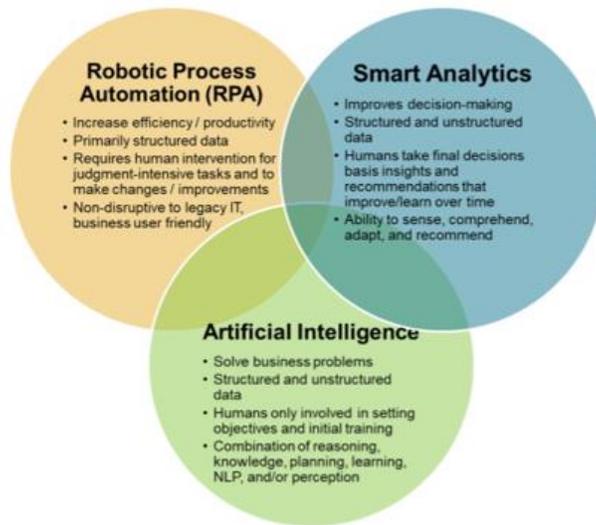


The Rise of the Robot Pilot

Guided Autonomous Automation



Master Chief and Cortana - HfS Trifecta Use by Permission

By John Slagboom – Pareto Automation

How do you update a Guided Autonomous Automation theory called “The Robot Pilot”? Like you, I am inundated with a flood of new RPA and various related Cognitive Automation and AI research. Thankfully, I can map these to my own theories as validation or ascribe them to tool technology: implementation, integration, orchestration, governance, data security, which are about the “Plane” that flies in a Mainframe Cyberspace; i.e. how to build, scale, optimize, and maintain automation technology. I am not about the “Plane”, i.e. IT; rather the engagement, empowerment, and the evolutionary transformation of operation specialists who fly the “Plane”.

I just finished a review of HfS’ sponsored “RPA Bible” hot off the press¹. The term “Bible” is not exaggerated. It details all the necessary elements for a comprehensive, successful RPA implementation. At every point, it reminded me of my first; considered an extremely advanced RPA program at a Fortune 100 that produced massive ROI eight years running. Yet, it is the transformation of Operations and the technology that is at the heart of my automation writings, from Direct Support Robotic in June of 2011 thru BiModal RPA² now, and into the future:

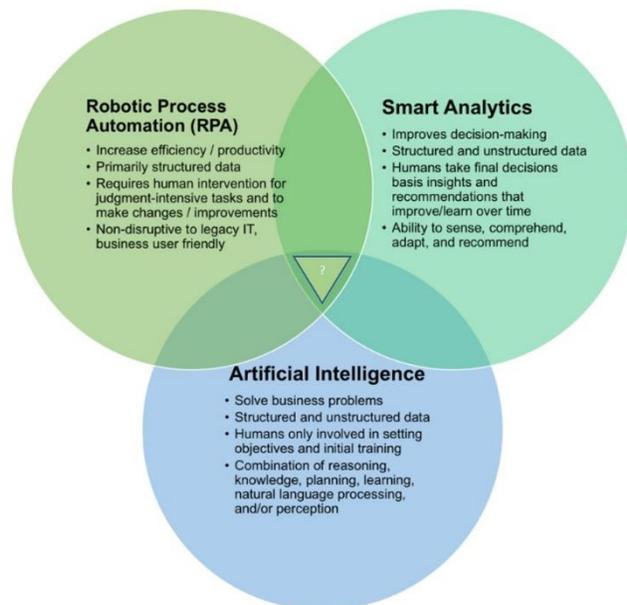
“The Robot Pilots” who will create and fly full blown Autonomic and AI Automation.

