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PROBLEM SOLVING APPROACH ON CONSUMER DECISION ANALYSIS

ABSTRACT

This study proposes an approach to analyse the consumption of goods provided within the socio-cultural process (social sphere). Based on the study of individual social and economic characteristics of goods, the traditional approach is not sufficient for the management of production and consumption processes. An alternative model is argued, in which the process of consumer decision-making takes center stage. When consumption is recognised as a problem-solving process, the underlying structural-functional relationships of consumption can be modelled and analysed in their entirety. The theoretical verification of the model is based on a compatibility study with rational motivations in behavior, and uncertainty and risk in consumption.

KEYWORDS: consumer choice, consumer decision, rational decisions, problem solving

JEL: A13, B41, D11, I12, I21

INTRODUCTION

The social sphere has a long-term and stimulating impact on economic development and social living conditions. The consumption of the goods it provides (education, health, etc.) ensures an increase in human capital and potential, making it an immediate and long-term factor of economic growth and social development.

The subject of this study is the consumption of goods provided within the socio-cultural process (social sphere) and in particular that of educational and health services. The study attempts to theoretically model an approach to the identification of consumption that takes into account the value, social and economic relevance and connectedness of the process of consumption behaviour of these goods. An analysis based and focused unilaterally on the economic or social side of the consumption of these goods, or on the goods as objects of consumption is not sufficient to manage the socio-cultural process. Overcoming this one-sidedness of existing approaches to the analysis and evaluation of consumption through a systematic approach to its identification can be done from the perspective of the consumer, who recognizes consumption primarily as a *problem-solving process*. This allows, on the one hand, to summarize characteristics about subjects, objects, decisions, processes and consequences and, on the other hand, to take into account the underlying structural-functional relationships in the overall consumption process.

In the following, a theoretical attempt is made to justify a research perspective (approach) that reconciles the aspects of consumption - the objects and processes of consumption - that are necessary for (social) governance. Attention is focused on the description of the structure and process of consumption decisions, which allows to take into account the factors that determine it. The proposed analytical approach, which presents consumption decisions as a problem-solving process, is investigated from the point of view of rational motivations, which play the role of an ideal model in the analysis of consumption, taking into account uncertainty and risk in consumer decision-making.

1. SOCIAL AND ECONOMIC ASPECTS OF CONSUMPTION

The traditional approach to analyzing the consumption of goods provided by the social sphere can be described as content-based, i.e. *focusing on identifying the characteristics of goods* as they are consumed. Its implementation involves a process of *identification*, i.e. of defining and generalizing, the consumption characteristics of these goods that reflect their social and economic nature. In other words, the traditional model of consumption analysis is based on the identification of goods, whereby the good is analysed through its basic attributes - the need satisfied, the utility possessed and the value in personal and social terms. Accounting for these attributes characterizes consumption as a causal and goal-directed process whereby a person places utility (of a particular good) in relation to the satisfaction of specific needs. This relationship is determinative of the value of consumption - in individual terms it is a *subjective* attitude and is evaluated in terms of the importance that goods have in satisfying needs.

In line with the dimensional structure of goods, we can summarize the characteristics determining their consumption. For the purpose of this study, we will summarize such in two areas - economic and social. In this way, we will characterize the social and economic aspects of their consumption, respectively.

1.1. Social determinants

A common basis of consumption is the individual. All its consequences are internalized in it. What is most essential in the nature of social goods is their character as basic values that determine basic life chances. The social manifestation and dominance of goods express the axiological rationality of consumption - it can be assumed that, all economic conditions being equal, these goods will be preferred over others.

The social dominance of consumption is most clearly seen in the overall objective function of goods. A key feature of the consumption of the goods under consideration is their *social nature and purpose* (capabilities, ideas, values) and their inherent activities. The socio-cultural enhancements accumulated in humans are used by them *throughout the life cycle*, have a *complex* mode of manifestation (direct, indirect and collateral effects) and include extensive and intensive components (quantitative and qualitative enhancements). In many studies on the economics of education, health and culture, it is assumed that through the demand for specific educational, medical and cultural services, consumers seek sustainable socio-cultural improvements that result in personal outcomes.

Systematic arguments in this direction are already available in classical economic science. Alfred Marshall considered health, food, heating, rest, optimism, freedom and the desire for change as goods of the same order and called them "*means of life*" (Marshall, 1983). Health is the general condition for the "subsistence means of life" that determine the "vigour of the population". The general term he uses for these fundamental goods is "physical and spiritual health". Later, Gary Becker, developing a new theory of consumer choice, defined them as

fundamental aspects of life: they are "fundamental objects of choice" *rather than goods and services* (Becker, 1976).

Again, according to Alfred Marshall, "general ability," i.e., the qualities and pervasive level of *knowledge and resourcefulness* that depend most on one's environment in childhood and adolescence, are "a common feature of all higher forms of productivity" (Marshall, 1983). By distinguishing the "specialized ability" required for the specific purposes of individual industries, the idea is put forward that the fundamental demand for ability (health and education) underlies consumer choice and demand for education and health services. It is these that are directly related to the satisfaction of needs. Later, Michael Grossman developed this idea in the health sector by viewing health as a basic good. He developed the idea that consumers seek health because it allows the consumer both to feel good and to increase the time of his or her working capacity (Grossman, 1972a, 1972b). Similarly, Culyer formulates the investment motive as "the demand for health care depends on the demand for health" (Delcheva, 1994). In other words, "medical care is not what the consumer personally seeks, but health" (Delcheva, Gladilov, 2003).

