

## Is it *smart* to combine different organisational structure schemes within value-added/complex product industrial companies?



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Mr Sanjeeva Nagmoti describes in the article below<sup>3</sup> 8 common types of organisational structures in project management. The 8 identified types of organisations are:

- Organic/Simple
- Line
- Line & Staff
- Functional
- Divisional
- Project
- Matrix
- Virtual/Network/Modular

I really recommend reading this article that describes, with diagrams, characteristics, advantages and disadvantages of each of those ‘more or less’ elementary types of organizations.

### 1. [When is there a need for hybrid organisations?](#)

In the context of startups and very small companies, organisations are often driven by ‘simple’, line or functional structures. As small companies grow, organisations appear as a function of business requirements but also personality of managers. These structures can allow fast growth but transformation and higher level of structuration is often necessary when the threshold of 30 employees is reached in order to avoid stagnation and significant losses of performance.

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<sup>3</sup> Refer to the link: <https://www.greycampus.com/blog/project-management/common-types-of-organizational-structures-in-project-management>

In the context of industries that design, manufacture and sell added-value products or systems implying technological multidisciplinary know-how, particularly in rather limited quantities such as [10-100], with unit prices in the price range [10 k\$ - 1 M\$], such as defence or aeronautical industry, those types of organisational structures are often mixed in order to adapt to the complexity of product and market. Typical structuration for such mid-cap of big-cap companies is split into 2 levels:

- A corporate level;
- A more operational level.

At corporate level (see Fig. 1), there is often a mix between functional and divisional organization. Functional for finance, human resources, procurement, quality assurance, IT, marketing, legal & compliance. Divisional to take into account different products families and markets, and specific functional and legal entity constraints (general management, local finance, HR business partners, export control, site security...). Optionally, the sales functions can appear at corporate functional level or can be split inside each operational/divisional level if product complexity and customer relation require a bespoke expertise.

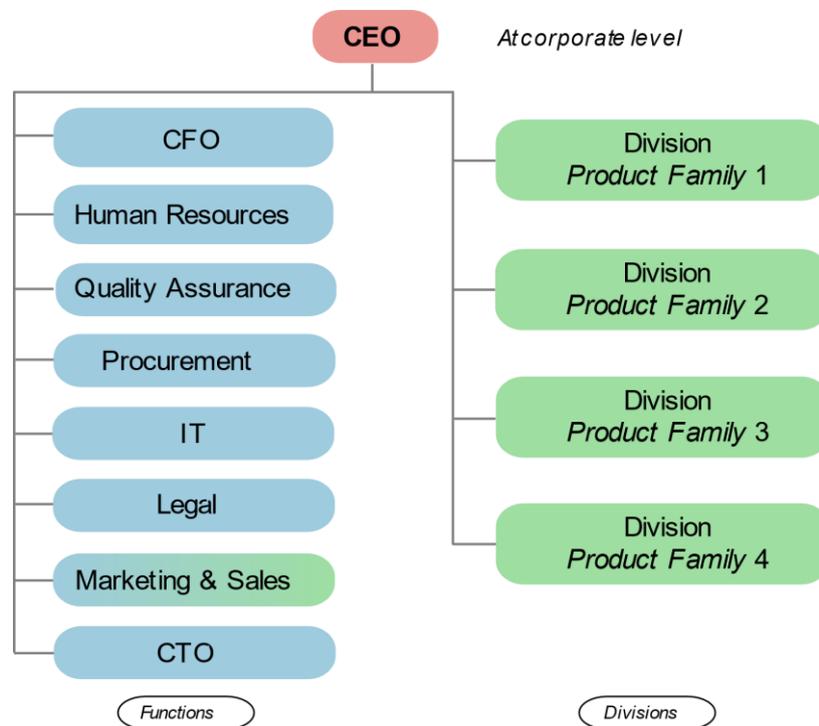


Figure 1: overview of a corporate organization scheme combining functional and divisional structures

At operational level (see Fig. 2), within each division, there is most of the time another mix of organisational schemes: functional delegated representatives are supporting a divisional matrix organization that is combining a project hierarchy (with project leaders and, if needed, program managers as intermediate N+1 of project leaders) with other organisation skill hierarchies that can be distributed to projects according to backlog order requirements and priorities.

- Matrix project axis: if a single client is likely to bring a significant part of yearly revenues, project managers are also playing the role of contract managers, being responsible or accountable to the successful deliveries of solutions incorporating one or several types of products, having to take into account the constraint of customer satisfaction and the constraint of internal profitability;

- **Matrix operational skill axis:** most of the time, they include engineering, industrialization, production and customer support workforces.

