

## The Theory of Disequilibrium: Why Complexity is Required to Sustain Organizational Management

Article by Romeo Gloverberg  
CEO and founder of Master Brain Solutions (MBS) Accra, Ghana  
E-mail: yoomybaby@yahoo.com

### Abstract

*The study of management has been a series of sequential events contingent upon the exploration of multiple fields of study. Widely and broadly inclusive in the evolution of organizational management are sociologist (Max Weber), economist (Adams Smith), philosopher (Pluto) etc. This research has attempted analysis and classification of organizational management in three phases: Pre-industrial era, industrial era and post-industrial era. In a second fold, this study has compounded and formulated the theory of organizational disequilibrium or simply put the theory of disequilibrium. This theory has been adopted to emphatically, intrinsically and extrinsically elaborate to a comprehensive whole, the variance of imbalance of organizational management across the evolutionary phases of management, in a highly complex digital transitioning and transformational era. A dashboard analysis of the theory exposed organizational management and leadership (internal environment) as a fundamental fracture impeding organizational growth from reaching the required complexity of the digital age. In furtherance, provided measures to mend the organizational fracture.*

**Keywords:** management; evolution; organizational disequilibrium; imbalance; complexity; leadership.

### Introduction

Organizational management has evolved through the antecedent of revolutionary and transitional contingencies, famously, the industrial revolution (Chen, 2019), and now the ever-penetrating acceleration of the digital age (Mircea, 2015; McKinsey Quarterly, 2016; Meyer, 2017). Management theories have evolved from a null setting of theoretical (Business Communication, 2016; Segupta, 2018) and philosophical (Arun, 2018; Bragnes, 2007; Meinwald, 2019) ideologies through the path of interdisciplinary modeling and revolutionary precedencies. Yet, the faith of management theories is still derogatory and leaves stench of organizational melancholy in a highly complex digital revolution. In the words of (Matthews, 2016), the digital era has just commenced, but organizational management is far from equilibrium and battling with the reality of stability in an ever-changing global community. Indeed, the modern world has been adulterated, and altered by the resurgence of digital revolution, giving sleepless nights to organizations, in constant competition to catch up with the digital pace (Goran, 2017). However, the complexity of business organizations is not that they cannot catch up with the pace of digitization; the problem is compounded internally than externally. Business organizations in the 21<sup>st</sup> century are dragged backward by their own internal processes and procedures rather than being left behind by the pace of digitization. The complex reality is that business organizations require change in management approach, parallel to features that speaks the language of digitization and complexity, compatible with the information age (Schwab, 2016). The complexity of the digital age is not only limited to the demand of celestial visualization, predictability and risk response rate, expansion and restructuring, adaptable and flexible practices (New Media, 2016), but also, the digital age increases complexity through globalization, interconnectivity, interrelationships, interactions and interdependence of individuals and systems (Kaufman, 1995). Exploration of weaker nations and weaker organizations, cybercrimes, insecurity and safety issues are other characteristic of a complex society. Hence, organizational management should adapt to managing these complexities. However, in a sharp contrast, management principles of the industrial era are no longer satisfactory. Organizational procedures of the industrial era are not compatible with the complex management requirement of the digital age. Fundamental to the success of the digital age is information (French, 2012). In other words, the digital age feeds on information to function efficiently. In respect, the digital age is people centered.

Indicating that an efficient management theory or principle is one that manages people (the human resource of the organization) because information resides with the people. Therefore, management practices should focus on the study of human behavior that is fast transforming the digital world, in the form of innovation and technological advancement that enable organizations to predict and forecast human behavior in relation to change, growth and development.

The literature has attempted to respond to the challenges of organizational management in the 21<sup>st</sup> century. This study has therefore built on the advancement made in the literature into a holistic force. The study has classified into three era, the analysis of the evolution of management practices: pre-industrial, industrial and post-industrial. In furtherance, compounded and formulated the theory of organizational disequilibrium to elaborate into a holistic whole, the root causes of organizational imbalance or disequilibrium across the revolutionary and transformational stages of organizational management. Subsequently, this study proposed measures to mend organizational fracture and augment complexity in the digital

### **Classification of the evolution of management practices**

The graduation and success of management principles from evolution to revolutionary existence has been the interplay of multidisciplinary fields of study rather than confinement to a constructive possession of a monopolistic field of study. The growth of organizational management has been aided through the scientific study of Economics (Adam Smith, 1723-1790) Sociology (Max Weber, 1864-1961) Philosophy (Socrates, 469-399 BC) Engineering (Frederick W. Taylor, 1856-1915) etc. It is very difficult to classify which subject area has made the most impactful contribution to the growth of organizational management. This study has therefore segregated the study of management into three analytical phases:

#### **Pre-industrial era**

This period describes the early formational stages of man and his communities prior to the commencement of the industrial revolution around the mid-1700 (Torrington et al., 1989:12). Consequentially, the first Homo sapiens is the native of this era and by 12,000, Homo sapiens made other transitions in their environment (McBrearty and Books, 2000). According to Stockton (2017), pre-industrial era was anything but paradise “for thousands of years, town planning meant little more than putting houses close together and hoping for the best. As a result, ancient cities were death traps, full of overcrowding, diseases and filth. Especially filth.”- (McBrearty and Books, 2000). If this statement is any testimony of the pre-industrial era, then obviously, McGrath (2014) is right to claim that little existed to be associated with the practice of management. Without missing words, Hartwell (1971) also confirmed that pre-industrial era was very static and often cruel, dominated by child labour, dirty living conditions and long working hours. Withal, does it mean there was no management practices in pre-industrial era?

The Merriam-Webster dictionary interprets management synonymously as administration, change, control, supervision, direction etc. According to the Business Dictionary (n.d), the size of management varies across persons, organizations and multinational. Wilkinson (2013) attempted the definition of management as “a single or group of individuals who challenges and oversees a person or collective group of people in effort to accomplish desired goals and objectives”. Denning (2013) admonished that management matters and that what happens in management is a measure of how far we go in life. He stated, “Without management, no people are clothed or fed or housed, no children are educated, no health services are provided...and no government can be run”. In congruence, history confirmed that people and group of people have challenged, and oversee the accomplishment of desire goals. The Mali Empire, Ghana Empire and the Roman Empire are all testimonies of great management techniques. Management theories cannot be subjected to control experiment in the laboratory, but management represents a direction and focus of life. Therefore, management practices have existed since time immemorial, but the practice and subject area have evolved and transformed overtime.

