

DECISION SCIENCES INSTITUTE

Systemic Thinking for Decision-Making Managers

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ABSTRACT

This paper focuses on basic concepts and thinking logic of systems science and shows how powerful they can be when employed to address business and economics problems. We look at how such view of the world can produce thought-provoking results. By analyzing how household members interact, an iff condition under which Becker's Rotten-Kid Theorem holds is developed. By studying the board of directors and CEO of a publicly traded company, it is shown that the CEO could pursue any number of short-term projects. By considering personal value systems, it shows why the principles of management efficiency and organizational inefficiency hold.

KEYWORDS: mispricing of assets, management efficiency, organizational inefficiency, Rotten kid theorem, and systemic yoyo model

INTRODUCTION

As the title indicates, this paper introduces the logic of systemic thinking in practically useful terms for business managers. After the relevant basics are presented, this methodology of holistic thinking is used to produce unconventional insights from which tangible results that are practically valuable for decision making are established.

In particular, one important result in economics is the rotten kid theorem, initially established by Gary Becker, a Nobel laureate, in 1974. Since then this result has found many applications in a wide range of studies. However, Bergstrom (1989) demonstrates that this result is not generally true as believed earlier. By looking at the scenario considered in this theorem systemically, emerges a sufficient and necessary condition under which the important Becker's Rotten Kid Theorem holds true. For business managers, this new development provides a theoretical reason for why they need to think twice before they offer incentives to their subordinates in order to mobilize them for particular purposes.

In terms of the dynamics of the relationship between the board of directors and the CEO of a publicly traded company, this paper looks at the board's choice and CEO's choice of long-term and short-term projects. By systemically modelling the interaction between the board and the CEO, it is found that the number of short-term projects the CEO likes to take on is less than the number the board would like him to take on. That is, the CEO can simply work on as many short-term projects as he pleases without the need to worry about offending the board; and as long as the CEO is successful with his short-term projects while keeping all long-term projects on track, the board would put more trust on him and automatically give him more bargaining power.

Along with the contemplation of many managers about efficiency, relevant systemic reasoning suggests that inefficiency is unavoidable. So, two principles, one on management efficiency and the other on organizational inefficiency are casted.

Considering how systems science has brought forward magnificent progress in science in the past ninety some years, we also expect that this science and related holistic thinking will produce measurable development in areas of business and related decision making.

The rest of the paper is organized as follows: Section 2 summarizes the relevant history, philosophy, models, and laboratory observations of systemic thinking. Section 3 highlights how this logic of thinking and related models can be practically used to intuitively imagine some of the very important results in economics and business before they are rigorously established. Then, Section 4 concludes the presentation of this paper with some thought-provoking problems for future research.

SYSTEMS SCIENCE AND ITS THINKING LOGIC

Von Bertalanffy (1924) pointed out that the fundamental character of living things is their organization, the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life. Since then, this holistic view of nature and social events has permeated the entire spectrum of science and technology (Lin, 2009). And in the past 90 some years, studies in systems science and systems thinking have brought forward brand new understandings and discoveries to some of the major unsettled problems in the conventional science (Klir, 1985; Lin, 1999). Because of these studies of wholes, parts, and their relationships, a forest of interdisciplinary studies has appeared, revealing the development trend in modern science and technology of synthesizing all areas of knowledge into a few major blocks, and the boundaries of conventional disciplines have become blurred ("Mathematical Sciences," 1985). Underlying this trend, one can see the united effort of studying similar problems in different scientific fields on the basis of wholeness and parts, and of understanding the world in which we live by employing the point of view of interconnectedness. As tested in the past 90 plus years, the concept of systems and results of systems research have been widely accepted by the world of learning (Blauberg, et al., 1977; Klir, 2001).

Similar to how numbers and algebraic variables are theoretically abstracted, systems can also be proposed out of any and every object, event, and process. For instance, behind collections of objects, say, apples, there is a set of numbers such as 0 (apples), 1 (apple), 2 (apples), 3 (apples), ...; and behind each organization, such as a business firm, a regional economy, etc., there is an abstract, theoretical system within which the relevant whole, component parts, and their interconnectedness are emphasized. As a matter of fact, it is because of these interconnected whole and parts, the totality is known as a firm, an economy, etc. In other words, when internal structures can be ignored, numbers and algebraic variables can be very useful; otherwise the world consists of dominantly systems (or structures or organizations).

