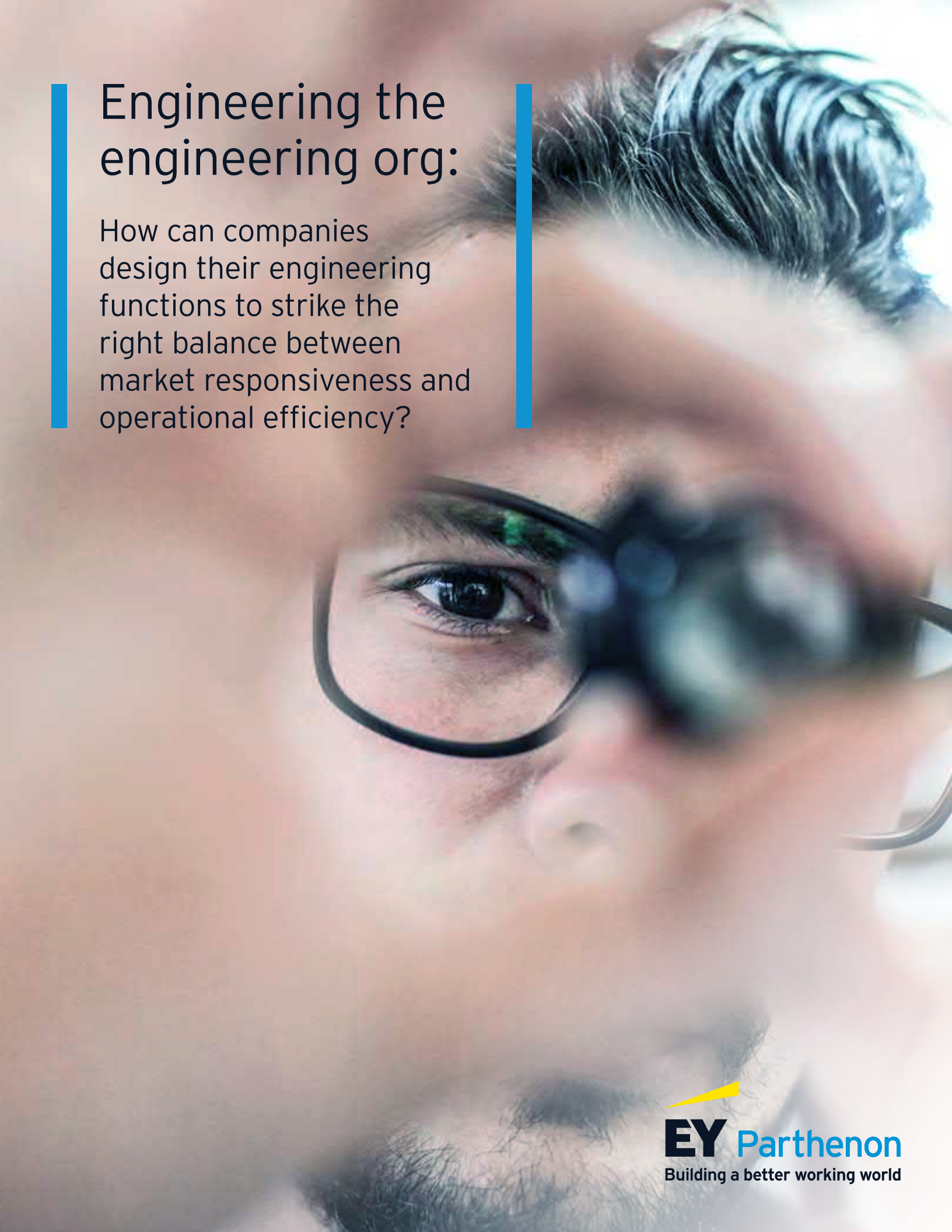


Engineering the engineering org:

How can companies design their engineering functions to strike the right balance between market responsiveness and operational efficiency?

EY Parthenon

Building a better working world

Introduction

Harnessing and optimizing engineering talent is paramount to success in the technology sector, but our experience has shown that there is no single way to accomplish this when it comes to designing an engineering organizational structure. Some structures optimize solution time-to-market, while others optimize operational efficiency. If an organization leans too far in either direction, it risks falling behind competitors in cost structure, innovation or speed-to-market. How can companies design their engineering functions to strike the right balance between market responsiveness and operational efficiency?

It is worth noting that what is right for one company in its current form (stage in the product life cycle, competitive landscape, etc.) may not be right for another or for that same company five years from now. In short, there is no right structure — only the right structure at the right time for a given company.