This Paper is about those new Millennial Technologists who evolve from hybrid cross-functional Ops/IT Teams of Cognitive Intelligent Operations. The “One in a Thousand” who integrates Cognitive Automation and Smart AI powered analytics to create “Autonomics”, and then adds Reinforced Learning based ML fueled by Big Data to create truly Autonomous Automation; overcoming the new “Danger Zone” of “Data with Inference” to make the “Digital One Office” a reality! **The Robot Pilot!**

Before continuing, I owe a great debt to HfS’ visionary research and cooperation with my own, as the “Trifecta” diagram is

a token of HfS’ influence on the content of this White Paper. It was HfS’ original RPA Maturity

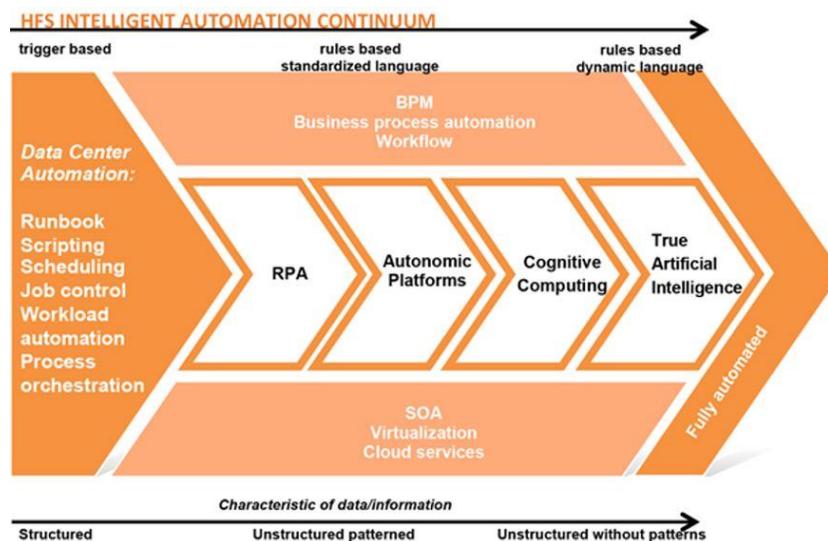
Exhibit 1: The HfS “Triple A Trifecta”: Automation, Analytics, and AI



Model³ my boss gave me in 2014 that triggered my own quest for “Self-Healing” robots. This led to my second white paper titled “The Rise of the Robot Pilot – The Automation Quarterback”⁴ a year and a half later. It was that Paper and other interactions with HfS, which led to a personal interview and guest invitation to HfS’ “Vision 2020 Intelligent Operations” research summit held in April of 2016.

That Summit became the genesis of my own automation methodology “Marine Robotics” published one year later in April of 2017. Marine Robotics and spin off Operation Intelligent Automation Ops Dev, led to another research summit, “The Future of Operation” held in Chicago last month. This Summit helped me finish my BiModal RPA white paper², which became a lead into this Paper, and generated a huge amount of HfS research that will provide the lion share of documentation to supports and clarify “The Robot Pilot” theory.

The first HfS Intelligent Automation Continuum that appeared in an updated RPA Maturity Model³, “Autonomics Platform” correlates to my “Adaptive or Expert RPA” of Cybernetic Robotics. Also known as “Augmentation”, where an Ops/Dev RPA approach provides a tight interface between Human and Machine to create a form of remote control RPA that doubles standard RPA productivity. The Cross-Functional, hybrid Ops/IT teams of BiModal RPA takes automation into Cognitive Computing, which becomes the incubator of Robot Pilots and their support teams, who create autonomous automation of “True Artificial Intelligence”:



HfS Future of Operation Research Summit – Chicago 2017: “What’s Next?”

My own recap of the Summit titled “Operation Intelligent Automation Ops/Dev – Reflection from HfS “Future of Operations” Research Summit”⁵ cites HfS’ CEO and Founder Phil Fersht who said, “...while we know what is going to happen in the next five years to transform Operations in the direction of “The Digital One Office”, the five years after that we have no idea?” What did He mean? Perhaps the following from HfS report on “The State of Automation and AI...” published after the Summit holds the key?

