FACING FUTURE CONTINGENCIES

Aristotle’s Optimum Activity as a Proposal for Organizational Systems

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INTRODUCTION

In the contemporary business organization, individual activities are pooled together in order that it may effectively adapt to uncertainties inherent in a highly complex environment. But what is the nature and scope of the optimum activity performed in the «business edifice»? This work traces the notion of optimum activity in organizational system theory with the aim of comparing and evaluating such notion under the light of the Aristotelian account of practical activity. System perspective in organizations is a trend which has imported ideas from various fields of study. The system model of productive activity typifies the contemporary aspiration of a holistic account of an activity which can handle future contingencies. It postulates that production is a rational activity which considers the information coming from an uncertain environment.

The present endeavor is not a critical survey of the plethora of concepts proper to organizational theory. Rather, it is an examination of the conceptual assumptions of individual activity on the basis of which the organization as a system is constructed. It can be gleaned that the author postulates that behind the study of the business firm (conceived as an organized set of activities) is the notion of human activity which Aristotle has talked about in the *Metaphysics* and, especially, in his *Nicomachean Ethics*. It can likewise be seen that underneath this work lies the question: Can organizational system theory import ideas from Aristotle's Theory of Action? Stated in other words, what can the Stagyrite say on the quest for the optimum activity in the business enterprise?

Divided into two sections, the first chapter discusses the incipient notions of productive activity. A pair of concepts are examined in this chapter: «work by knowledge» and work environment. They are described as the basic presuppositions of work activity in the corporate enterprise. Given the dearth of authorities in the analysis of the corporate enterprise, the inquiry will focus its attention on the precursors of these ideas which have greatly influenced the perspective of business organizations. Concretely, the first section is dedicated to the explanation of the notion of «work by knowledge» introduced by Frederick Taylor, the founder of Scientific
Management. However, it was solely applied to the factory floor. Henri Fayol amplified the Tayloristic concept of work activity throughout the business firm. His theory later became known as «Classical Administrative Theory». The contributions of Taylor and Fayol undoubtedly have left an indelible imprint in the study of business organizations.

The second section of the chapter is the reaction provoked by the so-called «conventional theory». It is grounded on the affirmation that work environment greatly influences individual activities. This trend is denominated as the Human Relations Movement which is heavily bent on the psycho-sociological perspective. On the basis of the conclusion reached by Elton Mayo and his Hawthorne Group, Chester Barnard attempted to form a comprehensive and unitary organizational theory similar to what Fayol had done with the findings of Taylor. A further enhancement of the movement’s conception of work activity was conveyed by Douglas McGregor. Anchoring on Abraham Maslow’s Hierarchy of Needs, McGregor formulated Theory X and Theory Y; theories which also influenced a great deal the Neo-Human Relations School¹.

Chapter 2 contains the system model of productive activity. Embracing the preceding notions on work activity, this paradigm embodies the contemporary aspiration of a holistic account of activity in an environment wrought by future uncertainties. It affirms that production is entirely a rational activity which is greatly influenced by environmental energy or information. By drawing the essential notions of General System Theory and Cybernetics, the system perspective provides a deeper insight on the dynamism of production process performed in a contingent situation. For this reason, it behooves a greater understanding of system thinking to expound on the system concepts from which the paradigm is derived. These are stated in the first section of the chapter. The following section touches on the concrete aspects of the organizational system model of productive activity. The chapter concludes with a brief account of the firm’s dynamic relationship vis-à-vis complex environment. In spite of its consideration of the uncertain environment, the search for the optimum handling of future contingencies continues as manifested by the actual state of organizational system theory².

Indeed, the system model is superior to the preceding notions of productive activity. Furthermore, it is analogous to the Aristotelian concept of poiesis. With the concepts previously discussed as parameters, chapter 3 begins with a comparison between the system model and the Stagyrite’s own account of poietic activity. The first section talks about the principle of making, namely: thinking or operation. Considered in itself, thinking is an activity which is nobler than whatever form of activity. It is the foundation of the person’s adaptation to the environment because thin-
king is the activity which captures the information regarding the state of the external world. The next section dwells into the second constitutive element of the activity, production process. It is the aspect of poietic activity which manifests how thinking influences the external world in time. The articulation between these two constitutive elements is outlined in this section. The next section is the Aristotelian evaluation of production. Its discussion does not depart from the comparison with the system model since the evaluation is developed from the following question, to wit: is production a negentropic activity?

The fourth chapter is an examination of another activity which is done in the contingent level, namely: action or praxis. Action is a practical activity just like production. As such, the former is similar in some respects to the latter. That is to say, both are carried out in the environment over a period of time. Action may seem to be an alternative to production, if it could be shown that production is not a negentropic activity, and that praxis enjoys a certain advantage over poiesis. The fact that both are practical activities makes this evaluation possible. The succeeding inquiry is whether or not action has a certain privilege of superiority over production. It follows the same pattern of argumentation as the evaluation in the preceding chapter. The last section of the chapter is the structure of the action paradigm which puts into evidence what the second section has accomplished.

This study ends with what contemporary system analysis of the business enterprise has obtained in its search for the optimum activity. The conclusion likewise assesses what Aristotle can say about this aspiration. As such, it comments on whether or not Aristotle’s Theory of Action is relevant for providing the cornerstone on which the business edifice can solidly rest.

The author wishes to express some words of caution. It would be presumptuous to say that the outcome of this study is the panacea to the present crisis of the analysis of business enterprises. As mentioned above, what shall be attempted here is an inquiry of the basic unit of the collaborative effort which exists in the firm. Individual activity is the conditio sine qua non of corporate actions. It is the foundation on which the corporate edifice is constructed. Thus, organizing individual activities in the firm (that is, the laying of the building blocks of the edifice) is not within the purview of this work.

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NOTES OF THE INTRODUCTION


2. Cf. SCOTT, W.R., «The Sociology of Organizations: Crisis or Continuum?», in HIMMELSTRAND, U. (ed.), *Sociology: The Aftermath of Crisis*, Sage Publications, California 1986 quoted in SCOTT, W.R., *Organizations: Rational, Natural and Open Systems*, Prentice Hall, New Jersey 1987, p. XV: «The dominant cathedral of Rational Structure has been partially dismantled and, although portions are still standing, many of its building blocks have been carted off to be reconfigured into alternative and challenging constructions. More fragile shelters and colorful but perhaps temporary tents have been thrust up in vacant lots. The scene is one of much animation and energy: raw materials and scaffolding are strewn about; lamps in windows and camp fires burn far into the night. The image I wish to convey of the present situation ... is partly that of crisis and confusion but more that of vigorous controversy and an enriching profusion of competing models and methods». Cf. WILMOTT, H., «Beyond paradigmatic closure in organizational enquiry», in HASSARD, J. and PYM, D. (eds.), *The Theory and Philosophy of Organizations: Critical Issues and New Perspectives*, Routledge, New York 1980, pp. 44-60.
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1. Sources of Aristotle’s Works


2. Specialized References


— *Summa Theologiae*, under the editorship of CARAMELLO, Fr. P., Marietti, Rome 1962.


**brentano, F.,* Aristóteles*, Editorial Labor, Barcelona 1951.


**cubells, F.,* El concepto de acto energético en Aristóteles*, Series Valentina VIII (St. Vincent Ferrer Faculty of Theology), Valencia 1981 (repr.).


**Organizational Analysis and General Systems Theory**

1. Theory of organizations


— *La dirección de los talleres*, Librería de Feliu y Susanna, Barcelona 1914.


2. Cybernetics and General Systems Theory


THE INCIPIENT NOTIONS OF WORK ACTIVITY

A. TOWARDS WORK BY KNOWLEDGE

In the nineteenth century, the worker acquired his skills by tradition or by experience. Such has been the case for many centuries until Frederick W. Taylor introduced his principles of Scientific Management which revolutionized the shop floor. Scientific Management was responsible for the increased production in the factory and consequently, the increase of wages that freed the workman from the level of bare subsistence. Nevertheless, what is germane to the aim of this study is Taylor's contribution to the notion of work activity. Instead of basing the activity on tradition or experience, it is based on knowledge.

Taylor postulated that the objective of management was to ensure maximum prosperity. This objective has a two-fold meaning within the context of the firm. On the one hand, maximum prosperity for the employer because he or she receives a larger profit, and that the development of every department of the firm reaches a superior degree of excellence. On the other, maximum prosperity for the employee because he or she not only receives relatively higher salaries but also acquires an increase of efficiency within the best of his or her abilities.

The concern of the enterprise, therefore, is a higher bottom-line so as to provide an increase in the wealth of the employer and an increase in the wages of the workmen. The popular interpretations of Taylor’s primary motive (for example that his primordial motive was to increase the profits of the capitalists disregarding the miserable subsistence-level wages of the factory workers) in formulating his system are false. Taylor was not primarily occupied with efficiency or economy nor was he concerned solely with the profit-making motive of the employer. Drucker pointed out that these false interpretations of Taylor’s primary aim were a result of not having considered Taylor’s view on management’s objective.
The most important contribution of Taylor’s Scientific Management is the introduction of knowledge in manual activities\(^1\). Scientific Management attempts to foster efficient work activities in the factory floor. Its foundation rests on a set of clearly defined laws, rules and formulae. The main principles of scientific management are the following: 1) The collection of traditional work methods so as to develop a science (composed of rules, laws and formulae) of a specific activity; 2) A scientific selection and training of factory hand; 3) Cooperation in accordance with the established principles of a concrete activity; 4) An equal division of work and responsibility\(^4\).

The cooperation which scientific management envisions is «not the type of cooperation in which a mass of workmen on one side together cooperate with the management; but that in which several men in the management (each one in his own particular way) help each workman individually, on the one hand, by studying his need and his shortcomings and teaching him better and quicker methods, and, on the other hand, by seeing that all other workmen with whom he comes in contact help and cooperate with him by doing their part of the work right and fast»\(^5\). From the viewpoint of the Taylorist doctrine, cooperation in the factory floor is achieved when «managers assume new burdens, new duties, and responsibilities»\(^6\) on which this system rests for its foundations.

The notion of cooperation espoused by Taylor solely refers to one part of the business enterprise, namely: the factory floor. Henri Fayol adapts Taylor’s notion as a point of departure but goes even further by applying it to how an entire firm is organized. Scientific Management was restricted within the shop floor. Its primary interest was to improve the performance of the factory hand. This contribution was later adapted by Henri Fayol, the father of administrative theory. His elucidation of the administrative process contributed to the amplification of Taylor’s concept of work activity in all levels of the organization\(^7\).

Fayol defines management as «the drawing up of the broad plan of how the business will operate, assembling the personnel, or coordinating and harmonizing all of the organization’s efforts and activities»\(^8\). The managerial function is principally exercised through the personnel unlike other functions such as accounting, and security are primarily concerned with money, material and machines. The managerial function, therefore, is a corporate-wide activity which cuts through the entire personnel structure of the firm. It aims to achieve the optimum level of available resources and coherence among the sub-activities which managers perform.

It can be gathered, from what has been said above, that the plan presupposes the idea that every activity is manager-based. It shows how Fayol
has the same line of thought as Taylor in attributing to the manager the stock knowledge required to run the firm. Since the top echelon of the business claims for itself the monopoly of this stock, then it follows that it has the power to plan or to systematize personnel actions in pursuit of company objectives. Moreover, since these plans are claimed by management to be accurate, then it means that the personnel must diligently comply them. Thus, it is not surprising that the human person in the enterprise, the employee, is a factor which must be manipulated together with the rest. The employee is like any other passive company resource subjected to management manipulation. In the words of Simon and March, the personnel is considered as a «given» 9.

The «Classical Administrative Theory» is an amplification of Taylor's doctrine. Both believe the division of work into simpler tasks. What is important, however, is the application of the «rational logic» of Scientific Management to all facets of the business organization. It maintains that the firm must be divided into the basic activities such as production, maintenance, etc. These activities are necessary for the attainment of the firm's goals.

The division of the organizational activity into basic activities avoids their overlapping and costs in organizational activity are minimized. This system guarantees «uniformity in the performance of every task, regardless of the number of persons engaged in it, and the coordination of different tasks» 10. It defines the responsibility of each corporate member and his relationships with the rest.

The organization of the work activities requires their division into several elementary motions. Drucker lucidly declares that this affirmation led to the further misinterpretation of equating improvement of individual operations with confinement of the worker to a specific task element of the entire work activity 11. This results to strict dichotomy between planning and performing the work activity. According to the Taylorist doctrine, planning the work rests on management while performing it belongs to the workers. This schism between planning and doing was a typical trend of his time which was basically Puritan inspired 12. The prerogative of management to decide for the worker underlies the notion that only management has the competence in technical affairs 13. What can be observed here is the problem that confronts the bureaucratic system of organization and in particular the classical organizational theory: the problem of change. The rational logic of a bureaucratized form of organization is that change has to come from the top and must be universal and must therefore affect the entire organizational bloc 14.

The idea of work by knowledge drastically changed the notion of work activity. It heavily emphasizes, however, on planning and directing...
activities without considering the individual worker's perception with regard to his work environment. According to this scheme, the worker is restricted to his behavioral alternatives. This observation provoked a negative reaction and contributed to a sharp refocusing of work activity which the Human Relations Movement undertook.

B. The Work Environment

The so-called Human Relations Movement, rather than focusing on the rationalization of the work activity, focuses on the behavior of the individual worker. The Hawthorne Group of Elton Mayo started this movement by affirming the influence of the work environment upon the individual worker. Chester Barnard developed an organizational theory based on the findings of the Hawthorne Experiment. His observation of the notion of cooperation within the work environment resulted to the notion of the organization as a system composed of activities consciously performed by the agents of such system. Barnard values the process of communication to maintain the organization as a system of cooperative effort among the individuals comprising the organization.

Barnard calls human activity and its factual aspects as behavior. He postulates that behavior is a result of psychological factors. These factors are defined as "the combination, resultants, or residues of the physical, biological, and social factors which have determined the history and the present state of the individual in relation to his present environment." This affirmation agrees with Elton Mayo's observation that the individual's perception of his environment has a direct influence on his work behavior.

Barnard's explanation of organizations is based on his own notion of cooperation as an inherent aspect in any social grouping. An individual by himself cannot accomplish his purposes alone. He needs the collusion of other people to meet his ends. Thus, he joins a group because some of the interests of the group are compatible with some of his own. An organization is composed of persons. However, an organization cannot pursue its goals without its members' willingness to serve.

