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Nataliia Sas, Francisco de Assis Gaspar Neto, Kateryna Yuryeva
Svitlana Gazarian, Lesia Petrenko, Kateryna Slinkol

CHAPTER 4

COMBINATION OF THE METHOD OF THEORETICAL GENERALIZATION, BIOGRAPHICAL METHOD AND SURVEY METHOD IN RESEARCHING SUSCEPTIBILITY TO THE NEW

ABSTRACT

The study gradually reveals the methodology for studying the phenomenon of susceptibility to the new, which is an important component of a person's cognitive-emotional and personal development. Within the framework of the three-year research cycle, an interdisciplinary approach was applied, which combines the methods of theoretical generalization, the biographical method and the survey method.

At the first stage, the classification features of susceptibility to the new were outlined using theoretical generalization, which allowed the author to formulate the concept of the phenomenon.

The second stage involved the use of the biographical method for the empirical analysis of the life stories of prominent personalities, such as A. Fleming, V. Roentgen, I. Duncan, F. Haber, H. Ford, S. Jobs. These examples illustrate different types of susceptibility to the new: from involuntary to voluntary, from sensory to cognitive-emotional.

The biographical method has proven its validity and effectiveness in studying deep personality characteristics, such as sensitivity to change, ability to innovative thinking, intuition, emotional involvement in the creative process. Particular attention is paid to the accumulation of external and internal impulses, which are transformed into active deeds and new ideas.

At the third stage, a survey was conducted, the results of which supplemented and expanded theoretical generalizations. The developed questionnaire contained five questions, formed in accordance with the author's concept, and was combined with a formalized interview. As a result, the key features of individuals susceptible to the new were identified: openness to experience, insight, curiosity, readiness for interaction, sensitivity to change, emotional flexibility, ability for global cooperation, critical thinking, empathy.

The survey results allowed us to carry out a content analysis of definitions related to the phenomenon of susceptibility to the new, to identify typical combinations of traits and classification features, which allows us to speak about the uniqueness of each individual. The study outlines the prospects for further scientific research, in particular, the study of correlations between key factors, the development of diagnostic tools and the compilation of a classification index. The data obtained contribute not only to a deeper theoretical understanding of the phenomenon under study,

but also open up new opportunities for its practical application in the field of education, psychology, innovation management and personal development.

KEYWORDS

Susceptibility to the new, innovative thinking, interdisciplinary approach, theoretical generalization, biographical method, survey method, classification, creativity, cognitive-emotional processes, personal development.

Education, which is aimed at fulfilling the strategic tasks of economic development, is determined, on the one hand, by the achievements of fundamental sciences, on the other hand, by the development of production. In the context of the chosen topic, in our opinion, such documents as the "National Doctrine for the Development of Education of Ukraine in the 21st Century", the policy brief "Industry 5.0: A Transformative Vision for Europe" are important.

"National Doctrine for the Development of Education of Ukraine in the 21st Century", formulating the goal (creating conditions for the development, self-affirmation and self-realization of the individual throughout life), specifies it in the task – establishing a strategy for accelerated, anticipatory, innovative development of education and science [1].

Among the main features of Industry 5.0, a human-centric approach and individually tailored regulatory changes regarding achieving the level of compliance are highlighted [2]. The slogan used is "there can be no Industry 5.0 without a 5.0 government!" (section "Governance 5.0") regarding the specified topic can be as follows "Industry 5.0 must correspond to education 5.0." (both at the level of educational process management, and the actual management and technologies of teaching and learning). At the same time, according to the State Employment Center, the labor market in Ukraine is faced with an acute shortage of labor, workers in various industries and different levels of education [3]. In a speech by the Deputy Minister of Economy of Ukraine Tetyana Berezhna at the Kyiv International Economic Forum 2024, it was noted that according to the International Labor Organization, Ukraine needs to attract 8.6 million additional workers, and according to a study by the Ministry of Economy, 4.5 million people are needed. Among the ways to overcome this are the creation of an inclusive labor market (which will return people who have left), investing in labor productivity (including the creation of more programs that will help Ukrainians be more competitive in the labor market) [4].

The above outlines new requirements for subjects of professional and innovative activity (at the same time, for professional training): the ability to promptly update specific knowledge, skills and abilities to ensure the multifunctionality of existing personnel; the ability to form new models of social behavior, construct a personal system of values and identification structures. The mechanism for creating a new identity (collective and individual) is susceptibility to the new. Its explication through the interpretation of the traditional and updated, constant and changing, social and

personal components of social progress, professional adaptation and activity in a competitive environment involves new aspects in general philosophical and psychological and pedagogical dimensions. Educational institutions, methods, technologies should become a factor in successfully solving the problem of promoting the identification and stimulation of the development of susceptibility to the new. In this regard, the idea of professional education as a continuous process of promoting the identification and stimulation of the development of susceptibility to the new, the ability to mental, behavioral, emotional new formations is radically changing.

The above-mentioned updates the generalization and presentation of the author's experience in using the potential of an interdisciplinary approach and combining various methods in the study of susceptibility to the new (theoretical generalization method, biographical method and survey method).

4.1 CHARACTERISTICS OF RESEARCH METHODS

Since the study lasts several years, most intensively in 2022–2025, we can note the sequence and phased application of the theoretical generalization method (2022–2023, first stage), the biographical method (2023–2024, second stage), the survey method (2024–2025, third stage). At the first stage, we used the understanding and opportunities, provided by the interdisciplinary approach, disclosed by A. Kolot [5]. The generalized results of the first stage of the study are presented in the original publication by N. Sas [6]. During the second stage, the author used the understanding of the biographical method of N. Denzin [7]. The main results and generalizations are presented in the author's work [8]. At this stage, a thematic analysis of the survey results is carried out. [9] are publications, in which this is presented

Susceptibility to the new is a rather complex, multifaceted and multi-vector phenomenon, the study of which allows using the potential of an interdisciplinary approach and complementary methods: the method of theoretical generalization, the biographical method and the survey method.

Scientific and theoretical generalizations at the first stage of the study (2022–2023) were carried out on the basis of an interdisciplinary approach. The author supports the understanding of interdisciplinarity as a scientific and pedagogical innovation that generates the ability to see, recognize, perceive what is inaccessible within the framework of a separate science (discipline) with its specific, narrowly focused object, subject and research methods [5]. The interdisciplinary approach helps to overcome the narrowness of the pedagogical view and enrich pedagogical science with the achievements of modern economic, sociological, philosophical, psychological sciences regarding a specific topic. By applying the achievements of other sciences related to a specific topic, the integration of the latter is achieved at the level of constructing interdisciplinary objects, subjects, the processing of which allows obtaining new scientific knowledge (in our case, regarding susceptibility to the new).