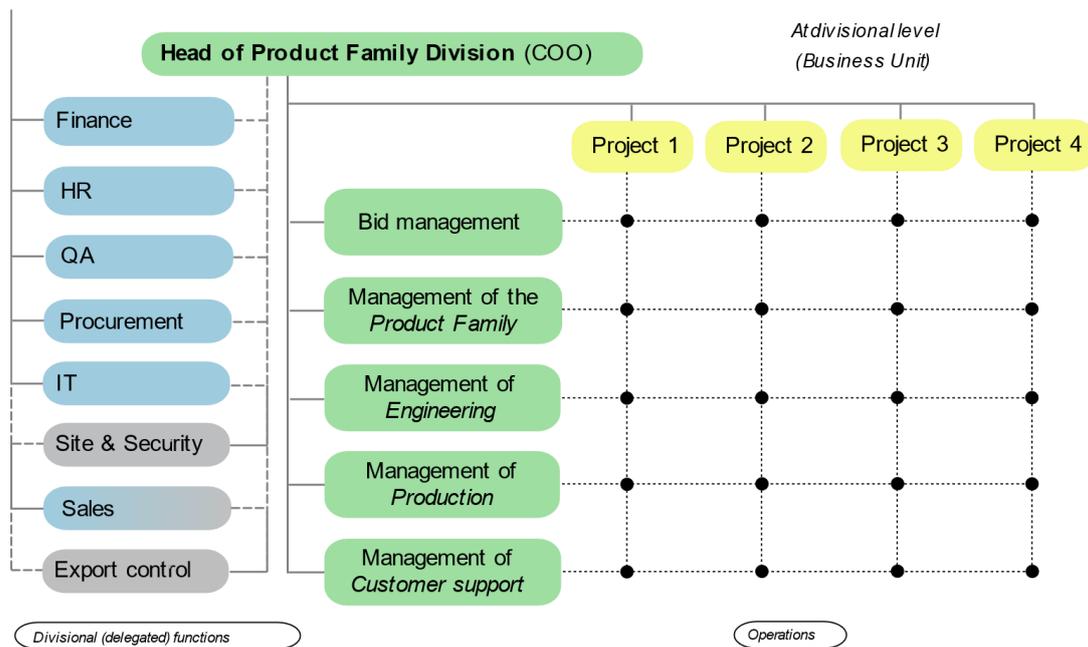


Figure 2: within each division, a matrix organization schemes appears with lines depending on the complexity of the product life cycle management. If this organization is multi-national, this view could be split under the responsibility of several country managers. National legal entity constraints as well as potential hierarchies in the different management lines (project, bid, engineering, production...) are not displayed on this diagram. Dotted lines reflect the potential double reporting constraint that appear for functional representatives. Black bullet points reflect the double reporting constraint within the matrix.

## 2. Harmonization of hybrid organisations and company processes

Additional operational skill lines can sometimes appear in the matrix:

- Within some of the bigger companies, the matrix sometimes incorporates a dedicated *bid management* organisation line with *bid management* experts distributed toward different product tenders in support to sales divisional managers. Otherwise, default is to consider that project managers play directly the role of bid managers when needed;
- On top of that, when the product life cycle becomes long ([3 – 10] years or more), as the quantities to produce increase, and as the customers are likely to require potential customization implying anticipated and regular R&D, the handling of product versions needs to be closely coordinated with sales members as well as technical experts: this favours the building of another matrix line dedicated to the management of products. According to the size of the activities, product management can be temporarily executed inside the project/program organization as for bid management, or a can be driven by a permanent matrix line with dedicated product managers;
- In other cases, when product quantities are lower and unit prices reaches 100 M\$ order of magnitude with high safety and reliability requirements, the role of quality assurance becomes so critical that a dedicated quality assurance manager is allocated 100% of time during each contract;

- Sometimes, particularly when part of software increases within solution development, dedicated virtual organization lines appear taking into account agile digital development methods.

And when several legal units are implied in the same division, a representative director with legal responsibilities appears to cover the sites within each country.

As a result, the risk of such hybrid<sup>4</sup> organisational scheme is to reduce the empowerment of project managers that are dependent on availability of workforces outside their direct collaborators, with potential impacts on customer delivery time.