When a person cooperates with other individuals, he or she is expected to assimilate the purpose of the entire group. Any form of cooperation imbued with a purpose is the principal channel through which the intellectual capacities of individuals pass and originate. This common purpose is achieved by coordinating the efforts of the individual members of the organization. Purpose is an element without which cooperation would be entirely meaningless and whose communication is an essential executive function.
The communication of purpose is the process that puts into motion the possibility of pursuing a common end and the capacity of individuals to cooperate. An organization arises when there are people who can communicate with each other. People in a cooperative system must be willing to contribute action which tends to the attainment of the common goal. Thus, for Barnard, purpose, communication and the willingness to serve are the elements which give rise to an organization.

Barnard’s notion of cooperative effort in the business enterprise takes into account the individual’s perception of the environment. He postulates that it is a very important ingredient in the effectiveness as well as in the efficiency of the organization. For this reason, the organization cannot solely rely on the work activity but also depends on the working environment. This requires a process of communication in all levels of the firm. In the final analysis, the organization is characterized as an interdependent coalition of individuals pursuing a common end. Douglas McGregor calls this cooperative effort as interdependence whereby the individual learns by means of participation in solving the problems faced by the firm.

Douglas McGregor’s «Theory Y» depends on cooperation in the work environment. This Theory Y adopts the prism of Maslow’s hierarchy of needs as opposed to the assumptions maintained by the conventional theory which McGregor denominates as «Theory X». Traditional theory disregards the behavioral component in the work environment. In contrast, Theory Y postulates a working climate which enables the participant to direct and succeed in his or her activity. From the organizational perspective, the capability of the participants to direct their own activities is a *conditio sine qua non* for the pursuit of the common objective. The work environment is not governed by dependent relationships but rather by interdependence among individuals comprising the entire firm. The productive activity therefore becomes a learning process which the individual personally undertakes.

Interdependence requires striking a balance between the application of some specific types of dependence which do not frustrate individual’s aspirations; giving him independence which does not permit a situation of anxiety to arise in him. The corporate organization can neither ignore what it wants to pursue nor tie the hands of its members. McGregor coincides with Barnard’s position that cooperation is geared towards the needs of the individual. As he lucidly declares, «management cannot provide a man with self-respect or with the respect of his fellows, or with the satisfaction of needs for self-fulfillment....(It) can create conditions such that he is encouraged and enabled to seek such satisfactions for himself...»
Having emphasized on the work environment, the humanist trend overlooked the cognitive dimension as the principle of work activity. Furthermore, such emphasis insufficiently recognizes the impact on both the firm and the individual of future contingencies in the external environment. System thinking in organization addresses these questions with the aim of providing a holistic account of productive activity in a highly indeterminate world.

THE SYSTEM MODEL OF PRODUCTIVE ACTIVITY

A. THE OPEN SYSTEM AND ITS INFORMATION PROCESSING CAPABILITY

The ideas expounded by early organizational theories are presupposed by organizational system thinking. System thinking in organizations is considered as an attempt to explain in a holistic manner the work activity which happens in the enterprise. The paradigm of productive activity which this theory offers is taken from the conceptual notions of General System Theory introduced by Ludwig von Bertalanffy and Cybernetics by Norbert Wiener.

General System Theory (GST) criticizes the Newtonian world view as a conventional scientific thinking which fails to explain the interaction of various elements or processes. GST proposes a dynamic interrelatedness of the things within the world, whereas conventional ways of thinking are considered as closed views of the world. It represents a departure from the conventional modes of viewing man and the enterprise. While the Newtonian world view is deterministic, system theory adopts a contingent view of the world.

Teleological or purposeful behavior is due to feedback mechanisms of the system. Cybernetics, considered as a branch of General System Theory by von Bertalanffy, is the discipline which studies how a system receives and responds to information coming from its surroundings. It investigates the communication and control of the cybernetic machine. Assuming the contingency view of the world, it considers man as an information-processing system.

A dynamic system enjoys an equilibrium state described as the system’s internal stable disposition on which its activity is based. Since the system is in continuous dialogue with its environment, it receives information coming from the external environment which serves as systemic resources for the performance of work.

Any type of dynamic system is in equilibrium state with its environment. The equilibrium state is the system’s internal constitution which
offers a range of possible systemic activities in the external environment. This constitution, expressed in mathematical form, is called the set of constraint. The constraint set reflects in mathematical form the possible states of the world. It is, so to speak, the theory regarding the environment. The constraint is a formula of the system field defined as «the phase-space containing all the lines of behavior found by releasing the system from all possible initial states in a particular set of surrounding conditions».

According to the mathematical theory of information, the constraint not only channels energy flow but also senses the energy density of the environment and uses that information to direct the modification of the environment. Sensing energy density serves to detect whether a specific part of the environment is conducive for energy exchanges. The constraint set is, therefore, the system's potentiality from which the behavior with the environment is based.

The processing of information is based on the structural configuration of the system which is known as the constraint. It reflects the possible states of the environment. It likewise is responsible for sensing and discerning the relevant information which triggers a systemic response. The constraint or the equilibrium state is the system's potentiality which permits the system to perform an activity in a contingent environment. In the context of the organization, such potentiality is the cognitive dimension of productive activity.

B. THE FIRM’S COGNITIVE DIMENSION

Organizational system thinking assumes and improves upon the incipient notions of work activity. It assumes that the principle of work activity is rationality which is considered as internal consistency of choice and maximization of self-interest.

The concept of rationality is borrowed from the physical sciences, or more exactly, from statistical mechanics. Maximization of one's satisfaction or putting it negatively, the minimization of dissatisfaction, has its origin in the least-action principle of mechanics. This principle serves as the basis for the maximum-minimum continuum of statistical mechanics and of its predecessor, classical mechanics. «The discovery of external principles (the maximum-minimum continuum) is of vital importance for physics and economics since it permits determination of one particular path of motion or action out of the many possible paths, i.e. the path of the maximum or minimum, as the one taken by nature in physics or as the one to be taken by human action in economics.»
Simon's «bounded rationality» is a perspective of the rationality of an individual decision-maker immersed in an uncertain environment. It is a widely accepted assumption in organizational model-building. Contrary to what early decision theories assume, bounded rationality presupposes that an agent perceives only a part of the environment.

Decisions regarding the allocation of personnel and resources for production purposes in contemporary organizations is more complex than the assumptions of classical economic theory and statistical decision theory. Administrative practice, drawing to a large extent from these theories, assumes that the decision maker possesses objective rationality in deciding a determinate course of action. Objective rationality means that the behavior of an individual is an integrated pattern which results from a panoramic vision of the alternatives available for decision-making, the foresight of all the consequences of these alternatives, and the selection of the optimum of the alternatives with a system of values serving as its criterion. This view of objective rationality applied in organizations implies that «it is not necessary to expend resources specifically to achieve coordination; no administrative overhead is required for planning, collective decision making, or control».

The validity of theories based upon objective rationality depends on the simplicity of the confronted situation. In other words, objective rationality is a type of rationality that confronts only a tiny fraction of the real environment in which the decision maker moves. Specific events characterized by certainty occur in this fraction of the real environment.

However, the individual acting on real circumstances does not, however, reflect the assumptions of the rational man of classical economic and statistical decision theories. The first reason is that these models are valid only for situations of certainty; it is clear that environmental situations are not always certain. The second is that in real life, the individual cannot foresee all the consequences which will follow from his behavior. In sum, the environment in which the individual finds himself is far too complex to be handled alone: an individual's behavior is purposive but it is limited. The decisions taken according to bounded rationality will be valid only if the utility functions and assumed scenarios match those of the real world.

The individual possesses limited calculative powers. Simon calls this rational limitation as bounded rationality. Bounded rationality has the following characteristics: a) decisions relate to concrete (instead of comprehensive) issues which are more or less independent of the others; b) future scenarios are general (not exact and detailed) visions of perceived consequences of one's actions; c) decisions pertain to specific features of
the individual's life, and reflect concrete values of the individual; d) facts are evaluated and preferences are evoked on the basis of those facts.

The individual is unable to picture the entire complex environment in which he encounters himself, but captures only a part of it. Due to the decision maker's limited frame of reference, selective information is exercised in the process. An important assumption of organizational system thinking regarding rationality is that it is influenced by the individual's perception of the environment. Rational choice in each individual is therefore considered as a limited calculative process whose end (that is, the chosen course of action) is an action towards the resolution of a perceived problematic situation. In this context, rationality in behavior connotes the grasping of relations which are necessary for the individual's adaptability to the environmental situation. The person's adaptive behavior to the environment is achieved by capturing objects (found in the environment) into behavioral patterns (gestalts) which are the set of actions capable of active repetition. Thus, two poles exist in the decision making process. They may be generally called as adaptation and assimilation. The individual's decision making system (or cognitive system) is isomorphic with the open system model.

The system perspective in organization postulates that the basis of work activity is the agent's cognitive dimension. This is the potentiality from which activity springs. The agent's rationality is, however, limited. The nature of the agent's rationality demands that the environmental climate within the organization is conducive to the pursuit of the common objective and that the individual assumes the norms and criteria established by the enterprise. For this reason, productive activity is constructed by pooling individual activities together into the form of a means-ends chain.

Rules and procedures established along the means-ends chain are production techniques which enable the effective and efficient generation of the output. Activities performed according to the existing rules and procedures of the organization denotes that each of the agents and the entire enterprise are concomitantly at an equilibrium state.

An organization, through the discernment and use of information or energy coming from the contingent environment, generates an output. The administrative apparatus is the systemic part which selects the firm's environment and organizes the activities towards the generation of the firm's output. The manager perceives information which is disseminated within the organization in order to achieve a fit with the environment, that is, in order to meet the output demanded by the environment. Determined information is communicated, thereby provoking the performance of activities.
which are carried out sequentially along the means-ends chain of the enterprise. Behavior is «adaptive at any one time.... This “one-thing-at-a-time” or “ceteris paribus” approach to adaptive behavior is fundamental to the very existence of something we can call organizational structure».

The aim of communication is «to influence the conduct of the receiver» (that is, the subordinate) with the view of obtaining the result planned by the transmitter (that is, the manager). The influencing of individual behavior rests on the assumption that the person always seeks his own interest. According to system thinking, the process of learning takes the form of an adaptive response which triggers a reordering of behavioral patterns which fit the demands of the decision environment. Learning or cognitive success signifies that the cognitive system assimilates the relevant factors which link the system with environment. Learning occurs when there is a continuous and progressive systemic adaptation to the environment in the form of feedback cycles.

Learned behavior is synonymous to success in adapting to the environment. This learned behavior remains imbedded within the organization in the form of records and manuals, and if, done successfully, they become routine procedures. This is similar to Aristotle’s description of acquiring the potentiality of producing by performing the very activity of production.

C. THE LIMITS OF THE SYSTEM PARADIGM OF PRODUCTIVE ACTIVITY

Organizational system thinking emphasizes that the enterprise relates itself with an uncertain environment. System thinking in organizations portrays the corporate enterprise as an «organized complexity circumscribed by the existence of strong interactions». It tries to explain the dynamism of a complex whole with different parts pertaining to it. Systemic explanations of organizations are given by the «relationship between organizational behavior and the biological and physiological capacities and needs of the actors, and ... the respective adaptations between the organization and its geographical-physical environment». Organizational system thinking sees the organization «as an open system in which the behaviors of members are themselves interrelated». Moreover, the open system model attempts to explain «the ways in which any given system meets its needs through other systems (its “input”) and the services which it then goes on to provide for them (its “output”)».

The interdependency among the parts of an organization has a certain order which reflects the equilibrium state of the system. The organization, however, intends to maintain its equilibrium in the face of a more...
complex and changing environment by controlling the information which it receives from the environment. The system, with which the environment interacts, responds to the demands imposed by this environment through its structural form.

As organizations deal with their respective environments, unit segmentation takes place within them. Each unit or subsystem has the function of coping with the problems presented by a corresponding environmental segment. Its function is to adapt to the specific demands imposed by that specific segment. In order that the system may respond to environmental demands, coordination between the subunits of the entire system is essential. Unit segmentation is a condition which makes it possible for the system to survive in the face of environmental complexity. The system's persistence to remain dynamic is the reduction of environmental complexity through systemic differentiation. Sub-units arising from differentiation «help an organization achieve a better fit with its environment, allowing it to compete more effectively with other organizational forms for vital resources».

However, a problem arises when coping with environmental complexity:

the principal problem created by diversification is that it creates increasing complexity and uncertainty —this time within the organization rather than in the environment— up to a level that exceeds the information-processing and decision-making capacity of the managers.

Although organizational system thinking assumes that the individual adapts to the contingent environment, its paradigm for productive activity seems to be incapable of confronting uncertainty. Earlier it has been mentioned that the systemic model is analogous to the Aristotelian account of production (poiesis). By comparing the systemic model with the Aristotelian account of productive activity, the following chapter shall evaluate whether or not this activity is the optimum for confronting uncertainty.

ARISTOTLE'S ACCOUNT OF PRODUCTIVE ACTIVITY

A. Operation: The Cognitive Dimension in the Production Model

According to system theory, when a system is isolated from contingent situations, the information contained within that system is what Christenson calls as the theory of the system. This theory is composed of the systemic assumptions regarding the external environment; it is the infor-
mation which the system possesses about the environment in which it moves. Theory is, according to system theory of the business enterprise, the basis of adaptation to the environment. He asserts that "the symbolic expression of the organizational form of a given system is simply a theory of that system. The organizational form must serve the function of coordinating the possible states of the system in the face of its interactions with its environment".61

Theory therefore provides the basis for interacting with the environment. When interacting with its environment, the system uses this stored information in conjunction with the input which it receives from the environment. When applied in contingent situations, the set of variables comprising theory constitutes the equilibrium state of the system. It is the system's stable internal disposition for performing an activity within a given situation. This stable internal disposition dictates how the system passes from its initial to final state. In the context of an economic organization, this stable internal disposition forms the so-called set of norms and procedures of production which permits the production process to achieve its result under certain contingent situations and which forms the cognitive dimension of systemic activity.

How does Aristotle consider theory? More concretely, what precisely is the nature and scope of thought? Aristotle affirms that "everything is a possible object of thought".62 Thus, the intellect has the possibility of knowing all things. For this reason, Aristotle says that the "soul is in a way all things".63

It is in this affirmation that Aristotle explains how adaptation to the environment is achieved.64 Thought is perfectly adaptable to all things. For this reason, operation "is essentially "adaptation". All other forms of adaptation are only analogies of the adaptation in which operation consists" (Bastons).65 The person not only has the possibility of knowing things, but is also capable of perceiving the principles and laws governing these things.