“These technologies fundamentally alter the building blocks for every organization’s operating model. And yet, the implications *of the seismic shift brought on by automation are not yet visible.*”⁶

Instantaneously I thought, “I do – The Robot Pilot”. Why? Because this new technologist will be necessary for the same reason current Operations’ experts (specialists) need to be directly engaged and empowered to own RPA automation: “The Danger Zone of Requirements”. Those fluid, complex, yet still rules based “data elements” necessary to automate complex processes that are beyond the capabilities of Standard RPA require direct domain experts’ involvement.

You might be thinking, AI powered Autonomous Automation will resolve “The Danger Zone of Requirements”. ML algorithms replace the requirement of expert human judgement for complex, fluid decision making; however, how? Through access to a lot of “Data” to learn. However, creating ML algorithms still requires identifying precise, comprehensive, relevant, “Domain Data” necessary to automate the target process. From the post-Summit article “Accelerate Data Strategy to Drive Business Outcomes” that quotes Lee Coulter:

“Lee’s as always astute observations culminated in the suggestion that Machine Learning requires “learnable” data. That is, data that is known to *contribute to inference.*”⁷

Who do you think knows what “learnable data” is for any given process? That’s right, a domain expert and any hand off loss between that that Expert and the Team that sets up the ML algorithms will be exponential, perhaps unintelligible, or worst yet, almost accurate* result!

Edited Version of the first Robot Pilot White Paper

Today, the big money in Manage Health Care (MHC) is tied to the Medical Loss Ratio. However, ultra-complex regulations and customer expectations makes any real cost saving here a complicated nightmare at best! What about Operation overhead? Here is a place where the Automation and Analytics Revolution is providing powerful tools in Big Data, Machine Learning Artificial Intelligence (AI), and various forms of Software Automation to realize substantial savings! As with all Revolutions, extra ordinary, visionary leadership is required!

In the days of Indemnity Health Insurance, prior to the advent of MHC, Claim Operations was central to the Health Insurance Business and represented a huge portion of overhead. MHC plans pushed Claim Operations into the shadows, as Medical Management became the place where the bottom line is most influenced. Even though Technology and Offshoring greatly reduced the cost of Claim Operations, it still employs tens thousands of FTEs representing hundreds of millions, even billions in overhead for the largest MHC Insurers.

The advent of Robotic Process Automation (RPA) is on the verge of yet another round of massive savings in Claim Operations; first through “Dev Ops”, that increases cooperation between IT and Business, then via “Cybernetic Robotics”, where software RPA is wed to human intelligence via technology enhancements and organizational realignment that essentially allow automation robots to augment human claim processors (not referring to RDA or unattended RPA here). “Cybernetic Robotics” will evolve into “Guided Autonomous Automation” as AI, made possible by Big Data and Super Computers with Machine Learning algorithms, facilitated by the new star of Automation, the Robot Pilot or Automation Quarterback as you prefer, replaces human intelligence. These three stages of evolutionary development correspond to the three ERAs of Automation describe in the June 2015 edition of Harvard Business Review (HBR) (1).

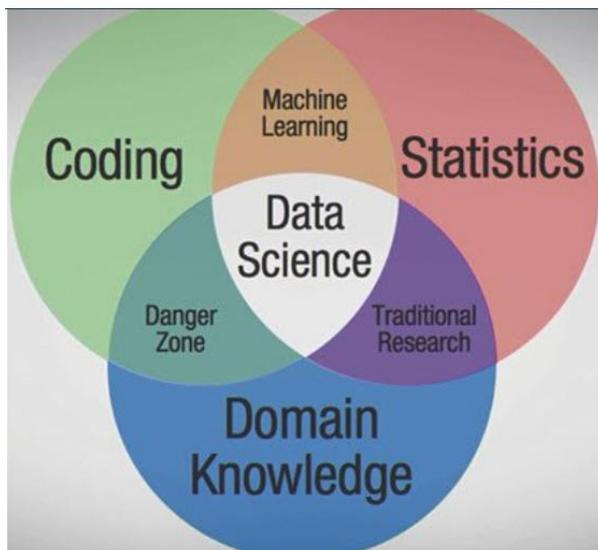
Claim Operation automation alone can save a major MHC Insurer hundreds of millions per year and billions industry wide; not to mention huge potential spin off savings. Yet the biggest challenge to realize these savings is not the technology, rather the human element, starting with the “Danger Zone” of requirements. Obtaining complete, high quality requirements, in a timely manner is a huge challenge for all technology software based endeavors. The rapidly changing

