the newsletter of Reliability, Maintainability, and Supportability

December 2019

Volume 24

Issue 4

in this issue:

A Knowledge-Cultural Disconnect between the Government and Industry Workforce

by Russell A. Vacante, Ph.D.

The October 2018 and the March 2019 Boeing 737 MAX crashes that caused 346 deaths is indicative of a knowledge-cultural disconnect between the government's oversight function and the technical and economic priorities of industry. This disconnect manifest itself in four ways. The first one is the capitulation of government oversight and control to industry demands for less government regulations and guidance. Secondly, the government's seemingly myopic focus on acquisition and related policy and procedures at the expense of technical knowledge and expertise. Next, the lack of training within government and industry (but acutely in government) pertaining to the reliability and systems engineering disciplines. Lastly, the profit driven motivate that creates a culture within government and industry that tolerates life cycle process short-cuts for economic rewards.

The relation between government and industry may now be receiving some close scrutiny due to the two Boeing 737 MAX crashes. However, the delegation of many former government oversight responsibilities is not restricted to Boeing and the FAA. The lack of government oversight of industry in general is pervasive throughout most of the government-industry relationships irrespective of government agency or type of industry. For example, the acquisition reform measures under Secretary of Defense Perry in 1993 significantly reduced the oversight role of the government contracting and technical communities. During the same time period, DoD turned over base housing responsibilities to contractors. Today many military personnel families are living in residences that are mold and rat infested.

Government agencies during the 1990s were forced to yield many of their oversight responsibilities due to Congressional pressure, that was in turn responding to political pressure from industry to "get government off its back." Industry insisted that the numerous government regulations and procedures were costing them money and dulling their competitive edge. This perspective, while containing some accuracy, is obviously not reflective of current realties.

(Continued on page 2)

Maintaining Your Workforce Through STEM Outreach

by Ralph Tillinghast and Mo Mansouri

It is clear with a systems mindset all processes and products become complex when you start to focus on them. When trying to maintain your workforce, a systems view is critical to fully appreciate the complexity of the task. Factors such as motivation, salary, work location, family life and work environment are all significant. Within this construct, every person in management is on a constant quest to optimize Reliability, Maintainability and Sustainability (RMS) as it relates to their workforce. Any manager who has to hire or try to motivate the

(Continued on page 3)

(Continued from page 1)

A Knowledge-Cultural Disconnect between the Government and Industry Workforce (Continued)

The grounding of the Boeing 737 MAX series certainly has negatively impacted the profitability of the Boeing Company. Current preliminary investigation findings into the two deadly Boeing 737 MAX crashes indicate that self inspection by Boeing personnel is a contributing factor. Similarly, the lack of government technical oversight with respect to base housing has inflicted much pain and suffering on its military residents, as well as shown that corrective repair measures have been exceedingly expensive.

The prolific production of regulations, rules and procedures charts by folks in a government leadership position is well-known to most government-industry employees. Anyone who has ever attended a conference, symposium or workshop at which a government employee made a presentation understands that regulations, policies and procedures will be the topics of discussion. Presentations of this type are intended to inform government-industry representatives about acquisition and contractual expectation pertaining to cost, schedule and performance—which of course is important for most to understand. However, substantive technical information and knowledge is slighted in favor of promoting and explaining regulations, policies and procedures. It probably is safe to say that the longer that an employee remains in government service (of course there are exceptions) the less chance does he or she have to remain on the cutting edge of technology. This has evidently become an increasing problem as a result of decreased government oversight of industry activities.

The low priority given to training, especially technical training, within the government means that engineers and related technical professions are increasingly becoming less interested in establishing a government career. All are aware, both seasoned professionals or those just out of college, that training is a low budget priority while training that will keep their knowledge and experience on the cutting edge of technology is infrequent, if at all. Moreover, the scant opportunity for professional career development will prevent them from successfully performing their remaining industry oversight responsibilities. However, how can government representatives oversee industry projects when they often lack the knowledge and expertise of technical industry personnel performing a task?