The social nature of goods and their intrinsic social functions are the reason for the determinant non-market character of the organisation of the activities of their provision. The social reproduction functions of the individual are summarised as cultural (educational), economic and social and are realised at different levels (individual, group, sectoral, national, etc.). With regard to education in particular, the target function is associated with the educational potential of the nation, in the knowledge, skills and significant personal qualities and work opportunities acquired, and the forms of manifestation extend to all levels of the social system. In health, the target function is associated with health maintenance. The official WHO definition, which defines health as "a state of complete physical, psychological and social *well-being* and not merely the absence of disease and infirmity" (WHO, 1984), is a platform for the development of statistical indicators to track and analyse various aspects of health and health systems, to achieve health improvements that are more broadly seen as synthetic measures of lifestyle. These are the two fundamental aspects of health - life expectancy and health-related quality of life. Other forms of measurement of health improvements produced for the purposes of global studies and comparative analysis of health systems performance are 'disability-adjusted life years' (DALYs) and 'quality-adjusted life years' (QALYs).

Another popular focus on benefits is the concept of *merit goods*, the consumption of which is associated with *externalities* for a wide range of social actors or for society as a whole. It implies a coercive consumption of goods based on the distinction and judgement that *societal benefits are greater than individual benefits*. Public judgements about the public benefits being greater than consumption are grounds for state intervention in the provision of goods and for limiting (replacing) the market mechanism. According to K. Brown and P. Jackson (Brown, Jackson, 1998) the state "enters into the role of patron" for goods "that bring welfare to all members of society" (Stigliz, 1996). Richard and Peggy Musgrave take this view even further, arguing that "there is a public interest as such which is an attribute of society as a whole ... Such shared interests and values can find expression in community desires", leading to some restriction of individual choice. With these goods, consumer sovereignty is not thought to be acceptable and if consumers are unwilling ... or unable to afford it, there are reasons to encourage them to do so" (Masgreyv & Masgreyv, 1998).

The logic of " merit goods" requires a corresponding cultural and political context. In a culture of equal opportunity, the provision of social goods becomes predominantly non-market, and the main argument for this is their value to people. The culture of Western democracies has as its foundation the political traditions of natural rights, in which the provision of guaranteed access to and equality in the consumption of a range of goods is essential. This is a political

argument for reducing inequality of access and consumption as a goal of social policy. On this basis, it can be assumed that inequality in access to and consumption of merit goods is felt more strongly by individuals and reinforces a general sense of (political and economic) inequality (strong moral and ethical arguments in this direction are presented by Sandel, 2017).

1.2. Economic determinants

The economic aspects can be summarised in three areas: outputs/products, work process/technology and resources.

1.2.1. Outputs/products

Consumption characteristics that reflect outcomes and products are varied. It is generally accepted that consumption of social goods implies a *merging of direct and investment consumption*. At the phenomenal level, the *cumulative* nature reflects the permanent process of human social reproduction, and at the concrete level, the continuous process of production and the fusion of production technologies and consumption (evident in the organisation of education and health systems). Outcomes are manifested at the micro-, meso- and macro-levels as tangible and intangible, direct and indirect, intermediate and final, quantitative and qualitative, ongoing and subsequent. They satisfy a wide range of physical, intellectual, spiritual and social needs, which defines the relevant groups of products (health and recovery, intellectual, social service and institutional). An important indicator of consumer behaviour and attitudes is the way in which consumers respond to price signals - normal, luxury, inferior goods.

The *unique nature of the results* is a key product characteristic that has implications for limiting consumer choice and sovereignty. It is reflected in the following: (a) the uniqueness of the processes of creating and rendering the good, and hence of the mechanism of transforming outcomes into benefits; (b) the uniqueness of the benefit itself (the inherent enhancements of the individual); (c) the specific combination of resources required to create and consume the product, in the modes of organization and delivery, and the mechanisms of regulation.

Closely related to uniqueness are the immediate *involvement* of individuals in the concurrent processes of production and consumption and the *heterogeneous* nature of products. Consumer involvement is a sign of strong consumer motivation and is a condition for so-called 'extended problem solving' (inherent in consumer decisions with a high degree of complexity and duration). The degree of involvement is an important adaptive mechanism of (post-)consumer response. Involvement can also be seen as a consumer response mechanism that compensates for conditions of uncertainty and risk (physical, mental, social, qualitative, financial).

The separability of the effect in consumption is the basis for the distinction between *individual*, *group/collective* and *public* consumption. Price exclusion delineates the boundaries of market consumption and pure private goods. Where the price exclusion principle cannot be applied (or is inappropriate) and non-competitiveness exists at the same time, consumption is non-market, i.e. goods are consumed jointly by all members of society. Combining the two criteria under the condition that one of the principles is violated defines the field of public goods of mixed type (e.g. club goods). Each type of good is characterized by certain features of consumer behavior, mechanisms of consumer choice, and certain exceptions to it (so-called "failure" or "anomalies" in the phrase of Nort, 2000).

1.2.2. Work process/technology

The consumption of social goods takes place *within* the production (labour) process. Unlike material production, it is characterized by the following features: the uniqueness, creativity and predominantly intellectual nature of the living labour that dominates its production; a specific combination of hardly substitutable (or irreplaceable) factors of production. Important characteristics are also the great variety of activities, the considerable territorial localization,

the inconsistency in quality, the phased provision and consumption, etc. These characteristics of labour and the social significance of its results generally require the introduction of publicly regulated technologies of production and consumption. Batch supply and standardization of processes reduce risk for producers and consumers. The application of social regulation rules by institutions has the related double effect of coordinating production and the labour process, which reduces uncertainty and ensures predictability of behaviour.

In the production of social goods, the labour process takes the form of services. The classification of the unique technological features of service production is generally accepted: intangible (non-material), inseparable from the source, heterogeneous, not capable of being accumulated and resold ("*Four I's of Service" - Intangibility, Inconsistency, Inseparability, Inventory* - see Berkovitz, 2000; Zeithaml, Parasuraman, Berry, 1985). These characteristics have a significant impact on the way activities and production technologies are organized. To these aspects can be added: seasonality and irregularity of consumption of certain services; internalization of the effect regardless of the way the services are provided; reflection of socially accepted norms of behaviour and values; unpredictability of the outcome (benefits); specific property relations; constraints on commercialization, etc.

