

Revisiting the Organisational DNA Metaphor: Unlocking Genetic Potential

Dr Katombe Madi

Graduate School of Business and Leadership, University of KwaZulu Natal

E-mail: madi.katombe@south32.net

doi: <https://doi.org/10.37745/ejbir.2013/vol13n23955>

Published February 11, 2025

Citation: Madi K. (2025) Revisiting the Organisational DNA Metaphor: Unlocking Genetic Potential, *European Journal of Business and Innovation Research*, Vol.13, No.2, pp.,39-55

Abstract: *Strategic management researchers reckon that the combination of the biology and genetics reality with the management science, could provide effective steps in improving and developing organizations; hence, the initiative paradigm shift of organisational DNA metaphor. This study embarks on an in-depth review of both the organisational DNA concept and the DNA knowledge frontier - firstly, to assess whether the organisational DNA metaphor and academic discussions are warranted; secondly, if advanced DNA knowledge could be integrated into the organisational DNA concept for the betterment of operations management; and if so, thirdly, provide a spectrum of organisational DNA model. The review of DNA knowledge frontier reveals that the genome (DNA) has two components - the “coding DNA” (or Genes) and “non-coding DNA”. Their integration into organisational concept has enabled to establish an analogy: The “coding DNA” (or Genes) that contains the instructions needed for an organism to grow and survive, – translates into unique organizational traits (“structure, decision rights, motivators, and information”); The “non-coding DNA” that controls genes activity (“transcription, and hence, translation, or can switch genes on and off”) and ensures correct chromosomes bundling, which is vital for cell survival, – translates into renewal and innovation without which an organisation survival is compromised. The study proposes a spectrum of organisational DNA model and establishes a pivotal point for re-alignment between internal and external environments.*

Keywords: Organisational DNA, metaphor, renewal, and innovation.

INTRODUCTION

Ever-changing external organizational environment driven by globalization, socio-political-economics hardships, global warming, fast pace of technological advancement, has forced organizations to continuously re-adapt their strategies accordingly to survive, but also to thrive (Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021). Unfortunately, the pace of change in the organizational ecology is faster than the organizations' ability to respond and adapt (Hamel & Välikangas, 2003). As a result, Hovivyan (2006) claims that there is a

substantial existential necessity to explore organizational change. Strategic management researchers have concluded that in order to ensure organizational survival, decision-makers should constantly re-align their strategies with the external environment. Hamel & Välikangas (2003) establish that “the forces that previously contributed to a strategy's success do not warrant future success; thus, success no longer depends on momentum”. Schoemaker & Laurentius Marais (1996) corroborate by stating that “continuous success is contingent upon the manner the organization anticipates and reacts to change and its ability to renew strategies and re-alignment with the external environment”.

In line with the above, at the end of the last millennium, operations management academics introduced the concept of organisational DNA as a metaphor considering the function of DNA in organic species (Morgan, 1995; and Spear & Bowen, 1999). Hence, the initiative paradigm shift of organizational DNA metaphor; the tenet portrays that each organization has exclusive genetic characteristics like any living organism which are shown by the constructing main and natural elements (DNA). Soroush, Esfahani, & Poorfarahmand (2013) suggest that the combination of the biology and genetics reality with the management science, could provide effective steps in improving and developing organizations. According to the proponents, the tenet infers that “the organizational DNA has an effective role in the identification of organizations and their leadership and management functions such as the decision-making process, information, motivators, and organizational structure” (Hamilton, 2004; Neilson, 2004; and Naderi, 2009).

The organizational ecology theory highlights that organizational change is challenging, costly, risky, and time consuming. This theory implies that successful organizations constantly change their routines and structures through renewal or innovations to ensure alignment with the environment (Al-Moaz and Tawfeik Shahein 2019). Huff, Huff, and Thomas (1992) argue that “the firm's inability to carry out such re-alignment leads to inertia”. Strategic management researchers point out that “the way renewal efforts are hindered in an organization is known as strategic inertia (Hopkins, Mallette, & Hopkins, 2013; Rusetski & Lim, 2011; Mallette & Hopkins, 2013), which translates into the extent of commitment to the current strategy”. Their findings reveal that the commitment to current strategy “grows stronger over time as strategies become deeply imbedded in an organization, regardless of the external environment dynamics”. Hamel & Välikangas (2003) and Besson & Rowe (2012) highlight that it is therefore imperative for organizations to overcome the forces of inertia to successfully realign with the environment, failing which organisations could stutter, wither, and eventually stagnate.

The proponents of Organizational DNA as a biological metaphor claim that “the concept describes organizations' strengths and weaknesses, predict employees' behaviour and performance, facilitate the dissemination of knowledge, promote decision-making, and support sustainability by deploying their best capabilities to meet unforeseen changes in their external environment” (Booz-Allen- Hamilton, 2005; Neilson & Fernandez, 2006). While the organisational DNA metaphor is an appealing concept, other researchers are wondering whether the metaphor and the academic discussions are warranted. This study embarks on an

in-depth review of both the organisational DNA concept and the DNA knowledge frontier - firstly, to assess whether the organisational DNA metaphor and academic discussions are warranted; secondly, if advanced DNA knowledge could be integrated into the organisational DNA concept for the betterment of operations management; and if so, thirdly, to provide a spectrum of organisational DNA model.