When the traditional science is joined with systems science that investigates systemhood, that collectively gives rise of a 2-dimensional spectrum of knowledge, where the traditional science, which is classified by the thinghood it studies, constitutes the first dimension, and the systems science, which investigates structures and organizations, forms the genuine second dimension (Klir, 2001). In other words, systems research focuses on those properties of systems and associated problems that emanate from the general notion of structures and organizations,

while the division of the traditional science has been done largely on properties of particular objects. Therefore, the former naturally transcends all the disciplines of the classical science and becomes a force making the existing disciplinary boundaries totally irrelevant and superficial.

The importance of this second dimension of knowledge cannot be in any way over-emphasized. By making use of this extra dimension, the exploration of knowledge has gained additional strength in terms of the capability of solving more problems that have been challenging the very survival of the mankind since the beginning of time. Such strong promise that systems research holds relies materialistically on the particular speaking language and thinking logic – the systemic yoyo model (Lin, 2007), Figure 1, similar to how the Cartesian coordinate system plays its role in the development of modern science (Kline, 1972).

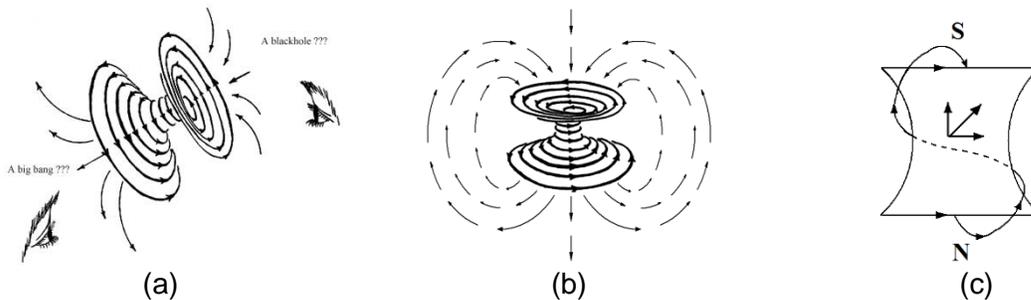


Figure 1. The systemic yoyo model: (a) Eddy motion model of the general system; (b) The meridian field of the yoyo model; (c) The typical trajectory of how matters return

Specifically, on the basis of the blown-up theory (Wu and Lin, 2002) and the discussion on whether or not the world can be seen from the viewpoint of systems (Lin, 1988; Lin, et al., 1990), the concepts of black holes, big bangs, and converging and diverging eddy motions are coined together in the model shown in Figure 1 for each object and every system imaginable. That is, each system is a multi-dimensional entity that spins about its axis. If we fathom such a spinning entity in our 3-dimensional space, we will have a structure as artistically shown in Figure 1(a). The black hole side pulls in all things, such as materials, information, energy, profit, etc. After funneling through the “neck”, all things are spit out in the form of a big bang. Some of the materials, spit out from the end of big bang, never return to the other side and some will (Figure 1(b)). For the sake of convenience of communication, such a structure as shown in Figure 1(a), is referred to as a (Chinese) yoyo due to its general shape.

What this systemic model says is that each physical or intellectual entity in the universe, be it a tangible or intangible object, a living being, an organization, a culture, a civilization, etc., can all be seen as a kind of realization of a certain multi-dimensional spinning yoyo with an eddy field around. It stays in a constant spinning motion as depicted in Figure 1(a). If it does stop its spinning, it will no longer exist as an identifiable system. What Figure 1(c) shows is that due to the interaction between the eddy field, which spins perpendicularly to the axis of spin, of the model, and the meridian field, which rotates parallel to axis of spin, all the materials that actually return to the black-hole side travel along a spiral trajectory.

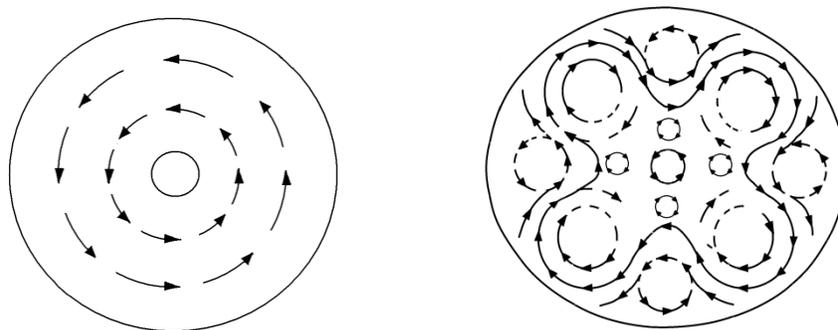
As expected, this yoyo model has successfully played the role of intuition and playground for scholars who investigate the world and explore new knowledge holistically, just as what the Cartesian coordinate system did for the traditional science (Lin, 2009; Lin and Forrest 2011;

