

WISDOM QUOTIENT AS A BASIC INDEX OF HUMAN COGNITIVE CATEGORIES AND WISDOM ATTRIBUTES

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ABSTRACT

Various understanding of human wisdom is discussed, from common-sense approaches through cognitive considerations to scientific analysis. The main cognitive levels are considered such as: filtering the available information about the appearing situation, comprehensive assessment of the situation, awareness of the consequences about the existing situation and reaction to the existing situation. The basic set of essential attributes like knowledge, skills, and inspirations are also analyzed. Based on these considerations some relations between cognitive levels and wisdom attributes are presented. It leads to a definition of the wisdom quotient which is a representative measure of human wisdom behaviors. Some representative cases of such behavior are specified and discussed as human attitudes. It is also shown how computer science approaches can support calculation of some wisdom indexes and, in consequence, allow understanding human wisdom.

Keywords: human wisdom definitions, cognitive levels, wisdom attributes, relation analysis, intelligence and wisdom quotients, success quotients

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1. Introduction

Modern philosophy (fifteenth to twentieth centuries) engrossed itself in the methods of reasoning, the passage from existence to cognition, and from religion to science. In 1912, research on wisdom was conducted by the German psychologist William Stern, who investigated the intelligence quotient (IQ) in children and then in adults, especially military recruits. The IQ is seen by many as wisdom; however, what the IQ test does is it assesses an individual's capability of doing complex tasks. It could, then, be a wisdom ability index. At the end of the twentieth century, the American psychologist Vivian Clayton [1] distinguished between three activities determining wisdom: obtaining cognitive knowledge, reflective analysis of knowledge, and filtering knowledge with one's emotions. When she retired, further psychological research was undertaken in Germany.

In 1980 the German Max Planck Institute started a project on wisdom research (which can be understood as "taking wisdom down to the lab") under the guidance of the German-American psychologist Paul Baltes (1939–2006). In the It Berlin project, wisdom was recognized as "expert knowledge having a pragmatic influence on the fullness of life" (Baltes & Mayer, 1999) [2]. The latter part of the definition regarded wisdom as right judgment, refined advice, analysis of psychological depth, emotional control, and committed understanding. However, to the benefit of the cause, a group of psychologists from that institute was sharply critical of the philosophers' perception of wisdom as utopian. They saw wisdom as unpopular because, having studied 700 people, they did not find anyone wise among them. They concluded that the

development of wisdom reaches its climax around age 65, while around age 75, the human mind loses its intellectual capabilities, with several exceptions. The German-American psychologist Monika Ardelt, however, disagrees with the Max Planck psychologists' proposition that wisdom is a unique privilege of experts. She thinks that regular people can be wise, too (Ardelt, 2004, p. 257–285) [3]. She continued Clayton's research in a 3D model that integrated "cognition, reflection, and emotions."

To the detriment of the cause, though, the Berlin project did not launch any broader empirical research on wisdom. It was only the American psychologist Robert J. Sternberg from Yale University who researched wisdom, proving that the investigation of human potential cannot conclude with the IQ; it must also reckon with wisdom (Sternberg, 1999) [4]. Wisdom is understood as a successful application of intelligence for the sake of attaining the common good using balanced personal, interpersonal, and supra-personal interest, in both the short and long term, considering adaptation to the environment, changing, or even selecting a new environment. Wisdom, he believes, can thus be equated with prudence. It is a lengthy definition of wisdom—a very complex and complete one, as well. It is, however, complicated in an application and seemingly only applies to vital life situations.

One of the most recent researchers of wisdom is the American publicist Stephen Hall, who conducted a review of wisdom research for the New York Times (Hall, 2007) [5]. He concluded that young people are more pessimistic than their elders in expressing their opinions, the reason being that the individuals more advanced in age have encountered more negative situations than the young, and so they

have developed more emotional composure and tend to regain a balance in their psyche after a negative experience. Still, the author proposes no definition of wisdom, which he sees as a mystery; the way wisdom is developed remains a mystery to him, as well. It is hardly surprising that the most famous Encyclopedia Britannica does not define wisdom, either.

English philosopher Nicholas Maxwell (2012) [6] differentiates knowledge-inquiry from wisdom-inquiry. The former is inherited from the past, and the latter is about updating knowledge-inquiry by actual issues and curing it from its irrationality. In conclusion, he states that "knowledge-inquiry needs to be transformed so that it becomes wisdom-inquiry in order to update rationality of current knowledge. According to Maxwell, wisdom is updated rational knowledge while It approach differentiates knowledge and wisdom according to their different aims and content.

It is puzzling that neither philosophers nor psychologists should have taken any notice of the fact that, since the end of World War II (1939–1945), economic decision-making theorists have developed research on making optimal decisions, that is, mainly wise ones. Several pioneers such as Simon (1978), and Kahneman (2002) [7] were even given Nobel Prizes in Economics precisely for elaborating a method of making the best possible decisions. One of the optimization problem is to calculate the best possible timetable of production in order to minimize machine idleness or to make some parts of the machine so that the loss of raw material would be minimal. Was It method not a wise solution? It, too, betrays wisdom in decision-making. As far as optimal calculating decisions in corporate management is concerned, management science has tackled It problem. Methods of linear programming are

currently used in the present to determine the best possible planning of a production program to manufacture the necessary number of cars of various models to a maximal company profit or too minimal company expenditure (but never both at the same time). It is the so-called diet problem: how many specific kinds of food need to be eaten to secure the necessary number of proteins and vitamins at the lowest possible cost. An optimal diet is an expression of wise eating. Another method of linear programming, the so-called transportation method, computes the best possible route of a truck's journey in shipping goods to shops so that the sum of the paths will be most cost-effective regarding labor and fuel, and shortest in time.

Quite a different approach to wisdom related to computer science activities is presented by Targowski [8]. In general the wisdom of a human being in his/her daily conduct results from right judgment and choice of a solving concept using the cognition capabilities. Also, the quality of wisdom depends on the art of a given person, which results from his/her genetics, character, morality, education, practice, relationships, environment, and the ability to draw on the wisdom of family, profession, civilization, and other possibilities. In particular, the wisdom of the person must result from his/her responsibility for the positive fate of the surrounding civilization. The effects of wisdom are survival, health, life, fulfillment of goals, cognition, solution, action, suggestion, advice, opinion, decision, and others.

In a concise statement, one can state that wisdom is information and information processing methods. We observe an important trend in the development of information technology (IT) leading to building ever-faster computers that can process information as fast

as people do. According to some estimates, such a computer is supposed to become available around 2025. A question can be asked, though, whether a computer like it would think wisely if there is no consensus as to what

gurus only partly understand. Businesses from pizza-delivery to Hollywood and manufacturing are being changed by information technology. All these knowledge and wisdom-driven

Table 1 The well known wisdom concepts

Authors	Wisdom meaning
Paul B. Boltes and Margaret M. Mayer	Right judgment, refined advice, analysis of psychological depths, emotional control, committed understanding
Vivan Clayton	Cognition, reflections, emotions
Robert Sternberg	Successful applications of intelligence for balancing personal interests, wisdom=prudence
Stephen Hall	Balance in psyche after negative experience
Nicholas Maxwell	Rational knowledge but different their aims and context
Daniel Kahneman and Herbert A. Simon	Wisdom=optimal or satisfying decisions
Andrew Targowski	Art of living and the proper judgment and choice, human satisfaction & happiness

exactly knowledge and wisdom are. Another branch of IT deals with automating decisions using artificial intelligence (AI). AI can automate a clear concept of the decision, but its wisdom will never be higher than the wisdom of the designer of such a computer system. Therefore, it is a *signum temporis* since nowadays, knowledge and wisdom are the subjects of artificial intelligence and machine learning and deciding. Now one must forget Gordon Gekko's "greed is good" since computers increasingly call the shots on Wall Street. Machines are taking control of investing – not just the monotonous buying and selling of securities, but also the commanding heights monitoring the economy and allocating the capital. Funds run by computers that follow the rules by humans account for 35% of America's stock market, 60% of institutional equity assets, and 60% of trading activity. New artificial-intelligence programs are also calculating their own investing rules, in methods their human

solutions are possible due to machine learning that is a technique of data analysis that automates analytical model creation. It is a new and fast-developing part of artificial intelligence based on the idea that algorithms can learn from data (like Big Data about the whole market and own company), pinpoint patterns, and make wise decisions with minimal human intermediation.

