Editorial Preface

"The Future of Systems is in the Past"

Frank Stowell, School of Computing, University of Portsmouth, Portsmouth, UK

In this edition, we have seven invited papers from distinguished academics in the Systems and Cybernetics field. Each author has written an opinion piece on the present 'status' of the subject and expressed an opinion where the subject might develop. But we must emphasize that opinion pieces are just that, authors are expressing their opinion without the constrains of conforming to a particular publishing criterion. However, each paper has been reviewed and comments passed back to each author before the publication of the final version. It is rare that as many opinions about Systems and Cybernetics are published under a single edition. It may be of interest to the student of 'Systems' to note the different perspectives of the Systems epistemology expressed. The majority of the papers reflect what might be called the 'hard' systems perspective, but even these are influenced by the 'soft' perspective. The importance of this comment is that it highlights the close relationship that all 'shades' of systems and Cybernetics share. Comments from the community on this subject are welcome and selected replies may be published in the future.

A summary of each opinion piece is as follows:

In the first paper entitled "The past, present and possible future for systems", Professor Minati, who is the president of the Italian Systems Society, briefly summarises the characteristics of the science of complexity or what he refers to as post- Bertalanffy General Systems. He asks is General Systems Theory and the science of complexity sufficient to adequately model post-industrial social problems? In his paper, he explores the past, the present and a possible future of the science of systems and how newer types of systems and systemic properties may be applied to 'social problems.' He begins by criticising Bertalanffy's Systemics as incapable of dealing with complexity. He then goes on to suggest how the post-Bertalanffy General system can deal with complexity followed by considering new types of systems and systemic properties such as systemic fields and quantum systems.

In this opinion piece Professor Minati discusses the shift from one where systems are considered as acquiring properties resulting from their design, to considering them as self-organised, emergent systems. He says that approaches to modelling and interventions to change vary in nature with what he refers to as post-Bertalanffy Systemics. What he means by this is modelling to allow simulations and interventions to allow suitable influence on the behaviour of the Systems, such as acting on their environment and generating perturbations. He points out that whilst new models and approaches are under study in science there appears to be a distinct lack of progress when dealing with the complexity found in social systems that are developing in the post-industrial age. For example, economic crises, security, defence, privacy, managing prisons, and supporting development. Applying Bertalanffy's concepts or simply transposing models and changing the meaning of variables are deficient when facing such challenges. This inadequacy is because the peculiarities of Human Systems are underestimated. Such systems consisting of complex interactions that allow coherence are also cognitive, informal, learning, evolutionary, ecological and non-governable Luhmannian subsystems. The non-cultural or

low-cultural accessibility of the approaches considered by the science of complexity contribute to this inadequacy. In the paper, Professor Minati suggests how the science of systems may further evolve by considering new types of systems and systemic properties such as systemic fields and quantum systems. He concludes the paper with a vision about possible future understanding of human social systems as potential areas of research.

In the second paper, "Systems Thinking Research in the twenty-first century: A SWOT Analysis", in which Systems research is also discussed, Professor Dominici highlights the strengths, weaknesses, opportunities and threats of systems Thinking. Talking about the "weaknesses of ST, he is critical of some research undertaken in the name of Systems. He says, "The main problem of a certain type of systemic research is that sometimes it is just 'hot air' and not science. Some streams of systemic research are just New Age style theories based on no evidence, except what is in the mind of the systemic 'researcher'." He defines two kinds of hot air. The first he refers to as Pseudo-systemic theories (e.g. abstract holistic theories) and the second as "Systemic puzzles" which he says are uncoordinated potpourris of several pieces of other previous systemic theories. But he acknowledges that this is not peculiar to systems thinking alone there are examples of the way in which scientific ideas, e.g. string theory, are often confused with 'metascience.' This also happens in systems, he says, because even if Systems research cannot adopt the experimental methods of Galilean science, this cannot be an excuse to build up theories with no empirical base. The way to avoid this and not fall into the trap of pseudo-science is to carry out grounded research based on the interpretation of a certain perspective of reality. In this way, even if the object and the context of analysis are not repeatable (as in all social sciences), at least we can find an object of analysis and avoid being tempted by elaborate fascinating theories which lack real world credibility.

