

QOR

NEWSLETTER

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Volume 1, Issue 1

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Editor's Notes

Welcome to the first issue for 2020. I am delighted to introduce Quality and Operational Research (QOR) Newsletter. Our newsletter publishes peer-reviewed technical articles every month on Quality, Excellence and Operational Research. QOR publishes current, high-quality and original articles, together with relevant and insightful reviews. The last pages cover important events, conferences, workshops, training courses, call for chapter and call for paper. Distinguished experts and academicians have joined the Editorial Board.

I would like to say my "Big Thank You" to Paulo Sampaio, Yucel Ozturkoglu, Dawn Ringrose, Luciana Paulise, Jesus Velasquez, Marcio Cardoso Machado, Gerhard-Wilhelm Weber, Alberto Pinto and Nguyen Thanh Hai for accepting my invitation to contribute in this and future issues.

This issue includes three articles across the spectrum of Quality, Excellence and Operational Research fields. The first article is "*Mathematical Programming 4.0 & The Hypothalamus of the Enterprise*," by Jesus Velásquez-Bermúdez. Mathematical Programming (MP), a branch of Operations Research, is perhaps the most efficient technique to make optimal decisions. Operations between mathematical problems are not part of MP culture, therefore a new vision is required that allows the implementation of organization hypothalamus based on the integration of the multiple mathematical models that are required to ensure the optimal functioning of the organization as an integrated system. This paper describes new approach that it is called Mathematical Programming 4.0 (MP-4.0).

The second article, "*Why Is Organizational Excellence So Powerful?*" by Dawn Ringrose. Ms. Ringrose shares a personal story that includes the discovery of and experience with excellence models and that culminates in the development of an innovative toolkit that is designed to make the quest for improvement in organizations more simple, straightforward, time efficient and cost effective.

Our third article, "*Sustaining quality culture while working remotely*," by Luciana Paulise, Ms. Paulise describes the challenges of working remotely. The article discusses best practices for engagement, change management, and innovation while living and working remotely. While some companies are already returning to in-office work, in most cases, this return will be slow, and some will never completely return. If remote work is extended permanently, the question that remains is how to sustain an organization's quality culture through time. Three "Great Place to Work" companies were interviewed to share their insights.

The last pages of QOR Newsletter include:

- "*Overview on the Quality Management Forum (QMF) and Organizational Excellence Technical Committee (OETC)*," by Denis Leonard
- Introducing important International conference, "*International Conference on Quality Engineering and Management (ICQEM 20)*," by Paulo Sampaio
- "*Organizational Excellence Framework Workshop*," by Dawn Ringrose
- Call for chapter, "*Advances of Machine Learning in Clean Energy and Transportation Industry*," by Gerhard Wilhelm Weber

You are cordially invited to submit articles QOR Newsletter, working individually or in collaboration with others. Your submissions are much appreciated and will contribute to the early development and success of the QOR Newsletter.

Best regards,

Mohammad Hossein Zavvar Sabegh

Editor, QOR NEWSLETTER

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Mathematical Programming 4.0 & The Hypothalamus of the Enterprise

Jesus Velásquez-Bermúdez, Ph.D
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1. INDUSTRIAL REVOLUTIONS

In the course of history, economic transformations often occur when new communication technologies converge with new energy generation systems.

1.1. First Industrial Revolution

The First Industrial Revolution is the process of economic, social, and technological transformation that began in the second half of the eighteenth century in Great Britain, which extended a few decades later to much of Western Europe and Anglo-Saxon America, and which ended between 1820 and 1840.

During this period, the humanity experienced the largest set of economic, technological, and social transformations in human history since the Neolithic period, which saw the passage from a rural economy based primarily on agriculture and trade to an urban, industrialized, and mechanized economy.

The Industrial Revolution marks a turning point in history, modifying and influencing all aspects of everyday life in one way or another. Production from both agriculture and the nascent industry multiplied while reducing production time. From 1800 on, wealth and per capita income multiplied as it had never done in history, as until then GDP per capita had remained virtually stagnant for centuries.

1.2. Second Industrial Revolution

The set of interrelated socio-economic transformations that occurred approximately between 1830 and 1914 is called the Second Industrial Revolution. Technical innovations focused, essentially, on new energy sources such as gas, oil or electricity; new materials and new transport systems (plane and car) and communication (telephone and radio) led to chain transformations that affected the labor factor and the educational and scientific system; to the size and management of companies, to the form of the organization of work, to consumption, until it also leads to policy. During this period, the changes suffered a sharp acceleration.

This process took place within the framework of the so-called first globalization, which was a progressive internationalization of the economy, and which was increasingly operating globally because of the transport revolution. This led to its extension to more territories than the first revolution, limited to Britain, and which would reach almost all of Western Europe, the United States and Japan.

1.3. The Knowledge Society

The conjunction in the 21st century of the advancement of communications technologies, together with the great development and use of the Internet and renewable energies give rise to the Third Industrial Revolution, also called the scientific-technological revolution, or the intelligence revolution, or digital revolution, which is characterized by the consolidation the standardization of smart networks for the supply and consumption of energy and the production of robots (physical and cognitive) capable of acting autonomously, as is the case with the machines that do bitcoin mining.

This revolution was visualized by Peter Drucker in his book "The Post-Capitalist Society" (1974) in which he dictated the future based on a technological society integrating two types of new industries:

- Intensive Information Industries: capitalization of information in which industrial growth is directly related to the ability to process efficiently analyze and synthesize big-data to make better decisions.
- Intensive Knowledge Industries: Capitalization of knowledge in which growth in which the basic resource would be information and knowledge, and the willingness to apply knowledge to generate more knowledge. They are the support of intensive knowledge industries.

1.4. Industrial Revolution 4.0

Industry 4.0 is the name given to the current trend of automation and data exchange in manufacturing technologies. It includes

Cyber-physical systems (CPS), the IoT/IIoT (Internet of Things & Industrial Internet of Things), cloud computing and cognitive computing; this concept was coined by Klaus Schwab in 2016. Industry 4.0 is commonly referred to as the fourth industrial revolution linked to smart factory.

Within modular structured smart factories, cyber-physical systems (CPS) monitor physical processes, create a virtual copy of the physical world, and make decentralized decisions. A cyber-physical system (CPS) is a mechanism (physical system) controlled or monitored by computer-based algorithms and tightly integrated with the internet (cyber system). In CPS, physical and software components are deeply intertwined, where each element operates on different space-time scales, exhibiting multiple behaviors, and interacting with each other from countless forms that change with context. Examples of CPS include intelligent power grid systems, autonomous automotive systems, medical monitoring systems, process control systems, manufacturing process monitoring, infrastructure and road monitoring, robotics systems, home automation, autopilots, Over the IoT/IIoT, cyber-physical systems communicate and cooperate with each other and with humans in real-time both internally and across organizational services offered and used by participants of the value chain. CPS presents a higher combination and coordination between physical and computational elements.

Industry 4.0 is characterized by the fusion of technologies currently under test or in development, which is disintegrating the boundaries between the physical, the digital, and the biological spheres; then, it is marked by emerging technological advances in a number of fields, including robotics, artificial intelligence, machine learning, blockchain, nanotechnology, cloud computing, quantum computing, biotechnology, IoT/IIoT, 3D printing, autonomous vehicles and predictive advanced analytics. Paradoxically, not much reference is made to the algebraic modeling (Mathematical Programming) that supports all areas of knowledge, including the behavior of people and social organizations.

As a synthesis it can be said that the Intelligence Revolution produced autonomous robots and the Industry 4.0 must generate the power that collective knowledge gives when robots can communicate with each other autonomously and intelligently, and without errors.

2. THE HYPOTHALAMUS

2.1. Human Hypothalamus

The hypothalamus is a portion of the brain that contains a number of small nuclei with a variety of functions. One of the most important functions of the hypothalamus is to link the nervous system to the endocrine system via the pituitary gland. The hypothalamus is located below the thalamus and is part of the limbic system that it is set of structures of the brain. These structures cover both sides of the thalamus, right under the cerebrum. It is not a separate system, but a collection of structures from the cerebrum, diencephalon, and midbrain. It supports many different functions, including emotion, behavior, motivation, long-term memory, and olfaction.

All vertebrate brains contain a hypothalamus please see Fig1. In humans, it is the size of an almond. The hypothalamus is responsible for the regulation of certain metabolic processes and other activities of the autonomic nervous system. It synthesizes and secretes certain neurohormones, called releasing hormones or hypothalamic hormones, and these in turn stimulate or inhibit the secretion of hormones from the pituitary gland. The hypothalamus controls body temperature, hunger, and important aspects of parenting and attachment behaviors, thirst, fatigue, sleep, and circadian rhythms.

