta
- Peruskoulu / Elementary school
- Ammattikoulu / Vocational school
- Opistotaso / College
- Ammattikorkeakoulu / University of Applied Sciences
- Ylempi ammattikorkeakoulututkinto / Master's degree of University of Applied Sciences
- Yliopisto / University

14,3%
14,3%
42,9%
14,3%
14,3%

Ammatti / Profession 7 vastausta
- Opiskelija / Student
- Työntekijä / Employee
- Toimihenkilö / Official
- Ylempi toimihenkilö / Superior

71,4%
14,3%
14,3%

Kansallisuus / Nationality 7 vastausta
- Norja / Norway
- Ruotsi / Sweden
- Saksa / Germany
- Suomi / Finland
- Tanska / Denmark
- Venäjä / Russia
- Viro / Estonia
- Muu / Other

100%

1. Mikä on kognitiivinen harha/vinouma? What means cognitive bias?
7 vastausta

Ei varmasti aukea kaikille tämä termi helposti. Käsitän sen näin: henkilön arvioi asioita omalla tavallaan ja kyvyillään sioita eli hän näkee/arvioi asian "väärin", kuin se todellisuudessa on. Kysymys: testataanko tällä kyselyllä henkilön tuntemusta termistä vai onko kyseessä oikeasti päätöksentekoon liittyvät asiat. Nimittäin koskaan ei saisi käyttää termiä, joka ei aukea helposti yleisellä tasolla. Kyselyn nimi "Common kwoledge" on myös erikoinen.

Häiriö, väärin ymmärrys

En tunne asiaa

liian vähän tietoa

Työ tehdään ilman ennakkosuunnitelmaa

väärä luulo, väärät päätelmät

Häiriötekijä keskittymisessä

2. Olen tunnistanut päätöksenteossani kognitiivisia harhoja/vinoumia. I have recognized cognitive biases in my desicion-making process.
7 vastausta

Kyllä — 6 (85,7 %)
En — 1 (14,3 %)

3. Olen huomannut kognitiivisia harhoja/vinoumia ihmisten päätöksenteossa. I have recognized cognitive biases in desicion-making process of other human being.
7 vastausta

Kyllä — 7 (100 %)
En — 0 (0 %)

4. Mitkä elementit vaikuttavat päätöksentekoosi? What kind of elements affect on your desicion-making?
7 vastausta

Asianosaisten mielipiteet ja kokemukset. Oma intuitio. Faktat Mahdollinen tutkimustieto asiasta.

Tieto, laaja-alaisuus, myös negatiiviset näkemykset. Kokonaispaketti, joka tyydyttää itseä ja muita

kokonaiskuva asiasta

Tarpeellisuus, laadukas tuote, hinta-laatusuhde, hyvä tuttu merkki.