Summarizing, Table 1 gives some concepts of wisdom. In farther consideration we concentrate on some attributes and cognitive characteristics of the wisdom. In that way we try to systematize the wisdom concept and describe its main characteristics.

Nowadays, the wisdom study is being passed to informaticians (info-communication-decision systems-oriented) and computer scientists (programming oriented). On the other hand, there is the urgent task for philosophy and

sociology to turn attention to the ethics and rules of different human processes to combine info and human approaches. Therefore, in the paper, various understanding of human wisdom is discussed, from common-sense approaches through cognitive considerations to scientific analysis. The basic set of essential attributes like knowledge, skills, and inspirations are also analyzed. The main cognitive levels are considered such as: filtering available information about the appearing situation, comprehensive assessment of the situation, awareness of the consequences about the existing situation and reaction to the existing situation. Based on these considerations some relations between cognitive levels and wisdom attributes are presented. It leads to a definition of the wisdom quotient which is a representative measure of human wisdom behaviors. Some representative cases of such behavior are specified and discussed as human attitudes. It is also shown how computer science approaches can support calculation of some wisdom indexes and in consequence understanding of human wisdom.

2. Common-sense approaches

All human activities can be expressed in many different decisional undertakings. The necessity to make the rational or/and intuitive approach is a paradox of decision-making. However, such a symbiosis can lead to wise solutions. Maybe that is why wisdom is a special case among many different dilemmas that are omnipresent in our lives and can appear at any time and in any place. It is a good example of a common-sense approach to clarify wisdom significance, because people are learning from live and common sense is experience of life. There are many products of their experience expressed by aphorisms, proverbs, quotations dilemmas and

paradoxes. Based on these they build their attitude to the most important idea or activities. However, nowadays people more and more live in a virtual world, so lack of experience of life leads to ideology or naivety and in consequence to stupidity. Wisdom is replaced by mere factual knowledge and it guarantees no understanding, no ability to interpret facts. Therefore, to understand wisdom we present some well-known facts.

Aphorisms are "golden thoughts," mostly one-sentence statements expressing a general philosophical or moral truth in a surprising and brilliant way, which makes them easy to memorize. Here are some examples: A Jewish aphorism: "*A wise man talks about what he has seen and a foolish man about what he has heard.*" A Chinese aphorism: "*All people are wise, some before, others afterward.*" An Arabic aphorism: "*The wrath of a fool is expressed in words; the wise man's wrath is expressed in action.*" The quotation by Marie von Ebner-Eschenbach is very telling: "*What are people most ready to call stupidity. The wisdom that they do not understand.*" The interpretation of these aphorisms leads to the creation of an imaginative vision of a wise person who is worth following.

Proverbs have also accompanied our lives since the dawn of time. The aim is to learn them and to warn against misconduct. They can also come from different countries. They express thoughts of a general nature but refer to specific life situations. Here are some examples of warnings: "*A lie has no legs,*" "*Anger is a poor adviser,*" "*While two dogs are fighting for a bone, a third runs away with it.*" On the other hand, sound advice results from such proverbs as: "*Faint heart never won fair lady,*" "*Look before you leap,*" or "*Hope for the best but*

expect the worst". They contain many valuable pieces of advice that increase people's alertness and ability to act effectively.

Quotations are other form of human wisdom. The following can be given as examples of defining the art of wisdom:

- *The fool wonders, the wise man asks.* Benjamin Disraeli (British prime minister)
- *Early to bed and early to rise makes a man healthy, wealthy, and wise.* Benjamin Franklin (American politician)
- *Knowledge speaks, but wisdom listens.* Jimmy Hendrix (American guitarist and singer)
- *To attain knowledge, add things every day. To attain wisdom, remove things every day.* Lao Tzu (Chinese philosopher)
- *Where there is shouting, there is no right knowledge.* Leonardo da Vinci (Italian artist)

Nowadays, dilemmas are related to terrorist attacks or situations where fundamental values need to be defended or redefined. In general, three categories of dilemmas can be distinguished:

- Ethical dilemmas involve a choice between two options and interfere with established ethical standards. An example of such a dilemma is whether or not to be loyal to one's co-workers. Another is the dilemma of employees when it is necessary to point out to the boss that they are wrong.
- Moral dilemmas occur when the problem of choice is much more important because it concerns a conflict of principles and values, usually with severe consequences. Such problems include, for example, the decision not to treat a patient or to become a member of a drug gang.
- Common dilemmas, occurring most

frequently, force us to think about life issues, such as changing the place of residence or choosing a new job offer, which in consequence means introducing specific changes in our lives.

Paradoxes express some difficult solved or still unsolved problems. An example of a paradox is the false paradox of Achilles and the turtle (Sainsbury, [9]). A fast runner and a slow animal stand up to the race. Achilles starts running when the turtle has already traveled halfway. However, before it reaches the middle of the route by itself, the turtle will cover the next section of length equal to one-quarter of the total distance. By the time the runner reaches its place, the turtle will have covered another part of the total distance, and, therefore, the distance between them will always be positive, although diminishing. It means that Achilles will never catch up with the turtle. It is an absurd conclusion, but it took a long time before an error in the reasoning could be identified. The infinite number of road sections of diminishing length gives a total of finite length. It follows that the time needed to cover this section is also finite. Hence, Achilles will win It race. However, It type of paradox was used to fight the opponents, as its creator, Zeno of Elea, used it to fight Heraclitus' contemporary correct views by arguing that no movement exists and that changeability is an illusion. Only time showed who was right.

Another type of paradox is the paradox of antinomy, which occurs when two different ways of thinking lead to two contradictory conclusions. Each of such conclusions seems to be based on sound arguments, and it is impossible to reject either of them.

An example of an antinomy is the liar's paradox (Beall et al., [10]). Let us assume that a liar who

always lies says “*I am not lying now.*” Let us also suppose that if this statement is true and the liar is telling the truth, which means that he is not a liar. If a liar lies, their statement means that they are not telling the truth, i.e., that they are a liar. We, therefore, arrive at a contradiction. Paradoxes of It kind arise when the sentences that form them refer to themselves. One way to avoid such paradoxes in logic would be to distinguish between language and metalanguage. It is worth stressing that in a general case, such paradoxes may concern the recognition of truth, which is already a very ambitious task.

There is another type of paradox, the so-called existential paradox (Smilansky [11]). In this case, the conclusion resulting from such a paradox seems absurd to even after a full analysis. However, its truthfulness must be accepted despite its absurdity. The error is not related to the initial assumptions or to the reasoning that leads to contradictions. It concerns the reality described by a given statement. In other words, the existential paradox is something constructive: although we can make sure that the assumptions or reasoning are correct, it reveals the true essence of things hidden in ourselves or the community around us. An example of such a paradox can be “love and hatred,” which describe opposing human feelings but are not absurd, as they can occur at the same time, entailing unexpected consequences. Such paradoxes may be cited as something irrational or wrong, but unfortunately existing in life. Such duality of feelings does not even allow people to understand their mistakes.

To sum up, paradoxes are inseparably linked to our morality or social and personal reality, revealing the richness, complexity, and

sometimes the perversity and irrationality of our lives. We should come to terms with their presence, learn to live with them and learn from them. Paradoxes can be treated as motivating challenges that affect both human behavior and social structures. They can teach people and whole societies wisdom.

Attitude is a psychological construct, a mental and emotional entity precipitated through a responsive expression towards a person, place, thing or events. Human attitudes have two dimensions: the strength of interaction (high and low) and the sign of interaction (positive, neutral, negative). These dimensions can change in the process of shaping attitudes. Upbringing, education, and one’s own experiences have a significant impact on attitudes. The process of shaping attitudes and its changes are complex and depend on many different social factors, living conditions, the environment, as well as age.

The attitudes of people shaped by their parents in childhood are generally permanent and difficult to change. Nevertheless, they can be influenced by peer groups or one’s own experience. Education based on the transfer of information and knowledge also broadens human horizons. All these factors can, therefore, influence one’s attitude, sow doubts, and change both in strength and direction. Currently, an important role is played by various types of mass media, including advertising, especially in the business area. It is worth emphasizing that one kind of such widespread media is the Internet—a means of communication that has captured the contemporary world of ideas. The Internet allows us not only to search for what we like but also to publicize our attitudes, including opinions on various topics.