The pre-industrial era defines and confines management into systemic foundation and evolution of managerial ideas, mostly rational and philosophical, but relevant to the emergent and celestial application of knowledge in the contextual era. This period was dominated by rational and management

perspective and principles largely reflected in today's management practices. The managerial ideologies of this era focused on the perceived concession of management as a methodology of practice than as a field of study (Griffin, 1987:38; Black and Porter, 2000:32; Mescon et al., 1988:41). The pre-industrial era marked the period prior to the introduction of machines. We can therefore support (Hodgetts and Kuraliko, 1988:31) intuition that large-scale production was few or nonexistence. As such, management processes within this period did not experience the level of complexity associated with the industrial and digital revolutions (Bateman and Snell, 2002). Historically, the first managerial incidence could be accredited to Adam, the first human creation according to the bible (Genesis 1:27, stated in Walvoord, 2008). The bible made it clear that God created Adam in his own image and likeness and put Adam as the dominion of His creations (Genesis 1:26-28; Psalm 8:6, stated in Kulikovsky, 2009). In other words, Adam was the manager of God's creations and the first manager ever. Other great contributors to management evolution during this period include.

**Aristotle (384-322 BC):** the great philosopher and scientist universally known for the classification of animals into genus and species, and the founder of formal logic (Amadio & Kenny, 2019). Aristotle writings on actions, choice, virtue and constitution are among his relevant contributions to the evolution management. His work on household- management comes nearest to today's management practices (Nurmi, 1984).

**Socrates (Socrates, 469-399 BC):** Socrates the Greek philosopher, who is believed to have brought down philosophy from the heavens, is also widely recognized for inaugurating the study of management and business ethics (Bragues, 2007).

**Adam Smith (1723-1790):** Adams Smith, the father of modern economics is largely credited for laying the foundation for modern management practices through his work on the division of labour. In his book, the wealth of nations (1776), Adam Smith laid the bedrock for the foundation of management in the industrial revolution.

## **The industrial era**

This is a transition from the pre-industrial era to a period of expansion and growth, massively fueled by the introduction of machine and emergence of factories and industries for large-scale productions (Chen, 2019). The period is largely accrued to the industrial revolution of the late 17<sup>th</sup> to 18<sup>th</sup> centuries, pioneered by the creation of the steam engine (History.com, 2019; Wren, 1979:45). Commencing in England, the period can best be described as a total shift in life processes. A transformation from domestication to factory or industrial production. This is not to propel into the conclusion that pre-industrial era was characterized mainly by domestic production, but the concession that pre-industrial contribution to Gross Domestic Product (GDP) was in most quantities subsistence and few commercial production due to the absence of equipment for voluminous production (Hudgetts, 1981:6; Torrington et al., 1989:12). The period marked a great revolutionary from labor-intensive to capital-intensive system of production. Synonymously, this period has been described as the machine age due to the innovation and technological growth with industrial explosions in the form of mini and mega factories, medium and large-scale enterprises, accompanied with vociferous demand for change in management principles to accommodate the complexities of industrial revolution. According to (Kwok, 2014) industrial management theories can be categorized into three main branches-bureaucratic, administrative and scientific. Bureaucratic management theories are largely known for the work of (Weber, 1905, cf Sociology Group, 2018)). Fayol (1949:43-110) is credited as the pioneer of administrative or process management. Taylor (1911) is recognized as the father of scientific management approach. Each of these theories were evolutionary to meet the complexity of the industrial era. Inductively, complexity of the industrial era requires different level of thinking and management approach for organizational sustainability and growth. During this period, the rational and philosophical theories of pre-industrial era were put to test and in some cases enhanced to meet the increased level of complexity of the era. In other word, each revolution comes with its own level of increased complexity, shifting away far from equilibrium, business organizations (internal environment) and creating a phenomenon known as organizational imbalance with the external environment.

## **Post-industrial era**

Literature still celebrates the living testimony of the industrial era. Some writers like (Eubanks, 2017) hold strong concession that the industrial era still lingers on. Others such as Matthews (2016) is with the view that the digital era has just began. Salazar (2016) ascertains that the digitization is just a more modern version of industrialization. Simply, the post-industrial era is dominated by digitization and new world experience of the information age. Nevertheless, the digital era is defined as the period commencing with the creation of the transistor in 1948, but only got properly integrated into society with the arrival of personal computer in the 1980's (Digital Tonto, 2012). The term digitalization and digitization are associated with the period and used interchangeably, but the digital revolution has been accepted generally as the increase adoption and use of digital tools such as computer etc. by an organization, industry country etc. (BarNir, Gallagher and Auger, 2003; Khan, 2016). Pariona (2017) defines digitization as the development resulting in the switch from mechanical and analogue to digital. In the business parlance, digital transformation is the change in working culture through the implementation of digital technology in organizational processes, operations and activities (Parviainen et al., 2017). The digital era has witnessed never before in the history of the world, information dissipation at a breath taken pace. The rate of penetration and acceleration of information in the digital age is unprecedented and shrinks the world into every small corner of life. Hinton (2015) argues that the digital age represents a means of distributing information in a much, faster and universal way. According to (Jones, 2016), "digital evolution sped up everything both by facilitating communications (satellites, cellular phones, network, fiber optic cables, data centers, cloud computing, internet, standardized software...". In the words of Ardman (2018), the digital revolution is doing it all over again, but more deeply and ubiquitous.

Collin, Heikkinen, Korhonen, Halén, Itälä, and Helenius (2015) observed that digital revolution is transitioning and transforming the value chain in the global market and this is taking the business world by storm. Scholars such as (Brennen and Kreiss, 2014; Li, Liu, Belitski, Ghobadian and O'Regan, 2016; Brynjolfsion and McAfee, 2014; Bonnet, D., McAfee, A., Westerman, G., 2014) have acknowledged that digitization is transforming business models and management approaches. In effect, the digital transformation is speaking a different language of pace, speed and universal distribution of information to reach everyone. Tyler (2018) commemorates that the industrial revolution drives people from the countryside to the cities, but digital revolution carries the cities to the people in their various towns. In other word, the digital age is more inclusive than the industrial era. Indeed, the digital revolution is a true revolution for everybody, and everywhere. A revolution larger than any other revolution in history due to its penetration to deep rooted communities all over the world. Digital revolution is part-and-parcel of the people and the people part-and-parcel of it. The digital age is an era for the people, made by the people and consumed by the people, hence people centered. This makes relationships and interactions within the system ever more complex, as every individual character contributes to influence the behavior of the system. With ever-increasing complexity, business organizations (internal environment) further shifts away from equilibrium, creating a variance of imbalance with the external environment.

## **Complex Adaptive System (CAS) in post-industrial regime**

The journey of organizational management from pre-industrial to post-industrial era, from evolution to revolution, and to its status, owes much to the demand for increase organizational complexity. As demonstrated in the previous sections, revolution is not precisely the problem of organizational management, but the level of complexity required to sustain organizational balance with the global environment. Complexity is therefore not a choice, but a necessity for survival in CAS. According to McDaniel, Lanham and Anderson (2009), understanding the fundamental properties of CAS aids in diluting appropriate research solutions. CAS offer valuable tools that enables organizations to make sense of natural phenomenon and provide appropriate response (Ellis and Herbert, 2011). The aim of this study is not for a deep-throat cover of CAS, but helping with a diagnostic comprehension of CAS fundamental.

