

Excellence in Biomedical Informatics Development and Implementation

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Overview (1)

- ❑ Biomedical informatics (BMI) has crossed the lab
- ❑ Coupled -omics BI expands health-care practice and opens up new horizons and potential is immense.
- ❑ However, potential may not be realized (or realization may delay) if BMI is not placed in context of best industrial practice.
- ❑ Take best practice examples and adapt them to BMI reality.
- ❑ Aim: to enhance BMI potential and to facilitate development, organizational / social implementation to maximize benefit to society.

Setting the scene

- The mission of BMI is to provide the technical and scientific infrastructure and knowledge to allow evidence-based, individualized healthcare using all relevant sources of information.
 - ❖ Information as currently maintained in the health record
 - ❖ Genomic, proteomic and other molecular-level information.
- BMI bears the potential to improve the health and quality of life of the individual, as well as to reduce the overall costs of healthcare systems, by enabling a paradigm shift from late stage diagnosis towards early detection or even prediction of disease.

Industrial Excellence

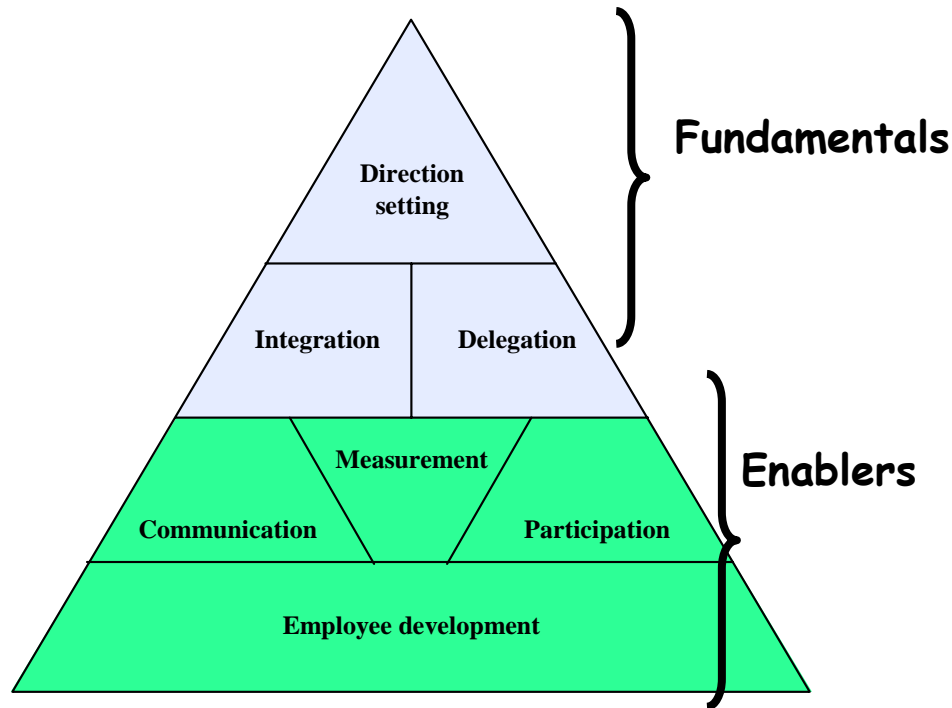
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What is industrial excellence (IE)?

- ❖ **IE** has generated enormous activity over the past century, fuelled especially by the changing landscape arising out of the industrial revolution. Industrialization is concerned with the emergence of explicit (as opposed to artisan) ways of producing goods and, especially more recently, services.
- ❖ **IE** and pervasiveness of industrialization in almost all aspects of our lives (**BMI pervasiveness in all aspects of health-care?**)