Know your options

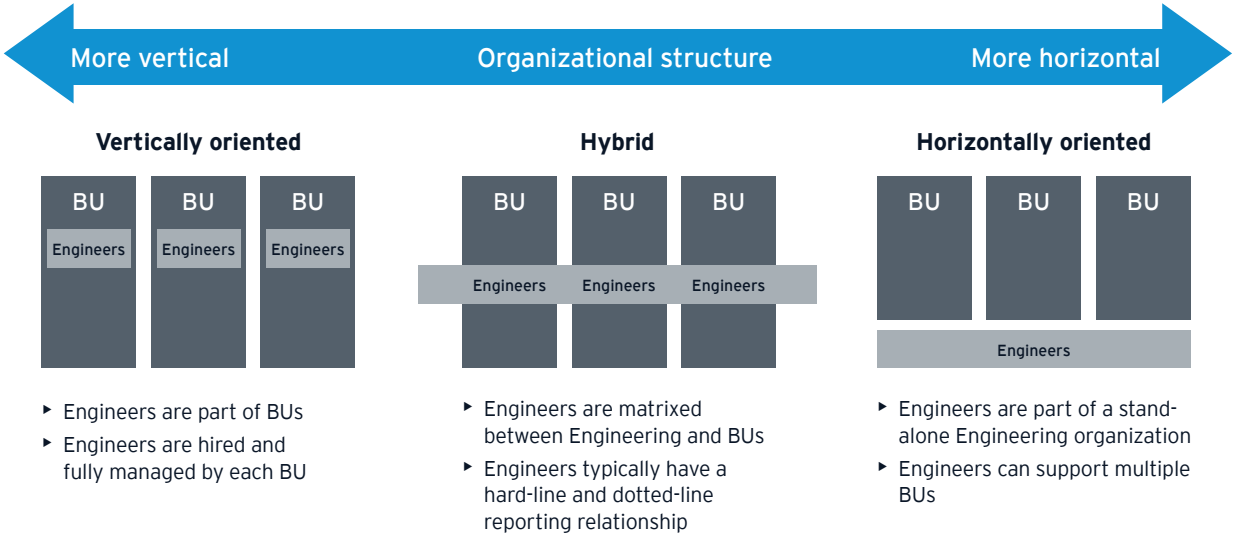
There are a wide variety of options when it comes to engineering organizational structures. For this analysis, we have grouped them into three categories: vertically oriented, horizontally oriented and hybrid.

1. Vertically oriented structure where engineering is part of each business unit (BU)
2. Horizontally oriented structure where engineering is a stand-alone organization
3. Hybrid structures that use hard and dotted lines to matrix engineers between an engineering organization and BUs

To assess where their company lies on this spectrum, executives can ask themselves questions such as:

- Who is responsible for meeting customer demands and anticipating market trends?
- Who owns the product line P&L? Who is responsible for prioritizing engineering investments?
- Who is responsible for attracting, developing and retaining engineering talent?

Figure 1: Engineering organizational structure spectrum



- Engineers are part of BUs
- Engineers are hired and fully managed by each BU

- Engineers are matrixed between Engineering and BUs
- Engineers typically have a hard-line and dotted-line reporting relationship

- Engineers are part of a stand-alone Engineering organization
- Engineers can support multiple BUs

Consider an example

Let's take the semiconductor industry as an example. We analyzed six major US semiconductor companies' engineering organizations and found two to be vertically oriented, one horizontally oriented, and three using a hybrid model.

These companies have used different evolutions to arrive at their current structures (see Figure 3). While some have maintained their structure orientations over the past decade, nearly all have seen some level of reorganization, and half have migrated across our organizational spectrum. All three of the companies that employed hybrid models in 2016 were using a vertically oriented structure 10 years earlier.