The hypothalamus is highly interconnected with other parts of the central nervous system, in particular the brainstem and its reticular formation. As part of the limbic system, it has connections to other limbic structures including the amygdala and septum and is also connected with areas of the autonomic nervous system. The hypothalamus receives many inputs from the brainstem, the most notable from the nucleus of the solitary tract, the locus coeruleus, and the ventrolateral medulla. It is the central regulator of several autonomic and endocrine visceral functions and acts as a relay point in the information that starts from the brain reaching the spinal cord.

Each of the target systems influenced by the hypothalamus return feedback controls onto the hypothalamus completing a circuit and so establishing a homeostasis system; in biology, homeostasis is the state of steady internal, physical, and chemical conditions maintained by living systems. This is the condition of optimal functioning for the organism and includes many variables, such as body temperature and fluid balance, being kept within certain pre-set limits; the role of the hypothalamus in regulation of homeostasis is essential for survival and reproduction of the species. The hypothalamus is one of those organs that we cannot live without.

This resume was built having as reference Wikipedia.



Figure1 Human Hypothalamus

2.2. Organization hypothalamus

Most of the things and processes used by humans have been totally affected by technology, which has opened the mind to the human imagination producing previously unsuspected results; mathematical modeling should not escape this process. Based on the discovery of the mathematical foundations that serve to establish the mathematical laws governing physical, industrial, economic, and social processes and with them build increasingly powerful mathematical models and calculation algorithms, today, the knowledge and the technology are available to develop a new level of artificial intelligence, which emulates the human hypothalamus, in any type of organization created by humans; this is called the Organization Hypothalamus (OH) that is essential for organization survival. Please see fig 2.

An organization to be smart requires a hypothalamus to coordinate all the activities that it carries out in such a way as to maintain the short/long-term balance and to ensure viability of the multifunctional structure involved in a human organization. Unlike the human being where the hypothalamus, and all the functions required to survive and evolve, is created by "life", in the business organization the directives and the executives are responsible for creating the hypothalamus that controls the execution of all functions in all areas of the organization.

Taking as reference the industrial environment, the organization hypothalamus must be based on the knowledge of the process of production of the services/products to its end customers from the supply of raw materials and inputs that are required for this transformation. The construction of the hypothalamus must be the result of a design process and its subsequent implementation must be supported in a coherent guide whose purpose is to produce the hypothalamus according to the needs of the organization; it integrates through interconnected functional mathematical models all the knowledge that the organization has to integral management of the organization; then it may be called Enterprise Wide Organization (EWO, Velásquez-Bermúdez, 2019). EWO must have an updated vision that leads to a set of action plans (sales, production, inventories, deliveries, new product development, financial, human resources,..) oriented to guarantee the survival of the organization even in times of crisis.

Nowadays, the functions of the organization have been independently modeled and are intended to act asynchronously and without permanent communication between them. That is not the form of action of the human being and it can be associated with the early eras of robots in which the sequence processing of their "hypothalamus" was notorious because its CPU did not allow to coordinate two functions simultaneously. But now, it is possible to conceive the organization hypothalamus as the union of multiple artificial networks and a central storage center, just as the human brain does. This implies a breakthrough in artificial intelligence, from the modeling of artificial neural networks to the modeling of networks of artificial neural networks. The following figure shows the concept.

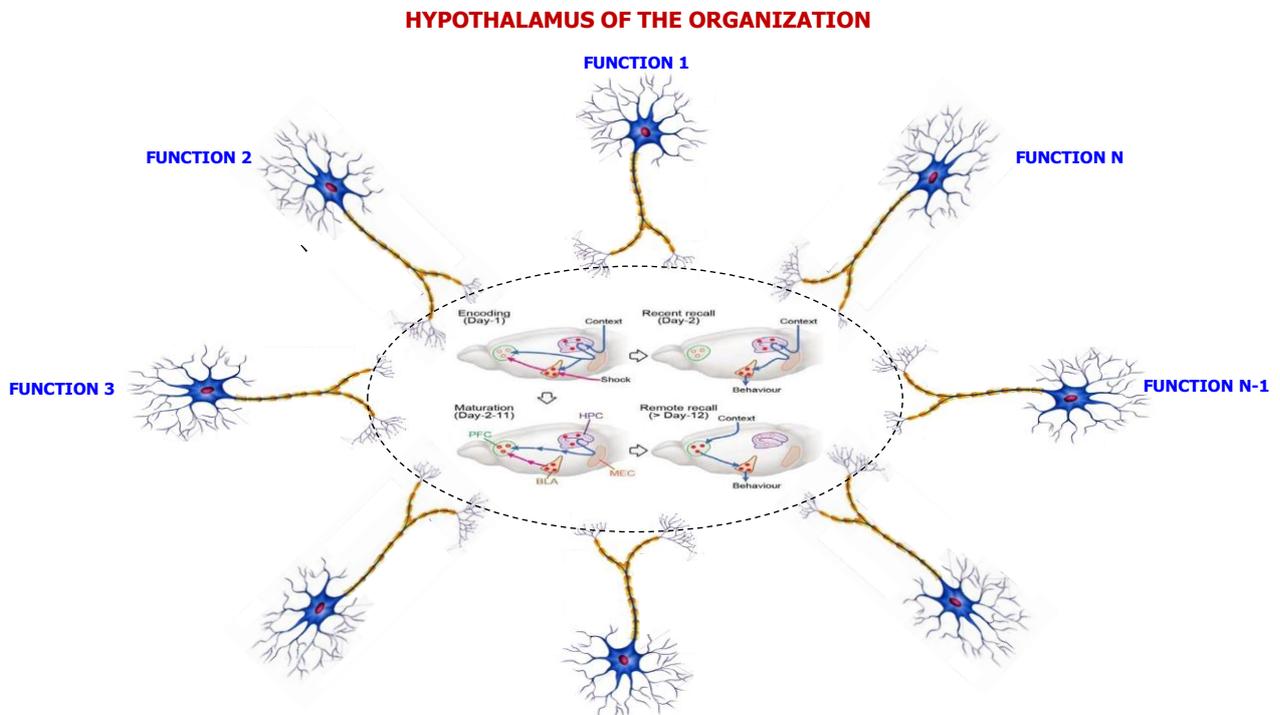


Figure 2. Organization hypothalamus

Below is the conceptualization of the hypothalamus of a partial supply chain of petroleum products. A real experience, in the oil sector, is presented in Velásquez-Bermúdez (2019a). Please see fig 3.

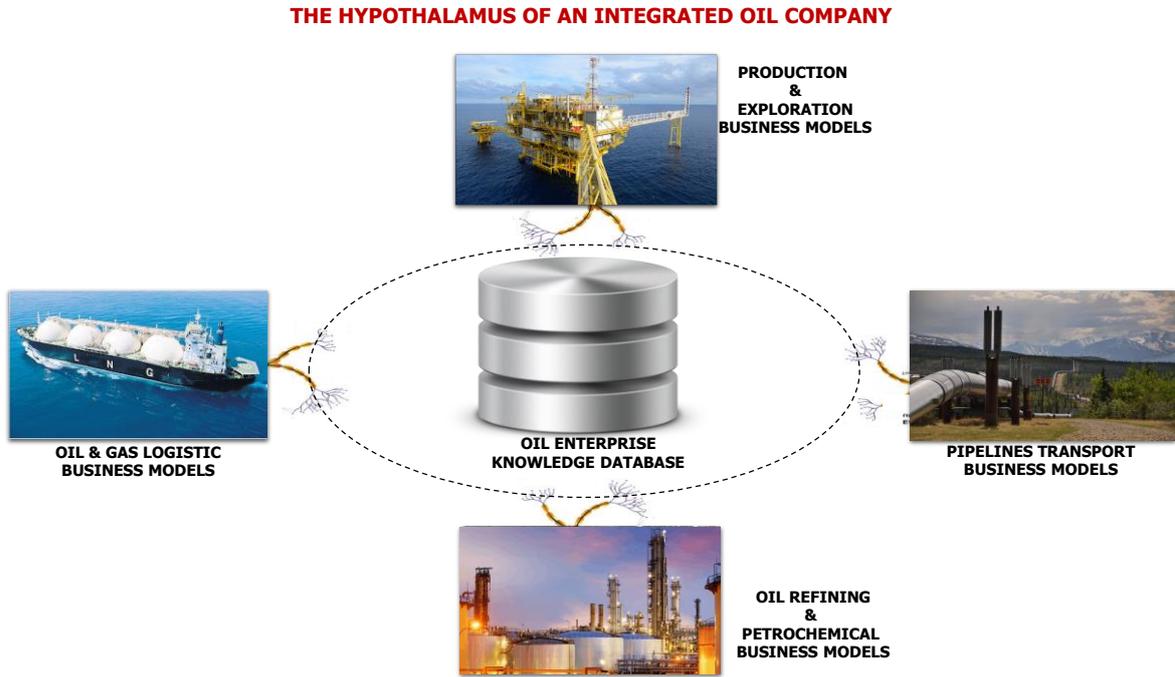


Figure 3. conceptualization of the hypothalamus of a partial supply chain of petroleum products

The following is an example of the models that a company working in the electrical sector may require; all shared the same data model. A real experience, in the electric sector, is presented in Velásquez-Bermúdez (2019b). Please see fig 4.

