Enterprise Augmentation

Introduction

The *dawning of the digital culture* is reshaping socio-economic environments. The *dawn* is the transient illumination of innovative objects and domains. The characteristics of this global 24/7 culture reveal a horizon of capabilities.

➢ It is the natural continuum of the Industrial Revolution.
➢ Normalizing the cognification[1] and interconnectivity of objects and domains.
➢ The ubiquity and open availability of information, increasing human knowledge.
➢ The commoditization of technology creating level playing fields.
➢ Substratum for spurring socio-economic innovations.
➢ A renaissance of ideas and methods.

"The world order is continual change.... [2]*"* There are moments in history where change is epochal – the *digital culture* is one of these moments. Navigating unfamiliar landscapes is a learning process where you move from the know to the unknown. You begin by *validating* what you know. Subject the present to a rigorous analysis that validates your paradigms. Proceed to *exploring* what you know that you don't know. This results in *discovering* what you don't know that you don't know. Significant change cause disruptions. Innovation responds to the needs, constraints, and curiosity of these disruptions. Curiosity and challenges advance knowledge is the epiphenomenon of science and technology. *"Learning is, in the ultimate analysis, the transfer of experience gained in the past to problems of the present.*[3]*"*

The digital socio-economic environment is a composite of thinking, attitudes, commerce, and behavior imbued in every enterprise. Enterprise domain are complex systems whose purpose and scope is analogous to an organism. Each enterprise has unique DNA, defining its physiology. The DNA is people, processes, procedures, policies, management, products, services, resources, computer software, and environment. The enterprise design, is a thruput system, utilizing its DNA to achieve its purpose. Thruput ecosystems have immunological responses to change forces and thruput constraints. Enterprise homeostasis is a continuous effort. Operational variants are common disturbances. Enterprise viability depends on your ability to understand its synergistic symbiosis[4].

The essence of the *digital culture* is integrating enterprise capabilities across multiple domains. Computerization is now a fundamental part of human activity. All enterprises are human centric where digital augmentation is a seamless aspect of socio-economic circumstances. Enterprises are growing in complexity, analogous to any organism. Operational management and organization need neoteric paradigms. Multi-discipline perspectives are insights necessary to ensure enterprise viability. Knowledge from manufacturing operations, medical science, human behavior, computer technology, management theories, and scientific discoveries are relevant to this phase of the industrial revolution. A pioneering world order uses the present digital framework, as the path to a sustainable journey. Continuous improvement parameters leverage your DNA for *enterprise augmentation*.

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1 Smart objects processes with integrated sensors, and software logic. Kevin Kelly TED Summit June 2016

2 Heraclitus, a Greek philosopher circa 500 BCE, Ancient History Encyclopedia, www.ancient.eu /

3 Joseph Harrington, Jr., **Understanding the Manufacturing Process**: *Key to Successful CAD/CAM Implementation,* Marcel, Dekker Inc., New York, 1984, page 1

4 S.A. Frank, **The origin of synergistic symbiosis,** Journal of Theoretical Biology. 1995 Oct 7;176(3):403-10; U.S. National Library of Medicine

Development

The power of story is *metanoia*. Stories affect thinking. The last *lustrum* of the 20th century is the advent of this *digital culture*. The combination of paradigms, scientific knowledge, and technological capabilities is an evolutionary process. The convergence of these various enlightenments and advancements are the basis of new stories. "*There is no appropriate scale available with which to weigh the merits of alternative paradigms: they are incommensurable.*"[5] This *lustrum* advanced technology and knowledge which is the kernel of my story. New knowledge includes social paradigms, technology (TV, computers, communications, media, space exploration), medical advances (polio vaccine, organ transplants, DNA helix structure, psychology), computer hardware and software, and manufacturing management theories. Knowledge and technological capabilities have inextricably consequences. You envision the future by extending the present.