Attitude is also determined to a large extent by cognitive processes taking place in the human brain. They influence the choice of attitudes or their changes in time. They can be specified through specific rules resulting from human attitudes or through operations that process selective knowledge, which is available internally or reach the brain from the outside world. Of course, these processes stimulate specific human actions resulting from an understanding of the situation and the need to make appropriate decisions. Moreover, harmonious interaction between these processes based on wisdom enables the adaptation of human thinking to change situations, while at the same time, it evokes certain emotions. Cognitive processes can be analyzed from different points of view related to sciences such as psychology, sociology, linguistics, neurology, anthropology, philosophy, or, recently, cognitive computer science (Targowski, [12]).

The described examples of popular wisdom allow defining the art of living. The art of living is the skill of controlling one's emotions; it is the will of employing morality. It is also intuition and the ability to be guided by the commonwealth rather than one's benefit, and it is the ability to focus on important issues: the will to apply selflessness and the will to be either patient and modest or energetic, depending on the situation. The art of living is the skill of functioning in unpredictable situations and reckoning with some less rational factors; it is also the skill of proper conduct when faced with a company of people coming from a generation different than one's own. The art of living may reinforce the wisdom of judgment and choice, but it can also weaken, discredit, and neutralize these. Effects of being wise lead to better life, in consequence assure

happiness. Happiness brings it down to satisfaction, whose hierarchy is as presented below:

1. Work satisfaction
2. Financial satisfaction
3. Home satisfaction
4. Health satisfaction
5. Marital satisfaction
6. Satisfaction with one's society
8. Environmental satisfaction
7. Free-time satisfaction
9. Childhood satisfaction
10. Family satisfaction
11. Political satisfaction
12. Educational satisfaction

Everyone can determine their satisfaction by way of judging each of the kinds of satisfaction, assigning to it a band 1 to 5. Then absolute satisfaction is 60 points if we treat 12 (5x12) above items as equal ones. It is tough to attain, but even if you score 31 points (50+%) of all the kinds of satisfaction, the balance is positive, and the person can feel satisfied, that is, along with the old terminology – happy.

3. General wisdom attributes

The above considerations show that, in common sense, wisdom is the right assessment and choice of a solution concept. A lot of computational (mathematics) methods can be used for evaluation and selection of the best solutions; where the scope and quality of assessments and choices also depend on the human intelligence. These assessment and selection methods and the number of minds employed can provide the right judgment and choice of solution options. However, this is what a computer would do, not a person who uses their art of life in these intellectual processes.

For many other situations, where problems are not defined formally some intuitive methods can be used, which are based on some human capabilities, i.e. if wisdom is “sufficient” to solve them. Such processes of the art of living are rather elementary processes of wisdom. In such a way some IT solutions can strengthen the scope and quality of judgment and selection, as well as reduce their uncertainty.

cases in which there is an impact (rule) of wisdom, the power is higher.

Knowledge is a familiarity or awareness of someone or something, such as facts (descriptive knowledge), procedure/methods (procedural knowledge), or objects (acquaintance knowledge) contributing to one’s understanding.

Table 2 Main wisdom attributes and characteristics

Wisdom attributes		
Knowledge	Skills	Inspirations
World view Principle, procedures Conditions Rights, law, rules Experience Tradition	Communicativeness Qualifications Intuition Talent Intelligence Creativity	Value system Objective of actions Importance of strategy Motivation Attitude Emotionality

The above investigations review several paradigms of wisdom but begin with the contradiction of knowledge versus wisdom because very often, the latter is considered as a synonym of the former. The cognitive processes created in changing situations and varying conditions are characterized by the increasing complexity of increasingly higher categories of additional human capabilities and limitations. Such processes are also determined by the different characteristics belonging to the essential attributes of wisdom [13]: knowledge, skills, and inspirations (see Table 2). Examples of different interpretations of the attributes of wisdom and the characteristics of the power of wisdom are given and also analyzed below. The higher the capacity of these characteristics is and the more complementary and context-fitting they are, the wiser a person is. In such

Skills are the ability to use one's knowledge effectively and readily in execution or performance of the learned ability to perform an action with determined results with good execution often within a given amount of time, energy, or both. Inspiration presents arousal of the mind to special unusual activity or creativity "When you do not know what you are doing and what you are doing is the best –that is inspiration" [Robert Bresson *Notes on the Cinematographer*].

Knowledge should concern the effects of individuals or teams when solving various types of problems. The greater the scope of access to such knowledge, the greater the possibility of learning about human capabilities, including human wisdom. In principle, a distinction shall be made between the following types of

knowledge available:

- Personal/declarative knowledge describing one's own experiences related to oneself and the world, contained in broad cognitive categories and redundant in relation to the currently performed tasks;
- Procedural/domain knowledge constituting a set of procedures for proceeding depending on different situational contexts and technological possibilities, which is also redundant in relation to current needs;

Universal/global knowledge constituting a set of principles, rules and rights established as a result of the 6,000-year development of civilization, for example, in the field of human rights, civil rights, international law, morality, and ethics.

However, each of these kinds of knowledge is a product of specialized minds that control human brains and influence behavior (Stewart, [14]). As far as the state of recognized knowledge about the world and its living and dead elements is concerned, the most developed category is common-sense knowledge, which has been supporting humans since we became a species of this kind, relying on our own strengths and skills in a very hostile animal environment and under the influence of a sometimes very ruthless nature.

The theoretical knowledge supporting independent and truth-oriented reasoning has been developed within physics and chemistry for many years. At present, the development of theoretical knowledge is largely due to the large number of professional researchers who produce peripheral theoretical knowledge in order to stay in work at universities and institutes. On the other hand, global knowledge

is available to pupils, students, and ordinary people. This started to develop recently and is related to the unexpected phenomenon of the Internet, which, since the beginning of the twenty-first century, has made it possible to develop globalization at almost all levels of human organization. Global knowledge takes the form of digital knowledge, resulting from the digitization of information of all kinds and the creation of digital libraries, which results in the disappearance of scans of paper publications such as newspapers and books. Due to this, ordinary users are able to search them quickly, sometimes even for free or for a small fee. On the other hand, virtual knowledge results from the phenomenon of the dissemination of social networks such as Facebook, Twitter, or many others. It occurs mainly at the level of individual, common-sense knowledge, although sometimes theoretical knowledge and other types of knowledge are disseminated by its creators who, without these networks, would be unnoticed, just as their contributions to knowledge. In addition, the information content of these networks is enormous and is an excellent reservoir of potential knowledge to explore. This sometimes happens, for example, in periods of government elections or the activities of intelligence and counterintelligence services.

Hybrid knowledge, resulting from the development of the "computational" power of the brain and the human mind through the implantation of electronic circuits and their connection with external computers, is also becoming more and more real. This can lead to the production of brilliant people and thus perhaps also to the creators of new knowledge. Another type of knowledge, the so-called cosmic knowledge, is connected with the activities of government agencies such as NASA, or private sponsors such as Elon Musk (Tesla),

Jeff Bezos (Amazon), and Richard Branson (Viking Corporation) who, among many projects, plan to travel one way to Mars. Such projects develop knowledge about space in the twenty-first century at an accelerated pace.

Of course, apart from knowing the world or the environment in which we live, it is important to know one's own self and systematize to some extent one's own experiences or reflections, which prove helpful in the analysis of new situations. In addition, an understanding of existing external conditions leads to taking more realistic actions that are otherwise in line with the existing reality. Noticing the possibilities of new technologies, in turn, creates an opportunity for their effective use, which may facilitate finding meaningful solutions to the problem under consideration. The most important functionality is information updating and its selection to dispose the current knowledge. It should be stressed, however that knowledge of this type is not wisdom, but it does create better conditions for the manifestation of wisdom. Wisdom is the way of using the available knowledge and making the right decisions or taking more fruitful actions, and this depends on innate or acquired skills.

A person's skills in relation to their wisdom reflect the cognitive levels of their mind and concern the perception of sensations, the understanding of the situation defined by these sensations, the realization of the consequences of different reactions to these sensations, and finally the choice of the appropriate response to them (Bruni et al., [15]). In the case of solving complex problems, the observed skills are much more developed and related to:

- *Communicativeness*, which describes the ability to transmit and receive information in an

understandable manner and, consequently, to be able to communicate with other people in order to clarify the essence of the matter.

- *Qualifications* held by the person result from a trained and/or educated profession.

- *Intuitiveness*, defining an imposing conviction which cannot be fully justified. It is a subconscious process that cannot be controlled either. Only a conscious solution can be accepted or rejected. Intuition always supports the creative process.