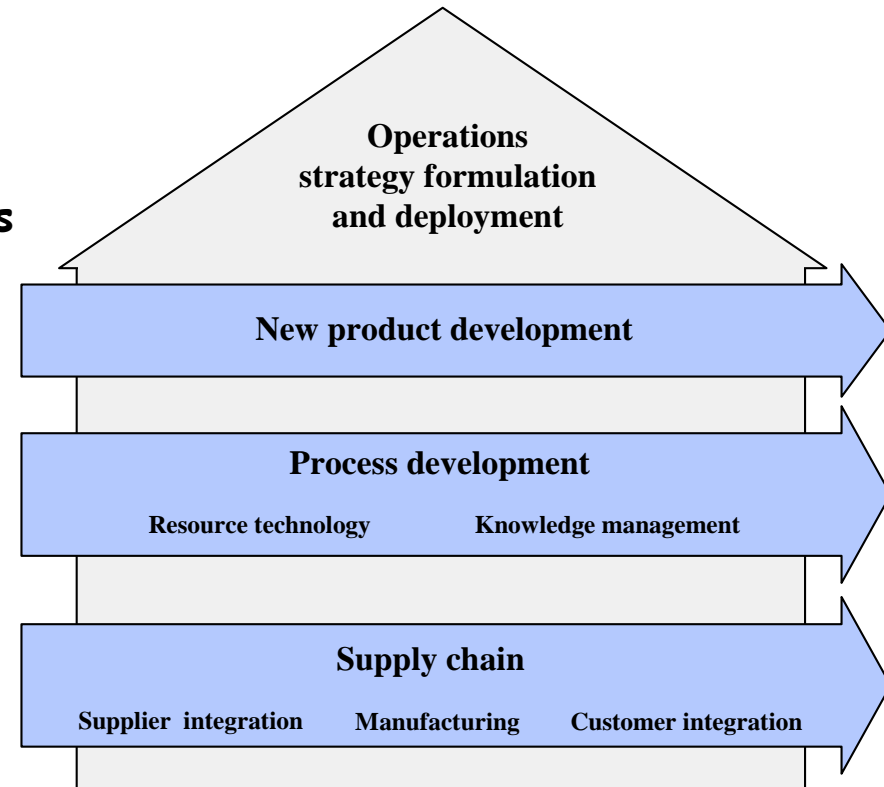
Driving the inquiry:

- o How does an excellent factory (**BMI**) look like?
- o How is it (factory - **BMI**) managed?
- o And what is the experience of people working in it (factory - **BMI**)?
- o What are the “pillars” of excellence?
- o What should the management particularly pay attention to? Is it technology, people, process, or product? Or all of them?
- o What is the role of well-known approaches like SPC, JIT, or TQM, which have received much press over the last decade(s)? What place do they hold in a more broader picture of IE?
- o Is there anything we can learn from respective industrial examples?