Background

My story begins in 1959, undergraduate studies in pre-med and psychology, along with seminary and ministry training provide insights into human behavior. Applications development spans the primitive punched cards, to a variety of computer programming languages. Designing function mechanizing functions, to programming applications and implementing enterprise (ERP) suites. Manufacturing management responsibilities gave me an advantage to apply these computer applications. International engagements confirm that the digital culture crosses all boundaries.

This polymathic background gives me a unique understanding. The story of my journey is unraveling mysteries of change using technology. John Edgar Wideman says that "*A story is a formula for extracting meaning from chaos, a handful of water we scoop up to recall an ocean.*" Your paradigm changes come from the voice of many stories. Success is your ability to listen to many voices giving you a foundation for continual and sustainable progress.

Continuum

The industrial revolution is an evolutionary stage of human progress. At each phase, new technologies improve processes. Revolutions are drastic changes and ways of thinking. Evolution is a process where stages are achieved by degrees. Thus, you see revolutions as disruptive events that are catalysts for new directions and accomplishments. The manufacturing industrial revolution starts by mechanizing trades skills, evolving to assembly and mass production to the digital development.[6] The digital stage is where "*technologies are converging: clever software, novel materials, more dexterous robots, new processes (notably three-dimensional printing) and a whole range of web-based services.*"[7]

The industrial revolution changed an agrarian economy to an industrial economy. While agrarian activity still exists, it is influenced by industrialization. Its beginning in circa 1760, reaches a plateau in the 20th century. The essence of the industrial revolution is the mechanization and enhancement of human power. The digital age is the computerization and

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5 Kuhn, Thomas S, *The Structure of Scientific Revolutions*, Microsoft Encarta, 2009

6 The Economist, **Manufacturing: The Third Industrial Revolution,** April 21, 2012.

7 Ibid

enhancement of human thinking. Industrialization took about 240 year to mature. The computer industry reached maturity in about 60 years. Realistically it is a phase in the evolution of human progress. At each stage progress is the integration of technologies and knowledge.

Epiphany moments come from perceiving patterns from diverse points of view. Visualizing different aspects result in new perspectives. Analyzing the activities that construct these patterns changes paradigms. Comparing various models leads to discerning behavior parameters.

Manufacturing

Using the manufacturing model includes several concurrent developments that describe how we got here and how we can see future trends.
➢ Manufacturing is a composite of multiple functions yielding a physical outcome.
➢ Integrates multiple disciplines to achieve output.
➢ Coordination of the various activities necessary to deliver the product or service.
➢ Progression of management theories from JIT (Just-In-Time), quality, and lean manufacture.
➢ Continuous improvement is the goal for optimization.
➢ Is a thruput systems where time and money determine profitability!

A manufacturing enterprise is a composite of multiple functions and requirements with physical end products. Manufacturing organizations leverage multiple disciplines within its domain. The outcomes depend on subsystems, activities, coordination (management), skills, and resources.

Computers

Computer industry development beginning with functional mechanization via punch cards (EDP), to primitive integration of function MRP, to enterprise integration ERP. Just like the industrial development of new machines, materials, and thinking – the computer industry went thru stages of growth. Because the timeline is compressed into decades, it provides insights into the industrial growth via technologies. In the computer field, hardware, communications, augmentations such a voice recognition, simulations, graphics, etc. improved application platforms. The greatest advantage of the computer industry is the development of software both operating systems and application programming.

The counter-culture of the 1960's, the space program, and computer technology are catalysts for opening a new world order. The advantage of social changes, was the *freedom to think*. The synchronicity of manufacturing improvements and computer application development accelerated the maturity of multiple industries. The industrial revolution renascence the nascent computer technology is an example of the synergistic symbiosis.

Disruptions

Technologies have a disruptive impact. The life cycle of any technology progresses along the path of figure 1. Technologies and innovations begin as product-centric domains. Their maturity is the commoditization of these products. This results in stages of decline and obsolesce. The digital life cycle extends commodities into application-centric domains. Here the stages attach optimization and sustainability.

