

Is There Something for Finance in General System Theory?

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Introduction

I was not aware that all my formal education followed a Western and modern approach. I was not aware that other perspectives play significant roles in knowledge, society and in the world. I thought that my very Western mind was in the right direction and that success meant fast increasing bottom lines. I thought all my text books were final truths or at least they were very close. But now I know there are other ways of viewing and understanding the same phenomena. My objective in this paper is to complement or mention areas of opportunity for some modern finance theories by adopting a more systemic point of view of the theories, or in other words, following the general system theory approach.

It is important to mention that is also my purpose to give the proper value to the existing financial theories. I believe it would be of better use than only deconstructing and criticizing them. In other words my perspective in this paper will be a post post-modern, that is a systemic perspective.

Also important is to inform the reader that this is not an exhaustive investigation but rather a selective and theoretical one.

In order to achieve the objective of this paper, I will first talk about General System Theory, next I will introduce some definitions and financial theories and how I believe they could be enriched if approached in a systemic perspective.

General Systems Theory Approach

History

Karl Ludwig von Bertalanffy was born September 19, 1901 in Austria, he was a biologist who did much of his work in the United States, however, returned to work in Europe and died in 1972. I didn't want to lose the opportunity to start this paper with the name of the so called "Father of General Systems Theory" (Davidson, 1983).

Although as we will see there are other three almost equally important thinkers to the origins of the systems movement, von Bertalanffy is believed to be the first to think about a General Systems Worldview (Weltanschauung) : "...the overall fate of the world depends on the adoption by humanity of a new set of values based on a general systems Weltanschauung.

We are seeking another basic outlook: the world as organization...with mutually reinforcing or mutually destructive interdependencies. (Bertalanffy in Davidson, 1983).

Ludwig von Bertalanffy was also "the first to undertake a mathematical rigorous approach to the understanding of biochemical synergies, came to both evolve and name general systems-theory (GST), and first seek out the parameters or known behaviors of the hypothetical considered whole" (Davidson, 1983).

Bertalanffy wrote, "Thus there exists models., principles, and laws that apply to generalized systems or their subclasses, irrespective of their particular kind. the nature of their component elements , and the relations of "forces" between them. It thus seems legitimate to ask for a theory, not of systems of a more or less special kind, but of universal principles applying to systems in general. In this way we postulate a new discipline called General Systems Theory. Its subject matter is the formulation and derivation of those principles which are valid for "systems" in general...General systems theory, therefore, is a general science of "wholeness."" (Bertalanffy in Mandel)

Having said that I will now introduce the remaining three thinkers with the help of Debora Hammond : “It all began with four people (Bertalanffy, Boulding, Gerard and Rapaport) who met in 1954 at the Stanford Center for Advanced Study in the Behavioral Sciences” (Hammond, 2002)

“They shared and articulated a common conviction: the unified nature of reality. They recognized a compelling need for a unified disciplined inquiry in understanding and dealing with increasing complexities, complexities that are beyond the competence of any single discipline. As a result, they developed a trans-disciplinary perspective that emphasized the intrinsic order and interdependence of the world in all its manifestations.” (Davidson, 1983).

I find also important to mention at this point a definition of system, not a dictionary or encyclopedia but one but a more formal or GST oriented one : “In the most basic definition a system is a group of interactive components that conserves some identifiable set of relations with the sum of the components plus their relations (i.e. the system itself) conserving some identifiable set of relations to other entities (including other systems).” (Laszlo and Krippner, 1998 p. 51)

I could easily go on citing authors and thinkers, there is so much about the pioneers of systems thinking but rather I would share my understanding so far.

In a world of great economic retribution to constant innovation and practical discoveries science has been misunderstood as the producer of prompt competitive advantages for an entity, a company, university, nation or individual.

No matter what the cost or damage a discovery would produce, and also not mattering to whom, if it represents wealth in the short term for someone, it is good enough.