Just as the evolution of management is interdisciplinary, so is the study of the complexity surrounding organizational management. Complexity evolved from more than one theoretical

framework (Yolles, 2018). Complexity theory emerges from the principle that human behavior is non-linear (Capra, 2002) and due to the intensity of interactions among a large number of micro and macro components within a system and between a system and its environment (Chan, 2001). A complex adaptive system involves many natural systems (societies, revolution, economic systems, the brain etc.) and as many artificial systems (artificial intelligence, evolutionary programmes, engineering systems, business organizations among others) (Honavar, 2001). According to (Colella, Klopfer, and Resnick, 2001).

“CAS is a system made up of many individual parts or agents”. CAS are not stable systems, but dynamic system that are able to adapt and evolve as the external environment keep changing. In order word, a business organization is an automatic member of CAS that contributes directly to the global environment and directly influenced by changes within the global environment. As stated by (Honavar, 2001), there is no separation between a system and its environment, a system always adapts to meet the complexity of its environment. Gell-Mann (1994) confirms this position stating that agents within CAS are in constant interactions with its own environment and the external environment, acquiring information into a kind of schema and acting based on the schema. McDaniel et al., (2009), enumerated five characteristics of CAS to include (a) diverse agents that learn (b) nonlinear interdependencies (c) self-organizing (d) emergent order and (e) coevolution. Others are far from equilibrium, state of paradox and connectivity (Page, 2009). CAS is irreversible and unpredictable (Gell-Mann, 1994). This assertion makes Doorley (1997) proceeds that the best way to predict the post-industrial era is to, allow it to evolve, and then observe what happens.

### **Analysis of CAS and organizational disequilibrium**

Characteristics of CAS may be irreversible and unpredictable because change is dynamic, but change is not spontaneous. Change occurs over a period. As elaborated, digital revolution took a period of more than 200 years to commence. A change resulting from an individual element or schema may affect other schema or entities around it (Gell-Mann, 1994), but not spontaneously. The entities/elements within a system may respond to a change overtime, due to the process of learning, which may take time to adapt. Hence, individual element in a system may be affected, but a change in the external environment implies a greater proportion of schemas adapting to a new knowledge.

Chaotic phenomenon is unpredictable because individual elements may exhibit paradoxical characteristics of the self (Doorley, 1997). However, chaotic situations are only evolutionary, but not revolutionary because chaotic situation do not necessarily represent the general characteristic of the external environment. They represent various elements or associations within the internal environment, which is itself, a part of the external environment. The precedence of revolution resulting in the formation of a new order implies chaotic elements or elements of both the internal and external environment exhibiting similar patterns of behavior. Only through this, we can talk of revolution or transformational change or drive, resulting in organizational shift from the state of equilibrium or organizational imbalance with the external environment.

Prediction within a chaotic system may not be necessary because chaotic systems are not synonymous to revolutions. Chaotic situations may be defined as revolutions if and only if elements within the larger ecosystem are showing similar patterns of behavior of the chaos system. In this case, the chaotic situation may no longer be described as chaotic, but as acceptable behaviour that can be predicted because they exhibit general pattern of change over time. Therefore, a change is unpredictable only in the chaotic state, but an external or global change is predictable when different elements of the environment begin to exhibit similar traits and characteristics with time. The challenge for business entities is prediction with precision because of differences in organizational fracture. This may be accrued to differences in organizational learning and resource capacity especially resulting from differences in the intellectual capital and the quality of leadership.

### **Overview of economic disequilibrium**

Disequilibrium is a displacement from the status of stability (Biswas, 2018). No economic condition flourishes in the pursuance of disequilibrium. A monopolistic condition is an artificial creation of economic instability; they set prices above the marginal cost because of absence of competition. Hence,

no economic efficiency is ever produced in a monopolistic ecosystem. A favorable economic condition that produces efficiency and effective use of resources is the point of equilibrium (Kainz, 2011). A general status of disequilibrium is a market condition in which the interplay of demand and supply fails to agree, resulting in inclination for change (Essay-Uk, 2018). Market disequilibrium is a function of market deficiency resulting in shortages or excesses in aggregate demand or aggregate supply side of the economy. Economists argue that any point below equilibrium point implies economic resources are under employed to full capacity. In the classical view, the economy automatically adjusts to clear the deficit, but Keynesian advocates contend this position, stating that markets may not be self-adjusting that markets will not attain full potential if allow to self-regulate (Essay-Uk, 2018). Thus, there is the need for deliberate actions by government to restore market conditions to equilibrium.

### **The theory of organizational disequilibrium**

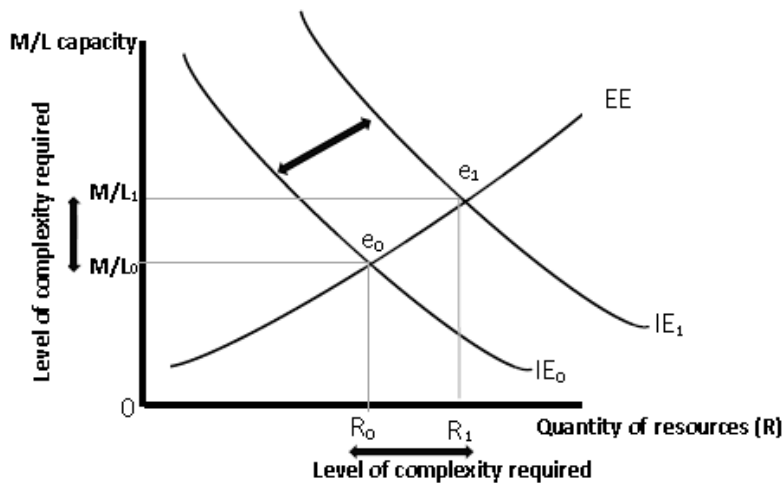
The theory of organizational disequilibrium is a consultation theory I compounded on the principles of CAS, economic principles, management perspective and general change theory. The foundation of the theory is deep rooted in CAS concession that a perfect understanding of individual parts does not necessarily translates into a perfect understanding of the whole (Miller and Scott, 2007). Thus, understanding the internal organizational environment is inadequate to meet the complexities of the external environment. Economic principles are adopted in this theory to demonstrate the inadequate employment of organizational resources to full capacity-especially leadership. As a result, there is the tendency for change, which again explains the need to augment complexity to attain the level of equilibrium. This theory also adopts the Keynesian's view for deliberate actions of organizations to increase complexity to attain and sustain equilibrium with the global market. A management view, according to this theory is relevant to cure the organizational fracture. Organizational leadership and management, in this instance, leadership roles and quality, an integral necessity to ensure the employment and deployment of organizational resource towards technological innovations.