Työn etukäteissuunnittelu, välineet ja materiaalit, ennakointi

kokemus, oletukset, oma motivaatio

Väsyneisyys, oma etu, seuraukset

5. Kuvaa ja kerro päätöksentekoprosessisi ja mitä tietoa käytät päätöksenteossasi. Please, illustrate and describe your desicion-making process and data, information and knowledge you are using for your decision.
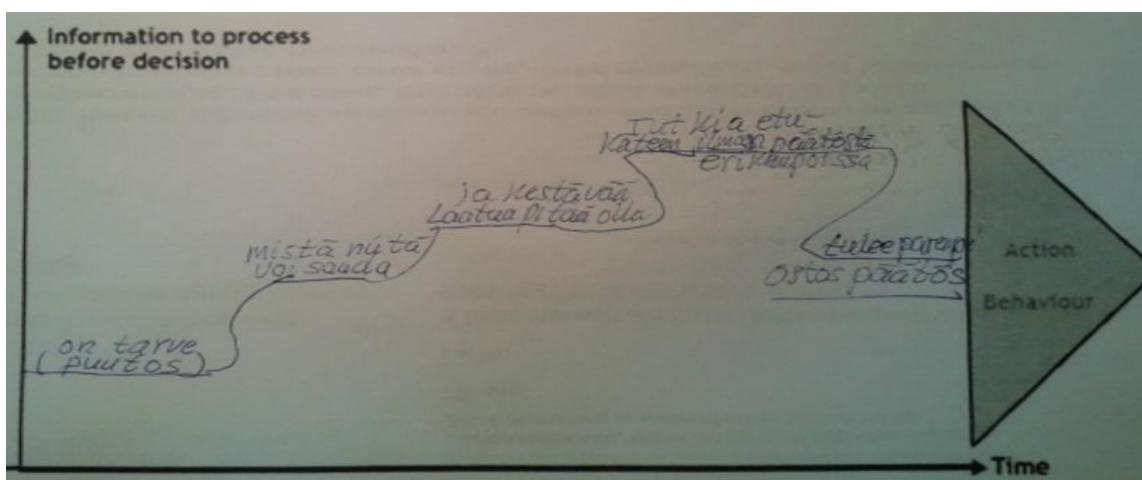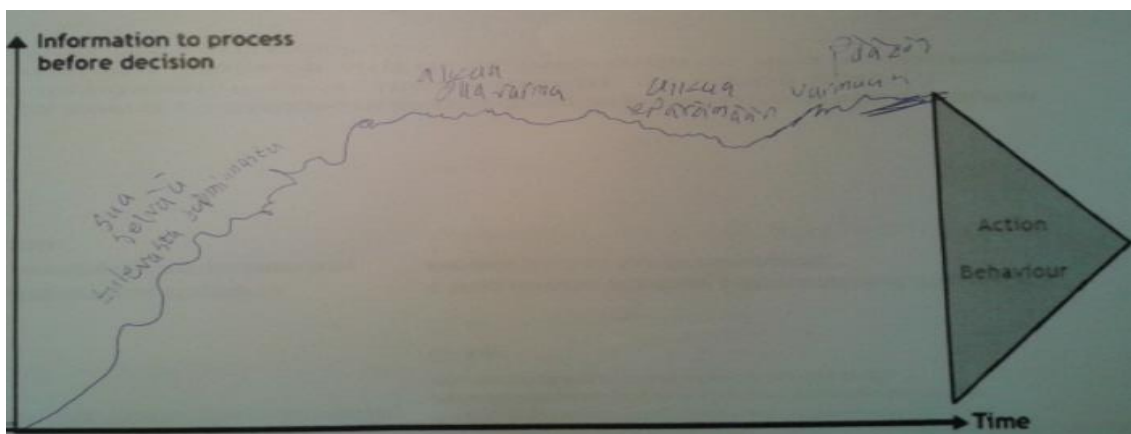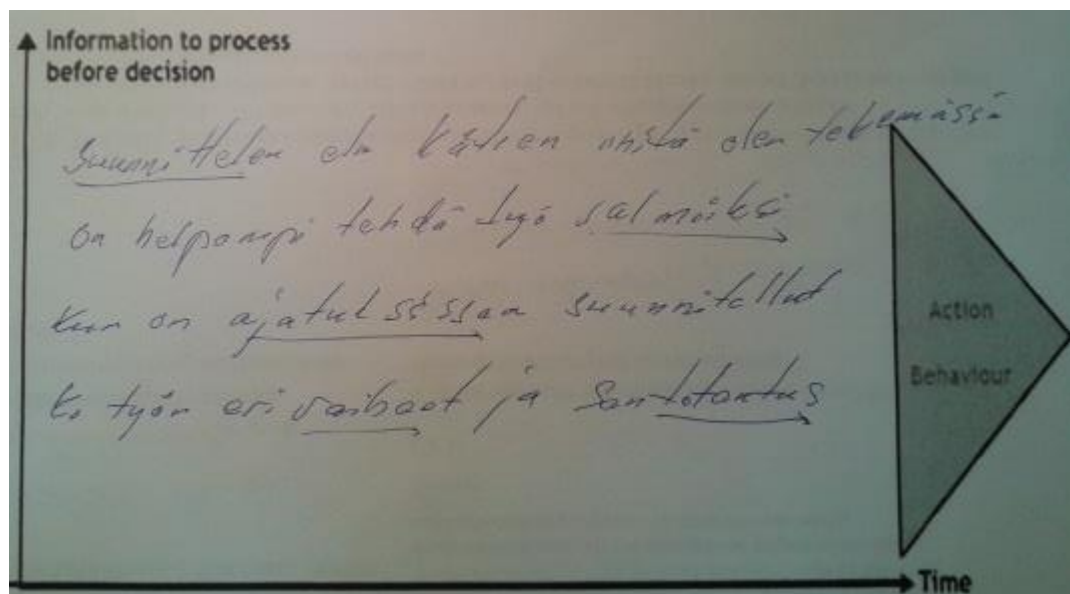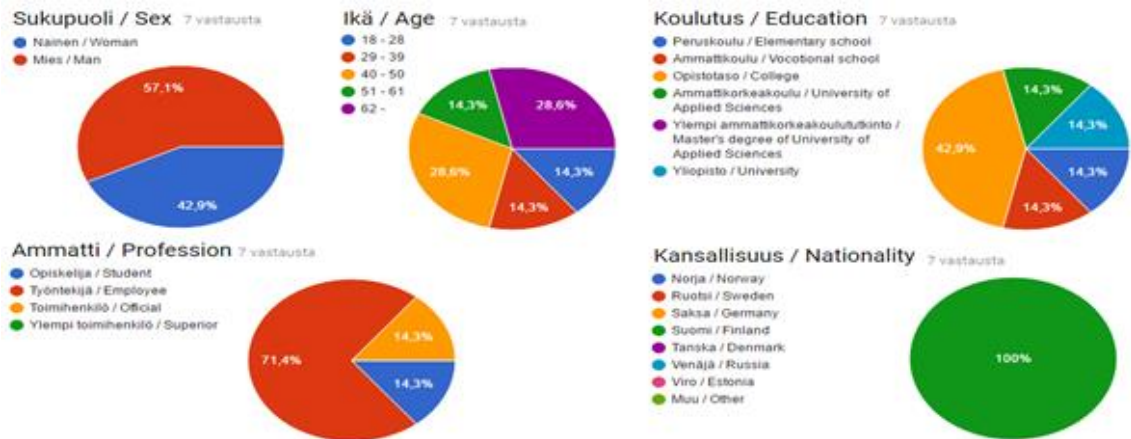7 vastausta