He says that systemic research can be perceived as not sound because dealing with complexity and emergent phenomena it cannot strictly follow the scientific experimental method. This implies that by failing to adopt a scientific approach in their research it may casts doubt and be seen as uncertain by people and organizations that are used to structured systems where projects are planned and targets are met. In other words, the methods employed in Systemic research may be seen by some as lacking rigour, especially those critics used to a structured approach with 'guaranteed' outcomes. Professor Dominici suggests that a solution for this is to deal with real problems and to supply an umbrella of solutions according to the findings, so that research can be grounded in 'real' issues.

Critics of Systems practice may view its methods as being incapable of providing tools to help decision makers to discover real issues. He suggests that in order to avoid such criticisms, systemic researchers must be able to filter and choose the most suitable and applicable information to establish plans and procedures that can help decision makers to reveal aspects of the analyzed phenomena that cannot be grasped through the implementation of a single reductionist model. He calls this ability "intelligence of complex phenomena" and describes it as a form of strategic intelligence and a more comprehensive way of managing knowledge. Professor Dominici emphasises that this intelligence cannot be "abstract", and should be based on a combination of a holistic view combined with specific and objective measures and directions. To this end, one important skill is to be capable of using intuition to find a path in the *mare magnum* of complexity, by using in the proper way models, simulations, narratives, semiotics, statistics, metaphors, and analogies to communicate sensemaking in a clear way to decision makers. The message here is that we should be able to use models, but not as one would in Engineering, but model used 'cum grano salis' a mix of the two; Soft but Hard, Hard but soft.

In the third paper by Professor Espejo entitled, "Our Cyber-systemic Future", he also considers how Systems and Cybernetics research can address the issues arising from a world that is increasingly beyond our traditional response capabilities. He says that to address such complexity requires imaginative propositions and innovative behaviours. As an example of how this might be approached he cites the World Organisation of Systems and Cybernetics (WOSC) conference in 2017. Researchers at the conference provided examples of approaching complexity from a cybersystemic perspective. The benefit of Systemic thinking, he writes, helps to visualise the situation as a whole which avoids

dysfunctional fragmentation. Cybernetics, he suggests, enables us to maintain dynamic stability created by the interactions among and between people, institutions, and organizations. Systemic thinking gives us methodological tools; cybernetics gives us tools to manage the complexity of situations from the local to the global. But failures like abject poverty, wars, increasing numbers of political and economic migrants are all challenging our abilities for systemic organisation and management. We are left with no alternative, he writes, but to "design" more innovative forms of bootstrapping the development of the less fortunate and increasing solidarity all these are systemic challenges. Professor Espejo says that self-organisation processes producing this scalability may take too long so it important that we reflect upon and look to improve our strategies to manage complexity.

Although cybernetics is making contributions in communication and control, first at the level of machines (e.g. robots) and increasingly at the level of people and society. Unfortunately, the integration of these developments into the more traditionally fragmented disciplines is proving slow and far from adequate. A systemic approach, to improve control and communications in a holistic society, should help building a 'cybersystemic' future, as a catalyst for social and individual learning. Scalable and transdisciplinary knowledge is helping to produce tools to deal with today's concerns of mankind as well as with the pressing problems of communities

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A key element in the development of policies for the World Organisation of Systems and Cybernetics- WOSC- (www.wosc.co), Professor Espejo plans to seek collaboration with several other associations, to set about fostering the collaboration of people pursuing systems thinking and Cybernetics as a means of addressing our complex world. He wants the WOSC to play its part in clarifying methodological and epistemological aspects of problem solving at all levels of society, from the global to the local. He will guide the WOSC to work towards bringing together, through its congresses, people into conversational spaces aiming at developing and strengthening transdisciplinary methodological approaches.