- *Talent*, which is a person's natural ability to do certain things that can be developed through training and practice. Everyone should discover their natural abilities, develop them, and use them effectively in their lives.

- *Intelligence*, which is the ability to understand, learn, and use one's knowledge (cognition in general) in different situations or contexts. It determines the efficiency of human cognitive activities.

- *Creativity*, which is understood as creative activity related to the emergence of new ideas, concepts, or associations with existing ideas and concepts, leading to obtaining new, original ideas and solutions.

It is obvious that the higher the skills of an individual, the wiser the person (Goldberg [15]). There are studies that try to determine the mutual correlations or influence of some of these skills on the capabilities of human action. However, there is no integrated model that would explain how wisdom is created in the human mind and how it impacts human action.

Observations show that wise actions are not just a routine, and in addition to knowledge and skills, human inspirations, which are conditioned by many different circumstances and factors, are also important in implementing

wise action. A person that moves the intellect or emotions to prompt action or invention idea is well inspired. Paraphrasing the saying that “*he who wants to be happy is happy*”, one can say that *he who wants to be wise is wise*. That is why the attitude of a person to the problems surrounding them as well as the motivation to achieve the set goal is very important (Putti, [16]). In a broad sense, by inspiration we will understand a set of the following factors:

- A *system of values* that determines the choice of values, symbols, and patterns defined as the most desirable, hierarchically ordered traits, behaviors, or norms that are extremely valuable and desired by the individual or the society. Often the system of values influences a person's attitude and induces them to specific behaviors.
- The *objective of the action* (well defined), which allows attention to be focused on the resulting importance of the problems to be solved and successful implementation of solutions. An important life goal may be to become a wiser person or to improve a difficult situation.
- *Motivation* to be informed, to develop one's own knowledge and wisdom or to get to know the wisdom of others, otherwise a state of readiness to take ambitious action, resulting from one's own or another person's/ organization's needs, desires, curiosity, or fear of consequences.
- *Attitude* (negative, positive, or indifferent) toward an object (person, object, event, idea, or community), consisting of passing a proper judgment on it. It is expressed through the behaviors of a given person or organization toward this object.
- *Emotionality*, concerning the emotional sphere of a person's psyche when they experience conflicting emotions over which they generally have no control. It can be caused by

fatigue, stress, or excessive sensitivity. Control over emotions is in many cases very important and very useful.

These factors have their own dynamics of change. One can be inspired at a given moment in time by one's own or another's attitude as well as one or another situation. One can be determined for a longer period to achieve a set goal that is important for the majority. One can have a well-established system of values and be guided by it in life despite unfavorable circumstances. It happens, however, that a person changes their views and, for example, becomes a nonbeliever from a believer or vice versa, or adapts to the current fashion or economic situation in accordance with emerging trends. Inspirations alone are not wisdom, nor are knowledge or skills. All these human attributes can be used in two ways: positively or negatively. Wisdom is related to using all these human qualities in a positive way. This will always be determined by the adopted system of values.

Human behavior strictly depends on the attributes of wisdom. In consequence, this leads to some effects that are expressed by the achieved satisfaction. It seems that human behavior may fall into the following categories:

- inappropriate (beyond established norms),
- acceptable (minimally in line with these norms),
- typical (i.e., characteristic of the majority),
- unusual (exceptional, e.g., characteristic of a strong minority),
- admirable (unexpectedly positive, or “wise”).

The effects of human activities is a derivative of human behavior and can also be assessed as the effects of human activities, which can be estimated as follows:

- Lack of effects means that nothing good has been achieved.
- Marginal effects concern certain minimum positives.
- Acceptable effects are the fulfillment of basic expectations.
- Exceptional effects include additional, less expected but important achievements.
- Admirable effects are extraordinary positive results, surprising everyone, mainly due to the action of the power of wisdom.

In general, the evaluation of human behavior (activities) is associated with the achieved effects to which this behavior leads. Awe-inspiring behavior occurs when a person behaves in a unique way that ensures that very useful results are obtained. It can, therefore, be assumed that for complex human or social problems, only wise behavior results in full satisfaction (admirable results). Full satisfaction means the achievement of something desired, planned, or attempted, which is also called a kind of success. Typical behavior, on the other hand, is behavior in cases where the majority of people, encountering the same life problem with similar conditions and limitations (similar situations occur in life, but rather rarely), behave similarly (e.g., 95% of the population) and achieve at best an acceptable effect. In consequence, each success is largely admired and has positive social influence. However, Albert Einstein said, *“try not to become a man of success, rather become a man of value.”* W. P. Kinsella states that *“success is getting what you want; happiness is wanting what you get.”* Satisfaction, success, and happiness are different faces of the same idea. To evaluate these items we can recognize functionality of human mind. It is related to analysis of cognition levels.

4. Wisdom and Cognition Levels

From learning points of view the cognitive process is divided into six categories (from low to high): remembering, understanding, applying, analyzing, evaluating, and creating (the improved Bloom's taxonomy [17]). In the literature the interpretation and names of these categories can be quite different. Below we assumed that:

Remembering (Knowledge) recalls terms, facts, and details without necessarily understanding the concept. It is defined as including those behaviors and test situations that emphasize the remembering, either by recognition or recall, of ideas, material, or phenomena. Incorporated at this level is knowledge of terminology, specific facts (dates, events, persons, etc.), conventions, classifications and categories, criteria, methods of inquiry, principles and generalizations, theories and structures. It recalls and recognizes information and idea or facts and concepts, being an extract relevant knowledge, coming from long-term memory.

Understanding (Comprehension) summarizes and describes main ideas of the material heard, viewed or read in own words without necessarily relating it to anything. It refers to responses that represent a comprehension of the literal message contained in a communication. This means that people are able to translate, interpret or extrapolate. Interpretation involves the reordering of ideas (inferences, generalizations, or summaries). Extrapolation includes estimating or predicting based on an understanding of trends or tendencies. It refers to constructing meaning from teaching information disseminated verbally, written, or graphically.

Applying (Application) applies or transfers

learning to one's own life or to a context different than one in which it was learned. It applies an appropriate abstraction (theory, principle, idea, method) and provides opportunities to use ideas, theories or problem solving techniques and apply them in new situations or new circumstances.

Analyzing (Analysis) examines concepts and ideas to break them into its constituent parts, and determines patterns and relationships between the constituent parts to form an overall structure. It involves the ability to recognize unstated assumptions, to distinguish facts from hypotheses, to distinguish conclusions from statements that support them, to recognize which facts or assumptions are essential to a main thesis or to the argument in support of that thesis, and to distinguish cause-effect relationships from other sequential relationships.

Evaluating (Synthesis) uses standards and criteria to support opinions and views or refers to makes judgments based on some guidelines including verification and judgment. It also justifies a stand or decisions for appraising the extent to which details are accurate, effective, economical, or satisfying.

Creating (Creation) assembles parts of knowledge into a whole using creative thinking and problem solving. In other words it refers to the reorganization of various elements to form a consistent or functional whole or the reorganization of elements into a new model or structure. It involves the production of a unique communication, the ability to propose ways of testing hypotheses, the ability to design an experiment, the ability to formulate and modify hypotheses, and the ability to make generalizations. It puts information together in

an innovative way and produces new or original work.

In general, cognition is the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. It encompasses many aspects of intellectual functions and processes such as: perception, attention, thought, the formation of knowledge, memory and working memory, judgment and evaluation, reasoning and "computation", problem solving and decision making, comprehension and production of language. Cognitive processes use the existing knowledge and discover new knowledge. They represent some human functionalities, which can be listed as follows [18]:

Memorizing, where human memory can be divided into two sections, short-term memory or working memory (analogy to RAM in a computer) and long-term memory (analogy to disk storage in a computer system). Human memory plays an essential role in all cognitive processes. It makes it possible to remember all kinds of information, such as events, meeting, science knowledge, etc. As it has been discovered neural networks are an important component of the human memory system, but their purpose is for information retrieval, not for information storage.

Attention is the ability to concentrate or focus on a particular object, thought, action, and environment for a long time. It is the ability to choose and focus on relevant stimuli. It is a selection process for both external stimuli such as sound, smell, feeling, etc.

Perception is the ability to recognize surroundings, thoughts, or bodily stimulation through our sensory organs and brain. Our tongue tells the brain what chemical

composition the food contains. And based upon the perception we say it is sweet or sour, and we actually taste through the brain. Our perception is the process of capturing, processing and making sense of the stimuli that our senses receive.