Forrest 2013; 2014; Forrest and Tao, 2014; Ying and Forrest, 2015). In particular, this yoyo model of general systems has been successfully applied in the investigation of Newtonian physics of motion, the concept of energy, economics, finance, history, foundations of mathematics, small-probability disastrous weather forecasting, civilization, business organizations, the mind, among others.

Within the study and application of systems science, the well-known dishpan experiment provides the needed intuition on how the spinning field of a general system would evolve with time. In particular, Raymond Hide (1953) of Cambridge University, England, and Dave Fultz and his colleagues of University of Chicago (1959) independently conducted this experiment. To make the story short, let us describe Fultz's version in some details. He partially filled a cylindrical vessel with water, placed it on a rotating turntable, and subjected to heating near the periphery and cooling near the center. The bottom of the container is intended to simulate one hemisphere of the earth's surface, the water the air above this hemisphere, the rotation of the turntable simulates the earth's rotation, the heating and cooling simulate the excess external heating of the atmosphere in low latitudes and the excess cooling in high latitudes.

In order to observe the pattern of flows at the upper surface of the water, which was intended to simulate atmospheric motion at high elevations, Fultz sprinkled some aluminum powder. A special camera that effectively rotated with the turntable took time exposures so that a moving aluminum particle would appear as a streak and sometimes each exposure ended with a flash, which could add an arrowhead to the forwarded end of each streak. The turntable generally rotated counterclockwise, as does the earth when viewed from the North Pole.

Even though everything in the experiment was arranged with perfect symmetry about the axis of rotation, such as no impurities added in the water, the bottom of the container was flat, Fultz and his colleagues observed more than they bargained for. First, both expected flow patterns as shown in Figure 2 appeared, and the choice depended on the speed of the turntable's rotation and the intensity of the heating. Briefly, with fixed heating, a transition from circular symmetry (Figure 2 (a)) would take place as the rotation increased past a critical value. With the sufficiently rapid, but fixed rate of rotation, a similar transition would occur when the heating reached a critical strength, while another transition back to the symmetry would occur when the heating reached a still higher critical strength.



(a) Symmetric flow at the upper surface (b) Asymmetric flow at the upper surface
Figure 2. Patterns observed in Fultz's dishpan experiment

What is important about the dishpan experiment is that structures, such as jet streams, traveling vortices, and fronts appear to be basic features in rotating heated fluids, and are not peculiar to atmospheres only.

HOLISTIC THINKING AND SYSTEMIC INTUITION AT WORK

This section lists specific cases of application to show how the logic of systemic thinking has been successfully employed in the study of some topics that are very important for managers. In particular, we will look at three cases of successful application: When will Becker's rotten kid theorem hold true? What is the dynamics between the board's and CEO's choices of long-term and short-term projects? Can any manager realistically achieve managerial and organizational efficiency?

Becker's Rotten Kid Theorem

When people interact with each other, differences in personalities and preferences lead to conflicting interests, how can the manager keep all these people on the same track and work for a common purpose? To address this problem, Becker (1974), in A Theory of Social Interactions, published his Rotten Kid Theorem. This theorem suggests that family members, even those who are selfish, will contribute to efforts to raise family income, if there is a benevolent head that voluntarily bequeaths gifts to other members periodically. The importance of this result is well described by (Bergstrom, 1989): "If it is generally correct, the Rotten Kid theorem must be one of the most remarkable and important results in the theory of incentives. For it tells us that a sufficiently benevolent household head would *automatically* internalize all the external effects that family members have on each other. Benevolent parents of intelligent, though selfish, children can breathe easier. In the family there will be no free riders or principal-agent problems. Elaborate incentive schemes and detection devices are unnecessary. All that is needed is to explain the Rotten Kid theorem to each family member and they will all (except possibly for a few irrational lapses) behave in the common interest. Not only would this be remarkable good news for parents, it would suggest a promising way of avoiding the incentive problems that bedevil firms and other social organizations. Shouldn't it be possible to find group incentive structures similar to those of families with benevolent heads?"