ORGANISATIONAL DNA CONCEPT

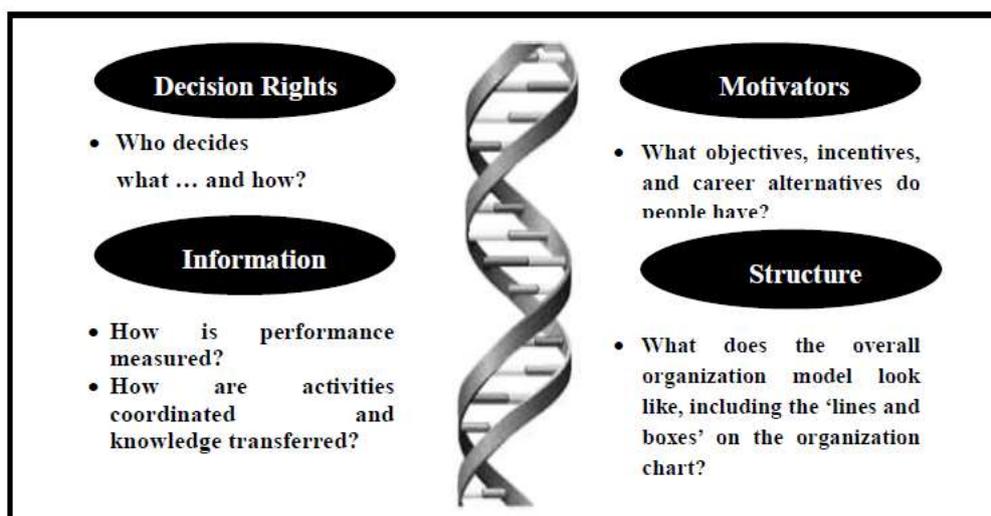
The organisational DNA literature review highlights that the concept was cited for the first time by Morgan (1995) in his book "Images of organizations - where he described the organizational identity through its DNA consisting of three components (Vision, Mission, Values) which are unique for each organization and differentiate it from its competitors in any industry". Later, Kapia, Newham & Volckman (1998) developed a model by "linking three components together in the organizational socio-technical system (Strategy, Process, People)". In an attempt to uncover the source of Toyota's outstanding performance as a manufacturer, Spear and Bowen (1999), publish a paper titled "Decoding the DNA of the Toyota Production System" where they highlight the tacit knowledge captured in four basic rules. These rules guide "the design, operation, and improvement of every activity, connection, and pathway for every product and service". Neilson, Pasternack, & Mendes (2003 & 2004) build on this concept and posit that "the DNA of a living organization has four bases that, combined in myriad ways, to define an organization's unique traits". They introduce a model consisting of four building blocks ("Structure, Information flow, Motivators and Decision-making authority").

Over the last two decades, several academics have published studies on the organisational DNA concept as a change-oriented approach that aims to re-adapt with the internal and external environment of the organisation under any contingencies (Neilson & Fernandez, 2006, and Duggal, 2018); such as – "process design and the facility layout" (Ivanov, 2011), "recruiting, selecting, staffing the workforce to achieve fitness between the organization and its people" (Holladay, 2005), "leading, motivating and managing performance" (Ray & Barney, 2008), "setting a new marketing mix" (Booz-Allen- Hamilton, 2005), and "describing the governance elements" (Vershoor, 2004; 2005; Arjoon, 2006).

Other academics have demonstrated that re-adaptation process could be accomplished through a "dual- DNA", which has static and dynamic components (Govandirjan and Trimble, 2005; Dobni, 2008). Their studies rely on the chaos theory in mechanics and mathematics. In a nutshell, chaos theory is "the study of apparently random or unpredictable behaviour in systems governed by a paradox because it connects two notions that are familiar and commonly regarded as incompatible". Or simply put "seemingly random and unpredictable behaviour that nevertheless proceeds according to precise and often easily expressed rules". Lorenz Edward (1993) summarises the chaos theory by stating that "the present determines the future, but the approximate present does not approximately determine the future". The chaos theory about the equilibrium state can be reached through two paradox forces, or two paradox schools of thinking such as "the mechanistic and organismic metaphors" (Prange and Schlegelimich,

2010; and Ricciardi, 2011). Similarly, renewal and/or innovation which is required for re-adaptation, can have two paradox forces (“External and Internal, Radical and Incremental, from Up-to-Down and from Down-to-Up across management levels, Technical oriented and Organization oriented, Process oriented and People oriented”).

Authors define organizational DNA from various perspectives: according to Thomas, (2007), “organizational DNA is a technique or means used to pinpoint difficulties facing an organization and inhibiting its performance, along with ways to overcome such difficulties”. David and Neilson (2006) suggest that “organizational DNA is a metaphorical term denoting the fundamental factors that define the character of an organization and help explain its performance”. Neilson, Pasternack, & Van Nuys (2005) argue that “organizational DNA is a theory or a metaphor, enclosing elements that together describe the identity of the organization and helps in expressing the organizational activities as the DNA in nature describes required aspects for creation of a unique living creature”. Based on Booz-Allen-Hamilton (2004) perspective, “organizations have four pairs of nucleotides that, combined in myriad ways and define an organization’s unique traits”. These unique traits which are called the organisational DNA are organizational “structure, decision rights, motivators, and information”. Booz-Allen-Hamilton (2005) highlights that organisations should assess their organisational traits when experiencing challenges in execution; furthermore, he boldly states that “organizations, unlike humans, have the ability to change their DNA to redress entrenched flaws in their unique traits to build better performance”. Neilson, Pasternack, & Mendes (2003 & 2004) propose the four building blocks of organisational DNA as depicted in figure 1. “The DNA of living organizations consists of four building blocks, which combine and recombine to express distinct identities, or personalities and largely determine how a firms look and behave, internally and externally”.



Source: Booz-Allen-Hamilton (2004), and. (Neilson, Pasternack, & Mendes 2003; 2004)
Figure 1. The four building blocks of organizational DNA

It is believed by this approach that “competent people in an organization, who are the main and principal forces of successful organizations, are merited by proper values, equipped by correct information and motivated by appropriateness rewards” (Neilson, Pasternack, & Mendes, 2005).

These four elements are inextricably intertwined - For instance, making a change to the organizational structure requires making changes to the decision-making rights. This will trigger the need to provide employees with new incentives and with information that enables them to make effective decisions, act freely and show creativity. In addition, changing the organizational structure requires developing new performance measures (Neilson, Pasternack, & Mendes, 2003 & 2004).