*It is said that hybrid organizations avoid the disadvantages of both functional teams in a purely hierarchical environment and autonomous project teams in a purely networked environment<sup>5</sup>. Companies with less rigid cultures, many projects, and the need for speed, typically arrive at hybrid solutions<sup>6</sup>.*

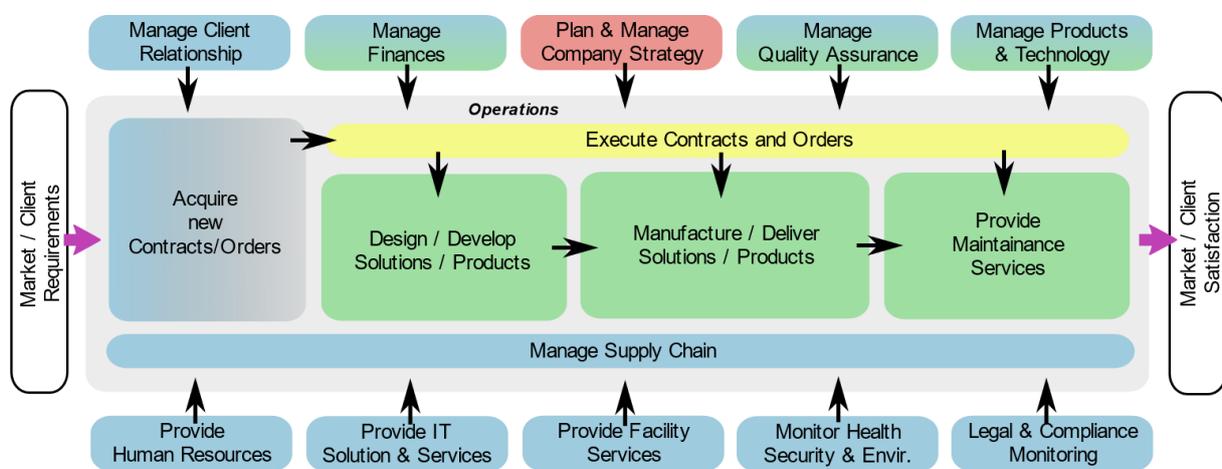


Figure 3: example of overall business process cartography covering planned company tasks. Colours are chosen according to the organisation colour code incorporated in Fig. 1 and Fig. 2: blue for functions, yellow for projects, green for operational skills and red for CEO.

This complexity is the price to pay in order to deliver high added-value and safe products with limited quantities. Due to scenarios of M&A, repositioning, or market growth to be anticipated, big companies also have a trend to regularly (every 2 or 3 years?) modify organisational structures, at high level but also at divisional level. Do these added complexities jeopardize the project management efficiency? Most likely not. Indeed,

- According to middle and top managers, within high-tech industry sectors, switching from divisional-project organisations toward divisional matrix organisations took between 3 to 7 years, in order to stabilize and optimize operational activities. Today, with 10- to 20-year experience, this kind of hybrid organization has reached a good level of robustness;
- The major part of the know-how is not in the organisation but in the processes (see Fig. 3) which is based not only on know-how but also on regulatory constraints. In the aeronautical industry, the certification process is a very severe constraint. In the defence industry,

<sup>4</sup> See J. APPELO, *Management 3.0, Leading Agile Developers, Developing Agile Leaders*, Addison-Wesley, 1<sup>st</sup> ed., Upper Saddle River NJ, p. 302, in the paragraph dedicated to hybrid organisations.

<sup>5</sup> Ibid.

<sup>6</sup> See D. REINERTSEN, *Managing the Design Factory*. New York, Free Press, 1997, p. 106.

management of sensitive or classified constraints is also introducing constraints that will sometimes reduce the flexibility and ability to reduce “silos” between sites and skills;

- And the organisation is actually aimed to support company strategy while facilitating execution of processes taking into account realities of talents, new market trends and different internal and external stakeholders. Thus, ‘Smart organising’ is actually not a specific organisation structure scheme, but a capability to adapt to context and to improve practices: a change towards hybrid structures belongs to this momentum to stick to realities.

### 3. Managing hybrid organisations requires significant care and strict monitoring

However, roles in the different positions of matrix organisation and in the company business processes require significant experience and training. At line management level, one of the true challenges it is therefore to anticipate and pilot different career paths avoiding two opposite strategies at risks:

- Favour mid-term and long-term expertise in roles with the risk to stiffen both employee careers and matrix adaptability in front of new trends and need of transformation emerging from market;
- On the contrary, favour short-term turn-over in matrix roles, particularly for engineering roles, with a risk of competence scattering and product development duration increase due to subsequent unavailability of sufficiently trained workforces.