Profit is not an inherently dirty word. Its meaning does however, become corrupt when greed motivates companies and individuals to trade off a greater good for their organization or self. Taking shortcuts, e.g. not properly addressing reliability, systems engineering and interoperability issues early-on and through a systems life cycle because there is a suspicion that it will adversely impact a company's profit can prove to be devastating to the company and the user community. The Boeing Super MAX and the military base housing experiences amply illustrate this.

The second tension associated with profit is within the context of the government-industry complex, revolving door syndrome, discussed by President Eisenhower. It is not uncommon for a government employee to seek out a more lucrative economic industry position sometime during their career or just shortly after retiring. With future possible employment opportunity in mind, the obvious question to ask is how rigorous will be a government representative's oversight of a particular industry that may employ him or her? This observation is not to call into question the preponderance of hardworking government professionals that do properly perform their industry oversight tasks. What is being expressed is that salaries have been established that are comparable to similarly skilled professionals in industry.

The thread of continuity that lends itself to a better understanding of the "disconnect" between the government-industry workforce can be found in the discussion above pertaining to the government surrendering much of its oversight responsibilities to industry self-inspections. This change has marginalized government oversight responsibilities and opportunities, is responsible for increased government representative's focus on policies and regulations at the expense of technical knowledge and expertise, which in turn resulted in less demand for technical training, that has the tragic consequence of depleting the desire of professionals from pursuing a career in government service. While it cannot be categorically stated that if the four measures discussed above were adequately addressed and managed there would not be two Boeing MAX crashes or unhealthy and unsafe military housing issues. What can be said, is that the probability of these disasters occurring as they did would have been less.

(Continued from page 1)

Maintaining Your Workforce Through STEM Outreach (Continued)

workforce knows this can be a difficult and continuous task. One method that can be leveraged to influence this issue is using employee-based Outreach programs to go out and try to build the next generation workforce in your area of expertise. For our organization, this is in the area of scientists and engineers (S&E) through Science, Technology, Engineering and Mathematics or STEM Outreach. The outreach your organization conducts can be outside of the STEM program towards other desired areas of expertise that your workforce needs. Utilizing outreach has been found to be a great way to not only grow your future workforce, but to also maintain and support enthusiasm and interest towards your organization's mission and goals.

Back in 2015, the US Army conducted a survey on their workforce of approximately 200 to 250 scientists and engineers who went out into the community to conduct STEM Outreach at least once a year [1].

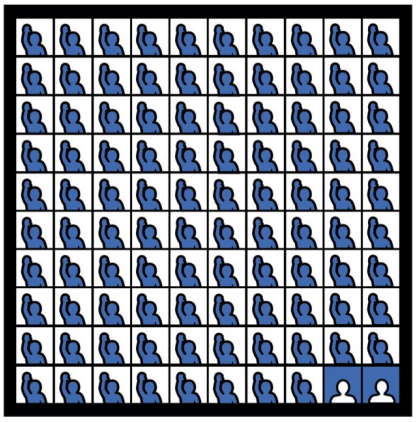


Figure 1: 98% of S&E Professionals indicated that conducting outreach had an increase in job satisfaction

This outreach supported kindergarten through high school, and even colleges, to promote the areas of STEM for both understanding and interest. From this survey they found that 98% of the employees felt they had a job satisfaction increase from doing STEM Outreach. This directly links back into this need to always be looking for methods to maintain your current workforce, while keeping them enthusiastic, engaged and focused on their work.

The survey also identified trends in the comments provided by the S&E participants finding three main reasons that the S&E's felt that they had an increase in their motivation and job satisfaction. The first being they felt that they were giving back to the community. By having this direct interaction with the community and students, a humanitarian feel was achieved which has been identified as a link to job satisfaction by multiple studies including Borgonovi's work illustrating this positive link [2].

