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Art of the possible or fool's errand? Diffusion of large-scale management innovation

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Abstract Organizations are continually challenged to increase efficiency and improve performance despite frequent cuts to personnel and budgets. These challenges force organizations to identify, develop, and diffuse various management innovations. Diffusion efforts are often met by resistance, reluctance, or ambivalence, resulting in what many consider to be a fool's errand. While management innovation may not be the forte of large, bureaucratic organizations, we present a case study of a U.S. Air Force maintenance, repair, and overhaul organization that has recently, and successfully, diffused a large-scale management innovation. Results from the case study support the development of a diffusion of innovation framework that identifies important mechanisms associated with the acceptance, routinization, and assimilation of management innovation. The framework informs leaders of the diffusion process, while the recommended actions of relentless leadership, deliberate development of personnel, and enterprise involvement drive diffusion efforts and help leaders achieve desired results in innovation diffusion and associated performance improvement. Overall, we assert that the pursuit of management innovation is not necessarily beyond the art of the possible for business leaders.
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1. Diffusing management innovation: Easier said than done

Imagine being faced with the difficult challenge of maintaining, repairing, and overhauling aircraft that are being flown well beyond their programmed life cycles, while simultaneously dealing with personnel and budget cuts. This confluence of events has encouraged U.S. Air Force leaders to increase efficiency while preserving the same, or even improving, levels

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of performance. Fortunately, when implemented and sustained, management innovation has generated significant improvements in multiple measures of operational performance. However, many business leaders have experienced difficulty in diffusing innovation internally, and much more difficulty in diffusing innovation externally, causing some to wonder if they were on a fool's errand. Even though implementation, and to a larger extent incorporation, of management innovation may be difficult, herein we demonstrate that it is not beyond the art of the possible. As such, the purpose of this article is to examine the mechanisms through which management innovation is diffused throughout an organization and provide recommendations to facilitate successful management innovation diffusion.

Notoriously, efforts to implement management innovation within and across organizations are met with resistance, reluctance, or ambivalence, and more often than not fade away (Price, 2014; Thompson, 1965). This phenomenon occurs even when the innovation identified for implementation is well known and has been recognized and awarded in other organizations. Surprising to some, resistance may occur even when organizations are essentially mandated to adopt and implement these innovations.

Why are implementation efforts seemingly so difficult? Why are organizations often seen as barriers to innovation (Van de Ven & Rogers, 1988)? Below, we present three typical issues associated with the implementation of management innovation.

First, cultural norms may create a barrier to the implementation of management innovation. Functional communities and organizations are generally protective of existing processes, procedures, and manpower levels, falling into what some researchers have referred to as competency traps (Levitt & March, 1988). Innovation efforts tend to encroach on guarded territory and personnel may be reluctant to try ideas that are not their own, exemplifying the Not Invented Here syndrome (Antons & Piller, 2015). For example, one of the authors of this article, while commanding an operational unit, attempted to encourage the replication of successful lean/continuous process improvement (CPI) initiatives across similar organizations at different locations. However, differences in mission sets, assigned equipment, facility layouts, and personnel proficiency provided convenient arguments as to why the innovation would not work for a particular peer organization.

Second, the lack of solid before-and-after process and outcome measurement may make it difficult to convince personnel of the true value of the management innovation. For example, in our experience,

organizations on a CPI/Lean journey sometimes have a difficult time showing tangible numbers-based results of improved efficiencies or real savings in terms of process time and/or money. Data that can quantify improvement are often available, but the CPI/lean 'experts' within the organizations often lack the education, training, or time to accurately capture and communicate tangible improvements and savings. Actual results are tacitly apparent to some in the organization; they 'feel' the improvement. However, to others, many of the positive results are often seen as anecdotal.

Finally, communication and coordination of innovation implementation efforts can be disjointed across organizations and organizational sub-units (both internal and external to the focal organization). These entities are made up of many personnel at many levels, each with different requirements, agendas, and objectives. Usually, little communication and collaboration between these entities exists. As a result, they do not necessarily work hand-in-hand to set the stage for innovation implementation and continuous improvement. In some cases, the disjointed communication and coordination efforts result in mixed messages, leaving personnel wondering if any real improvement could ever be realized.