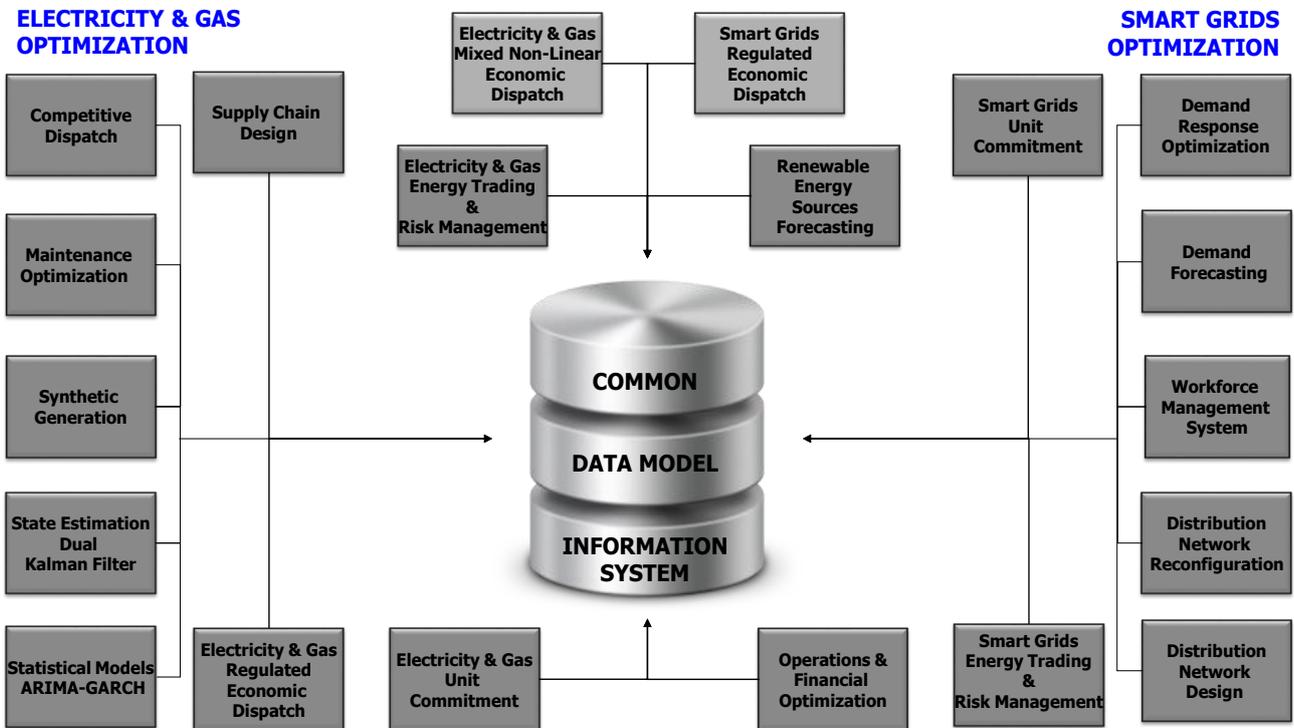


Figure 4. example of the models that a company working in the electrical sector

In practice, the computational implementation of the organization hypothalamus is based on the coordination of multiple mathematical models (software) using common data stored in an enterprise expert information system that store “all” the history about and enterprise data and optimization scenarios. Below the so-called Mathematical Programming 4.0 (MP-4.0) is presented as the ideal way to build organization hypothalamus.

3. MATHEMATICAL PROGRAMMING 4.0

“Algebra is the intellectual instrument which has been created for rendering clear the quantitative aspects of the world”
 Alfred North Whitehead.

Mathematical Programming (MP) is based on algebraic modeling, must bring fundamental changes in the way of modeling systems to reflect the changes generated by Industry 4.0. MP must be focused on the automation of cognitive human processes (thinking models), leaving aside the automation of manual activities (programming models).

While the algorithms will be a fundamental part of human knowledge, the future will be marked by new applications that enhance the ability to analyze and to generate knowledge from data online and from the speed-up of the computation, this affects: i) the programming development, ii) the deployment, and iii) the maintenance of real-life applications, using more effective mathematics methodologies.

3.1. Mathematical Programming: A Natural Standard

The math is a natural standard for all professionals who need it for their professional practice. The formulation of a problem in algebraic terms, or in differential equations, allows professionals, from different cultures and with different idioms, to express their mathematical models in such a way that they are understood by professionals with mastery of industrial algebra. Two algebraic formulations of the same problem can look different by the symbols used by the math modelers; but, if we build a map of the symbols all formulations should be equal.

MP meets the transitivity law, well known by mathematicians, indicating that if two objects of the same type are combined, the resulting object is of the same type. For example, an integrated model of the electricity-gas system is the union of the equations of the two individual systems (gas & electricity) plus the coordination constraints that may include some new variables. Please see fig 5.

MATHEMATICAL PROGRAMMING

IT IS POSSIBLE TO JOIN TWO MP PROBLEMS TO OBTAIN A NEW MODEL

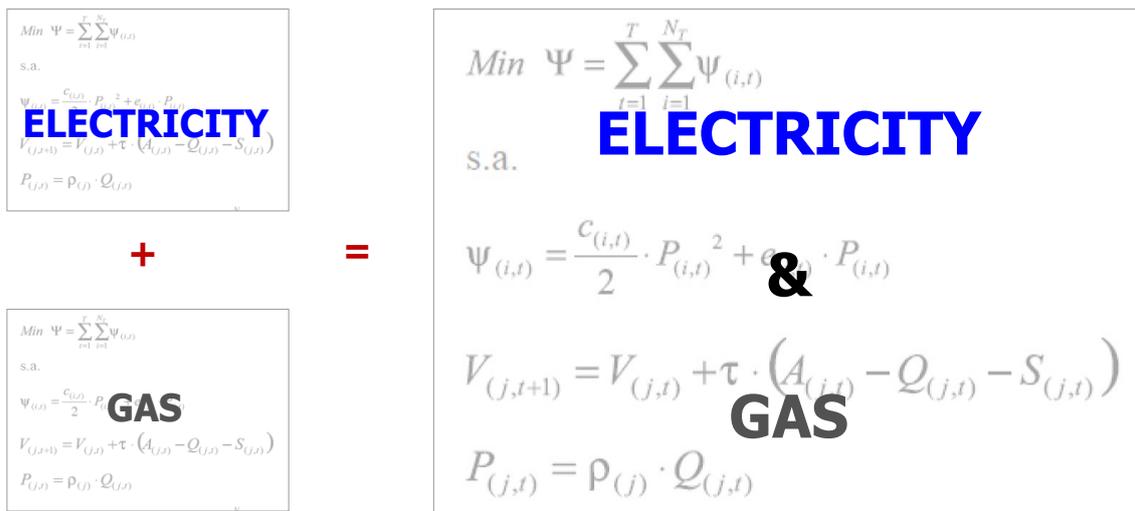


Fig 5. an integrated model of the electricity-gas system

The biggest advantage of the transitivity law is the ability to join mathematical models that fulfill multiple functions into combinations of new models to fulfill new functions without the need to permanently develop new models. Since its birth, in the middle of the last century, the MP has been oriented to model relationships between variables to form groups of equations and with them the mathematical problems. Operations between mathematical problems are not part of MP culture, therefore a new vision is required that allows the implementation of organization hypothalamus based on the integration of the multiple mathematical models that are required to ensure the optimal functioning of the organization as an integrated system. This new approach is called Mathematical Programming 4.0 (MP-4.0).

3.2. Structured Mathematical Modeling

Structured Mathematical Modeling (SMM) is the standardization (normalization) of mathematical programming modeling that implies easy connection of multiple models so they can interact with each other. This requires a clear difference between mathematical models and optimization technologies.

SMM requires an appropriate computer methodology that allows joint objects to produce a new object that can handle with the same technology; this is impossible for the case that we have two models in two different computer programs in any optimization technology. A technology suitable for this is Relational Databases (RDB), enabling to join tables whose results are still tables. If the math modeler check carefully, mathematical models can be arranged as data of an RDB, since they can be structured as a collection of related elements (objects or entities) (Velásquez-Bermúdez, 2019c). The model union, or division, will be based on joining, or extracting, of the elements of the RDB tables. Please see fig6.

