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Getting shop floor on the move a key part of progress

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Given how reliant everyone has become upon mobile devices and mobile technologies in their personal lives, it shouldn't be surprising that enterprise mobility solutions have become much more pervasive on the manufacturing shop floor and that manufacturers are likely to become even more reliant upon mobility going forward.

As long ago as 15 to 20 years ago manufacturers used certain types of mobile devices, such as portable scanners, in their business operations, Alok Aggarwal, president of OmegaCube Technologies Inc., Itasca, Ill., pointed out. But that was for certain very specific purposes, such as to help companies to keep track of their inventories. But as far as a more broad-based use of enterprise mobility solutions into the manufacturing sector, the biggest push has actually occurred within the past five to six years, coinciding with the explosion of the availability of more affordably priced iPhone, Android and Windows operating system smartphones and tablets, which are sometimes termed mobile information devices.

At the same time, according to Jeffrey McKinney, managing director at Accenture Strategy, suppy chain and operations, certain wearable mobile devices, such as smart glasses and goggles, smart watches and even certain smart helmets that sport a virtual reality screen, a certified hard hat and eye protection, have seen an uptick of popularity in the manufacturing environment, as have mobile life safety solutions, which are used to monitor the work environment, as well as the location and the vital signs of workers.

"Barriers are coming down for manufacturers of all sorts to adopt more mobility systems," especially now that wireless networks are becoming more robust and faster, and it is much easier to get ruggedized cases and sleds with barcode readers, and with most mobile devices now having much longer battery life, Chris Thornhill, chief architect for research and development at Alpharetta, Ga.,-based Aptean, said, noting that that has also broken down the barriers for software providers to develop more applications, or apps, to support this increase in mobility.

This, he explained, is because with certain new web technologies, such as HTML 5, and the ability of the various mobile devices to utilize those web technologies, software companies now can develop cross-platform apps—apps that could be used with the manufacture's choice of mobile device, whether it has an iPhone, Android, Windows or another operating system.

Recent Accenture research indicates that 93 percent of Fortune 500 manufacturers are currently evaluating the use of mobile information and/or wearable devices, with 86 percent already deploying at

least one type of mobility, 83 percent deploying at least two different types. “Also, this adoption curve has been quite recent,” McKinney said, noting that while these companies have “tested and toyed with” these devices for some time, 80 percent just started to use them on the shop floor with the past year or so, helped by the fact certain durable technologies, such as ruggedized tablets, have recently evolved to a point where they could be relied upon to be used in even harsh manufacturing environments.

This, he said, comes as the digital factory promises to revolutionize not only current manufacturing processes, but the manufacturers themselves. He noted that mobility is one of 11 factors that are seen to be able to enable this digital factory. Accenture, in its “Digital Factory: Cracking the Code to Success” report, said greater adoption of these enablers can lead to strong and more sustainable business performance and that at the operational level these enablers have led to improvements of 5 to over 10 percent in such key areas as throughput, lead times, work-in-process inventory, quality and service and operational flexibility.

“This positive operational impact has translated into stronger enterprise financial performance,” the report maintained, going on to say that, according to Accenture’s research, manufacturers with the strongest business performance in the previous two years were much more likely than other companies to have implemented these enablers, which, in addition to mobility, also include digital foundation, intelligent automation and control, operations analytics and process monitoring, digital safety and energy management, advanced technologies, engineering collaboration, digital production systems, talent development and learning, manufacturing control tower and industrial security.

Stefan Koch, global metals lead for SAP SE, Walldorf, Germany, observed that a recent push by Russia’s Severstal to use mobile solutions for the maintenance and repair of its industrial equipment has resulted in a five-fold increase in load balancing and personnel assignments for planned work and a 3.5-fold increase in registration of completed maintenance work orders. Also, its early stage detection rate for defects and equipment failures increased 16 fold.

“Manufacturing companies are always looking a new ways of doing things to improve their operations,” observed OmegaCube’s Aggarwal. However, at least at first, they had a certain measure of reluctance to turn to mobility, at least when it came to their business systems. But now that the technology has become more mature and is having more widespread acceptance, they aren’t nearly as reluctant to adopt this technology, although they continue to ask certain questions to ensure that this is the best move for their company.

Aggarwal said that the biggest question is how it will help the company to operate better, although manufacturers are also asking such things as what the costs (for both hardware and software) and cost savings will be, how it will affect the company’s speed of decision making and what impact it will have upon the accuracy and the efficiency of the production process.

Also, it helps that mobile devices are seeing very widespread use in office processes today. Koch said this makes good sense, given that when someone—whether they are an executive, salesperson or another worker—is outside of the manufacturing plant, when they are visiting customers, they need to have access to the same answers as they do while sitting in their office. He observed that they could do

so by just getting on their mobile device and logging into the company's (enterprise resource planning-ERP) system.

The trend of greater acceptance of the use of mobile devices and mobile technologies in general on the shop floor has followed the ruggedization of such devices. James Wood, Aptean's director of factory and Activplant, explained that when tablets first came out five to seven years ago, they weren't rugged enough to withstand certain aspects of the manufacturing environment. But that has since changed with the new, more rugged, yet lightweight tablets that could withstand being dropped or being exposed to certain harsh conditions becoming more and more the norm.