During the introduction and growth capacity expansion occurs as more firms enter this market. Attaining a high degree of maturity, results in excess capacity. Unless a company differentiates its offerings, the excess capacity nurture consolidations and atrophy.

Figure 1 - Product Life Cycle
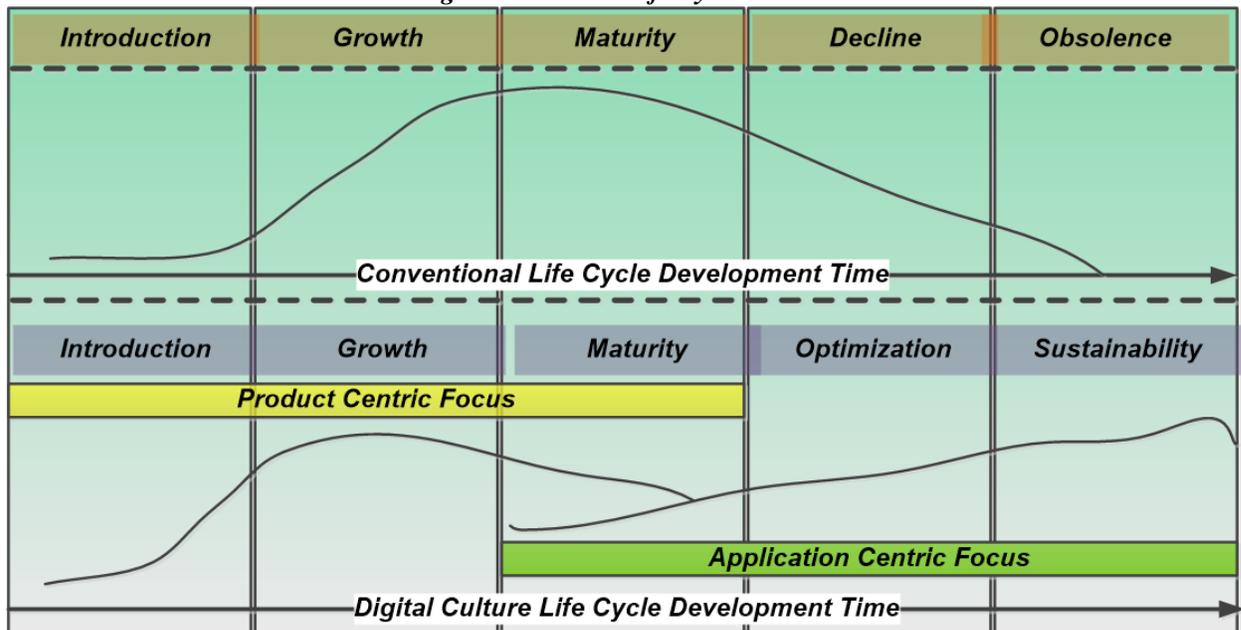
The transformation from product-centric to application-centric depends on your state of viability. If you are still fighting getting thru the day, you will miss the horizons.

Consequence

When anything begins, it is an *art* – it is a craft as it evolves thru trial and error to mastering the specific trade. Once you can define the processes necessary to reach the specific outcome, you can *program* its steps. *Thus, the art becomes a science*. As a science, it has rules of behavior.

The key changes came from the necessity to transfer the various processes and procedures into software logic. Accounting algorithms were relatively easy because of standards. Computerizing receivables, payables, general ledgers, inventory, and payroll, all had rules that allowed us to define the code. Manufacturing was a mystery where individuals appeared to possess the *art* of getting things done. The evolution of manufacturing systems was a symbiotic developing of hardware capabilities such as DBOM (disk bills of material) allowing us to develop materials management functions. At the same time the development of numerical controlled machines were automating the machining operations. During this evolution of manufacturing – management theories were also evolving. It is impossible to distinguish between the chicken and the egg. Ultimately it does not matter, if you progress. Yet any progress has its fallbacks. Seeing *failures* as signpost for new assumptions and new directions is part of the evolutionary path.