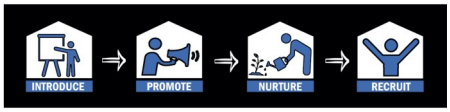


Figure 2: STEM career pipeline stages

The second reason relates to the busy pace at work. Stepping away from their daily work routine allowed them to recharge and catch a breath. The third and, maybe arguably, the most important reason is conducting outreach with students reminded them of why they became an engineer or scientist in the first place. Going back into the schools rekindled that early excitement and interest into the field that they chose for their career. These three reasons were identified by S&E's at various points in their career, whether they were fresh out of school or a 30 year veteran. This illustrates that these three areas are universal, no matter what stage you are in as an employee in your company, and can impact the employee systems model.

Beyond supporting your workforce through career satisfaction, another added benefit of conducting outreach is maintaining the career pipeline for your future workforce. Sending your employees into the classroom allows them to aid students in understanding and growing interest in the careers important to your organization. Your professionals have a unique perspective that most teachers cannot provide that can aid in shepherding the student as they move through distinct stages of career understanding.

If you are in a position to lead or manage your organization's workforce, starting an Outreach program can feel like an overwhelming task. To get you started, there are a few best practices to consider.

First, canvas your company for employees who may be interested or already doing outreach on their own. Next, look for schools that employees already have children in. Use this link to reach out to the teacher and or superintendent and offer to support the classroom. Teachers are always trying to figure out ways to better explain why what they are teaching is relevant to their students and your employees can answer this question. Finally, work to complement the teacher's needs. We have had teachers ask to just have an electrical engineer in the room to answer questions when they teach electrical circuits to 4th grade students. Just being in the classroom puts a face to what an engineer or scientist is and what they do. This allows the students to build an understanding of the career you are promoting.

Preliminary research related to understanding the systems model of the STEM career pipeline stages has identified four stages that a student goes through as they travel through their education towards a career. These are the concepts that

(Continued on page 4)

(Continued from page 3)

Maintaining Your Workforce Through STEM Outreach (Continued)

your employees can use to make a positive impact. The first is to introduce the vocabulary, concepts and how STEM relates to their everyday lives. This builds a base understanding of what STEM is all about. Second, the outreach aids in promoting the STEM disciplines. Ensuring that the students sees STEM as an option. This is important as students will add and trim off career options as they move through school. Third, once a student shows interest, the nurturing stage further mentors the student in the STEM career path. This illustrates, in finer detail, the types of STEM careers and how a student can achieve those career aspirations. The last stage is to recruit the students as a new employee for your organization. This could be through internships or other activities that can actually bring that person into and help them join your organization.

Although the example provided is STEM focused the outreach does not have to be for STEM fields. Anyone in leadership and management positions, who needs to bring on the next generation in a specific career field, can use outreach to inspire the next generations of employees. If you need more welders, graphic artists, lawyers, or engineers, going into the schools and promoting the careers you need will have the same impact.

To close, reflecting back on this in the context of RMS and managing your workforce, outreach is a very good opportunity to maintain, sustain and support your current workforce.

References:

[1] Tillinghast, Ralph C., et al. "Utilizing science and engineering professionals in the classroom: How your workforce can positively impact STEM and your company's bottom line." 2015 IEEE Integrated STEM Education Conference. IEEE, 2015.