I know that this sounds very current but I’m sure that Ludwig von Bertalanffy saw this almost fifty year ago. Therefore he proposed that a new way of seeing the world was necessary.

In my opinion he saw at least two things: The first is that reality should be seen as one and as a whole. Therefore the utility of a several few components with the damage of other components should not be permitted without conscious effort to assure that the good is greater than the bad. And second all systems share some common structures or organization and therefore a general law for all systems could and should exist, and maybe that law would help solve complex problems.

This is how I understand systems thinking but there are much better definitions :

“General systems theory is the branch of science specifically designed to cope with complexity” (Laszlo, 1973 p. v)

“we should look upon general system theory as a fruitful new research program... an essential component in the growth of scientific knowledge” (Laszlo, 1973 p. FW)

“In short, the task of general systems theory is to find the most general conceptual framework in which a scientific theory or a technological problem can be placed without loosing the essential features of the theory or the problem” (Laszlo, 1996)

“In contrast with the analytical, reductionist, and linear-causal paradigm of classical science, systems philosophy brings forth a reorientation of thought and world view, manifested by an expansionist, non- linear dynamic, and synthetic mode of thinking.” (ISSS Internet)

After revising and trying to understand the generals of the general systems theory I will now explore some particulars.

Systems Thinking as an Inquiry :

“Systems inquiry incorporates three interrelated domains of disciplined inquiry: systems theory, systems philosophy, and systems methodology.”

Systems Theory

“This theory would recognize the existence of (a) systems properties that are general and (b) structural similarities or isomorphies in different fields.” (ISSS in Bertalanffy and Boulding, 1956)

Systems Philosophy

“Systems philosophy seeks to uncover the most general assumptions lying at the roots of any and all of systems inquiry.”

“In general, philosophical aspects are worked out in two directions. The first involves inquiry into the WHAT: what things are, what a person or a society is, and what kind of world we live in. These questions pertain to what we call: ontology. The second question is HOW: how do we know what we know, how do we know what kind of world we live in, how do we know what kind of persons we are? The exploration of these questions are the domain of epistemology.” (ISSS)

Systems Methodology

“Systems methodology has two domains of inquiry, (1) the study of methods in systems investigations by which we generate knowledge about systems in the general and (2) the identification and description of strategies, models, methods, and tools for the application of systems theory and systems thinking to working and complex systems.” (ISSS)

“In addition to systems design methodology, there are other examples of “real-world” applications of systems theory, which leads to a three-fold distinction: hard systems approaches (such as are employed in systems engineering), soft systems approaches (such as are drawn upon in humanistic psychology), and mixed systems approaches (such as those employed in operations research) that are used as an aid to decision-making” (Laszlo and Krippner, 1998 p. 57)

Finally I would like to cite ALBERT EINSTEIN, in my opinion a holistic and systemic thinker :

"A human being is part of the Whole...He experiences himself, his thoughts and feelings, as something separated from the rest...a kind of optical delusion of his

consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is, in itself, a part of the liberation and a foundation for inner security".

As in any area in life, there is always the other side of the coin, and I would like at least to mention some criticism about the general systems theory made by a recognized academic in the field.

“It was supposed that this” (GST) “would provide a meta-level language and theory in which the problems of many different disciplines could be expressed and solve.”(Checkland, 1999)

“But the fact that GST has failed in its applications does not mean that systems thinking itself has failed” (Checkland, 1999)

It is up to the reader to engage or not with this affirmations.

Financial Issues related to general systems theory

My intention in this section of the paper is to explore the possibilities of complementing some current definitions and theories with a systemic point of view, some times I will depart from definitions or theories and some other times from my own ideas.