Framework

An article in a Production Magazine circa 1980 was an epiphany moment that prompted a different Systems Integration Paradigm. Joseph Harrington *computer integrated manufacturing*

captures the movement from mystery to knowledge and it was the key points of his insights and writings are summed up by what I refer to as *Harrington Principles*.

Principle #1 – Analyzing Behavior

"*Manufacturing is a science and not an art. As a science, it is subject to analytical procedures, which can identify rules, which govern its behavior. When we understand our profession as a science, we can subject it to well-defined methods of analysis. Having analyzed, we can predict; we can determine what the basic parameters are and how they are measured. When we can measure, we can control; and when we control we succeed!*"[8]

The key point is that any enterprise is a system that is subject to analysis. Thus, you can identify the rules and parameters that govern its behavior. Looking at the DNA of an enterprise is essential to advance viable solutions. The DNA of an enterprise is a composite of its people, offerings (products and services), outcomes, processes, procedures, resources, capacity, policies, and management.

Any nascent endeavor begins as an *art*. Improvements build on understanding and the challenges for optimizing the organism. The breakthrough of this principle was to view manufacturing as a total system with its activities and their relationships to the system. This paradigm shifted our attention from material transformation to coordination of the activities required to fulfill the goals of the enterprise.

NOTE: International engagements and experience in other industries reinforce this principle.

Principle # 2 – Thruput Systems

"*Manufacturing is an indivisible, continuous fabric extending from the first conception of a product, through design, production, and distribution, to field maintenance. Although it is a continuum, discrete parts manufacture has an incredibly complex, fine structure of many individual functions, each inextricably connected to and dependent upon every other function.*"[9]

Every enterprise is a composite of subsystems that coordinate its various activities to produce an outcome. It is analogous to an organism whose physiology determines the success or failure of the enterprise. It uses inputs and processes to create output value. When you see the processes as thruput, it shifts how you analyze the behavior. Systems thinking sees the organic enterprise as an entity which is greater than the its parts. Thus, the total system has an inconspicuous dimension whose physiology determine the characteristics of the subject thruput system.

NOTE: This is the essence of all organisms which includes all enterprises.

Principle # 3 – Transaction Processes

"*The principle activity of most of the people in a manufacturing organization is creating, analyzing, transmitting, and managing data and not the actual transformation of material as is generally believed. This questions many accepted beliefs which hold that improvements in*

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8 Joseph Harrington Jr., **Understanding the Manufacturing Process**: *Key to Successful CAD/CAM Implementation*, Marcel Dekker, Inc, New York, 1984, page *ix*.

9 Ibid, page 6

productivity and competitive positions lie in new materials, new machinery, new processes, and unique design or research."[10]

Thruput requires effective coordination of its activities to achieve results. Systems exchange signals (data) with its environment representing its circumstances. Messages to the environment define actions, whereas feedback from the environment represent conditions. Thruput is subject to critical paths, constraints, and operant variability. Within the flow of activities lies the *Hidden Factory[11]*, that constrains the velocity of thruput. A major illumination came from the Theory of Constraints[12], a new way of looking at operations management and identifying the thruput bottlenecks.

NOTE: The greater the number of variables like the health industry the more critical the need to understand the data transformation.