Reason captures the essences of the things. These are the principles which are considered as the absolute laws of the real. In so far as it captures those laws, science can be claimed as true.66 The Stagyrite explains on how these "environmental laws" are acquired:

Thus the states neither belong in us in a determinate form, nor come about from other states that are more cognitive, but they come about from perception - as in a battle when a rout occurs, if one makes a stand another does and then another, until a position of strength is reached. And the soul is such as to be capable of undergoing this.67
The object of thought which an operation captures is the «information stored» by the act. What differentiates one thing from another is matter. If operation is devoid of all matter, then the captured object is identical to the operation:

... thought is itself thinkable in exactly the same way as its objects are. For in the case of objects which involve no matter, what thinks and what is thought are identical\(^6\).

While one is thinking, the object of thought is already present: the activity of thinking has already thought the object and has already appropriated the object as something that is its own. Operation possesses the object in the very act itself:

What is immanent of operation is possession. To know in act, if the act is an operation, is to possess the known (object).... The operation of knowing does not gradually proceed towards a result but rather (knowing) has already achieved it\(^6\).

The possession of an intellectual operation is eminently peculiar and is called immanent appropriation or possession. Possession of the object is immanent when the known object is simultaneously present in the activity of thinking\(^7\). The operation’s possession of the object is immanent. There is a co-presence between the operation and its object due to the fact that what is captured is likewise immaterial. Thus, the so-called immanent possession of the object on the part of operation is analogous to the storage of information. The intellectual operation permits the capture of the environment which forms the object of thought. Within information theory, this object of thought can be abstractly construed as the quantity of information stored in the hardware.

The individual can act in and upon the environment on the basis of the knowledge that he has of it. The knowledge proper to production is called technical knowledge and pertains to the theoretical ambit of productive activity. The existence of this knowledge is affirmed by Aristotle: «Every science seeks certain principles and causes for each of its objects - e.g. medicine and gymnastics and each of the other sciences, whether productive or mathematical»\(^7\).

Knowledge is a potentiality of contraries since it involves a concept or formula (logos) which manifests both the thing in so far as it is and its privation accidentally. For this reason, «the things whose potentiality is according to a rational formula act contrariwise to things whose potentiality is non-rational, for the products of the former are included under one principle, the rational formula»\(^7\). In technical knowledge, this con-
cept or object is the form-principle. It is the form of the object detached from matter:

the knowledge is the the object. In the productive sciences (if we abstract from the matter) the substance in the essence, and in the theoretical sciences the formula or the act of thinking, is the object. As, then, thought and the object of thought are not different in the case of things that have not matter, they will be the same, i.e. the thinking will be the one with the object of its thought73.

This «general and abstract study of the form of producing» is composed of a system of general principles in view of generating the product74. Herein lies the Aristotelian explanation of the difference between the rule of thumb method and the scientific way of working propounded by both the Classical Taylorist Doctrine and Organizational System Theory: technical knowledge is distinct from experience for the former knows the «why» of the activity while the latter does not75.

Although the productive model is based on theory, it dwells in a different ambit from that of theoretical activities76. Whereas the possessor of theoretical knowledge is limited to the contemplation of the object, the possessor of technical knowledge can put this knowledge into practice; he can perform a movement, which is precisely the production process.

The possession of technical knowledge thus means that the agent possesses an internal state for directing an activity according to the principles of this knowledge. This is what the system model in organizations calls the equilibrium state of the system. When explaining knowledge proper to the productive model, the Stagyrite affirms thus: All arts, i.e. all productive forms of knowledge, are potentialities. They are principles of change in another thing or in the artist himself considered as other77.

As form of knowledge which directs movement, it is the role of rationality to be used within a particular situation, using the object possessed by productive knowledge as its point of departure.

Having established the Aristotelian view of productive science as analogous to theory as propounded by the system model, it must be emphasized that it is the basis for whatever type of adaptation to the environment. Theory in itself is unable to deal with contingent situation for it is eternal. The intellectual faculty in production has a different manner of determination78.

Technical principles are rules which conduct the activity towards the making of the artifact, which is the object of technical knowledge. The artifact can be produced in so far as the process is in accordance to the ru-
les which technical knowledge prescribes. The success of the result depends on whether or not the process of making is in accordance with the rules. Thus, the formalization of technical activity into a complex set of rules permits the generation of the output. For the same reason, a disciple is capable of making a product under a master who guides his activity.

Rational potentiality is operation in the productive model. Whereas operation has the end in theoretical activity, rational potentiality must also take into account the material external reality which affects that activity. This matter is that which «creates» the distance between the idea and the result of the productive activity.

As such, it is reason's role to discern the proper manner of generating an output within a given temporal situation. This takes the form of deliberation. Deliberation consists in calculating which of the available means can achieve the end in the best possible manner. The searching of means therefore implies that they pertain to a model that helps decide which one is best. The standard on which technical deliberation is based is the object or the idea which operation possesses. The «best means» signifies those things which lead to the artificial product.

Once again, system thinking (with the concomitant growth of decision theory) approximates the postulates of the Aristotelian account of technical calculation by assuming that rationality consists in deliberating upon the means to an end. The input information provides data about the environmental state conducive to performance of the activity. Deliberation stops at the moment when the person perceives that information coming from the environment does not impede the actualization of his or her potentiality of producing: «If we come on an impossibility, we give up the search, e.g. if we need money and this cannot be got, but if a thing appears possible we try to do it».

It is therefore clear that the activity, which presupposes the object, is simply an adaptation to what was previously known.

B. THE PRODUCTION PROCESS AS THE TEMPORAL CONFIGURATION OF THE OBJECT

To be in act can be said in different ways. Aristotle distinguishes two types of activity: the perfect and the imperfect. Where does the distinction lie and what is the characteristic of this distinction?

The Stagyrite describes the difference between perfect activity and imperfect movement in the Metaphysics:
At the same time we are living well and have lived well, and are happy and have been happy. If not, the activity would have had sometime to cease, as the process of making thin ceases: but as it is, it does not cease, we are living and have lived. Of these activities, then we must call the one set movements, and the other actualities. For every movement is imperfect - making thin, learning, walking, building; these are movements, and imperfect movements. For it is not true at the same time we are walking and have walked, or are building and have built... but it is the same thing that at the same time has seen and is seeing, or is thinking and has thought.

On the one hand, thinking (that is, operation) is identical to the known in act. This is to say that operation in se immediately captures its end or object. When one thinks, the object that is known is already present in the act of knowing. The act of knowing is simultaneous to the presence of its end.

On the other hand, productive activities such as the making of an edifice proceed in successive stages. The final product is only achieved when these stages have been accomplished. Thus, while the process of building is still on-going, the final product does not yet exist: the building stages have not yet built the edifice.

From these observations, one can see the difference between operation and productive process, to wit: the relationship of the activity with respect to the end. Aristotle further clarifies the distinction between operation and process by affirming that operation is an end since its object is identical to the very same activity, while process is not because it has a limit (pe­ras).

Since of the actions which have a limit none is an end but all are relative to the end, e.g. the process of making then is of this sort, and the things themselves when one is making then are in this way (i.e. without being already that at which the movement aims), this is not an action or at least not a complete one (for it is not an end); but that in which the end is present is an action.

Operation is identified with its end; it is its own end. In contrast, processes are activities which are not ends, but rather are means. They are transition stages. For this reason, they are called transitive movements. The real distinction between imperfect and perfect activities does not lie in its origin (that is, the potentiality from which it comes from) but rather in their relationship with the end.

«It is not true that at the same time we are building and have built». The act is not fully consummated in the perfect. There is no identi­
fication between the present and the perfect\textsuperscript{99}. So long as one is building, he or she does not have what is built. In other words, the movement of building must proceed temporally towards the end and proceeds towards the end in stages. Thus, temporality is a quality proper to process. A process occurs in «time because it has a limit at which it terminates; and not an end in which it reaches its fullness»\textsuperscript{100}. As such, time is not only a quantitative measurement of processual activity, but is also a qualification of this activity\textsuperscript{101}.

Unlike operation, production processes are transitive movements. They, therefore, behave in a similar manner as natural or physical movements which are also transitive movements. Movement can be defined as the act of potency in so far as it is\textsuperscript{92}. This is in line to what Aristotle explains that a thing can be in act as movement to potentiality\textsuperscript{93}.

Act is to potency as movement is to potentiality. Aristotle observes that while «art is a principle of movement in something other than the thing moved, nature is a principle in the thing itself...»\textsuperscript{94}. The Philosopher concedes that technical production is «concerned neither with things that are, or come into being, by necessity nor with things that do so in accordance with nature (since these have their origin in themselves)».\textsuperscript{95} The difference therefore lies in the potentiality from which each of these processes originates. While the potentiality which brings about natural processes are innate or congenital, the potentiality of technical production is acquired through the exercise of the activity:

As all potentialities are either innate, like the senses, or come by practice, like the power of playing the flute, or by learning, like that of the arts, those which come by practice or by rational formula we must acquire by previous exercise, but this is not necessary with those which are not of this nature and which imply passivity\textsuperscript{96}.

One can therefore form an idea of the «structure» of the productive model as an activity in which rationality and process form the constitutive elements. Whereas the source of natural movements are previously given potentialities, the source of productive movement are potentialities after the exercise of an activity\textsuperscript{97}.

While the source of natural movements originates from within, unnatural movements originate from without\textsuperscript{98}. The principle of movement in technical activity is found in another: in operation or in the rational potentiality. In contrast, the source of natural movement is found in the moved object itself (the «product» proper to generation):
For the art is the starting point and form (eidos) of the product; only it exists in something else, whereas the movement of nature exists in the product itself, issuing from another nature which has the form in actuality.

The important point of this discussion is however that the form of the end of technical process «exists in something else» in contraposition to that of a generated natural being. The cited passage speaks of the origin of production as something «which has the form in actuality». Such origin is operation.

Operation, when detached from the material environment, captures its end in the very same activity. On the other hand, operation in the production model is the determination of the means based upon the abstract form or the presupposed end of the deliberation. The privilege of operation as foundation of technical activity rests on the fact that it has this end. Nevertheless, the productive model demands the generation of the output. This output is the materialized form.

The form or idea is the artificial product’s potential mode of existing. The production process materializes the form possessed by operation and converts it into an output. This implies that productive activity as a whole (with its dual dimension of cognition and process) is a transition from the form to the materialized output. Technical process transforms the idea into actuality (in the form of an output or an artifact). This process requires time. It follows that technical process is the temporal configuration of the idea which is possessed by operation.

To recapitulate: this subsection has shown that the production process is equivalent to the state of motion in systemic activity. The Stagyrite likewise affirms that process is distinct from operation which is analogous to the concept of equilibrium state within the system model. This distinction, however, does not imply that the production process is totally independent from rationality. On the contrary, the production process transpires in accordance to the productive form of knowledge which is a complex set of rules and principles whose aim is the generation of an artifact. This is the fundamental description of a processual activity in organizations. Furthermore, this supposition is what distinguishes production process from other physical or natural processes.

The preceding paragraphs have shown the Aristotelian notion of production process. After examining the two dimensions of technical activity as the correlates of rationality and of process in organizational system thinking, it can be concluded that system paradigm of productive activity in organizations follows Aristotle’s poietic activity.
C. The Limits of the Technical Model

The system model of organizational theory assumes that systemic activity is negentropic which means that the system strives to achieve an energy density higher than its previous level. This takes place as a result of storage of received information which, in addition to the information previously possessed, increases the systemic energy level. This increase is the absorption of the past into the present which enables the system to respond to future contingencies in the environment. Ashby denominates it as "amplification of adaptation".

This section will assess the claim that the system model of productive activity can handle future contingencies under the light of the concepts discussed previously. More concretely, the evaluation will focus on two points which are intrinsically related to each other. First, does poietic activity increase the system’s potentiality or the energy level thus enabling to have further exchanges with the environment? This interrogation serves to assess whether or not productive model is a negentropic activity. Second, does poietic activity accumulate the past into the present? The question then aims if the model assumed by organizational theory is the optimum response to future contingencies.

Productive activity is geared to the generation of the output. In order for this to take place the agent must have an internal stable disposition or equilibrium for such a movement. This disposition is precisely that which gives the agent the possibility of embarking upon a productive activity. To be capable of producing means that the agent’s potentiality can be actualized.

The principle of productive activity is external to the becoming of the product. This means that the production process is not preordained by the nature of the moved thing. Furthermore, productive activity takes place when there is a conducive situation that warrants its performance. Production is simply the realization of the possibilities of the rational potentiality. This rational potentiality supplies the productive form of knowledge that guides production along its course. An agent that possesses a rational potentiality is capable of producing when the environment is conducive to the generation of the output. This environmental state is the so-called the passive object upon which productive activity works. Rational potentiality will not be able to act if this passive object is not present within the environment. Thus, although the agent possesses an internal condition for effecting a change, another condition must be met, namely the external condition.

Although the idea is the primordial origin of the output, one must also take into consideration the matter out of which the output is to be
moulded. This matter from which the output is produced is called the passive object. Like natural processes, technical activity involves the configuration of matter:

All things that come to be either by nature or by art have matter; for each of them is capable of both being and not being, and this capacity is the matter in each.

In order that productive activity may take place, one must search for the environmental information conducive for the generation of an output. This actualization concretizes the idea in the appropriate material environment. It is a transportation of the form into the matter by means of the production process. This is the Aristotelian way of describing adaptation through equilibrium fit.

Actualization involves stages towards the eventual accomplishment of the output. In the act of building for example «the fitting together of the stones is different from the fluting of the column, and these are both different from the making» of the edifice. The actualization of potentiality in technical activities is a passage from one stage to a succeeding stage and involves the gradual transportation of the form into the external material world. These stages form a feedback chain involving operation and the production process:

that which proceeds from the starting-point and the form is thinking, and that which proceeds from the final step of the thinking is making. And each of the intermediate steps is taken in the same way.

«It is not true that at the same time we are building and have built». The actualization of the production process ceases when the process has reached its end. This end is external to the movement. Thus, the actualization of the production process involves an imperfect movement.

In the production model, the end, or more precisely the limit, of a process is its output. The complete actualization of the process results in the output. Thus, output is nothing but actuality, the realization of potentiality. Potentiality and actuality are «complementary aspects of a single fact». This implies that during the passage from potentiality to actuality, the increase of actuality implies a corresponding reduction of potentiality.

Prior to the production process, the agent finds itself in an initial state of potentiality for making an output. During the incipient stages of the process, there is more potentiality than actuality. In other words, the
idea has not yet been materialized in the finished product; rather, the trans­
portation of the form into the matter involved in production is under way. Con­
sequently, actualization implies that the increase in actuality is com­
municated into the matter in which the completion of the production acti­
vity will later be found.