While the above list of issues associated with management innovation implementation is not all encompassing, it does provide several important points to consider. With ever-increasing operational requirements together with dwindling resources in many organizations, the motivation for improvement is apparent. Organizations must effectively implement management innovation to meet organizational objectives and reduce costs where feasible. Therefore, a framework that explicates necessary post-adoption activities required to ensure successful incorporation of management innovation would be of significant value. Diffusion of innovation (DOI) theory provides a starting point for investigation because it describes the process by which innovations are diffused throughout, and across, organizations (Rogers, 2003), as it involves how, when, and by whom an innovation is adopted (Lippert & Forman, 2005). In the remainder of the article, we discuss our case study research involving the management innovation diffusion journey. The results support the development of a diffusion framework that informs leaders in their management innovation diffusion efforts.

2. Why pursue management innovation?

Innovation is typically thought of in the context of technological advancement or new product development. Management innovation, however,

includes adoption and implementation of new practices, processes, and structures (Birkinshaw & Mol, 2006; Flint, Larsson, Gammelgaard, & Mentzer, 2005; Melnyk, Ritchie, & Calantone, 2013). Examples of management innovation include, but certainly are not limited to, lean/CPI, just-in-time, outsourcing, and third-party logistics. Management innovation characteristically involves a gradual implementation requiring repeated decisions over a substantial period of time (Cool, Dierickx, & Szulanski, 1997).

Management innovation is often driven by dissatisfaction with or the inability to maintain the status quo (Birkinshaw & Mol, 2006). Business leaders adopt a management innovation to alter an organization's structure and processes in order to improve performance (Damanpour, 1987; Van de Ven, 1986). However, innovation adoption does not necessarily guarantee incorporation, as adopted policies, programs, processes, and structure changes may never be put into action (Klein & Sorra, 1996).

According to Rogers (2003), the innovation diffusion process is represented by various stages, which highlight the main sequence of decisions, actions, and events associated with diffusion. The primary stages are represented as initiation and implementation. The initiation phase is characterized by the identification of a performance gap, or a shock to the organization, followed by the organization fitting an innovation to the performance improvement agenda. In the implementation phase, the innovation is restructured to fit the organization's needs, put into use, and integrated into daily activities to the extent that it no longer has a separate identity but rather is instead simply the way things are done.

The sustainment of the innovation represents the incorporation after initial adoption and implementation efforts. Sustainment is further ensured when the innovation fits the organization and is championed at all levels.

Multiple activities facilitate the incorporation of an innovation in an organization. These activities can be categorized into acceptance, routinization, and assimilation activities (Hazen, Overstreet, & Cegielski, 2012). Acceptance refers to how well an organization's constituents receive the innovation. Routinization refers to the degree to which an organization's governance systems are adjusted to accommodate the innovation. Assimilation refers to the extent to which use of the innovation has diffused across organizational processes. As shown in Figure 1, multiple activities are associated with each activity. This framework provides a useful foundation to evaluate management innovation diffusion. In addition, we will identify some required modification. The resulting framework and diffusion process are illustrated in the case study of management innovation diffusion.

3. A case study in management innovation diffusion

In 2012, U.S. Air Force leadership reorganized the institutions responsible for maintenance, repair, and overhaul of military aircraft and put them under a single organizational umbrella, creating an organization we will refer to as MRO. Following the re-organization, MRO immediately felt the