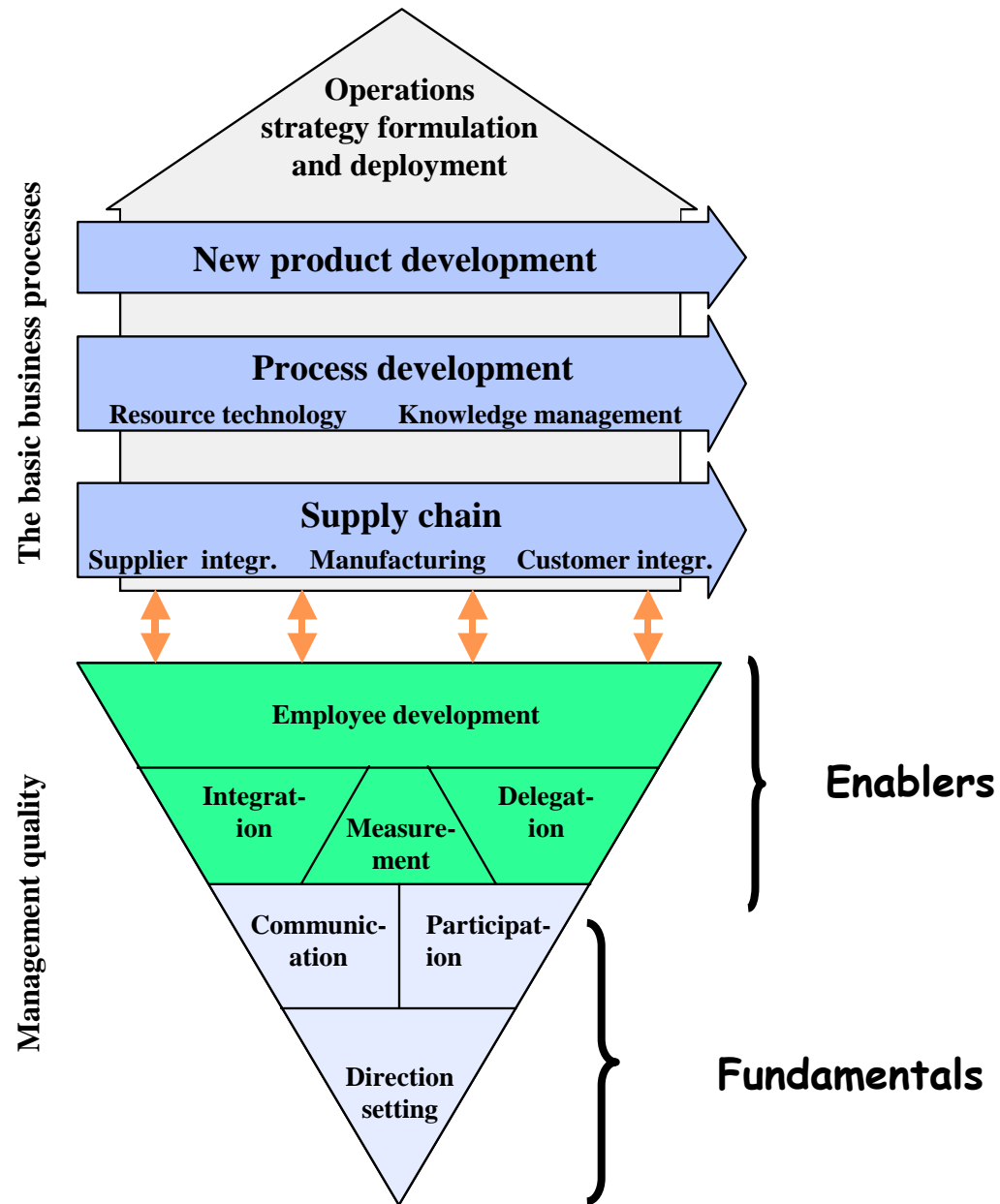
Components of Management Quality

- Enablers form the glue necessary to make the fundamentals stick.



The four basic business processes

Management Quality and Business Processes together



The road towards excellence

- ❖ Effort must be explicit and continuously assessed to steer effort on course.
- ❖ **We need metrics.**
- ❖ **Metrics, which associate DDD and effectiveness of IT and used:**
 - ✓ as ongoing performance indicators - used on an ongoing basis to assess performance over time and can be used internally or as a basis of comparison with other similar processes;
 - ✓ to plan and reflect progress towards or realization of specific goals;
 - ✓ to help focus the delivery of work;
 - ✓ for impact analysis - the same metric being used to record values before and after some a change is made.

More on metrics (1)

Metrics should:

- Focus attention and performance on what is important.
- Not get in the way of clinical work and should facilitate it or enhance it where possible.
- Help individuals, teams and the organization to fulfill their mission.
- Be meaningful and relevant.
- Promote intra- and inter- organizational comparisons.
- Help improve the effectiveness and efficiency of work.
- Be used to prevent problems occurring as well as remedying deficiencies.
- A few highly useful metrics are more important than many less useful ones.

Metrics identification

- ❑ Translate existing generic objectives into specific goals where possible.
- ❑ Identify potential metrics within each category.
- ❑ Identify purpose and importance of metric.
- ❑ Define target activity related to metric.
- ❑ Define future processes (process-level metrics).
- ❑ Define how work is done.
- ❑ Assign metric to metric category.
- ❑ Define metric characteristics.

Metrics characteristics:

- source of data;
- method of collection;
- frequency (e.g. daily, weekly, monthly etc) and regularity of collection;
- owner;
- importance/priority level;
- purpose (e.g. care delivery, reporting, impact assessment);
- whether the metric is an objective, a goal or an indicator;
- whether the metric is temporary or permanent;
- whether the metric is non-divisible or aggregated;
- whether the metric is predictive or historic;
- whether the metric can be used as a direct inter-organizational comparator.

