Research Paper

The systemic approach in sociology –reflections on its development, current status and potential

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Abstract

This article reflects on the development of the field of system theory- explains its origin, characterizes its history and considers its potential for further utilization. Development in this area is associated with the contributions and ideas of a number of personalities, including H. Spencer, L. Bertalanffy, N. Wiener, T. Parsons, N. Luhmann, and many others. The author describes the dominant ideas applied and considers the perspectives and goals to which this approach could currently be directed. He concludes that the main task of a systemic approach in sociology should be to analyse systemic processes at the macro-social level, especially those resulting from the specific cumulative effects that lead to certain latent phenomena.

★ Keywords: sociological theory; methodology; system; systemic approach; cybernetics; structure; function; self-reference; differentiation; holism; complexity; micro/ macro- social reality.

Introduction

The germs of sociological thinking existed even before sociology emerged as an autonomous scientific field. Both in its early stages and later, this type of thinking developed under the influence of certain metaphors which were a source of meaningful inspiration and important heuristic tools. Since the time of Aristotle, the attributes of living organisms have been projected onto the world and its various parts. This can also be observed in the approach taken to society, frequently considered as a living creature. In mediaeval thought, analogies were made between the individual components of society and various parts of the human body. In addition to physical metaphors, in early literature we also find society being likened to a building, city, or castle, and later the metaphor of the machine also emerged.

At the end of the 19th century, Herbert Spencer [1896] came up with an influential idea linking both biological and social organisms to evolutionary processes, where they both grow ever more internally differentiated and complex over time. The term organism was replaced in the 20th century with the term system, chiefly through the biologist Ludwig von Bertalanffy, who was the first to describe biological organisms as open systems. He elaborated systems thinking into a general theory of systems – a theory that saw the biological body, a machine, or even society and its individual components, as systems.

Analogically, sociology deals with social structure by breaking down society (the system) into the parts which form an entity that is whole as a result of reciprocal ties, connections, and interactions. The usual explanation for how these structures are formed is through processes of differentiation (social differentiation in Herbert Spencer's case, functional differentiation in the cases of Talcott Parsons and Niklas Luhmann), which takes place as a result of a spontaneous process of evolution occurring in similar (though not identical) ways in both nature and society. This type of explanation is typical for positivism in particular, but also found in functionalism, which developed under positivistic influence.

The early stages of functionalism tend to be associated with the ideas of August Comte, Herbert Spencer, and Emil Durkheim [1997 (1893)]. However, an instrumental role was played in the formation and spread of functionalism in the social sciences by British cultural anthropology, most prominently, Bronislaw Malinowski and Alfred R. Radcliffe-Brown, whose approaches draw an analogy between social functions and human needs [Malinowski 1990 (1939): 5-7, Radcliffe-Brown 1990 (1935): 30]. Just as humans, if they are to survive, must ensure that certain needs are met, there are certain functions in society that must take place and are essential for society to continue to exist, work well, and evolve. Function here means the contribution of one part of a system to the maintenance of the system as a whole. Applying functionalist methodology involves examining the individual parts of a system (subsystems) with regard to their specific contributions (i.e. functions) to maintaining the whole, placing emphasis on integrity and equilibrium.

Developing the systemic approach after World War II

In the 20th century, the term 'system' truly took off, with the development of a general systems theory, cybernetics, and mathematical modelling, all viewing systems as complex, dynamic entities. The general systems theory of Ludwig von Bertalanffy began developing in the 1930s, initially in the field of biology. Subsequently, it grew into a universal scientific concept and methodology, utilised not just in the natural sciences but also those with humans and society as their focus. After the Second World War, references to social systems were made, primarily influenced by the sociology of Talcott Parsons [1966b (1951)], and later Niklas

Luhmann [1984] elaborated and popularised it with his writings.[1]

The founder of general systems theory, Ludwig von Bertalanffy, was a biologist specialised in physiology, and he was especially interested in the general characteristics of living organisms. Early on in his career he attempted to develop a general theory of biological organisms, conceived of as organised entities. From that idea he then proceeded to envision each living organism as an open system –in constant exchange with its environment.