Figure 1.   Process model for innovation incorporation*
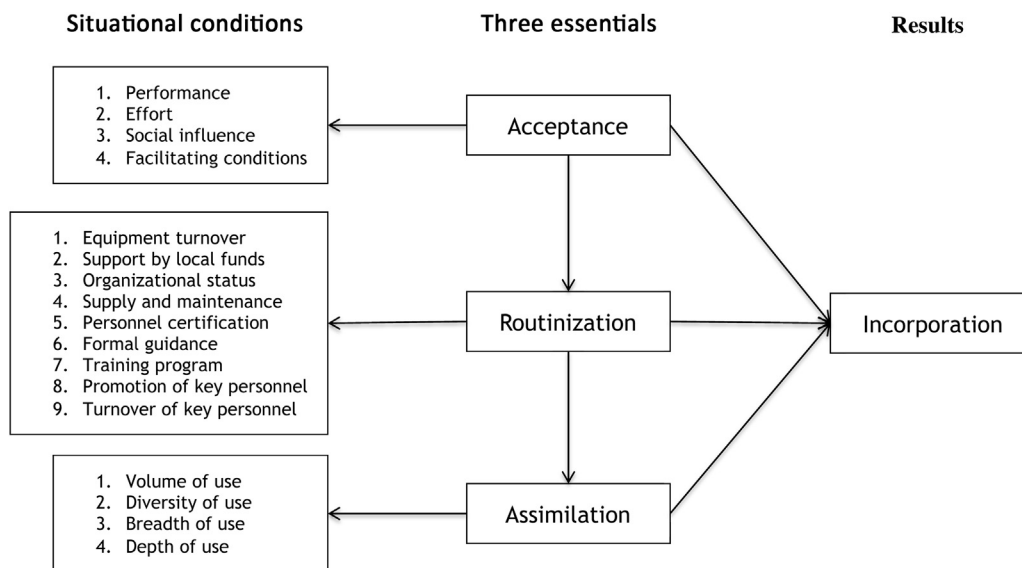
pressure to improve its $16 billion per year enterprise. To this day, MRO's strategy is to achieve maximum aircraft fleet readiness through the competitive priorities of cost, delivery speed, quality, and safety (Air Force Sustainment Center, 2014). In order to accomplish these objectives, MRO leadership adopted a management innovation designed to create a more process-based, efficient organization that fosters a culture of ownership and encourages the application of scientific methodologies and standardized processes. The program was also designed to ensure CPI, long-term continuity of operations, and improve performance in providing safe, reliable aircraft and aircraft parts to multiple military customers in the U.S. and abroad.

Diffusion of the innovation was originally designed to take place in three phases. Phase one was designed to set the foundation for the transformation. Phase two was designed to provide the workforce with the training, skills, and knowledge to effectively execute the program and get positive results. Phase three was designed to drive a broad and deep understanding of the program—and associated tools—throughout the entire organization and beyond (Air Force Sustainment Center Public Affairs, 2014).

Given the problems regarding diffusion of management innovation (as discussed earlier in this article) and the size and workforce structure of the MRO organization, we felt this organization presented an optimal case study to evaluate the management innovation diffusion process. MRO leadership readily accepted our request to perform an outside, objective look at how well MRO was achieving established diffusion and performance objectives. We were also asked by MRO leadership to identify some critical success factors that could help further facilitate diffusion across organizational units within, and external to, the MRO.

MRO employs 35,000 personnel and oversees maintenance, repair, overhaul, supply chain management, and software development for several types of military aircraft, associated aircraft systems, and aircraft parts for multiple military services. Of note, most of these personnel are part of a unionized civilian workforce. MRO conducts operations at three primary complexes located in different regions across the U.S. The embedded unit of analysis for the case study is the aircraft product line (APL). Each APL is a sub-unit of the MRO that conducts maintenance, repair, overhaul, and modification on one type of military aircraft.

The APLs were selected based on theoretical sampling (Yin, 2014). First, we selected at least two APLs from each of the three primary MRO operating locations to ensure that we captured the cultural and process differences in daily operations across the locations. Second, we selected APLs that represent multiple types of aircraft to capture differences in organization size, operational requirements, and throughput. Finally, we selected APLs at varying stages of maturity with respect to the diffusion of the programs and tools associated with the innovation. Hence, our study included seven APLs representing different sizes, locations, and operational characteristics.

We collected and coded data from multiple sources to ensure triangulation of the findings. Archival documents and visual materials included guidance documents, white papers, meeting charts, and training material. Moreover, we conducted a total of 77 face-to-face interviews with APL and supporting personnel. Interview participants included leadership, mid-level management, shop floor technicians, as well as leadership and personnel from supporting organizations. We also documented (via field notes) direct observations from informal discussions, participation in training events, meetings, and briefings, as well as other pertinent information that was obtained during one month in the field conducting site visits.