DNA KNOWLEDGE FRONTIER

Teruel-Carrizosa (2006) suggests that manufacturing firms, “like organisms, evolve and in the process adapt to changes in both their internal and external environments” on the other hand, Nelson and Winter (1982) draw an analogy between the theory of evolution in biology and the evolution of manufacturing firms and conclude that “firms survive and expand through technological competition”, a parallel could be drawn with the “struggle for life” published by Darwin (1859). Organisational DNA metaphor is based on the “biological molecule that encodes the genetic instructions in living organisms”. Flynn & Yamashita (2016) and Yamashita & Jagannathan, (2017) mention that DNA contains the instructions needed for an “organism to grow, survive, and reproduce”. To carry out these functions, DNA sequences which is written in a simple alphabet that has just four letters — A, T, C, and G, “form set of instructions to orchestrate the cells' proteins synthesis processes”.

Genetic information refers to as genes (or “coding DNA”) is “the hereditary material that individuals pass on to their offspring, influencing characteristics, health status, and kinship”. DNA is defined to have three main functions: “genetic, structural, and immunological functions (Jagannathan & Yamashita, 2017). Jagannathan, Cummings, & Yamashita, (2018) highlight that Genes or coding DNA comprise only about 1-2% of our entire genome or DNA. Scientists call “non-coding DNA” the 98-99% of our entire genome that is doing something else except for coding for proteins (Flynn & Yamashita (2016). It seems that the organisational DNA metaphor primarily focus on “coding DNA”, this is because the proponents claim that organizational DNA is “a metaphor or a theory, involving elements that together describe the identity of the organization and helps in expressing the operating performance according to four principal factors that unify and distinguish the character of an organization namely: decision rights, information, motivators, and structure” (Neilson, Pasternack, & Mendes, 2005; and David, & Neilson, 2006).

Non-coding DNA are those pieces of DNA between the coding regions that do not make any known proteins (Jagannathan, Cummings, & Yamashita, 2018 & 2019). Until recently, scientists believed that “non-coding” DNA did not serve any real purpose. However, lately they have found that “non-coding DNA can contribute to its regulation by controlling transcription,

and hence, translation” (Flynn & Yamashita, 2023; Flynn & Yamashita, 2024). This study will explore this newly DNA discovery aspect into organisational DNA theory.

Jagannathan & Yamashita (2021) contend that “even though genes or coding DNA are almost identical from person to person, non-coding DNA has many more differences, making it easier to distinguish between individuals”. This variability makes non-coding DNA a more effective tool for identification purposes in forensic science. According to Jagannathan, Warsinger-Pepe, Watase, Yamashita (2017) non-coding DNA can switch genes on and off; when genes or coding DNA are switched off, the process of transcription stops. Researchers find that the non-coding DNA plays a crucial role in holding the genome (DNA) together; in addition, “it performs the vital function of ensuring that chromosomes bundle correctly inside the cell’s nucleus, which is necessary for cell survival” – (Jagannathan & Yamashita, 2017; Jagannathan, Cummings, & Yamashita, 2018). Flynn & Yamashita (2024) confirm that this function appears to be conserved across many species.

In summary the organisational DNA metaphor and academic discussions are warranted; this research will build on previous studies to explore recent advanced DNA knowledge in an attempt to establish an analogy between coding DNA and non-coding DNA in organisational DNA concept.

INTEGRATION OF ADVANCED DNA KNOWLEDGE INTO ORGANISATIONAL THEORY

According to Geroski (1995), “The growth and survival prospects of organisations will depend on their ability to learn about their environment, and to link changes in their strategy choices to the changing configuration of that environment”. One could draw a parallel with Epigenetics which provides “insights on how environmental and lifestyle factors can change genes behaviour without altering genetic makeup” Flynn & Yamashita (2023). Similarly, by including the firm-level rivalry measure in their study, Nand, Prakash, & Ananya (2014) conclude that the environmental dynamics or levels of competition faced, is a significant predictor of strategy choice. According to Al-Moaz & Tawfeik-Shahein (2019), the organizational DNA concept is “a constellation of interrelated and integrated tangible and intangible variables that identify the organization. These variables are static in the short term and dynamic in the long one and are responsible for the re-adaptation process, which are needed when contingencies have changed in the whole ecosystem that any organization is part of it”.

Coding DNA sequences or instructions written using four simple alphabet letters — A, T, C, and G, must be converted into messages that can be used to produce proteins. Each group of three bases corresponds to specific instructions, which are the building blocks of proteins, for example T-G-G (tryptophan), G-G-C (glycine), and T-G-A (indicating the end of a protein sequence). Based on Booz-Allen-Hamilton (2004) perspective, a similarity can be drawn – “organizations have four pairs of nucleotides that, combined in myriad ways, define an organization’s unique traits. These unique traits are organizational structure, decision rights, motivators, and information. These traits are called the organizational DNA” – they largely

determine how a firm looks and behaves, internally and externally (Neilson and Fernandez, 2006, and Neilson, Pasternack, & Mendes, 2003). Based on the above, it can be concluded that so far, the organisational DNA theory has focused on the coding DNA (or genes) which provides Identity or characteristics of the organization and expresses the operating performance.

Some non-coding DNA sequences are known to serve functional roles, such as in the regulation of gene expression, control of gene activity - transcription, and hence, translation. Moreover, non-coding DNA can switch genes “on and off” to stop the process of transcription. Recently, scientists have acknowledged that non-coding DNA is vital to studying “human health and disease”; non-coding DNA performs the vital function of ensuring that chromosomes bundle correctly inside the cell's nucleus to ensure cell survival (Flynn & Yamashita (2023); by drawing an analogy with organisational DNA, non-coding DNA functions point to renewal and innovation without which growth and survival of an organisation could be stopped. At an organisational level, “firms survive and expand through technological competition”, Nelson and Winter (1982) termed processes ‘routines’ the combination of both a resource and a risk. According to them, the challenge of process management is that “even though at an organisational level survival and competitiveness are the result of process adaptation and innovation, the individuals executing these processes exhibit satisfying behaviour rather than innovative behaviour”.