When the production process draws closer to its final stages, actual­
ity is greater than potentiality. Departing from its initial potential state, tech­
tical activity leaves behind the previous stages. As it progresses, the pro­
cess spends its initial resources: it loses potency. All this implies a loss of its initial energy and the subsequent loss of its ability to do work. The loss of energy also means that the process is entropic and therefore irrever­
sible. An important implication of this observation is that production shares a characteristic proper of whatever type of natural or material pro­
cesses, to wit: irreversibility.

The terminus in productive activity is the product. Stated in other words, productive activity is the transportation of a form into the matter by means of the production process and implies the actualization of the ratio­
nal potentiality. This actualization, however, is solely external: the actual­
ity generated is not preserved by the agent, but remains in the external product.

What then is the state of the agent at the end of the productive acti­
vity? The agent’s final state is equivalent to its initial state since actuality is not conserved in the agent, rather it is consumed and lost to the external environment. The conclusion is that the productive model is entropic because it loses the energy (actuality) to the external environment and there­
fore does not contribute to an increase in the agent’s potentiality.

In its entirety, productive activity is a transitive movement. As such, the production model consists of the mover, the moved, and the ini­
tial and final situations of the activity. Apart from the three constitutive elements, productive activity involves time like all types of processual mo­
vement. The temporal aspect of technical activity is inherent to it because it is a processual movement which involves a movement from an initial si­
tuation to a final situation:

We have, then, the following factors: that which directly causes motion, and that which is in motion; further, that in which motion takes place, namely time, and (distinct from these three) that from which and to which it proceeds (for every motion proceeds from something and to something, that which is directly in motion being distinct from that to which it is in motion and that from which it is in motion...).
Aristotle affirms that «it is not possible to move otherwise in terms of time»\(^{118}\). Productive activity is therefore is in consideration of time\(^{119}\). As seen earlier, it is precisely in the posterior dimension of technical activity (that is, the production process) that the «materialization of the idea» takes place\(^{120}\). This «materialization of idea» is the actualization of the potential state, an actualization that is a linear passage which begins with an initial and concludes in a final situation. From this viewpoint, production activity can be considered in terms of a precedent-antecedent relationship\(^{121}\).

It is in this «whence-whither» relationship of movement that time is captured\(^{122}\). This notion of time as something which is inherent in movement reveals that it is not merely a quantifier of movement. Rather, time is also a *quality* which describes the progress of the actualization in terms of its numerical distension toward its final situation\(^{123}\). For this reason, movement can be measured according to time\(^{124}\).

Time is the flux between «before» and «after». Now, if actualization is a succession of stages, then such stages can be measured according to a «before» and an «after»:

And this transition (the temporal transition) is not only continuous, but it also has *direction*. Each «present-now» is not limited to *being between* the other *nows*, but it is a now that goes «from-to».

And this is precisely what gives it a direction *whence-whither*\(^{125}\).

The initial state previous to actualization signifies that the activity has a future. When the initial stages of production process are realized, productive activity leaves such stages. This denotes that the «now» (the production-in-process) has consumed the past. This consumption of the past also implies that the activity has less future. To proceed towards successive stages means that the activity at the present moment has simultaneously left the past and destroyed the future. This is so because process is

a tension towards its terminus and its progress presupposes an expenditure of the initial resources, that is the potential. It implies the loss of initial energy. Consequently, it is an entropic and irreversible activity. That it is irreversible signifies that in that the measure that it progresses it becomes less potent and faces less of a future\(^{126}\).

Recall that as processual movement, production is a transition stage whose end is its limit. This affirmation signifies that when this end is reached, the entire productive activity ceases. Taking this in the context of time, the future of the activity is destroyed upon the complete realization of the activity.
Time is continuous: «present time joins on to both past time and future time»[127]. The past is linked with the present which is in turn linked with the future: time is the flux of a now which exists from a before that has ceased to exist to an after that does not yet exist. From this, one may derive a temporal description of an on-going production stage: it is a now which has departed from a completed stage and which is on its way to a stage following the present. This description can be further applied to productive activity as a whole. Thus, the future of productive activity is specifically linked to and depends on the past.

The past of a productive activity is the so-called model or the subjectively known which guides the production process toward the fabricated product. Arendt affirms that

the image or model whose shape guides the fabrication process not only preceded it, but does not disappear with the finished product, which it survives intact...[128].

The future of a production model is firmly anchored on the past. Thus, the so-called future of productive activity is nothing but the anticipation of the past. As a consequence, no novelty is produced by technical activity. The crux of the matter in the productive-system model’s insufficiency is based on the fact that the environmental demand or information to which the activity responds is the subjectively known aspect of the environment. What provokes novelty and creates the opportunity to increase systemic potentiality is the subjectively unknown environmental aspects:

The external driving force (of the so-called «amplification of adaptation») is not the subjectively known character of the environment to which the system adapts; but rather its subjectively unknown aspects which produce novelty and disturb the adaptation. A sufficiently great disturbance creates an opportunity to move the system from one of internal equilibrium state to another, more complex one[129].

In the final analysis, the production-system model is not the optimum activity for it responds not to the future and complex environmental contingency but rather to the present environment perceived by a limitedly rational agent[130].

The role of operation in the production model is limited to the present time-frame. Its restriction to the present precludes the system to provoke opportunities for action in a highly indeterminate contingent environment. Thus, although production activity has operation as its origin, operation cannot entirely dominate the entropic characteristic of proces-
ual movement. Albeit the system has a certain degree of control over its environment, its activity is partly restricted by the perceived external environment.

The directive role of operation in production activity is restricted to the determination of the means. Consequently, it disregards the highly indeterminate character of the environment. Of course, system model assumes that the environment is highly complex. But what the model prescribes is to restrict systemic response to the known aspects of the environment. As such, this prevents the system to provoke opportunities to proceed its exchanges with a complex environment. In the final analysis, the persistence of the agent's activity in such an environment is not feasible if one were to follow the normative prescription of the system model.\textsuperscript{131}

What, then, must be done in order that the agent can handle the future? The agent must first be exceptionally resistant to change. Second is that in order to deal with an indeterminate environment, it must be open to higher degrees of complexity.\textsuperscript{132} For this to take place, operation must not be restricted to the known. Its directive role consists in opening up and leading the activity to the unknown. Does Aristotle speak of an activity that fits these requirements?

THE ACTION PARADIGM

A. ACTION AS PRACTICAL ACTIVITY

Does Aristotle hold an alternative activity which takes place in contingent situations and which promotes a qualitative increase in the system? If he does, this activity must be something distinct from productive activity. The difference would have to lie in the overcoming of the destruction of time which takes place in processual movements. For this to take place, the actuality produced in the activity must be conserved in the agent so that its potentiality is increased, thereby generating more possibilities for it to act in the future. This chapter shall take a look at action which is the sole Aristotelian alternative to the production model.

Aristotle calls the activities which an agent can perform in the contingent level as practical activities. Production, however, is not the only type of practical activity. Aristotle admits that,

\begin{quote}
Among things that can be otherwise are included both things made and things done.\textsuperscript{133}
\end{quote}
«Things made» refers to production, «things that are done» refers to the ambit of action. Both action and production presuppose reasoned states of capacity to do or to make respectively and are activities directed by the intellect.

Operation, therefore, is the directive element of action, but the execution and consecution of the end is achieved through a process. The rational capacity within the level of action as well as within the level of production is acquired through a repetition of acts:

For the things we have to learn before we can do, we learn by doing, e.g. men become builders by building and lyre-players by playing the lyre: so too we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts.

Finality in movements is described as that for the sake of which something is done. Aristotle posits that the nature of the end is good since good «is found in the field of action and movement, and it is the first mover; for that is the nature of the end». Aristotle maintains that the good can be said in many ways.

Thus, the good for a certain activity is not the good for another. In the case of medicine, the good is health, or in the case of architecture, the good is the edifice. These two activities have their end-result external to them; they are thus imperfect activities and belong to the ambit of production. On the other extreme, the good of an intellectual operation is the object of the very same activity. Since the end and the activity are identical to each other, Aristotle holds that it is a perfect activity. For this reason, he states that it is the highest form of activity:

Now this would seem to be in agreement both with what we said before and with the truth. For this activity is the best (since not only is intellect the best thing in us, but the objects of intellect are the best of knowable objects); and secondly, it is the most continuous, since we can contemplate truth more continuously than we can do anything.

This, however, does not signify that one must dwell exclusively in this activity to the point of neglecting practical activities. In fact, theoretical activity is proper to an omniscient being. Aristotle sees that the thinking of the gods is a self-conditioned and self-contained activity: a thinking of thinking. This absolute activity does not take place in man for he cannot sustain a continuous activity. All human activities are incapable of being sustained indefinitely since «our nature is not simple but there is another element in us as well, inasmuch as we are perishable creatures».
The individual person is not a self-contained intellect; he is inserted in a contingent world. Although man is a unique being, he is still a being among other corporeal beings. He is therefore subject to contingencies.

With things standing as such, it would be absurd to consider productive activity as the highest activity which an agent can perform in contingent affairs, and to deny the primordial place of reason in man. On the contrary, the proper perspective of looking at the different types of activity which man can perform should be taken under the light of a hierarchy of activities.

Strictly speaking, productive activity «is merely useful and for the sake of something else». As has been repeatedly underlined, this is so because in production model (an imperfect activity), operation does not play a complete directive role in the agent’s handling of contingent situations; it loses its directive role in favor of the process which externalizes the actuality.

In so far as operation is superior to process, the effective handling of future contingencies will depend on whether or not operation dominates and controls processual movements. The desired type of activity would then be an activity in which the superior element completely dominates the inferior one. This type of activity must effectively handle contingent situations without restricting the directive power of operation. It must be an activity which shares the characteristics of productive activity and intellectual operation.

Aristotle distinguishes action from production in the following passage:

> For while making has an end other than itself, action cannot; for good action itself is its end.

Recall that Aristotle distinguishes activities according to the relation which they have with their ends: imperfect activities are a type of movement whose end is external to itself; perfect activities are movements whose end is in itself. Once again, the Stagyrite’s assertion on the behavior of the activity towards its end.

Moreover, Aristotle implies that action is superior to production since the relation of action to end is analogous to the relation which intellectual operation has to its object. In other words, action, like intellectual operation has possession of its end. This similarity is, however, not absolute since action possesses a processual dimension, while operation does not.
B. THE NEGENTROPIC NATURE OF ACTION

Recalling the limitations of the production model, the action model would be the optimum activity for handling future events, if it could be shown that action is a negentropic activity. Thus, this section shall attempt to answer the following queries:

1) Is action an activity which avoids the loss of actuality so proper of entropic activities exercised in a contingent environment?

2) Does action possess a temporal characteristic which does not preclude the divorce of the present from the past, thereby enabling the agent to pursue its activity in the future?

The rational capacity for acting is acquired through repetitive exercise of deeds. Indeed, Aristotle affirms that action involves a processual movement as shown when he compares the acquisition of potentialities in action with that of production: «the excellences we get by first exercising them, as also happens in the case of the arts as well».

At first glance, action seems to consist in a feedback process similar to that of production. Movement precedes the capacity which, in turn, provides the stable disposition to produce the movement. It has been seen in the previous chapters that in the production model, thinking precedes making. Production in its intermediate stages is a cyclic process involving thinking and making. This progressive actualization continues until it attains the external result, the product. The modification that takes place in production is an external modification of matter which does not modify in any way the potentiality involved in the activity.

Action is, however, more than a feedback process. The excellences (or the virtues) are acquired when the following movement occurs: first is the passage from a natural disposition to its movement and then, through the exercise of such acts which results in the possession of the virtues. In contrast to the externalization of the actuality which takes place in the production model, the actuality in the action model is internally possessed. The production model results solely in an external modification in production while the action model involves an additional internal modification of the agent’s potentialities and thus results in the constant perfectioning of these potentialities.

Unlike pure physical movements, action is not a linear movement towards its end. Neither is it a movement consisting of successive feedback stages whose end is external to them. Rather, the reiterative exercise of actions leads to a consequent and continuous perfectioning of the agent’s state.
The act proper to the state of acting is a movement. As such it is continuous and that which is continuous can take «more, less, or an equal amount, and that either in terms of the thing itself or relatively to us, and the equal is an intermediate between excess and defect» 153. This intermediate or established condition is habit. Habit is a quality of a faculty which has not been specified by nature. For this reason, it is sometimes called a second nature: «habit is hard to change just because it is like nature» 154. If the movement leads the faculty to an excess or defect, the habit is called vice. In the case of a good action (that is, the movement to the intermediate) the established state is denominated as virtue, which is the actuality resulting from such an action 155.

Action (more precisely, good action) is a practical activity which refers back to the initial state thereby potentializing it. This optimization implies an improvement of the initial state which brings with it a quantitative increment and a qualitative improvement of future actions:

We may remark, then, that every excellence both brings into good condition the thing of which it is the excellence and makes the work of that thing be done well.... Therefore, if this is true in every case, the excellence of man also will be the state which makes a man good and which makes him do his own work well 156.

To possess something signifies to have that thing. To have is «a kind of activity of the haver and the had-something like an action or movement» 157. The manner of possessing in the action model is different from that in the production model. From the prism of the action model, the external result is an insufficient indicator of a well performed activity. A well performed action largely depends on the agent’s state:

Again, the case of the arts and of the excellences are not similar; for the products of the arts have their goodness in themselves, so that it is enough that they should have a certain character, but if the acts that are in accordance with the excellences have themselves a certain character it does not follow that they are done justly or temperately. The agent must also be in a certain condition when he does them 158.

While production activity ceases when the external result is achieved 159, the action model demands a process of optimization in the face of an indeterminate future. It demands a continuous growth in the agent’s conduct: «for it is activities exercised on particular objects that make the corresponding character. This is plain from the case of people training any contest or action; they practise the activity the whole time» 160.
Translating this into systemic terms, the action model acts as a systemic activity in a contingent environment which results in an equilibrium state which is higher than the initial state. Thus, by realizing good actions in an uncertain world, the agent gains the capacity to do more and better actions in the future. However, the realization of these good actions signifies that the activity takes time. Is «active time» the same as transitive time?

An inherent characteristic of systemic activity that takes place in an environment is the linear temporal passage which brings with it the destruction of the future. It can be recalled that in transitive movements (be it natural or productive), the past is not conserved and, at the same time, the future is reduced. In the case of productive activity, this temporal destruction takes place due to the fact that the actualization is progressively externalized and eventually terminates at its limit, the output. Thus, productive activity is entropic and is ineffective in dealing with future contingencies since its development leads to a reduction of the system’s capability to act in the future: when the activity reaches its end, or limit, it ceases to exist.