and fluid “Cyberspace” of a MHC Claim Processing Platform increases this challenge exponentially! No segmented organizational structure, regardless of how collaborative, can ever be responsive enough to meet the needs of the most aggressive, innovative RPA applications, which is why a “Cybernetic” approach is needed that joins the human source of requirements virtually directly to the automation vehicle. RPA evolving to replace the human source of requirements with AI brings with it issues of transparency and oversight, which due to the complexity of the technologies involved, requires the mastery of a new type of automation professional: **The Robot Pilot!!!**

I realize there are a host of issues related to any major technology implementation and necessary culture changes to accommodate radically new approaches to work. The Robot Pilot Automation Vision will require the Business, IT, and Operations to work together as never before; guided and inspired by Visionary, Innovative, Out of the Box leadership, to create a new Operations paradigm to optimize ROI with **Automation and AI Analytic** technologies!

Requirements, the Greatest Challenge to MHC Claim Automation Savings

Even with agile RPA, MHC Insurers are running into an automation threshold they cannot cross easily. The complexity and volatility of claims left to automate will require not just better technology, rather a radically new approach to obtain and implement the minute change requirements necessary to continually adapt RPA robots to an ever fluid Claim Processing Platform “Cyberspace”. The advent of Big Data and Super Computer capable of Artificial



Intelligence (AI) via Machine Learning algorithms are evolving into autonomous analytics, which may one day soon resolve this problem of fluid, changing requirements. However, people with expert domain knowledge are still the key to even this innovation adaptation.

None of this is news to automation and analytic experts as the Data Science Venn diagram

illustrates, i.e. the equal importance of Coding, Statistics, and Domain expertise. A “Danger Zone” exists between the “Coding” and “Domain” knowledge areas. The “Danger Zone” are the coding requirements that absolutely depend on intimate, ever changing “Domain” knowledge expertise, which just so happens to be in short supply after decades of outsourcing Claim Operations. The “Domain” knowledge assets that are left are in ultra-high demand and automation is at cross purposes to those assets as most Enterprises are currently organized!

For the most complex, fluid innovative automation endeavors such as RPA, even sophisticated cross-department collaborative team models such as Dev Ops simply are not responsive and committed enough to overcome the requirement challenges of the “Danger Zone”! Only an organizational set up and leadership approach that provides End to End ownership, with minimal hand offs, can ever hope to be responsive and committed enough to handle such a dynamic automation process! The solution to the “Danger Zone” is the fusion of IT automation and analytic assets with Claim Ops to create a hybrid IT/Operations team that jointly owns the remaining manual processing claim inventory, effectively creating “Cybernetic Robotics (this turned out to be Operations IA Ops/Dev and HfS agrees, see Key Takeaway #5⁸).

“Cybernetic Robotics” practiced by this hybrid IT/Operations team is just the next evolutionary stage from Dev Ops. Then, as more advanced and powerful analytics are created, reliance on the human intelligence of Claim Operations assets for requirements diminishes, as AI facilitated by Robot Pilots transitions to “Guided Autonomous Automation”. (Autonomics, new Continuum)

The Advent of the New Automation/Analytic Professional – The Robot Pilot!