In the process of scientific research, the scientific achievements in philosophy, sociology, economics, psychology, pedagogy were analyzed regarding the relevance, objective necessity and

possibility of targeted influence on the development of susceptibility to the new of an individual, group, organization (institution, establishment).

A relatively small number of works on susceptibility to the new motivated the expediency of a comprehensive understanding of the materials, devoted to this problem. In particular, the sources, used during the scientific research and to which there are references in generalizing publications (all types of publications: monographs, articles, abstracts of scientific works, conference materials, results of examinations, interviews with practitioners), were studied [6].

The use of the biographical method at the second stage (2023–2024) of the study is due, firstly, to the lack of experimental and test methods for studying such a deep process as susceptibility to the new; secondly, the susceptibility to the new of outstanding personalities (the peculiarities of its manifestation in various forms) has a clearly expressed character, does not cause doubt, and ensures the representativeness of the data obtained; as those that meet the specified requirements and objectives of the study, the following were selected: autobiographies by I. Duncan "My Life" and H. Ford "My Life, My Achievements", biographical works by A. Maurois "The Life of Alexander Fleming", D. Stolzenberg "Fritz Haber: Chemist, Nobel Prize Winner, German, Jew: Biography", K. Benek "William Conrad Roentgen", V. Isaacson "Steve Jobs.

We used the definition of the biographical method as the method of "life stories", "vita" (according to N. Denzin) [7]. All available information was taken into account (records of their autobiographical works, speeches, interviews, etc.). In particular, the autobiographies of Isadora Duncan "My Life" and Henry Ford "My Life, My Achievements" do not simply describe the life path of I. Duncan and H. Ford. Each author focuses on the unique aspects of his or her life, on a subjective, personal approach to describing the history of his/her life's work ("free" dance of Isadora Duncan and "self-moving cart" of Henry Ford).The analysis of the subjective anamnesis of the own life by I. Duncan and H. Ford convinces that the authors have a rather complex structure of subjective experience and are able to separate their own "image of the Self" from the image of the surrounding world, are able to "perceive themselves as an active subject of their own life history, different from the social world." All together gives reason for the appropriate conclusions on the research topic.

Biographical works by A. Maurois "The Life of Alexander Fleming", D. Stolzenberg "Fritz Haber: Chemist, Nobel Prize Winner, German, Jew: Biography", K. Benek "William Conrad Roentgen", V. Isaacson "Steve Jobs. The biography of the Founder of Apple" are written on the basis of memoirs and interviews of family members, contemporaries about A. Fleming, F. Haber, V. Roentgen, S. Jobs. They recreate a historical, time-expanded perspective of events.

The specified sources are used for analysis in the study of a specific issue as those that meet the specified requirements and objectives of the study.

In the third phase (2024–2025), the study uses methods to collect non-numerical data, such as personal experiences, attitudes, and behaviors. The study is flexible and open-ended and does not have a predetermined hypothesis, which allows the researcher to collect qualitative and quantitative data, explore different perspectives, and identify potential patterns or themes that can guide further research.

The study is conducted on a small sample. The number of survey participants is 16 people. The age of the survey participants ranges from 33 to 72 years (average age is 52.5 years). By gender, the indicators were distributed as follows: 11 women and 5 men. By race (skin color): brown (4 people), yellow (2 people), white (9 people). Representatives of different races among the respondents do not reproduce the entire palette of races, nations, nationalities and ethnicities, whose representatives live in Brazil, but reproduce the fact of variability of adaptation, appropriation of the experience of other peoples, its transformation, and, as a result, potential loyalty to the new (knowledge, experience, etc.).

According to the results of the analysis of the level of education among the respondents: secondary education – 1 person, higher education – 3 people, master's students of higher education – 7 people, postgraduate students – 2 people. By type of professional activity: teachers – 5 people, civil servants – 2 people, librarians – 2 people, engineer, truck driver, scientific manager, event organizer, doctor – 1 person each. Respectable age (implies significant life and professional experience) and high educational level (implies a wide range of knowledge) made it possible to consider the participants experts. Thus, the respondents are precisely those people who, by their main characteristics, correspond to the purpose and objectives of the study, namely, obtaining information about their views, educational and life experience, regarding their willingness to learn new things. In addition, participation in the survey of representatives of various types of professional activity stimulates the conclusion regarding the potential replication of the study results to a wide audience (based on the projection of the results of individual representatives of a particular profession to the level of large professional groups). The collected data were subjected to thematic analysis and descriptive statistical analysis.

The questions are formulated in accordance with the author's concept of susceptibility to the new [6]. The surveys involve filling out questionnaires. Despite the fact that the questionnaire was prepared for a correspondence survey, in our study it was combined with a formalized interview. The answers are not limited by time and amount of information. The participants are free to answer as they wish, not limited to a predetermined choice. There are no right/wrong answers. In addition to the fact that the survey results are analyzed in the aggregate of responses, the survey takes place during an online meeting, which provides direct observations of the interviewers on the reaction of the respondents to a particular question and to the entire questionnaire as a whole.

4.2 FEATURES OF THE MANIFESTATION OF DIFFERENT TYPES OF SUSCEPTIBILITY TO THE NEW (USING THE EXAMPLE OF BIOGRAPHIES OF A. FLEMING, V. ROENTGEN, I. DUNCAN, F. HABER, H. FORD, S. JOBS)

This work is related to the generalization of information regarding the identification of different types of susceptibility to the new according to previously identified classification features. The biographical method performed the following tasks: to identify the main features of susceptibility

to the new in A. Fleming, V. Roentgen, I. Duncan, F. Haber, H. Ford, S. Jobs, according to the developed classification. To understand what influenced the identification of susceptibility to the new in each specific case.

In the author's classification of the definition of susceptibility to the new, the following are defined by divisible (generic) concepts: form of cognition of reality; leading aspects of the perceived object; dominant sensations; field of activity; components of the subject's experience; cognitive-emotional processes; environment of selected information; hierarchical level of the subject of management.

Based on the form of cognition of reality, we distinguish involuntary and voluntary susceptibility to the new.