Hence, we see with this example that, after initial implementation and transformation effort, the management of hybrid organisation requires permanent ‘tuning’ as well as significant orientation activity and costs. Also, as the structure to manage becomes complex, its behaviour may become sensitive to parameter change that would position the “system” outside its comfort zone. A simple example is typically the existence of a minimal staff size for the division that become a ‘critical size’:

- If the division is too small, the major benefits of hybrid structure very quickly turn into resource tensions that propagate into all the dimensions of the matrix;
- Moreover, if one key competence happens to be missing (due to illness, accidents...) or is present without enough redundancy, this weakness in a single point of the matrix has impact in the whole structure with potential resource conflicts or delays of development and deliveries.

This is why the matrix management requires important anticipation, coordination between stakeholders and everyday tuning effort, not only at skill line level and project level, but also at human resource levels, in order to prevent leaving the operational comfort zone. It is here useful to consider a potential analogy with resolution of linear or non-linear systems in matrix algebra used for automatic or signal processing application: due to potential significant ratios between matrix *eigenvalues*, the numerical solving can become instable<sup>7</sup>. In a nutshell, within complex systems, there are stable areas of use with remarkable amplifications and significant benefits: this is where there is a payback of investment toward higher complexity. Nonetheless, outside these stable areas, operations become very quickly instable with greater disadvantages than with more simple systems<sup>8</sup>.

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<sup>7</sup> Such an analogy between human-based complex structures and deterministic algebraic systems has of course some limits. It is good however to keep in mind that, even for a deterministic algebraic model, numerical solving in limited time can fail due to intrinsic ill-posed or instable matrix structure. See for example [https://en.wikipedia.org/wiki/Numerical\\_stability](https://en.wikipedia.org/wiki/Numerical_stability)

<sup>8</sup> The topic of systemic modelling of complex organisations is beyond the scope of this article. The interested reader may refer to: M. Mansouri and A. Mostashari, "A systemic approach to governance in extended enterprise systems," 2010 IEEE International Systems Conference, 2010, pp. 311-316, doi: 10.1109/SYSTEMS.2010.5482432, for an overview of different modelling approaches.

Another systemic analogy can be made in the medical domain between a sick body and a misbehaving complex organisation. In a sick body, a disease symptom does not always designate the illness root cause that can be located in the body far from the painful zone. Within hybrid interconnected organisations, particularly when there are different distant sites within a single division, some stress symptoms appearing on one site can be signs of insufficiently well-defined processes with a root cause originating from another site and aggravating causes in the fact that coordination between sites is too weak. This kind of issue can more particularly appear after *merger or acquisition* if *roles*<sup>9</sup> of newly integrated sites within the matrix are transitorily incompletely executed. Such symptoms can also be acting in a more latent way if long-repressed conflicts have not been solved.

Of course, systemic dysfunctions, sometimes called *organisation pathology*<sup>10</sup>, are not an exclusivity of complex organisations. For hybrid organisations, the effort to operate in the stabilized zone and to coordinate different members, with a bespoke sensitivity to weak signals, becomes paramount.

### Conclusion: what trend for the future of hybrid organisations of high-tech firms?

We also see, within an increasingly digitized world, that there is a trend of rarefaction of critical resources, particularly in sectors involving interdisciplinary hardware and electronics know-how. This evolution has been visible for 20 years through the relative disregard of future engineers towards very 'physical' technical disciplines compared to digital skills. Now, internal availability of such technical competencies remains vital for company innovation capability and intellectual property disruptive development for which only parts should be subcontracted. In addition, with the regularly increased levels of safety and performance requirements, the critical size of a matrix inside a division will most probably have to continue to grow. As a result of these evolutions, there is a good chance that, in the next decade, such companies with hybrid organisations will

- Either have to pursue creations of joint ventures of high-tech parts of their activities, as well as mergers and acquisitions at regional level
- Or to divest portions of their claimed in-house skills and maybe forsake some product activities

in order to maintain agility or improve efficiency of their 'smart organisations'.

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<sup>9</sup> Roles are normally defined in the *Process Management System* of the company.

<sup>10</sup> An interesting overview of *organisation pathology* is: <https://www.linkedin.com/pulse/10-organizational-pathologies-leandro-herrero/>. Systemic pathology is always based on intrinsic collectively unconscious, unsound and energy-consuming behaviours, most of the time out of the field of company registered processes. It is therefore different from some regularly observed lame, vulnerable or rigid conducts that managers have internally identified. It is always desirable to 'cure' organisational pathology because it will bring substantial benefits. Somehow, it is not always appropriate to try to suppress systemic 'claudication' that brings suboptimal results but are not intrinsically risky: most of the time, it needs to be managed and coached with improvement targets.