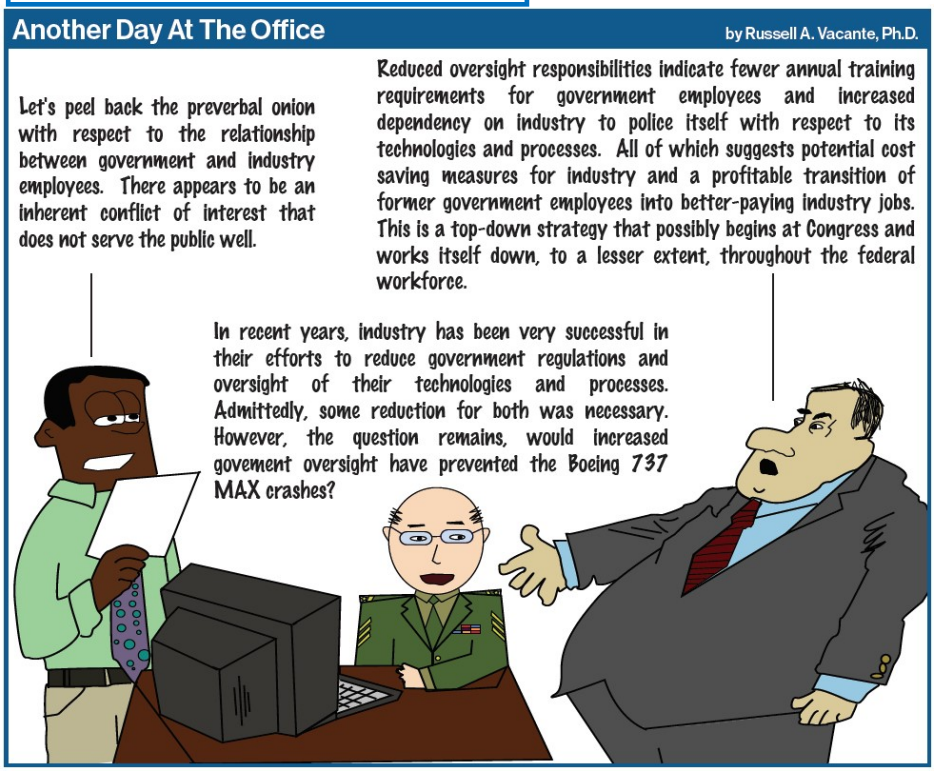
[2] F. Borgonovi, "Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness," Social Science and Medicine, vol. 66, no. 11, pp. 2321-2334, 2008.

Author info:

Mr. Ralph Tillinghast currently works for the US Army's Combat Capabilities Development Command - Armaments Center in the Fire Control Systems Directorate and is the S&T Advisor for Fire Control. Along with this role, he is a strong advocate for STEM (Science, Technology, Engineering and Math) Outreach programs. Mr. Tillinghast visits schools on a monthly basis, giving workshops to introduce students to STEM related materials. Mr. Tillinghast has undergraduate degrees in both Electrical and Mechanical Engineering along with a Masters in Manufacturing Engineering from Worcester Polytechnic Institute. He is currently continuing his studies in System Engineering with Stevens Institute of Technology.

Dr. Mo Mansouri is a Research Associate Professor at Stevens Institute of Technology and Program Lead for Systems Engineering and Socio-Technical Systems.

Cartoon by Russell A. Vacante, Ph.D.



A Discussion on Software to Improve Service Reliability and Costs for On-demand Stat Orders

by Gerard Ibarra, PhD

The reliability for on-demand medical transport continues to grow in complexity as more people get older as well as younger ones having babies. The medical attention these individuals may require increases proportionally to the growth of the population. In instances where doctors must order immediate lab tests so they can continue to diagnose the patient, the lab or courier company must pick up these specimens and deliver them to the appropriate lab within a specified time. If they do not, they risk compromising the integrity of the specimen. The medical transport industry typically refers to these types of orders as a stat, which is an abbreviation for the Latin word statim that means immediate. The lab then performs the test and reports the results to the doctor as soon as possible. The logistics behind the pickup and delivery of the specimen is straightforward, but complicated when demands exceeds supply. That is, there are not enough drivers to pick up and deliver all the specimens within the allowed time. To complicate the logistics further, orders that come in during rush hour make it even harder for companies to complete the deliveries timely. The drivers take longer because the speed at which they drive is slower due to the added and intensified traffic. On top of this, there are cities that continue to grow because businesses move there for assorted reasons. As they move there the people follow them and the population of the city and amount of new construction expands. The current infrastructure of the city is not set up for optimum traffic flow and as a result, moving about the city is less efficient and making the deliveries on time more difficult. Given these circumstances, the lab and delivery companies must contend with the costs and more importantly the reliability of the deliveries, service. If during a specimen pickup and delivery they compromise or worse yet lose the specimen, they can jeopardize the diagnosis and or the health of the patient. This is not good especially if the doctor ordered the test for you or a love one. To make better decisions where lab companies maintain or improve the service reliability and keep costs in check, they should look at the pickup and delivery as a system and use software to help them staff appropriately.