Involuntary (unintentional) receptivity to the new arises when a person does not set a goal to perceive something and does not make an effort of will for this. In our opinion, the manifestation of involuntary (unintentional) receptivity to the new is best illustrated by the biographical information of A. Fleming (based on the book by A. Maurois "The Life of Alexander Fleming") [11].

In particular, according to the memoirs of contemporaries, it was characteristic of Fleming to bring a little frivolity and fantasy into serious issues. According to Freeman's memoirs, planning anything in advance was not characteristic of A. Fleming. He was content with collecting facts and giving fate complete freedom. Since no one is able to predict what will come of the decision he/she makes, this is not such a bad method. Thus, the Water Polo team determined A. Fleming's choice of St. Mary's College; the rifle team forced him to choose bacteriology, and in both cases the choice turned out to be successful. This way of choosing a life path may seem incredible, reckless and indicative of complete indifference to everything.

For example, the discovery of penicillin (which saved and still saves the lives and health of a large number of people) by A. Fleming is attributed to his carelessness and a random coincidence. While studying influenza, he did not wash laboratory glassware in time and did not throw away influenza cultures for several weeks. Once, in one of the many unwashed Petri dishes, he discovered mold, which, to his surprise, suppressed the inoculated culture of staphylococcus bacteria. A. Fleming left the dish on the laboratory table and went to rest. The alternation of cold and warm weather in London created favorable conditions for the growth of mold and bacteria. In our opinion, in addition to the coincidence of circumstances, an arbitrary susceptibility to the new (prepared by previously acquired special knowledge and experience) worked. We agree with A. Maurois, A. Fleming had long been looking for a substance that would destroy pathogenic microbes without harming the patient's cells. This magical substance accidentally flew onto his desk. But he would not have paid attention to the unfamiliar visitor if he had not been waiting for him for fifteen years [11].

Voluntary, purposeful susceptibility to the new is characterized by the fact that a person sets a goal to perceive something and makes willful efforts for this. In our opinion, the combination of involuntary and voluntary susceptibility to the new served Wilhelm Conrad Roentgen in the discovery of Roentgen rays or X-Rays. K. Benek in his biographical work "William Conrad Roentgen" cites the following recollections of W. Roentgen: "I have long been interested in the problem of

cathode rays from a vacuum tube. I followed with great interest the research of Hertz, Lenard and others on this issue and decided to conduct my own research as soon as I had time for it." The following dialogue testifies to the high degree of purposeful concentration. To the question of K. Benek: "What did you think when you discovered a new type of rays?" W. Roentgen replied: "I did not think, I investigated. Having discovered the existence of a new kind of rays, I began to find out what they would do. And then, by concentrating on the cause of the glow, it was discovered (within a few weeks) that the cause of the glow was the direct rays coming from the cathode-ray tube; that the radiation cast a shadow, and it could not be deflected by a magnet – and much more. In addition, it turned out that human bones cast a denser shadow than soft tissues, which is still used in roentgenoscopy.

"There is a lot of work ahead, and I am busy, very busy," he said at last and stretched out his hand in farewell, his gaze already wandering over his work in the room. The words: "I am busy," seemed to describe in one sentence the essence of his character and the motto of a very unusual person" [12].

Depending on the leading aspects of the perceived object, we distinguish the following types of susceptibility to the new: susceptibility to new changes in space, time, movement, form of objects. We imagine that this can be both a reaction to changes in the object that have occurred, thereby launching the process of changing the environment (for example, service functionality), and predicted changes in space, time, movement, form (will cause a change in the object, service functionality, etc.).

The dominant basis of susceptibility to the new can be sensations (distant, contact, deep). Accordingly, we distinguish visual, auditory, olfactory, gustatory, tactile, pain susceptibility to the new, and susceptibility to the new deep sensitivity (internal organs, muscle sensitivity, etc.). Indicative, illustrative in relation to the specified classification feature is the emergence and development of impressionism in painting, sculpture, music. In choreography – the "free" dance of Isadora Duncan based on own sensations, caused by music.

The rhythm of the waves of the ocean, on the shore of which the family lived, and the absence of restrictions from parents and governesses in childhood, contributed to the formation (according to I. Duncan) of an original manner (of ideas and movements), the inspiration for dance, which was an expression of freedom. I. Duncan notes that her leading character trait in childhood was a constant spirit of protest against the narrowness of the society, in which she and her family lived, against the limitations of life.

I. Duncan defines spontaneity as the main characteristic of the "new" choreography, (which was characteristic of I. Duncan in childhood and which she never lost). "As a child, I expressed in dance the sudden joy of growth; as a teenager, the joy that turns into fear at the first feeling of underwater currents, the fear of ruthless cruelty and the destructive progressive course of life. Later, I began to depict my struggle with Life, which the public called Death, and my attempts to wrest ghostly joys from it [13].

It is appropriate, in our opinion, to recall doctors who resorted to self-infection with the disease in order to describe the symptoms and effects of treatment based on their own feelings.

By sphere, we distinguish susceptibility to the new in society, science, art, etc.

As already noted, the perception of the new, forecasting involves all the previous experience of the subject, which makes it possible to distinguish susceptibility to the new, depending on what part of the subject's experience is involved and, in turn, on the formation of what part of the future experience it is aimed. In particular, this is the perception and formation of new worldviews; emotional, cognitive and practical experience in relation to the object of research. Susceptibility to the new can be "turned on" (involuntarily or arbitrarily) by the interests, aspirations, hopes of the subject (which, in turn, causes a favorable or inhibitory effect).

This is what explains the fact of the influence of ideology on social changes in different countries of the world over the last two or three centuries. Political parties and social movements that carried out radical transformations in all spheres of society were guided by ideological doctrines, ideals, and programs that became a direct impetus for change. The most significant in world history were the Great French Revolution of the 18th century, the struggle for independence and assertion of independence of the United States of America in the 18th century, the Paris Commune of the 1970s, the October Revolution of 1917 in Russia, the Chinese Revolution of the late 1940s, and others. It is believed that all of them were carried out under the banner of the struggle for the implementation of certain ideological principles and values (liberal-bourgeois, Marxist-Leninist, Maoist, etc.). The most progressive modern ideology may be the ideology of creating a state whose goal is happiness for all citizens [14].

According to the cognitive-emotional processes that stimulate the discovery, we distinguish analytical, synthetic, analytical-synthetic, emotional susceptibility to the new.