STRUCTURED MATHEMATICAL MODELING



Figure 6. Structured Mathematical Modeling

To capitalize this possibility of model integration, and therefore high productivity, it is necessary to change the look of linking models to an optimization technology with one that links models with a standard formulation and model integration (portables) and subsequently linked them to several optimization technologies, which must be selected according to the greatest convenience at the time of use of the models.

Then, SMM must be a standard that can be understood by any math modeler, this standardization must be so solid that ensures that the binding of MP problems is a new problem of MP, for this a mathematical model must be conceived as the union of math components harmonically integrated. For example, a problem is a set of equations, a model a set of problems, and an equation the integration variables, indexes, parameters, and sets.

The evolution of Mathematical Programming includes the change of products which mathematical modelers delivered to enterprises it must be a Decision Support System (DSS) composed of multiple models, which must share data among themselves, that should use advanced mathematical methodologies to use effectively the multiprocessing capabilities of the modern computers.

3.3. Organization hypothalamus Processing

The new environment must include the concept of Real Time Distributed Optimization (RTDO) in which multiple digital agents (robots) act simultaneously to cooperatively optimize, in real-time, a real-life problem based on agent-to-agent communication, which is the main feature of Industry 4.0. This is the key of the organization hypothalamus processing. Then RT-DO is the distribution of the optimization process in many robots that act simultaneous and independently when they received information from the its exogenous environment. The process can be summarized in the following steps:

1. From a top-down mathematical analysis is possible to construct mathematical or logical rules of interaction between multiple agents (representing each part of the system), which can represent the “state of the reality”
2. Starting from the math/logic rules, following an approach bottom-up, is possible to build segmented/atomized models of the real-world.

New technologies and big-data generated change the traditional isolated time-synchronous process to an optimization process in which the models will run autonomously when they are necessary, by events. This implies that each component of the system must know the information that it needs to take of the available measuring systems (smart metering) and what is the information that it should be provided so that other components of the system can make its decisions oriented to keep system in the “optimality path”.

From the mathematics point of view, the solution of the integrated model can be faced based on large-scale methodologies like Dantzig-Wolfe Decomposition (Dantzig & Wolfe, 1960) and/or Benders Partition (Benders 1962). In general, partitioning and decomposing the problem can be done based on a three-level approach. At the top level we can have the general coordinator of the entire multi-business chain, that decides about: i) the investments in the supply chain, ii) the exchanges of products and/or services between the different businesses (at the operations level) and ii) the allocation of common resources; in this way the second level is generated in which there are as many models as business has the chain, these models in turn can be dynamically decomposed into as many sub-models as periods each model has. The diagram allows to visualize the partition and decomposition approach that may be solved using Multilevel (Velásquez-Bermúdez 1995, 2018) or Cross Decomposition (Van Roy 1983). Please see fig 7.

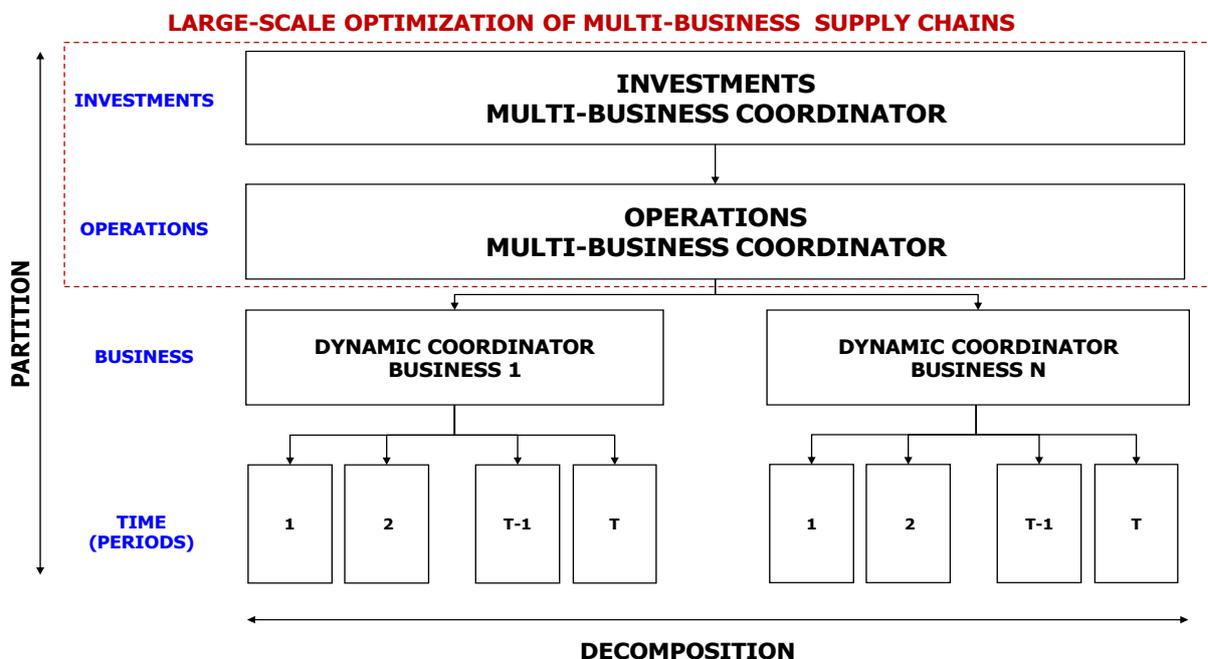


Figure 7. Large –Scale Optimization of Multi-Business Supply Chains

Each robot can be linked to a problem in such a way that the problem is resolved cooperatively, each robot fulfilling its function. This is different of Asynchronous Parallel Optimization (APO, Velásquez-Bermúdez 1997) that solves an optimization problem using multiple cores in a computer, or in a computer grid, using the moderns multiprocessing environments, joining the decomposition and the partition large-scale theories.

3.4. Applications: S&OP Multifunction Modeling

At present, and for several decades now, the traditional Sales & Operation Planning (S&OP) mathematical model is limited to planning production taking as border conditions: i) sales, ii) preventive maintenance, iii) financial constraints and iv) the workforce look like a static resource. The S&OP modeling is the Production Organization hypothalamus of an industrial organization.

However, the power of today's computers, allows to integrate (endogenize) in a single model the production and the main functions of this environment, so that the values of these variables are part of the results offered by the S&OP model, so as to approach an optimal solution from a holistic point of view that tries to consider the organization as a "unique" body and not as a separate components, each with its own definition of what their optimal behavior should be. In summary an S&OP model at the state-of-the-art level must integrate the following systems: i) Production, ii) Marketing & Sales, iii) Financial, iv) Human Resources, v) Supply/Purchasing, vi) Distribution, vii) Maintenance and viii) Energy/Water Industrial Services. The following figure describes the above.

S&OP: SALES & OPERATIONS PLANNING MODELING

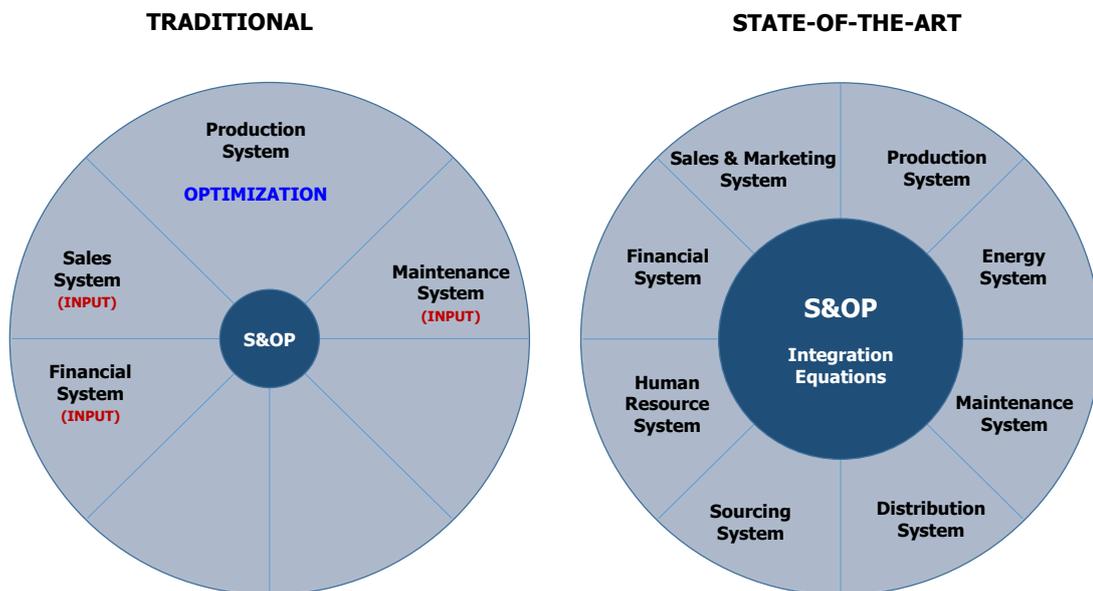


Figure 8. the traditional and state-of-the-art Sales & Operation Planning (S&OP)

An integrated and flexible DSS should enable independent models to be run for different regions, functions, and hierarchical decision-making; or, to be run integrated models of all systems, or subsystems. To do this the DSS must be built under the concepts of mathematical model families, which are properly parameterized to represent adequately the systems to be planned/studied. Additionally, it should be easy to modify the models as the real-world changes and it is necessary to adjust the models to new situations (for example the 2020 coronavirus pandemic). The idea that a mathematical model is static and serves for ever and ever must evolve to the dynamic concept of permanent design/redesign of the models used by the organization. Finally, mathematical models must be integrated into the enterprise computer tools, being one of its most valuable assets since they accumulate the scientific knowledge of companies and are generators of a significant added economic value and the only way to take advantage of the Industry 4.0 that requires autonomous intelligence at the level of cyber-space control.