The global environment is tensed with rivalries, ever-increasing competition coupled with fusion and diffusion of the global market with constantly changing, and evolving technological innovations of which digitization is the cynosure. Management principles of the 20<sup>th</sup> century (industrial era) are no longer sufficient to produce the level of complexity required in the post-industrial era because the business environment is not at par with digital revolution. This often created the condition this paper refers to as organizational disequilibrium. The state of disequilibrium is a phenomenon where business organizations (internal environment) is not at par with globalization (the external environment). No business entity wishes to find itself in the state of disequilibrium. However, the influence of the whole (the external environment) carries a greater proportional weight than the influence of the part (internal environment). As a result, the global environment is able to exert weight on equilibrium position, forcing a shift upward and to higher levels of equilibrium position. The internal environment in this content carries a description analogous to "David and Goliath". In this scenario, Goliath is the external environment or master, and David the internal environment or servant. David or the servant have no choice, but to follow in the path of the master and tries to adapt to tactics and strategies to meet the demands of the master. Following that, the inability of internal environment to adopt and adapt strategies towards attaining and sustaining higher levels of equilibrium with the external environment creates unpleasant conditions for survival. The external environment is able to influence the direction of the internal environment coz the interactions, interconnections, interrelations and interdependence of networks and individuals increases complexity higher than the activities within business organizations. When the various components within the external environment exhibit similar characteristics and build stronger schemas, they assume a steady pattern of behaviour that imposes force on the equilibrium position and in the process displacing equilibrium status.

### **A dashboard view of the theory**

In figure 1.0, two factors have been identified as relevant for organizational shift toward equilibrium i.e. organizational capacity with reference to a) resources and b) quality management and leadership. Management and leadership constitute one unit and represented on the vertical axis and organizational resources e.g. capital, human resource etc. also represented on the horizontal axis. The downward

sloping curve represents the internal environment (IE) and the upward sloping curve denoted the external environment (EE).



**Figure 1.0.** Disequilibrium caused by external complexity

In figure 1.0,

M/L = Management and leadership capacity;  $M/L_0$  = Management and leadership capacity at initial equilibrium of  $e_0$ ;  $M/L_1$  = Management and leadership capacity required to attain new equilibrium of  $e_1$

$M/L_1 - M/L_0$  = Level of increased Management and leadership capacity required at  $e_1$

R = Organizational resource capacity

$R_0$  = Initial Organization resource capacity at  $e_0$

$R_1$  = Required Organization resource capacity at  $e_1$

$R_1 - R_0$  = Required Organization resource complexity at  $e_1$

$e_0$  = Initial equilibrium position (during industrial era)

$e_1$  = New higher equilibrium position (during post-industrial era)

O = Zero complexity; zero internal and zero external pressure

IE and EE are curves, but assume a straight line, indicating the state of chaos that can be experienced externally and internally. At the state of chaos, both IE and EE are curves implying a complex and unpredictable conditions. However, after sometime, the curves assume a straight line, a phenomenon representing observable behaviours that are predictable.

At  $e_0$ , IE and EE are at equilibrium with a resource capacity of  $R_0$  and management and leadership strength of  $M/L_0$ . Nevertheless, equilibrium at  $e_0$  was only relevant as far as the industrial revolution was concerned. Globalization and digitization during post-industrial era increase the complexity within the external environment (EE) disproportionate to organizational complexity, which moved the equilibrium point from  $e_0$  to a higher equilibrium at  $e_1$ . The complexity within the external environment created the condition known as disequilibrium or organizational imbalance ( $e_1 - e_0$ ). Complexity within EE intensified due to technological innovations, competition in the global market and new market demand etc.

The movement from  $e_0$  to  $e_1$  was along a straight line. Indicating that the change did not occur overnight. The new equilibrium position in the global ecosystem does not only intensify the fight to attain efficiency at  $e_1$ , but exposes organizational incapacity or deficiency at  $R_1 - R_0$ , and management/leadership capacity gap of  $M/L_1 - M/L_0$ . The difference in capacity gap is the required level of complexity necessary to restore organizational equilibrium and efficiency at  $e_1$ .

In brief, the theory of organizational disequilibrium is a condition or phenomenon that displaces organizational equilibrium with the global environment, a consequence of revolution transformations. This theory posits that organizational imbalance is only temporal, but organizational fracture disables a spontaneous response necessary to increase organizational complexity required to sustain equilibrium with the external environment. The inability to produce a spontaneous response imposes unpleasant

conditions in the form of organizational dissolution, pre-mature death and organizational collapse. Organizations therefore in order to sustain completion requires increased level of complexity in technological innovations, capital investment, human resource development and effective and efficient leadership.

### Disequilibrium emerging from internal complexity

Output may be disproportionate to input, allowing small input to produce large outcomes. Similarly, large inputs may produce small outcomes (McDaniel et. al., 2009). A possible scenario applicable to the theory of organizational disequilibrium is the disproportionate influence of the IE on EE, to impose a shift away from equilibrium. This happens when complexity within the IE develops characteristics or schemas similar to other schema or agents within the internal environment. When this phenomenon occurs, IE grows larger with increased complexity and characteristics disproportionate to unparalleled behaviours within the external environment. The size of IE gradually grows allowing it to gain more influence and commands a shift away from equilibrium. In figure 2.0, EE requires a bodily shift from  $EE_0$  to  $EE_1$  to assume equilibrium at  $e_1$ .

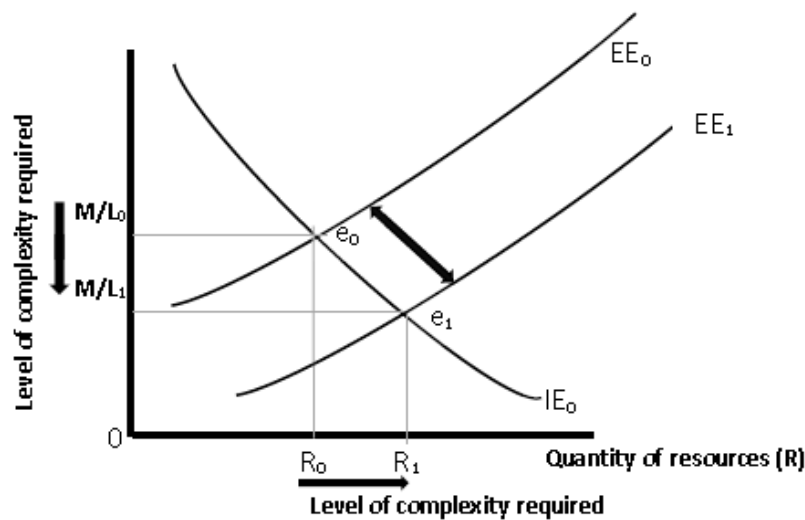


Figure. 2.0. disequilibrium caused by internal complexity

A downward shift in  $M/L_0$  to  $M/L_1$  implies a tradeoff between management and organization resource capacity. In other words, innovation and the drive for change in post-industrial era does not require many managers, but improved human resource capacity through training and development and distributional leadership, to influence individual beliefs in driving change through technological innovations. A shift from  $M/L_0$  to  $M/L_1$  further echoes the point that the digital age is stupefied by the need for more leaders than managers who can connect to teams internally and externally to lead the transformation change of innovative growth. A shift from  $R_0$  to  $R_1$  is a prerequisite condition that requires organizations to spend more on human resources to improve the existing technological capacity and encourage individual innovations; thus, increasing the complexity necessary to drive the change. When an organization drives the change, it becomes the leading player in the industry. For example, England commenced the birth of industrialization; hence, England benefited enormously as the leading innovator. Internal influence on the equilibrium position is possible in learning organizations that are industry drivers and direct the path of innovation. This scenario is a possible reality, but not often the case for most organizations. Management and leadership influence on organization shift toward equilibrium has been given further impetus in subsequent sections.