Principle # 4 – Digital Characteristic

"We are entering a third and new mode of manufacturing operations. It is characterized by the fact that every one of the many acts of manufacturing, and every bit of the managerial control of those acts, can be represented by data. Data are generated, transformed, and transmitted. To the ultimate analysis, all of manufacturing is a continuum of data processing. It provides the one base to which all the parts of the process may be related, the one thread which ties all of the parts together." [13]

The digital age allows simulations, modeling, voice recognition, robotics, new processes (3D Printing), virtual reality, and Artificial Intelligence which is providing an augmentation phase creating new opportunities and possibilities. Paradigms come from an understanding and perspective of any circumstance. The evolution of digital symbols, mathematics manifests ideas into objects that promote understandings and perspectives. Digital characteristics allow metaphors, symbols that simplify complex ideas. "*…it is the flow of data rather than the medium of the data flow which is of importance"[14]* Data analytics are how you understand the behavior of the enterprise.

NOTE: Data analysis is the nearest approach to objectivity. Behavior via data analysis applies the Pareto principle to separate the vital few from the trivial many. Classifications, segmentation, and surrogate quantification is the way to reveal behavior. Analytics provide the insight when you progress thru the following steps.

➢ *Validate* – what you know – make sure that your understanding is correct.
➢ *Explore* – what you know, you don't know – reveals new perspectives.
➢ *Discover* – these steps will uncover what you don't know that you don't know.

Synopsis

Manufacturing improvements came from new paradigms. A significant change is a new and better perspective on organizations and enterprises. This understanding comes from combining multidisciplinary knowledge. Eliminating the silos among other fields and industry is a major

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10 Ibid, page 7

11 Jeffrey G. Miller and Thomas E. Vollmann, *The Hidden Factory*, Harvard Business Review, September 1985 Issue.

12 The Theory of Constraints introduced by Eliyahu M. Goldratt in his book **The Goal**, 1984.

13 Joseph Harrington, **Understanding the Manufacturing Process**, Marcel Dekker, Inc., New York, 1984, page 6.

14 Computer Integrated Manufacturing – page 8

transformative change impacting the future. The basic understanding of these principles is to consider their implication to the requirements for successful integration of the digital culture into the contemporary enterprise.

➢ View the enterprise as a composite of rules and parameters that govern its behavior.
➢ The ability to analyze and study the enterprise identifies the measurable rules.
➢ Understanding the behavior allows you to change and control the behavior
➢ Functionality of behavior is a thruput system with inputs, processes, and outputs.
➢ Transaction processes drive the thruput – the physiology of the enterprise.
➢ Digitized transactions provide analytical material.

Systems Integration

The major points for this stage of the *digital culture* is that it is here, and you need to be ready to exploit the opportunities. Understanding the principles and the evolution of this stage is how you prepare. The technology will continue to advance. Your competitive advantage is how you differentiate your enterprise to exploit this evolving environment. the good news is there is still time. The signs are pointing the way to the new world.

If you are struggling fighting to maintain a sustainable organization, you will not be ready. Distractions will result in jeopardizing your business, whether for profit or non-profit. Whether a governmental agency or an NGO – your survival depends on a healthy operation that positions you for the future.

Technologies

Basic applications and function such as word processing, spreadsheets, graphics, media, database management and computer operating systems and browsers are commodities. The benefit is that these tools are available with standardization that allows for the exchange of information. The interconnectivity among these tools is a fast and easy means for exchanging information. These office and creative capabilities are human augmentations minimizing the clerical and time consuming efforts of old. It frees people to focus on the purpose rather than the methods for achieving these purposes.

The nascent availability of artificial intelligence, virtual reality, nanotechnology, advanced manufacturing, and 24/7 accessibility without regards to space and time. This is creating new tools that further augment and advance socio-economic opportunities and requirements. Now cognification and interconnectivity of all objects and domains advance both physical and thinking power. Integration of all social and commercial functionality is the automation of everything. *"The term computer integrated manufacturing does not mean an automated factory. … new skills are required at the working level and of course in the supervision of the working level"* [15] Praxis designs neoteric applications.