3.1. Management innovation diffusion in MRO

MRO leadership recognized, early on, the necessity to improve performance. Given this situation, they used a top-down approach and packaged the management innovation as a program to be implemented by all sub-organizations. The program suggested the utilization of multiple tools to achieve the aforementioned objectives. The administrative tools consisted of changes to organizational structures, governance mechanisms (i.e., meeting schedules and makeup), decision-making protocols, and assessment processes. The process tools consisted of changes to task design and execution, visual cues, and equipment and facility use. The tools were largely modeled after those used in lean manufacturing, but MRO leadership put a heavy emphasis on leadership, and developed a unique leadership model to guide leaders in their efforts to diffuse the innovation and reap the associated performance improvements. Sub-units (i.e., APLs) were not directed exactly 'how' to use these tools to achieve objectives, nor were they directed which tools to use. They were, however, evaluated by leadership on implementation progress against a specified self-assessment instrument and the resulting process improvement and performance outcomes that were frequently discussed at meetings. Therefore, each APL went through its own journey to understand and diffuse the programs and tools. Our cross-case analysis of the APLs identified similarities

among the APLs with regard to the diffusion process. We now present a description of the diffusion process and associated supporting activities, as well as a graphical depiction of the process model.

3.2. Diffusion process model

Based on our analysis of the diffusion of innovation process in the current context, we propose organizations diffuse complex management innovation in phases, with an initial rollout phase followed by phased iterations that continue to increase the prevalence of the innovation in the organization until it is fully incorporated (see Figure 2). Timelines for these phases vary based on factors such as top-down pressure, adoption initiation timeline, organizational learning, current/future state of operations, and customer requirements. For example, APLs that lagged behind in adoption may actually be able to speed up their diffusion process because they can rely on lessons learned from other APLs (Jacobs, Swink, & Linderman, 2015). Moreover, organizations that experience changes in customer requirements may, as a result, experience positive or negative impacts to the diffusion timeline. Overall, one notion remains stable throughout the phases; the activities associated with acceptance, routinization, and assimilation take place simultaneously, and at different levels of intensity and speed throughout each phase. These activities continually influence one another as the process progresses, and the number of new activities decreases as higher levels of incorporation are achieved, as is depicted in Figure 2.

We now present a generalized description of the process model, but we do not consider the specific timelines associated with each phase. Moreover, given the countless contingencies that may impact this process for any specific organization, we provide an example based on the diffusion process witnessed across the case study organizations. Quotes from interview participants are provided as supporting evidence for our assertions.

3.3. Initial diffusion phase

Diffusion begins when organizational leadership makes the decision to adopt a management innovation and associated programs, processes, and tools. If the innovation is an authority innovation decision, such as the one depicted in our case study, some routinization will likely occur during an initial rollout period. Organizational leadership communicates the adoption of the innovation via formal guidance and, perhaps, formal and informal training. Some APLs used creative means to familiarize personnel with the innovation, as is indicated below:

> "They took us down and wanted us to take an area in the [innovation guidance manual] and brief it, so we had to actually do a presentation. We actually partnered up—one or two supervisors or section chiefs or whatever—and we actually went down in front of our peers and briefed it."

Moreover, some personnel are promoted, moved, or hired to serve as opinion leaders for the innovation diffusion process. The key here is to promote or move people into positions whereby they can sustain or progress the innovation. For example, some leaders within the APLs had been purposefully moved in order to help encourage innovation principles across

Figure 2.   Process model for management innovation incorporation
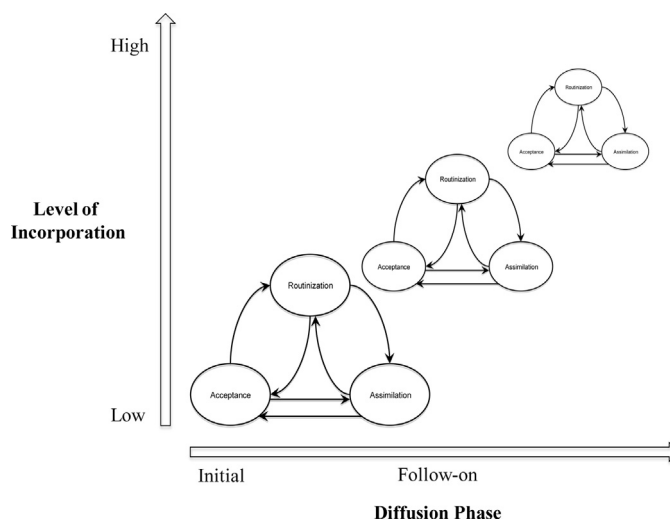
multiple organizations. This phenomenon was more prevalent in the APLs that were more mature in implementation. The following quote highlights this phenomenon:

> "A lot of them came from that floor down there as mechanics. They've seen it down there, so they know what they want to fix when they come up here."