In contrast, the temporal passage in the action model results not in consumption, but rather in temporal enrichment. The movement involved in action is not solely a pure tendency towards an external end. The actualization involved in the action model reverts back to the initial condition and implies the consequent increase in the agent’s potentialities. Through action, the faculties’ acts are reflexive and tend toward an end in such a way that the «energy level» at the final state of the activity is higher than what it was at its initial departure point.

Just as action and production differ from each other by the different relations which they have with their ends, there is a parallel distinction between active time and productive time. The internal possession of the actuality which is a result of action prevents the temporal passage from being a mere linear succession. The inherence of the actuality in the faculty which enables its further potentialization demands a modality of time wherein the past is conserved in the present, making possible the future.

The temporal peculiarity of the action model stems from the fact that the performance of good actions impedes the temporal destruction which is so proper of activities that take place in a contingent world. It does so by preserving the past in the present while, at the same time, it prepares for the future. The circularity of «active time» must not be understood in the sense that it is a repetitive cycle which produces nothing new. The circularity of active time does not terminate at the same point from where the activity began; circular active time is a temporal progression in
crescendo wherein the past is continuously accumulated with the view of proceeding further to the future.

The past accumulated in the present which, in turn, permits the future horizon to remain open produces habit. The acquired habit resulting from action absorbs time and avoids temporal consumption. Rather than losing time, acquiring habits is the manner of gaining time\textsuperscript{162}. Therefore, in the action model, time, under the guise of habit, becomes an «ingredient» for the agent’s constitution:

While time is indeed pure succession in the case of things, time for the rational being, such as man, becomes an ingredient of its own constitution. This happens under the form of habit\textsuperscript{163}.

Having conserved and accumulated the past, habit opens up the future to further actions in so far as they are of a specific and determined quality. Active time points out the propriety of the future exercise of better actions. It indicates when the right occasion is present for the intervention in a contingent event. Aristotle affirms that «active time», being an opportunity, is analogous to the category of the good:

Further, since things are said to be good in as many ways as they are said to be (for things are called good both in the category of substance, as God and reason, and in quality, e.g. the virtues, ... and in time, e.g. the right opportunity...)\textsuperscript{164}.

While it is true that the action paradigm requires the temporal performance of its activity in order to attain its end, there is, nevertheless, a certain simultaneous attainment of the end within the very same activity. This is not the case of production whose end is external to the act of making:

Now those activities are desirable in themselves from which nothing is sought beyond the activity. And of this nature excellent actions are thought to be, for to do noble and good deeds is a thing desirable for its own sake\textsuperscript{165}.

Since the primary aim of the study is not the exhaustive investigation of the differences between action and operation, this present discussion will focus only on the temporal predication between the present and the perfect:

Whenever there exists a perfect praxis, the possession of the end necessarily exists. On the contrary, when a moral praxis (action) is realized, it tends towards an end which is not yet posses-
sed and when it is possessed, it ends in a certain way. Thus, the simultaneous predication of the present and the perfect cannot, at least in the same sense, be applied to the ethical praxis. I see and have seen, but I am not brave and I have been brave. This simultaneity can only be maintained through habituation, that is, because I possess the virtue of courage I am brave, and I am precisely because I have been, because I have realized courageous actions\textsuperscript{166}.

Action is not a perfect activity because it does not achieve its end with only one single act; rather its end is gradually captured through habituation. The involvement of materiality in action is the basis of its distinction from intellectual operation. Matter is responsible for the gap between the potentiality and its attainment of the end. Whereas operation only involves the intellectual faculties, action involves the entire composite nature of the agent: «for deeds many things are needed, and more, the greater and the nobler the deeds are. But the man who is contemplating the truth needs no such thing, at least with a view to the exercise of his activity»\textsuperscript{167}.

C. THE STRUCTURE OF THE ACTION PARADIGM

It has been said that time in action is not a consumption or an expenditure of time; rather, action accumulates the past in the present under the form of habit. As such, active time provokes the opportunity for carrying out a well performed action.

In systemic terms, the provocation of an opportunity implies the continuation of further systemic activities in an uncertain environment. This cannot take place in the production model since the future of production is anchored on the known, presupposed end. Now, if action provokes more and better actions, then the structure of the action paradigm includes the possibility of openness to the unknown. Furthermore, this aperture to the unknown allows the system to move up to higher degrees of equilibria\textsuperscript{168}.

This section has the task of determining whether or not the structure of the action model complies with the criteria set above. Action, like production, is a practical activity. As such, it has operation as principle and involves a processual movement. Included in this discussion is the sufficiency of the action model for providing a proper account of operation's complete directive role in the performance of activities in a contingent world.

Now, operation in itself is incapable of producing movement in the action model. It requires a potentiality which brings it down into the tem-
poral thereby converting itself into something practical. This potentiality is called desire or tendency. Tendency is that which «is every form of it relative to an end» This aperture to the end is the initial state of tendency. In this stage, the faculty is not yet actualized.

Tendency in its initial state is aperture to the ultimate good which agent subjectively does not yet know. For the tendential potentiality, this ultimate, unknown good is in the future:

...to have a relation with the end is merely potential, or transcendental, it is not in the end nor in the possession of the end.... This is equivalent to placing the eminence of future in human biographical time: we live openly to a future which does not end while we are alive, that is, to a future which does not cease to be, a «non-defuturizable» future. To relate oneself with the end in a strictly potential manner connotes that the end is totally in the future.

Now, the end to which tendency naturally refers is the chief good. Aristotle describes this chief good or «non-defuturizable» future as «that for whose sake everything else is done» or «an unqualified end». It is the ultimate good for which any agent naturally yearns. Thus, the aperture to the unknown future is the natural configuration of tendency previous to its actualization.

The preliminary stage of the action model is the actualization of the tendential potentiality towards a particular thing. The Stagyrite says that, among the factors involved in movement, there must exist something which originates movement. This origin «may mean either something which itself is unmoved or that which at once moves and is moved».

«That which is unmoved» is the external object, that «which at once moves and is moved» is tendency:

...that which at once moves and is moved is the faculty of appetite (for that which is moved is moved insofar as it desires, and appetite in the sense of actual appetite is a kind of movement).

What the Philosopher implies in this passage is that the incipient stage of the action model is a processual movement towards a particular thing or occasion. In accordance with the agent's insertion in the contingent environment, the actualization of the tendential potentiality towards the subjectively unknown is by perceiving a particular thing.

The tendential potentiality develops toward the object once the situation presents itself to the agent. Since this actualization is processual, it is an imperfect movement. This preliminary stage contains no deliberation.
or rational discourse. The process of the tendential faculty begins, therefore, with the incipient development of action:

That which moves therefore is a single faculty and the faculty of appetite. As it is, thought is never found producing movement without appetite (for wish is a form of appetite; and when movement is produced according to calculation it is also according to wish), but appetite can originate movement contrary to calculation, for desire is a form of appetite.

This, in essence, is the first stage of the action model, namely: a processual movement which pertains to the tendential faculty whose initial condition is an absolute aperture to the unknown. In contrast to the production model whose future is anchored to the known, the future of the action paradigm is anchored on the unknown. At this point, however, the tendential faculty is not yet actualized. Its actualization commences when the agent perceives a particular thing in the environment. The Stagyrite affirms that this is a processual movement towards the thing.

It has been seen that processual movements destroy the temporal horizon of the activity. This is the case in production and may also be the case during the initial stage of the action model, that is, in the processual moment. In other words, action's initial aperture to the future may give way to a mere conformity with the present, especially if the tendency is left unattended by operation:

The man who solely uses sensible perception usually conforms with immediate goods. This is how human time is disorganized. From the temporal point of view, ethics is the organization of biographical time; that is, it permits man to live in time without giving in to the discontinuities of what is in fashion. If the will, however, is moved solely by the capturing of immediate goods, long-term projects are ignored.

The foregoing discussion studied the role of the tendential process plays in the action model when pursuing the future. It must be reminded that the action model precludes the externalization of the actuality, thereby giving the agent the possibility of proceeding to the future. In contrasting to the production model, it seems that the principle of action, operation, exercises a more complete directive role in the performance of the activity.

The incompetence of theoretical knowledge in practical affairs is repeatedly underlined during Aristotle's discourse of practical activities. Its incompetence is based on the fact that the object known in operation as activity per se is different from the object known by operation in the action...
paradigm: «...practical thought ... differs from speculative thought in the character of its end...»\textsuperscript{186}. For this reason, operation must be brought down to the practical so that its role as the foundation of action may be maintained\textsuperscript{187}.

The speculative intellect ignores the practical good. In the action model, practical end cannot be directly captured by reason because operation \textit{per se} dwells within the ambit of the necessary. As such, operation must «descend» from the necessary to the contingent level\textsuperscript{188}. The manner by which this descent takes place may be gleaned from the following passage:

Mind as speculative never thinks what is practicable, it never says anything about an object to be avoided or pursued, while this movement is always in something which is avoiding or pursuing an object\textsuperscript{189}.

The pursuit towards an object is a processual movement. More precisely, this is the actualization of the tendential faculty. In this process, the potentiality (in this case, tendency) is moved by a particular thing which, in turn, is presented to reason by the same potentiality.

The thing desired is not, however, just any kind of object, but rather something more: In the first place it is a future object in the contingent world\textsuperscript{190}. Secondly, it is something which, given the specific contingent situation, appears to be within the reach of the agent\textsuperscript{191}. Thus, the action model demands the object to be achievable by the agent's own efforts:

That is why, though in any case it is the object of appetite which originates movement, this object may be either the real or the apparent good. To produce movement the object must be more than this: it must be good that can be brought into being by action; and only what can be otherwise than as it is can thus be brought into being\textsuperscript{192}.

In order to realize its end, the agent requires another potentiality which points out the means by which this good can be achieved. This potentiality is operation applied in action, namely: the practical intellect. Thus, Aristotle affirms that both practical intellect and tendency are the sources of action:

Both of these then are capable of originating local movement, thought and appetite: thought, that is, which calculates means to an end, i.e. practical thought...; while appetite is in every form of it relative to an end; for that which is the object of appetite
is the stimulant of practical thought; and that which is last in the process of thinking is the beginning of the action\(^\text{193}\).

Tendency alone cannot proceed towards the end unless it perceives something. In order to do this, it must move from its initial state to a state in which it maintains contact with reason\(^\text{194}\). For this reason, it is said that nothing is desired unless it is known. On the other hand, reason cannot be practical without the tendential process towards particular end: nothing is known unless it is desired.

Thus, the stage which follows the processual stage consists of a mutual dialogue between reason (or practical thought) and tendency. To say that practical thought and tendency are the sources of action is to imply that the two of them together form the principle of action:

It follows that there is a justification for regarding these two as the sources of movement, i.e. appetite and practical thought, for the object of appetite starts a movement and as a result of that thought gives rise to movement, the object of appetite being to it a source of stimulation\(^\text{195}\).

This principle of action is what Aristotle calls choice:

The origin of action — its efficient, not its final cause — is choice, and that of choice is desire and reasoning with a view to an end\(^\text{196}\).

When the dialogue between reason and tendency is reached, tendency ceases to be pure desire and becomes intellectual desire; while the intellect becomes desiderative intellect: «Choice is either desiderative thought or intellectual desire»\(^\text{197}\). This reciprocal relationship which exists between the two constitutive elements of the action model shows that reason directs the irrational element of activity, contrary to the assumption of organizational system thinking on the individual’s tendency. According to system thinking, tendency is an obstacle to the execution of activity; in contrast, the action model assumes that tendency plays a key role in the performance of activities.

Heretofore, there is a simultaneity between operation and process. In production, operation is external to process, while in action, operation is co-simultaneous with process. This simultaneity is internal to the activity. Since both operation and the process are coimplicated, and since they form two dimensions in one single activity, a more appropriate term would be «co-simultaneity». Operation and process are united in such a manner that the operation’s projection unto the process is immanent. This «structural»
characteristic of the action model distinguishes it from the production model wherein the projection of the operation upon the processual component is *ab extra*\textsuperscript{198}.

Albeit the activity proceeds initially from a processual movement, the tendential process is accompanied by an intellectual operation, thereby constituting an action whose principle is the agent himself:

for good action is an end, and desire aims at this. Hence choice is either desiderative thought or intellectual desire and such an origin of action is a man\textsuperscript{199}.

This intimate interplay between tendency and intellectual operation does not, however, mean that they are identifiable with each other. Each preserves its sphere: the mutual dialogue implies that each one performs its proper and specific role. The first component, the tendential process, provides the end. Operation, the second element, accepts this end and determines the means which lead to that end:

The object of choice being one of the things in our own power which is desired after deliberation, choice will be deliberate desire of things in our own power; for when we have decided as a result of deliberation, we desire in accordance with our deliberation\textsuperscript{200}.

This directive role of operation is deliberation: the determination of the means within one's reach in order to arrive at the end\textsuperscript{201}. However, the function of operation in the action model must not be confused with its role in the production model. Aristotle affirms this when he distinguishes between action and production:

since it is impossible to deliberate about things that are of necessity, practical wisdom cannot be knowledge nor art; not knowledge because that which can be done is capable of being otherwise, not art because action and making are different kinds of thing.... For while making has an end other than itself, action cannot; for good action itself is its end\textsuperscript{202}.

Every activity has an end. For production, this end is external to the activity itself. Poietic activity is not concerned with the already predetermined end, but with how this end can be achieved: it only searches the means to realize the end. These means are instrumental for the attainment of the end and are called external means. In one of his explanations about the process of making, Aristotle speaks of rubbing one's body to produce warmth thereby producing a uniform state of body. In this example, the ex-
ternal means to the end (to wit, the uniform state of body) is rubbing an individual's body.\footnote{203}

On the other hand, praxis deals with the realization of actions which are considered as valuable in themselves, but which are chosen for another thing. The actions chosen by the agent are internal means which constitute the end; in other words, the means are parts of the end.\footnote{204} The agent searches for the activity for its own sake in so far as it is performed in view of another thing:

What sort of good would one call good in themselves? Is it those that are pursued even when isolated from others, such as intelligence, sight, and certain pleasures and honors? Certainly, if we pursue those also for the sake of something else, yet one would place them among things good in themselves.\footnote{205}

The use of operation in production is imperfect because it deals only with the means. This type of deliberation, which deals solely with the means and which lacks due consideration of the end is called cleverness. Production is an activity which is principally concerned with the means. Technique is based upon the rational dimension which determines the means and disregards the tendential dimension which provides the agent with an aperture to the unknown. Production is not concerned with the appropriateness of the pursued end in a given situation; whatever the situation is, the agent remains in the same state of equilibrium, both before and after the activity.