To begin, we must define what is a system and what is the system in this scenario. The term "system" as adopted by Benjamin S. Blanchard and Wolter J. Fabrychy in their Systems Engineering and Analysis book is: "an assemblage or combination of elements or parts forming a complex or unitary whole such as a river system or a transportation system; any assemblage or set of correlated members such as a system of currency; an ordered and comprehensive assemblage of facts, principles or doctrines in a particular field of knowledge or thought, such as a system of philosophy; a coordinated body of methods or complex scheme or plan of procedure, such as a system of organization and management; any regular or special method of plan of procedure, such as a system of marking, numbering or measuring." We can also borrow from Peter Senge, senior lecturer at the MIT Sloan School of Management, co-faculty at the New England Complex Systems Institute, and the founder of the Society for Organizational Learning who defines it as "To see the connections in any situation and to understand better how things unfold over time." From these we can define what the system is from a lab that participates in the medical transport of stat orders. This helps keep the definition of the system in scope with this abbreviated article.

Let us consider the system is the pickup and delivery of stat orders and the makeup of this system consists of three subsystems. Subsystems are systems within a system. The first is the transportation system. We define this as the highway network within the pickup and delivery area of the specimens. The network consists of nodes and links. A node, as defined in the dissertation of Gerard Ibarra, A Systems Engineering Approach to a Methodology and Mathematical Model for Identifying the Most Critical Links of a Highway Systems is, "a highway interchange of transfer point. The set of nodes is represented by N." Moreover, "Grouping the lanes of the highway system in both directions forms a link. Links are the bidirectional highway's lanes between nodes. The highway link connecting nodes i and j is denoted as {i, j}. The set of links in the highway systems is denoted by L. Thus, a highway system can be graphically represented as a network that consists of nodes and links…" Provided is an example of a highway network system.

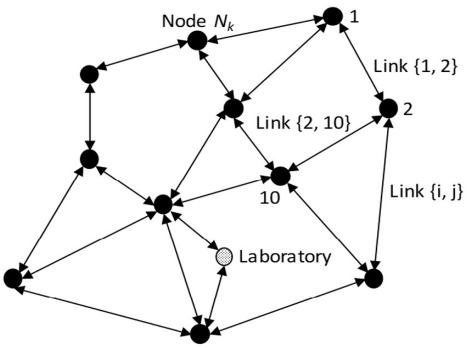


Figure of Network: N = {1, 2, 3, …, k} and L = {1, 2}, {2, 10}, …, {i, j}

The network represents the numer-

(Continued on page 6)

(Continued from page 5)

A Discussion on Software to Improve Service Reliability and Costs for On-demand Stat Orders (Continued)

ous ways a driver could get around the city from one location to another. Not shown are the pickup locations and travel path to the highway. Most of the drive takes place on this highway network example and is where many of the delays occur. There are other networks where highways and regular streets share approximately the same travel time or conversely where streets are the main travel path to the lab. Also shown is the location of the lab where the drivers deliver the specimens. The lab in this instance conducts all their tests at this location. There are other scenarios where labs could act as a consolidation point for specimen transport to another lab or a combination of both. If both, typically those transported are for specialty tests where the current lab does not have the equipment to do such test.

The next system is the Logistics department of the lab company. This department ensures they pick up and deliver the stats within the required timeframe. They must contend with personnel, vehicles, uniforms, training, supplies and facilities as examples. The number of drivers they hire depend on the number and order time of the stats. There are times in the day where the number of orders placed exceed the number of lab drivers available. In such a case they must outsource the order to a courier company. The courier company has the same set of rules, from the time to pick up and deliver the stat, to having the proper certifications to transport them. To add to the conundrum, the Logistics department must also worry about the proper number of vehicles and spares. If they do not have enough because of poor preventative maintenance planning, excessive corrective maintenance problems, or insufficient spares for either type of maintenance, they must outsource more of their stat work. These are some of the problems with personnel and vehicles, and there are others. The lab must also be cognizant of their training. If they do not adequately train the driver, the driver may compromise the specimen such that they freeze one that is supposed to be refrigerated instead. Moreover, they must deal with supplies like dry ice. If they happen to run out during the day, or the driver does not have enough for the pickup, they run the chances of compromising service. Likewise, they must pay attention to the facilities. From a high-level, if the Logistics department does not have enough real estate to process the specimens, which is get them checked in to the lab, they could create a backup for the lab technicians to receive them. What should take one minute to get the technician the specimen could extend to three. These are some of the things that go into this system. There are more depending on the size and location of the lab, and the type of test to perform.