"Four I's of Service" dominate the consumer demand process. A key parameter of demand is quality. Consumers who cannot objectively judge quality (due to strong information asymmetry or ignorance) are guided by subjective perceptions of it and demand depends heavily on accumulated experience and trust (services with 'high quality experience and trust'). A classic example of an extreme case of information asymmetry evolving into a monopoly of relationships is medical services. Using medical services as an example, Philip Kotler notes that demand for these services is based on 'high quality of trust', where judgement and attitudes to risk guide consumer choice (Kotler, 1996). The demand distortion is to the point of complete dominance - doctors act as the patient's confidant and make the decision for the patient, as the patient would act, given symmetrically distributed information and knowledge. A consequence of this problem is the possibility of further distortion of demand, the so-called 'supply-induced demand' effect. The separation of the production/consumption and payment processes and the impossibility of defining and comparing quality further complicates the position of consumers in the market for medical services.

The above characteristics of services have an impact on the way production/consumption is organized. We can summarize: the more the unique features of services (and thus the more valuable they are to the consumer) are manifested, the more uncertainty and risk in consumption are significant. Attitudes to minimize uncertainty and risk are key in consumer choices. Inherent in this process are corrective institutional trust mechanisms aimed at reducing significant transaction costs and strong non-price competition to regulate access to goods and offer security. In addition to the choice of a particular good, consumers also make a choice of how it is provided. Hence, in the choice of mode of production/consumption and throughout the consumption process, the rational consumer will seek to maximize security and reduce risk by smoothing cash flows over time and making choices that seek to shift income from low to higher marginal utility.

1.2.3. Resources

Economic theory views benefits, outcomes, products and processes as directly dependent on how resources (mainly financial resources) are allocated. The resources of the socio-cultural process are (a) diverse - material, labour, financial, institutional, with labour factors being decisive; (b) predominantly serve specific creative processes; (c) marked regional localization and attachment to places of consumption; (d) limited substitutability and complementarity. The technological transformation of resources into specific goods takes place within the labour

process and reflects socially accepted values, principles and norms of production and consumption that reflect opportunities and views of justice and equity.

How goods will be produced and consumed, and how they will be financed, are questions that are closely related to the appropriateness of consumption (see 'merit goods' above) and the judgment about the market failure and non-market systems of production and consumption. Commitment to direct financing of production/consumption depends on the existence of positive externalities, while public supply depends on market to non-market failure.

Consumption depends on both the quantity of resources and the organization of their production. Optimizing accessibility to goods requires harmonization of policies, administrative and economic decisions: prices, distribution, the size and allocation of budgetary resources, tax prices, etc. Consumption and its structure - individual, collective, societal - is at all times a *trade-off between an efficient and equitable allocation of resources*.

It can be summarized that the descriptive approach used here to analyze consumption is a process of generalizing, unifying and comparing characteristics that reflect their nature and characteristics. Similar to chemistry, where this process results in the identification of an unknown compound through the analysis of its properties, the task is reduced to such a generalization of the features (properties) of goods that enables them to be uniquely identified as objects of consumption.

The characterisation of goods as objects of consumption is useful and important for research purposes, but insufficient for management purposes. Despite its undeniable value, the debated approach is not sufficient for a meaningful analysis of consumption behaviour. To manage the provision of these goods, at the macro and micro levels, it is necessary to move *from a description of the objects of consumption to the processes of consumption*. Such an analytical framework that brings together the heterogeneous picture of consumption of different goods, thus focusing attention on consumption decisions. Consumer choices act as a 'social litmus test' in which the most relevant information on consumption is gathered. The study of the consumption decision-making process and the factors that determine it provides richer information for the purpose of research and the management of consumption behaviour.

The approach proposed in the following pages presents user solutions as a problem-solving process. Consumer choices are viewed as part of a holistic decision process in which rational motivations play the role of an ideal model in consumption research. More broadly, this provides an opportunity to examine how the characteristics of goods presented so far are reconciled with the conditions of rationality of motivations, uncertainty and risk in decision making.

2. CONSUMER SOLUTIONS AS A PROBLEM SOLVING PROCESS

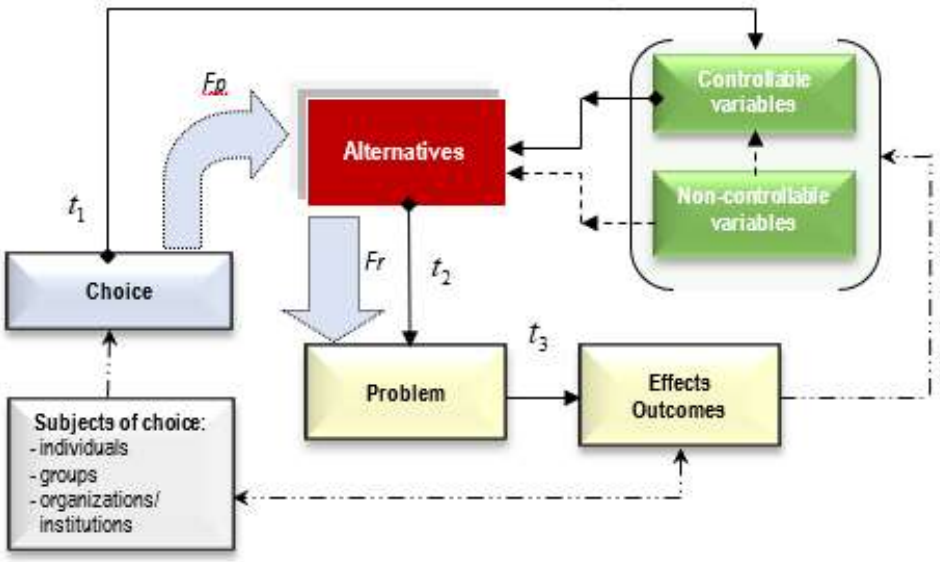
The problem-solving approach is widespread in modeling user behavior. The most popular models are the Howard-Sheth (Enis, Mokwa, 1995) and Blackwell-Miniard-Engel (Blackwell, Miniard, Engel, 2005) models. Consumer choice and consumer behaviour occupy a central position and find adequate description within a 'problem solving' approach, which provides the opportunity to place them in relation to underlying consumption factors.