Logic and inductive reasoning and deductive reasoning are the essential skills of the human brain to interpret logical sentences or situations; as stated already, deductive reasoning is the most important cognitive skill most of the human fail to adapt; asking questions to oneself is the most efficient way to improve this skill. Innovation, rational thinking, problem-solving, decision making, and handling many real-life situations require you to have good logical or reasoning skills. Logical thinking is the process of consistent reasoning to come to a conclusions.

Processing refers to the visual or auditory information or knowledge processing and can be characterized by the processing speed referring to the speed to reflect or think. Thinking speed, or processing speed, is the rate at which new information can be absorbed, assessing the information and formulating a response to that information. One of the important skills is learning which is specific processing related to understanding, analysis, synthesis and remembering of the acquired information or knowledge.

Mobility is the ability to mobilize our muscles or body parts according to the situation or direction by our brain.

Cognitive abilities are also skills that our brain uses to complete essential day-to-day tasks like thinking, learning, reading, remembering, speaking, listening and paying attention. They involve storage of patterns or data in a cognitive

memory, they occur naturally in the brain, but we can further develop and strengthen them by challenging ourselves. One of the popular methods leading to the improvement of cognitive processes or their functionalities include the following:

- Taking care of one's health according to the saying a sound mind in a sound body;
- Ensuring proper activity in order to constantly develop and exercise one's intelligence and critical thinking in accordance with the principle if you don't develop, you regress;
- Using the possibilities provided by new information and communication technologies, as opposed to limiting oneself to manual functions ("enter" type) - moving to a higher level of abstraction of operation based on the integration of the available functions into ones of a more complex nature;
- Skillfully taking on new challenges related not only to work but also to private life—Pierre Mure pointed out that in order to live, people must feel that they are alive.

Special exercises are also proposed which lead to improving the human mind, and in consequence, its cognitive possibilities. Unfortunately, cognition can be described from different points of view (processes, functionalities) and their interpretations cannot be unambiguous, when different aspects of a human being are analyzed. Therefore, in further considerations, we will limit ourselves to the most important cognitive aspects represented by cognitive levels related to decision making. We choose such a point of view because decision making is a very important aspect of human wisdom. The proposed cognitive levels of a person's mind determine their decision-making attitude and emotional behavior in different situations. According to some previous

works (Kitchener, [19]), we propose four levels of cognitive processes that create increasing possibilities for wise human actions.

These are as follows:

- The first level of cognition is related to embracing sensations and specifying the state of an individual in a given circumstance. It is determined by the basic cognitive processes related to filtering the available information and the processes of perceiving and becoming aware of external stimuli by the sensory organ (i.e., perception and reception of sensations). For interpersonal communication, it is also important to understand not only the verbal, but also the nonverbal (body) language. Sensory sensations can be deformed by other expectations, needs, or feelings that are triggered by the subconscious. It is therefore necessary to correct the first sensations for which the processes of human intelligence are responsible.

problems, or other situations brought about by the richness of the human experience.

- The fourth level of cognition is the most creative and is responsible for creating ideas that aim to prepare a suitable scenario of our actions as a reaction to the existing situation.

Of course, we can distinguish many categories of sensations, evaluations, and ideas created in our minds. It would be difficult to catalog them accurately, given their multiplicity, diversity, and complexity as well as the fact that many of them are unique. Most importantly, in addition to the performed cognitive processes, our mind generates complementary knowledge. Furthermore, it ignores some irrational ideas, trying to find justification only for rational actions.

The above levels of cognition are also taken into account for farther considerations. The basic functionalities for each level are analyzed (see

Table 3. Functionality of cognition levels for decision

Cognizance	Comprehension	Imagination	Behavior
Memorizing	Learning	Dating	Reaching goals
Attention	Judging	Analyzing	Progressing
Perception	Recognizing	Reflecting	Proceeding
Transfer /Exchange	Marshaling	Estimating	Decision making
Conversation	Remembering	Forecasting	Evaluating

- The second level of cognition is a comprehensive assessment of the situation or working out a stance on what has happened. Some cognitive skills (see above) are necessary to make it quickly and correctly.

- The third level of cognition is related to working out a certain level of awareness of the existing situation—developing an attitude, goal, and strategy in decision-making, solving

Table 3) in order to plan and carry out appropriate actions. A short discussion about cognition tests is presented. Based on these, the measures of the wisdom power and the wisdom quotient in terms of achieved success are proposed. Some representative cases of such behavior are specified and discussed as human attitudes. It is also underlined, how computer science approaches can support the

understanding of human wisdom.

We name the identified levels of cognition as follows: Cognizance (the lowest level), supported by cognitive properties and actions due to the details of the existing situation are recognized; Comprehension (Level 2, intermediate), which allows an appropriate evaluation of the situation; Imagination (Level 3, intermediate), which concerns the imagination of possible consequences of responses to such a situation; and Behavior (the highest level), which provides an appropriate response in the form of some activities to this already properly defined and evaluated experience (see Table 3). In Table 3 we propose some activities describing each level of cognition. It can be stated that these levels should provide wise perception, wise assessment, wise awareness, and, consequently, wise action and/or solutions. They create a very complex, dynamic dispersed system, coordinated by wisdom as a central unit of knowledge in the apparatus that controls humans: the brain and the “society of minds” (Minsky, [20]). The role of wisdom can change depending on the different contexts in which a person finds himself/herself.

The cognitive levels of a person's mind determine their decision-making attitude and emotional behavior in different situations. The literature considers different measures of wisdom, assuming different sets of characteristics in different types of experiments and taking into account different characteristics influencing wisdom [13]. For example, some researches consider the following characteristics:

- life experience;
- emotional intelligence;
- reminiscences and reflections on life;

- openness to experience;
- sense of humor, distance to oneself.

Others, coming from a different point of view, consider the following traits:

- harmony: agreement, positive mood, accurate judgments;
- warmth: humor, compassion;
- intelligence: the ability to solve problems;
- the link with nature: respect, healthy environment;
- spirituality: spiritual life, relationship with God.

It is easy to note that the characteristics mentioned above have some correlation with the three attributes of wisdom presented in Section 3: knowledge, skills, and inspiration. The power of wisdom can be applied to the mind on a microscale that captures the basic repetitive activities in each of its cycles of reactions to the existing situations. However, their roots are in the central mind, controlling the role of wisdom in the integration of basic human process activities belonging to cognitive levels, where:

- Cognizance related to human conversation or transfer/exchange: internal-cognition based, external language-based, and body-based exchange of messages among the basic life processes, with different attention and perception;
- Comprehension - cognition enhancement, discovering and remembering, marshaling or judging, learning and attitudes creation;
- Imagination - reflecting and evaluating decisions and actions, and also the results of possible actions and planning the next steps or concluding the activities;
- Behavior - behavior-based positioning in post and *a priori* actions, such as: decision-making

and problem-solving, implementing solutions into controlled processes such as eating, reproducing, learning, passing examinations, reading, cooking, harvesting, producing, transporting, curing, and so forth.

It is difficult to evaluate the cognition possibilities of a human being. There are cognitive tests which measure a candidate's thinking abilities, including, reasoning, perception, memory, problem-solving skills, and verbal reasoning. Cognitive tests measure a candidate's thinking abilities, including, reasoning, perception, memory, problem-solving skills, and verbal reasoning. They are usually used by potential employers to assess an applicant's thinking abilities. The questions featured in these tests tend to include verbal analogies, arithmetic calculations, spatial relations number series puzzles, comprehension, and reading comprehension. Cognitive ability tests are notoriously tricky, as they often come with harsh time-limits and specific question types. Yet, rest assured, through practice, it is possible to familiarize oneself with the types of questions featured on these tests and to improve one's speed. Sometimes test takers confuse Cognitive Ability tests with Cognitive Skills tests. Cognitive Ability tests measure general intelligence, ability to learn and apply new skills. Cognitive Skills tests are designed to find out if math and verbal career training programs are necessary for entry-level roles. This exam will inform the applicant's future employer about where to best put him/her within the company structure.