The last system is the software used by the lab company to take, manage and dispatch orders. This too is a system within a system where one can easily roll up the software to the Logistics department. The reason it is classified as a separate system is the magnitude the software plays in the reliable pickup and delivery of a stat. The software is essential to help the Logistics department manage their drivers and orders. The software helps them dispatch the orders to the most efficient driver available that can complete the order on time. If no driver is available, the department sends the order to the courier company. A factor in service reliability is in the delay the lab company may encounter, and there are multiple reasons for this, where the order to go from one system to another, like from the customer service representative of the lab to their Logistics department, or from the Logistics department to the courier company, takes longer than five minutes. If the key performance indicator (KPI) is a 120 minutes turnaround time TAT), a 5-minute delay accounts for more than 4% of the TAT. This type of delay can negatively affect the KPI. A software system that is robust, such that it can automatically route orders to the most efficient driver, whether it is the lab or courier company, and is able to model traffic delays in its algorithm, can make the difference in service reliability. The costs for systems like these are significant. If we identify each subsystem as qn and Q as the entire system, we can say the system consists of all qn. Provided is a diagram representation of the system and subsystems.

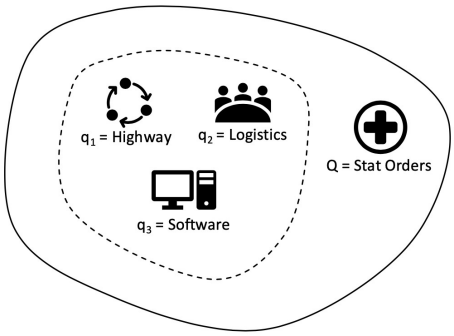


Figure of System: Q = {q_1, q_2, q_3}.

We identified the system and its subsystems. There are potentially more systems of systems which depends on how finite or broad one makes them. That is, one could have made the software part of the Logistics department to reduce the number of subsystems. Or they could have added the Lab and Sales department as subsystems and made the system larger. It is up to the company that performs the analysis, and the time and cost budgeted for such analysis. For the scope of this paper, we shall merge the transpor-

(Continued on page 7)

(Continued from page 6)

A Discussion on Software to Improve Service Reliability and Costs for On-demand Stat Orders (Continued)

tation network with the software. We shall outline how these subsystem affects the reliability of the service and provide suggestions to maintain it. Refer to the transportation network. The reliability of the service depends on the effectiveness of the network layout, that includes but is not limited to the number of lanes that make up the link {i, j}, and the points that connect the highways from one link to the other, that are the nodes, N. Not enough lanes will cause traffic to move slower in a heavily congested network. Or inadequate number of connection points could mean longer paths from the pickup to the delivery. Both impact transport time. In addition, the number of drivers needed to complete the amount of orders influences the service reliability. An insufficient number of drivers at a given time means the demand outweighs the supply. In other words, where one driver was able to make three pickups and deliver them on time now has four. The extra order given to the driver made one or more of the four late. The key however to the number of drivers required is based on two perspectives from the time of day, and yet another on contingencies. First, it is more difficult to move about the network during rush hour. Heavy traffic makes it harder for drivers to move about freely. Second is when the doctors place most of the orders. There are patterns to the peaks and valleys of the orders and the former has the greatest effect on service reliability. If there are not enough drivers to handle the volume, then the orders could be late. Last of all is to have enough drivers for unpredictable items such as accidents, to semi-predictable as weather, to something that is predictable like events. Accidents are the most difficult to determine because one is not sure when and where one will take place. It could be at any time on any link, node or both. To staff for it might be too costly at which point the department makes the best decisions they could under the circumstances. This means they could outsource stats to other courier companies, but they too will face the same delays. Inevitably, some orders might be late. Conversely, weather such as heavy rain or ice, is a little easier to plan. What might become a problem is if the weather is more severe and widespread and lasts longer than anticipated. If such is the case, there could be late orders. Then events such as a presidential visit, sports game, or concert are the easiest to plan for unless there is an oversight by the planner. If so, this could possibly cause some late orders. What the planner may not have control over however, is if the event is extremely fashionable where the drivers may skip work to attend the event. This would cause the department to be short staffed.