In decision theory, choice is an axiomatically defined concept. A general description of choice in the problem-solving process can be described as shown in Fig. 1. The process described allows us to define: *choice is always associated with the selection and preference of an alternative that is in some way, and to some degree, relevant, to the underlying problem of choice.*

Choice, according to this definition, is situated (figuratively) between the alternatives and the problem, and preferences link the alternatives and the problem into a solution. Then, if the alternatives and the problem are given and clear, the choice can be uniquely described by a *preference function*, or *choice function* (Fp). It depends directly on the degree to which the alternatives relate to the problem, i.e., the *relevance function* (Fr).

A problem is here understood as some general form of deficiency (need, want), and choice is seen as a goal-directed process motivated by its solution, which is enough to link the alternatives to the problem. For there to be a choice, there must be *at least two* alternatives that have different implications for solving the problem. Therefore, not all alternatives are equally desirable, and not every choice solves the problem.

Figure 1: Problem-solving process



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On the one hand, at a given point in time, some of the alternatives are desirable but not feasible (unavailable), and others do not sufficiently link desires to problem solving. Choosing an alternative means selecting one or more variables controlled by the subject that the subject directly associates with problem solving (and its associated consequences). Their number and their ability to be causally related to problem solving depends on the environment in which the choice is made, i.e., the constraints and the parameters not controlled by the subject. The greater the number of controlled variables, the greater the freedom of choice. This can be represented as a sovereignty field, and within it freedom of choice can be defined as absolute. The greater the number of non-controllable variables and the stronger their influence on the alternatives, the more limited the scope for sovereignty and the more relative the freedom of choice. More generally, *an alternative is defined as a view that links the two types of variables in terms of limited freedom* (to show this in Fig. 1, the field of choice of alternatives is framed in middle brackets). Choice (as a social process) is always *a preference under conditions of limited sovereignty whose value is reduced to the ability to solve problems* (Ackoff, 1978).

On the other hand, solving a problem is associated with its consequences. When the desired consequences are achieved the problem ceases to exist and it is solved. The degree to which it is solved may vary - alternatives, problems and consequences change over time. Complicating matters, the problem-solving process illustrated in Fig. 1 proceeds with temporal differences between elements that can be significant. The total period (T_j) for solving the j -th problem

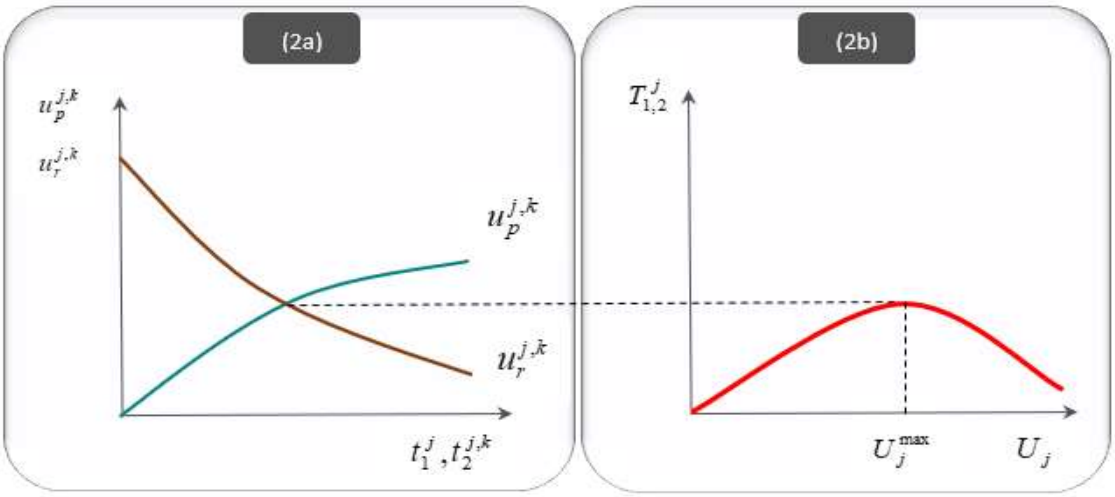
will include the time (t_1^j) for preparing and making the choice of an alternative - the "(pre)solution" period, the time ($t_2^{j,k}$) for implementing the chosen alternative k - the "solution" period, and the time ($t_3^{j,k}$) for manifesting the effects of the alternative applied to the given problem - the "(post)solution" period. The subject seeks to choose an alternative whose consequences are most desirable for solving the problem. Ideally, the utility of the chosen alternative can be evaluated in terms of the degree of problem solving, i.e., as achieving the most desirable consequence. An entity seeking such an alternative is engaged in optimization (utility maximization), and the solution to the problem can be called optimal. To the extent that the solution to the problem (consequences) deviate from the maximization principle (optimality criterion) they may be, to varying degrees, efficient or satisfactory.

In a more rigorous form, choice as part of the problem solving process can be described functionally.