That is, the Rotten Kid Theorem can streamline a family, a firm, or any organization. To witness this end, various implications and applications of this theorem appear in studies of family altruism and asset transfers (Becker, 1991; Bhalotra, 2004; Altonji, et al., 1997), moral hazard (see (Ghaudhuri, et al., 2005) and references there), the effects on consumption and savings of public debts, social security, and other governmental transfers among generations (Barro, 1974), patterns of parental bequests (Menchik, 1980; Becker, 1991), child labor and labor supplies (Baland and Robinson, 2000; Bommier and Dubois, 2004; Fernandes, 2000), foreign aids (Federio, 2004), intergenerational education and culture transmissions (Patachini and Zenou, 2004), among countless others.

Due to its wide-ranging importance, Bergstrom (1989) notes that it is worthwhile to find the limits of generality for such a theorem with strong and interesting applications. He constructs three examples to show where this theorem could go wrong. Similarly, in their study of child labor, Baland and Robinson (2000) show that the Rotten Kid Theorem does not hold true when parental savings are at a corner. And, Bommier and Dubois (2004) reveal that child's disutility, a dimension overlooked by previous researchers, considerably affects the validity of this important theorem. Even though thirty years has elapsed since the Rotten Kid Theorem was initially published in 1974, no one has formalized a condition under which the theorem holds true in general (see (Becker, 1991, p. 11) for more details). To this end, in this subsection, we see how systemic intuition (Wu and Lin, 2002; Lin, 2007) can be employed to establish a sufficient and

necessary condition under which Becker's Rotten Kid Theorem (the 1974 version) holds true in general. Although a slightly different version of the result is given in (Becker, 1991), (Bergstrom, 1989) establishes his version, and (Dijkstra, 2007) generalizes Bergstrom's work to a different level, the reason why we base our work on Becker's original result published in 1974 is because this version provides a sense of evolution of the head's benevolence and the selfish kids' unselfish behaviors and tolerance toward potential redistributions of the head's resources, Figure 3. The scale marks on the time line represent the moments of individual asset distributions are given for reference purposes with mark 0 being the beginning of our discussion and negative scale marks the moments of distribution of the past and the positive marks the future moments of distribution.

Theorem 1 (Becker's Rotten Kid Theorem) *If a family has a head who cares about all other members so much that he transfers his resources to them automatically, then any redistribution of the head's income among members of the household would not affect the consumption of any member, as long as the head continues to contribute to all. Additionally, other members are also motivated to maximize the family income and consumption, even if their welfare depends on their own consumption alone.* □

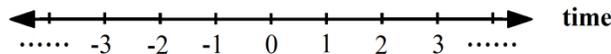
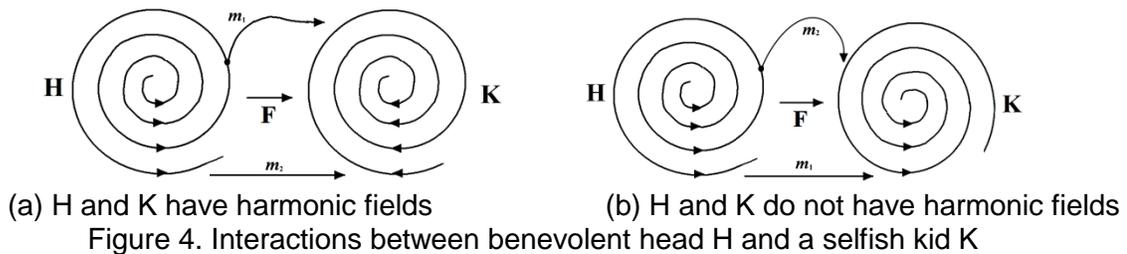


Figure 3. Evolution of the head's benevolence and selfish members' behaviors.

Now, If we look at Becker's Rotten Kid Theorem in light of the yoyo model, we can easily see that the correctness of this result must be conditional. In particular, the family can be seen in two different fashions:

- (1) The entire family is a spinning yoyo, where the family consumption is seen as the materials spitting out of the big-bang side and the family income as the materials sucked in from the black-hole side; and
- (2) The family is a collection of individually spinning yoyos that interact with each other, where each individual's consumption is seen as the materials spit out of his yoyo's big-bang side and his income as the materials sucked in from his yoyo's black-hole side.