First I want to bring about some important financial definitions :

Market : “An arrangement whereby buyers and sellers interact to determine the prices and quantities of a commodity. Some markets as the stock market or flea market take place in physical locations; other markets are conducted over the telephone or are organized by computers, and some markets now are organized on the Internet”
(Samuelson and Norhaus, 1998 p. 750)

Taken from the first two lines in the preceding definition, I created the next two definitions:

Market : “An arrangement whereby the elements interact to fulfill the need for an exchange”

System : “An arrangement whereby the elements interact to fulfill the need for an exchange”

At least for the writer this is very enlightening, I am aware that in both cases the definition could be incomplete but in general terms this helps me visualize a market as a system, and a very open system, depending on and having relations with other systems.

It was very important for me to understand that a market is not a self contained bubble with proper life, it is a system with all the implications, members of one market can go to other markets and that affects the first. And also a market could be contained in other market and therefore depending from it. This idea has implications in the following theory.

Lets analyze these three definitions of Efficient Market:

Efficient Market : “A market where all new information is quickly understood by market participants and becomes immediately incorporated into market prices.”
(Samuelson and Norhaus, 1998 p. 744)

Efficient Market : “A market in which the value of an asset reflects all available information about the asset. In such a market, it is impossible to generate excess returns constantly.” (Rao, 1995 p. 852)

“Efficient Market Hypothesis : The prices of securities fully reflect available information. Investors buying bonds and stocks in an efficient market should expect to obtain an equilibrium rate of return. Firms should expect to receive the fair present value for the securities they sell.” (Ross, Westerfield and Jaffe, 1999 p 858)

This hypothesis carries so much implications if we analyze it in a systemic perspective.

The most important implication, in my opinion, is that a financial market is an artificial congregation of securities. By artificial I mean that the decision or determination for a security to be incorporated in one market or another is a monetary, less difficult, size, or managerial one, and not an answer of where should this security be listed according to its influence or dependence to one market or the other.

Lets now think for a while when a financial consultant shows us a graph and tells us that there is a technical support for a index market in a given price, in my opinion we should see that support as probably the best information available but very far from being a representation of reality.

In my opinion there should be information (variables) that could describe better the movements of a market or a security than those inside the artificially created market. I'm also aware that macroeconomic variables are taken into account sometimes to understand and predict markets, but are those variables again artificially gathered by international boundaries or availability of information? I would leave this question open and try to address it in future investigations.

As I mentioned in the beginning of the paper it is my intention to give proper value to existing financial theories and not only make criticism, again in my opinion the financial world, although artificial and non perfect in many senses, is one of the better sustained and good working creations of man for developing the world.

And for it to work, the economic and finance communities need to work with the closest representations available of the aggregated whole. And that is a market, an index or an economy.

My guess is that in order to study financial markets with a systemic view we need to incorporate some other factors that have not been taken in to account with the proper weighted value as a market modifiers. Such factors I believe could be : human behavior, human beliefs, bounded rationality, fear, culture, religion, war, or cultural and interregional (not only international) dependencies.

For example “Modern financial theory is based on the fact that the economic agent acts rationally in two ways 1) makes decisions following the expected utility axioms and 2) makes predictions of the future without proclivity (unbias)” (*Thaler, 1999p12*)

There is evidence that humans do not completely follow the basic assumptions of rationality when making financial decisions or any kind of decisions. (Kahneman and Tversky, 1979). When I first read about this fact, a paradigm was torn down in my mind.

But other inefficiencies have already been detected in markets I now present some examples: “The efficient market theory is strong, but no theory is perfect. There must be exceptions”, “The stock market is inefficient, and consistently underprices stocks of small firms.” (Brealey and Myers, 1996 p 994)

Why do investment bankers continue to invent, and successfully sell, complex new securities that outstrip our ability to value them? The truth is we don’t understand why some innovations in markets succeed and others never get off the ground” (Brealey and Myers, 1996 p 995)

“Arnold Sametz commented in 1994 that “we know very little about how the great non routine financial decisions are made””, we don’t know “What is the process that causes one company to make a major investment and another to reject it” (Brealey and Myers, 1996 p 992)

“In general, if two people have different tastes, it may make sense for them to hold different portfolios” “you can invest in wine making whereas somebody else may do better to invest in Basking-Robbins. The Capital Asset Pricing Model isn’t rich enough to deal with such a world.” (Brealey and Myers, 1996 p 993)

I think there are some very interesting areas of opportunity in finance and we might be able to enrich our knowledge of the field if we take a more embracing point of view.