The preference function (Fp) refers to the pre-decision stage and expresses the utility of the choice ($u_p^{j,k}$). The main argument of this utility function is the time to fully prepare the solution of the j -th problem when choosing an alternative k from the subset of admissible (real) alternatives (K).

Each choice of alternative k , has a different lead time and then the utility of the choice in the preference function will depend on t_1^j . It can be assumed that at the beginning the utility function of the choice increases faster, and after a while the relative increase in utility slows down (relative to the preparation time). Or the general form of the utility function has the form: $u_p^{j,k} = F_p\left(t_1^j\right)$, where $u_p^{j,k} = \max$, at $t_1^j \rangle 0$ and $k \in K; K = (1,...,k,...n)$, when $\frac{\partial u_p^{j,k}}{\partial t_1^j} t_1^j = \max$ (see Fig. 2a).

Figure 2: Utility functions in the problem-solving process



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The second function (Fr) refers to the problem-solving phase and expresses the utility of the choice, of *applying* the already chosen alternative k , with respect to solving the j -th problem. Each implementation of a *chosen* alternative requires time and then the utility of the function $u_r^{j,k}$ can be represented as dependent on the duration of t_2^j . The utility of the solution is greater the shorter the time to implement it in solving the problem. It can be assumed that at the

beginning the utility function of the implementation of the chosen alternative decreases faster, and over time the relative decrease in utility slows down (relative to the time to implement the solution). The general form of the second utility function has the form: $u_r^{j,k} = F_r\left(t_2^j\right)$, where $u_r^{j,k} = \max$, at $t_2^j \rangle 0$, when $\frac{\partial u_r^{j,k}}{\partial t_2^j} t_2^j = \max$ (see Fig. 2a).

The two functions are assumed to have the properties of standard utility functions known from economic analysis and reflect behavior viewed as a sequence of choices that the subject makes in the process of problem solving. The process is holistic - the choice of an alternative makes sense only as a prerequisite to the decision, and the implementation of the chosen alternative transforms it into a satisfactory, efficient, or optimal solution to the problem. The two functions as well as any solution have a common basis - the solution of the problem and can only be evaluated in terms of the consequences of solving the problem. Hence, the two functions express the relevant part of the total utility of the choices made in the problem-solving process (the total utility function is additive). The approach taken in this theoretical analysis consists of decomposing the general optimality criterion into local criteria that reflect individual parts of the problem-solving process. The timescales of the two local optimality criteria are expressions of multiple factors. The subject basis of the model includes individuals, groups, or institutions for which the two functions are valid as general theoretical reasoning. It is possible to differentiate the implications depending on the type of subject: for example, institutional decisions matter not only and not so much for the institutions themselves as for individual behavior.

Assuming that the general optimality criterion of a problem-solving process is expressed in terms of the consequences of the choice and decision (utility maximization), we can represent total utility U_j, by the sum of $u_p^{j,k}$ and $u_r^{j,k}$, or $U_j = u_p^{j,k} + u_r^{j,k}$. It can also be assumed that $t_3^{j,k} \approx 0$, which means that the consequences are short-lived, i.e., they manifest themselves at the time of problem solving. Then an argument of the total utility function (U_j) is the time to prepare, make and implement the decision ($T_{1,2}^j = t_1^{j,k} + t_2^{j,k}$) or $U_j = F(T_{1,2}^j)$, at $T_{1,2}^j \rangle 0$. The assumption of brevity of effects ($t_3^{j,k} \approx 0$) allows representation in a Cartesian coordinate system. It corresponds to a situation of finite consumption as opposed to investment consumption, where we have induction of effects over a longer period of time.

Because Fp and Fr represent the utility of choices and decisions *per unit time*, they can be presented in aggregate. The former is increasing but after a certain period of time at a slower rate and the latter is strictly decreasing. Then, the total utility function of problem solving should have the form shown in Fig. 2b. Any problem-solving process requires a comparison of choice time and solution time, and maximization U_j is associated with the extreme values of the local criteria (the *marginal utility of choosing and implementing solutions*). The two functions introduced clearly show that the problem-solving process aims to reduce the gap between Fp and Fr, i.e. to reduce *doubts* in the relative efficiency of different lines of behaviour.

The theoretical validation of the proposed model solution implies answering the following question: does the problem-solving model take into account the principle of rationality?

3. RATIONALITY OF CONSUMER CHOICE

When the goods consumed are subject to market realization, their consumption is viewed entirely as rational behavior. Non-market consumption is assumed to be derivative, and non-market mechanisms of provision and consumption of goods are considered to encompass the domain of market anomalies ('market failure'). What, then, does rational consumer choice look like within the problem-solving process presented above? The most crucial assumption of rational consumer behavior is that it maximizes utility, which is a defining feature of all problem-solving models.

3.1. Subject of choice

Consumption decisions for the goods under consideration are made by different actors (individuals, groups, institutions, the state) and consumption should therefore be characterised as individual, group or societal consumption. The existence of different types of consumers does not change the basic principle of consumer choice and behaviour - maximisation. Rational behaviour ignores everything that does not concern it - personality traits, group relationships, diversity and hierarchy of goals, learning, habits, tastes, etc. etc. In other words, the rational consumer solves a deterministic-type problem in which the consumption problem (incentives) is identified with a scarcity of resources, and consumption (response in the broad sense) is a process of their allocation or use. Consistent with the notion of impersonality of consumption, consumer tastes are set and for choice it is sufficient to assume only their order. Individual "consumption baskets" (goods) differ only in the degree of desirability. The issues of elaboration of preferences by different types of subjects as well as their change is not relevant for the rational consumer. A very important premise is the assumption that it is sovereign and no one can influence choice. Even in a situation of information scarcity and/or market power, he makes his own consumption decisions and is responsible for them. In accordance with the atomized notion of the subject, his relations with others are built only on the basis of mutual compensation.