Following communication of the decision to adopt, employees react. Employees either accept or resist the innovation. Resistance, however, does not necessarily mean employees outright refuse to adopt. They may feel reluctant to adopt an innovation that they do not understand or they may feel resentment or ambivalence toward the innovation, particularly if organizational change is forced, frequent, and rarely sustained. All three of these attitudes are represented in the following quotes:

> "This is how we've done it for 30 years or 40 years, and we're not changing."

> "Of course I got [from the employees] the deer in the headlights look. Are you crazy? We've never done an aircraft that fast. . . ."

> "Kind of thought, okay, it's another bumper sticker."

Of note, this initial diffusion phase can take many months, and possibly years, as was noted in our cases. Some of the APLs did not start post-adoption activities in earnest until one and a half years after the initial MRO adoption and rollout. Once the initial diffusion phase has run its course, however, follow-on diffusion must be deliberate.

3.4. Follow-on diffusion phases

Leaders continue to address organizational issues during follow-on diffusion phases (or iterations). The diffusion process can be rather chaotic to an organization as multiple initiatives are likely being implemented simultaneously (e.g., changes to organizational structures, meeting schedules, and production/support processes). The success and failure of activities associated with acceptance, routinization, and assimilation will provide continuous feedback to leaders and employees, allowing them to adjust as necessary and incorporate the innovation into daily activities. Of note, we discuss each primary diffusion activity in isolation. However, in reality, the activities associated with acceptance, routinization, and assimilation are taking place simultaneously, with each activity influencing the other activities, and vice versa.

3.4.1. Acceptance

To ensure successful innovation incorporation, leaders first buy into the efficacy of the innovation and are actively involved to ensure lower level buy-in. Leaders that have already bought in work to overcome lower level resistance by carrying out activities designed to obtain acceptance of the innovation throughout the organization. For example, through various means, leaders may reinforce the importance of the innovation (social influence), increase awareness of the expected performance improvements associated with the innovation (performance expectancy), and increase understanding of the innovation (comprehension).

Relentless Leadership was prevalent across organizations that had achieved some success in diffusing the innovation. Relentless leadership refers to accountability, transparency, and consistency. Leaders hold people accountable to agreed-upon processes and objectives, are transparent when problems arise, and are consistent in these areas. When leadership is on board with the innovation, personnel are more likely to follow, as is indicated in the following quote:

> "Once senior leadership started coming out and saying 'hey, this is the way we need to head,' things started getting better. People started getting on board."

Overall, performance expectancy turned out to be one of the most prevalent and influential dimensions of acceptance. When personnel experienced innovation diffusion and events (i.e., CPI events), and saw positive results associated with implementation and those events, they were more likely to buy into the efficacy of the innovation. Below are direct quotes from case study participants that provide support for this subdimension of acceptance:

> "That helps on the buy-in, when you can see some progress."

> "If I can see some positive, I'll perform and try to change with it."

As previously mentioned, personnel felt reluctance toward the innovation because they did not understand it. Once personnel were able to gain some understanding of the tenets and tools surrounding the innovation—and how those tools could be successfully implemented in their area—they were more likely to buy into the program. Some quotes on comprehension were:

> "Once you start—once leadership started talking about it more, actually defining the process of what the [innovation] was, and how they

interjected it or how they implemented the process of the [innovation], they gave us clear guidelines of what it is and how to implement it. We jumped in—the unit jumped in with both feet first."

"I'm sold because there's practicality for it. I understand it."

Leaders also empower lower level personnel to convince their peers of the efficacy of the innovation (peer influence), or empower them to personally implement practices and tools associated with the innovation (employee involvement). Astute leaders find lower level opinion leaders that have already bought into the innovation and deploy them to 'sell' the innovation to their fellow employees. This phenomenon can be seen in the following quote:

"The other maintainers that are brought in are now looking at that one individual that's on the outside like, hey, this works. Come on board."