In Cognitive Ability Tests the following topics are included: Numerical Reasoning, Verbal Reasoning, Abstract Reasoning, Logical Reasoning. The Scores contain: *Raw score*, *Subscores*, *Percentile score*. The Criteria Cognitive Aptitude Test (CCAT) is widely used to

predict the work performance of candidates seeking upper-level jobs, including sales executive, managerial roles, software developer, executive assistant, and software analyst positions. The goal of the CCAT aptitude test is to measure one's problem-solving, critical thinking, aptitude & learning skills. Far too many otherwise qualified job seekers are turned away from the job for which they simply because they fail the CCAT. The passing rate for the CCAT is surprisingly low, in fact, only 20% of test-takers pass. And, the average score is just 24 out of 50. For instance Quick Facts on the CCAT Test: Free CCAT Practice Test – Criteria Cognitive Aptitude Test [2022] (preterminal.com) characterize the following properties:

- There are 15 minutes to answer 50 questions;
- No calculators are permitted;
- There are three types of questions: math and logic, verbal, and spatial reasoning;
- After the CCAT is completed the raw score and the percentile score are sent to employers
- The average candidate only manages to get 24 questions correct;
- Fewer than 1% of test-takers answer all 50 questions.

It is hard to pass the CCAT test, so it is crucial to prepare. Some firms have developed a CCAT Rapid Course to get top results in no time. Though their course is rapid and specifically designed for working busy people, it covers everything to guarantee a high score. With the CCAT Rapid Course, one will get video-based and written materials and the best tricks to solve every question type on the test. The Course consists of 14 modules with a topic quiz to consolidate one's knowledge. 2 full-length timed tests have been created to provide an accurate testing experience before the real thing is completed.

Other tests are used to evaluate the cognitive level of learners during online learning. It is an essential indicator for evaluating the effect of online learning. A timely evaluation of the cognitive level of learners helps them understand their cognitive level and adjust learning strategies in time (Feng et al., [19]). It can also help teachers obtain learners' cognitive level information in time, implement teaching strategies more accurately, and provide personalized teaching interventions.

For the method of cognitive level evaluation, there are mainly content analysis methods (Ullah, [20], Chen [21]) They focus on the learning analysis technology ignores the implicit semantic information in the unstructured text data and requires manual selection of many data features, what is time-consuming and labor-intensive, and has a poor generalization ability. Cheng [22] evaluates learners' cognitive level based on a supervised deep learning model, where the four deep neural networks are proposed for the online course discussion texts of engineering disciplines. The experimental results show that the deep neural network can realize the automatic evaluation of learners' cognitive level based on Bloom's taxonomy of cognitive objectives. However, Bloom's taxonomy of cognitive objectives has a certain degree of overlap and ambiguity in the semantics of each cognitive level, which makes it more difficult for the model to evaluate different cognitive levels accurately.

Learners at the level of remembering or understanding can pay attention to change their learning attitudes in daily learning, recognize their dominant position during the learning process, clarify the purpose of learning, cultivate the desire for knowledge, and apply the learned

knowledge to practice. At the level of applying or analyzing, they can also actively stimulate their creative thinking in the interaction with the teachers, and exercise their high-level cognitive ability. At the level of evaluating or creating, they can try to normalize higher-order thinking to maintain higher-order thinking skills during other learning tasks. On the one hand the proposed approach opens new possibilities of cognitive levels evaluation, particularly on remembering, understanding, and analyzing texts by some keywords. On the other hand, it shows how tedious a task is a total evaluation of all the functions presented in Table 3. The cognitive level evaluation models require not only the automatic extraction of text features given by the hybrid deep neural network but also including the fine-grained language features such as the syntactic rules.

5. Relation between level of cognition and wisdom attributes

As we know, life can be varied; hence, different decisions can be made. They are visible at every level of cognitive actions. Controlling the role of wisdom is integration and management of various human process activities, supported by the functionality of cognitive levels. In other words, both of them are intertwined, as it is shown graphically in Fig. 1. As was presented in Section 4, finding all concrete associations existing between wisdom attributes and cognition levels is a difficult task and requires numerous experiments. Let us consider the example of acquiring knowledge. The source of advanced knowledge is the knowledge generated during human activity, which is different from the so-called everyday knowledge (common-sense knowledge and the above-mentioned beliefs, various types of quotations, and the aforementioned principles and

dilemmas or paradoxes resulting from them). Every human cognition or action, especially when based on a deeply understanding mind, can also be a source of new knowledge, if only people can provide it with a universal form. This constant cognition also includes the achievements of many generations, often irretrievably lost with the loss of a given personality. This is why undocumented knowledge is often rediscovered. It is only information technology that makes it possible to collect and store knowledge in the form of huge sets of data, which are constantly developed, made available, and analyzed. However, it can be partially possible for simplified association models and the corresponding verification procedures.

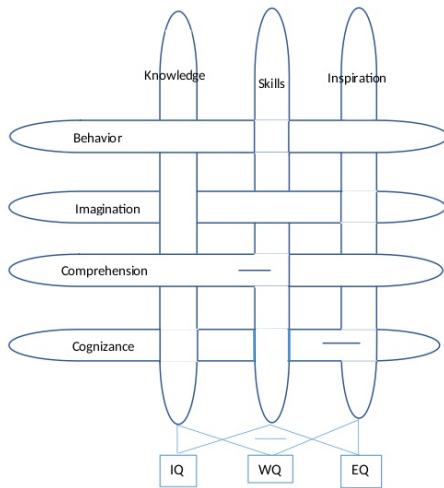


Figure 1. Graphical illustration of association among wisdom attributes and cognition levels.

Let us concentrate on one important role in the development of knowledge which is played by the personal attitude, which also has an impact on the formation of knowledge. By personal attitude we mean individual readiness to accept or reject a specific way of thinking and act in relation to processes of cognition, action, and reflection. In practice, this can be expressed by an appropriate attitude toward promoted ideas,

the course of events, or the general needs that a person encounters more or less temporarily or permanently. It follows that the elements of personal attitude are:

- The attitude toward new challenges, or new or existing experiences related to a given state of affairs, expressed through an open or closed mind;
- Emotions related to the case under consideration, resulting from the given state of affairs and leading to a negative or positive attitude toward the processes of cognition, action, and reflection;
- The type of activity related to the existing circumstances and created around the existing circumstance, consisting of external (extrovert) or hidden (introvert) / static cognitive and reflective thinking, and action.

The attitudes of people shaped by their parents in childhood are generally permanent and difficult to change. Nevertheless, they can be influenced by peer groups or one's own experience. Education based on the transfer of information and knowledge also broadens human horizons. All these factors can, therefore, influence one's attitude, sow doubts, and change both in strength and direction. Currently, an important role is played by various types of mass media, including advertising, especially in the business area. It is worth emphasizing that one kind of such widespread media is the Internet—a means of communication that has captured the contemporary world of ideas. The Internet allows us not only to search for what we like, but also to publicize our attitudes, including opinions on various topics. Extensive information is available and analyzed from different points of view.

Attitude is also determined to a large extent by cognitive processes taking place in the human

Table 4. Example of associations between the level of cognition and the attributes of wisdom for decision making

Cognition/Wisdom	Knowledge	Skills	Inspirations
Behaviors	Proceeding/Rights Low	Progressing/Creativity Talent	Reaching goals/Emotion
Imagination	Planning/Principles Foreseeing/World view	Evaluation/Intuition Analysis/Intelligence	Association/Motivation
Comprehension	Remembering/Conditions Judgment	Recognizing Learning/Qualification	Comparison Recognition/Attitude
Cognizance	Exchanging Transferring /Experience	Perception Memorizing/ Communication	Attentive/Importance Value system

brain. They influence the choice of attitudes or their changes in time. They can be specified through certain rules resulting from human attitudes or through operations that process selective knowledge, which are available internally or reach the brain from the outside world. Of course, these processes stimulate certain human actions resulting from an understanding of the situation and the need to make appropriate decisions. Moreover, harmonious interaction between these processes based on wisdom enables the adaptation of human thinking to changing situations, while at the same time it evokes certain emotions. Cognitive processes are analyzed from different points of view, related to sciences such as psychology, sociology, linguistics, neurology, anthropology, philosophy, or, recently, cognitive computer science. However, up to now, the research has concentrated on explaining how the brain is functioning, where some associations can be explained. Therefore below, based on the intuition, we can express the association proposition presented in Fig. 1 by the matrix in Table 4.

Its results follow from a comparison of Table 2 and Table 3 and some extra knowledge. Let us point out the correspondences existing among some characteristics of wisdom attributes and some factors of cognition levels. As is shown above, plenty of experiments should be conducted to verify the most valid associations. Below we assume that such associations exist and we try to describe it in a more formal way to simplify the problem of their analysis.

