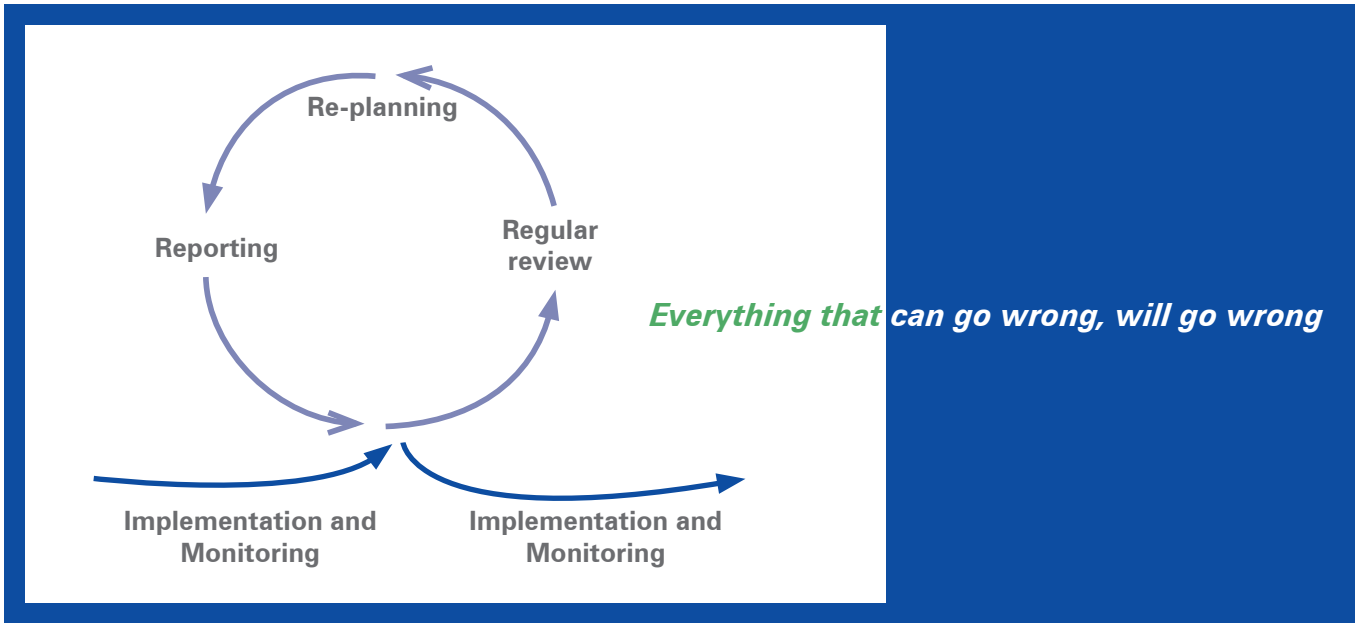

Monitoring, Evaluation and Controlling Material in HVAC Projects

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Introduction

Sustaining the growth of HVAC project consulting organizations is a major challenge. Building a strong team or building a strong business model and value proposition is not enough for sustainable long-term growth. There are various factors that affect the growth of an organization, among which one of the major factors is Monitoring, Evaluation and Controlling (MEC) of Material. Ineffective materials management for a project can result in significant cost blow-outs and delays in project completion. Such cost inefficiencies will also negatively impact the growth of the organization.

Key Stages in MEC

To implement an efficient MEC of Material, there are four key stages one has to focus on:

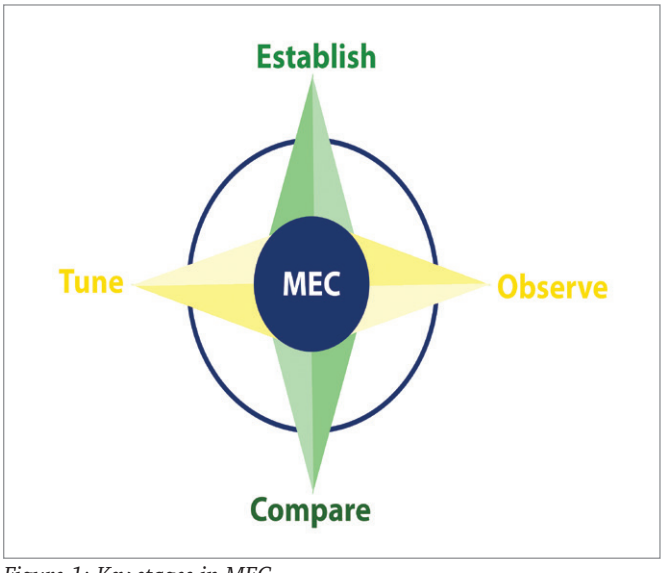

Figure 1: Key stages in MEC

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About the Author

Sitaram Burle is a Management Consultant in the field of information technology. He holds an M.S. in Mechanical Engineering from the USA with over 25 years of experience in IT consultation, including over 8 years related to HVAC industry. He is the author of METS, an application for HVAC project estimation and material handling.

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i. Establishing
ii. Observing
iii. Comparing
iv. Tuning

Figure 1 depicts the MEC compass. As stated by Mechanical Contractors Association of America, "Actions taken in the first 25 percent of a project are significantly more important to the successful outcome of the project than actions taken after that point." At the initial stage of a project, one has to carefully draft the Scope of Work in detail, build and manage the project Bill of Quantities (BoQ) with a well-defined Work Breakdown Structure (WBS), and have an efficient Change Control Management System (CCMS) in place. All these are part of the Establish stage of MEC compass. Though it is widely accepted that BoQ is the heart of HVAC project management, people often fail to implement an effective BoQ Management System. During the initial design and estimation phase of the project, a good amount of time is spent in building the BoQ to define the scope and accurately forecast the cost, price and margins of the project. However, due to various reasons people fail to retain accuracy in BoQ Management at later stages of the project, especially when there are revisions to the Scope of Work. Eventually, managers involuntarily fall into the mode of "Your guess is as good as mine," or the habit of biting back, due to lack of accurate information when needed. Hence, it is most important to have the right tools to manage BoQ accurately throughout the project life cycle.

Continuous observation, comparison and seamless conversation are all part of monitoring and evaluation of projects. Each project should have embedded internal project monitoring arrangements to check its progress and achievement of milestones, identify problems and recognize the need for change or amendment. Whether it is material or work, continuous observation on what has been estimated or designed versus what has been delivered so far versus actual work completion at site will give a good control on project execution and help to realize the objectives. In addition to observation, comparing the actual with the plan will reveal:

i. Are we procuring at the right cost?
ii. Are we delivering the right quantity on time?
iii. Are there any deviations from what has been estimated/designed?
iv. What is the variation and how is it going to impact the project?

These are the key metrics one has to continuously monitor. Establishing the right tools and infrastructure for accurate and precise monitoring will provide fine grain control on projects and eliminate or minimize the valuable management time spent on Monitoring and Controlling projects.

Research indicates that knowledge workers spend a great deal of their time — an average of 40% — on discretionary activities that offer little or no personal satisfaction and could be handled competently by others. So eliminate or delegate unimportant tasks and replace them with value-added ones.

Just having good Monitoring and Control in place is not good enough. One has to Evaluate and Tune the process as and when required to ensure that the project never enters the red zone or, even if it does enter, taking corrective action at the right time and putting it back on track is important for sustainable growth of the organization.

Monitoring, Evaluation and Controlling

Organizations have various departments/sections. In small organizations, some departments are combined, but they do have different teams for Sales, Procurement, Stores, Execution/Planning, Billing (Accounts) and Management. Each team may be handling multiple projects simultaneously. They may be short term projects, long term projects or retrofits. To have an effective Monitoring, Evaluation and Controlling system in place, there needs to be seamless communication among various departments with accurate and reliable information corroborating each other. In addition to seamless communication, each team should have accurate information at their disposal to validate against the latest revision of the project BoQ to minimize deviations and variances. Hence, for any transaction that may be related to purchase, dispatch, billing or return, one needs to implement an approval process wherein transactions are validated against the standing BoQ, then approved by an authorized person and finally executed. Any deviations during the validation process need to be carefully analyzed, justified and processed at the inception itself rather than going into a firefighting mode that may lead to unnecessary friction and ultimately may jeopardize the successful completion of the project.