Figure 2: Semiconductor industry example – 2016 snapshot

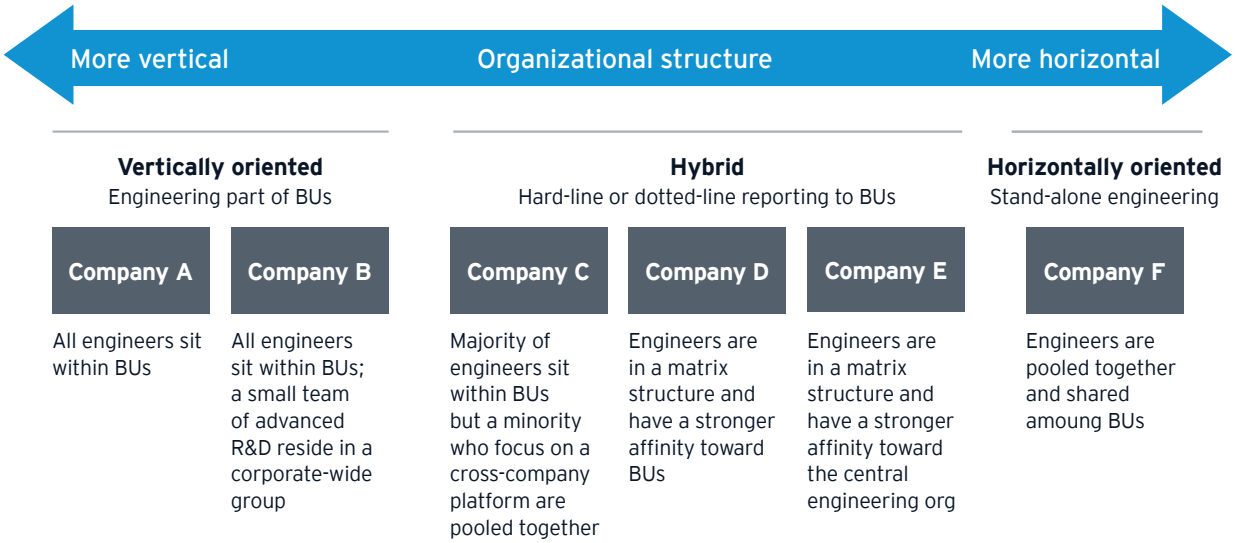
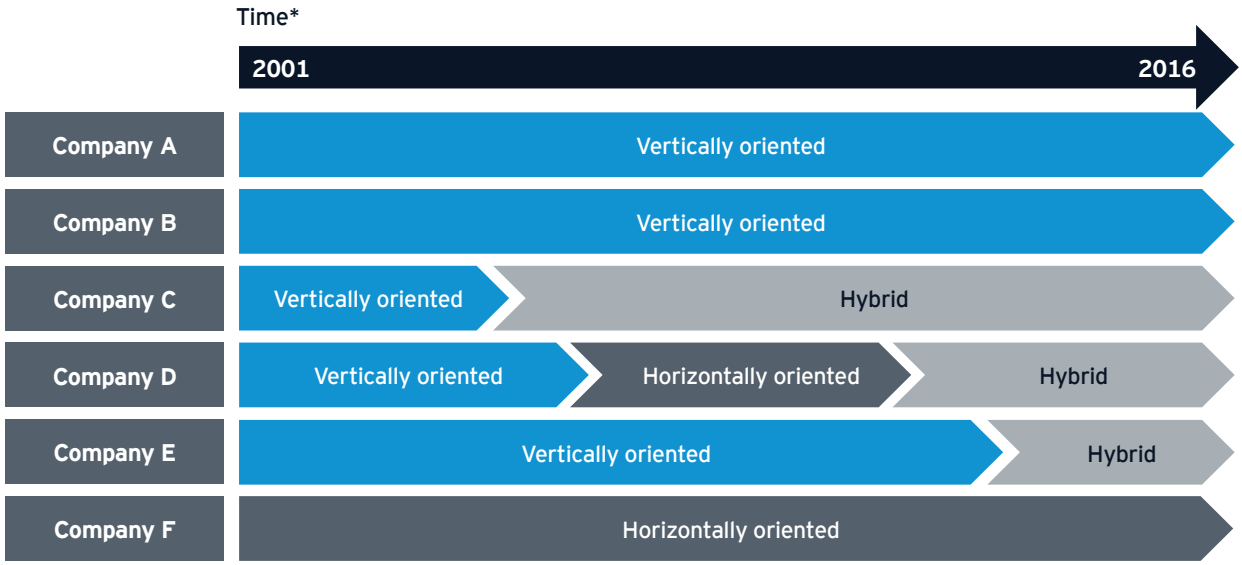


Figure 3: Semiconductor industry organizations – evolution



*Note: Organizational structures are loosely tied to the above timeline

What is the right structure for your company?

To understand the journey from where a company is to where it should be, management should weigh the pros and cons of each of the three organization structure types and understand which situations make a company better suited for one structure versus another.