Experts in Dev Ops, a current IT approach to tame the requirements “Danger Zone” are already writing about the potential demise of Operations side of their equation (6) as analytic capabilities advance rapidly. I am even questioning if “Cybernetic Robotics” will be more than an ephemeral stage in the RPA evolutionary process? One recent industry RPA Maturity Model (7) that uses ten measures to gauge an Enterprise’s level of RPA utilization, assigning three levels of maturity from Initialization, to Industrialization, and finally Institutionalization, theorized about a fourth level they call “Innateness” that creates and sustains “Self-Healing” robots (“Innateness” became “Integrate” in HfS’ One Office model and ultimately is leading to a No Ops underbelly⁶)

One thing is for sure and top automation experts agree, the rate of automation and analytic advances are just entering the exponential growth phase of the “Second Machine Age” (Fourth Industrial Age is now the more commonly used term); a term coined by a New York Times best-selling authors on the topic to describe the Automation and Analytic Revolution (8). Another area of agreement is that “Super Stars” will increasingly dominate the “Second Machine Age”, like “Rock Star” Data Scientists already are, and finally, while Skynet of Terminator fame is still in the realm of Science Fiction, runaway AI with significant impacts is not. There are plenty of Technocrats who believe that Automation and AI should be completely autonomous as soon as possible, since “Humans” can make mistakes! (8)

Yet the fact of the matter is that Machine Learning AI can make mistakes and sometimes with fatal consequences; such as airliner crashes, when humans become too dependent on automation or it is not created with human oversight and control in mind (8). Further, automation can take on a life of its own that is not understood by its human creators, as is in the case of robot trading induced stock market crashes that lose billions in investor capital (8). To say nothing of out of control, fully autonomous military killing machines! While the “Second Machine Age” heralds undreamed bounty, serious ethical concerns are already more than just premonitions. For the time being, human oversight and control is a necessary, ethical requirement.

So taking all these factors into consideration, the highly transitional nature of hybrid IT/Operations “Cybernetic Robotics”, the inevitable advent of Autonomous Automation and Analytics, and the need for oversight and control by “Second Machine Age” Super Stars, perhaps an even better solution to the requirement’s “Danger Zone” is to fuse the necessary elements of Analytics, Domain Knowledge, Coding, and Statistical expertise with Automation mastery into a single automation/analytic professional I term the Robot Pilot?

Why not take the new “Rock Star” of Big Data and Machine Learning AI, the Data Scientist, who has the Coding and Statistical expertise and put them through a multi-year Domain Knowledge and Automation internship program to turn him or her into the Super Star of “Second Machine Age”? Then adapt that hybrid IT/Ops Team into ground support. Even as many MHC Insurers have multi-year rotational internship technology programs to supply their needs for technically proficient associates, how much more profitable in terms of ROI potential to take the

right kind of Data Scientist and put him or her through a three-year internship where they learn intimate domain expertise and automation design, apprenticed by Domain and Automation masters? And just like physician internships, they would be actual practitioners, customizing with first hand domain expertise an iterative, sequenced marriage of automation and analytic algorithms, with them in the cockpit as Robot Pilots of “Guided Autonomous Automation”?!?!?

What’s Keeping MHC Insurers from being the First Industry to create Robot Pilots?

To develop an actual internship program to create Robot Pilots would not be that difficult, neither to form the initial hybrid IT/Operation Cybernetic Robotics team to be the main incubator to start the process, which would go through a metamorphosis to become the Robot Pilot’s ground crew as the internship matures. Nor the Data Scientist mastering RPA, which is the easiest part of the whole process; the difficult part for him or her will be acquiring Claim Domain knowledge. Management’s real difficulties will start with vetting the right candidates and once developed how to manage and compensate Automation’s new star player? Maybe something like managing hot shot fighter pilots or compensating a winning quarterback; it will not be a straight forward affair!

Doesn’t sound worth the trouble, except for one fact, one Robot Pilot via “Guided Autonomous Automation” can do the work of hundreds, perhaps thousands of FTEs (at this point you effectively have No Ops of Google, Netflix, etc.)! Sure, there are technology issues as well; however, these put together pale in comparison to the real show stopper.