In contrast, the use of operation in action is perfect because the deliberation is directed towards the incorporation of the finality which has been supplied by tendency. The principle of action is choice, the dialogue between reason and tendency. While reason determines the means, tendency points out the end. As such, action is concerned with the determination of both the means and the end. Indeed, the search of the means in a contingent situation is a constitutive element of action.\footnote{206} Deliberation in action dwells within the realm where there is a high degree of uncertainty with respect to the outcome and where there are no fixed rules:

Deliberation is concerned with things that happen in a certain way for the most part, but in which the event is obscure, and with things in which it is indeterminate.\footnote{207}

The reason for this is that, in action, reason interacts with tendency which is the condition of possibility for the processual aperture to the unknown. More precisely, when choosing, reason departs from the object desired and returns and terminates in the same object. In action, «deliberation,
then, is a process of reasoning which starts with a desire and ends with a desire: it leads from volition to decision»\textsuperscript{208}.

In sum, the use of operation in action is perfect. Although it has a processual component, operation’s projection unto process is immanent: this projection is depicted as the incorporation of the finality into the operation. It does not, however, completely reveal the ultimate good to which natural tendency refers since the known object is something particular. This is so because reason determines in each action what should be desired in particular circumstances:

It is evident that reason, acting as active principle, cannot attain a complete dominion over the appetitive faculty with just one act. This is the case because appetite is in relation to many objects and is determinable in several ways, while reason judges in each act what should be desired in these particular circumstances. Therefore, it is evident that one act of reason is insufficient in obtaining the object to which the appetitive potentiality naturally tends in every situation. This is proper of the habit of the virtue. As a consequence, the habit of the virtue demands for its formation not one, but rather a reiterated series of acts\textsuperscript{209}.

It is within this context that the apprehension of the unknown future must increase\textsuperscript{210}.

The stages elucidated hitherto are stages previous to the acquisition of habit. Habit is the past conserved in the present which keeps the future open for further actions. It brings a qualitative and a quantitative improvement in the agent who has performed well\textsuperscript{211}. This section will investigate the role of habit (or virtue) in ensuring the agent’s continuous pursuit to the subjectively unknown.

In the production model, operation precedes the processual movement which gives rise to the externalization of the actuality. In production, operation deals only with the means and leaves aside any consideration of an aperture to the unknown end\textsuperscript{212}. This imperfect use of reason in production is called cleverness; it is a disposition which can be used without due regard for the pursuit of the absolute good:

There is a faculty which is called cleverness; and this is such as to be able to do the things that tend towards the mark we have set before ourselves, and to hit it. Now if the mark be noble, the cleverness is laudable, but if the mark be bad, the cleverness is mere villainy; hence we call clever both men of practical wisdom and villains\textsuperscript{213}. 
Although the initial stage of action is processual, operation projects itself upon process in such a way that the finality of the former is incorporated or apprehended by the latter. Thus, operation in action does not dwell solely with means, but also captures the specific finality to which process tends. Thus, prudence, the disposition of searching for the adequate means in due consideration of the ultimate end, has cleverness as its initial state, but cannot be identified with this.

Nevertheless, the succeeding state can only be attained if it is supplied with the proper end. The performance of a good action requires not only prudence but also virtue. The presence of virtue is necessary because «the choice will not be right without practical wisdom any more than without excellence». The necessity of right choice in acting well warrants that the faculty which refers to the end (the tendency) must become good. As shown in the first part of this section, the condition of possibility for the aperture to the unknown future is the tendential faculty. Tendency, upon receiving a stimulus from a particular thing or situation in the environment, proceeds towards the future through a processual movement. This actualization is, however, insufficient for proceeding towards the unknown since tendency by itself is blind; it needs to be rectified by thought in order to remain open to the future. This rectitude of tendency is called a good habit or virtue which, as seen in the previous chapter, is acquired in time through a repetition of actions. Therefore, just as prudence has cleverness for its initial state, the initial state of virtue is natural tendency:

We must therefore consider excellence once more; for virtue too is similarly related; as practical wisdom is to cleverness—not the same, but like it—so is natural excellence to excellence in the strict sense.

The co-simultaneity between prudence and virtue is merely the co-simultaneity in the initial level in which there is an interplay between practical reason and tendency. This is to say that the level posterior to the initial occurs after doing a good action. Recall that the principle of action is choice whose constituents are reason and tendency. While tendency is that which relates to the end, reason is that which determines the means. If what is chosen is good action, it logically follows that the constitutive elements must likewise be good. Therefore, the co-implication between prudence and virtues is similar to that between practical reason and tendency but in a higher and posterior level: virtue determines the proper object, prudence determines the proper means. Aristotle affirms the mutual dialogue between the two potentialized faculties: «for the one (virtue) determines the end and the other (prudence) makes us do the things that lead to the end». 
In the action model, the past is conserved in the present so that the future remains open; this is embodied in virtue. Virtue supplies the person with the right objects or situations and strengthens tendency as it gradually proceeds to the future. Therefore, the condition of possibility for gradually acquiring knowledge of the unknown future is virtue:

In the face of what must be done, before the end of our conduct, the risk is not in error, but in blindness: not seeing in an absolute way. Practical reason sees or does not see the end; accordingly, it is present or absent. The responsibility for its presence or absence lies not with practical reason, but with the will as tendency. Thus, we return once again to virtue, the good habit of the will in its tendency to the good, as a condition of possibility for the knowledge of the good.

The use of operation in good actions gives rise to the capture of particular ends. Upon apprehending a determined right end, prudence points out the proper means according to the specific situation under consideration. As repeatedly mentioned, the use of the intellect in the action model is perfect since its role of determining the means precedes the apprehension of the specific right end. Moreover, by means of virtue, which strengthens tendency in its progressive pursuit towards the future, operation gradually unravels and incorporates the unknown future within the dynamism of repeating good actions.

The affirmation that, in the action model, there is a certain simultaneity between the activity and its end can now be more understood. Recall that operation in theoretical activity possesses its end immediately. In contrast, operation in the action model captures an end which is not yet possessed to which tendency, strengthened by virtue, refers. The contemplation of the end in the action model is processual and in conjunction with the virtue:

It is, therefore, necessary to respect the peculiarity of the distinct types of knowledge. We contemplate the human good, the practical end, through habit, through virtue: we know what we desire and we know well if we desire well. And by desiring well, through virtue, we can subjectively desire the objective and absolute good and, wanting it, we know it.

Having covered the different aspects and phases of the action model, it can be concluded that this practical activity is superior to the production model since it provides the possibility of potentializing the agent's state so that he or she can continue in the future despite the inherent uncertainty of a complex environment. Aristotle, thus, states:
If activities are, as we said, what determines the character of life, no blessed man can become miserable; for he will never do the acts that are hateful and mean. For the man who is truly good and wise, we think, bears all the chances of life becomingly and always makes the best of circumstances\(^2\).

**CONCLUSION**

In gist, this study shows that system thinking in organizations integrates the incipient notions of productive activity. It is an attempt to search for the optimum activity in a highly uncertain environment. The systemic paradigm of productive activity is rationally carried out on the basis of the environmental information which the agent receives and processes. The paradigm is analogous to Aristotle's account of *poiesis*. Poietic activity is likewise performed in a contingent environment. Its principle is the so-called productive form of knowledge. The role of rationality in productive activity, however, is limited. With the end as presupposed, reason solely searches for the means. It does not control the processual component which has the task of executing and obtaining the output. Actualization in the productive model implies temporal destruction because the actuality is externalized. The performance of the production process results in a systemic state equivalent to the initial level which incapacitates the agent to perform more and better activities in the future. Thus, in systemic terms, productive activity is entropic.

Utilizing the above concepts as parameters, the alternative activity for the effective handling of future contingencies is Aristotle's account of *praxis*. The role of rationality in the action paradigm avoids the temporal destruction inherent in processual movements. In contrast to production, the end is not presupposed in the action model. Tendency is the faculty which refers to the unknown end. In order to be actualized, tendency must come in contact with reason. The thing that is known in action is concrete and particular such that it does not satisfy the referred end. It is necessary to persistently perform actions so that operation can unravel progressively the unknown end. This can take place when tendency is strengthened by the virtues. Virtue is a good habit which qualifies the faculties to do more and better actions in the future. It does not signify the destruction of time but rather the gain in and conservation of time. Operation which performs its role in the habitual level is denominated as prudence. Functioning in tandem with the virtues, prudence determines the proper situation to perform a virtuous action. As a consequence of good action, the systemic state of the agent is higher than the previous level. The increase in systemic
state continues as long as the sign of future actions does not change. In this context, therefore, action is a negentropic activity. Stated in other words, it is the optimum activity for handling future contingencies.

Concluding this study, the author subscribes to the proposition that Aristotle's Theory of Action can indeed open a new frontier for system thinking in the corporate structure. It serves as an alternative foundation to the productive model. As has been shown, action model proves stronger than the technical paradigm. However, the task of building the corporate edifice based on this proposed foundation still remains to be done.
NOTES

1. Cf. TAYLOR, The Principles of Scientific Management, ed. cit., p. 9. Cf. TAYLOR, F., La dirección de los talleres, Librería de Feliú y Susanna, Barcelona 1914, p. 38: The differential piece-rate wage scheme was devised by Taylor in order that worker's wage is directly related to his output.


5. Ibid., p.84.

6. Ibid., p. 36.


12. Cf. DRUCKER, P., The Practice of Management, ed. cit., p. 285: «Taylor's divorce of planning from doing was both specifically American and specifically late nineteenth century. It is a descendant of our oldest tradition: the New England theocracy of the early Puritans. It puts the priestly-elite concept ... but leaves it otherwise almost unchanged; and like the Puritan divines, Taylor reduced a God-given right of the planning elite to rule. It is no accident that we hear this right to rule described today as the «prerogative of management» —the term has always been applied to right by divine or priestly appointment». 
13. Cf. *Ibid.*: «But the divorce of planning and doing was also a part of the elite philosophy that swept the Western World in the generation between Nietzsche and World War I —the philosophy that has produced such monster offspring in our time. This movement is usually considered to have been anti-democratic. It was —in intent and direction— fully as much anti-aristocratic. For the assertion that power is grounded in technical competence —be it for revolutionary conspiracy or for management— is as hostile to aristocracy as to democracy. Both oppose it to the same absolute principle: power must be grounded in moral responsibility anything else is tyranny and usurpation».


19. Cf. BARNARD, *op.cit.*, p. 84: «Willingness...means self-abnegation, the surrender of control of personal conduct, the depersonalization of personal action....Without this there can be no sustained personal effort as a contribution to cooperation. Activities cannot be coordinated unless there is first the disposition to make a personal act of contribution to an impersonal system of acts, one in which the individual gives up personal control of what he does».


21. Cf. *Ibid.*, p. 89: «The possibility of accomplishing a common purpose and the existence of persons whose desires might constitute motives for contributing toward such a common purpose are the opposite poles of the system of cooperative effort. The process by which these potentialities become dynamic is that of communication. Obviously a common purpose must be commonly known, and to be known must be in some way communicated».


ton's dynamics, in its original form, we are concerned with an individual system, with given initial velocities and momenta, undergoing changes according to a certain system of forces under the Newtonian laws which link force and acceleration. In the vast majority of practical cases, however, we are far from knowing all the initial velocities and momenta.»


27. Cf. Wiener, N., The Human Use of Human Beings: Cybernetics and Society, ed. cit., p. 19: «Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it. The process of receiving and of using information is the process of our adjusting to the contingencies of the outer environment, and of our living effectively within that environment....Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society». Cf. Wiener, N., Cybernetics or control and communication in the animal and the machine, ed. cit., pp. 30-34.

28. Cf. Ashby, W.R., Introduction to Cybernetics, Methuen, London 1964, p. 77: Stated algebraically and let T be the transformation applied to the system, «we start with a state of equilibrium a, displace the system to state D(a), and then find TD(a), T^2D(a), T^3D(a), and so on; and we notice whether this succession of states does or does not finish as a, a, a. More compactly: the state of equilibrium a is the system with transformation T is stable under displacement D if and only if lim T^nD(a)= a» as n approaches to infinity.


31. Cf. Couffignal, L., La cibernetica, A. Redondo editor, Barcelona 1969, pp. 130-135. The behavior of a system can be expressed mathematically. Since discussion of its mathematical formulation is not the concern of the study, it shall not be dealt with herein. Nevertheless, it is enough to say that sytemic behavior can be formulated mathematically from the initial and final values of the variables or constraint set of the system. As such, behavior depends on the potentiality of the system expressed as a set of variables.


36. SCOTT, W. R., op. cit., p. 149.

37. Cf. SIMON, H., «Alternative visions of rationality», in MOSER (ed.), op. cit., p. 196: «...the goodness of the decisions it will produce depends much more on the adequacy of the approximating assumptions and the data supporting them than it does on the computation of a maximizing value». It is obvious that the maximizing value is based on a postulated decision criteria.


42. Cf. BROWN, R., Understanding Industrial Organizations: Theoretical Perspectives in Industrial Sociology, Routledge, London 1992, p. 87: »to occupy a position within a system of roles and relationships is to be subject to expectations, supported by positive and negative sanctions, as to how one should behave, and to be subject to processes of socialisation which may lead to the internalisation of appropriate values and norms».

43. Cf. SCOTT, W. R., op. cit., pp. 47: «Viewed from the bottom up, the rationality of individual decisions and activities can be evaluated only as they relate to higher-order decisions.... Viewed from the top down, the factoring of general purposes into specific subgoals that can be assessed to organizational subunits (individuals or departments) enhances the possibility of rational behavior by specifying value premises and hence simplifying the required decisions at every level. From this perspective, then, an organization's hierarchy can be viewed as a congealed set of means-ends chains promoting consistency of decisions and activities throughout the organization». 
44. Cf. Alchian, A. and Demsetz, H., «Production, Information Costs, and Economic Organization», in American Economic Review, Vol. 62 (1972), p. 779: «There exist production techniques in which the z obtained is greater than if $x_i$ and $x_j$ had produced separable z. Team production will be used if it yields an output enough larger than the sum of separable production of z to cover the costs of organizing and disciplining team members».

45. Cf. Ashby, Design for a Brain, ed. cit., p. 79: «That a whole dynamic system should be in equilibrium at a particular state it is necessary and sufficient that each part should be in equilibrium at that state, in the conditions given to it by the other parts.». Cf. Simon, Administrative Behavior, ed. cit., p. 252: «...administration is not unlike play-acting. The task of the good actor is to know and play his role, although different roles may differ greatly in content. The effectiveness of the performance will depend on the effectiveness of the play and the effectiveness with which it is played. The effectiveness of the administrative process will vary with effectiveness of the organization and the effectiveness with which its members play their parts».