REFERENCES

- Benders, J.F. (1962). Partitioning procedures for Solving Mixed Variables Programming Problems. *Numer. Math* 4, 238-252.
- Dantzig G. and Wolfe, P. (1960). "Decomposition Principle for Linear Programs". *Operations Research*. 8: 101-111
- Van Roy, T. J. (1983). "Cross Decomposition for Mixed Integer Programming". *Mathematical Programming*, January 1983, Volume 25, Issue 1, pp 46-63
- Velásquez-Bermúdez (1995). OEDM: Optimización Estocástica Dinámica Multinivel. *Teoría General*. Revista Energética No. 13 (<http://www.doanalytics.net/Documents/OEDM.pdf>).
- Velásquez-Bermúdez (1997). Asynchronous Parallel Optimization for Expansion and Operation of Multisectorial Industrial Systems. 34th European Conference on Operational Research held in Barcelona (Spain).
- Velásquez-Bermúdez (2019a). Multi-Business Supply Chain Optimization Holistic Modeling. A Real-Life Case: The Oil Industry (<https://www.linkedin.com/pulse/multi-business-supply-chain-optimization-holistic-case-velasquez/>).
- Velásquez-Bermúdez (2019b). Electricity & Natural Gas - Advanced Supply Chain & Market Optimization (<https://www.linkedin.com/pulse/electricity-natural-gas-advanced-supply-chain-jesus-velasquez/>).
- Velásquez-Bermúdez (2019c). OPTEX: Making Complex Math Models as LEGO Models (<https://www.linkedin.com/pulse/standardization-base-mathematical-programming-40-making-velasquez/>).

Why Is Organizational Excellence So Powerful?

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Abstract

With the plethora of business solutions to help improve organizational performance in the marketplace today, where do leaders turn? There is nothing quite like an excellence model that provides a platform for long term organizational success and that is applicable to any size and type of organization.

This article shares a personal story that includes the discovery of and experience with excellence models and that culminates in the development of an innovative toolkit that is designed to make the quest for improvement in organizations more simple, straightforward, time efficient and cost effective.

It concludes with an explanation of why organizational excellence is so powerful. Afterall, organizational excellence can be applied to one organization at a time to improve performance or collectively to many organizations to buoy the economy, trade and resident quality of life.

Personal Story

After completing a BSc and MBA, my career began in management consulting with large international firms. This experience provided a strong foundation for working with leaders to address challenges facing their organizations, serve as a temporary member of the team or help improve performance. While working with these firms, I was involved in ISO 9001 projects and then quite by accident discovered excellence models. This happened in 1990 when various entities around the world had been doing research on what was common to high performing organizations and developed the leading excellence models ^{1,2,3,4} that defined the:

- Principles that described a culture committed to excellence
- Best management practices that had been successfully deployed
- Balanced system of measurement that was used to gauge performance

These models also encouraged the use of system thinking, to think about an organization as a collection of interrelated and interconnected parts that must work well together for the system to perform well. System thinking was analogous to the human body or the ecosystem that are also subject to internal and external factors that influence the way the system performs and evolves.



Figure 1. System Thinking

Since then I have never tired of reading the global research validating that excellence models work ⁵ and the award programs ⁶ that celebrate organizations that have successfully implemented an excellence model and sustained performance. And I have absolutely loved working with organizations along various themes to strive for better performance - address an issue, work on a key management area, develop a good management system.

That said, I noticed three tremendous opportunities for improvement. First, there was low awareness of excellence models. Research studies estimated 10% to 20% of the working population were familiar with the models and my practical experience confirmed the same. Every audience I asked across professions and industry sectors confirmed this finding. Second, the literature seemed to be missing implementation guidelines. Some of the conferences I attended even had speakers that gave

advice such as “don’t tell people how to implement the practices, let them figure it out on their own”. And I observed the most frequently asked question being posed by leaders in organizations was - “How”? As a Certified Management Consultant, I realized that implementation guidelines might be second nature to our profession but not to others. Third, the cost and time to implement an excellence model were significant and the entire exercise seemed within the reach of large size organizations but absolutely daunting for micro, small and medium size. With the latter segments representing about 90% of organizations in any economy, it was imperative this be addressed! So, I asked myself, “What can I do to help with these opportunities for improvement”?

Development of the Organizational Excellence Framework and Toolkit

Building on academic endeavours and practical experience that spanned 35 years and included 20 years of practicing in the organizational excellence field, I thought it was important to contribute to the literature and share lessons learned. The intent was to transfer knowledge to other professionals that would help them to be successful in this field and to make the quest for improvement more simple, straightforward, time efficient and cost effective for organizations. This effort culminated in developing an integrated excellence model⁶ and turnkey toolkit that could be used by professionals and would provide support for any excellence model, improvement approach or award program.

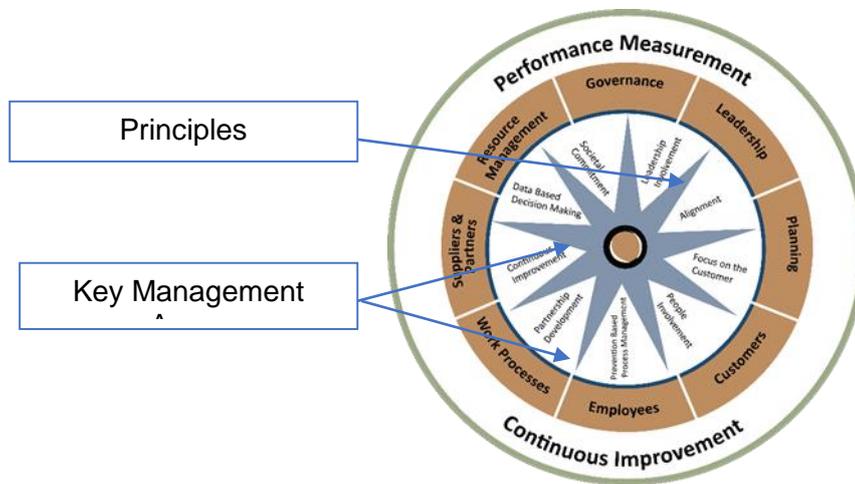


Figure 2. Organizational Excellence Framework (© 2010, Dawn Ringrose)

The tools in the toolkit included:

- Scenario Games that encourage leaders to discuss the current state of their organization and to embrace desired future state and to learn more about the way they make decisions and how to improve such
- Publication that integrates the leading excellence models, provides implementation guidelines for the user, identifies interrelationships between the principles and best management practices and shares an assessment and improvement planning methodology
- Holistic Workshops for micro and larger size organizations that provide an overview of excellence models and research and engages participants in the self-assessment of their organization against the model and creation of an action-oriented improvement plan to address gaps
- Modular Workshops for participants that wish to dive deeper into a particular key management area and better understand the implementation guidelines for each best management practice
- Automated Assessment and Reporting Tool that captures ratings and open-ended comments from employees, generates an action-oriented improvement plan to address gaps and saves time and money on repetitive work so the user can focus on higher order activities
- Global OE Index that allows an organization to compare current state with other organizations by size, industry sector and country
- Train-the-Trainer program for professionals that want to develop their knowledge and skill in this area and receive external recognition for their efforts

These tools allow an organization to realize the formula for success = implement the best management practices used by high performing organizations, develop a culture committed to excellence, and achieve exceptional results across a balanced system of measurement.



Figure 3. Exceptional Results

Important to note, these tools are meant to be used by organizations that wish to engage and involve their employees in the excellence journey as this is where the vast majority of improvement will be realized – building on the suggestions, ideas and innovations from people that do the work. It is also important to note these tools are further supported by external services that will augment your internal resources such as consulting, training, coaching professionals and by learning from other organizations that are recognized for using best practice or as a role model offering a best-in-class example. After all, why reinvent the wheel if you can learn from others?