Industrial Excellence Overview

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Four basic industrial processes:

❖ Supply Chain:

current business

❖ New product Development:

means to generate future business

❖ Process development:

key to industrial competitiveness

❖ Strategy Formulation and Deployment:

clarity and focus

Supply chain

- ❖ Encompasses the physical supply activities of goods and services, from the delivery of materials and informational inputs to the industrial unit, to their transformation inside the unit, and their delivery using existing channel activities. This process mainly focuses on current business.
- ❖ BMI: Supply of tissues, molecules, molecular information, scientific findings ...targeted to the ultimately social delivery. Complexity: BMI - HC industry is distributed (virtual). This is already acknowledged in DDD and has led to re-engineering. Great that it is already acknowledged- leading business schools engage students in research and teaching.

New Product Development

- ❖ Encompasses all activities concerned with the improvement of current products and services, as well as with the development of the next generation of products and services. This process is concerned with the future of the company.
- ❖ DDD represents an hot area for BMI to intervene. Reduce cost, reduce time to introduce a new (safe and cost effective) drug to society.
- ❖ Which are the BMI facilitated products?

Process Development

- ❖ Encompasses all activities concerned with the improvement of the industrial unit's processes and activities, whether they pertain to the supply chain, to product development, or to other tasks of the organisation, like strategy formulation and deployment. Continual and fast process improvement is key to industrial competitiveness.
- ❖ It relates to BMI functioning, supply chain, and impact to BMI facilitated product development. BMI community should understand that BMI product industry is changing to take advantage of BMI R&D.

Strategy Formulation and Deployment

- ❖ The process concerned with the formulation and deployment of strategy via a coherent mission which engages the entire unit and sets clear goals for it. It reflects a process view of strategic leadership, i.e., clarity and focus require a holistic and integrative process.
- ❖ For BMI: holistic and integrative process are even more critical than in other areas.

Fundamental #1

Direction Setting:

Management starts with clear direction (or goal) setting. Short of clear directions, actions can be partial at best, confusing at worst. Direction setting is facilitated by a clear focus and needs to be clear, motivating and operational.

Fundamental #2

Delegation:

It is not simply work that needs to be delegated, it is the entire traditional top-down command - and - control structure that needs to be reviewed. Executives are learning to delegate decisions to the functional departments and teams that have the more direct and detailed knowledge (empowerment).

Fundamental #3

Integration:

The more decision-making is decentralised, the more it also must be aligned to the common goal: horizontal (supply chain), vertical (strategy deployment) and temporal (concurrent engineering). Integration must address both information (asymmetries) and incentives (alignment).

Fundamental #4

Communication:

directions and goals need to be communicated frequently and to all employees to become a shared reality in the unit. Employees need to be equipped with the information necessary to make decisions consistent with the goals of the unit.

Enabler #1

Measurement:

allows managers to keep track of performance as well as its drivers. If processes are not well-measured, progress cannot be validated with certainty, and hence direction setting remains a virtual exercise.

Enabler #2

Employee Participation:

employees need to be motivated to make contributions to the unit that transcend their job descriptions. They need to use their brains and their hearts, in addition to their hands. Fostering such behavior requires the right culture (trust), incentives, and training.

Enabler #4

Employee Development:

delegation of ever more complex decisions can only be successful if employees are given the chance to grow their knowledge and skills with the challenges. Asking employees to go beyond the call of duty (standard job descriptions) requires giving them the opportunity to advance themselves and their careers.

References

Material on industrial excellence draws from:

N. Bilalis, L. N. Van Wassenhove, E. Maravelakis, A. Enders, V. Moustakis and A. Antoniadis. 2006. An analysis of European textile sector competitiveness. *Measuring Business Excellence*, 10 (1):27 - 35.

Material on metrics draws from: Deliverable 2.1 of ESPRIT project 27066 (MEASURES), 1998.