Ensimmäisenä haluan kuulla mielipiteitä, ajatuksia, kokemusperäistä tietoa. Yritän kasata päätöksentekoa varten faktat: mahdollisimman paljon perustaa ja tutkimustietoa. Jos päätös koskee ihmisiä, pitää todella kuunnella asianosaisia. Huom! En kykene piirtämään tuota prosessia ilman apuja.

Eri asioissa eri tietoa, keskustelu-kuuntelu-asiatieto-oikeudenmukaisuus-asioiden eteneminen lopputulokseen

tunne asian oikeudenmukaisuudesta ja eri faktoja

tarve-saatavuus-laatu-tutkimus ja selvitys-päätös

Suunnittelu-valmis ajatus-työvaiheet-toteutus

Etsin ensin tarpeeksi tietoa ja kyselen ihmisiltä. Sen jälkeen päättelen, mikä olisi järkevää ja mistä olisi hyötyä. Teen kyselykierroksen. Äänestytän päätökset muilla organisaationi jäsenillä

Käytän saatua tietoa eri lähteistä, mutta aina ei tule ajatelleeksi tai kontrolloiduksi milloin nämä tiedot tai uusi informaatio vaikuttavat lopulliseen päätökseen

Appendix 19: Testing and test results of improved model of decision-making

Nimi ja päivämäärä / Name and date

Kimmo Konttinen
Petri Pelkonen
Hannu Rissanen 16.9.2017
Irma Leiwo 23.9.2017
Timo Ohtonen 11.9.2017
Tiina Ohtonen 11.9.2017

Viesti / Message

Katsoimme Tiinan kanssa, että on niin vaikea asia emmekä osaa sanoa tähän mitään järkevää. Olisin vastannut tuohon kyselyyn "en osaa sanoa".

Katsoimme Timon kanssa, mutta täytyy sanoa, että on niin vaikea asia, että emme osaa sanoa tähän mitään järkevää. Olisin vastannut tuohon kyselyyn "en osaa sanoa" tai "en ymmärrä".

Vastaako kuvaamanne päätöksentekomalli OODA-loopia? Is your illustrated model of decision-making comparable to OODA-loop?

6 vastausta

- ● Ei lainkaan / Not at all
- ● Vähän / A little
- ● Pääosin / Mainly
- ● Paljon / A lot
- ● Täysin / Equal
- ● Vastausta ei saatu / Reply not available

66,7% / 16,7% / 16,7%

Vastaako kuvaamanne päätöksentekomalli kunstruktoitua päätöksentekomallia? Is your illustrated model of decision-making comparable to constructed model?

6 vastausta

- ● Ei lainkaan / No at all
- ● Vähän / A little
- ● Pääosin / Mainly
- ● Paljon / A lot
- ● Täysin / Equal
- ● Vastausta ei saatu / Reply not available

66,7% / 16,7% / 16,7%

Vastaako kuvaamanne päätöksentekomalli OODA-loopin ja konstruktoitua aikarakennetta? Is your illustrated model of decision-making comparable to time description of OODA-loop and constructed model?

6 vastausta

- ● Ei lainkaan / Not at all
- ● Vähän / A little
- ● Pääosin / Mainly
- ● Paljon / A lot
- ● Täysin / Equal
- ● Vastausta ei saatu / Reply not available

66,7% / 16,7% / 16,7%

Vastaako kuvaamanne päätöksentekomalli verrattuna konstruktoituun malliin vinoumien sijaintia päätöksenteossa? Is your illustrated model of decision-making comparable to description of biases of constructed model?

6 vastausta

- ● Ei lainkaan / Not at all
- ● Vähän / A little
- ● Pääosin / Mainly
- ● Paljon / A lot
- ● Täysin / Equal
- ● Vastausta ei saatu / Reply not available

66,7% / 16,7% / 16,7%