For Case (1), if we stand above the yoyo and look at the big-bang side, similar to the situation where scientists look at the earth from above its north pole, then the flows of the materials spit out of the big-bang side can be simulated by the fluid patterns in the dishpan experiment. So, the spin field of the family yoyo in Case (1) will sooner or later have local eddies. That is, Case (1) turns into the situation described in Case (2).



For case (2), to make the situation easier to analyze, let us assume that there are only two members, the benevolent head H and a selfish kid K, in the family. In this case, the interactions between the yoyos can be depicted in Figure 4, where the benevolence of the head H is

represented as a divergent whirlpool and the selfishness of the kid K as a convergent whirlpool. If both m_1 and m_2 stand for the voluntary money transfers from the head, the spin field of K in Figure 4 will accept the gift m_1 happily and the transfer m_2 unwillingly (Figure 4(b)) or even reject such a monetary gift (Figure 4 (a)). Here, m_1 is given to the selfish kid K without violating his own preference of consumption, while m_2 is forced on K against his wills or personal preferences. That is, we have seen the following result.

Theorem 2 (Lin and Forrest, 2008; Lin, 2009). *Becker's Rotten Kid Theorem holds true, if and only if the distribution of the benevolent head's resources is not in conflict with the consumption preferences of any selfish member.*

This result provides business managers a theoretical reason for why they need to think twice before they offer incentives to their subordinates in order to mobilize them for particular purposes.

Dynamics of Long-Term and Short-Term Projects

In this subsection, we analyze CEO's choices of long-term and short-term projects, where projects and assets are used interchangeably, because investors mainly care about when mispricings of their holdings disappear so that they can close their positions with profits. By short-term projects, we mean such projects that they cannot stay mispriced for long. Otherwise, these projects would be called long-term.

To this end, let us imagine each corporation as a spinning yoyo, where the black-hole side sucks in funds from different sources, while the big-bang side spends money in various ways. When a yoyo represents an investor, the black-hole side stands for ways and amounts he could get his return on his investments, and the big-bang side contains opportunities of future finance provided to each particular corporation.

According to (Alchian, 1950; Stigler, 1958), the following evolutionary theory holds: No one should worry about corporate governance reform, because in the long run market competition would force firms to minimize costs. As part of this cost minimization is to adopt rules, firms would be able to raise external capital at the lowest cost. If we imagine that the yoyos, each of which represents a firm or an investor, coexist side-by-side, interacting with each other, then due to differences in spinning strengths, directions, and angles, some yoyos will be destroyed and some will combine into greater (yoyo) structures with enhanced ability to absorb more resources. To prevent abusive competitions and maximize cash flows, regulatory entities are involved to help those tiny (yoyos) investors from being crushed so that when necessary, firms can still attract capital for their venture needs from all potential sources, including these tiny investors. In other words, the afore-mentioned evolutionary theory holds true conditionally only when the field of competition is level for all competitors (yoyos) to participate (spin). This end explains why developed countries have all introduced sophisticated laws to protect investors.

For a publicly traded firm, because financiers are generally either too small or not qualified or not informed enough to make detailed operational decisions, they rely on a manager to run the firm. That gives the manager substantial control rights and discretion to allocate funds as he chooses. He can expropriate the funds (Zingales, 1994), or spend the funds on his private benefits of control, such as building an empire for himself (Owen, 1991), spending on consumption perquisites (Burrough and Helyar, 1990), expanding the firm irrationally, pursuing pet projects that do not benefit the investors (Jensen, 1986), etc. Worst of all, the manager can expropriate

investors by staying on the job even if he is no longer competent enough to run the firm (Shleifer and Vishny, 1989). To prevent any of these possibilities of how the manager could misuse his power – an agency problem, the systemic yoyo model suggests that one possible solution would be to place the manager’s personal yoyo in the same spin field of the yoyos of individual investors: tie the financial interests of the manager with those of the financiers (Jensen and Meckling, 1976). One method of tying the manager’s interest with those of investors is to employ incentive contracts (Berle and Means, 1932). However, (Yermack, 1997) shows that incentive contracts create enormous opportunities of self-dealing for managers. To this end, as suggested by the enclosed areas in Figure 5, no practical method could solve this agency problem completely: As long as the manager is not the same as the numeraire investor, an abstract investor representing the common characteristics and desires of all financiers together, there will be conflicts. And, the dishpan experiment shows that as long as the manager is not the same as the only investor, the agency problem will appear in one form or another. In particular, individual investors have a single goal – earn a return on their investment. However, the manager in general has more goals to achieve and more benefits to enjoy beyond simply making an earning or return on his labor effort and talent for being the manager. So, our analysis implies that in terms of corporate governance, as long as there are investors who are not the manager, there will be an unsolvable agency problem. The best one can do is to reduce its severity.

