Midagon Point of View

Integrated Production Site

Production efficiency – Striving for new levels

In the traditional manufacturing context, existing production units always strive for performance improvements regardless of how successful they have been in the past. When recent improvement opportunities have been utilized, new targets are set and new developments planned. The changing business environment makes it necessary to adjust; new technological opportunities will be used by competitors and stakeholder expectations continuously become more demanding.

Benefit assessment of improvements should be made from both technological and benefit characteristics point of view.

Picture 1. Some reasons for the continuous need for transformation in manufacturing.

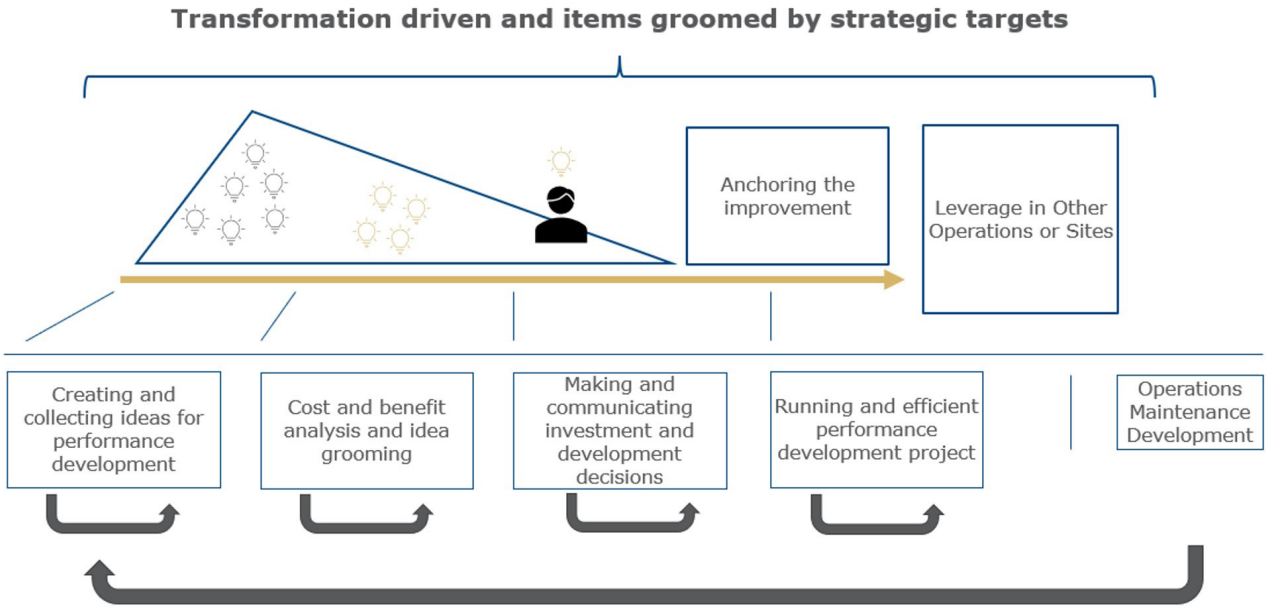
Data driven improvement opportunities

In an industrial manufacturing site, the technological structure where improvements can be found, may be described as follows:

1. **The physical production process itself**: Technical unit processes where physical and chemical changes happen.
2. **Instrumentation** is required to capture the state of the process. In process industries, these typically include measurements of the physical and chemical properties of reaction mixtures. In discrete manufacturing, this might include the measurement of acceleration, position, cycle time and such of the machinery. Actuators that change the conditions of the primary process also belong to this category. Again, in process industries, these include controllable valves and motors, for example. In discrete manufacturing, the speeds and positions of machinery, conveyors and the mechanical configuration of the production line are controlled. Robots belong to the high end of this category, but also have properties from the other categories which are presented below.
3. **Basic control** is an area that in discrete manufacturing is typically part of the main machines but may also entail production line level controls which are made possible by programmable controllers, for example. In process industries, programmable controllers are used too, but for larger production units Distributed Control Systems are used. The basic feedback control of primary and secondary measured variables as well as higher level disturbance elimination occurs on this level.
4. **Advanced control,** recipe control and scheduling are built on well-functioning basic controls. The platform for these activities varies greatly depending on the nature of the manufacturing operation itself but is typically also dependent on the age of the facility. In older facilities, these may be built on bespoke application hardware with various levels of programmable features, while in newer facilities these may be part of the Manufacturing Execution System or even Distributed Control System. Although the control frequency in these applications is lower than in basic control, these applications may be very complex from the theoretical point of view. Physical and mechanical man-machine co-working usually requires applications on this level but may already be part of the robotics.
5. **Integration** of unit processes or main machines may be required to orchestrate the use of the entire asset, to balance the production capacities and to compensate for various disturbances. Typically, here we are talking about integration inside one production plant but also between traditional departments.
6. **Collaboration** with other internal or external production units, subcontractors, suppliers, and customers can be boosted with modern data handling methods and the provision of data for various purposes. Data storage, security and delivery methods are essential topics on this level. Wearable solutions may be part of a collaboration solution where data from different sources as well as live feed can be used to improve performance in a collaborative manner.
7. **Situational awareness and empowerment of employees** may also be considered a vertical activity across many of the levels described above. In many cases, it deals with providing accurate real-time data, the capability to interpret this and having the opportunity to make changes to the manufacturing process. The lower levels described above can often be automated but this activity is human centric by default.

	Hard credits	Soft credits	Intangible credits
Situational awareness empowerment	Benefits directly from engineering improvements	Benefits evaluated as percentage improvements from theoretical potential	Benefits not measurable with quantitative metrics but are part of the development responsibility and mandate
Collaboration			
Integration			
Advanced control, recipies, scheduling, human-machine coworking			
Basic control			
Instrumentation			
Process			

Picture 2: Benefits of data driven improvements in Manufacturing Operations



Picture 3: A development portfolio should be managed in a way that allows early benefits

Benefits of data utilization

For the purpose of full visibility of targeted benefits, they can be divided into three categories: Hard Credits, Soft Credits and, Intangible Credits

1. **Hard Credits** are benefits that can be directly derived from the proposed technical improvements. They typically include savings in raw material costs, a reduction of downtimes, and improvements in the stability of the production process, meaning higher yields of in spec production, etc.
2. **Soft Credits** are calculated based on identified potentials. For example, a certain percentage change in waste production or unnecessary side streams or use of energy may be estimated.
3. **Intangible Credits** typically include benefits that are difficult to estimate in monetary terms but may still be connected to the strategic targets of the company. These might include topics such as improved employee satisfaction, sustainability image, corporate citizenship or even dealing with hard limits such as environmental allowances, etc.

While the investment payback calculation is typically based on Hard and Soft Credits alone, the inclusion of Intangible benefits might be very important when considering the long-term success of the company. It is important to include these in the benefit assessment and project targets, otherwise the project cannot be held responsible for targeting them.

Combining the technical improvement opportunities with the different types of benefits provides us with a very handy tool for benefit gathering and visualization.

Midagon services

Production sites are always seeking improvements in their operations. Once the targeted levels of performance have been reached, the next level becomes the new target. In future investments, the involvement of all employee knowledge – and sometimes even that of other stakeholders, such as customers – must be captured in a meaningful way. The improvement opportunities must be captured, groomed and communicated in a way that the success of the project itself and the beneficiation of the project results can be secured.

Midagon has the tools and experience to carry out all the phases of industrial site performance development. The core competence is in the benefit gathering steps and the actual project management. Midagon's project managers are also seasoned in communicating with all the levels of the organization. This guarantees consistent messages to all stakeholders and decision makers.

Midagon

Midagon is a truly independent transformation partner focused on tangible business benefits realization. We combine extensive program and project management experience, business domain and technology expertise with 100 % objectivity to help our clients succeed in their most complex transformations.

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