Thus, patriotic aspirations to serve one's homeland motivated F. Haber – a German chemist of Jewish origin, winner of the Nobel Prize in Chemistry, for his contribution to the synthesis of ammonia, necessary for the production of fertilizers and explosives; the father of chemical weapons. It is no coincidence that Dietrich Stolzenberg, summarizing the opinions of many researchers of the life and work of F. Haber, wrote that he was a great scientist, devoted to his idea and his country [15].

The identification and formation of ideas, cognitive representations, and beliefs that influenced F. Haber's actions and choice of professional activity were facilitated by the occupations of his relatives (significant persons), primarily his father and uncle. Siegfried Haber, Fritz Haber's father, was a successful dye merchant, which, in our opinion, influenced the choice of chemistry as a future professional activity. Fritz Hermann, Fritz Haber's uncle, was active in politics and the managing director of a newspaper in Breslau (it was the example and influence of his uncle that contributed to the identification and formation of a sensitivity to the new, which was stimulated by the idea of serving the Fatherland, Germany).

Coming from a Jewish family, F. Haber converted to Christianity (Protestantism), in a certain way accepting German nationalism as his religion (according to D. Stolzenberg). At his insistence, his fiancée (later first wife), Clara Immerwahr, also became a Christian. They even married as Christians, although both came from Jewish families.

Later, F. Haber's scientific research and exploration were driven by the principle: "In peacetime, a scientist belongs to humanity, but in wartime he belongs to his country."

In particular, in the first decade of the twentieth century, the world's demand for nitrogen, necessary for the production of fertilizers, was much greater than the available supply. The main source of the chemicals, needed for fertilizers, was discovered in a huge deposit of guano (seabird droppings), 220 miles long and several feet thick, along the coast of Chile. Unfortunately, this natural source of ammonia was disappearing relatively quickly.

During the First World War, when Germany lost access to the nitrate mines as a result of the British naval blockade, F. Haber believed that Germany was unfairly landlocked during the war and deprived of the supplies necessary for life. Laboratory experiments by F. Haber (Haber-Bosch process) allowed to obtain synthetic ammonia, which became a raw material for fertilizers, as well as for explosives and ammunition.

According to Stoltenberg, F. Haber helped create fertilizers for plant growth and productivity, which, in turn, helped Europeans avoid total starvation; in addition, the Haber-Bosch process allowed the German war machine to last for four years (Germany would have had to surrender at the end of 1915) [15].

During the war, Haber invested his energy in continuing to support Germany. Although Haber hated war, he believed that the use of chemical weapons could save many lives if the exhausting trench warfare was stopped. He developed a new weapon using chlorine gas, which was put into production in January 1915. Thus, ammonia was actively used during the First World War as a chemical weapon. On April 22, 1915, the Germans carried out the first ever gas attack in history in the Ypres area under the leadership of Fritz Haber.

Another direction of F. Haber's research is indicative (in relation to the research topic). In 1920, he began research on the extraction of gold from seawater, hoping that if successful, this enterprise would allow Germany to pay reparations to the Entente countries. However, after many years of research, he came to the conclusion that the concentration of gold, dissolved in seawater, is much lower than reported in the works of his predecessors, and that the extraction of gold from seawater is economically unprofitable. Thus, the discovery of susceptibility to the new in F. Haber was stimulated by cognitive-emotional (cognitive-patriotic) processes.

Henry Ford was stimulated by a passion for invention, the desire to invent a "self-propelled cart" and then endlessly improve it (author of 161 US patents), which led him to develop a technological line (conveyor), and, ultimately, to establish the production of a "car for everyone." In his book "My Life, My Achievements", H. Ford, recalls that he was the son of a farmer. He knew that farm work requires a lot of time and there is no time left for trips to the city, trips to the theater, cinema. One of the greatest advantages of the car, he considered a beneficial effect, creating opportunities for expanding the horizons of the farmer (due to the reduction of time for such and other trips). Therefore, the idea of creating a steam cart and using it as a means of transportation came to mind of an experienced mechanic who had a good workshop at his disposal. At that time, the idea of creating a *self-propelled cart* was consonant with the idea of a *horseless carriage* [16].

V. Isaacson in the book "Steve Jobs. Biography of the founder of Apple" indicates that Steve Jobs's real talent was not in creating computers, but rather in anticipating the desires and needs of potential consumers; understanding the transformative impact of personal gadgets [17].

V. Isaacson draws attention to how strong impressions of S. Jobs at a young age later inspired him in his work. First of all, this is the family of Paul and Clara Jobs, Steve's adoptive parents, who not only recognized his intelligence and exceptional abilities, but were ready to adapt their own lives for his benefit. So Steve grew up not only with the understanding that he had once been abandoned (by his biological parents), but also with the awareness of his own uniqueness. In his opinion, this is what played the most important role in the formation of his personality.

Paul Jobs (Steve's father) repaired and resold used cars, kept a garland of photos of his favorite models in his garage. He was the first to draw his son's attention to the details of the design (lines, holes, chrome, seat trim). Steve watched Paul Jobs haggle during deals because he knew better than others how much something should cost (Steve about his father). These early observations later became fixed in Steve's mind.

The book describes the role of teachers who contributed to the development of Steve's cognitive interests (despite the fact that Steve was not a "nerd"). So, on the recommendation of one of them, Lang, Steve visited the Hewlett-Packard Research Club. Engineers from a laboratory were invited there to talk about what they were working on, in particular, the use of LEDs. Young people in the research club were encouraged to participate in various projects.

One of the subjects Jobs studied became part of the mandatory curriculum in Silicon Valley: an electronics class, taught by John McCallum. This subject personified the interests of the younger generation of inventors.

During his studies, Steve showed the ability to communicate with people of a much higher level to solve design problems. In particular, as a member of the Hewlett-Packard Research Club, Jobs decided to design a frequency counter that would determine the number of vibrations per second in an electronic signal. He needed some parts that HP produced, so he picked up and called the director, Bill Hewlett, in Palo Alto at his home number. Bill Hewlett, interested in the young researcher, helped with spare parts, and also offered a job at a factory where frequency counters were made (young Jobs worked there for a whole summer after completing his first year at Homestead School).

Another time, in McCallum's class, Steve needed a part that he couldn't find anywhere else, so he called the manufacturer, Burroughs, in Detroit, and said he was developing a new product and wanted to test their part. The thing he needed arrived by airmail a few days after that conversation. When McCallum asked Jobs where he had gotten the part, the guy told him – with undisguised pride – about his collect call and the story he had told the manufacturer.