46. Cf. Stinchcombe, A., Economic Sociology, Academic Press, New York 1983, pp. 135-136: «...the fund of resources is entrusted to an administrative apparatus, of which the property-owning group (the board of directors) is the formal head ...the property rights are...used to make the activities of an administrative apparatus controlling the resources legitimate».

47. March and Simon; op. cit., p. 169.


49. Cf. Nicomachean Ethics II, 1: 1103 a 34: «For the things we have to learn before we can do, we learn by doing, e.g., men become builders by building and lyre-players by playing the lyre...».


59. LANGTON, op. cit., p. 337.


61. CHRISTENSON, op. cit., p. 20. Cf. Ibid, pp. 9-10: The mathematical system of information can be constructed on the basis of observation of the external environment. A mathematical system is composed of variables which has a definite structure. This structure defines the relation among these variables. The set of structured variables can therefore be considered as the theory of the environment. It has been seen in the previous chapter that the structure of a system can be expressed in logarithmic equation which comprehends the possibilities of systemic actuation.


64. Cf. CHOZA, J., Conciencia y afectividad: Aristóteles, Nietzsche y Freud, EUNSA, Pamplona 1978, p. 168: «...lo que Aristóteles pretende es que, para el hombre, adaptación al medio significa conocimiento de la realidad en cuanto tal, que si hay conocimiento se puede saber qué significa y qué significa adaptación, y que si no lo hay no».

65. Cf. LLANO, A., «El problema de la libertad», in La filosofía en el BUP, Dorcas, Madrid 1977, p. 174: «La transcendentalidad de la inteligencia humana estriba en su apertura, basada a su vez en la condición ontológica del hombre de no ser una realidad clausurada en sí, sino abierta en cierto modo a todos los entes, apta para convertir con el ser».


68. On the Soul III, 4: 430 a 3-5.

69. POLO, L., Curso de Teoría del conocimiento I, EUNSA, Pamplona 1984, p. 54: «Lo inmanente de la operación es la posesión. Conocer en acto, si el acto es una operación, es poseer lo conocido... La operación de conocer no procede gradualmente hacia un resultado, sino que ya ha logrado».


75. Cf. Metaphysics I, 1: 981 a 24-30: «We think that knowledge and understanding belong to art rather than to experience, and we suppose artists to be wiser than men of experience... and this is because the former know the cause, but the latter do not for men of experience know that the thing is so, but do not know why, while the others know the “why” and the cause».

76. Cf. Metaphysics XI, 7: 1064 a 10-14, 16: «There is a science of nature, and evidently it must be different both from practical and from productive science. For in the case of productive science the principle of production is in the producer and not in the product, and is either an art or some other capacity.... But the science of the natural philosopher deals with the things that have in themselves a principle of movement».

77. Cf. Metaphysics IX, 2: 1046 b 2-3: When explaining knowledge proper to the productive model, the Stagyrite affirms thus: «All arts, i.e. all productive forms of knowledge, are potentialities. They are principles of change in another thing or in the artist himself considered as other».

78. Cf. VATTIMO, op. cit., p. 67: «...apprendere un’arte non signiﬁca principalmente imparare dei principi, ma imparare a trattare correttamente, in vista di certe ﬁni, determinate realtà. I principi non servirebbero affatto nel trattamento di situazioni particolari se non fossero vissuti in un soggetto concreto legato a condizioni particolari». Cf. On the Soul III 4: 430 a 14-15: «And in fact thought, as we have described it, is what it is by virtue of becoming all things, while there is another which is what it is by virtue of making all things...».

79. Cf. Metaphysics IX, 7: 1049 a 5-10: «And the deﬁnition of that which as a result of thought comes to be in fulfillment from having been potentially is that when it has been wished it comes to pass if nothing external hinders it, while the condition on the other side...is that nothing in it hinders the result. Similarly here is potentially a house, if nothing in the thing acted on —i.e. in the matter— prevents it from becoming a house...».

80. Cf. Nicomachean Ethics III, 3: 1112 b 11-15: «:We deliberate not about ends but about what contributes to ends. For a doctor does not deliberate
whether he shall heal, nor an orator whether he shall convince, nor a statesman whether he shall produce law and order, nor does any one else deliberate about his end».


84. Cf. *On the Soul* III, 4: 430 a 3-5. It is obvious that considered *in se* actual knowledge is different from the known before the act of knowing. Cf. *On the Soul* III, 4: 429 a 22-24.


91. Cf. Ibid., pp. 70-73.


93. *Metaphysics* XI, 6: 1048 b 7-10: «But all things are not said on the *same sense* to exist actually, but only by analogy-as A is in B or to B, C is in D or to D, for some are as movement to potentiality, and the others a substance to some sort of matter».


95. *Nicomachean Ethics* VI, 4: 1140 a 10-14.


97. Cf. *Nicomachean Ethics* II, 1: 1103 a 25-29, 31: «Again, of all the things that come to us by nature we first acquire the potentiality and later exhibit the activity (this is plain in the case of the senses; for it was not by often seeing or often hearing that we got these senses, but on the contrary we had them before we used them, and did not come to have them by
using them);.... the things we have to learn before we can do, we learn by
doing, e.g. men become builders by building and lyre-players by playing
the lyre...». VATTIMO, op. cit., p. 66: «Per questo essa si distingue dalle
potenze che sono in noi per natura; e anche perché, mentre nel campo
delle potenze naturali l’esercizio viene dopo il possesso, per la tevchn
come per le altre virtù succede l’opposto, il possesso segue e deriva
dall’esercizio».

the thing itself is its nature, while a force is a source of movement in so-
thing other than it or in itself qua other, and since movement is always
due either to nature or to constraint, movement which is natural, as down-
ward movement is to a stone, will be merely accelerated by an external
force, while an unnatural movement will be due to the force alone». Cf.


100. Cf. Metaphysics IX, 7: 1049 a 5-10.

101. Cf. POLO, L., Ética: hacia una versión moderna de los temas clásicos,
Universidad Panamericana, Mexico 1993, pp. 238-240.

102. Cf. CHRISTENSEN, op. cit., p. 26: «...the existence of an equilibrium state
implies two system levels, one in equilibrium and one (possibly) under-
going motion or change to maintain the equilibrium».

103. The system exchanges energy or resources with its environment. System
Theory assumes that the system is subject to the laws of thermodynamics.
Now, an open system avoids entropy. The Law of Entropy states that
spontaneous energy flows through an energy gradient until it reaches the
maximum, that is, until the energy is distributed in complete uniformity
throughout the system disenabling the system to have further exchanges
of energy with its environment. This is precisely what an open system
tries to avoid. What the system attempts is to be negentropic.

kinds of machines and some living organisms —particularly the higher
living organisms— can...modify their patterns of behavior on the basis
of past experience so as to achieve specific anti-entropic ends. In these
higher forms of communicative organisms the environment, considered
as the past experience of the individual, can modify the pattern of beha-
vor into one which in some sense or other will deal more effectively
with the future environment.... Its present is unlike its past and its future
unlike its present.... The whole conception of the apparently purposive
organism...is that of an arrow with a particular direction in the stream of
time.... It moves ahead from a known past into an unknown future and
this future is not interchangeable with that past».


107. Cf. VATTIMO, op. cit., p. 16: «E come gli accidenti sono il risultato di un incontro e di un rapporti a cui la cosa non è necessariamente preordinata (in questo senso sono fatti casuali), così anche i moti para; fuvsin saranno giustificati unicamente dal fatto che la cosa si trova in una determinata situazione, e la loro possibilità dipenderà dall’esistenza della cosa in un mondo, cioè in un contesto di rapporti con altre cose».


111. Cf. Metaphysics VII, 8: 1032 b 11.

112. Note the similarity of Simon’s explanation of the fit between the system and the environment. SIMON, H., Las ciencias de lo artificial, Ed. ATE, Barcelona 1973, p. 30: «...el comportamiento del sistema no responde más que en parte al medio en que se mueve, ya que, en parte también, responde a las propiedades limitadoras del sistema interior».


118. Nicomachean Ethics X, 4: 1174 a 24.

119. Cf. VATTIMO, op. cit., p. 100.


121. Cf. Nicomachean Ethics X, 4: 1174 b 2: «We have discussed movement with precision in another work, but it seems that it is not complete at any
and every time, but that the many movements are incomplete and different in kind, since the whence and whither give them their form.»


123. Cf. Bastons, M., El saber práctico según Aristóteles, ed. cit., p. 73: «...dejando a un lado, la actividad perfecta, el movimiento como imperfecto, es entendido como la distensión de algo hacia el fin, el tiempo, como número de ese movimiento, ha de ser comprendido como el número de la distensión de la cosa respecto al fin».


126. Ibid., pp.212-213: «El proceso es una tensión hacia su término y su avance supone para el un gasto de los recursos iniciales, es decir, del potencial. Implica la pérdida de energía inicial. Por consiguiente, es una actividad entópica e irreversible. Que sea irreversible significa que a medida de que progresa va siendo menos potente y va teniendo ante sí menos futuro».

127. Categories 6,5 a 7.


129. Christenson, op. cit., p. 40. Cf. Llano, A., La nueva sensibilidad, ed. cit., p. 43 (commenting on the so-called social segmentation according to system thinking, the author asserts): «...ese enfoque sólo alcanza a formalizar los procesos previstos».

130. Cf. Christenson, op. cit., p. 41: «To which environment are we trying to “fit”...? To the subjectively-perceived, finite environment of the present? Or to the objective, infinitely-complex environment with which the system must successfully interact in the future? If it is the second environment —would anyone deny that it is?— then the manager or designer can not ... “fit” the organization to its environment, because he does not know what the relevant information will be». Cf. Spaemann, «Teleología natural y acción», ed. cit., p. 278: «Dondequiera que se habla de teleología en la Biología moderna y se simulan estructuras teleológicas por medio de
modelos cibernéticos, el *telos* es entendido sólo como *telos* para el correspondiente sistema».

131. It is in this regard that Spaemann affirms that the so-called «epistemological monisms» (for example, Systems Theory and Theory of Evolution) as reductivist despite its claim to be holistic in perspective. Cf. SPAEMANN, R., *Lo natural y lo racional. Ensayos de Antropología*, Rialp, Madrid 1989, p. 29: «...son, a pesar de sus intenciones, reductionistas, pues refieren de modo funcional las experiencias absolutas de tipo estético, cognoscitivo, moral y religioso —aunque sea a través de instancias mediadoras— a la supervivencia de sistemas orgánicos o de otros sistemas, y no consiguen autointerpretar tales experiencias».

132. Cf. CHRISTENSEN, *op. cit.*, p. 31: «...to preserve this inner stability, it must be, as I have said, exceptionally resistant to change. But to increase this inner stability, it must be open to change to a higher level of complexity.»

133. *Nicomachean Ethics* VI, 4: 1140 a 1.

134. Cf. *Nicomachean Ethics* VI, 4: 1140 a 2-5.


142. Cf. ZUBIRI, X., *Sobre el hombre*, Alianza, Madrid 1986, p. 40: «El hombre como viviente que se enfrenta con las cosas reales, se enfrente con ellas "animalmente", y, recíprocamente, se enfrenta con las cosas-estímulo "realmente". Todo comportamiento humano se inscribe en una sola habitud, en un solo enfrentamiento propio. Es lo que expresamos diciendo que el hombre es animal de realidades. En su virtud el animal humano está instalado no sólo "entre" realidades, sino "en" la realidad, en lo transcendental».

143. Cf. *Nicomachean Ethics* X, 7: 1177 b 28-31: «But such a life would be too high for man, for it is not in so far as something divine is present in him; and by so much as this is superior to our composite nature is its activity superior to that which is the exercise of other kind of excellence. If intellect is divine, then, in comparison with man, the life according to it is divine in comparison with human life».

144. Cf. POLO, L., «Tener y dar. Reflexiones en torno a la segunda parte de la encíclica «Laborem Exercens»», in FERNÁNDEZ RODRÍGUEZ, F. (ed.), *Estudios sobre la encíclica Laborem Exercens*, Biblioteca de Autores Cris-
tianos, Madrid 1987, p. 204: «En la medida en que un nivel es más perfecto que otro, existe una relación de subordinación tal que el inferior tiene carácter de medio respecto del superior, y el superior es fin respecto del inferior».

145. *Nicomachean Ethics* I, 5: 1096 a 5. Cf. *Nicomachean Ethics* X, 7: 1177 a 30-34: «For while a wise man, as well as a just man and the rest, needs the necessaries of life, when they are sufficiently equipped with things of that sort the just man needs people towards whom and with whom he shall act justly, and the temperate man, the brave man, and each of the others is in the same case, but the wise man, even when by himself, can contemplate truth, and the better the wiser he is».


147. *Nicomachean Ethics* VI, 5: 1140 b 6-7.

148. Cf. YARZA, I., «Sobre la praxis aristotélica», in Anuario Filosófico, Vol. XIX, No. 1 (1986), p. 148: «Ahora bien, las praxis éticas no manifiestan sólo caracteres de inmanencia, sino que ofrecen también aspectos que indican una cierta procesualidad y que hacen imposible su absoluta identificación con las praxis perfectas.» This will be examined further in the discussion about the «typological structure» of the action model.


150. Cf. *Metaphysics* VII, 7: 1032 b 16-18: «...that which proceeds from the starting-point and the form is thinking, and that which proceeds from the final step of the thinking is making. And each of the intermediate steps is taken in the same way».


152. Cf. *Nicomachean Ethics* X, 9: 1180 a 14-15: «...the man who is to be good must be well trained and habituated, and go on to spend his time in worthy occupations and neither willingly and unwillingly do bad actions». Cf. POLO, «Tener y dar. Reflexiones en torno a la segunda parte de la encíclica «Laborem Exercens»», ed. cit., pp. 215-216. More precisely such modification is an optimization of the potentialities. More will be said regarding this in the following section. At this point of the discussion, the interest is to point out that the action model goes beyond the concept of feedback process espoused by system thinking in organizations.


Aristotle, in his political philosophy, is still well aware of what is at stake in politics, namely, no less than the ergon tou anthropou (the “work of man” qua man), and if he defined this “work” as “to live well” (eu zên), he clearly meant that «work» here is no work product but exists only in sheer actuality...the “work of man” is no end because the means to achieve it —the virtues, or aretai— are not qualities which may or may not be actualized, but are themselves “actualities”».

156. *Nicomachean Ethics* II, 6: 1106 a 15-17, 21-23.


159. Cf. *Metaphysics* V, 20: 1022 b 6-10: «When one thing makes and one is made, between them there is a making; so too between him who has a garment and the garment which he has there is a having. This sort of having, then, evidently, we cannot have; for the process will go on to infinity, if we can have the having of what we have». Cf. *Metaphysics* V, 23: 1023 a 16ff.