Additionally, it is important to involve everyone in the implementation process and in the application of tools to improve processes within their work centers. That is, let personnel experiment with innovation initiatives, and allow them the room to fail. As a result, personnel begin to feel more involved, see the positive results of their personal efforts, realize innovation practices and tools can make their jobs easier, and begin to buy into the innovation. Pretty soon, the team will start to come to leadership with ideas, shifting the dynamic to a bottom-up approach. Some notable quotes include:

"I try to keep them involved, even the ones that are not as apt to input as some others. For the most part, I think it's changed a lot of the attitude out here."

"Even on the failures, though—if I bring an idea to a manager and the idea flops, it fails, it's a bad idea—if they at least let me entertain it, that helps."

"That was really the power of the journey is that you got a plan from the bottom up."

3.4.2. Routinization

Leaders concurrently conduct routinization efforts based on the achieved levels of acceptance and assimilation. At the outset, routinization efforts are likely focused on initial and recurring training. Training activities can be used to directly support leadership efforts designed to gain acceptance. In fact, training and development of personnel were perhaps the most prevalent ways to routinize the

innovation into the APL governance structure. Training also served to feed acceptance, as it increased innovation comprehension and provided an outlet to show the results of innovation efforts. That said, training efforts must be balanced with workload, as training efforts that conflict with the ability to get the job done might create frustration, and potentially hurt innovation acceptance. As diffusion progresses, training can move from the classroom to the shop floor as is indicated by the following quote:

"Basically, we're passing down the knowledge to each [maintenance] dock, like okay, this is the process that we've improved on and kind of co-mingling the technicians, taking people from this area, helping them run [an improved maintenance task] down there, sending them down here so that everybody can get on the same level of proficiency so everybody can be equally as successful as they were down here in dock #."

Moreover, leaders continue to conduct deliberate promotion and movement of key personnel to ensure the right personnel are in the right jobs to further diffusion of the innovation and achieve performance objectives.

"We look to find the place where that person can benefit us the best. I don't mean a bad apple. They're just maybe not a barn burner, not a go-getter. Find where they fit, find what they do, because there's a couple of people—I could give you examples that they didn't really impress me—but I moved them somewhere else and they just took over, tore it up, [and] started to shine."

If personnel with the right skills are not in the organization, leaders work to hire and sustain personnel who possess the desired skills to accomplish the technical aspects of their assigned jobs, as well as those who possess the leadership skills necessary to further the diffusion of the innovation. Issues with hiring personnel can impact an organization's ability to get the right people in the right job in a timely manner, thus potentially reducing performance and impacting innovation acceptance and assimilation. Moreover, efforts to reduce certain overhead positions can contradict efforts to improve efficiency by taking away people that would normally maintain or increase productivity. The following quotes highlight some of the APL's current challenges associated with hiring and personnel certification:

"Another one might be the [. . .] hiring process, where if we need to be responsive and either hire or fire people or move personnel, it's not

that easy with the union and the [. . .] hiring process. There's not as much flexibility there, as there should be, as far as trying to manage [. . .] personnel, and the workload. We might need to move workload here, transfer this. Then you have to run it through the union. If we have to hire 30 people, don't plan on that happening for six or nine months."

"Overhead is your enabler. That's your planner. That's your scheduler. That's your parts person. That's your integrator that's going to have the parts out there at the airplane. . . .The more solid overhead you've got, then naturally the better network you're going to have."

Given the abundance of activity associated with innovation diffusion, consistent, timely communication and elevation of issues ensures those issues are solved at the appropriate level. In the case organizations, the innovation generally provided the mechanisms for decisions and activities (i.e., CPI events and meetings) to be conducted at the appropriate level. The following quotes highlight this phenomenon:

"They did their own CPI right there on the floor. No manager had to do it for them, no flight chief, nobody. They did their own because they feel empowered now to be able to do that."

"All of a sudden you come in one day, and they [leadership] just sit back because they've got a leader. They've got a person they appointed, the scheduling chief, to chair that meeting now, so they sit back in the background."