W. Isaacson presents Jobs' recalls about his admiration for Eichler's houses (his houses were well-designed, cheap, and solid; they brought clean design and simple taste to people with lower incomes; they had beautiful little details, like underfloor heating, etc.). The observation ignited in him a desire to create beautifully designed products for the mass market. Jobs enjoyed good

design (which was inexpensive and easy to use). This vision later became a core requirement for Apple products. This was embodied in the first Macintosh and later, in the iPod.

The very area where the Jobs family lived was saturated with the spirit of invention and entrepreneurship, "…differed from thousands of others across America in that even the losers were, as a rule, engineers." In favor of creating an environment that would contribute to the development of the talent of S. Jobs and other young people, the idea of Frederick Terman, dean of the engineering department of Stanford University, was implemented – the creation of an industrial park with an area of 280 hectares on the territory of the university, so that private companies could commercialize the ideas of his students. The first tenant was the company Varian Associates, where Clara Jobs worked. According to S. Jobs himself, the implementation of Terman's idea did more than anything else for the development of the techno-industry here.

V. Isaacson, adhering to the principle of objectivity, cites the memories of S. Jobs's friends and acquaintances (and Jobs about them), who draw attention to the influence of peers on Steve. The most impressive thing was meeting Steve Wozniak: "Woz was the first person in my life who knew more about electronics than I did. I liked him right away. I looked a little older than my age, and he looked the opposite, so we were like peers." That partnership led them to another, more successful joint adventure. Wozniak came to the same conclusion: "It gave us the opportunity to feel what we were capable of with my engineering skills and his perspective." Wozniak would be a quiet wizard who would be happy to share his next brilliant invention, and Jobs would figure out how to make it as convenient as possible, pack everything nicely, find buyers and earn a few bucks on it. In addition to Wozniak, according to Steve Jobs, his friends inspired him to engage in spiritual practices and develop successful behavior skills. F. Haber, H. Ford, S. Jobs influenced the formation of the world, in which we live today.

According to the environment of the selected information, we distinguish susceptibility to external and internal information.

In particular, for a closed model of the innovation process, susceptibility to internal information is important, capable of solving all problems related to the innovation process within the enterprise, organization, institution. For example, 25 research centers belong to Medtronic (USA), where 45,000 employees produce innovations [18].

If we extrapolate certain provisions of nanotechnology to the indicated issue ("nano" means one billionth (10^{-9}) of something) and take into account that there are more than eight billion people on the globe, we can conclude that each person is a potential carrier of a proposal that will change the work being performed, the technological process, etc. for the better. The combination of such nano-proposals can cause a cumulative effect and lead to significant changes. In the context of the theory of open innovation, susceptibility to external information, receiving valuable proposals from partners, end consumers, constructive cooperation with competitors becomes important. According to H. Chesbrough, open innovations are "valuable ideas that can come from both the company itself and from outside and can be provided on the market as a result of both the actions of the company itself and other structures" [19].

By the number of people involved, we distinguish individual, group (innovation, project group), collective (enterprise, organization, institution) susceptibility to the new.

Separate attention is paid to the susceptibility to the new of management entities, which, accordingly, makes it possible to distinguish by hierarchical level the management entity (head of the structural component of the enterprise, organization, institution; head of the enterprise, organization, institution; government body of the country; region; industry) that exerts one or another influence on the economic policy of the management objects.

4.3 THEMATIC ANALYSIS OF EXPERTS' PERCEPTIONS OF INDIVIDUAL COMPONENTS OF SUSCEPTIBILITY TO THE NEW, CHARACTERISTICS OF INDIVIDUALS SUSCEPTIBLE TO THE NEW, THEIR LEVEL DIFFERENTIATION

The purpose of the survey is to identify information and perceptions of respondents regarding individual components of susceptibility to the new, characteristics of individuals susceptible to the new, their level differentiation, and to determine the most stable ones for further in-depth development. Five questions were formed:

1. Read the text, answer the question:

"Nano" means one billionth (10^{-9}) of something. Nanotechnologies predict that a change at the level of individual particles will lead to a change in the whole (for example, the qualities of materials, substances). Given the number of people living on the globe (more than eight billion), each person can contribute an idea that will change any group, organization, or institution for the better.

Other things being equal, what feature distinguishes those who are able to do this?

The question is aimed at identifying the respondents' opinions regarding the components of susceptibility to the new. The analysis of the answers shows that the respondents named the following components of susceptibility to the new: openness (3 individuals), insight, curiosity, readiness (for example, to communicate), sensitivity one person each. The remaining answers, although not close to understanding susceptibility to the new, nevertheless concerned the conditions and ways of developing susceptibility to the new; personality traits that are important for putting forward an idea and during its implementation; stages of implementing an idea.

The results obtained were critically evaluated and compared with previously obtained data based on the biographical method [8], alternative explanations and interpretations were considered. A content analysis of the definitions of susceptibility to the new, *openness*, *insight*, *curiosity*, *readiness*, *sensitivity* was carried out.

In particular, susceptibility to the new is defined as the ability of a person to perceive signs of the new (future) and be guided by the formed idea (consciously or unconsciously) in their practical activities. Susceptibility to the new is the degree of relative advance of an individual over other members of his/her social system in the perception of new ideas, phenomena, discoveries that will determine the future [6].

In the context of our study, the definition of *openness* is understood as the ability to select information, ideas, impulses of the new (even unconscious ones). The openness factor reflects the motivation to explore the world around us in various ways, the complexity and flexibility of processing information of different types [20].

Within the openness factor, scientists distinguish six subscales [21], namely: openness to aesthetics; openness to activity; openness to fantasy; openness to feelings; openness to ideas; openness to values. In our opinion, these can be directions of information selection within the framework of susceptibility to the new. In particular, this is confirmed by the results of the author's scientific research using the biographical method in the study of susceptibility to the new [8].

Insight is interpreted through the ability of a person to notice, understand and predict the development of events, situations, processes and phenomena in real life conditions. In turn, the *ability to notice* means to feel, perceive, pay attention, see the insignificant, any trifle, hidden. On the one hand, insight is associated with foresight, intuition, competence and life wisdom, on the other hand, there is also childish insight – the acquisition of a pure soul and mind, an impartial attitude towards something and the ability to consider a problem from different points of view.

Curiosity, *interest* – is a quality, associated with inquisitive thinking, such as research and learning, motivated by a desire to obtain information [22], which comes from a passion or thirst for knowledge, information and understanding.