Bertalanffy gradually progressed from this viewpoint towards a more general goal: to create a *general theory of systems* [Bertalanffy 1984 (1968)]. A general theory of systems was first developed as a branch of mathematical logic, and focused on deducing and formulating principles for systems in general. The pages of the studies that Bertalanffy wrote on this subject are full of mathematical symbols, equations, and formulae, and his work was supposed to become a kind of trans-disciplinary super-concept to serve as a theoretical and methodological starting point not just for biology but for a whole range of scientific fields – the social sciences and humanities as well as the natural sciences.

Bertalanffy's concept of general systems theory was relatively well received, and became invested with great hopes and expectations as many other researchers tried to build on it, among them Kenneth Ewart Boulding, who focused on economic and social development [Boulding 1969], and Russell L. Ackoff, who dealt with operational research [Churchman – Ackoff – Ackoff 1957] and systems theory's applications to state institutions and political objectives. The 1960s saw talk about the spread of systems thinking across science, and many believed that the systems approach could become the foundation for a re-unification of the sciences.

This was boosted by the popularity of another new discipline born after the Second World War, cybernetics, founded by the American mathematician and philosopher Norbert Wiener [1965 [1948); 1989 (1950)]. Cybernetics was meant to be a science concerned with the principles behind the transmission and processing of information, and with the self-organisation and self-regulation of complex dynamic systems. The two disciplines – general systems theory and cybernetics – began to be viewed as compatible and capable of being combined to solve a very broad field of scientific and practical problems (see, e.g., the study by William Ross Ashby [1952; 1956]).

The optimism and enthusiasm that heralded the systems approach have cooled considerably today, but the systems approaches inspired by Bertalanffy have not disappeared, continuing to develop in various areas of scientific inquiry. An important successor to these ideas today is the theory of networks [Barabási 2016; Estrada – Knight 2015]. Other approaches work with the concepts of synergetics, entropy, and chaos.

One type of research, known as network analysis, has been developing in the United States since approximately the 1960s, proceeding from an intellectual tradition that extends back to social psychology, sociometry (Jakob Moreno), and graph theory in mathematics. The analysis of social networks was popularised by Mark Granovetter in his study *Getting a Job* [Granovetter 1974].

As the theory of cooperative and co-active development, synergetics, based on the pioneering ideas of German physicist Hermann Haaken [2004], deals with the issue of self-organisation, or more specifically the creation, stability, and demise of organised temporal and spatial structures that emerge spontaneously, as a joint effect of synergy, or the interaction and reciprocal effects of the processes occurring within systems.

Theories of social entropy are among the efforts to apply the basic principles of thermodynamics to the dynamics of social systems. This problem has been separately

1 In Germany, Parsons' ideas were taken up not just by Luhmann, but most notably by Richard Münch [1987], who was more faithful to Parsons' theoretical legacy and did not depart from it as markedly as Luhmann did.

addressed by Michel Forsé [1989] and Kenneth Bailey [1990].

Chaos theory is the mathematical discipline concerned with non-linear dynamic systems with phenomena that can be called turbulence (dynamics with the greatest complexity) and deterministic chaos (phenomena of this type are observed in the natural sciences, especially climatology, but also, for instance, in price activity in the stock market or in population dynamics). Deterministic chaos is not the absence of order but order marked by a very high degree of complexity.

The authorities that systems researchers look to today include: Ilya Prigorine, a scientist and philosopher specialised in the problem of self-organisation and what are known as dissipative structures [Kondepudi – Prigogine 1998]; Austro-American physicist, mathematician, and cybernetician Heinz von Foerster [2002]; Anglo-American anthropologist and philosopher Gregory Bateson [1979], who studied communication and learning; American philosopher and psychologist Ernst von Glasersfeld [1995], founder of radical constructivism; Chilean biologists and cognitive science experts Humberto Maturana and Francisco Varela [1992]; Austro-American communications expert Paul Watzlawick [1984]; Hungarian philosopher of science and systems theorist Ervin Lázsló [1996]; French philosopher Edgar Morin [2008]; and British sociologist John R. Urry [2003].

There are also several international associations devoted to research in this area. Within the field of sociology, the primary association that warrants mentioning is the World Complexity Science Academy (WCSA), headed for many years by Italian sociologist Andrea Pitasi, and producer of a number of academic publications [Pitasi – Mancini 2012; Mancini – Angrisani 2014; Bonazzi – Di Simone2015; Fabó – Ferone – Chen; 2017; Narro – Folloni – Pitasi – Ruzzeddu 2017].