### Factors affecting organizational shift towards equilibrium

Organizations are slow to react to change. Technological innovations in post-industrial regime, moving at exponential rate, is not really the dominant challenge of organizational management. Instead, accepting change, adopting learning strategies and adjusting to a new organizational culture that comes



along with the change. According to Quick Base (2012), “it doesn’t matter if the proposed change is a change in the process of project or general planning or general operation. Adjusting to change is difficult for any organization and its employees”. A research conducted by Garner incorporation (2014) on technology adaptation reveals that CEO’s pay attention to things that are easily measurable than things that adds the most value to the company. Michelman (2016) carried out a research on the CEO’s of Accenture and discovered that as at 2015, many leaders are still in limbo of having a website or even the need for cloud computing. The Lewin’s Change Management Model, shows that majority of people are not in favour of change and will therefore engage in any repellant behaviour to discourage it.

### **The cost of complexity**

Accepting change is a daunting task for organizations and its employees. However, change is everywhere, but not everywhere free. Change requires adapting to higher levels of complexity and complexity is a cost to every organization as organizations and employees have to adjust to a new organization culture, which is more demanding technically, mentally, requires advanced knowledge and skills, time involving and financially straining. In figure 2.0, the cost of complexity is the cost of management expenditure that must be forgone ( $M/L_1 - M/L_0$ ) in order to increase organizational resource capacity from  $R_0$  to  $R_1$ . In figure 1.0, to attain the desired level of complexity from  $e_0$  to  $e_1$ , the organization will have to increase expenditure on organizational capacity from  $M/L_0$  to  $ML_1$  and  $R_0$  to  $R_1$  respectively. Hence, the cost component of organizational management is a major drawback in the quest to keep up with digitization.

### **Improving organization imbalance in post-industrial era**

Firstly, improving organizational imbalance requires identifying areas that need improvement and what kind of improvements necessary to affect the required complexity. Complexity in the digital age is not a reflection of a fixed phenomenon. Complexity is relative in time and space, culminating from various factors including the speed of technological innovation and transformation within the external environment. Complexity in the digital age can be intensified in to two major ways: a) figure 1.0- a bodily shift in IE or b) figure 2.0- a movement along EE. In figure 1.0, improving organization imbalance requires a bodily shift from  $e_0$  to  $e_1$ . A bodily shift in IE implies organizational incapacity in all areas including management and leadership and organization wide resource capacity. This indicates a total transformation or improvement required to sustain organizational growth. In figure 2.0, attaining equilibrium status at  $e_1$  is rather substitutionary and requires a movement along the same path, EE. Improving organization imbalance requires organizations to spend more on their human resource i.e. employees and leadership development, but not on management. Representing a shift or movement of resources in particular area(s) to other area(s) that are more valuable. Chery (2019) posits that making a lasting change is a function of three variable: knowledge, resource and readiness to change. Removing or eliminating organization imbalance also requires improving these three variables through:

### **Relevant learning theories**

Day (1994) in his study of organizational learning define learning as the process of adopting new knowledge based on informed inquiry and interpretation. This postulate that organizational learning is not reflex but a mental consciousness through cognitive ability (Hesse et. al., 2001). On the other hand, (Odor 2018; Bergmann, 2000) agrees with Day (1994), but adds that learning is also through behavioural approach. Argyris (1977) claims that learning leads to discovery and correction of errors. However, Dooley (1997) argues that learning and change are dependent function of each other. In other words, without adoption of effective organizational learning practices, organizations may not acquire new knowledge relevant for organizational growth. Nevertheless, organizational learning does not occur in a vacuum and learning is not a codified property of one organization. Organizational learning is a context between internal and external interplay of agents (Glynn, Lant, and Milliken, 1994) resulting in the discovery of new knowledge. The external environment represents a more complex structure of multiple interactions, interdependencies, interconnectivity that directly or indirectly contributes to value appreciation on the organization. Knowledge is not unidimensional; therefore, learning must be multidimensional in solving uncertainties (Boiston and Child, 1999) of the external environment that

affect the internal environment. It is therefore very necessary for organizations to engage in knowledge sharing strategies such as benchmarking, community of practice, crowd sourcing, association with digital platforms etc., to acquire and tap relevant external knowledge. In figure 1.0, the shift away from equilibrium was because of application of new technological knowledge within the external environment disproportionate to technological growth within the organization. Organizational knowledge is a prerequisite for technological innovations (Gomes and Wojahn, 2017). Diversity is a mandate for creativity and problem-solving ability McDaniel and Walls (1997), but knowledge is diversional, hence organizational learning is strategic approach to tackling organizational complexity.

Organizations should focus on learning as a scientific measure to predict and focus the next level of action. Detailed prediction of systemic behaviour is impossible (Zimmerman, 1998), but learning is a systemic acquisition of knowledge; hence, learning is not spontaneous. Therefore, organizational learning can guide with the direction of change, since learning is externally participatory. In figure 1.0, increase in  $M/L_0$  to  $M/L_1$  requires organizational leaders in addition to possessing the necessary leadership qualities to be psychologically strategic and scientifically equipped to study and manage its human resources.

### **Training, development and organizational research**

Complexity is a necessity but attaining the required level of complexity in post-industrial era require organizational employment of resources to full capacity. In figure 2.0, employment to full capacity is resident on development of organizational human resource. However, the value of organization's resource capacity includes intellectual capital that is not readily available (Chen, 2019). In order for organizations to lead the wind of change, organizations must be ready and able to mine new knowledge across the breadth and length of its human resource. The digital world has demonstrated that the drive for change is rather the drive for individual innovations, exploring idle knowledge. Digital innovation is not necessarily planned action of management, but the intellectual applications of individual like Mark Zuckerberg, Osafo Kantanka of Ghana etc. In order to make visible the invisible organizational assets, organizations must be ready to motivate and train future leaders to identify other digital gurus within the company (CCCK online, 2018).