The makeup of the network and number of drivers shapes the reliability of the service. Given this, it is simple to construct a shortest path algorithm to identify the most direct path in the set of links {in, jn} from say point □k to □́k. The program gets the drivers from pickup to delivery in the most efficient manner and allows the user to plan for the right number of drivers. However, the algorithm does not account for the time of day and the congestion that has a direct correlation to the number of drivers needed. These are vital elements to service reliability. And since it is impossible for the lab to change the makeup of the network, it is more important that they have a grasp on the number of drivers required. Not having enough means late deliveries and too many means higher costs. To obviate such fractures, a simulation software program that accounts for these items would be ideal to help sustain service reliability and keep costs in check.

There are four items it should consider.

First, the software should account for readily seen items such as congestion based on traffic patterns and the time of day. Traffic patterns for the most part follow the time of day when travelers are about the network. It is heavy in the morning going to work and afternoon going home. On the other hand, it has acceptable levels for the links to sustain with minimum congestion during the day. The program would have tables that consists of cost variables that correspond to the time of day and inject those into the simulation to provide the most optimum travel paths for the drivers. That is, the table would have a set of costs at time T which affects the travel path one way and another set at time T+1 which affects the travel path another way. Incidentally, what is difficult to include more so are accidents than events, and weather being in between.

Second, the program should account for accidents, events and weather. Accidents are dynamic and must be part of the simulation at least in the most unsophisticated manner where the user enters the link(s) {in, jn} and or node Nk that corresponds to the accident. It may not be real-time, but if included shortly after the incident, it could still provide a shorter path in terms of costs. Events on the other hand are known in advanced and should be easier to inject the links and nodes affecting the travel path. Lastly, weather is semi-known due to the forecast. Semi in the fact that one is not sure of the impact until the weather hits the area and it might change dramatically from the

(Continued on page 8)

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A Discussion on Software to Improve Service Reliability and Costs for On-demand Stat Orders (Continued)

forecast. Nonetheless, as before, the software would determine the shortest path based on the costs.

Third, the software could tell the user the minimum drivers needed during any of the periods. That is, the number required during rush hour is more than the middle of day. Thus, if the driver could do three orders every two hours during the day and only one during rush hour, the simulation would account for these changes and determine the drivers required. This aids to keep the cost in check while maintaining service reliability.

Lastly, and perhaps the most difficult for the simulation to do is to account for order patterns. There is a morass of variables to consider from changes in the economy to new drug treatments to changes in the strategic vision of the lab company. Orders also have short, mid and long-term patterns and range by day, week and year. For instance, the number of orders during the day may be such that eighty percent of them come in two waves. One before lunch and the other at the end of the day. Furthermore, the number between the two periods could have a forty/sixty split. Forty percent come in before lunch and sixty at the end of the day. In terms of the week, it could be doctors place most of the orders on Friday and the least on Tuesday with the rest of the workdays spread approximately equal. This is another item to add to the simulation. Then there is the seasonality and holidays. More orders come in before school starts and right before a holiday begins. The exact dates vary by year. To include these into the simulation is a strategic factor to help with reliability

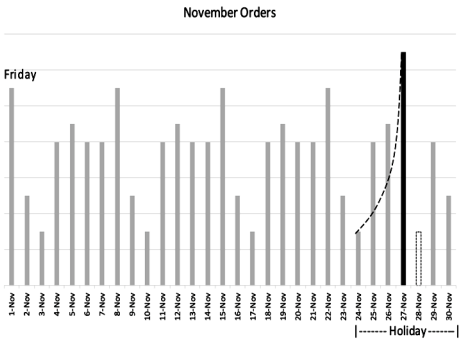

Figure of Volume: Orders by Day for November

and costs. Provided is an example of what the orders may look like in November.