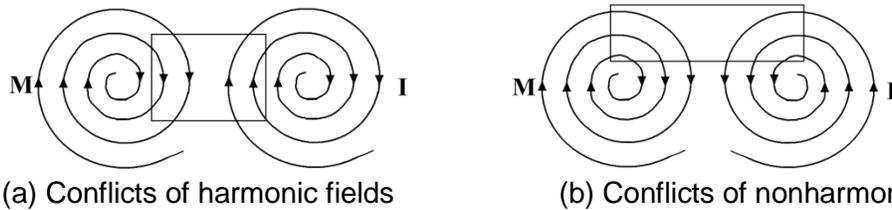


Figure 5. Conflicts of interests between manager M and the numeraire investor I

The reason why the fields M and I are convergent in Figure 5 is that the manager M and the investor I both want to grab more of the financial return and other privileges. In Figure 5(a) yoyos M and I have a tendency to combine into a greater yoyo due to their harmonic spinning direction. In Figure 5(b), the yoyos M and I will try to destroy each other without the slightest chance to combine due to their opposite spinning directions.

The other side of the yoyos in Figure 5 is shown in Figure 6. Since the yoyos are all divergent when viewed in this angle, they do not tend to combine into a greater yoyo in the case of Figure 5(a), unless M (or I) is much more powerful than I (or M) (Figure 6(a)). Once again, the field interactions in Figure 6(b) will never combine relatively peacefully due to their opposite spinning directions unless one of them is destroyed completely by the other.

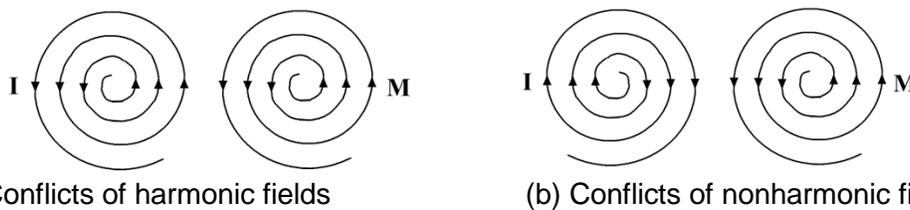


Figure 6. Conflicting ideas of how to manage the firm between the manager M and investor I

That is, if the relationship between the board of directors and the CEO is as depicted in Figure 5(a) and Figure 6(a), the firm has a chance to grow into a successful business venture. If the

relationship between the board and the CEO turns out like the one as described in Figure 5(b) and Figure 6(b), then the firm is heading to its eventual destruction, unless the CEO is replaced or some of the main shareholders or creditors give up their controlling influence of the firm.

In the rest of this subsection, assume that the firm of our concern is publicly traded with a board of directors dominated by long-term, large shareholders, while the CEO is not a long-term, large shareholder. So, the board desires the CEO to devote all his talent and labor to work on the existing long-term projects and initiate new ones so that the market value of the company would grow steadily over time. On the other hand, the CEO needs short-term equity performance, because poor equity performance raises the likelihood of replacement by the board or through a hostile takeover. In either case, the CEO loses his job and all the privilege of control (Kaplan and Minton, 1994; Shivdasani, 1993; Denis and Serrano, 1996).

By analyzing the mispricings of both long-term and short-term projects over time, (Lin, 2009) concludes that when assets are undervalued, the mispricing of the long-term asset in equilibrium is worse than that of the short-term asset. When the assets are overvalued, the mispricing of the short-term asset in equilibrium is worse than that of the long-term asset. And, when risky long-term asset is involved, mispricings become even worse for the long-term asset if both assets are undervalued, and for the safer short-term asset if both assets are overvalued, than when risk free assets are considered.