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15 Joseph Harrington, Jr., Sc.D., **Computer Integrated Manufacturing**, Robert E. Krieger Publishing Company, Malabar, Florida, 1973

Preparation

The best way to be ready and evolve with the digital culture is healthy DNA. If your current operations are struggling, you will be distracted and miss your competitive advantage. Just like your own personal health, you keep your organization working. Leverage what you have. Make sure that you are getting maximum performance and growing your business. Frequent checkups will avoid surprises. Plan with a multi-discipline systems integrator to perform a *systems triage* (due diligence) of your operation. This is your sustainability insurance.

Another important preparation is to make sure you are optimizing the features and functions of your existing software. Keep tuning your immune systems. Your foundation is digital – computer hardware and software. It is not necessary to have the latest software, but you must make sure your hardware and software is up to date. Always upgrade to the latest release. Most of all you must keep your security up to date. Cyber security is a vulnerability that can cause major failures. Applications software is your contingency planning. Maintaining core capabilities. healthy and optimum DNA is critical to survival.

Revive functions that were eliminated during downsizing. Operations and cost accounting, industrial engineering and information systems support. The evolving virtual capacity allows you to take advantage of these skills without the attendant overhead. Cloud computing is more than a platform for your hardware and software. The internet makes it easy to engage skills on a retainer basis. Resources on demand is another means for expanding your capacity when necessary.

All improvement projects should be a part of your operating environment. Instead of a special project outside the DNA, you must make improvements that empower and enhance thruput. You cannot improve the physiology of an organism without subjecting the entity to the learning curve.

Experiment with cloud computing. Take small steps, subscribe to software as a service. You are already doing this with your smartphone. Ultimately the interconnectivity of all domains will be the status quo. The idea of cloud computing goes beyond your information systems. It is how all objects will be connected and you need to evolve to this environment.

The cognization of all objects and domains is a competitive requirement. Begin to experiment with integrating your products and services with logic and telemetry. Most of all in an evolving environment Research & Development are essential. With these technologies, your next competitor may not be visible today. The idea to market timeframes are no longer obstacles.

Advantage

The twenty-first century requires more than just integrating the components. In this era, the competitive advantage comes from creating DNA enhancements. The system integrator is a genome editor finding ways to advance the competitive advantage of your enterprise. This requires a polymathic assessment of your strategic direction and current operations.

Progress is your ability to view current circumstances differently. New perspectives are the catalyst for new frameworks that bend the arc of progress upward. It is essential that no

preconceived ideas dominate before all the due diligence is complete. A polymathic background is necessary to *see* all the possibilities. Computer skills are now only a portion of the necessary expertise. Human behavior, management, new technologies, and business functions provide the ability to reach sound conclusions. Learning skill are a major asset to understand the developing technology and its opportunities.

People are an intricate part of your DNA. To ensure success, you must improve and sustain their skills. Keeping your people relevant requires you understand the direction of your journey.

Challenges

Systems integration has the following challenges for this stage of the digital evolution. Technological advancements such as AI (artificial intelligence), deep learning, robotics, miniaturizations, genetics, communications, voice recognition, and the cognization of all things – objects and domains. These advancements like all inventions move from product-centric to applications-centric development. When technology becomes a commodity, competitive advantage is how you integrate and apply this technology as part of your organizational activity.

Business Models

Business models are changing. Work instead of jobs is changing traditional workplace environments. Digital capabilities have more options than the conventional office spaces. Maturing management theories provide insight without the promise of the magic pill. The disruptive factor of these changes will require more attention to the displacement of the social – human to human – interaction of the traditional workplace.

Organizational structures need to respond and support your DNA. You are entering an evolving *digital environment*. The next 20 years will have a profound change on socio-economic circumstances. Competitive advantage belongs to the relevance of your DNA in adding value to its domains. To succeed you must promote the viability of your enterprise. The following key factors are essential to success.

Organization

Viewing enterprises as viable organisms opens new horizons in sustaining thriving systems. Understanding organizational DNA, points to the physiology of operations. An enterprise is a thruput system where outcomes depend on the coordination of all activities to achieve value results. The goal of every entity is to deliver socio-economic value. Medical science offers a perspective that is applicable to other industries, especially your unique operation.