Figure of Volume: Orders by Day for November

Friday begins on November 1. Notice those are the heaviest days during the week followed by Tuesdays. Conversely, Monday, Wednesday and Thursday share the same volume and the weekends are lightest with Sunday being the least. Additionally, notice November 24th the volume starts off like any regular Sunday but by November 27th, the day before Thanksgiving, the volume spikes dramatically to a point it becomes the heaviest day of the month. Friday the day after in contrast drops to levels of what the lab gets on weekends.

One other note about forecasting the number of orders. Recall we discussed increases to them based on three growth factors. One was the aging population. The older people get and the longer they live the higher the chance they will need lab work. At the same time, as more babies enter the world the greater the chances are doctors may request lab work for them and their mothers. In the mix was also growth of the city due to businesses relocating to the area. More people mean more tests. These are some of the other items the software must account for that muddles even further projecting the number of drivers required. And if the software includes the strategic growth plan of the lab, that adds just one more dimension to what is ever so complicated in projecting the right number of drivers for reliability with the competing agent, costs.

In conclusion, the reliability of service and cost associated with it transcends multiple systems of systems. We identified the system as the pickup and delivery of stat orders and defined three subsystems of the system: transportation network, Logistics department, and software. We suggested to improve service reliability meant understanding how the transportation network operates to impact TATs and how to offset failures by having the right number of drivers for the orders without overextending costs. We pointed to variables the software should consider for reducing failures and costs. They included congestions because of the time of day, accidents, weather, events, as well as short, mid and long-term forecasting which we suggested could be the most difficult. This is because of the numerous variables one must contend with and cyclical patterns of orders. Included in the forecast were the growth of the elderly, newborns, and population of the city. We also suggested in an incident where the lab will have to make the best decision they could because to hire drivers for contingencies is cost prohibited. Further research is suggested on this article to include providing a more robust definition of the system that includes additional subsystems and how they make a unitary whole. Another aspect is to build a stronger framework for the software that defines better how it should interact

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(Continued from page 8)

A Discussion on Software to Improve Service Reliability and Costs for On-demand Stat Orders (Continued)

with the multiple variables and users. That is, what are the other parts, idiosyncrasies and nuances needed to construct the software, and how could it interact more efficiently between the multiple users that are the customer service representatives of the lab, Logistics department of the lab, and courier companies. Finally, we suggest building a mathematical model for the software. This might include adding some type of prospect theory to help make better decisions, to Markov chains and regression analysis to improve order forecasts.

Author info:

Gerard Ibarra, PhD is a consultant, speaker and trainer who works with companies to make more efficient decisions given a set of requirements using a system's view. He can facilitate and bring together multiple stakeholders with different opinions to achieve outcomes for the overall good of the company. Furthermore, he specializes in working with labs, hospitals and pharmaceutical companies to help them understand their routes, volume trends, turnaround times, reliability, and logistics' costs. He is the author of the upcoming book on how individuals and companies can make better decisions through a step-by-step process of multiple techniques that includes how we think and decide based on our thoughts and beliefs.

Gerard has over thirty years of professional experience in logistics, industrial engineering, operations, marketing, and sales. He was the CEO of Jaguar Logistics, the largest medical on-demand transport company in Texas before being acquired by Dropoff Inc. in 2018. He received his PhD in Engineering and Applied Science with emphasis in Logistics Systems Engineering and Operations Research from Southern Methodist University. Gerard enjoys exercising, reading, vacationing and spending time with his wife.