Outside these approaches to studying systems, the term ‘system’ has been used for decades in the historical-sociological research of Immanuel Wallerstein, focusing on the development of the global capitalist system. He published a four-volume work [Wallerstein 1974, 1980, 1989, 2011] inspired by Marxism and the dependency theory that emerged out of Marxism.

The Conception of Niklas Luhmann

For German sociologist Niklas Luhmann (1927-1998), modern society is a functionally differentiated society. This means, among other things, that it is made up of non-homogeneous but equivalent parts with relatively separate characters, referred to as societal subsystems (Teilsysteme, sub-systems, systems within systems). Luhmann nowhere gave any comprehensive list of these subsystems, but their number clearly exceeds at least a dozen, including the economy, politics, law, army, science, art, religion, mass media, education, health, sports, family and intimate relationships.

Societal systems are self-referential, which means that while consisting of elements, operations and structures, they refer to themselves. A prerequisite for this “self-reference” is the ability of the system to observe and describe itself, to provide self-evidence. In contradiction to Parsons’ concept of systems which are open (in the form of Input / Output) to their surroundings, Luhmann [1984: 25, 1997: 92] emphasized the self-reference of social systems, and their operative closure (selbstreferentiele Geschlossenheit, operative Geschlossenheit); he turned his reflections from open to operationally closed systems. Self-referential closure, however, is not a form of solipsism or autism. Even though systems in their construction and reproduction are closed, it does not mean that they cannot and do not create contact with their environment; on the contrary, without these contacts, the dynamics of operationally closed systems would cease.

First of all, it is important that each system belongs only to its own functional specialization in the specific area of action that takes place in it (economic behaviour is not religion or intimate relations, etc.; to each of these types of behaviour a different significance is attributed and each pursues a different goal). Each subsystem contributes, due to functional specialization, in a different way to the reproduction of society. Despite heterogeneity, subsystems are equivalent in that that they are all necessary for this reproduction and, it can be said, even irreplaceable for society to retain its character.

The mutual unity of these subsystems is formed by relationships based on a combination of their functional closure, and at the same time their openness towards the environment. This means that modern society represents a differentiated unity, i.e. a whole consisting of functionally dependent (i.e. on the functions of other dependent systems) and at the same time autonomous partial systems. Autonomy and dependence are here in mutually potentiated, graduated ratio; even though partial systems have relative independence, the collapse of one can have fatal consequences for the societal system as a whole.

The condition of the existence of social systems is communication. For this reason, systems create mechanisms to stabilize communication processes. Luhmann, in this context (inspired by Parsons), uses the concept of symbolically generalized communication media, which, however, cannot be narrowed down to commonly understood means of mass communication, as they concern such media as power, money, law, faith, or knowledge. Luhmann considers the differentiation of individual communication areas, such as politics, economy, law, religion, science, but also education, art, or intimate relationships, as one of the main features of social evolution, each accompanied by an appropriate communication media.

The communication mediated by these media within the individual subsystems takes place in the framework of a certain binary code (e.g. in the political system: to have power – not to have power, in the economic system: payment – non-payment, in the legal system: law – injustice, in science: truth – untruth, in religion: immanence – transcendence).

Thanks to these binary codes, expressing a certain type of leading difference, sub-system-specific semantics are created, in which the autonomy of individual sub-systems is based on the application of its systematic leading difference. The differentiation of the economy as an autonomous societal sub-system, for example, begins with the establishment of a symbolically generalized communication medium – money [Luhmann 1988: 230]. Unit acts are payments; the binary code is payment / non-payment; language is represented by prices, which are conditioned and reconditioned by payments.

As a whole, the operational logic of individual systems is narrowed down and one-sided, based on the highly specialized binary code controlling the operations in the respective system. Problematically, each sub-system, on the basis of its own observations, creates a picture of society (what the legal system observes, for example, is society, but just seen through the application of the distinction law – lawlessness). As a result, individual systems can only see what their schematisations allow them to see. The unified picture of society fragments into partial observations and, instead of a centrally-conceived world, a multi-centric world emerges [Luhmann 1984: 284].