3.2. Choice

That said, consumer choice defines consumer choice - it is an impersonal pursuit of maximization. Unlike the problem-solving model, where there is a clear distinction between ends and means, the rational consumer's choice is based on their overlap. For him, the objects of choice are available and they fully express desires. Their acquisition is also equivalent to the satisfaction of needs. Insofar as they are dependent on the available resources (and only on them), the objects of choice are seen as images of the constraints themselves (and are themselves seen as resources). The rational consumer's choice requires an exact object-function match between desires and capabilities, i.e. between ends and means. This is described by the term 'propensity to consume', which expresses the intersection of what we 'want' and what we 'are able'. Outside the constraints, desires are impossible, and within the possibilities, means are arranged according to desires (utility). Based on this, consumer choice is uniquely described by the process of "voting with money", i.e. choice is reduced to a variant of resource allocation according to utility maximization. The two elements of consumer choice (desires and options) are not immutable. Above certain threshold levels of desires and opportunities, there is a correlation and mutual incentive between them (also up to a certain level). The process of consumption makes sense and continues as long as the relative increment of utility (goals, desires) is greater than the increment of opportunities. Following this logic, the consumer seeks to exhaust his desires, i.e. to reach a level of total satisfaction of his needs at which the additional resources spent no longer bring him any additional utility. The principle of total utility maximization is therefore reduced to the equivalent principle of marginal utility of a series of choices (which is used to describe economic consumer behaviour). The static choice criterion requires that the coordinates of consumer choice are on the line of consumer opportunity and

reflect the preference sequence. The dynamic criterion requires always a movement towards such a state. In this sense, consumer choice consistent with the rationality principle is optimal choice.

3.3. Alternatives

Each possible and desirable state of consumption described by the characteristics of type, quantity, price and income is considered by the rational consumer as an alternative or consumption pattern. Each state of consumption reflects a certain relationship between them, and each choice object is fully and uniquely expressed by the meaning of these basic choice parameters. The free choice field includes only one controlled variable, quantity, while the others are assumed to be set and the consumer only tailors his choice to them at a given moment. Rational choice boils down to selecting a consumption pattern (quantity, at fixed income, price and type) that maximizes utility. Since the uncontrollable variables are set it is assumed that utility is expressed by quantity. The number of uncontrolled variables that affect the choice of quantity of a good is extremely wide and under certain conditions may violate the optimality conditions and distort the maximization principle. For example, the "free" provision of goods affects the quantity demanded. But in the rational consumer model this is judged as a change in the consumption state, i.e. the adaptation mechanism via quantity always involves the other three parameters. Free consumption of one good is also interpreted as increased real income that is directed for consumption to another good, or as a change in relative prices, etc. Prices, incomes and species diversity are invariant characteristics. They are present in every consumer alternative and help explain the other uncontrollable variables. The mechanism of rational adaptation by quantity assumes that the alternatives are comparable, their consequences are fully predictable, and therefore the consumer can sort them into a common list of associated benefits. Hence, he is not only rational in his ultimate desires (maximizing utility), but he does so rationally. For a consumer to be rational it is sufficient that he acts rationally, i.e., that he has *instrumental* rationality.

3.4. Problem

Rational behavior can also be traced to the next level of the problem-solving process. Obviously, different problems are inherent to different subjects of consumer choice. They are derived from needs, but only unsatisfied needs give rise to desires. But only those of them that are real (accessible) are subject to consumer choice. This means that *consumption problems represent a specific scarcity (deficit) of the "ends-means" type*. Not every need and not every desire (desired utility) can be transformed into a consumer preference. The rational consumer is not concerned with the nature of needs. It is sufficient to identify them and, insofar as they are correlated with opportunities and become the object of choice, they are included as part of the unmanaged variables. Once they are part of the environment for solving a problem, the rational consumer takes as such the possibility (or conversely the impossibility) of satisfying, under the given constraints, the available needs. For him, the problem is not the needs as such, but the scarcity of the means to satisfy them. By choosing an alternative according to the principles of rationality, he allocates his resources optimally. By *acting* rationally, and therefore allocating his resources efficiently, the consumer will always approach utility maximization.

3.5. Effects/Outcomes

Strictly speaking, the rational consumer is not concerned with the subsequent use of goods and those elements of welfare that are not directly related to the rationality principle. At the macro level, addressing inequality and poverty, environmental pollution, and the expanding influence of institutions require increasing attention to reformulating policies of intervention and regulation in the context of scarce resources.

Analyzing the principle of rational behavior in the problem-solving process is important for understanding the mechanisms of consumer choice and behavior. In this analysis, the problem-solving process is a higher-order theoretical model. Strictly speaking, to study rational consumer choice, it is only necessary to observe the maximization principle and the instrumental rationality conditions. However, a number of studies, in economics, psychology, and sociology, that address the question of *how* people make choices argue that, in general, consumer behavior is not based on rational considerations alone (Kahneman, 2011; Pinker, S. 2022; Sandel, 2017; Simon, 1955; Taler, Sansteyn, 2014; et all). The problem-solving process model includes elements that extend the rational consumer behaviour framework and it therefore provides the opportunity to obtain a more complete picture of the consumption process.

We have shown above that there are inherent features of social goods that, in practice, systematically violate rationality conditions and place consumer choice in a natural environment of uncertainty and risk. In summary, the particular features of their consumption that violate rationality are: the social nature of goods; the multiplicity of the effects of consumption; the simultaneous dominance of demand by consumption and investment motives; the heterogeneity of benefits, outcomes and processes; the cumulative nature of consumption and the internalization of benefits in the personality of the consumer over a lifetime; the existence of expediency and urgency of consumption, imposed consumption (limited consumer sovereignty); information asymmetry reaching to complete domination of supply over demand; the unique features of services (intangibility, inseparability, non-preservation and non-permanence of provision and quality). This list is incomplete. As can be seen, it includes only the most essential features of consumption without addressing the issue of production and the mode of provision. Economic theory assumes that the market for social goods is not Pareto efficient, and the process of their production and consumption operates predominantly in areas of market failure (Brown, Jackson, 1998; Penkova, 2019). It can be summarised that the behaviour towards minimizing uncertainty and risk dominates the process of consumer behaviour and choice.