The possibilities of human knowledge depend not only on the gathered data, but also on the way of accessing it, and its processing procedures, taking also into account some principles and intelligent decision making. The human skills depend on such capabilities as perception and communication or imagination and intuition. The human inspiration depends on the sense of actions, importance of the implemented strategy in referring to the value system, or in other words, depending on the attention and attitude to the considered problems. We assume that human wisdom is determined by many different types of characteristics (*WDC*), which are assigned to the three main attributes of wisdom (*WA*): knowledge (*Kn*), skills (*Sk*), and inspiration (*In*)

(see Table 2), then:

$$WDC = Kn \cup Sk \cup In \quad (1)$$

Let Kn be a set of wisdom attribute characteristics related to knowledge (e.g. experience, tradition, and so forth), let Sk be a set of wisdom attribute characteristics related to skills (e.g. communication, qualification, intuition, and so forth), and let In be a set of wisdom attribute characteristics related to inspiration (e.g. value system, importance, motivation, attitude, emotion). Possible wisdom characteristics (denoted by WDC) are shown in Table 2. Each characteristic can be described by some factors, so we can define a wisdom tree of various wisdom parameters.

In the same way we can describe the characteristics of cognition levels CL (denoted by CLC). Let us denote Cg - characteristics of cognizance, Cm - characteristics of comprehension, Im - characteristics of imagination and Bh - characteristics of behavior (see Table 3). Then:

$$CLC = Cg \cup Cm \cup Im \cup Bh \quad (2)$$

The force of influence denoted by ($Force(clc, wac)$) between $wac \in WAC$ and $clc \in CLC$ can be determined using the Rensis Likert scale see pattern (3) as follows:

$$Force(clc, wac) = \begin{cases} 1 - \text{when It role is negligible} \\ 2 - \text{when It role is noticeable} \\ 3 - \text{when It role is average} \\ 4 - \text{when It role is high} \\ 5 - \text{when It role is enormous} \end{cases} \quad (3)$$

This kind of evaluation can be done by brain storm of experts or estimated by some clever experiments. Let us assume theoretically that such evaluation is possible in practice. Let us note that higher force of influence means higher power of wisdom. The wisdom power (WP) we

can defined in the following way:

$$WP = \frac{1}{|CLC| |WAC|} \sum_{clc \in CLC} \sum_{wac \in WAC} Force(clc, wac) \quad (4)$$

The power of wisdom WP can also be expressed on a five-point scale as an average rate of the role rates of all the wisdom characteristics taken into account, i.e., $WP \in \langle 1,5 \rangle$. Theoretically, the power of wisdom can be evaluated from the following matrix $M = [Force(i, j)]$, where i is the i th position of the element clc in a set of CLC , and j is the j th position of the element wac in a set of WAC . The number of all possible combinations of values for M is $K=5x$, where $x=|CLC| \times |WAC|$, where $|CLC|$ is the cardinality of the considered set CLC ; $|WAC|$ is the cardinality of the set WAC . Analysis of all these combinations is practically impossible. Therefore, we put our consideration on the highest level, i.e. we limit our evaluation to all cognition levels ($cl \in CL$) only and all the wisdom attributes ($wa \in WA$) then we have 512 possible combinations of matrix values. Then, WP can be calculated in a much simple way:

$$WP = \frac{1}{12} \sum_{cl \in CL} \sum_{wa \in WA} Force(cl, wa) = \frac{1}{12} \sum_{i=1}^4 \sum_{j=1}^3 Force(cl_i, wa_j) \quad (5)$$

where is estimated in the same way as $Force(clc, wdc)$, see pattern (3).

Let CL be a set of Cognitive Levels, and WA a set of Wisdom Attributes. Based on the above considerations we can calculate the matrix, called Role (CL, WA), the elements of which $Role(cl, wa)$, $cl \in CL$, $wa \in WA$, are defined by pattern (3). is the cardinality of the considered set WA ; is the cardinality of the set CL . In our case $|WA| = 3$, $|CL| = 4$. We can concentrate on 12 estimates to evaluate the values of $Force(cl, wa)$ for each person participating in the evaluation experiments. The values of the above matrix elements are estimated arbitrarily, based

directly on the presented definitions of the cognitive levels and wisdom attributes. It can be determined either intuitively by experts or on the basis of collecting questionnaire forms filled out by the persons tested based on the idea of Table 3 In the future, special standard kinds of experiments can be made and used to prepare standard tests for evaluating the rate of roles. As is shown above, there are many various combinations of possible values representing the roles of each category of wisdom cooperating with different cognition levels. However, we can select some representative cases of such evaluations. The first case assumes that the correspondence (force) between wisdom attributes and cognition levels is rather low for knowledge and decreasing for skills and inspiration. It means that each person uses the possibilities of cognitive levels, but with varying degrees. One such an example of $Force^3(CL, WA)$ corresponding to a person, rather with low power of wisdom, could be as follows:

$$Force^1(cl_i, wa_j) =$$

Cognitive Levels/Wisdom Attributes	1-Knowledge	2-Skills	3-Inspiration
4-Behavior	2	1	1
3-Imagination	2	2	2
2-Comprehension	3	3	2
1-Cognizance	3	3	2

Then $WP = (4+6+8) : 12 = 26 : 12 = 2.017$ which means that the wisdom power of the evaluated person is noticeable, since they achieve a bit more than 40% of the highest potential. It seems to be a representative value for ordinary people. Let us consider the next case, as follows;

$$Force^2(cl_i, wa_j) =$$

Cognitive Levels/Wisdom Attributes	1-Knowledge	2-Skills	3-Inspiration
4-Behavior	3	3	2
3-Imagination	4	3	3
2-Comprehension	4	4	3
1-Cognizance	4	4	4

Then $WP = 3.41$, what means that such people may achieve 68.2% of the highest potential. We can state that the second person represents higher wisdom power, and in consequence, his/her activities are more efficient and useful. This corresponds to average people. The last case is as follows:

$$Force^3(cl_i, wa_j) =$$

Cognitive Levels/Wisdom Attributes	1-Knowledge	2-Skills	3-Inspiration
4-Behavior	4	4	5
3-Imagination	4	4	5
2-Comprehension	5	5	5
1-Cognizance	5	5	5

Then $WP = 4.67$, what means that such people may achieve 93.4% of the highest potential. This corresponds to notable people. The proposed evaluation approach is rather an optimistic one. Therefore, another definition (more pessimistic and the weakest link of the chain, which, if it can go wrong, it will go wrong) is as follows:

$$WP = \min_{\substack{cl \in CL \\ wa \in WA}} \{Force^3(cl, wa)\} \quad (6)$$

Then $WP = 1$ for the first considered case, $WP = 2$ for the second considered case, and $WP = 4$ for the third considered case.

In that way we define three categories of persons representing various wisdom possibilities. If wisdom attributes are well complemented by the cognition levels, then the power of wisdom is higher. In other words if these dependencies are stronger, they have a stronger impact on wise human behavior. We can claim that cognitive levels determine human possibilities only, but their practical implementation requires also a high impact of wisdom attributes on the human behavior. Understanding such multidimensional connections can explain some secrets of human wisdom.

6. Wisdom Quotient

In addition to the WP parameter, we propose another called the Wisdom Quotient (WQ), which is calculated in the following way:

$$WQ = \text{const} + 3 \cdot 2^{WP} \quad (7)$$

where the const value is chosen arbitrarily, e.g., $\text{const} = 80$. Let us consider such as below:

- only notable (all of them have values of 1), what means that $WP = 1$, then $WQ = 86$
- if their mean value of $Force = 2$, then $WQ = 92$
- if their mean values is 34, $WQ = 104$
- if they mean values is 4, $WQ = 128$
- if they are the highest values equals 5, then $WQ = 176$

In practice, we should take into account different real cases of human decisions which take place during the performance of various human activities. As above, we may distinguish three broad categories of decision making people. Authorities/experts with high power of wisdom are in the most advantageous position. The decision makers with middle power of wisdom can make "relevant" or "irrelevant" decisions. At the other end of the spectrum, there are the most disadvantaged people with low power of wisdom, they make much more irrelevant decisions than relevant ones. For the matrices considered above $WQ = \sim 92$, $WQ = \sim 108$, and $WQ = \sim 161$, respectively. The WQ represents (a) cognitive processes that potentiality determines the wisdom ability of the basic thought and (b) decisional activities carried out in the brain through the cognitive level, associated with reactions to the occurrence of certain events and/or facts.