Because it takes time for fundamental uncertainties to resolve, CEOs are typically averse to severely underpricing their long-term equity. Considering their job security, they also avoid overvalued short-term projects and all long-term projects, even though some of these projects could be detrimentally important to the long-term growth of their companies. Combining this reasoning with the fact that CEOs' compensation depends typically in part on short-term equity performance, CEOs should prefer undervalued short-term projects, if the CEOs are not large, long-term shareholders. So, to this end, a natural question arise: How do CEOs and their boards, dominated by large, long-term shareholders, agree on which projects, long-term or short-term, to devote their limited energy and labor efforts on? To this end, (Lin, 2009) develops the following result:

Proposition 1. *The number of short-term projects the CEO likes to take on is less than the number the board would like him to take on.*

This result and the relevant analysis indicate that the CEO can simply work on as many short-term projects as he pleases without the need to worry about offending some of the large, long-term shareholder directors.; and that as long as the CEO is successful with his short-term projects while keeping all long-term projects on track, the board would put more trust on him and automatically give him more bargaining power.

Management Efficiency and Organizational Inefficiency

No matter where and which business entity we work for, over time we tend to find inefficiencies, be they in management, business operation, or in employees' efforts. Many of us always seem to have ideas about how things could improve if this or that is introduced and implemented. One reason why we tend to be able to discover abundant inefficiencies within our environment is because each one of us, as a living being that is severely limited by its sensing organs, looks at the world with a pair of colored eyes. The term of "color" in the literature is also known as personal values and philosophical assumptions about the world (Lin and Forrest, 2011;

Villalobos and Vargas, 2015; Terán, Sibertin-Blanc and Gaudou, 2015). That is, because of the varied philosophical assumptions and value systems that exist from one person to another, from one people to another, from one culture to another, ..., the same physical world becomes extremely beautiful and multi-colored when people individually try to describe what they see and what the world is really about.

This subsection addresses the following important questions: How management efficiency could be potentially achieved? And why organizational efficiency could only be a conceptual dream in real life. The literature on organizational and management efficiency is extensive. For example, (Pawłowski, et al., 2012) see management as a series of decision makings and creations of conditions for effective realization of the decisions. (Ren and Xiong, 2010) investigate the measurement of management efficiency. (Laura-Georgeta, 2011) studies the performance management. (Burton, et al., 1991) consider the relationship between organizational size and performance. (Cummins, et al., 1999) estimate the relative efficiency of alternative organizational forms. (Ismail, et al., 2011) study the relationship between efficiency and organizational structure for takaful operators. (Alvesson, 1989) looks at the common conceptualizations of organizational culture. And (Kasianiuk, 2016) presents models useful for understanding self-organization processes. To limit the length of this paper, we list only a few of the representatives of the vast literature.

To address the afore-described questions on management and organizational efficiency, let us first look at the concepts of personal values and philosophical assumptions, which mean the value system of a person that consists of his/her beliefs about how the world functions and his/her moral codes with which he/she is recognized with his/her particular identity and integrity.

The systemic yoyo model indicates that each human being lives in a vast ocean of spinning fields, which consists of the fields of other people, the fields of physical objects, the fields of abstract thoughts, and the fields of myriad of other things and matters. Soon after a person is born, he/she starts to interact with the outside world. It is these interactions with people, with physical objects, with abstract thoughts, and with the myriad of other things and matters that shape the person's philosophical assumptions and values. That is similar to how a civilization formulates its value system (Lin and Forrest, 2011). Because of the subtle differences between the interactions experienced by one person from those by another person, each person has his/her own set of very specific philosophical assumptions and values, which dictate the behaviors and decision making of the person for the rest of his/her life. Although the differences might be "subtle" when seen from the angle of the magnificent scale of the entire ocean of spin fields, they are generally major to the individuals involved, causing important differences in the relevant personal value systems. That explains why children who grow up in the same household may have quite different personalities, characteristics, and thinking processes. In other words, a person's basic philosophical assumptions and values are a reflection of the fundamental structure of his/her yoyo field. Although it changes and evolves with the environment, its basic characteristics will stay the same throughout the lifespan of the yoyo structure. For a detailed analysis, see (Forrest and Orvis, 2016; Lin and Forrest, 2011).

By organization in this subsection, we mean such an economic entity of people that are connected by some common purpose while somehow the entity has to maintain its economic viability through its members' efforts and works. So, any unorganized group of randomly selected individuals is not treated as an organization. In terms of the concept of general systems (Lin, 1999), an organization considered in this subsection has to be a non-trivial system that is made up of people, while the system has to produce in order to generate revenue to

sustain its operation. For example, a university is an organization that exists for the purpose of educating people while sustained by financial viability; a business firm is an organization that exists for the purpose of making profits through producing and/or selling products and services; while all the people who are leaving a theater right after having watched a movie is not an organization, because these people are no longer related to each other in terms of a common purpose.