What are the implications of uncertainty and risk for consumer choice viewed as a problem-solving process?

4. UNCERTAINTY AND RISK OF CONSUMER CHOICE

The study of consumption risk and uncertainty requires a complementary modelling framework to enable a deeper understanding of consumption in a 'problem solving process' analytical approach. Together with this, a general typology of tasks in the problem-solving process will highlight the dominant place and importance of uncertainty and risk in consumption.

The problem-solving process is a theoretical stimulus-response model, but unlike rational behavior, it does not require that the stimulus structure uniquely determine the response. It takes into account the widest range of non-economic stimuli and factors, and its most significant advantage is that it views the choice subject as a system that is goal-directed (and proactive) towards the external environment.

Uncertainty is a common prerequisite of any decision-making process and is associated with the knowledge the subject has about the conditions and consequences of the choice, or more generally about the external environment. A possible approach to structuring the environment is in the form of a three-dimensional space of the following *measurable* characteristics: uncertainty (x), dynamics (y), and complexity (z). Hence, each problem to be solved can be represented as a point with coordinates that reflect these characteristics. On this basis, the problems are generalized into two classes:

- *Deterministic* (risk-free) (*0, y, z*) problems are those where the solution is in terms of determinacy (*x=0*), and each alternative leads to well-defined consequences. Depending on the values of (*y*) and (*z*), the combinations: static/dynamic and simple/complex can be added.
- *Probabilistic problems* (risky) *(1, y, z)* are those in which the outcome of the chosen alternative cannot be determined with certainty. This class of problems requires *proactive* behavior. In addition to combinations depending on the values of (*y*) and (*z*), two other important types can be added: open and closed problems. In closed problems the subject has full information about the alternatives and consequences and can perform optimization, while in open problems such information is missing and the criterion is reason (the solutions are not optimal but satisfiable).

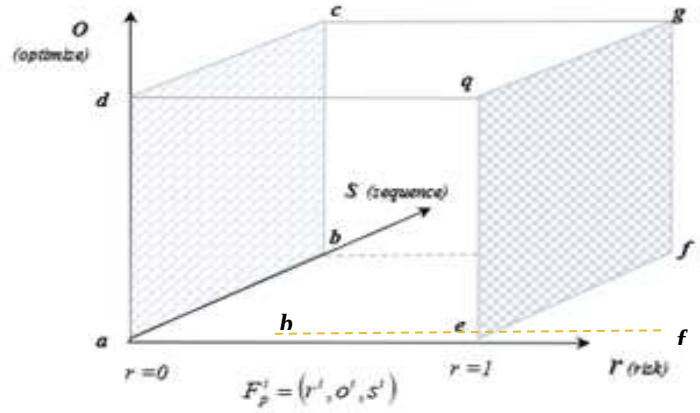
Consumer choices find expression in the derived preference function. To the extent that the choice criteria, the sequence of evaluation and the degree of risk are known, it can be argued that consumer decisions are determined and the choice task is clear.

For the purpose of the theoretical analysis, assume that the arguments at Fp the *individual* level are: *degree of uncertainty and risk (r - risk), sequence of choice (s - sequence)* and *optimality (o - optimize).* The arguments of the function are not homogeneous, but it is assumed that they are *measurable* and can be represented in a standardized scale between (0,1). The first parameter, 'risk', can be measured by the probability of achieving the predicted consequences for each alternative. Therefore, when a consumer chooses an alternative, he chooses its consequences along with it. Thus, *the consumer choice problem (of goods) is structured as a problem with risk: the consumer chooses an alternative from a given lottery of alternatives*.

The other parameter, 'consistency of choice', can be expressed by the dynamics and 'hardness' of choice. Presumably, the more consistent the user is, the faster and more tension-free the choice will be. When (*s=1*) in the conditional consistency scale, the user is completely sure of the consistency of the choice, it proceeds quickly and without "backtracking", i.e. without repeating it. The third parameter, "optimality", is located at a scale at both ends, on which are the understandings/beliefs of "fairness and efficiency". Even if the measurement of the *degrees* of the three parameters is not practically possible, it has its value as a way of representing user choice tasks in a structured way.

Therefore, any user solution that expresses Fp, is a point in the coordinate system with parameters (r,o,s) or $F_p=(r,o,s)$. This forms the *user choice space* (D) (see Fig. 3). Consumer choices in which uncertainty and risk feature prominently ($r^i>0$) form a set of points {F(p)}. Each choice of {F(p)} has coordinates that satisfy the condition: $F_p^i=(r^i,o^i,s^i)$ such that at each $i\subset F_p$, $r^i>0$, $o^i\geq 0$ and $s^i\geq 0$.

Figure 3: Space of consumer choice



Source: own

The entire consumer choice space (D) includes choices associated with risk $F_p^i = (r^i, o^i, s^i)$ and those without risk. Decisions without risk $D_r = (0, o^i, s^i)$ fall in the closed plane (between points *a, b, c, d*), and those in the plane $D_r = (1, o^i, s^i)$ reflect a state of complete uncertainty of consumer choice (between points *e, f, g, q*).

Uncertainty is inherent in any activity. Consumers, in particular of health and education goods are predominantly of the type $F_p^i = (r^i, o^i, s^i)$. In the context of consumption, risk is primarily associated with *some degree of uncertainty about the process itself and about its outcomes*. Consumption risk varies from good to good, but in the most widely represented social domains, health and education, it is becoming increasingly significant.