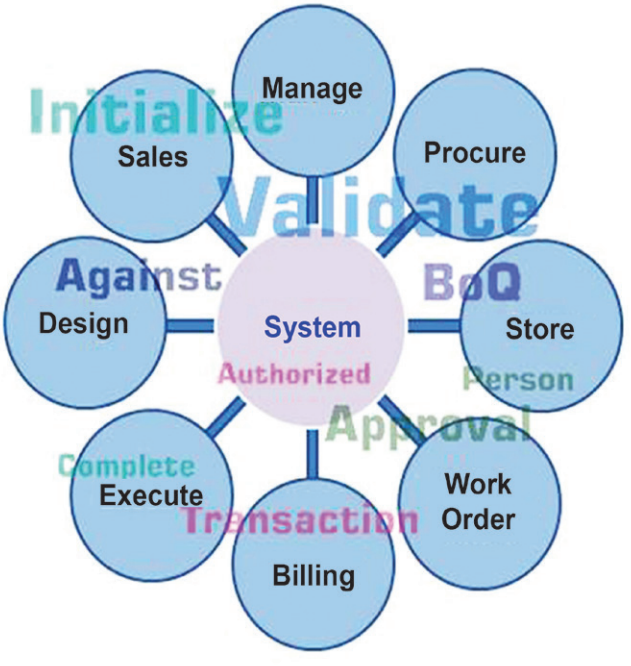

Figure 2: Functions in an organization

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To clarify how on-time validation plays a critical role in MEC, let us discuss a scenario. Somewhere in the middle of a project, there was a request from a project engineer for another 100 running meters of copper pipe of certain make and size to complete the ground floor piping work. On receiving the request, one needs to cross verify against the BoQ and see what is the approved estimate/design quantity; against this how much has been delivered so far and what is the balance quantity. If the requested quantity is within the balance quantity, it is ok to proceed for procurement. If the requested quantity exceeds the balance quantity (Estimated Quantity – Delivered Quantity), a red flag needs to be raised spontaneously indicating a deviation, and the concerned team members need to analyze the reason for deviation. There may be many reasons like the material was diverted for other tasks, or there is a change in the design, and so on. After carrying out the analysis, the manager will take a decision with appropriate justification/rectifications and, if required, raise a request for change control.

Once the requisition has been approved, during the procurement stage again one has to validate various factors and judiciously place a purchase order on the vendor. To list a few checks and validations during procurement, one has to see if the material is procured at the right price, what is the current average price, when was the latest purchase and from whom and at what price, what is the deviation from estimated cost and what is the cause for deviation, what impact it is going to have on the project, what is the current overall deviation of the project and so on.

This way every business process needs to have its own checks and balances that need to be validated and approved. Just imagine the list of business processes, number of projects, number of items and number of validations at each stage and the number of business scenarios; they all get multiplied and create a big mess unless a good MEC system is implemented.

At present, most organizations rely on the memory of their experienced resources, backed by some generic application or custom designed Excel spreadsheet. In some cases, this approach has been successful so far. These managements are happy that they have the best team in place and have streamlined their business processes. But, there are two questions that the management should ask themselves:

- Are these well defined MEC processes capable of handling growth?
- Without diluting MEC efficiency, are they scalable, extensible and flexible?

The answers to these two questions will tell us if there is a necessity to pull up our socks. And before trying to answer these questions and coming to a conclusion, let us also look at some of the facts and basic management strategies related to growth and sustaining growth and what are the hurdles in retaining an effective Monitoring, Evaluation and Controlling system.

Challenges for MEC

India has been witnessing continuous growth across almost all the major industrial and commercial sectors; growth not only in metropolitan cities, but also in tier 2 and tier 3 cities. Expansion of commercial space, offices and corporate hubs, retail outlets, entertainment centers, etc. is driving the demand for HVAC installations across the country. This economic boon in India is driving the HVAC consulting firms' growth at a high rate and the big question is, "Is this growth sustainable?" Another big question is, "Why are we facing this question?"