The age-old struggle between centralized versus decentralized operation is no longer relevant. The continuous reorganization creates havoc and is detrimental in a fast-paced socio-economic environment. Management control the rational for centralization and the close to the action reasons for decentralization leverage digital technology to offset the conundrum.

Software establishes the standards for organizational processes and procedures. Application suites define the steps, logic, and parameters for executing the various activity of thruput. I still remember the volumes of *standards manuals* that were necessary to manage and coordinate the organizational activity. Standards and methods now reside in software. The collective computer

terminals are now available via smartphones, tablets, laptops, and desktop devices. The internet allows easy access *the cloud* linking your entire organization with the constraints of space and time.

The hierarchical organizational structure is changing. Lean enterprise theories advanced the need for flattening the hierarchy – getting rid of the bureaucracy. Getting rid of the *hidden factory syndrome*. This effort is leading to new structures, many still in development. Network arrangements analogous to the human nervous system is a new way of thinking about organizational structures. The central nervous system CNS – coordinated the various physiological activities. Each subsystem (organs, cells, nerves, blood, oxygen, etc.) coordinates its activity via signals – command and feedback. The CNS triggers the immune system to correct a problem. The brain signals the legs to start walking. The ultimate organizational structures will continue to evolve, with the normal trial and error processes of development.

Human Behavior
The reason for any enterprise is to augment human socio-economic objectives. Technology in its initial stages creates barriers to human needs. Frequently people become assets, rather than essential ingredients to the rational of enterprise existence. Servant leadership is how you overcome these disruptions. You empower individuals to promote the enterprise. When you involve and support decisions at the point of contact – where the action is – you gain results that are greater than the sum of its parts. This is the way in which your body works. The heart does not have to ask permission to pump. It just does it because the consequences are unacceptable.

Functions
The enterprise functions have changed. Cost accounting, industrial engineering, data entry, etc. are now part of the software logic. The user now enters their information. Routings define the fabrication steps, and task cost provide the standards. Maintaining cost at the item and task levels replace the costing functions of pre-software periods. Transactions link to chart of accounts classifying and costing the transaction.

However, the raison for cost accounting, industrial engineers, and data entry support has not gone away. The advantage of the digital configurations is that these functions are not full time requirements. These functions become a part of individuals work to correct variances or dashboard presentations signaling the need to correct a situation.

Virtual Capacity
The new models of organizations, human behavior (work not jobs), and function offer new capacity models. You can establish special arrangements for cost accounting on a retainer or on demand basis. These functions do not require full time personnel. You create a virtual clearing house, where individuals are responsible for certain tasks. Or you subcontract or subscribe to an independent person or firm skilled in these requirements.

Software
The emphasis of the digital evolution is computer software. Software development is the thinking augmentation defining the current frontier. Technology depends on standardization.

Enterprise Augmentation

Standardization is the basis of commercialization and pervasiveness. Software is the actions of a digital domain. It is the logic (programs) that instruct, coordinate, and decide responses. It is the integration of reasoning and hardware.

Elementary applications software is a commodity that augments basic tasks. Microsoft Office is the *de facto* standard for word processing, spreadsheets, and presentations. Adobe Creative Suite provides standardization in design, media, and digital presentations. Adobe and Microsoft have a common platform, which is necessary to advance to higher states of development. the ubiquity of Word and Excel and Adobe Acrobat for information exchange – set a framework allowing you to develop new possibilities. QuickBooks the *de facto* standard for accounting.

In addition to a platform of office and design capabilities they are advancing the *computer cloud* model with their subscription offerings. The main difference is that their subscriptions download the programs to your computer, keep the software current, provide a backup, and provide you with storage to keep offline information. This model alleviates Internet traffic, gives you an economical option, and keeps your software updated.