Finally, codification of the innovation is important to sustainability, and it can facilitate acceptance and assimilation of the innovation. MRO leadership had produced multiple guidance documents regarding the innovation that included a guidance manual, white papers, and training presentations. The existing formal guidance helped routinize the innovation, and facilitated learning, understanding, and formalization of the innovation, as is indicated below:

"Codifying it in the [guidance manual], in the book, putting it in print, getting it out to everybody. That kind of helped start etching it in stone, for lack of a better term."

3.4.3. Assimilation
At the beginning stages of post-adoption diffusion, assimilation is achieved as the number of innovation-related activities begins to increase at lower levels of the organization and across processes.

However, personnel soon realize that innovation assimilation and performance improvements are only possible through improved relationships with other functions within their organization (i.e., internal breadth).

"The dynamics are good. It never used to be that. I know there was a dividing line between [support function] and production."

Furthermore, as innovation-related activities continue to accelerate, and are occurring at lower levels of the organization and across more processes, constraints to innovation diffusion and performance improvement again become evident. Eventually, personnel must reach outside their organization and build relationships with external supporting organizations to achieve innovation diffusion and performance objectives (i.e., external breadth).

"It's kind of fun to see that, because it's been a long time since you've seen anybody bonding like we are now. Especially with the [external support organizations], and that's the good thing with the [support organization]. They're there every day with us."

"Them [external organizations] understanding our [process] has been—it's a critical component of us succeeding."

Understanding this process and conducting the associated activities ultimately ensures incorporation. Acceptance of, and participation in, innovation-related activities is nearly complete, leaving only pockets of non-believers. Assimilation efforts are continually assessed and tailored to meet the needs of the organization as improvements are made and customer requirements and workload change. Innovation-related activity volume is high and is evident across internal functions and processes, and down to the lowest levels of the organization. Internal and external integration have been achieved, and all enterprise organizations are working toward the same performance objectives.

4. Making management innovation possible

We began this article with some examples of the difficulties associated with implementation of a management innovation. Resistance in various forms, poor personnel development, and lack of communication and collaboration often slow or stall management innovation efforts. However, our fieldwork revealed an organization that was thriving, both with respect to innovation diffusion

and performance improvements among APLs—albeit to varying degrees. In fact, a leader in one of the up-and-coming APLs described his visit to one of the more successful APLs in almost religious terms. He could just *feel* that something special was going on.

How did the more successful APLs do it? We contend that success is partially due to the time they have had to overcome resistance, apply the tools, and learn from their mistakes. However, despite resistance, mistakes, and setbacks, they persevered and incorporated the innovation while simultaneously improving performance to never-before-seen levels. We found they attained and sustained the desired results through three critical success factors: relentless leadership, deliberate development of personnel, and enterprise involvement. We believe these success factors can be applied to ensure successful innovation diffusion in any organization.

4.1. Relentless leadership

Leaders must be relentless in ensuring their organization maintains momentum and continues to diffuse the innovation and improve. We have all heard the term 'top management support,' but we argue that relentless leadership goes beyond leaders simply providing top cover. That is, leaders must understand changing structures and processes and be directly involved with innovation diffusion. Continuous improvement comes from identifying and attacking issues, every day. Therefore, relentless leadership means holding personnel accountable to specified goals and objectives, all the time. In our case study, leaders used an innovation assessment tool as a guide to determine innovation diffusion maturity. The mature APLs used it more frequently to drive decision making and resource allocation. Leaders in the mature APLs frequently assessed their organization's diffusion progress and associated operational performance, and were honest with themselves and members of the organization about where they needed to improve.

That is, relentless leaders encouraged transparency, even when things were not going as planned. These leaders were open to bad news from employees, and as a result, personnel were more likely to up-channel issues in a timely manner. Perhaps more importantly, relentless leaders also actively communicated positive results associated with innovation diffusion and performance improvements efforts. When personnel were able to see the return on investment associated with the application of the innovation, they were more likely to buy into the innovation and continue to improve performance.

Relentless leaders must understand their organization and production machine, and have the discipline to stick to their process. We talked to many personnel that learned the hard way by not staying disciplined and following the agreed-upon production process. Maintenance professionals always want to be working on the aircraft, and that is a good thing, but they need to understand that the principles behind the innovation may sometimes dictate counterintuitive behavior. A relentless leader must be able and willing to detect these discrepancies in behavior and correct them before major issues arise.