Assume that each organization has a relatively fixed mission, by which all employees put in their efforts and work to produce the pre-determined products or services in order to sustain the economic viability of the organization from falling into an entity of non-organization.

For any chosen organization, its organizational efficiency is defined as how well its employees help the organization to reach its defined mission. We say that an organization is efficient, if all employees work towards the common goal and help approach or materialize the stated mission; otherwise, we say that the organization is not efficient (or inefficient). Then, we have the following:

Theorem 3 (Forrest and Orvis, 2016). *Inefficiency always exists in any organizational system that has at least one full-time employee whose personal value is not in total agreement with the organization's mission.*

As what has been mentioned earlier, each organization exists for a particular purpose. Hence, to materialize the purpose, the organization generally has to hire employees with desired talents. Now, a natural question arises as follows: Assume that two employees have conflicting personal values, for example, one employee enjoys life to the fullest extent possible while treating work as a nuisance, and another employee is totally submerged in his work, believing the work is his life and purpose of life. In such a case, can the organization still operate smoothly while keeping the best interests of these employees in mind at the same time? The answer to this question is: Yes, it is possible (Forrest and Bruce, 2016). Another question is: When the organization's mission is in conflict with the personal value of an employee i , can the organization still function smoothly while keeping the well-being of employee i in mind? The answer to this question is: Yes, it is possible (Forrest and Bruce, 2016). So, if we define efficiency of management as keeping all employees' well-being in mind while materializing the mission of the organization, then the following principle holds:

Principle of Management Efficiency (Forrest and Bruce, 2016): Management flexibility in terms of managerial style is the key for maintaining management efficiency.

To increase organizational efficiency, why can we not hire only people whose personal values are in complete agreement with the organizational mission? First, from the previous paragraphs, it is practically impossible to find such employees. Secondly, personal values evolve with time and changes of the environment. So, initially similar personal values tend to diverge over time. Thirdly, suppose it is possible to find employees who have the desirable identical personal value, then what is observed in the dishpan experiment would suggest that differences among the personal values will inevitably appear within the smooth operation of the organization. In particular, we can naturally imagine that the entire pan of the dishpan experiment stands for the mission of the organization and the spin of the pan the operation of the organization, while individual employees' personal values are drops of the water inside the pan. So, this experiment indicates that although the organization could find and hire employees with identical personal value, this initial uniformity in individual personal values will soon be materialistically destroyed

by the interactions and conflicts of interests of the employees of the organization. Therefore, the discussion above implies that organizational inefficiency starts to appear. That is, we have

Principle of Organizational Inefficiency (Forrest and Orvis, 2016): Inefficiency always exists in any organization, where the concept of efficiency includes all aspects of running the business of the organization beyond from what is specified earlier.

SOME FINAL WORDS

What is presented in this paper demonstrates the power of holistic thinking and systemic intuition: Some unconventional tools of reasoning have become available, and previously unseen results can be imagined readily in advance before they can be rigorously shown. Additionally, beyond showing the power of systems science in exploring knowledge and guiding principles in the area of business, the thought-provoking results presented in this paper also provide a rich source for future follow-ups.

For example, the concept of utility functions in economics can surely be studied from the angle of the underlying value systems of the customers. However, most people do not really have a firm understanding of their own personal value systems. So can this fact explain why at various occasions people seem to behave impulsively? Do these seemingly impulsive behaviors provide market researchers instantaneous opportunities to peak into the true state of the underlying value systems of people? Could this understanding be employed as the foundation for developing a mature behavioral economics and finance that possess the power of making predictions?

If marketing research is looked at in this light, could we say that the fundamental idea behind marketing tactics is really about reaching the value systems of as many customers as possible so that customers would behave as *impulsively* as possible?

If management is seen as a science or art of how to complete tasks by optimally mobilizing people and resources, then should this science/art base its practical guidelines and theoretical principles on studies of personal and cultural value systems?

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If the entire spectrum of business activities and knowledge is considered from the angle of holistic thinking and systems science, should we rely on our understanding of value systems to make relevant decisions?

The future along this line of knowledge exploration seems to be boundless. We hope that this paper would play the role of a flying pebble that could attract many beautiful birds in the world of learning in general and the area of business in particular.

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