Linkage to the Economy, Trade and Quality of Life

So, this personal story brings us full circle to the question posed in the title of this article – Why Is Organizational Excellence So Powerful? – And the rationale for such. I believe that all leaders want their organizations to perform well. So, this toolkit will help these leaders to work with their employees - to put a good management system in place that will help achieve the vision, deliver the mission, live by core values, meet goals and objectives and get exceptional results (e.g. good governance, trust in leadership, customer delight, employee engagement, continually improving work processes, strong supplier and partner relationships, better utilization of resources, balanced system of measurement, financial). And just think about it, if we have a collection of organizations that are performing well in a region, this will ultimately contribute to a local economy, trade and resident quality of life. These organizations will employ people, buy goods and services and meet customer requirements. And a stronger business community will buoy government through the payment of taxes that will provide for the delivery of programs and services that contribute to socio-economic development. This sounds a lot like nation building doesn't it? Daunting as it may be, I believe we should populate the world with professionals that can use the excellence model and toolkit and realize the formula for success with organizations. Whether these professionals want to use the resources that are provided on the website or to join our professional team, there is an open invitation to get involved so we can work together toward a common aim – to realize the exceptional results and desired outcomes that organizational excellence offers all of us.

Future Articles

Now that the organizational excellence stage has been set, future articles for the QOR Newsletter will focus on sharing information about the work we do in organizational excellence in the hopes it delivers true value for the reader. Stay tuned for news about the global research study, stories about high performing organizations, tips from subject matter experts and more.

References

1. Australian Business Excellence Framework, www.sai-global.com
2. Baldrige Excellence Framework, <https://www.nist.gov/baldrige/>
3. EFQM, <https://www.efqm.org/>
4. Canadian Framework for Excellence, <http://www.excellence.ca/>
5. APO Survey on the Impact of Business Excellence and Quality Awards in Asia, Baldrige 20/20 An Executive's Guide to the Criteria for Performance Excellence, BQF EFQM Research Report, Excellence Pays Off on Stock Market (2016), Implementing Australian Business Excellence Framework, <http://oes-learning.ca/resources.html>
6. National Excellence Programs, <https://blog.bpir.com/wp-content/uploads/2018/05/National-Business-Excellence-Awards-and-Initiatives-2018.pdf>
7. Organizational Excellence Framework © 2010 Dawn Ringrose & Associates, <http://organizationalexcellencespecialists.ca/>

Sustaining quality culture while working remotely

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Abstract

The article discusses best practices for engagement, change management, and innovation while living and working remotely. While some companies are already returning to in-office work, in most cases, this return will be slow, and some will never completely return. If remote work is extended permanently, the question that remains is how to sustain an organization's quality culture through time. Three "Great Place to Work" companies were interviewed to share their insights

1 Introduction

After more than two months with more than 50% of the US workforce working remotely, going back to normal is still uncertain. While some companies are already returning to in-office work, in most cases, this return will be slow.

Many tech companies like Google, Facebook and Zillow announced that employees who need to return to their office would start in June or July, while the majority of employees can continue to work from home for the remainder of the year.

Twitter CEO Jack Dorsey announced Twitter employees would be able to work from home *permanently* even after COVID-19, and Mark Zuckerberg committed to having 50% of workers working remotely in 5-10 years. And they are not alone, One in five chief financial officers surveyed said they planned to keep at least 20% of their workforce working remotely to cut costs. The other bright side of setting the stage for remote work is that companies can have access to more skilled workers, all around the globe, without the need to move or even getting a visa.

If remote work is extended permanently, the question that remains is how to sustain the quality culture through time.

2. Defining a problem; is quality being impacted by the change?

A culture of quality is embedded in the employee's day to day behaviors. Still, if employees are forced to working remotely, some of those behaviors may change or get lost, impacting the productivity or quality of the work. Interviewing companies awarded the Best place to work in 2020 by INC Magazine, what matters is to develop company habits that can be sustained through time, even remotely.

3. Communication and transparency are key

97th Floor, 5 y 1-800 contacts highlighted the importance of communication and transparency while working remotely. They all were already used to working with some employees remotely before COVID-19, so the transition to 100% remote was not difficult.

Using Zoom, Hangout, WhatsApp or Teams to add video to conferences is essential to create a human connection and allows employees to be involved no matter where they are. These tools enable not only regular formal meetings but also informal ones to improve the engagement of the team.

1-800 hosts a virtual lunch on Tuesday and virtual coffees on Thursday. The company 5 organized a virtual baby shower and offers art or cooking classes. 97th Floor opened a meeting link to connect for lunch every day. These meetings have no agenda; everybody can dial-in. It's a chance for employees and the management team to connect. The key is to create different ways of integrating everybody and let the associates find the one that suits them the best.

Another way of integrating everyone is through the "All-hands meeting," where all the employees can participate periodically, either remotely or face-to-face. The habit of transparency can be developed by creating an instance where results are shared directly by the executives, and all employees can participate and ask questions.

SLACK, Monday and Asana are also other tools that are being widely used to improve virtual communication and task assignment.

4. Coaching

While many companies stick to doing one-on-ones only face-to-face, extending remote work requires changing the coaching habits too. Especially in times of uncertainty, a Deep understanding of the employee challenges and concerns is vital to ensure they will be able to provide a great service, so coaching sessions should be even more often than when working in the same office.

The energy company 5, based in Irving Texas, organized a CARES team to touch base with every employee every week. They do group coaching, supervisor coaching and cross-coaching, where any employee can coach you, from a team member to one of the owners. They do at least a one-on-one monthly deep dive and a group annual coaching session that invites them to develop the habit of self-reflection.

1-800 Contacts also emphasized coaching, now more than ever. Phil Bienert, Chief Marketing officer at 1-800 said that “When working remotely, coaching has to be two or three times more frequent.” Time management and work-life balance can be challenging, so employees need to be supported and coached to practice the right habits. Some employees may be alone and work longer hours; others may work at night to avoid family distractions. 1-800 makes sure it doesn’t impact the quality of work by discussing expectations regularly and providing flexibility to choose how and when to work.

5. How autonomy increases job satisfaction and productivity

Autonomy is key to ensure employees respect the company rules, even when “nobody is looking,” that’s the ROI of a strong culture. 1-800 contact promotes empowerment by avoiding scripts in the call center and allowing employees to decide how many hours per week they will work. This policy allows to hire employees from remote locations, even students or people with disabilities. Autonomy is a blessing when employees need to work remotely, as they learn to make more decisions by themselves. 1-800 also allows employees to decide how to WOW their customers, even if it entails paying an uber lift or sending unexpected gifts. Their drivers are the company values: make her day, we win as a team, live for the impossible and champion each other.

Autonomy increases engagement and job satisfaction, as the employees feels more unique and valued. The other benefit of autonomy is that it makes employees less dependent on a leader and more self-organized, reducing both team member and leader stress and frustration while working from home. Big companies like Google uses OKR’s (Objectives and Key Results). 97th Floor, a Digital Marketing Agency applies the ROWE method (Results only work environment) to promote autonomy as a key value. Results are the only thing that matters to them, giving employees freedom and responsibility to achieve their goals, so it is not required for employees to work in the office. They use Monday to make goals visible and flexible. Their teams are particularly organized not by department, but by customer. Being multi-disciplinary, they provide a better service to the customer through dedicated designers and writers more connected to their specific needs. Annalee Jarret with 97th Floor says, “people feel valued when they are given the responsibility to self-manage.”

6. Driving innovation remotely

If autonomy is promoted, remote work can boost innovation. 5 was awarded as one of the most Innovative Companies by Entrepreneur. Jeff Schiefelbein, 5 Chief Culture Officer, says that “the key to success is to give a free pass for people to be creative, as long as they have in mind the purpose and vision of the company. Sometimes formalities, structure and fear tamper the spirit. For instance, some of their employees are more innovative than ever given that they are less distracted working from home.

Team innovation can also be promoted by organizing remote brainstorming and retrospective sessions. Some tools that are recommended are Mural.co, Poll everywhere and Teams.

7. The ROI of Building a strong culture

While most of the companies could “survive” working from home in the short term, the challenge is not only to get the job done, but also to focus on keeping the culture alive to boost company values like employee engagement, customer focus and innovation.

Working remotely and being productive and quality-oriented at the same time depends on how strong the company culture is, to ensure employees keep working the same way even when nobody is looking. Leaders need to communicate with their employees and remind them why the organization exists and how. The first step is to design a set of values that build upon the expected behaviors. The second step is not to have them just hanging on the wall but build corporate habits that support them every day. Change is constant. The ROI of having a strong culture based on autonomy is that employees sense whatever is going on. Empowering employees, companies have more sensors to react to change more effectively. In this new normal, leader’s job is not to tell team members what to do but set a context that enables their strengths.