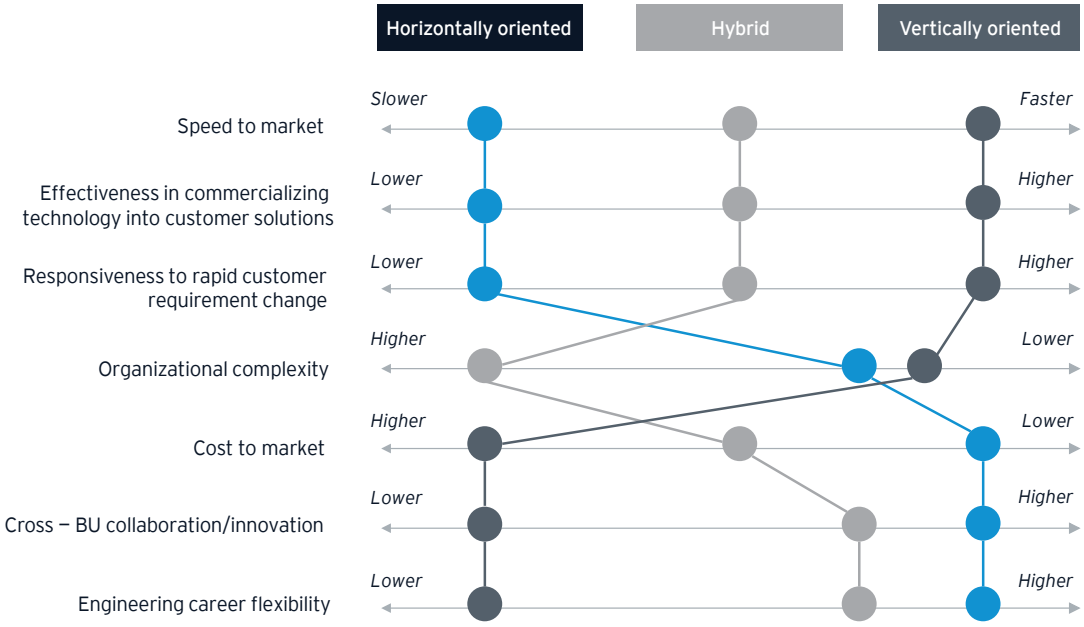
Vertically oriented organizations enable the BUs to determine and develop products independently. This allows companies to shorten time-to-market for customer solutions and respond nimbly to customers with a rapid pace for changing requirements. Placing engineers in product silos, however, reduces collaboration between engineering teams and can lead to duplication of effort or missed opportunities for innovation. Vertically oriented structures tend to work well when market demands evolve quickly or are unpredictable and when there are a smaller number of larger customers with more customized or unique requirements.

Horizontally oriented structures pool the engineers together and deploy talent to meet the needs of the various businesses. This optimizes operational efficiency and helps with managing margins. It can create a headwind, however, when companies look to vertically integrate technologies for specific customers or to perform other real-time changes that can be delayed by lack of control in a horizontal structure. Horizontally oriented structures tend to work well when cost optimization is a top priority, technologies are shared across product lines, market demands are predictable, and there is a need or desire to re-allocate engineering resources between businesses quickly.

Hybrid structures look to attain the best of both worlds though various arrangements. In many cases, hybrid companies assign engineers to the BUs, but maintain a dotted-line relationship back to engineering (or vice versa). Structures can grow in complexity from there. The pros and cons of these structures vary as much as the structures themselves, but generally the benefit is a balance between operational efficiency and speed-to-market. This structure also offers a flexible career path, training and mentorship for engineers while still tying them directly to the performance of the BU. So why doesn't everyone do this? The downside is that the models become complicated, and it can be difficult to assign clear goals and delineate responsibilities to executives, leading to slower decision-making and confusion over who is ultimately responsible for meeting deadlines, achieving financial targets and addressing customer needs. Hybrid structures tend to work well for companies building in scale that want to provide both growth and flexibility to their engineers, as well as for companies where there is established mutual respect between executives in the BUsand engineering organizations.

In short, executives must analyze their company's place on the product maturity curve, degree of competitiveness, pace of product innovation, length of life cycle and mix of other concerns to determine what org structure will best enable them to meet their goals. They should do this periodically to make sure that as their competitive and operating environment changes, so too does their organization.