It has also helps that newer tablets often have more screen space, enabling workers to use them for certain processes that involve the input of a lot of data, which was something that they previously could only do with their office computers or certain fixed touchscreen terminals that many workers share closer to the production area. "With increased, lower-cost hardware and larger-sized mobile solutions, we are seeing more and more transactions being recorded on mobile devices, Aggarwal said, adding, "People could do almost everything on a mobile device as long as they have the right screen size."

They also are advantageous from cost perspective for the company. Wood explained that by comparison installing stainless steel encased touchscreen terminals could be very expensive. "First you have to buy the personal computer to go into the stainless steel cabinet and then you need to hardwire the PC into the company's internet network," he explained. "But all that that could be circumvented if you use a wireless technology." Thornhill pointed out that another big difference with a terminal, or workstation, is that it tends to be fixed to the floor and isn't associated to a specific individual, while a mobile device assigned to a specific individual and moves around with him. "That opens up a lot of possibilities for personalization and targeting of notifications which didn't exist before vs. that terminal that didn't belong to anyone specifically."

Accenture's McKinney said the major advantages to manufacturers tend to be in five major categories: direct labor cost savings due to the fact that their employees could be much more efficient; greater operational flexibility and agility; a reduction in lead times; a reduction in the amount of work in process; and greater quality and service improvements.

Of these, Aggarwal says the major impact is the speed at which they can now do their work, given that they don't have to wait to communicate in person with someone else or to have access to a computer to record what they have done or to access the data they need to do their job. "It helps the workers to react much quicker," he explained. "When there is change they could communicate it easily on their mobile. They can also make decisions faster."

Another advantage, SAP's Koch pointed out, is the ability for the worker to move around in a controlled environment and do things faster. "It is about the speed that you could get data into a system," he explained. "If you have a quality defect and you take a camera and take a picture, if you have a mobile device you just need to click on it and it can be instantly transferred." He said all of this speeds up the manufacturing process.

Manufacturing mobility is also moving into the direction of the use of more virtual reality and augmented reality right on the shop floor, thanks to certain wearables, such as sophisticated glasses that allow the certain data related to the task at hand to be overlaid in their field of vision. Koch said this could help the worker to identify what they are looking at and to give them needed information about either the product being produced or about the production machinery.

In the future, that could be taken a step further. Thornhill said that the increased use of mobility on the shop floor could be very supportive of the intelligent digital assistant applications that Aptean is currently looking at developing. He said this app would both enable workers to receive notifications and to either talk with an intelligent digital assistant that is a more sophisticated version of Apple's Siri or Android's Cortana without taking off their gloves or picking up their tablet, similarly to what was depicted in the TV show Star Trek. This, he said, could involve the use of certain wearable hardware, such as a smart helmet that would enable the worker to have voice or even gestures, without even having to touch a mobile device's screen, which could be very helpful when in a dirty environment.

Safety is a big concern, especially in a heavy manufacturing environment, but Koch noted that with certain apps, which could be described as more sophisticated versions of the "Fitbit" consumer-based software, mobile devices can now be used to not only ascertain where certain workers are but that they are in good physical condition.

While it appears that the use of mobility solutions will continue to increase going forward, that is not to say that there are not challenges related to this occurring, with perhaps the biggest concern being security issues, even though that is now less of a concern than it had been in the past. Aggarwal said that there are now several tools and technologies in place that help to mitigate security risks, including mobile devices' firewalls.

Thornhill pointed out that mobile device manufacturers are now incorporating some of those features right into their devices' operating systems, which make it easier to do things like geofencing, which is the use of GPS or radio-frequency identification (RFID) technology to create a virtual geographic boundary, enabling software to trigger a response when a mobile device enters or leaves a particular area. Also, other security dedication and authorizations, such as encryption and privacy settings make mobile devices much more secure.

The skill level of the employees who will need to use mobile devices, or their desire to use such devices, has, at least in the past, had a dampening effect upon speed of adoption of these solutions on the shop floor, Accenture's McKinney pointed out, although that is becoming less of a problem with more baby boomers retiring and more millennials entering the workforce.

Now with older generation employees also using smartphones, so their fear of using mobile technology at work doesn't really exist anymore, Aggarwal pointed out. "Even the business owners and older employees realize that by using mobile solutions it makes their lives easier."

Another potential issue has been certain difficulties integrating the use of mobile solutions into the older ERP systems that some manufacturers own. That, Thornhill said, is because many older ERPs don't

have the application programming interfaces (APIs) or web services suitable for an app to communicate with the backend.

“But if a company’s ERP system runs on relatively current technology, integration is possible,” SAP’s Koch said. “The question is how much time and effort the company may want to expend in order to integrate it” by building in more up to date APIs or web services.

“The use of mobile solutions on the shop floor will only increase going forward,” Koch said, especially as device processing power increases, and the availability of such wearable devices as smart goggles, smart watches and smart helmets increases.

Aptean’s Wood agrees, adding that the fact that more software providers are developing an increasing amount of mobile apps tailored to what occurs on the shop floor and that also keep the users’ experience or skill levels in mind. “Because of this many manufacturers are not nearly as worried about making a jump into mobility as they had been about dipping their toes into the water in the past.