Overview on the Quality Management Forum (QMF) and Organizational Excellence Technical Committee (OETC)



Denis Leonard, PhD, ASQ Fellow

Chair of the QMF Review Board & Vice Chair of the OETC

The Organizational Excellence Technical Committee (OETC) is a Committee of the ASQ Quality Management Division (QMD). The OETC's goals are to contribute to a body of knowledge about excellence models; promote the use of international, national and local excellence programs; share case studies and success stories about performance excellence; and explain how traditional quality methods and tools integrate with excellence models. The OETC LinkedIn Group has members from over 100 countries! The group is a great way to connect with professionals with the same goal of working with Excellence Models and improving organizations. The OETC group allows you to share ideas, ask questions and share best

practices. So feel free to join us at: <https://www.linkedin.com/groups/4369749/>

The Quality Management Forum (QMF) is a peer reviewed publication of ASQ's Quality Management Division. Every quarter QMF publishes papers on Quality Management topics by experts around the world. This is a great way to see case studies, best practices, new fresh ideas and lessons learnt to help you in your work. Remember if you have an idea for a paper yourself why not submit it to QMF! You can find out more information on QMF at: <https://my.asq.org/communities/files/folder/28/44>



4th International Conference on Quality Engineering and Management

A better world with Quality!

September 21 - 22, 2020
University of Minho, Braga, Portugal



Paulo Sampaio, Conference Chair

Professor of Quality and Organizational Excellence, University of Minho

Welcome to the 4th International Conference on Quality Engineering and Management!

In 2020 the International Conference on Quality Engineering and Management (ICQEM) is back to Portugal, to the city of Braga.

The ICQEM is an international forum to present and discuss the progresses in the Quality Management, Quality Engineering and Organizational Excellence fields. Consequently, since the beginning, the conference covers different topics as: Standards, Continuous Improvement, Supply Chain Quality Management, Management Systems, Lean Six Sigma, Quality Tools, and Quality Management in Higher Education, Quality Management in Services, Total Quality Management, Organizational Excellence, The Future of Quality and Quality 4.0.

This conference provides the unique opportunity to share the latest insights of academic and industrial research on Quality Engineering and Management and Organizational Excellence, as well as to experience the unique environment of the North of Portugal.

The ICQEM20 includes keynote speeches, parallel technical sessions, workshops and a number of social and networking events, including the conference dinner. All the presented full papers will be published in the **ICQEM20 Proceedings Book** – at least one author should be registered in the conference. **The ICQEM20 Proceedings Book will be indexed at SCOPUS database.** Please check the ICQEM Proceedings Publication [Ethics](#) and Malpractice Statements.

Let's take advantage of this great opportunity and make with your contributions an event with Quality, shared and built by such a top level group of participants! See you in September in Braga, at the University of Minho!

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The Scientific Committee of the International Conference on Quality Engineering and Management cordially invite you to submit an abstract or paper. All the abstracts/papers, both theoretic and practical applications, are welcome. Relevant topics include, but not limited to:

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- Quality Engineering
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- Quality Management and Innovation

- Quality Management in different activity sectors (healthcare, higher education, services, ...)
- Quality Tools
- Reliability & Maintenance
- Six Sigma / Lean-Six Sigma
- Standards
- Supply Chain Quality Management
- The Future of Quality and Organizational Excellence
- Total Quality Management

Important dates

Abstracts or Full papers submission deadline: **June 30, 2020**

Abstracts or Full papers acceptance: **July 15, 2020**

Early registration deadline: **July 31, 2020**

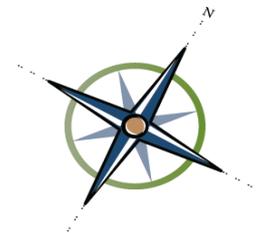
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Contributions in English containing original and unpublished work are encouraged to be submitted. The full paper should be according to the guidelines available in the **full paper template**. The submission should be through the **EasyChair platform**. Authors will have also the chance to submit an **abstract** (no template is needed, max. 500 words). However, only full papers will be published in the conference proceedings.

For more information, please check the conference website: <http://icqem.dps.uminho.pt/callforpapers.html>

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Gerhard-Wilhelm Weber
Poznań University of Technology, Poland)

Objective of the Book

Attention to clean energy in recent decades has been growing exponentially. This is mainly due to a decrease in the cost of both installed capacity of converters and a decrease in the cost of generated energy. Such successes were achieved thanks to the improvement of modern technologies for the production of converters, an increase in the efficiency of using incoming energy, optimization of the operation of converters and analysis of data obtained during the operation of systems with the possibility of planning production. The use of clean energy plays an important role in transportation industry, where technologies are also being improved from year to year – transportation industry is growing, and machinery and systems are becoming more autonomous and robotic, where it is no longer possible to do without complex intelligent computing, machine learning optimization, planning and working with large amount of ocean of data.

Recommended topics include, but are not limited to, the following:

Machine learning, Quantum Optimization, Modern Technology in Transport Industry, Innovative Technologies in Transport Education, Systems Based on Renewable Energy Conversion, Business Process Models and Applications in Renewable Energy, Clean Energy, and Climate Change.

Important Dates

15th March, 2021: Full Chapter Submission

24th April, 2021: Review Results Returned

10th May, 2021: Final Acceptance Notification

24th May, 2021: Final Chapter Submission

Publisher

This book is scheduled to be published by Nova Science Publishers, Inc.

<https://novapublishers.com/>

Guideline for manuscript preparation is given below:

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Inquiries can be forwarded to

Prof. Dr. Gerhard-Wilhelm Weber, Poznan University of Technology, Poland, and METU, Ankara, Email: gerhard-wilhelm.weber@put.poznan.pl

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Alberto A. Pinto is a full professor at the Department of Mathematics, Faculty of Sciences, University of Porto (Portugal). He is a researcher at the Laboratory of Artificial Intelligence and Decision Support, Institute for Systems and Computer Engineering LIAAD, INESC TEC. Together with Michel Benaim, they founded in 2014 the Journal of Dynamics and Games, published by the American Institute of mathematical Sciences (AIMS), and are the current co-editors-in-chief. He is an editor of the Springer Monographs in Mathematics. He is an editor of Algorithms, published by MDPI. From 2011 to 2016 he served as President of the International Center for Mathematics (CIM). From 2017 to 2021 he was appointed President of the General He was appointed Delegate to the International Mathematical Union (IMU) General Assembly, Gyeongju, Republic of Korea, August 10-11, 2014 and also Delegate of the Institutional Members of the European Mathematical Society (EMS). In 2009 he served as the executive coordinator of the Scientific Council of Exact Sciences and Engineering at Fundação para a Ciência e Tecnologia, the Portuguese Foundation for Science and Technology. From 1999-2001, Alberto Pinto was a member of the steering committee of Prodyn at the European Science Foundation (ESF). Alberto Pinto worked with David Rand at the University of Warwick, UK, on his master's thesis (1989) that studied the work of Feigenbaum and Sullivan on scaling functions and he went on to a PhD (1991) on the universality features of classes of maps that form the boundary between order and chaos. During this time Alberto A. Pinto met a number of the leaders in the field of dynamical systems, notably Welington de Melo, Mauricio Peixoto and Dennis Sullivan, which had a great impact on his career. As a result he and his collaborators made many important contributions to the study of the fine-scale structure of dynamical systems culminating in several papers published in leading journals, as for example The Annals of Mathematics, Communications in Mathematical Physics, Transactions of the American Mathematical Society, Proceedings of the American Mathematical Society, Proceedings of the London Mathematical Society, Bulletin of the London Mathematical Society, among others, and in his book "Fine Structures of Hyperbolic Diffeomorphisms", Springer Monographs in Mathematics (2010), coauthored with Flávio Ferreira and David Rand. Since then Alberto Pinto has branched out into more applied areas. He has contributed across a remarkably broad area of science including game theory and mathematical economics, finance, immunology and epidemiology. He edited with George Zubelli the special issue: Mathematical Methods in the Biosciences, celebrating the 70th birthday of Prof. David Rand, for the journal Mathematical Biosciences and Engineering, published by the American Institute of Mathematical Sciences (AIMS). He edited two volumes, with Mauricio Peixoto and David Rand, entitled "Dynamics and Games I and II" (2011). These two volumes initiated the new Springer Proceedings in Mathematics series. He edited with David Zilberman three volumes, "Modeling Optimization, Dynamics and Bioeconomy I-III" that also appeared at Springer Proceedings in Mathematics & Statistics series. While President of CIM, with Jean-Pierre Bourguignon, Rolf Jeltsch and Marcelo Viana, he edited the books "Dynamics, Games and Science" and "Mathematics of Planet Earth" that initiated the "CIM Series in Mathematical Sciences", that he created, published by Springer-Verlag. He edited, with J. F. Oliveira and J. P. Almeida, the book "Operational Research", published by Springer-Verlag in the CIM Series in Mathematical Sciences" and three more volumes also co authored by Maria João Alves and A. Ismael F. Vaz published by Springer Proceedings in Mathematics & Statistics series. He edited, with Lluís Alsedà, Jim Cushing and Saber Elaydi, the book "Difference Equations, Discrete Dynamical Systems and Applications", published at the Springer Proceedings in Mathematics & Statistics. He published, with Elvio Accinelli Gamba, Athanasios N. Yannacopoulos and Carlos Hervés-Beloso, the book "Trends in Mathematical Economics", published by Springer-Verlag.