Just as intellectual capital is hidden and resides in individual human resource of the organization, so is knowledge. Knowledge is not always acquired. It is only acquired after it has been discovered. Therefore, the most assured way to uncover raw knowledge is to invest in organizational research to discover raw knowledge. Research and development is the first stage in the development process that leads to the discovery of new products (Kenton, 2019) and a leading factor in displacing IE away from EE.

### **Modeling management as function of leadership**

Kottler (2001) states that management involves dealing with complexity while leadership deals with change. This may be comprehensive in the sense that leadership is closer to change, hence, able to effect necessary change. Thus, change is a direct function of leadership, but indirectly contingent upon management. Management and leadership are often argued to be complementary concepts of similar purpose, but this duality is incongruence in debt and application because no matter their complementary roles, leadership in the position of change depends on management to function. In this sense, management can be argued to be perceived from a broader or macro perspective while leadership from a micro or narrow angle. This analysis can be inferred from the evaluation interpretation of management and leadership roles in organizational performance. Management, (a passive function), and leadership (activity function) are complement of change, but the active has to depend on the passive to function. This is incongruence and will eventually fail with intense complexity.

The argument of this study is that organizational fracture is deeply rooted in the duality of the two concepts: leadership and management. The digital age is skeptical. The pace of digitization is outdoing and outmoding laid down procedures and plans. Management plans and processes often become outmoded relative to the rate of change in the global ecosystem. As a result, management processes are not spontaneous response to complexity that influence the required change. In other word, the lag in management response is a deficiency to change. This paper is with the view that organizational

imbalance can be reduced if management is practice as a distributive and executive function of leadership. In essence, management is modeled actively than passively as a process. The 21<sup>st</sup> century organizations should begin practicing management as an activity and not a process because the process represents just the means, but activity is living the means. According to the contingency theory, what managers do depend on the situation at hand (Chandra, 2013), but this explains the reason why management is in slumber and moving at a slower pace as a follower. However, the formula in the 21<sup>st</sup> does not require followers, but leaders who can effect rapid change; this can only be modeled through everyday activity.

This study argues that it takes innovation to check innovation. Hence the continues use of managers with insufficient capacity to match a digital system of machine exploration of Artificial Intelligence (IA), is an imperfect fit of a square peg in a round hole. Thus, the digital age requires a carbon copy of itself to match its pace and speed for successful organizational management. Electronic-Leadership (Walumbwa and Weber, 2009) is an example of a perfect system, necessary to cut down the cost of management, and distribute management as a constructive function of leadership.

## Conclusion

Latour (1992) and Callon (1999) professed that technology is made by humans, and substituted for human actions. Shield (2012) in a similar voice claimed that technology shapes human behaviour, but does not determine human actions. In order words, the post-industrial era may be transcending at exponential rate. However, the inability of organizations to match the pace of digital revolution is fundamentally the inability of human beings to live up to their own standard. According to (Drucker, 2009), management is doing things right, and leadership, doing the right thing. So therefore, organizational imbalance is certainly a problem at the doorsteps of organizations not doing things right and leadership not being empowered to do the right thing. Hence, in order for business organizations to attain the necessary complexity required in the digital age, organizations must adopt a radical and paradigm shift in organizational management. Organizational leadership need a virtual reality glasses that project the future in the form of a mirror-like image, draws on existing technology trend, modify to simplicity, relatable and applicable future complexities and possible revolutionary changes. Leaders do not need to be supernatural; they only need to be super humans, as management in the 21<sup>st</sup> century requires more than just being a human to model the reality of what the next revolution will be. Leaders need to be people with celestial minds, visionary, system thinkers, pace setters, with vast psychological experience and intellectual capital extractors. The focus of the digital age should be the language of management, meaning leadership and leadership translated as management.

## References

- [1]. Ardman H (2018) How does the digital revolution compares to the industrial revolution? [ONLINE] Available at: [www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution](http://www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution) [Retrieved: 11/07/2019].
- [2]. Amadio A.H & Kenny (2019) Aristotle. Greek Philosopher. Available at: [www.britannica.com/biography/Aristotle](http://www.britannica.com/biography/Aristotle). [Retrieved: 15/07/2019].
- [3]. Argyris C., (1977) Double Loop Learning in Organizations. Harvard Business Review. 115-125.
- [4]. BarNir, A., Gallagher, J.M., Auger, P. (2003). Business process digitization, strategy, and the impact of firm age and size: the case of the magazine publishing industry, Journal of Business Venturing, vol. 18, no.6, pp. 789–814.
- [5]. Biswas A. (2018) What's the difference between stable, unstable and neutral equilibrium? Available at: [www.quora.com/what-is-the-difference-between-stable-unstable-and-neutral-equilibrium](http://www.quora.com/what-is-the-difference-between-stable-unstable-and-neutral-equilibrium). [Retrieved: 23/07/2019].
- [6]. Boiston M. & Child J (1999) Organizations as adaptive systems in complex environment: the case of China. Organizational Science. 10(3): 237-252.
- [7]. Bonnet, D., McAfee, A., Westerman, G. (2014). The Nine Elements of Digital Transformation. MIT Sloan Management Review, Available online: <http://sloanreview.mit.edu/article/the-nine-elements-of-digital-transformation/> [Accessed 4 April 2017].