Operating systems and browsers will continue to improve. Standardization with Android, Win10, UNIX, and MAC-OS allow any device to communicate with any other device. The operating systems, communications software, and database management suits are crucial security and the intercommunications among disparate software. The future of database management systems is speed, reliability, storage, and retrieval algorithms that incorporate user interfaces.

Complete enterprise applications in the form of ERP (Enterprise Resource Planning) has achieved a level of standardization. However, the integration of ERP with the evolving digital offerings need redesign. The basic ERP functionality will not change. Part of the manufacturing and ERP development has established process and procedural standards. The interface with the evolving digital world is the next area of innovation. SAP's dominance is being challenged by INFOR.

This stage of software development presents itself in two ways. Applications software thinking augmentation and embedded software device augmentation.

➢ *Embedded software* – device logic, and robotics as the advanced level of this software, hardware augmentation.
➢ *Thinking software* – the artificial intelligence – deep learning, discipline augmentation.
➢ *Advanced manufacturing* – new materials, especially materials that have the ability to change properties in response to conditions.
➢ *Medical augmentation* - genetic engineering.

Excel is a good example of software dependency. Excel is the prevalent tool for all calculations and analysis. It is the common denominator for exporting data from disparate systems. Using Pivot tables is a powerful analytical function. The graphics via charts translate calculations to visual imagery for better understanding. The introduction of Power Pivot Tables provides database capabilities. Excel and all its features and functions is an essential tool for data analytics, dashboards, and score boards of all you KPI. It is also the primary way you validate, explore, and discover the properties and behavior of your enterprise DNA.

Closing Thoughts

A summary of these principles and paradigms is equivalent to your personal health. You visit your primary physician when you have an ailment or a physical checkup. The process is the same, but the outcomes differ depending on your situation.

The physician listens to your symptoms, checks your vital signs, and observes your physical appearance. Additional tests, may be necessary such as blood test. The objective is to get an initial diagnosis of the source of your ailment. In a checkup, the tests look for conditions that are not presenting clinically. Arriving at an initial diagnosis, there may be the need to do more test to validate the diagnosis. Treatment plans using drugs, or therapy, are under your control. Prognosis is the best guess of the outcome vis the treatment plan. Defining the source may require a specialist to further define the source and the appropriate treatment.

In the enterprise, the symptoms are individuals' opinions, problems, they face, or questions about a subject. The vital signs of the enterprise are the financial statements, cash flow, and other KPI. Further tests are necessary to drill deeper into the situation to arrive at the core problem.

The physician has a polymathic insight into your physiology. To arrive at the correct diagnosis, the analysis must begin as objective as possible. You progress from an open mind to arrive at the right diagnosis. The treatment is defining a priority of actions necessary to correct the ailment or prevent an issue. First responders, have an urgent and need for rapid assessment. In both these cases primary or first responder – *triage* is the process of going from the unknow to the known.

The health industry understands more about the immunization system. The power of the organism to respond to physiological abnormalities. However, sometimes the immune system itself may be the cause of the ailment. This applies to the enterprise itself. When thruput system constraints or operating variances, the DNA of the enterprise will respond. The people will find workarounds that may cause other damage. Unless enterprise anomalies are properly diagnosed to define the proper treatment, you risk further deterioration.

Enterprise augmentation is a new paradigm for assisting an enterprise to achieve its purpose. Instead of conventional consulting approaches, augmentation is a study of the entire organization, determining the health of the systems' DNA. Arriving at a diagnosis using a *system triage* paradigm. Defining a treatment that reinforces the existing DNA and its immunology. This ensure a sustainable journey where you have a competitive advantage.

Your enterprise is part of a cosmos. Threats and constraints emanating from this situation means you also must be active in government, regulations, and international commerce. Your DNA depends on an environment that strengths your health. Most troubling are cyber security and the power grid – cloud computing is dependent on these seemingly minor infostructures.