Dawn Ringrose has consulted to management in areas that positively contribute to organizational performance since 1984. A wide range of academic qualifications (Bachelor of Science Specialization, Master of Business Administration), professional certifications (Fellow Certified Management Consultant, Registered ISO Specialist, Assessor of Quality Systems, Certified Seminar Leader) and practical experience (1984 to date) have contributed to her subject matter expertise in organizational excellence. She has worked with large international firms (Deloitte, Pannell Kerr Forster, KPMG) and her own businesses to assist different size organizations with addressing challenges and improving performance. Several of these organizations have earned national excellence awards. With a strong desire to transfer what she has learned to others, Dawn has developed a turnkey toolkit that is designed to make the excellence journey more simple, straightforward, time efficient and cost effective. The toolkit aims to transfer knowledge to others and includes the Organizational Excellence Framework publication (©2010) and related tools: scenario games, holistic and modular workshops, automated assessment and reporting tool, global index, and train-the-trainer program. These tools are currently being used by professionals in over 65 countries and on nation building projects. She was pleased to lead the 'first global assessment on the current state of organizational excellence' that was launched by the Organizational Excellence Technical Committee QMD ASQ and supported by the Global Benchmarking Network, International Academy for Quality, ISO Technical Committee 176 and included over 400 researchers around the world. This study continues with the intent to publish

an annual index by organization size, industry sector and country. Dawn owns and operates Organizational Excellence Specialists Inc in Canada and currently serves as: a Board Member with the Global Benchmarking Network, an Executive Team Member with the Organizational Excellence Technical Committee QMD ASQ, the Chair of the Content Management Committee (Leadership) at QMD ASQ and a Goodwill Ambassador and Advisory Board Member with the ISCM Foundation. She has presented on her work at international conferences and published a chapter on organizational excellence (Global Encyclopedia of Public Administration, Public Policy and Governance in Springer 2016) and articles in international management journals (Springer, Emerald) and peer reviewed newsletters (Global Benchmarking Network, Business Process Improvement Resource, Centre for Organizational Excellence Research, Quality Management Forum, South African Quality Institute).



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Invited Keynote Lecture in: i) **XIX Latin-Iberoamerican Conference on Operations Research (CLAIO 2018, Lima)** and ii) 2nd (2017) and 3rd (2018) **On-line International Conference on Ancient Mathematics & Science for Computing**, Doctor in Engineering of the Mines Faculty of the Universidad Nacional de Colombia (2006). Industrial Engineer and Magister Scientiorum of the Universidad Los Andes (Colombia, 1975). Postgraduate studies in Planning and Engineering of Water Resources (Simon Bolivar University, Caracas) and in Economics (Los Andes University). Chair of CLAIO 2008. Consulting engineer with experience in management of projects in mathematical modeling, industrial automation, and information systems, for large companies in multiples countries. LOGYCA Award for Innovation and Logistic Excellence 2006 (GS1-Colombia). ACOLOG Award to the Investigation in Logistic (2006). Prize ACIEM-ENERCOL Award to Colombian Engineering (1998). ALBERTO LEON BETANCOURT Operations Research Award (1986). President of the Colombian Society of Operations Research (2000-2008). Vice-president of the Latin-Ibero American Association of Operations Research (2004-2008). Member by Colombia Executive Committee of the International Federation of Operations Research Societies (2002).



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Born in Braga, Portugal, in 1978, he graduated in Industrial Engineering and Management at the University of Minho in 2002 (5-year degree). He completed his PhD in Industrial Engineering in 2008 at the University of Minho. He began his career at the University of Minho in September 2000, as Junior Lecturer in the Department of Production and Systems of the School of Engineering. In the academic field he had been lecturing courses in the fields of Quality and Organizational Excellence. His research activities are developed under the Industrial Engineering and Management Research Line of the ALGORITMI Research Centre, within the Supply-chain, Logistics and Transportation

Systems (SLOTS) Research Group. Always privileging research and development for industrial applications, he has been participating in several R&D projects supported by Portuguese Institutions and under European funding programs, namely, INNOVCAR, 12 754 548,62 €; iFACTORY, 9 246 492,55 €; HMIExcel, 5 110 000,00€. Paulo has supervised with success 2 PhD students and more than 70 Master students. He has co-authored or authored more than 200 publications, 160 of them ISI/Scopus indexed papers (1810 citations at Google Scholar). He is the Coordinator of the Research Group on Quality and Organizational Excellence at the University of Minho. He is an elected member of the Scientific Council of the School of Engineering at the University of Minho. He is Director of the Industrial Engineering and Management Integrated Master at the University of Minho. He is an elected member of the Senate of the University of Minho. He is Vice-Dean of the School of Engineering at the University of Minho since September 2016. During 2015, Paulo was a Visiting Scholar at the Massachusetts Institute of Technology (MIT) for a sabbatical leave. At the American Society for Quality, Paulo is currently member of the Board of Directors, member of the Feigenbaum Medal Committee and member of the Influential Voices Group. Previous positions: (2010-18) Country Counselor for Portugal; (2011-12) member of the Membership Committee; (2014-17) member of the Global Advisory Committee and (2015-16) GAC Liaison Member at the Voice of the Customer Committee. Additionally to these positions, Paulo was member of the Advisory Board in the following projects: Global State of Quality Research (1 and 2); Culture of Quality; Insights of Economics of Quality Research. Paulo is a Founding Partner of Quality for Excellence (since 2013). Paulo had several technical and management positions at the University of Minho and other organizations, profit and non-profit, in the past 17 years. Paulo participates as a Keynote Speaker in Quality and Organizational Excellence international conferences and he is author of several publications in the Quality field (books, papers in international and national journals). He coordinates several research projects on Quality and also supervises several researchers (Postdoctoral, PhD Students, Master Students and Visiting Researchers). In 2006, 2008 and 2009, he was distinguished with the award of the Best Paper Presented in the Student Technical Paper Competition during the ASQ World Conference on Quality and Improvement. In 2008, his PhD Thesis was distinguished by the Portuguese Association for Quality as the best thesis developed in Quality. In 2009, Paulo was distinguished as Senior Member of the American Society for Quality. In 2011, he was distinguished with the award of the best presentation in the European Organization of Quality Congress. In 2011 and 2016, Paulo was nominated as one of the Quality Progress “New Voices of Quality” (ASQ) and in 2012 he was awarded with the Feigenbaum Medal (ASQ). He has been an Associate Academician of the International Academy for Quality since 2014. In 2015 Paulo was included in the Group of Best Reviewers of the Total Quality Management and Business Excellence Journal (2010-2014).



G.-W. Weber is a Professor at Poznan University of Technology, Poznan, Poland, at Faculty of Engineering Management, in the Chair of Marketing and Economic Engineering. His research is on data mining, analytics, artificial intelligence, machine learning, mathematics, operational research, finance, economics, optimization and optimal control, neuro-, bio- and earth-sciences, medicine and development; he is involved in the organization of scientific life internationally. He received Diploma and Doctorate in Mathematics, and Economics / Business Administration, at RWTH Aachen, and Habilitation at TU Darmstadt (Germany). He replaced Professorships at University of Cologne, and TU Chemnitz, Germany. At Institute of Applied Mathematics, Middle East Technical University, Ankara, Turkey, he was a Professor in Financial Mathematics and Scientific Computing, and Assistant to the Director, and has been a member of five further graduate schools, institutes and departments of METU. G.-W. Weber has affiliations at Universities of Siegen (Germany), Federation University (Ballarat, Australia), University of Aveiro (Portugal), University of North Sumatra (Medan, Indonesia), Malaysia University of Technology, Chinese University of Hong Kong, KTO Karatay University (Konya, Turkey), Vidyasagar University (Midnapore, India), Mazandaran University of Science and Technology (Babol, Iran), Istinye University (Istanbul, Turkey), Georgian International Academy of Sciences, at EURO (Association of European OR Societies) where he is “Advisor to EURO Conferences” and IFORS (International Federation of OR Societies), where he is member in many national OR societies and working groups, at Pacific Optimization Research Activity Group, etc. G.-W. Weber has supervised many MSc. and PhD. students, authored and edited numerous books and articles, and given many presentations from a diversity of areas, in theory, methods and practice. He has been a member of many international editorial, special issue and award boards; he participated at numerous research projects; G.-W. Weber received various recognitions by students, universities, conferences and scientific organizations, nationally and internationally.



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