Despite the self-referential communication closure of individual social sub-systems, these sub-systems do not operate only in their own world, independent of each other, but on the contrary there are various structural links between them (*strukturelle Kopplungen*). However, self-referential closure means that modern society can no longer represent a substantially graspable whole; sub-system functions may no longer be considered from the perspective of the whole (as, for example, was the case for Parsons).

According to Luhmann, contemporary society is quite simply created by the co-existence of many different sub-systems, among which arise various structural links; however, to think of whole system integration in terms of the coordination or management of this complex network from a control centre is futile.

Generally speaking then, systemic differentiation represents a successful strategy of modern life that has brought many communication benefits, but has problematic consequences, including not only very limited options for controlling mutually dependent functional subsystems in their interaction with each other, or the relation of these systems to their environment, but above all the absence of integration mechanisms. Society, in attempting to respond "as a society" to these problems, is hindered by the principles of functional differentiation; it can respond, but only in a partial, system-specific way.

How to further orientate system research?

In contemporary sociological thinking, many members of the sociological community silently share certain simplified assumptions derived (the question is, how correctly) from certain widely accepted and respected individualist-type paradigms. These simplified and simplifying assumptions are not usually articulated explicitly in sociological writings, but make their presence known by being embedded – usually implicitly rather than transparently –in discussions relating to various sociological issues.

One such widespread assumption is the belief that it is human nature that people have in their mind (seemingly from the very start) individual plans, intentions, and goals, and as soon as they come into contact with other people they start to pursue these and realise them. Another simplifying assumption is that social reality begins to form just as soon as any two individuals randomly come together and start a conversation, from which incidentally something greater than them emerges, as a single element of the larger whole that we call the social order. A third popular assumption, consistent with those above, is that all social entities, even the most complex ones, can be viewed as assembled and pieced together out of individual micro-situations, and usually regarded as conversations containing the negotiations by which social reality is constructed.

The problem with this approach is simply that in social reality we come across all sorts of phenomena (as long as we are willing to see them) that cannot be easily captured and explained using this perspective. Such phenomena include cities, roads, civilisation(s), stratification, armies, industrial enterprises, states, and regions, phenomena usually captured in holistically-oriented sociology, which often uses the term 'social system' to describe them. These entities are usually tied to the macro level (or sometimes the mezzo level), which it would be absurd to conceive of as just a never-ending chain of conversations.

If a concept is to find its own indisputable place in sociological thought, it needs to correspond to something that cannot be aptly captured by any other concept in the social sciences. The use of the term 'system' tends to suggests itself when we encounter in social reality phenomena of a holistic nature above the level of the individual; that is, phenomena whose specific systems attributes cannot be explained on the basis of the attributes of individuals and individual elements. Such phenomena are mainly encountered on the macro-social level, rather than emerging from relations between the ego and the alter ego or between a handful of individuals within small social groups. They are instead phenomena as the outcome of certain complex relations, through time and space drawing in large numbers of individuals who in most cases could not possibly know each other.

A third characteristic of systems processes is their latency, a distinctively characteristic feature of systems-type phenomena. These are mechanisms that manifest themselves

through the existence of phenomena that in most cases were not consciously constructed by people – at least not in the form we encounter them – and that are instead something of a particular nature, independent of the wishes of any individuals, formed by latent means as an unintentional and unplanned consequence of deliberate human actions.

Although we can legitimately question and criticise aspects of systems theory in the work of its main representatives, especially Luhmann and Parsons, at minimum systems theory is a to-date irreplaceable contribution to the analysis of macrosocial phenomena. In vain would current sociology seek a comparably productive theoretical approach, capable of theoretical description and analysis of macrosocial phenomena, to passably substitute what is offered by system, structure and function.

We proceed from the assumption, therefore, that macrosocial reality has its own principles – holistic and supra-individual in character – not explicable from the analysis of individuals. It follows that many phenomena at the microsocial level are significantly influenced by factors formed at the macro level.

The systems approach is suited above all to social phenomena of a holistic character, whose features and communications not only surpass individual characteristics, but are latent in nature.