One measure of human intelligence is a person's

'intelligence quotient,' or IQ (Mackintosh, [25]). The IQ is based on a series of tests which assess various types of abilities such as mathematical, spatial, verbal, logic, and memory skills. On most modern IQ tests, the average score is 100, and the standard deviation of scores is 15. There is an association of people with a very high IQ , exceeding 160. There are even propositions in which IQ is calculated for nations. It was estimated that the Chinese currently have about 105 and Americans 95. The IQ reflects one's ability to solve problems. Moreover, Chinese students in the USA are usually the best because they "cram" as much as possible. Harvard even set quotas for them, which resulted in litigation. In Malaysia, the Chinese have very small quotas as far as university enrollment is concerned. It is clear that the values of the WQ correspond very well to the values of the Intelligence Quotient (IQ). However, it does not mean that the highest IQ corresponds to the highest WQ . Why? Each of them describes different items (see Fig. 1), representing some relations between cognitive levels and the chosen wisdom attributes, respectively.

Formula 7 makes it possible to evaluate the WQ of a single person belonging to a society or civilization. Selecting the right set of characteristics of the wisdom attributes and conducting appropriate experiments engaging different functionality of cognition levels we are able to evaluate their force, we can define the standardized Wisdom Quotient (WQ) for the representative groups more exactly than it is given above.

One of the most accurate IQ test available online is IQ TEST (IQ test 2022 - Test your IQ | MyIQTester). This test consists of multiple questions (puzzles) that must be solved. Each puzzle follows a pattern or rule. Each question

has 6 possible answers, but only one answer is correct. All you have to do is find out the relationship between the puzzle parts and choose the correct shape that completes it.

It has recently been argued that emotions are very important, and the concept of emotional intelligence has been suggested (Sternberg, [26]). Emotional intelligence has been defined as the ability to monitor one's own and other people's emotions, to discriminate between different emotions and label them appropriately, and to use emotional information to guide thinking and behavior. The It definition was refined into four proposed abilities: perceiving, using, understanding, and managing emotions. Emotional intelligence also reflects abilities to join intelligence, empathy, and emotions to enhance thought and understanding of interpersonal dynamics. It is evaluated by the so-called Emotion Quotient (EQ), where only the ability to control emotions is taken into account. An average EQ score ranges from 90 to 100, with a perfect score of 160. Those who score high on the It test should continue to make an effort to understand and empathize with others. Those with below average EQ scores can increase their emotional intelligence by learning to reduce negative emotions. The EQ is the ability to think, decide, and act in a balanced way.

However, the *IQ* indicates the existing possibilities of using the intellectual potential, where knowledge is the dominant characteristic. In turn, the Wisdom Quotient indicates the possibilities of using the intuitive potential, so it complements the possibilities of human action in a way. In addition, the Emotional Quotient describes a third dimension of human life related to the emotional potential, which expresses the efficiency of human

inspiration (see Fig. 1). Therefore, we can assume that the three quotients presented above impact wise human behavior and allow us to calculate the chance rate for human satisfaction and, in consequence, human success. In other words:

$$Success = function (IQ, EQ, WQ) \quad (8)$$

The It statement shows that success can be described as having at least a three-dimensional space, where each dimension corresponds to one of the three quotients. Space is more complex when those dimensions are described by more characteristics. Up to now, we have assumed that a human being uses wisdom in thinking, deciding, and acting in order to obtain the assumed goals and, in consequence, to achieve the required quality of live. An unwise human being cannot do It. The effective organization of wisdom, intelligence, and emotion impacts human successes in real life. Different successes can be measured by a similar metric called Success Quotient (SQ). Let us note that the *IQ* includes two attributes of wisdom: knowledge (*Kn*) and skills (*Sk*), the *EQ* also comprises two attributes: knowledge (*Kn*) and inspiration (*In*), but the *WQ* has all these attributes. Simply put, It is the weight mean value of the values of all the presented quotients, i.e.:

$$SQ = \frac{1}{7}(2 \cdot IQ + 2 \cdot EQ + 3 \cdot WQ) \quad (9)$$

where: *WQ* is from 86 to 176, *IQ* is from 50 to 1701, and *EQ* is from 50 to 1602. Thus, *SQ* is from 60 to 167. If a person presents average possibilities for achieving success, then *SQ* = 114 because the average of qualities is to equal 131, 110, and 105 respectively. Then, *SQ* = 117.6, when the maximum value of *SQ* is 169.7. On the one hand, we use such procedures as

recognition, conceptualization, selection, and implementation, which are constructed by human minds. On the other hand, we adopt them to the existing contexts by describing the time and place of our activities, organization structures where we live and make activities, and such possibilities as the current level of development or favorable/unfavorable accompanying situations. The categories of our mind analyze these kinds of information and control human behavior. Some possibilities of a human being can be described by two well-known factors: *IQ*, *EQ* and *WQ*. Higher values of these factors mean higher possibilities of human beings in solving more difficult problems. First of all, the proper procedures are selected and used in accordance with the current context. It is rather unlikely that there are many persons with the highest value of *WQ*. It is one and half times less probable than finding a person with the highest *IQ*. It means that success is something unusual and is rarely achieved, even in especially favorable conditions (context). Important successes are achieved at different moments, but happiness lasts for some period. We can assume that happiness is a sequence of remarkable successes. Thus, happiness is often much more challenging to achieve than success. Therefore, wisdom is also a unique example of the scale of human life. It means that the analysis of wisdom is also very complicated.

Summarizing, we can claim that each development of human being leads to an increase in his/her power of wisdom, then his/her decisions are more reliable and in consequence he/she achieves success. It can be described as the following chain:

$$\text{wisdom} \nearrow \text{decision risk} \searrow \text{positive effects} \nearrow \rightarrow \text{success} \quad (10)$$

In many cases it is difficult to decide which of the above given decisions is the most suitable in given circumstances determined by different conditions. Taking into account extra constraints occurring with time and the cost or the quality requirements we enlarge the complexity of solutions. The question is what the role of wisdom is, what a new wisdom decision should be taken, which allows finding a better solution. Observing the behavior of different people according to the rule (10) we can estimate the *WQ*, *IQ* and *EQ* and verify the role of wisdom in our life. In general, wisdom should be the final application of cognition for any human activities, including the development of knowledge, developing skills and increasing inspiration, and in consequence, taking right decisions, minimizing risks, and giving a big chance for fruitful effects of human undertakings. In such a way we can collect data and, in further consequence, create knowledge about the role of wisdom in our society. However, to initiate a new direction of wisdom science we need more information about the decisions of humans and the society in different existing life contexts and we should analyze their possible positive and negative consequences. To collect such information, we should monitor and analyze data on different levels of human activities; the whole or a part of the human society. By making observations on such different levels we can evaluate also the different human attitudes, and classify better categories of people.

7. Conclusions

Some ideas of wisdom are investigated in this paper. Different aspects of wisdom are analyzed and different definitions of wisdom are given. In short, it is assumed that wisdom is the right judgment supported by knowledge and the right

choice and efficient and effective actions determined by skills and inspirations in the context of the art of living. The power of wisdom can be applied to the levels of cognition that captures the necessary repetitive activities in each of reactions to the existing situations. The cognition levels focus not only on appropriate responses to the encountered situations but also examine them in different contexts and from different perspectives and use the available functionalities.

Our consideration combines two points of view. On the one hand, we consider the main attributes of wisdom representing knowledge, skills and inspirations. Nowadays, owing to the Internet, access to knowledge is easy, much more difficult is its interpretation and selection. Therefore, suitable skills are needed to make proper decisions. Moreover, high level of engagement to attain the assumed goals is necessary. All this together leads to wise human behavior. On the other hand, wisdom attributes and characteristics must be supported by special human cognitive functions available in the human brain. Cognitive informatics investigates the human, e.g., the methods that the mind uses to process different kinds of cognition units such as data, information, concept, knowledge and wisdom and the available different mind operations. On this basis, we try to integrate the attributes of wisdom and the level of cognition to explain what and where the source of human intelligence and cognition is in general, and why they work successfully.

We propose the quantitative approach to measure the wisdom power and the wisdom quotient, close enough to the methods used for estimating the intelligence and emotion quotients. Thereby father secrets of our mind can be examined. In our next investigations we

plan to make many suitable experiments to find a true correlation between the wisdom attributes and the cognition levels and to construct valid tools to evaluate the wisdom power dormant in the human brain. Then, it will be easier to establish procedures to develop the human wisdom capabilities.

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Conflicts of interests

The author(s) declare(s) that there is no conflict of interest.



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