160. *Nicomachean Ethics* III, 5: 1114 a 6-8. Cf. Wojtyla, K., *Persona y acción*, BAC, Madrid 1982, p. 115: «Por “devenir” —el fieri latino— entendemos el aspecto del dinamismo humano tanto en el aspecto del actuar del hombre como de lo que ocurre en él —que se centra en el hombre mismo, sujeto de este dinamismo en la medida en que introduce o comporta un proceso de cambio. De hecho, en las dinamizaciones, el sujeto no permanece indiferente; no sólo participa en ellas..., sino que él mismo se ve, de una manera u otra manera, formado o transformado por ellas...».


163. Bastons, *El saber práctico según Aristóteles, ed. cit.*, p. 108: «Así, mientras que para las cosas el tiempo es, efectivamente, pura sucesión, para el ser racional, como el hombre, el tiempo se hace ingrediente de su misma constitución. Eso sucede bajo la forma de hábito».


166. Yarza, I., *op. cit.*, p. 149: «Siempre que se da una praxis perfecta, necesariamente se da la posesión del fin; al contrario, cuando se realiza una praxis moral se tiende hacia un fin todavía no poseído y cuando se posee, acaba en cierto modo la acción. Por eso, la predicación simultánea de presente y perfecto no pueden aplicarse a las praxis éticas, al menos en el
mismo sentido. Veo y he visto, pero no soy valiente y he sido valiente; tal simultaneidad podría ser mantenida sólo por vía habitual, es decir, porque poseo la virtud del valor soy valiente, y lo soy precisamente porque lo he sido, porque he realizado acciones valerosas».

167. *Nicomachean Ethics* X, 8: 1175 b 1-5.


169. Aristotle divides tendency into three, to wit: appetite, impulse and will. Cf. *On the Soul*, III, 10: 433 a 10-433 b 10. Tendency shall heretofore be designated as that faculty which embraces these types.


172. Cf. *Nicomachean Ethics* I, 4: 1095 a 16-25: Where Aristotle affirms that there exists a general verbal agreement on the ultimate good (that is, «happiness») but there seems to be no agreement on what it consists in. Cf. Polo, Ética: *Hacia una versión moderna de los temas clásicos*, ed. *cit.*, p. 170: «Desde el inicio nuestro espíritu es respectivo a la felicidad antes de saberlo. Esta no es una tesis gnoseológica, sino una tesis ontológica: la voluntad no sabe qué es la felicidad». Cf. Aquinas, ST. Thomas, *In IV Sententiarum*, d. 49, q. 1, a. 1, sol. 1, ad 2: «...in principio nihil cognoscimus de fine hominis nisi hoc generale quod est quodam optimum».


175. *Nicomachean Ethics* VI, 2: 1139 b 2.


177. Cf. *Nicomachean Ethics* III, 5: 1114 b 5-12: «...the aiming at the end is not self-chosen but one must be born with an eye, as it were, by which to judge rightly and choose what is truly good, and he is well endowed by
nature who is well endowed with this. For it is what is greatest and most noble, and what we cannot get or learn from another, but must have just such as it was when given us at birth, and to be well and nobly endowed with this will be complete and true natural endowment». Cf. MARIN, H., *La antropología aristotélica como filosofía de la cultura*, EUNSA, Pamplona 1993, pp. 82-84.


181. Cf. AQUINAS, St. Thomas, *Summa Theologiae*, I-II, q.51. a. 2, no. 3: «...in agente quandoque est solum activum principium sui actus: sicut in igne est solum principium activum calefaciendi. Et in tali agente non potest aliquis habitus causari ex proprio actu: et inde est quod res naturales non possunt aliquid consuescere vel disuescere ut dicitur in “Ethic.”. Inventur autem aliquod agens in quo est principium activum et passivum sui actus: sicut patet in actibus humanis. Nam actus appetitivae virtutus procedunt a vi appetitiva secundum quod movetur a vi apprehensiva praesantante objectum.». Cf. *On the Soul* III, 7: 431 a 8-15: «To perceive is like bare asserting or thinking: but when the object is pleasant or painful, the soul makes a sort of affirmation ir negation, and pursues or avoids the object. To feel pleasure or pain is to act with the sensitive mean towards what is good or bad as such. Both avoidance and appetite when actual are identical with this...».


184. POLO, L., *Ética: Hacia una versión moderna de los temas clásicos*, ed. cit., p. 192: «El hombre que sólo usa la percepción sensible se suele conformar con bienes inmediatos. Así se desorganiza el tiempo humano. La ética desde el punto de vista temporal es la organización de la biografía humana, es decir, lo que permite el hombre vivir en el tiempo sin ceder a las discontinuidades de la moda.... Pero si la voluntad se mueve solamente por la captación de los bienes inmediatos, los proyectos a largo plazo se cancelan». Cf. BROADIE, S., *Ethics with Aristotle*, Oxford University Press, Oxford 1993, pp. 106-107: Tendency is «typically aroused by the presence or imagined presence of the appropriate object or occasion.... The desire to take or otherwise engage is expressed straightaway in typical movements immediately linked to perception of the object or the triggering circumstance. Hence it is characteristic of these desires to tend to their own satisfaction without mediation by reflective thought». Cf. CHARLTON, W., *Weakness of Will*, Blackford, Oxford 1988: Tendential processes unaccompanied by reflexive thought is denominated as «weakness of the will».
185. Cf. *Nicomachean Ethics* VI, 2: 1139 a 35-b 2, 4: «Intellect itself, however, moves nothing, but only the intellect which aims at an end and is practical; for this rules the productive intellect as well, since every one who makes makes for an end, and that which is made is not an end in the unqualified sense (but only relative to something, i.e. of something)....and desire aims at this».


187. Cf. INCIARTE, F., «Ética y política en la Filosofía práctica», in *El reto del positivismo lógico*, Rialp, Madrid 1974, p. 204: «Lo decisivo es que la teoría por sí misma es incompetente para la práctica; lo decisivo es que la teoría, por sí sola no sabe lo que es el bien práctico, el “agathon prakton” lo que hay que hacer, lo agible».


190. Cf. *On the Soul* III, 7: 431 b 5-9: «perceiving by sense that the beacon is fire, it (the faculty of thinking) recognizes in virtue of the general faculty of sense that it signifies an enemy, because it sees it moving; but sometimes by means of the images or thoughts which are within the soul, just as if it were seeing, it calculates and deliberates what is to come by reference to what is present, and when it makes a pronouncement, as in the case of sensation it pronounces the object to be pleasant or painful, in this case it avoids or pursues; and so generally in cases of action».

191. Cf. *Nicomachean Ethics* III, 3: 1112 b 26-27: «...if a thing appears possible we try to do it. By “possible things” I mean things that might be brought about by our own efforts». Cf. BASTONS, *El saber práctico según Aristóteles*, ed. cit., p 97: «En este ámbito (that is, the contingent level). lo propio de lo posible se trata de una noción correlativa. Algo es posible, dynaton, en relación a un poder, dynamis, esto es, sólo si se encuentra al alcance, de un poder: “es posible lo que puede ser realizado por nosotros”. Lo práctico, lo posible, es lo que “está al alcance de nuestro poder; y nuestro poder es, a su vez, práctico en la medida en que “tenga a su alcance” algo posible».


194. Cf. POLO, L., Ética: Hacia una versión moderna de los temas clásicos, ed. cit., p. 186: «La voluntas ut natura y la voluntas ut ratio no son dos voluntades. Es la misma considerada en dos momentos, pues la conside-

ración de la voluntad tiene que ser procesual, precisamente porque se trata de una potencia tendencial cuyo despliegue hay que estudiar. Ese des-

pliegue comienza por la confluencia de la inteligenicia».


196. Nicomachean Ethics VI, 2: 1139 a 32.


199. Nicomachean Ethics VI, 2: 1139 b 3-5.

200. Nicomachean Ethics III, 3: 1113 a 10-12. Cf. BASTONS, El saber práctico según Aristóteles, ed. cit., p. 126: «...en la elección, el intelecto se vincula a la tendencia, precisamente porque el intelecto no es, en sí mismo, una tendencia, pero necesita de la tendencia para ejercer su función intelectual en la praxis. Paralelamente, los medios se ponen en relación a un fin, porque no son ellos mismos fin, pero necesitan del fin si quieren mantener su estatuto de medios. Lo mismo puede decirse, en sentido contrario, de la tendencia respecto al intelecto y del fin respecto a los medios».


203. Cf. Metaphysics VII, 7: 1032 b 6-10: «The healthy subject, then, is produced as the result of the following train of thought; since this is health, if the subject is to be healthy this must first be present, e.g., a uniform state of body, and if this is to be present, there must be heat; and the physician goes on thinking thus until he brings the matter to a final step which he himself can take». Cf. DAHL, N., Practical Reason, Aristotle, and Weakness of the Will, Universtiy of Minnesota Press, Minneapolis 1984, p. 76.

204. Cf. DAHL, op.cit., p. 76. Cf. KENNY, Aristotle’s Theory of the Will, ed. cit., p. 149: «Because poiesis is concerned with the production of ends distinct from the process of production while praxis is concerned with the performance of actions which are valuable in themselves, the relationship of instrumental means to ends is the preponderant one in technical reasoning, while the relationship of constituent means to ends is the dominant one in ethical reasoning».


206. Cf. Nicomachean Ethics VI, 2: 1139 b 5-9: «Nothing that is past is the object of choice;... for no one deliberates about the past, but about what is future and contingent, while that is past is not capable of not having taken place...».


209. *Aquinas, St. Thomas, Summa Theologiae*, I-II, q.51, a. 3, no. 3: «Manifestum est autem quod principium activum quod est ratio, non totaliter potest supervincere appetitivam potentiam in uno actu: eo quod appetitiva potentia se habet diversimode et ad multa; iudicatur autem per rationem, in uno actu, aliquid appetendum secundum rationes et circumstantias. Unde ex hoc non totaliter vincitur appetitiva potentia ut feratur in idem ut in pluribus per modum naturae: quod pertinet ad habitum virtutis. Et ideo habitus virtus non potet causari per unum actum, sed per multos».

210. Cf. *Polo, L.*, *Ética: Hacia una versión moderna de los temas clásicos*, ed. cit., p. 171: «Aquello que finaliza la tendencia es el puro bien. El bien se caracteriza como aquello que se corresponde con la voluntad desde el punto de vista final. La voluntad es, por tanto, la correspondencia en nosotros el bien. Conocemos que existen bienes..., pero como la dimensión humana que corresponde con el bien es la voluntad, ese conocimiento puede quedarse corto.... Ahora bien, eso comporta, como es claro, que nuestro conocimiento del bien es, de entrada, no suficiente. Es precisamente que dicho conocimiento crezca».


212. Cf. *Nicomachean Ethics* I, 6: 1097 a 5, 11: Aristotle affirms that most form of the sciences, including the productive form, «aim at some good and seek to supply the deficiency of it, leaving on one side the knowledge of the good.... For a doctor seem not even to study health in this way, but the health of man, or perhaps rather the health of a particular man...».


215. Cf. *Nicomachean Ethics* VI, 12: 1144 a 30. Cf. *Nicomachean Ethics* X, 9: 1179 b 1-4: «Surely, as is said, where there are things to be done the end is not to survey and recognize the various things, but rather to do them; with regard to excellence, then it is not enough to know, but we must try to have and use it, or try any other way there may be of becoming good».  

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217. Cf. *Nicomachean Ethics* VI, 12: 1144 b 5-11: «for from the very moment of birth we are just or fitted for self-control or brave or have the other moral qualities; but yet we seek something else as that which is good in the strict sense —we seek for the presence of such qualities in another way. For both children and brutes have the natural dispositions to these qualities, but without thought these are evidently harmful. Only when we seem to see this much, that, while one may be led astray by them, as a strong body which moves without sight may stumble badly because of its lack of sight, still, if a man once acquires thought that makes a difference in action».

218. *Nicomachean Ethics* VI, 12: 1144 b 1-3.


220. Cf. *Nicomachean Ethics* II, 4: 1105 b 1. Cf. *Nicomachean Ethics* VI, 12: 1144 a 6-10. Cf *Nicomachean Ethics* X, 8: 1178 a 16-19. Cf. STRAUSS, L., *The City and Man*, University of Chicago Press, Chicago 1964, pp. 25-26: «According to Aristotle it is moral virtue that supplies the sound principles of action, the just and noble ends, as actually desired; these ends come to sight only to the morally good man; prudence seeks the means to these ends. The morally good man is the properly bred man, the well-bred man. Aristotle's political science is addressed only to such men. The sphere of prudence is then closed by principles which are fully evident only to gentlemen. In seeking for higher principles, one would raise the question “Why should one be decent?”, but in doing so one would already have ceased to be a gentleman, for decency is meant to be choice-worthy for its own sake».

221. *Nicomachean Ethics* VI, 13: 1145 a 6. Cf. *Nicomachean Ethics* VI, 12: 1144 a 8, 32-34: «And this eye of the soul (that is, the rational faculty) acquires its formed state not without the aid of excellence as has been said and is plain; for things which deal with acts to be done are things which involve a starting-point, viz., “since the end, i.e. what is best, is of such and such a nature”, whatever it may be...». Cf. KENNY, A., *The Aristotelian Ethics*, Clarendon Press, Oxford 1978, pp. 188-189.

222. BASTONS, M., *El saber práctico según Aristóteles*, ed. cit., p 163: «...ante lo que hay que hacer, ante el fin de nuestra conducta, el riesgo no está en la equivocación, sino en la ceguera: no ver en absoluto. La razón práctica ve o no ve el fin, según éste esté presente o ausente, pero no es ella la responsable de su presencia o ausencia, sino la voluntad como tendencia. Por eso, volvemos de nuevo a la virtud, al buen hábito de la voluntad en su tendencia al bien, como condición de posibilidad del conocimiento del bien».
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224. Cf. Nicomachean Ethics VI, 12: 1142 b 32-35: «Excellence in deliberation will be correctness with regard to what conduces to the end of which practical wisdom is the true apprehension». Cf. Nicomachean Ethics VI, 10: 1143 a 4-9.


226. Bastons, M., El saber práctico según Aristóteles, ed. cit., pp 156-157: «Es preciso, pues, respetar la peculiaridad de los distintos tipos de conocimiento. El bien humano, el fin práctico, lo contemplamos mediante el hábito, la virtud: conocemos lo que queremos y conocemos bien si queremos bien. Y queriendo bien, mediante la virtud, podremos querer subjetivamente el bien objetivo y absoluto y, queriéndolo, lo conoceremos».

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