Scholars were keen on investigating the genes of change with different concepts; for instance, Rashid & Challab (2007), Thomas (2007), Govindarajan & Trimble (2005), and Al-Moaz & Tawfeik-Shahein (2019) indicate that organizational DNA has a significant relationship with innovation and performance. Lawton, Rajwani, & Reinmoller (2012) concur to this, and state that “DNA allows the innovative biological infrastructure and storage areas of learning to develop and accumulate through evolutionary processes”. “Renewal and/or Innovation chain consists of systematic consequential phases that start with the problem definition phase then the creativity phase, which begins with producing, collecting and filtering unique and new ideas” (Al-Moaz & Tawfeik-Shahein, 2019). Thus, creativity is a phase in the innovation whole chain followed by the invention phase - in which prototyping and technical feasibility have been achieved (Khiliji, Mroezkowski, Bernstien, 2006; Crossan & Apyadin, 2010; Brennan & Dooley, 2005). Therefore, “creativity is coming up with new and useful ideas, while innovation is the successful implementation of those ideas” (Al-Moaz and Tawfeik-Shahein (2019). Creativity concentrates on the psychological status of the organization and is related to concepts such as “perception, emotional intelligence, organization learning, and organization values”. In contrary, renewal and innovation concepts concentrate on concepts such as “products, process, marketing mix, business model, structure, technology, effectiveness and efficiency” (Udwadia, 1990; Spena & Mele, 2012). Moreover, renewal and innovation concepts are significantly different from knowledge concept because “knowledge might be stored, retrieved, and shared but renewal or innovation might not because of its freshness nature” (Gurteen, 1998).

An interesting connection between creativity and innovation is that one can have quite a lot of creativity in a business organization without having much innovation at the other end. In order to close the gap between creativity and innovation or more broadly the dynamics between internal environment and external environment - the “need” information (what the customer wants) with the customer, and the “solution” information (how to satisfy those needs) which lies with the firm” should reside in a similar repertoire so that the requirement/value is unlocked through innovation (Thomke and Von Hippel, 2002). While on one hand, a telltale sign of organisation renewal strategy could include - retrenchment strategy, turnaround strategy, and diversification strategy which could be done through Incremental renewal or Transformational renewal (radical shifts) (Sammut-Bonnici & McGee, 2015); on the other hand, there are many typologies for innovation: radical and/or incremental (Tidd, 2006; Ben-Regeb, Gumares, Boly & Assielou, 2008); technical and/or organizational (Adams, Bessant & Phelps, 2006; Crossan & Apyadin, 2010, Gunday, Ulusoy, Kilic & Alpan, 2011); product-oriented, process-oriented, people-oriented, and/or business model (Crossan & Apyadin, 2010; Gunday, Ulusoy, Kilic & Alpan, 2011; Xu, Chen, Xie, Liu & Zheng, 2007).

REVISITING THE ORGANISATIONAL DNA THEORY

The introduction of advanced DNA knowledge suggests that there are two components to the organisational DNA theory. The coding DNA (or genes) that contains the instructions needed for an organism to grow and survive which translates into unique organizational traits (“structure, decision rights, motivators, and information”). The non-coding DNA that controls genes activity (“transcription, and hence, translation, or can switch genes on and off”), and ensures correct chromosomes bundling to guarantee cell survival - which at organisational level, translates into renewal and innovation without which an organisation survival is compromised. Several academics state that renewal and innovation have been imperative factors for organisation survival and growth in such a global competitive environment and ever-changing business environment (Lawton, Rajwani & Reinmoller, 2012; Sammut-Bonnici & McGee, 2015). Practically, market dynamics are far more volatile than resource dynamics, which exacerbates the alignment of internal performance with external performance. For example, while on the one hand, Competitors will introduce new products and higher levels of service on a permanent basis, on the other hand, Customer preferences and their spending habits can shift with fashions, the weather in general and particularly global warming, technological advancement, socio-political and economic conditions, contributing therefore to an extremely dynamic, volatile, or turbulent market.

At an organisation level, from an operations point of view, the internal and external environments dynamics require to manage with insight and lead with foresight: Managing with insight and leading with foresight influence organizational alignment with the environment and firm resources and processes, and on the establishment of an organization’s course of action, deriving from renewal and innovative ideas (Madi, 2023). Overall, preparation is vital to guarantee success regarding sensible course of action.

Managing with insight not only includes “unwavering commitment to quality, ownership, adaptability, clear sense of purpose, reputation, transparency and communication, professionalization (to ensure competitiveness and success over the long-term), hierarchy of practiced organizational routines and their coordination, and higher order decision procedures for choosing what is to be done at lower levels (to name a few), but also insightful management of interaction between functions at each stage of product development and continuous interaction with current and potential customer-base” (Madi, 2023). This implies that new information stemming from the various functions of the firm and its various interfaces with up—and downstream entities (suppliers and the market) is considered and incorporated into the evolution and continuous refining of the strategy itself.

Similarly, leading with foresight not only includes “corporate governance and leadership, entrepreneurship, investment in growth, succession planning, blending tradition and embrace renewal and innovation as driving forces for progress, adaptation to change, long-term vision, adopting new technologies, exploring global markets, and diversifying its offerings (to name a few)” (Madi, 2023), but also, (1) create competitive anticipatory management capability: through activation of future-oriented interests and concerns encompassing long-term as well as near-term considerations and (2) enable operations managers to make prudent anticipatory competitive innovative decisions.

Graphically, “manage with insight” and “lead with foresight” together with “the instruction to grow and survive”, and “renewal and innovation” are represented in figure 2 - which in a nutshell depicts the spectrum of organisational DNA model. Managing with insight mainly focuses on the inwards environment while leading with foresight mainly deals with the outwards environment. This view is also supported by Menelau et al. (2019). In this way, this study suggests that “leading with foresight” guarantee continuous alignment between the environment and the firms’ operational capabilities, while managing with insight ensures continuous alignment between and within functions (e.g., R&D, supplier, operations and marketing) as well as at all of the firm levels. This view is supported by Brown (2000), Brown and Cousins (2004), and Wang and Cao (2008). Hence, Besson & Rowe (2012) contend that “organizational health is more challenging to achieve than most think since it results from employees' everyday decisions and actions in a complex business environment”.