- We would add that the term system may be understood, and is used in sociological literature, ordinarily in two senses. In one sense, it simply refers to a certain social entity – most frequently society itself, or its individual parts (subsystems) – as a whole, with everything that belongs to it (within its system boundaries). This can be found in authors who otherwise do not work with the systems approach, but endorse a wholly different paradigmatic perspective. In the second case, under the term system we understand entities with a certain way of working, whether operating, communicating or autopoetic; this approach is characteristic of systems analysis. Systemic processes:are of a holistic nature, arising from the cumulation of certain types of action and interaction, and the outcomes founded on them.
- result in phenomena with the character of short-, medium- and long-term processes. have their own logic, principles and rules, which cannot be derived from the actions of individuals because they introduce certain qualities which lie with the whole rather than with individuals.
- represent principles and rules thanks to which social reality obtains its character, which may to observers resemble occurrences in nature, possessing the character of natural phenomena. in the current development of sociology are scrutinised by structuralism, functionalism, and system theory.

One of the typical efforts in the development of system theory has been the search for some universal interpretative principle to explain multiple distinctive types of system in the various areas and levels of lived reality. For Luhmann, this universal key was the concept of communication and the related concepts of communication media and system semantics. Unfortunately, it must be admitted that this theory, like other approaches to finding a single interpretative principle within the system paradigm, has not convincingly contributed to uncovering the mechanisms that trigger systemic processes at the macrosocial level of social reality. The basic forces of human history, if we follow Ernst Gellner's observations, are work, war, and productive knowledge. Knowledge was retained (first only in oral style, later with the help of symbols and letters) and passed from generation to generation, gradually broadening and transforming, differentiating into a range of sub-systems, including religion, morality, law, social categories, values and norms, philosophy, science, arts etc.

Work and production are associated with materialistic doctrines, elaborated especially in Marxist discourse. System processes which can be connected with this field include the

discovery, development and transformation of various working procedures, manufacturing technology (what Marxists called productive power), and their influence on the character of society. The relationship between technological change and the social sphere is significant not only in the area of production, but also in the military and science, affecting even the means of interpersonal communication.

Alongside the technological aspects of production there is the social significance, and, it can be said, the key question of the production, distribution and exchange of value created by work (for Marx this was the area of productive relations). In the economic area there are a whole range of processes to be discovered and examined which are of highly systemic nature and thus of a holistic character, which play out on a macrosocial level and take latent form.

Politics is an area which system theorists like Parsons or Luhmann had the tendency to see as the subsystem of politics, with its directing medium that of power. A problem nevertheless remains in the fact that we encounter various types of power relations in different areas of society, not only in politics - in economics, production, religion, science and arts - but also in ordinary interpersonal relations on a micro and organisational level. From the perspective of historical development too, worked on by authors such as N. Elias [1983], M. Foucault [1979], S. N. Eisenstadt [1963], Tilly [1990] and M. Mann [2012 (1986)], among others, the formation of the political system is much more complex than can be found within the scheme of current system theory.

What has so far not been sufficiently elucidated about social systems and social processes, then, are the latent mechanisms arising from the cumulation of individual acts and interactions. The latent level may frequently reveal a certain interior logic which was not devised by humans, or anyone else, made known via sorting principles and rules. The logic, or principles and rules, which thus – one might say autopoetically – arises, is visibly applied in reaction to problems when something crops up, when in a given area some new situation or event is discovered to interrupt expectations, customs, proportions or balance. We will try now to identify certain basic situations in which these latent mechanisms may be manifested.

The basic phenomena laying the trail of latent manifestations are unwanted and unplanned declines or increases in phenomena or values that on a mathematical level may be considered dependent variables.[2] A dependent variable may be a) phenomena of a natural character expressing natural powers (for example loss of water resources), b) phenomena of a natural character caused by previous human activities of ourselves or others (for example soil erosion), c) phenomena of a social or cultural nature caused by the manifest or latent activities of our own people group or society (e.g. an increase in crime), d) phenomena of a social or cultural nature caused by the manifest or latent activities of another people group or society (for example the growth of a hostile approach). If these phenomena are perceived as new events, we speak of their emergence.