- [8]. Brennen, S. & Kreiss, D. (2014). Digitalization and Digitization. Available online: <http://culturedigitally.org/2014/09/digitalization-and-digitization/> [accessed 6 April 2017].
- [9]. Bragnes G. (2007) Socrates on Management: An analysis of Xenophon's oeconomicus. Working paper. University of Guelph-Humber. <http://ssm.com/abstract=997057>.
- [10]. Brynjolfsson, E. & McAfee, A. (2014) The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: W. W. Norton & Company.
- [11]. Business Communication (2016) Six theories of Management with Modern Management Practices. Available at: [notesread.com/theories-of-management](https://notesread.com/theories-of-management). [Retrieved on 14/07/2019].
- [12]. Business Dictionary (n.d) Management. [www.businessdictionary.com/management.html](http://www.businessdictionary.com/management.html). [Retrieved on 13/07/2019].
- [13]. Callon M. (1999) some elements of a sociology of transaction: domestication of scallops and Fishermen of Saint Bricuc Bay. In biogioli, M. editor. The science study readers, page 67-83. Routledge, New York
- [14]. Capra F., (2002) The hidden connections. New York: Double day.
- [15]. Capra F., (1996) the web of life: A new scientific understand of living systems. New York: Anchor Books Double day.
- [16]. CCCC Online (2018) the role of organizational leadership in the digital age. Available at: [www.myonline.centralchristian.edu/news/2018/07/06/roel-organizational-leadership-digital-age](http://www.myonline.centralchristian.edu/news/2018/07/06/roel-organizational-leadership-digital-age). [Retrieved: 09/05/2019].
- [17]. Chan S. (2001) Complex Adaptive System. E.S.D.83 Research seminar in engineering systems
- [18]. Chandra M. S (2013) Evolution of Management theories. Available at: [www.slideshare.net/mobile/milady123/evolution-of-management-theory](http://www.slideshare.net/mobile/milady123/evolution-of-management-theory). [Retrieved: 08/07/2019].
- [19]. Chen J. (2019) Industrial revolution. Available at: [www.investopedia.com/terms/i/industrial-revolution.asp](http://www.investopedia.com/terms/i/industrial-revolution.asp). [Retrieved: 08/06/2019].
- [20]. Chen J. (2019) Intellectual Capital. Available at: [www.investopedia.com/terms/i/intellectual\\_capital.asp](http://www.investopedia.com/terms/i/intellectual_capital.asp). [Retrieved: 08/06/2019].
- [21]. Cherry K. (2019) The six stages of bahaviour change. The trans theoretical or stage of change Model. Available at: [www.verywellmind.com/the-stages-of-cahnge-2794868](http://www.verywellmind.com/the-stages-of-cahnge-2794868). [Retrieved: 08/06/2019].
- [22]. Collin, J., Hiekkanen, K., Korhonen, J.J., Halén, M., Itälä, T., Helenius, M. (2015). IT Leadership in Transition-The Impact of Digitalization on Finnish Organizations, Research rapport, Aalto University, Department of Computer Science.
- [23]. Colella V, Klpoter E, & Resnick, M. (2001). Adventure in modeling. employing complex, dynamics systems with starrLogo. New York: Teacher College Press.
- [24]. Day G.S (1994) The capabilities of market driven organization. Journal of Marketing. 58:37-52.
- [25]. Denning S. (2013) The Meaning of Management: The Great Awakening. Available at: [www.forbes.com/sites/stevedenning/2013/09/16/then-meaning-of-managment-the-great-awakening](http://www.forbes.com/sites/stevedenning/2013/09/16/then-meaning-of-managment-the-great-awakening) [Retrieved on 01/07/2019] [impacts-of-the-industrial-revolution/amp](https://www.investopedia.com/terms/i/impacts-of-the-industrial-revolution/amp).
- [26]. Dooley K.J (1997) A Complex Adaptive System model of organization change. Nonlinear dynamics. Psychology, and life sciences. Vol.1, No.1.
- [27]. Doolittle, P. E.; Complex Constructivism: A Theoretical Model of Complexity and Cognition; <http://www.tandl.vt.edu/doolittle/research.complex1.html>; 17 May 2002.
- [28]. Essay UK (November, 2018) Causes and effect of disequilibrium in the economy. Available at: <https://www.ukessay.com/essay/economic/causes-and-effects-of-disequilibrium-in-the-economy-economics-esaay.php?vref=1>.
- [29]. Eubanks W.E (2017) Impact of industrial revolution that are still affecting us today. Available at: [www.greenandgrowimng.org/amp](http://www.greenandgrowimng.org/amp). [Retrieved: 20/06/2019].
- [30]. French J. (2012) communication in the digital age. Available at: [www.experthubinfo/business/growing-a-business/information/communiation-in-the-digital-age](http://www.experthubinfo/business/growing-a-business/information/communiation-in-the-digital-age).
- [31]. Gartner Inc. (2014). Gartner Executive Program Survey of More Than 2,800 CIOs Reveals That CIOs Must 'Flip' Their Leadership Styles to Grasp the Digital Opportunity, Available online: <http://www.gartner.com/newsroom/id/2865322> [Accessed 12 March 2017].
- [32]. Gell-Mann, M. (1994). The quark and the jaguar. New York: Freeman & Co.
- [33]. Gomes G, Wojahn R.M (2017) Organizational learning capacity, innovation and performance: study in small and medium-size enterprise. CSMEs.

- [34]. Goran J. (2017) Culture of the digital age. Available at: [www.mckinsey.com/business-functions/digital-mckinsey/our-insight/culture-for-a-digital-age](http://www.mckinsey.com/business-functions/digital-mckinsey/our-insight/culture-for-a-digital-age).
- [35]. Griffin, R. (1987). Management, Boston: Houghton-Mifflin.
- [36]. Glynn M.A, Lant T.K, Milliken F.J (1994) Mapping Learning Process in Organizations; A multi-level Framework for linking and learning organization. *Advances in managerial cognition and organizational information processing* 5:43-83.
- [37]. Hearwell R.M (1971) The industrial revolution and economic growth. Methuen and Co. ISBN 0-416-19, 500-8. pp. 339-41.
- [38]. Hinton J. (2015) How does the digital revolution compares to the industrial revolution? [ONLINE] Available at: [www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution](http://www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution) [Retrieved: 11/07/2019].
- [39]. History.com (2019) Industrial Revolution. Available at: [www.history.com/topics/industrial-revolution/industrial-revolution](http://www.history.com/topics/industrial-revolution/industrial-revolution). [Retrieved: 06/07/2019].
- [40]. Holland J.H (1995) Hidden order: How adaptive builds complexity. New York: Addison-Wesley.
- [41]. Honavar V. (2001) Complex Adaptive System at Iowa State University. Available at: <http://www.cs.iastate.edu/inhonavar/alife.isu.html>. [Retrieved: 11/06/2018].
- [42]. Jones A. (2016) How does the digital revolution compares to the industrial revolution? [ONLINE] Available at: [www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution](http://www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution) [Retrieved: 11/07/2019].
- [43]. Kenton W. (2019) Research and Development (R&D). available at: [www.investopedia.com/terms/r/randd.asp](http://www.investopedia.com/terms/r/randd.asp). [Retrieved: 07/07/2019].
- [44]. Kainz J. (2011) Twenty thoughts “Efficiency and equilibrium in competitive market”. Available at: [econclassroom.com/efficiency-and-ped](http://econclassroom.com/efficiency-and-ped).
- [45]. Kauffman, S. (1995). At home in the universe: The search for the laws of self-organization and complexity. New York: Oxford University Press.
- [46]. Khan, S. (2016). Leadership in the digital age – A study on the effects of digitalization on top management leadership, Master Thesis, Faculty of Social Sciences, Stockholm Business School, Available Online: <http://su.diva-portal.org/smash/get/diva2:971518/FULLTEXT02.pdf> [Accessed 30 March 2017].
- [47]. Kotter, J.P. (2001). What Leaders Really Do, Harvard Business Review, December 2001, vol. 79, no.11, pp. 85-97, Available through: LUSEM Library website: <http://www.lusem.lu.se/library> [Accessed 4 April 2017].
- [49]. Kulikovsky A.S (2009) Creation, preservation and dominion: part 1-God, humanity and the created order. *Journal of creation* 23(1):86-93.
- [50]. Kwok C.F.A (2014) The evolution of management theories: A literature review. *Nang Yan Business Journal*, Hong Kong. Vol. 3, no. 1.
- [51]. Latour B. (1992) where are the missing masses? A sociology of the few mundane artifacts. In Bijker, W and Law, J. editors *shaping tech/building society*. MIT Press, Cambridge, MA.
- [52]. Li, W., Liu, K., Belitski, M., Ghobadian, A. and O'Regan, N. (2016). E-Leadership through strategic alignment: an empirical study of small and medium sized enterprises in the digital age, *Journal of Information Technology*, vol. 31, no. 2, pp. 185-206.
- [53]. Matthew S. (2016) How does the digital revolution compares to the industrial revolution? [ONLINE] Available at: [www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution](http://www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution) [Retrieved: 11/07/2019].
- [54]. McBreath S. & Brooks, A (2000) the revolution that wasn't: a new interpretation of the origin of modern humans. *Journal of Human Evolution* 39,453-563.
- [55]. McDaniel R.R, Lanham H.J, & Anderson R.A (2009) Implication of Complex Adaptive System Theory of a Design of Research on Health Care Organization. *Health Care management review*. 34(2):191-194. Do.10.1097/HMR0b13e31819c8b38.
- [56]. McDaniel R.R Jr. & Walls M.E (1997) Diversity as a management strategy for organizations: A review through the lenses of chaos and quantum theories. *Journal of Management Enquiry*. 6(4): 371-383.
- [57]. McGrath R.G (2014) managers three era: A brief history. [ONLINE] Available at: [hbr.org/2014/07/management-three-eras-a-brief-history](http://hbr.org/2014/07/management-three-eras-a-brief-history) [Retrieved on 08/07/2019].