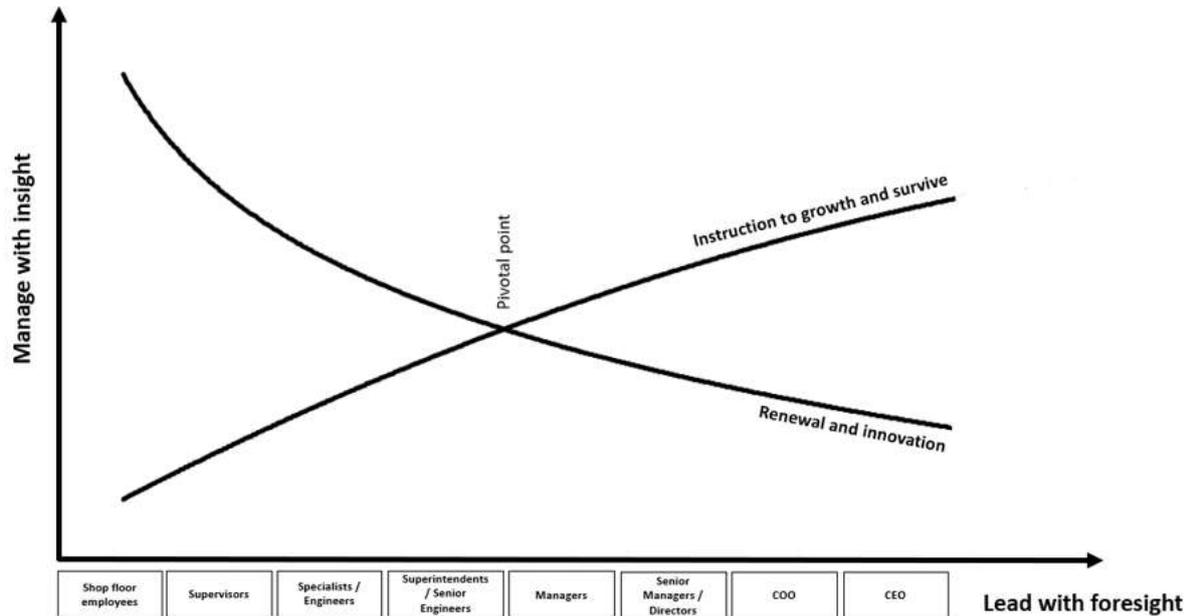


Figure 2. The spectrum of organisational DNA model

The “instruction to grow and survive”, which is hardwired into unique traits (organizational structure, decision rights, motivators, and information), is prevalent at the highest level in the organisation, corresponding to the highest level of “manage with insight”. The “renewal and innovation” drives are more prevalent at the highest level in the organisation as naturally foresight is a prerogative of top management. However, the workforce who is manning daily equipment, workstations, and processes and designs (respectively shop floor employees and supervisors, specialists, and Engineers) will have more detailed insight than top management regarding “renewal and innovation” of these factors of production. Hence, Spear and Bowen (1999) confirm that frontline workers generate improvement initiatives which are implemented under the guidance of a “master”. It is worth mentioning that depending on the environment, these curves could shift up or down respectively depending on the increasing or decreasing level of “manage with insight” of the workforce, therefore two similar assets may possibly perform differently.

In addition, the intersection point of these two curves is critical since it represents a nexus where middle management has both “corresponding levels” of “manage with insight” and “lead with foresight”. One could argue that in terms of “instruction to grow and survive” and “renewal and innovation” the middle management plays a crucial role and should be the strongest link as they ensure that, on the one hand, the vision from top management is decoded into short, medium, and long-term routines for shop floor employees, supervisors, specialists, and engineers and; on the other hand, the middle management has the duty to funnel improvement initiatives generated by frontline workers to keep the organisational momentum of renewal and innovation. It can be concluded that the middle management constitutes a pivotal point for re-alignment between internal and external environments. This is supported by several scholars who propose that “decision-making autonomy offered to middle managers

(leads to) the flexibility and responsiveness to changes” (Malette & Hopkins, 2013; Hopkins et al., 2013).

The crucial and pivotal point is not static during the life of the organisation. Theoretically, after inception of the organisation, the “instruction to grow and survive” starts to increase together with the drive for “renewal and innovation” dependent on the nature of the industry and the environment. Ultimately the attraction, growing and retaining of the required talent and skills or exceptional human capital matching the DNA of the organisation will prove to be the survival of a legitimate organisational bloodline.

RESEARCH IMPLICATION

The integration of advanced DNA knowledge has enabled to draw explanatory comparisons of functionality of coding DNA (or Genes) and non-coding DNA in organisations, while intentionally not ignoring the ways in which biological DNA and organisational DNA are different since it is a bit more complex. The construction of the spectrum of organisational DNA model serves to assess further, the plausibility of the expanded understanding they afford, as well as to expand our understanding of these entities. An interesting theoretical implication of this research is that this study brings about a paradigm shift of the organisational DNA theory from metaphor concept to conceptual analogy; practically, the study has categorised each class of workforce on the spectrum of organisational DNA and has highlighted their plausible impact on the constant quest for re-alignment of internal strategies with the external environment through renewal and innovation.

CONCLUSION

This study embarks on an in-depth review of both the organisational DNA concept and the DNA knowledge frontier. The review of DNA knowledge frontier reveals that the genome (DNA) has two components - the “coding DNA” and “non-coding DNA”. Their integration into organisational concept has enabled to establish an analogy: The “coding DNA” (or Genes) that contains the instructions needed for an organism to grow and survive – translates into unique organizational traits (“structure, decision rights, motivators, and information”); The “non-coding DNA” that controls genes activity (“transcription, and hence, translation, or can switch genes on and off”) and ensures correct chromosomes bundling, which is vital for cell survival, – translates into renewal and innovation without which an organisation survival is compromised. The study proposes a spectrum of organisational DNA model and establishes a pivotal point for re-alignment between internal and external environments.