The definition of readiness to accept change is used along with the concepts of *mental flexibility and neuroplasticity*, meaning freedom of thought from biased assumptions and stereotyped ways of solving, the ability to find new solutions when changing the environment and task conditions. Readiness to accept change (mental flexibility, neuroplasticity) can relate to cognitive skills, memory, thinking, muscle memory, associated with motor skills.

Sensitivity – one of the main functions of the nervous system, which consists in the ability of the body to perceive with receptors and be aware of irritation from the environment and internal organs. That is, the concept of *sensitivity* is a component of the broader concept of *reception*, which, in addition to conscious information, also includes information from the autonomic nervous system. Each type of sensitivity is responsible for a separate analyzer, which consists of receptors, pathways and the corresponding area of the cerebral cortex. External analyzers (exteroceptive) include: visual analyzer, auditory analyzer, olfactory analyzer, taste analyzer, tactile analyzer; internal (interoceptive): motor analyzer. The above definitions of the categories of *susceptibility to new things, openness, insight, curiosity, readiness, sensitivity allow us to conclude that sensitivity cannot be a characteristic of susceptibility to new things. It is likely that sensitivity is the biological basis of openness, insight, curiosity, readiness*.

2. Read the text, answer the questions:

Huawei (China) research centers are located in Russia, China, India, the USA, France, Germany and other countries. Huawei has more than 65,000 employees, engaged in innovation, research and development. They are involved in different countries, in different factories and laboratories.

What trait can be considered characteristic of all these people?

The second of the five questions (according to the indicated topic) is aimed at revealing the respondents' opinion regarding the traits of a person susceptible to new things?

We grouped the respondents' answers by similarity and complementarity:

– self-worth, motivation, responsibility;

– empathy, resilience, enthusiasm, courage of mind, ability to generate creative ideas, flexibility in solving problems;

– education (its level, versatility of knowledge, openness to mastering different knowledge, using it to develop one's own ideas);

– not believing in limitations, looking for answers;

– the ability for global cooperation (cultural adaptability; ability to adapt and work effectively in diverse cultural environments; effective communication; ability to work together in geographically distributed teams).

The methods of theoretical generalization, the survey method, and the biographical method were used as complementary methods.

In particular, based on theoretical generalizations (works by N. Taleb, V. Pekar, I. Prigozhin, H. Hacken, etc.), the author identified the following features of a personality susceptible to the new:

– an active attitude towards the future, involving the "future factor";

– a critical attitude towards the past, which "takes" with it everything that contributes to overcoming the crisis and further development;

– flexibility and mobility, willingness to take risks;

– the ability to self-organize;

– the ability to change in response to external challenges [6].

The identified groups of characteristics were confirmed to some extent by examples of biographical information about S. Jobs (according to V. Isaacson "Steve Jobs. Biography of the founder of Apple") and H. Ford (according to H. Ford "My life, my achievements").

In particular, the respondents' opinions on the importance of self-worth, motivation, and responsibility (not only towards colleagues, but also towards future generations) are illustrated by the following examples. "Steve's most important goal was ... to create a company that would be so saturated with innovative creativity that it would outlive its founder." According to H. Ford, the goal of business is to transform the world into a source of joy. Another important goal, even the duty of every person, is to take care of the well-being of the country.

Confirmation of the importance of the following group of distinguished characteristics of people susceptible to the new (empathy, resilience, enthusiasm, courage of mind, ability to generate creative ideas, flexibility in solving problems) is found in numerous testimonies of S. Jobs's employees. For example, Debbie Coleman recalls that Steve Jobs always stood up for what he believed in and respected colleagues who held such a position.

According to H. Ford, there is no such idea that would be good only because it is old, or bad because it is new. Ideas themselves are valuable, but each of them, in the end, is just an idea. It is important to be able to implement it practically.

One of the groups of traits characteristic of people who are susceptible to the new includes education (high level of education/training; different (versatile) knowledge; openness to learning knowledge, obtained in other countries, and using it to develop their own ideas). The analysis of the biography of S. Jobs shows that he studied at a higher education institution for two years and then stopped studying. Instead, he gained knowledge non-formally and informally. He attended individual courses that interested him as a free visitor (for example, he studied fonts), visited a club of like-minded people, communicated with people with common interests (for example, with Steve Wozniak, etc.). The biography notes that Steve Jobs was a hippie-anti-materialist; he was an adherent of Zen philosophy and made a pilgrimage to India, and later decided that his calling was to create a business. However, these contradictory concepts were intertwined rather than creating an internal conflict. Steve himself recalled: As a child, I considered myself a humanitarian, but I liked working with electronics. Then I read that one of my heroes, Edwin Land from Polaroid, spoke about the importance of people who could stand with one foot in the humanities and the other in the exact sciences. So I decided that this is what I wanted to do.

As S. Jobs' biography shows, he did not receive higher specialized education (for example, in the field of computer science and modeling of personal computers). Instead, his susceptibility to the new (in particular, in the field of electronics) found its confirmation in the circle of those like him; the development of knowledge, skills and abilities occurred through "mutual infection". S. Jobs is characterized by obtaining important skills and abilities for him (leadership, the ability to present oneself, influence people, entrepreneurship, etc.) by imitating people, known to him (father, friends, etc.). Later, he attracted the best, in his opinion, engineers, designers, marketers, etc. to his work.

The conclusion of V. Isaacson (author of biographies of S. Jobs, B. Franklin and A. Einstein) who was particularly interested in the creativity that arises when inclinations to the humanities and exact sciences are combined in one strong personality is worth attention. He believed that this (the combination of inclinations to the humanities and exact sciences) would be the key to creating an innovative economy in the twenty-first century.

In search of answers to questions related to the functionality and appearance of future personal computers, S. Jobs, together with his colleagues, visited various exhibitions (for example, the Louis Tiffany glass exhibition at the Metropolitan Museum of Art in Manhattan), conferences (for example, the international design conference in Aspen in 1981), which were sources of inspiration.

In our opinion, it is interesting to single out such a feature as "not believing in limitations, looking for answers".

Steve Jobs' interest in Eastern spirituality, Hinduism, Zen Buddhism and his search for enlightenment led him to believe that the true understanding of things is intuitive. He inspired others with his own intuitive vision of things (desired characteristics of future PCs), thus achieving the impossible. Atkinson (one of S. Jobs' colleagues) said, "I believed in the power of naivety. Since I didn't know exactly how to do it, I was able to do it. It was like self-programming," said Debbie Coleman. "You do the impossible because you don't realize it's impossible."