Let us answer the second question first. Let us rewind a bit and see how most of the HVAC firms were founded. Most HVAC firms have been established by individuals or partners who stretched their entrepreneurial skills after gaining a lot of experience in the HVAC sector. And they are the founding teams and strong supporting pillars of their organizations. Due to the strong founding teams, they see success and at the same time rapid growth in line with the economic growth. However, whatever tools they have in place currently, generic applications or Excel spreadsheets, may not be efficient enough to handle their growth, or may be time consuming. This results in huge demand for management time for monitoring, evaluating and controlling projects.

To address the demand for additional management time, one may try to ramp up resources. And we know how difficult and expensive it is to get a capable and reliable resource. Also, ramping up with senior resources will increase indirect costs, risk factor and uncertainty. And it has limited scalability. The management's biggest and everlasting concern is uncertainty: if the senior resource quits in the middle of a project or goes on a long personal leave, can we get another senior resource on board in time for a new project or

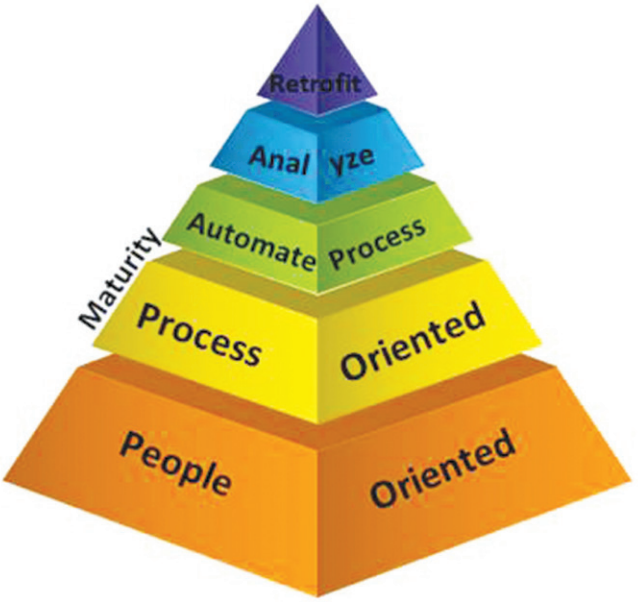

Figure 3: The Maturity Pyramid of organizations

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can the existing team handle the new project without diluting the efficiency and impacting the ongoing projects. So, just ramping up resources is not a solution to sustain growth.

Organizational Maturity Pyramid

To address these everlasting concerns, let us review some of the basic principles of organizational maturity and how the growth of an organization is an integral part of the maturity model. If we look at the Maturity Pyramid in layman's terms, organizations relying on resources are at the bottom of the pyramid. To retain efficient MEC processes and sustain growth, organizations have to climb the maturity pyramid. They have to move up by defining and implementing business processes, and then automate the process by establishing the right tools and infrastructure. The right tools enable us to analyze precisely and retrofit as and when required. And automating business processes with the right tools will allow us to delegate work to lower cadres so that the core team stays focused on the business. Automation not only helps us delegate work, it also ensures that the quick transition of work from one resource to another can be done smoothly and efficiently. This way, organizations can scale to any level and sustain growth with the least effort.

And finally, at the top of the pyramid, retrofit is nothing but tuning, for which again we need the right tools to perform predictive analysis and protect business performance and move our business strategies from vision to reality.

Where is our organization standing on the Maturity Pyramid? Are we close to the top of the pyramid or the bottom? Don't be surprised, our research shows that most of the HVAC firms are still at the base or close to the base of the Maturity Pyramid. And that is the reason why we have the first question, "Is this growth sustainable?" confronting us.

Conclusion

To retain sustainable growth, one needs to have the right tools like an ERP package to Monitor, Evaluate and Control material and work related to projects. However, most of the renowned ERP packages are not tailor-made for HVAC projects; moreover, their cost of ownership is very high. Alternatively, the organization may try to get in-house custom software developed, which again is time consuming, expensive and risky. A better bet is to shop around; you can find a computer application that balances out process automation and tools to leverage your business analysis. Just like Small Medium and Emerging (SME) organizations in the HVAC sector, there are a lot of SME organizations in the IT sector, which are involved in developing out-of-the-box innovative applications that satisfy most of an HVAC contractor's business requirements. You can judiciously join hands with a company who has an application ready for your business, and build a strategic partner relationship with them towards sustainable growth.