REFERENCE

- Adams, R., Bessant, J. & Phelps, R. (2006). Innovation Management Measurement: a Review, *International Journal of Management Reviews*, Vol. 8, No.1, (pp. 21-47).
- Al-Dahan, O., Ramadan, Z., Sheikh Salem, F., & Makhmra, M. (2018). *Modern Management Concepts*, Jordan Book Center, Amman, Jordan.

- Al-Moaz H. M. and Tawfeik-Shahein H. (2019). Building a conceptual proposed model for the total innovation DNA European Journal of Business and Innovation Research Vol.7, No.6, pp.18-34, November 2019 Published by ECRTD-UK
- Ameeneh, M., & Maymoon, K. (2017). Organizational DNA and Organizations Entrepreneurship (Case Study of Algerian Mobile Operators). Journal of Economic and Financial Research, 4(1), (pp. 53 – 79).
- Arjoon, S. (2006). "Social Polices Challenges in the Post-Independence Era: Corporate Governance and Organizational DNA: The Role of Ethics", Seventh Annual Conference, Sherburne Conference Center, Trinidad & Tobacco, (pp.1-19).
- Ben-Rejeb, H., Guimares, L., Boly, V. & Assielou, N. (2008). "Measuring Innovation Best Practices: Improvement of An Innovation Index Integrating Threshold and Synergy Effects", Technovation, Vol. 28.
- Besson, P., & Rowe, F. (2012). Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions. The Journal of Strategic Information Systems (21), (pp. 103-124)
- Besson, P., & Rowe, F. (2012). Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions. The Journal of Strategic Information Systems (21), (pp. 103-124).
- Booz-Allen-Hamilton (2002). When Everyone Agrees but Nothing Change: Aligning People, Incentives and Knowledge to Overcome Organizational Inertia. Business + Strategy Review. Retrieved from <http://www.strategy-business.com>
- Booz-Allen-Hamilton (2004). Organizational DNA. Booz & Company. Retrieved from <http://www.orgdna.com>
- Booz-Allen-Hamilton (2002). When Everyone Agrees but Nothing Change: Aligning People, Incentives and Knowledge to Overcome Organizational Inertia. Business + Strategy Review. Retrieved from <http://www.strategy-business.com>
- Booz-Allen-Hamilton (2004). Organizational DNA. Booz & Company. Retrieved from <http://www.orgdna.com>
- Booz-Allen-Hamilton (2005). "the DNA of Marketing", Working Paper, Booz.-Allen-Hamilton, (pp. 1-16).
- Bordia, R., Kronenberg, E., & Neely, D. (2005). Innovations Organizational DNA. Retrieved from <http://www.boozallen.com>
- Bordia, R., Kromenbery, E. & Neely, D. (2005). "Innovations' Org DNA", Working Paper, Booz. Allen. Hamilton, New York, (pp. 1-10).
- Brown, S. (2000). Manufacturing the Future—Strategic Resonance for Enlightened Manufacturing. Financial Times/Pearson Books, London.
- BROWN, S.; COUSINS, P. D. (2004). Supply and operations: Parallel paths and integrated strategies. British Journal of Management, 15, (pp. 303-320).
- Brennan, A. & Dooley, L. (2005). "Networked Creativity: A structured Management Framework for Stimulating Innovation", Technovation, Vol. 25, (pp. 1388 -1399).
- Crossan, M. & Apyadin, M. (2010). "A Mult-Dimensional Framework of Organizational Innovation: A systematic Review of the Literature", Journal of Management Studies, Vol. 47, No. 6, (pp. 1151-1191).

- Crossan, M. & Apyadin, M. (2010). "A Mult-Dimensional Framework of Organizational Innovation: A systematic Review of the Literature", *Journal of Management Studies*, Vol. 47, No. 6, (pp. 1151-1191).
- Daft, R., (2000). *Organization Theory and Design*. Canada, Toronto: Nelson Education Ltd.
- David, G. K., & Neilson, G. (2006). *Organizational to Executive: It's in the DNA*. Ivey Business Journal, (pp. 1–16).
- Darwin, C. (1859). *On the origin of species, or the preservation of favoured races in the struggle for life*. London: Murray.
- Duggal, J. (2018) "The DNA of Strategy Execution", John Wiley & Sons., New-Jersey.
- Flynn Jullien M. , Yukiko M. Yamashita (2023). The implications of satellite DNA instability on cellular function and evolution. <https://doi.org/10.1016/j.semcd.2023.10.005>Get rights and content
- Flynn Jullien M, Yukiko M. Yamashita (2024). *Seminars in cell & developmental biology*, volume 156, 15 March 2024, (pp. 152 -159).
- Flynn Jullien M. , Yamashita Yukiko M. (2016). The implications of satellite DNA instability on cellular function and evolution <https://doi.org/10.1016/j.semcd.2023.10.005>Get rights and content
- Gale, M., & Aarons, C. (2017). "The Digital Helix: Transforming Your Organizations DNA to Thrive in the Digital Age", Greenleaf Bok Group Press, Texas,
- Geroski, P.A. (1995). *Markets for Technology: Knowledge, Innovation and Appropriability*. In: Stoneman, P., Ed., *Handbook of the Economics of Innovation and Technological Change*, Blackwell Publishers, Oxford, (pp. 90-131).
- Govindarajan, V., & Trimble, C. (2006). *Organizational DNA for Structure Innovation, Management Span and Layers*. Retrieved from <http://www.Orgdna.com>
- Gunday, G., Ulusoy, G., Kilic, K. & Alpkan, L. (2011). " Effects of Innovation Types on Firm Performance", *International Journal of Production Economics*, Vol. 1. 133, (pp. 662-676).
- Gurteen, D. (1998). "Knowledge, Creativity & Innovation", *Journal of Knowledge Management*, Vol. 2, No.1, (pp. 5-13).
- Hamel, G., & Välikangas, L. (2003). The quest for resilience. (cover story). *Harvard Business Review*, 81(9), (pp. 52-63).
- Hamilton, B. (2005). *Organizational DNA*. Retrieved from <http://www.boozallen.com>
- Hamilton, B. (2005). *Organizational DNA*. Retrieved from <http://www.boozallen.com>
- Hodge, B., & Anthony, W. (1991). *Organization Theory: A Strategic Approach*. Allyn & Bacon, Inc.
- Holladay, R. (2005). "Simple Rules: Organizational DNA", *OD Proctioner*, Vol. 37, No. 4, (pp. 1-10).
- Hopkins, W. E., Mallette, P., & Hopkins, S. A. (2013). Proposed factors influencing strategic inertia/strategic renewal in organizations. *Academy of Strategic Management Journal*, 12: (pp. 77-94).
- Hovivyan, L. H. (2006). *Organizational DNA: Diagnosing the Health of Organizations in Armenia*. American University of Armenia
- Huff, J.O., Huff, A.S. and Thomas, H. (1992). "Strategic renewal and the interaction of cumulative stress and inertia", *Strategic Management Journal*, 13 (S1), (pp. 55-75).