Culture!

Might as well pull the sign and close shop before even starting? Not so fast, the answer is simple, though not easy. Create a sub-culture, just like Special Operations functions in all our current branches of the Military. It took close to forty years to fully establish a distinct, accepted Special Ops culture in the Military. Managing disruptive technologies is nothing new to Corporate Leadership. Where GM failed with Saturn, an MHC Insurer might be the first to succeed with Robot Pilots? (10)

A Final Thought - It Ultimately Comes Down to Leadership

While the Industrial Revolution almost made apprenticeship obsolete, the Automation and Analytic Revolution is going to make something like apprenticeship hugely profitable once again, since Super Star Automation and Analytic Professionals can pull down insane levels of ROI! It will be worth sparing no expense, taking whatever risks, and creating and managing whatever processes and partnerships necessary to find and develop these Robot Pilots. One last thought, they will indeed be Super Stars, so Business Leadership is going to have to figure out how to management and contract them, ego and all! I believe this is where Talent Search Firms and HR/Legal/Contract Consultant Vendors are going to have a new market!

Where will they fit in the leadership structure of the Enterprise? Consider the obvious, that these Robot Pilots will be high on IQ based skills and in most case not so much on EQ skills. Yet for optimal efficiency and affect need to have direct control of immediate processes and resources necessary to automate. Again, the perfect analogy might already exist for what this might look like. In the Military, they have Warrant Officers, for complicated, critical functions that require hands on leadership by subject matter experts. Warrant Officers form a third and distinct class of leadership in all modern militaries, starting with the British Man O' War sailing vessels (13) – the most advanced technological wonder of over three centuries ago. Warrant Officers are not known for their people skills, rather for their no-nonsense management of critical military support functions and sometimes, extremely heavy firepower.

The Information Age led to the creation of the “Sole Contributor” to recognize, structure, and manage the incredibly valuable asset of the “White Collar Knowledge Worker”. Collaborative leadership approaches, which require enhanced EQ skills, where required to maximize their performance. Corporate American may well need to look into how to create and adapt new forms of apprenticeship and categories of leadership, to optimize the Automation and Analytic Revolution at its door step! In any event, MHC Claim Processing Automation provides a relatively benign environment and safe medium, with concrete and substantial ROI that might make MHC IT and Claim Ops the perfect candidates to be the first to develop these new Automation Super Stars? Read the original <https://www.linkedin.com/pulse/rise-robot-pilot-automation-quarterback-john-slagboom/>

Analysis and Expansion of the Original Robot Pilot White Paper

The only area that I would substantially change in the original Paper is the apparent optimism I had that Managed Health Care Insurer leadership might rise to the occasion to adapt disruptive technologies. My experience and doctoral studies since have clearly shown me otherwise. While the need to manage disruptive technologies is not new, the success record of large Enterprises adapting them is less than admirable. This realization begins to show up in my writing towards end of 2016 as doctoral studies began to explain why both Managed Health Care Insurers where I practiced RPA failed to take automation forward, despite automation maturity. I will spare the details here. If you are interested, check out my “Cutting Edge Series”:
<http://www.jdscyberbots.com/category/cutting-edge/>.

Besides those articles, once again, excellent HfS content from the Summit is really all you need to know about the number one source of those innovation inhibition:

"Our core workforce, the millennials ... know what's coming. The people at the top also want to change and educate themselves, they're going to conferences and understanding. The ones in the middle then, how do we expose them, either out of fear or yearning for learning?"⁸

Enough said about “Culture”, let’s unpack “The Robot Pilot”!