"It is necessary to study not only parts and processes in isolation, but also to solve the decisive problems found in organization and order unifying them, resulting from

dynamic interaction of parts, and making the behavior of the parts different when studied in isolation or within the whole..." (Excerpted from General Systems Theory)

I find relevant also to mention that there are some initiatives (in my opinion very imperfect) to embrace finance and economics with a more holistic approach and with an effort understand world as one, as a Whole : The Bretton Wood System (nations agreed for the first time to regulate international financial transactions) , The International Monetary Fund: A central bank for central banks and among others The World Bank : Funded with money from rich countries for financing projects on developing countries.

There is another astonishing theorem demonstrated in this century that applies to finance and also to systems thinking and we owe it to Kurt Gödel, but in my own words it sounds like this : even the most comprehensive formal systems that humans have created (Mathematic and Axiomatic) there are relatively simple problems that can not be fully proved.

A simple example is : "All Mexicans are liars, and I'm Mexican", this is probably the simple logic but as simple as it sounds there is no proof of the last phrase if it is true because I'm liar but if it's not true then I'm lying.

I wanted to bring this idea into this paper just to state that I believe there is no theory complete and according to Kurt Gödel no one can fully prove one. Therefore knowledge is a work in process and we can find many areas of opportunity to enlarge human knowledge and to manage complexity and incompleteness.

This is how I feel about knowledge, but here is a recognized holistic thinker with a similar and more valid point of view about systemic models (made a when I was one year old) :

"No model in existence today is sufficiently complete and free from errors to warrant implementation on a global scale. On the other hand to sit back and wait until sufficiently sophisticated models are developed may be lethal : by that time world systemic processes may have shifted to catastrophic pathways." (Laszlo, 1973 p. 3)

CONCLUSION

Probably the most important reason that made focus my academic formation and professional experience in finance (and away from computer systems) was that I discover (is my belief) that many of the most transcendental decisions in organizations are taken by or with the help of the CFO.

Now with a more holistic view of what the financial world could be I think there is still a lot to learn and complement the current theories and therefore make better assessments and decisions.

I also believe that organizations need to take into account that the decision they make (we make) affect not only their organization but a greater system.

I'm convinced that our generation is not aware that we all live in the same whole, and we are far (and maybe going farther) from reverting the beliefs intensively inculcated into us : competition (better kill competitors, or they will kill you), bottom line (is all that matters), consumption (the bigger the better) and so on.

But those of us having the chance to eat three times a day (if wanted) and reaching a doctoral study level should be able to understand the advantages of looking at problems from various perspectives :

“The advantage of bringing systems theory to this state of affairs is its potential to provide a transdisciplinary framework for a simultaneously critical and normative exploration of the relationship between our perceptions and conceptions” (Laszlo and Krippner, 1998 p. 47)

“The world faces a dilemma on one hand peoples of the developing world demand a rising standard of living. On the other and, if that standard of living is reached in the European, North American or Japanese pathway of development, we will destroy our life support system.” (Jackson, 2002)

“Therefore, the only solution is an alternative pathway of development; one that meets the criteria of productivity, justice and sustainability” (Jackson, 2002).

We have been very busy creating unsustainable systems, systems that maximize a small part of a greater system without concern for other parts, therefore affecting, killing or changing other areas or systems inside the same whole.

Systemic or holistic thinking can help not only in specific areas of finance (or other scientific disciplines) but can also help us understand outer relations among organizations for a world design that won't take from future generations the resources we have available today.

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