- Ivanov, S. (2012) "The Problem of Defects in Modern Organizations: Preliminary Research Findings", The International Conference of Management and Education Innovation, Singapore.
- Jagannathan Madhav and Yamashita Yukiko M. (2021). Defective satellite DNA clustering into chromocenters underlies hybrid incompatibility in *Drosophila*. doi: <https://doi.org/10.1101/2021.04.16.440167>; this version posted April 16, 2021.
- Jagannathan M., N. Warsinger-Pepe, G. J. Watase, Yamashita Y. M. (2017). Comparative Analysis of Satellite DNA in the *Drosophila melanogaster* Species Complex. *G3 Bethesda*. 7, (pp. 693–704).
- Jagannathan M., R. Cummings, Yamashita Y. M. (2018). A conserved function for pericentromeric satellite DNA. *Elife*. 7 (2018), doi:10.7554/eLife.34122
- Jagannathan M., Yamashita Y. M. (2017). Function of Junk: Pericentromeric Satellite DNA in Chromosome Maintenance. *Cold Spring Harb. Symp. Quant. Biol.* 82, 319–327 (2017).
- Jagannathan M., R. Cummings, Yamashita Y. M. (2019). The modular mechanism of chromocenter formation in *Drosophila*. *Elife*. 8 (2019), doi:10.7554/eLife.43938.
- Kaplan, P., Newham, C. & Volckman, R. (1998). "Aligning Strategy, Process & People Through Pyramid Building", *System Thinker*, Vol. 9, No.3.
- Kaplan, S. (2015). *Truce Breaking and Remaking: The CEO's Role in Changing Organizational Routines*. *Cognition and Strategy*, Published Online: 19 Aug 2015, 1-45.
- Kaplan, S., & Henderson, R. (2005). Inertia and Incentives: Bridging Organizational Economics and Organizational Theory. *Organization Science*, 16(5), 509–521. doi:10.1287/orsc.1050.0154
- Khilji, S., Mroczkowski, T. & Bernstein, B. (2006). "From Invention to Innovation: Toward Developing an Integrated Innovation Model for Biotech Firms", *Journal of Product Innovation Management*, Vol. 23, P.P. 528-540.
- Lawton, T., Rajwani, T. & Reinmoller, P. (2012). "Do You Have a Survival Instinct?: Leveraging Genetic Codes to Achieve Fit in Hostile Business Environments", *Business Horizons*, Vol.55, (pp. 81-91).
- Lorenz Edward N., (1933). *THE ESSENCE OF CHAOS*. University of Washington Press - This edition published in the Taylor & Francis e-Library, 2005. www.eBookstore.tandf.co.uk."
- Mallette, P., & Hopkins, W. E. (2013). Structural and cognitive antecedents to middle management influence on strategic inertia. *Journal of Global Business Management*, 9(3), (pp. 104-115).
- Menelau Sueli, Akutsu Luiz, Isidro-Filho Antônio, Fernandes Antônio Sérgio Araújo (2019). Strategic resonance and innovation in public security services in Brasil. *Revista Organizações & Sociedade* - v. 26, n. 88, p. 50-71, jan./mar. DOI 10.1590/1984-9260883 | ISSN Eletrônico - 1984-9230 | www.revistaoes.ufba.br
- Morgan, G. (1995). "Images of organization", Sage Publications: California.
- Nelson R. R. & Winter G. S. (1982). "An evolutionary theory of economic of change", The Belknap press of Harvard University press – Cambridge – Massachusetts and London - England