Ever wonder where these articles I write come from? In a nutshell, I have already practiced a proto-form of the Robot Pilot. I write in story form, because I have been there, done that! Again, HfS official summary of the Summit:

“Augmented Intelligence rather than Artificial Intelligence is Redefining Work...aka the human mind + machine play a role?”⁸ (this is Cybernetics)

I was the Domain Expert re-defining Operations through Cybernetic Robotics. I had all the process requirements either in my mind or at my fingertips with expert data analytics I created, knowing intimately the “data inferences” of claim data in relation to claim automation.

I quickly differentiated myself from the other RPA business analysts with huge ROI automation. System and IT assets naturally and quickly assemble around me to become a de facto ground crew. While I was a sole contributor, with no direct reports, I had unspoken authority to get what I needed, because at the end of the day, I practiced End to End Robotics, with a small cross-functional team that produced consistent ROI in excess of 1000%. Was I a unique “One in a Thousand” former maverick claim manager that “Fate” decided to make insanely productive via Cybernetic Robotics I pioneered? Yet, in no way could be replicated and scaled across an entire Enterprise? You might begin to sympathize with Management for not embracing my bold automation methods? My Boss and his did; however, not Middle Management.

Yet, I was not the only former maverick claim manager, became sole contributor, getting these results with RPA. There was another and together, we put together a short list of a few others in the company who fit our profile. We were Baby Boomers who were not naturally tech savvy; however, out of the box, non-conformist, no-nonsense metric oriented career front-line ops leaders, who didn't really fit in, yet were tolerated because of our consistent overproduction. We went sole contributor as analysts and were brought in on the ground floor of a technology initiative; RPA, that just happen to synergize with our vast domain knowledge, inclination to be in control of End to End processes, and retained access to live Production. We also had ready access to a multitude of top domain experts we had trained ourselves over the years in ops leadership. So, all requirements were either in our minds or at our finger tips and we were not afraid to experiment, because we could correct our own mistakes or had direct access to those that could. Was our proto-Robot Pilot experience unique; just a fluke? Hardly, it is intrinsic to the nature of the technology itself, consider HfS and the Future of Operations in the Robotic Age (FORA) Council key takeaway #6 from the Summit:

“What is clear from our recent surveys and from discussions at the conference is the huge appetite for self-determination in the operations community, which is one of the reasons RPA has struck a huge chord....digital process management is putting the levels for control back into hands of operational leaders (front line).”⁸

What type of automation designs comes out of this and what are their success rates?

Conservatively, double what you can get with a non-Ops/Dev automation method.

Other Examples of Proto-Robot Pilots:

Consider another model, and you will see where I am going with this. Fortune 1000 Managed Health Care Claim Appeal Department once had three teams of approximately 15 each when everything was fully manual. A young, technology savvy millennial is hired, becomes a domain expert who loves playing with Excel, Access, .Net Macros, etc. Within a few years, he creates essentially a department ERP that cuts the teams from three to one. Real story no doubt replicated hundreds, if not a thousand times across companies over the past decade or so, aka “Shadow IT” on automation steroids!

In my last gig, I walked the Operations floor every-day. The first thing I did was to talk with front line leadership and employees. I spotted one of these young millennial types and was pretty sure he had what it took and sure enough, he got snagged as a customer service supervisor, before I got a chance to work with him closely. The two Ops supervisors I work with, and their manager were already seasoned in Macro technology automation, and would have made great leaders of Hybrid/IT automation teams I was mentoring them and the developers to create. The Client just couldn't see it apparently?

Why not co-op the desire for determinism and formalize this strong tendency of operations leadership to use savvy millennials domain experts to create “Shadow IT”? Why not dovetail an Operations Ops/Dev approach to automation with the Enterprise's Technology Early Development Program, which becomes the first vet of potential Robot Pilot candidates? Those that successfully complete these normally two-year programs and want to pursue an automation/analytic technology career, can apply for a three-year internship that potentially leads to Robot Pilot status.