- [58]. McKinsey Quarterly (2016) leading in the digital age. Available at: [www.mckinsey.com/featured-insight/leadership/leading-in-the-digital-age](http://www.mckinsey.com/featured-insight/leadership/leading-in-the-digital-age).
- [59]. Mircea F (2015) the impact of the digital revolution. Available at: [deepknowhow.com/2015/07/17/impacts-of-digital-revolution](http://deepknowhow.com/2015/07/17/impacts-of-digital-revolution). [Retrieved: 11/07/2019].
- [60]. Meinwald C.C (2019) Plato. Greek Philosopher. Available at: [Britannica.com/biography/plato](http://Britannica.com/biography/plato). [Retrieved: 11/07/2019].
- [61]. Michelman, P. (2016). Leading in an Unpredictable World, MIT Sloan Business Review, 19 July 2016, Available online: <http://sloanreview.mit.edu/article/conversation-with-the-ceo-pierre-nanterme-chairman-and-ceo-accenture/> [accessed 20 April 2017].
- [62]. Miller J.H & Scott E.P (2007) Complex Adaptive System: an introduction to computational models of social life. Princeton University Press. ISBN 9781400835522. OCLC 760073369.
- [63]. Meyer H. (2017) Understanding the digital revolution and what it means. Available at: [www.socialeurope.eu/understading-digital-revolution-means](http://www.socialeurope.eu/understading-digital-revolution-means). [Retrieved: 19/07/2019].
- [64]. Misachi J. (2018) where did the industrial revolution start? Available at: [www.worldatlas.com/articles/where-did-the-industrial-revolution-start.html](http://www.worldatlas.com/articles/where-did-the-industrial-revolution-start.html).
- [65]. New Media (2016) Characteristics of Digital Age. [ONLINE] Available at: [thecomplexgroup4.blogspot.com/2016/05/characteristics-of-digital-age.html](http://thecomplexgroup4.blogspot.com/2016/05/characteristics-of-digital-age.html) [Retrieved on 12/07/2019].
- [66]. Nurmi R. (1984) Aristotle and management. Scandinavian Journal of management studies. Vol.1.Issue 1. pp, 6573.[https://doi.org/10.1016/0281-7527\(84\)90010-0](https://doi.org/10.1016/0281-7527(84)90010-0).
- [67]. Odor H.O (2018) a literature review on organizational learning and learning organizations. International Journal of Economics and Management Sciences. 7:1 Doi:10.4172/2162-6359.1000494.
- [68]. Page, S. E. (2009). Understanding complexity Teaching Company Chantilly, VA.
- [69]. Pariona A. (2017) what was the digital revolution? Available at: [www.worldatlas.com/articles/what-was-the-digital-revolution.html](http://www.worldatlas.com/articles/what-was-the-digital-revolution.html). [Retrieved on 12/07/2019].
- [70]. Quick Base (2012) Three types of change management models. Available at: [www.quickbase.com/blog/three-types-of-change-management-models](http://www.quickbase.com/blog/three-types-of-change-management-models) . [Retrieved on 01/07/2019].
- [71]. Salazar H. (2016) How does the digital revolution compares to the industrial revolution? [ONLINE] Available at: [www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution](http://www.quora.com/how-does-the-digital-revolution-compares-to-the-industrial-revolution) [Retrieved: 11/07/2019].
- [72]. Schwab K. (2016) How business can thrive in the digital age. Available at: [fortune.com/2016/04/27/digital-disruption](http://fortune.com/2016/04/27/digital-disruption). [Retrieved: 21/07/2019].
- [73]. Sengupta S. (2018) Time Management Theories. Available at: [missionself.com/time-management-theories](http://missionself.com/time-management-theories).
- [74]. Shields M.A (2012) Technology and Social Theory Crews: Tech and culture. 53(4):918-920.
- [75]. Sociology Group (2018) Protestant ethic and the spirit of Capitalism: Summary. Available at: [www.sociologygroup.com/protestant-ethic-spirit-of-capitalism-summary](http://www.sociologygroup.com/protestant-ethic-spirit-of-capitalism-summary). [Retrieved on 12/0/2019].
- [76]. Stockton R. (2017) why pre-industrial life was anything but paradise. Available at: [allthatsinteresting.com/pre-industrial-history-gross](http://allthatsinteresting.com/pre-industrial-history-gross). [Retrieved on 19/07/2019].
- [77]. Taylor, F. (1911). Principles of scientific management. New York: Harper & Bros.].
- [78]. Walvoord J.F (2008) The human race: its creation, history, and destiny of creation of man. Available at: [bible.org/seriespage/5-human-race-its-creation-history-and-destination-creation-man](http://bible.org/seriespage/5-human-race-its-creation-history-and-destination-creation-man). [Retrieved: 02/07/2019].
- [79]. Wilkinson J. (2013) Management Definition. Available at: [www.strategiccfo.com/management-definition](http://www.strategiccfo.com/management-definition). [Retrieved on 19/07/2019].
- [80]. Yolles M. (2018) “the complexity continuum. Part one: hard and soft theories” *kybernetes*.48(6): 1330-1354.doi:10.1108/k-06-2018-0337.
- [81]. Zimmerman, B (1998). The inherent drive towards chaos. In P. Lorange, B. Chakravarthy, J. Roos, and A. Van de Ven (Eds.), *Implementing strategic processes: Change, learning, and cooperation* (pp. 373-393). Oxford: Basil Blackwell.