4.2. Deliberate development of personnel

Continuous improvement requires a commitment to learning (Garvin, 1993). Moreover, training and education help organizations develop routines that survive the test of time and turnover of personnel (Levitt & March, 1988). Training and education necessarily influences acceptance and assimilation of a management innovation. Therefore, leaders should set personnel up for success by providing them leadership opportunities, training, and education that is balanced with their required workload. We observed great examples of training and education throughout the APLs to include book reviews, peer-led innovation training sessions, and CPI events. An important aspect of these sessions was that they often involved lower level employees and took place in classrooms, common areas, and shop floors. Involvement improved understanding of the innovation and also allowed personnel to directly witness positive results of innovation diffusion, thereby influencing acceptance.

As part of the personnel development process, leaders should let personnel experiment with innovation initiatives, and understand that some initiatives will fail. Successful initiatives will increase the likelihood that the innovation will be further accepted, routinized, and assimilated in the organization. When personnel do fail, and they will, ensure they do not look solely to that failure to determine the worth of their efforts. Allow them to experiment again, perhaps with some mentorship, so that they can ultimately succeed.

As the innovation diffusion process continues, leaders should continue to expand training and education efforts, both in depth and breadth. At this point, training and education should be able to go beyond the basic innovation familiarization and include more in-depth concepts to ensure objectives are met. Also, we recommend leadership develop some standard training material for use across internal and external organizations.

The key with development of personnel is to not lose diffusion momentum. During our study, MRO experienced a leadership changeover at the highest

level of the organization. Many personnel were concerned their hard work implementing the management innovation and improving performance would go to waste. However, the strong innovation routines that were in place through deliberate personnel development ensured that the new leader had no choice but to continue efforts to fully incorporate the innovation across the MRO. Training and education have instilled the innovation to the extent that it will not likely become another flavor-of-the-month program.

4.3. Enterprise involvement

Leaders should look to develop strong relationships with external and supporting organizations. This was the most talked about factor in our interviews, and enterprise relationships were stronger in the APLs that had been working with innovation tools for many years. The innovation diffusion and performance success of the APLs relied on multiple agencies, and many of the critical agencies resided outside of MRO. In fact, some APLs had reduced production flow time so much and so quickly that they often outpaced their supply chain. In other words, supporting organizations had become the main constraints to innovation diffusion and further performance improvement. APLs had to perform workarounds and adjust processes to accommodate the faster flow and lack of (or delayed) external support.

Aircraft supportability solutions are inherently cross-functional, and the APLs in our case study realized they needed willing partners to support the achievement of APL objectives. Therefore, APL leaders worked hard to bring external supporting organizations into the fold and make them feel like they were a part of the production team, ensuring those organizations understood APL needs and the impact their support had on the APL objectives. However, communication is a two-way street, and both supported (APL) and supporting organizations have a responsibility to communicate about potential or existing needs and issues early and often. APLs also realized they must be good 'customers,' providing the timely, appropriate communication of needs to give supporting organizations the opportunity to successfully support the APL and its objectives. Overall, these efforts built enterprise relationships, improved performance, and served to further incorporate the innovation across MRO.

5. Good stewards of shareholder and taxpayer dollars

Failure to effectively diffuse management innovation has been described as the primary bottleneck to

progress (Stata, 1989). Moreover, management innovation is difficult to diffuse (Kuratko, Covin, & Hornsby, 2014), particularly in large, bureaucratic organizations (Thompson, 1965). However, as we have shown, management innovation diffusion is not necessarily beyond the art of the possible. Herein, we described a case study involving a large organization and uncovered mechanisms that describe and support the management innovation diffusion process.

Organizations must be especially deliberate about efforts to diffuse management innovation and, despite opinions to the contrary, can leverage bureaucracy to their advantage. In our case study, we saw leaders using bureaucratic means (i.e., organizational structure, formal governance systems) to their advantage to achieve innovation diffusion and performance objectives (Craig, 1995). As innovation diffusion progresses, however, the organizations must continue to evolve, pursuing innovations through a more bottom-up approach to ensure sustainability (Leonard-Barton, 1992; Vego, 2013). When successful in these efforts, organizations can become innovative and efficient organizations that are good stewards of shareholder or taxpayer dollars (Sarkees & Hulland, 2009).

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