Create a new four tier job family that corresponds to the Military's four rank Warrant Officer program used by all Service Branches. Does this sound unusual? It shouldn't, once again I cite a former Apple Software Engineer and current SEO entrepreneur from my article “The Future of Service Operations – Intelligent Ops” that was my recap of the first HfS Summit,

“Then military analogies are the perfect way to understand this shift, since large enterprises are based on the military approach to organizing – they always have been, and anyone who has convinced themselves otherwise is misguided. No other viable model exist for organizing a large workforce”⁹

I could go on and on with details. I am going to save the rest for my Book, Marine Robotics due out next month; however, the fact of the matter is that I have already flesh out a lot of the detail through a three-part series titled “The Transition from RPA to SPA” published right after the first White Paper. Check these out for now:

<http://www.jdscyberbots.com/category/transition-from-rpa-to-spa/>

In Conclusion - Where is Operations Leadership in Developing the Optimal Automation Deployment?

There are a couple of aspects of HfS recent research I find both disturbing and telling. First, evidence that Operations Leadership does not play a significant role in the business transformation process fueled by AI Automation and second, that the C-Suites apparently has firm, long term commitment to AI Automation technologies on the one hand, yet continues to prioritize short term cost savings on the other. I believe they are related and symptomatic of what is really at the heart of significant RPA program failure and dissatisfaction⁶. Consider the following data compiled by the number one industry analyst in this space: HfS.

While FORA’s express purpose is to map the redesign of Business Operations based on the impact of intelligent automation and digital technologies and that this change will be ongoing and continuous⁸, HfS’ “The State of Automation and AI: C-Suite’s Number One Strategic Imperative for Operations”⁶ report makes is clear that this is being driven by the CEO, CIO, and CFO, i.e. where is the COO? Further, while “Short-term cost or FTE reduction” is last of 10 expected benefits of Automation, “Immediate cost savings not attractive” is cited as the number one hesitancy aka business as usual; the short-term performance metrics will trump medium to long term transformation. Again, refer to my

“Cutting Edge Series”; especially “Pareto Automation – Company on a Hill”¹⁰ and Rana Foroohar’s input.

Some Final Thought from the Movie “Hidden Figures”¹¹

A couple of weeks ago, my wife invited me to watch one of her favorite movies with her: “Hidden Figures”. After the movie was over, it was immediately apparent there were significant parallels with implications to the subject at hand. First off, the prejudicial culture of NASA that treated their black, female mathematicians as second-class citizens created a talent bottleneck that almost resulted in USA losing the Space Race to the USSR. In fact, it was only imminent failure that motivated the necessary magnitude of culture change. The USSR corresponds to new Barbarian start-up that threaten to quickly take out large establish players in virtually any vertical. I get the distinct impression that after two plus decades of Off-Shoring/Out-Sourcing and getting mega-big via M&A activity, that Operations is looked down upon as a second classes citizen by the Business and IT?

On the technology side, an IBM Mainframe took over all mathematical calculations for the Mercury Project. *Katherine Johnson, the top mathematician on the Project caught and corrected a rounding error the Computer made and saved the first US manned space flight from disaster. Many of the black female mathematicians went on to become the IBM programmers and Katherine Johnson stayed with NASA through the Apollo Project into the Space Shuttle Program to keep an eye on the Computers’ math! Clear enough!

With all due respect to the guardians of “Corporate Culture”, Middle Management, you are going to have to push automation resources and decision-making authority down to the Operations front line level if you ever hope to challenge the productivity onslaught of Digital Disruptor Start-Ups. They cannot be bought out forever. Yes, it is impossible and probably not wise to try and change the entire Enterprise Culture at once (Marine Robotics has a solution here); however, you need to start at the Digital Underbelly now, the key to jump starting the entire transformation process on the Road to a Digital One Office¹². Finally, even when fully autonomous automation is operationally possible, it

will need to be guided for quite some time before society and therefore regulations will allow it to operate unsupervised? So, Guided Autonomous Automation might be with us for a decade or two? My next paper will deal with the ethical implications of all this.

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