The processes triggered by such events (apparently) may vary in the space they take, their duration (long term, short term), and rapidity. Individual courses of change through time may be linear or non-linear, recognised and expressed as a certain trend. These trends may represent rises or falls, strengthening or weakening, widening or narrowing, growth or decline, profit or loss. A specific phenomenon of social dynamics is periodic cyclicity, manifested in the economic system (the economy) as alternating rises and falls. Processes can vary in their speed, encounter various obstacles, and even cease. Each requires for its duration certain energy and resources, which in the case of system mechanisms of a social nature can feed various types of human activity (work, war, the products of science etc.).

2 Relationships between dependent and independent quantities can be of direct or indirect proportions and can be linear or non-linear in nature.

The growth or decline of variables in a certain system area may cause change to the hitherto stable existing proportions – or disproportions – between variables, which, having been destabilised, may stimulate unexpected development; when one element notably strengthens, it changes the character of the whole system (and vice versa; as a result of the weakening of one branch of the economy, other branches may grow, and with this a structural transformation of the whole economy take place). These changes of proportion may be connected not only with crisis phenomena, but with effects of a substitutionary character (replacing something with something), or implementing new knowledge, technology and discoveries.

Alongside changes of a quantitative nature there are qualitative ones. However, in modern times a fundamental role in the emergence of qualitative change has been played by human ingenuity and invention, especially through the development of the subsystem of science.

All types of phenomena may represent causes for subsequent phenomena and processes, which may also have their consequences on a latent level (a decrease in water resources, for example, may make way not only for migration but changes in the organisational structure of society). In practice, however, phenomena are of a much more complex character because many variables may come into play (interaction caused by migration processes may also have geographic, demographic, military, economic and cultural dimensions), and also because their interconnections and interrelations (via eg. the so-called domino effect) may be affected. When the development of two or more processes is conditionally related, we may speak of interdependency. If these simultaneously running processes are mutually supportive, we may speak of their synergy. Social wholes, which we may designate as social or societal systems, are mostly not held together due to one type of feedback, communication or exchange, but rather the multifaceted connectivity of their individual elements. Nevertheless, this might not always prevent such wholes – due to a severe imbalance in a key factor – ending up in disintegration and collapse.

Many processes of a systemic nature take place spontaneously in society, but many also require someone – leaders or experts – to control or regulate them. This relates to a wide range of processes on the macrosocial level, characterised by inclusion and exclusion, and ultimately connection and division (also differentiation or bifurcation).

Social systems and social processes exist in time, and have a duration in which partial phases of historical movement can be distinguished – both for the whole system and for subsystems – by such terms as stability and change, rise and decline, continuity and discontinuity. For systems associated with self-reflection (and not just systems of knowledge), an important role is played by memory and the reorganisation of horizons of past, present and future. The future is not – as supposed by the modernist philosophy of history – wholly determined in advance by historical laws, but is to some degree open to individuals, their discoveries and innovations, and furthermore to emergent events which may arise, not least as a result of the latent mechanisms described above.

The important thing is that the system approach can be aimed not only at investigating (characterising) specific system mechanisms, but describing and analysing the functioning of whole societies at the scale of the nation state, and beyond that, the issues of international relations and globalisation.

In conclusion

It has been the aim of the preceding text to show that the systems perspective is important, and one could say irreplaceable, for sociology, above all in the analysis of

phenomena of a latent sort on a macrosocial level – that is, system mechanisms. The goal of research should be to reveal and analyse the hidden principles underlying individual actors, which bring unintentional, unplanned and often unwanted effects, altering or even cancelling out their stated goals. The attempt of many concepts of a systemic character to reveal certain universal principles applicable to all types of social system (some system variant of a theory of everything) is certainly desirable but remains a dream, which current sociology cannot recognize as real and realisable.

Among the key premises of system thinking is the complexity of social reality and social theory, and the need to reduce it. This reduction should not mean inadequate simplification in the area of theory, such as with the widely held assumption that phenomena on a macrosocial level can be explained by principles revealed at a microsocial level by examining individual action and interpersonal interaction. By contrast, the assumption should be that phenomena at the macrosocial level have their own inherent logic, unguided by microsocial phenomena. It may be that this conclusion, as indeed as may be the case with many opinions expressed in the second part of this text, is of a polemical nature, but this contribution is aimed at provoking debate on how the systemic approach should be further developed, and the aims to which it should be oriented. For this reason, any reactions that this article triggers will be welcomed, including critical ones.

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