In contrast to S. Jobs, H. Ford used logical conclusions and principles in his work. One of the principles was: "Do not be afraid of the future and do not bow to the past… Failures are only an excuse to start all over again and act more wisely. The past is useful only when it shows us the ways and means of development."

The respondents identified such an important characteristic for international teams (for example, Huawei (China)) as the ability to global cooperation (cultural adaptability, the ability to adapt and work effectively in various cultural environments; effective communication; the ability to work together in geographically distributed teams). This feature is also becoming important for Ukrainians.

3. Read the text, answer the question:

In marketing, the following groups of customers are distinguished by their susceptibility to new types of goods and services: innovators – risk-averse, they try out new products, taking a little risk; early followers – opinion leaders in their environment, they accept new ideas quite early, although with caution; early majority – people are cautious, they accept innovations earlier than the average person, but they are rarely leaders; late majority – people who are skeptical: they accept a novelty only after the majority has already tried it; laggards – people, bound by traditions, they are suspicious of changes, communicate with other supporters of traditions and accept a novelty only because it has already become a tradition to some extent.

What other characteristics can distinguish susceptibility to the new?

The third of five questions (according to the indicated topic) is aimed at identifying the respondents' opinions regarding the signs of level differentiation of people susceptible to the new?

The most obvious factors of differentiation of people susceptible to the new (which was confirmed by the results of the analysis of the responses of the survey participants) are the following: age, educational level, financial capacity, social group, religious and spiritual beliefs. Since the differentiation of society (in sociology – stratification, in marketing – segmentation) occurs according to the indicated factors, it is logical to predict a similar differentiation among people susceptible to the new. Along with the obviousness, each of the above factors requires a separate study regarding internal differentiation, confirmation by examples, etc. And, thus, is a prospect for further scientific explorations.

While studying the biographies of prominent personalities whose susceptibility to the new is beyond doubt, I noticed ways of accumulating external/internal sensations, impulses, information and transferring them into an active (consciously or unconsciously) state ("method of releasing creative energy", "continuous concentration", "intuition, search for inspiration and examples", "systemic improvement").

Rahul Jandial, a famous neurosurgeon, author of the book "Neurofitness. Recommendations of a neurosurgeon for improving brain function", describes his "method of releasing creative energy" as follows. My method of generating ideas grew out of an old habit of surgical planning. If the next day I have a particularly difficult operation, in the evening I meticulously study the patient's brain scans and the tumor that has settled in them, and when I fall asleep, I scroll through all this again in my head, mentally rotate the neoplasm in all projections, visualize the dangerous zones adjacent

to it. In the morning, I definitely take a few minutes to look at the scans, clarify the shape and position of the tumor contours.

In the course of and to develop this approach, I read articles two evenings a week before going to bed that are directly or indirectly related to the experiment I am working on. Thus, scrolling through the data and conclusions, obtained by others, in my head, while my brain continues to search for answers to its own scientific and practical questions, I discover new connections between what has already been established and the interesting, and sometimes too bold, conclusions that we have reached in the laboratory.

Incidentally, such mental wanderings in the borderland between sleep and wakefulness have proven fruitful. It is quite possible that at the moment of falling asleep (in neurobiology this intermediate state is called hypnagogic) and during the slow transition back to wakefulness (hypnopompic state) portals to the subconscious open for a moment in our consciousness to snatch a creative insight [23].

Bill Gates (co-founder of Microsoft, who played a decisive role in the popularization of computers and the Internet), has repeatedly emphasized throughout his career that the habit of reading and self-isolation became the driving force behind his achievements. B. Gates called his method "continuous concentration". In the 1990s, he spent every year "Week of Reflection" – he secluded himself in an isolated hut in the desert with a pile of books and technical documentation. During this time, he did not check his e-mail and focused on reading, thinking and writing down the ideas that arose. According to Gates, it was these periods of deep concentration that allowed him to create large-scale ideas, including the development of the Internet Explorer browser [24].

Steve Jobs' interest in Eastern spirituality, Hinduism, Zen Buddhism and his search for enlightenment led him to believe that the true understanding of things is intuitive. "Intuition is a very powerful thing, it is, in my opinion, stronger than intelligence. Understanding this had a great influence on my approach to work," S. Jobs testified. He inspired others with his own intuitive vision of things (desired characteristics of future PCs), thus achieving the impossible. It was like self-programming, – recalled Debbie Coleman – You do the impossible because you do not realize that it is impossible [17].

H. Ford's method is called "systemic improvement". This is how H. Ford describes his method in the book "My Life, My Achievements".

We must start from the product itself. First, you need to understand whether it is really as good as it should be, that is, whether the product fully meets its purpose. Then – whether the best materials or the most expensive are used for its production. Can its design be simplified and its weight reduced? And thus bring the product to perfection. Production must start from the product itself – technology, management, sales and financing are adapted to it. This is how the company hones its capabilities and ultimately wins over time. Forced release of a product without proper confidence in it is the hidden cause of many, many disasters.

It took twelve years before the Model T, which is popular today, began to suit me in every way. Until we had finally completed its development, we did not even try to start its production. But later

this model did not undergo any significant changes. I do not miss a single good idea, but I try not to decide right away whether it is good or not. If the idea is really worth it or opens up new possibilities, I am for testing it. But from testing to change is a long way. When most manufacturers are willing to change the product, we change the production methods [16].

As for level differentiation, the most common in pedagogical research is a three-level one, according to the level of quality (low level, medium level, high level).

In marketing, a five-level differentiation of customers is used according to their susceptibility to new types of goods and services: innovators; early followers; early majority; late majority; laggards.

By the number of people who were covered by the proposed innovation: from personal, unique, unrepeatable, (for example, artistic performance of dance, painting, etc.) to mass application (for example, a personal computer).

By the level of recognition: geniuses of the first kind are those who are recognized during life; geniuses of the second kind are those who are recognized after death; geniuses of the third kind are those who can be recognized in a more or less distant future.

The use of theoretical generalization, survey and biographical methods as complementary methods has enriched the author's idea of the differentiation of individuals susceptible to the new. We consider research on the internal differentiation of each factor, the development of diagnostic tools, to be promising.