Practice shows that for some goods, user problems can be described by one of the end (corner) points of the plane of complete uncertainty. In health care, for example, lack of information about the condition, the specific therapy, and its outcomes may lead the consumer to be unable (and unwilling) to make choices for herself (Arrow, 1963). Such a task of "depth indeterminacy" is not exceptional in the context of high value of outcomes and benefits, lack of information, duration, and highly personalized consumption processes. The application of the problem-solving model to consumption confirms that motives whose source is uncertainty and risk are increasingly influential in consumer behavior.

How does uncertainty and risk affect the problem-solving process? Answers can be sought in four directions:

4.1. Complexity of the objectives

The consumption of goods provided in the social sphere is linked to the achievement of complex goals. Complex goals are those that are linked to the achievement of higher-order goals (which is why we can also call them composite goals). This is probably the most important aspect that makes choice situations difficult. The clearest confirmation of this is that the consumption of these goods is both a typical consumption process and an investment consumption process. Combining these consumption characteristics requires a greater volume of information and the ability to process it. The inclusion of the 'time' factor and the need for synchronicity in consumption involve the consumer in considerably more uncertain and subjective assessments of utility. These assessments are dynamic in nature, the perception of the utility of one or another consumption alternative depends on the state of the subject.

Viewing consumption targets as complex (composite) tasks has two important implications. The first, relates to the variety of objectives and their effects. Externalities and the difficulties of retaining ownership and monopoly over consumption effects are typical problematic situations. The second consequence is related to considering their consumption as a proactive process where the consumer can set, change the set of goals, i.e. the set of consumption goals can be changed and thus their utility can be regulated (in the problem-solving model this is the value of effects).

4.2. Multi-criteria choice

Complex goals lead to multi-criteria choices. The consequences of consumption in the subject area under consideration are multidimensional and this makes choice difficult as different aspects of consumption may impose different and conflicting evaluation criteria. It can be argued that when choosing a behavioral strategy, the consumer gives different weights to the criteria and thus develops a generalized evaluation of the specific alternative. A convenient exception to this rule is when all criteria can be reduced to one (price, cost, etc.), but this is not always possible. Reducing all criteria to one is essentially a *forced* process which does not eliminate the importance of the others. For example, the choice of a treatment procedure posed between the criteria of appropriateness and cost may be decided in favor of the lower cost, but appropriateness is not dropped from the evaluation matrix - for a particular choice and at a given time it has lower relevance. In the presence of multiple conflicting criteria, consumer choice reflects the trade-off between them.

Complex and multi-criteria solutions are generally multi-stage. When consumption is not a single act within the consumption period it can be viewed as optimizing a *sequence* of choices, the goal being to select the decision that yields in aggregate the greatest benefit. A convenient term that summarizes these characteristics and allows for uncertainty and risk analysis is portfolio consumption. The solution to a problem that considers consumption as a long-term portfolio of alternatives has a strong focus and motivation on utility-risk optimization.

4.3. Information constraints

The level of uncertainty and risk in user decisions depends on the scale, complexity, the ability of the entity to process the information, its availability and distribution. The asymmetric distribution, high degree of complexity and significant costs of delivering and processing consumption-related information are typical information challenges in consumer behaviour. The *information burden* on consumer decisions is growing, resulting from a disconnect between the extreme growth of information and the relatively limited capabilities and capacities of consumers (infrastructural, cognitive, etc.) to evaluate it. The incompleteness about the conditions and outcomes of consumption on the one hand, and the growing information load on consumer decisions on the other hand, are a major source for the systematic manifestation of irrationality in consumer decisions. Placing consumers in the research perspective of decision-making processes enables the economic criterion of optimization to be complemented by the criterion of level of satisfaction (*aspiration level*, Simon, 1955).

There is also a body of evidence of other features of information processes that are characteristic of problem-solving processes that make consumer choices difficult - the "primacy effect", "cognitive conservatism", the "inertia effect", etc. – see Jelev, S. i dr. 2019). A typical reaction to information risk minimization is the development of formal and informal institutions of trust and experience. Another reaction and natural mechanism for minimizing uncertainty and risk is the expanded demand for non-market activities (Ulf, 1995).

4.4. Subjectivity of choices

A distinguishing feature of problem-solving models is that they emphasize the subjectivity of choice (user identity, personality characteristics, cognitive processes, competence, communication, and groups). The degree of personalization of consumption is high. Service provision is immersed entirely in the field of immediate human interactions, hence the strong personalization of the processes of demand and consumption. There is no single view of how subjectivity affects the level of risk and consumer motivation. Significant personalization in rendering, destabilizes the accurate assessment of utility required for choice and consumption.

There are also mechanisms that work in the opposite direction – the repetition of initial consumer choices; the introduction of search and choice procedures; and the compensation of uncertainty through the expansion of communications and trust institutes. The widespread use of group decisions in consumption also has a two-way effect. For example, the breakdown of personal responsibility within the group increases the propensity and magnitude of risk-taking, while conformity reduces it. In both cases, however, choice quality may be lower. It is a commonly accepted view that a higher degree of consumer involvement in the production (and consumption) process requires proactive behaviour, which corresponds to a higher degree of consumption motivation.

CONCLUSION

The theoretical analysis of consumption goods and consumer choices for socio-cultural goods provides a unifying analytical and instrumental solution. For pragmatic management purposes, the analysis of consumer choices and the overall consumption process brings significant advantages. This approach allows reconciliation of a wide range of factors and of structural-functional relationships in the overall consumption process. The 'problem-solving' approach is consistent with the rationality requirements of behaviour and takes account (collectively and in its individual elements) of uncertainty and risk in consumption. This extends and validates its analytical and predictive capabilities.

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