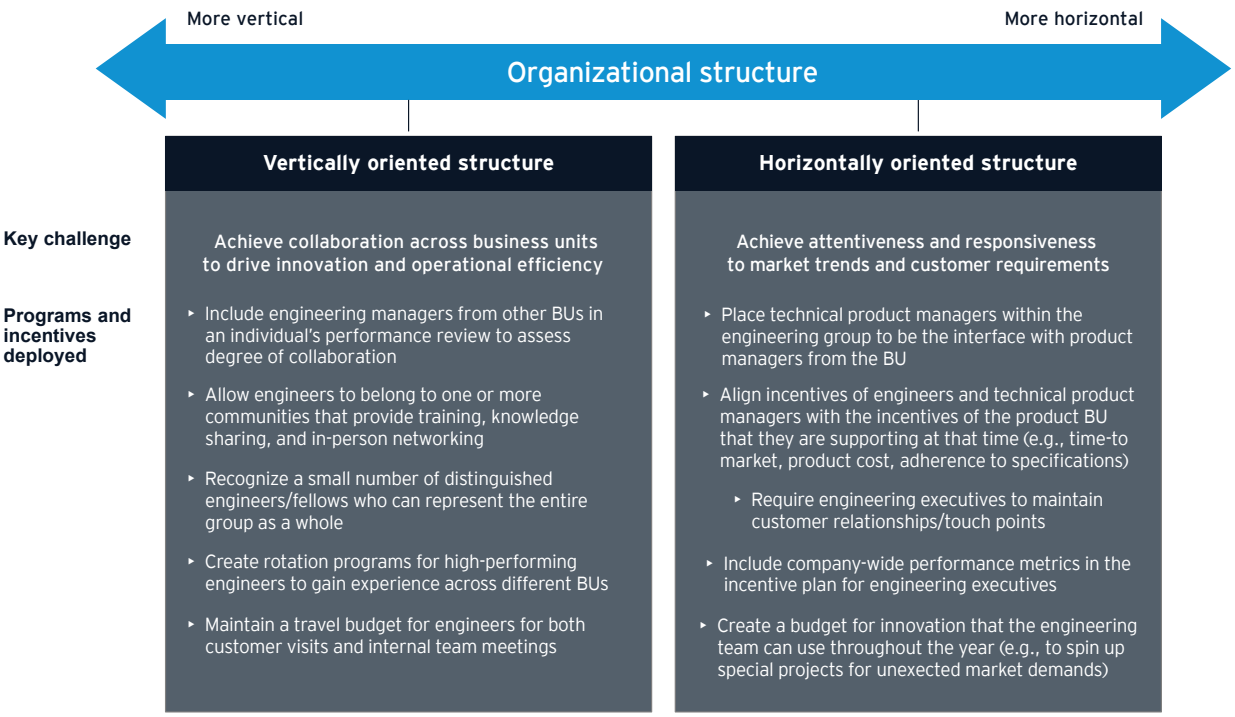
Figure 4: Picking the right structure



Balancing act

Whichever structure a company chooses, it is important to be aware of the inherent limitations and take action to counterbalance them. The figure below demonstrates some leading practices that we've observed for accomplishing these feats.

Figure 5: Programs/incentives to counterbalance limitations of vertical and horizontal organizational structures



In closing

Companies should be aware of the challenges and opportunities presented with different structural options and build engineering organizations to achieve their goals. It is important to recognize that the organizational design is important, but it is not the only factor in determining the success of product engineering. It is just as important to appropriately design the engineering career track, business metrics, executive goals, P&L structure and corporate culture when optimizing the engineering organization.

Contributors

Barak Ravid
Managing Director
Co-head of Technology
EY-Parthenon
Ernst & Young LLP
+1 415 894 8070
barak.ravid@parthenon.ey.com

Spencer Lee
Vice President
EY-Parthenon
Ernst & Young LLP
+1 213 977 5017
spencer.lee1@parthenon.ey.com

Nina Lapachet
Senior Manager
Transaction Advisory Services
Ernst & Young LLP
+1 213 977 7620
nina.lapachet@ey.com

For more information, please visit ey.com/parthenon.

EY | Assurance | Tax | Strategy and Transactions | Consulting

About EY
EY is a global leader in assurance, tax, strategy, transaction and consulting services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. Information about how EY collects and uses personal data and a description of the rights individuals have under data protection legislation are available via ey.com/privacy. For more information about our organization, please visit ey.com.

About EY-Parthenon
EY-Parthenon teams work with clients to navigate complexity by helping them to reimagine their eco-systems, reshape their portfolios and reinvent themselves for a better future. With global connectivity and scale, EY-Parthenon teams focus on Strategy Realized — helping CEOs design and deliver strategies to better manage challenges while maximizing opportunities as they look to transform their businesses. From idea to implementation, EY-Parthenon teams help organizations to build a better working world by fostering long-term value. EY-Parthenon is a brand under which a number of EY member firms across the globe provide strategy consulting services. For more information, please visit ey.com/parthenon.

EYG No. 03995-171Gbl
CSG No. 2005-3491326
ED None

ey.com