- Nand Alka Ashwini, Singh J. Prakash and Ananya, Bhattacharya Ananya (2014). Why do firms trade-off or accumulate operations capabilities? Competition based explanation from the dynamic capabilities view. *International Journal of Innovation Management*, vol. 18, issue 03, 1-17
- Neilson, G., Pasternack, B., & Mendes, D. (2005). *The Four Bases of Organizational DNA*. Retrieved from <http://www.boozallen.com>
- Neilson, G., Fernandez, L. (2006). "The Dominant Genes: Organizational Survival of the Fittest Working Paper, Booz. Allen. Hamilton Inc., New York.
- Neilson, G., Fernandez, L. (2006). "The Dominant Genes: Organizational Survival of the Fittest Working Paper, Booz. Allen. Hamilton Inc., New York.
- Neilson, G., Pasternack, B. & Mendes, P. (2003). *The Four Bases of organizational DNA, Strategy & Business*. Vol. 33, Winter (pp. 1-10).
- Neilson, G., Pasternack, B., Mendes, D., & Tan, E.-M. (2004). *Profiles in organizational DNA: Research and remedies*. Drainesville, VA: Booz Allen Hamilton. <https://www.strategyand.pwc.com/gx/en/functions/organisationalstrategy/orgdna-profiler.html>
- Naderi, A. (2009). *Organization DNA Explanation and How to Find it*. Management Thesis for MSc, Islamic Azad university Khorasgan Branch.
- Neilson, G. (2004). *The Four Factor of Organizational DNA*. Retrieved from <http://www.Boozallen.com/4Factor.html>
- Neilson, G. (2006). *The Four Factors of Organizational DNA*. *Harvard Business*, 33, (pp. 1–10).
- Neilson, G., Pasternack, B., & Mendes, D. (2003). *The Four Bases of Organizational DNA Trait by trait, companies can evolve their own execution cultures*. Retrieved from <http://www.strategy-business.com>
- Neilson, G., Pasternack, B., & Mendes, D. (2004). *The 7 Types of Organizational DNA An Exclusive Survey Shows Most Companies Possess Traits that Inhibit their Ability to Execute*. Retrieved from <http://www.strategy-business.com>
- Neilson, G., Pasternack, B., & Mendes, D. (2005). *The Four Bases of Organizational DNA*. Retrieved from <http://www.boozallen.com>
- Neilson, G., Pasternack, B., & Van Nuys, K. (2005). *The Passive-Aggressive Organization*. *Harvard Business Review*, 1–12.
- Neilson, G., Pasternack, B. & Mendes, P. (2003). "The Four Bases of organizational DNA", *Strategy & Business*. Vol. 33, Winter, (pp. 1-10).
- Rashid, S., Chalab, I. (2007). "The Influence of Organizational DNA of Innovation Performance: An Empirical Study in a Sample of Iraqi Industrial Organizations", *Qadesia for Management and Economic Science*, vol. 9, No. 4, (pp. 9-22).
- Ricciardi, F. (2011). "Beyond Darwin: The Potential of Recent Evolutionary Research for Organizational and Informational Systems Studies ", Working Paper, Catholic University, Milan.
- Prange, C., Schlegelmlich, B. (2010). "Heading for the Next Innovation Archetype", *Journal of Business Strategy*, Vol. 31, No.1,

- Rusetski, A., Lim, L.K.S. (2011). Not complacent but scared: another look at the causes of strategic inertia among successful firms from a regulatory focus perspective. *Journal of Strategic Marketing*, 19, (pp. 501-516).
- Sammut-Bonnici Tanya & McGee John (2015). *Strategic Renewal*. Wiley Encyclopedia of Management Vol 12 Strategic Management. DOI: 10.1002/9781118785317.weom120211
- Schoemaker, P. J. H., & Laurentious Marais, M. (1996). Technological innovation and firm inertia. In F. Malerba, & G. Dosi, (Ed). *Organization and strategy in the evolution of the enterprise* (pp. 179- 205). Basingstoke: Macmillan.
- Soqoor, M. (2015). The relation between leadership practices and organizational DNA: a study of Industrial organizations in Damascus. University of Damascus, *Journal of Economics and Law*. 1(34). (pp. 9-46).
- Soroush, S., Esfahani, D., & Poorfarahmand, B. (2013). Investigation of organizational DNA in Esfahan Province sport and youth offices according to Honold and Silverman Model. *International Research Journal of Applied and Basic Sciences*, 4(6), (pp. 1417–1425).
- Spear, S. & Bowen, H. (1999). "Decoding the DNA of the Toyota Production System", *Harvard Business Review*, September-October, (pp. 95-106).
- Spena, T. & Mele, C. (2012). "Five Co-s in Innovating: A Practice Based View", *Journal of Service Management*; Vol. 23, No. 4, (pp. 527-553).
- Teruel-Carrizosa, M. (2006). *Firm Growth, Persistence and Multiplicity of Equilibria: An Analysis of Spanish Manufacturing and Service Industries*. Doctoral Dissertation, Universitat Rovira i Virgili.
- Tidd, J. (2006). "A Review of Innovation Models", Working Paper, Imperial college, London, (pp. 1-15).
- Thomas, L. (2007). *Innovation Organizational DNA*. Retrieved from <http://www.12manage.com>
- Thomke and Von Hippel (2002). *Innovation - Customers as Innovators: A New Way to Create Value*. Harvard busnisee review by Stefan Thomke and Eric von Hippel
- Turban, E., Mcleam, E., & Wetherbe, J. (1999). *Information Technology for Management: Making Connections for Strategic Advantage* (2nd ed.). John Wiley & Sons Inc.
- Udwadia, F. (1995). "Creativity and Innovation in Organizations: Two Models and Managerial Implications", *Technology Forecasting and Social Change*, Vol. 38, (pp. 38-65).
- Verschoor, C. (2004). "Can Organizational DNA Exclude Ethics?", *Strategic Finance*, Vol. 86, No. 3, (pp. 19-25).
- Volberda, H. W., Khanagha, S., Baden-Fuller, C., Mihalache, O. R., & Birkinshaw, J. (2021). Strategizing in a Digital World: Overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms. *Long Range Planning*, 54(5), (pp. 102-110). <https://doi.org/10.1016/j.lrp.2021.102110>.
- WANG, J.; CAO, D. (2008). Relationships between two approaches for planning manufacturing strategy: A strategic approach and a paradigmatic approach. *Int. J. Production Economics*, 115, (pp. 349-361).
- Wheelen, T. L., & Hunger, J. D. (2010). *Strategic Management* (12th ed). Addison Wesley Co, New York

Xu, Q., Chen, J., Xie, Z., Liu, J. Zheng, G. & Wang, Y. (2007). "Total Innovation Management: In the 21st Century ", Journal of Technology Transfer, Vol. 32, (pp. 9-25).

Unpublished Manuscript

Madi K. Operations management: manage with insight – lead with foresight. Manuscript submitted to strategic change journal (2024).