The fourth paper, "Advances in Cybernetics Provide a Foundation for the Future", written by Professor Stuart Umpleby reminds us that Cybernetics is a transdisciplinary field that has influenced and has been influenced by many fields including neurophysiology (Maturana, 1975), psychology (Watzlawick, 1983), engineering (Sage, 1992), management (Beer, 1972; Ackoff, 1981; Schwaninger, 2008), mathematics (Wiener, 1948; Kauffman, 2016), political science (Deutsch, 1966), sociology (Buckley, 1968), economics (Soros, 1987), anthropology (Bateson, 1972; Mead, 1964), philosophy (Abraham, 2016) and design (Glanville, 2015). Cybernetics conferences attract people from all of these fields and the conference participants communicate easily with each other due to shared assumptions, principles, and models.

In his recent book, *The Cybernetics Moment: Why we Call our Age the Information Age*, Ronald Kline (2015) describes how during the 1950s and 1960s a wide variety of terms competed to describe the growth of computers, management information systems and networks. He concludes that by the mid1970s the linear conceptions of input, process and output had become the accepted metaphor for understanding information systems. The success of computing meant that the more complicated ideas of cybernetics involving circularity and reflexivity have been overlooked.

Cybernetics today is still concerned with circular causal mechanisms in biological and social systems, but whereas the general public associates "cyber" with computers, the members of the American Society for Cybernetics have focused on cognition, social systems, philosophy and design. Whereas physics creates theories of matter and energy and deals with inanimate objects, cybernetics creates theories of communication and regulation and deals with purposeful systems (individuals, organizations, and some machines). Because purposeful systems are fundamentally different from

inanimate objects, "Cyberneticians have expanded the philosophy of science so that it more adequately encompasses the social sciences. (Umpleby, 2014)

Professor André Reichel, discusses Systems from the perspective of scientific inquiry in his paper entitled, "From Hardware to Hardcore: Formalizing Systems with Form Theory" he advocates the development of more formalized and coherent tools, as what he refers to as new 'hardware', enabling a new 'hardcore' for systems science to be built. He writes that the basis of this new hardware stems from a line of thought emanating from George Spencer-Brown and the 'Laws of Form', through Francisco Varela and the calculus for self-reference, radicalized by Niklas Luhmann and his views on 'Social Systems' and continued by Dirk Baecker with the application of form theory to in management and organizations. In his paper, he provides an appreciation of the potentials of a form-theoretical approach to formalizing systems (real-world phenomena) as well as Systems (field of research). Central aspects will be the power of the form-theoretical hardware as regards systems storytelling, systems diagnostics and abductive reasoning.

What he tries to show in his contribution is a glimpse into new territories for systems research and the entire field of Systems.

In "'Systems' research and new Challenges", Professor Frank Stowell writes about the difficulty that Systems researchers have in obtaining funding for large scale research projects. He argues that this deficiency is having a deleterious effect upon the subject. Lack of funding does not just stifle research, but its absence discourages early career academics from taking up research in this area. He asks if there is an alternative way of supporting large scale research other than funding from national research funding agencies. He revisits the successful action research project carried out at the University of Lancaster and asks if there are any lessons that can be learnt from that programme. The research at Lancaster explored both the methods used for organisational intervention and the nature of the Systems epistemology itself. The work had a major impact on the domain and spanned more than 3 decades. It is worth noting, he says, that the basis of the research arose from observations about the relevance of the management science literature to carrying to the role in the 'real world'. From this question a research policy was developed and implemented at the university leading to 30years of valuable research. In revisiting this project Professor Stowell is able to identify some key elements that might be transferable to a collaborative project through the use of modern information and communication technologies.

The 'last word,' the traditional end piece to the IJSS is written by Ian Roderick entitled "Should systems thinking be a core discipline in education?" Which provides the reader with a fitting end to this edition with food for thought about where do we go from here. Ian is well placed to ponder this question as he has experience of working in business and of academia. He managing director of the Schumacher institute in Bristol and an experienced Systems practitioner. He raises an important issue about Systems thinking and practice; he asked when should people be made aware of its value? He suggests that this should begin at school. It is conceivable that a suitable module could be devised and implemented as part of the secondary education curriculum. It is difficult to gainsay this suggestion as pupils are taught about the importance of the environment, the effects of pollution and of relationships and Systems is an ideal vehicle to support such considerations.

I hope that you find the ideas discussed in this edition stimulating.

Frank Stowell
Editor-in-Chief
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ENDNOTE

[1] With Acknowledgement of the paper by Russ Ackoff 1979