4. Read the text, answer the questions:

A. Fleming discovered penicillin (which saved and still saves the lives and health of a large number of people); V. Roentgen discovered X-rays or X-Rays; I. Duncan is known for his innovative "free" dance, which is based on own sensations, caused by music; F. Haber is known for his contribution to the synthesis of ammonia, necessary for the production of fertilizers and explosives; Henry Ford invented the "self-propelled cart" and then endlessly improved it (author of 161 US patents), developed a production line (conveyor), and, finally, established the production of a "car for everyone".

What is the difference in the susceptibility to the new of the people, mentioned in the text?

In the fourth of five questions (according to the indicated topic), the answers to the question are analyzed: What is the difference in the susceptibility to the new of A. Fleming, V. Roentgen, I. Duncan, F. Haber, H. Ford? The survey answered that the susceptibility to the new of the specified persons differs in the areas of their activity, starting opportunities, the environment, in which the researcher was raised and lived; motivation for achievements.

Using the method of theoretical generalization, the author singled out classification features, by which susceptibility to the new can be distinguished. It is difficult to calculate the number of possible combinations of the identified features. The author is aware of the possibility of the manifestation of new, previously undetected classification features and the presence of such classification features that are not currently recognized. The author assumes the presence of personal uniqueness (up to absolute).

5. Give examples of those who are susceptible to the new that you know.

The last question (according to the indicated topic) asked to give known examples of those who are susceptible to the new. The answers indicated: the use of new electronic gadgets, household appliances, technologies; problems that require solving and promoting progressive social and political changes; signs of susceptibility to new things (changing jobs, countries of residence, tendency to travel); names of specific Brazilian figures, such as Elke Maravilla, Helena Camargo, Silvio Santos, Pele, Tarcila do Amaral, Nise da Silveira.

CONCLUSIONS

Thus, the sequence and phasing of the study of susceptibility to the new are revealed: the application of the theoretical generalization method (2022–2023, first stage), the biographical method (2023–2024, second stage), the survey method (2024–2025, third stage). The author's experience in applying the potential of an interdisciplinary approach and combining various methods in the study of susceptibility to the new (theoretical generalization method, biographical method and survey method) is summarized. The use of the biographical method has proven its validity and persuasiveness in the study of such a deep process as susceptibility to the new, in particular, for generalizing information regarding the identification of different types of susceptibility to the new according to previously identified classification features.

In particular, the behavioral characteristics of involuntary (unintentional) susceptibility to the new on the example of A. Fleming (based on the book by A. Maurois "The Life of Alexander Fleming") could seem reckless, frivolous and, in the absence of advance planning, such as indicate complete indifference to everything.

The behavior of V. Roentgen (based on K. Benek, "William Conrad Roentgen") is an example of arbitrary, purposeful susceptibility to the new. V. Roentgen was interested in the problem for a long time, followed the current scientific searches of other researchers with great interest. During his own research, he demonstrated a high degree of purposeful concentration, posed new and new questions for himself, determining the perspective.

Biographical information about I. Duncan (according to I. Duncan, "My Life") illustrates the susceptibility to the new, the basis of which is a mix of visual, auditory and muscular sensitivity. The formation of the original manner of I. Duncan's performing style, the "new" choreography, was influenced by the perception of the rhythm of ocean waves, the immediacy, the inspiration of the dance, which was an expression of freedom.

Cognitive-emotional processes, in our opinion, stimulated the manifestation of F. Haber's susceptibility to the new (according to D. Stolzenberg "Fritz Haber: chemist, Nobel Prize winner, German, Jew: biography"). In particular, the example of significant individuals, worldview beliefs (service to the Fatherland, Germany) stimulated the manifestation and formation of susceptibility to the new in everyday life and in professional activities.

H. Ford's susceptibility to the new (according to H. Ford "My Life, My Achievements") was stimulated by a passion for invention, which was aimed at forming a new experience of farm work (to build a light cart with a steam engine that could replace horses as a tractor for extremely heavy plowing) and life.

S. Jobs's susceptibility to the new (according to V. Isaacson "Steve Jobs. Biography of the founder of Apple") was in the nature of forecasting, anticipating a new practical experience (massive use of personal electronic devices). The characteristic features of the design of future electronic gadgets of Apple were formed on the basis of transferring S. Jobs' impressions, received in his father's auto repair shop and from his admiration for Eichler's houses (it is simple and functional to use).

The respondents' answers to the five questions, which were formed in accordance with the author's concept of susceptibility to the new, were analyzed. The questionnaire for the survey was combined with a formalized interview.

After analyzing the data, the results obtained were interpreted in the context of the research problem. In particular, the following components of susceptibility to the new were identified: openness, insight, curiosity, readiness (for example, for communication), sensitivity. A content analysis of the definitions of susceptibility to the new, openness, insight, curiosity, readiness, sensitivity was carried out.

The following features of individuals susceptible to the new were identified. The respondents' answers were grouped by similarity and complementarity:

– self-worth, motivation, responsibility;

– empathy, resilience, enthusiasm, courage of mind, ability to generate creative ideas, flexibility in solving problems;

– education (its level, versatility of knowledge, openness to the acquisition of different knowledge, its use for the development of one's own ideas);

– not to believe in limitations, to look for answers;

– the ability for global cooperation (cultural adaptability; ability to adapt and work effectively in various cultural environments; effective communication; ability to work together in geographically distributed teams). The obtained results were critically evaluated. The biographical method was used as a complementary one.

The survey results enriched the author's idea regarding the differentiation of individuals susceptible to the new. While studying the biographies of outstanding personalities, whose susceptibility to the new is beyond doubt, attention was drawn to the ways of accumulating external/internal sensations, impulses, information and transferring them to an active (consciously or unconsciously) state ("method of releasing creative energy", "continuous concentration", "intuition, search for inspiration and examples", "systemic improvement").

Using the method of theoretical generalization, the author has identified classification features, by which susceptibility to the new can be distinguished. It is difficult to calculate the number of possible combinations of the identified features. The author is aware of the possibility of the

appearance of new, previously undiscovered classification features and the presence of such classification features that are not currently recognized. The author assumes the presence of personal uniqueness (up to absolute).

We see a perspective in the study of the levels of interconnection and correlation of the above definitions; the study of the internal differentiation of each factor, the development of diagnostic tools/compilation of a classification index of different types of susceptibility to the new.

The survey results contribute to the identification of new themes, patterns or trends and the understanding of the data in connection with previous theoretical generalizations, the consideration of alternative explanations and interpretations.

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