

Global Engineering 2.0

March 7, 2018

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What do the likes of GE, 3M, Pepisco, IBM, Boeing, and P&G have in common?

These companies are among the coveted 50 that have been featured in all editions of Fortune 500 (1955-till date). We examined the patterns that are consistent across these companies, and one key factor that emerged clearly was their razor-sharp focus on continuous innovation.

It's no surprise then that innovation is a key corporate agenda and many global companies are spending as much as 15% of their revenues on innovation. Despite innovation being a significant organization priority, a key challenge remains: ensuring that R&D organizations are not flying blind and are structured in line with the company's business goals, given the complex business environment they operate in.

This paper elucidates a systematic approach called '[Global Engineering 2.0](#),' with quantifiable metrics to rebalance R&D organizations while enabling them to focus on disruptive innovations. It talks in detail about (A) Evolving R&D globalization landscape and the driving forces; (B) Global Engineering 2.0 and its importance; (C) A structured approach towards Global Engineering 2.0; and (D) Case study and critical success factors.

A. Evolving R&D Globalization Landscape and the Driving Forces

Zinnov's study on the top 10 R&D spenders from 13 industries shows that MNC R&D presence is continuing to move eastwards. We estimate that by 2020, India and China, in addition to the US West Coast, are going to be the well-entrenched global R&D frontiers.

India, China and West Coast are going to be the global R&D frontiers



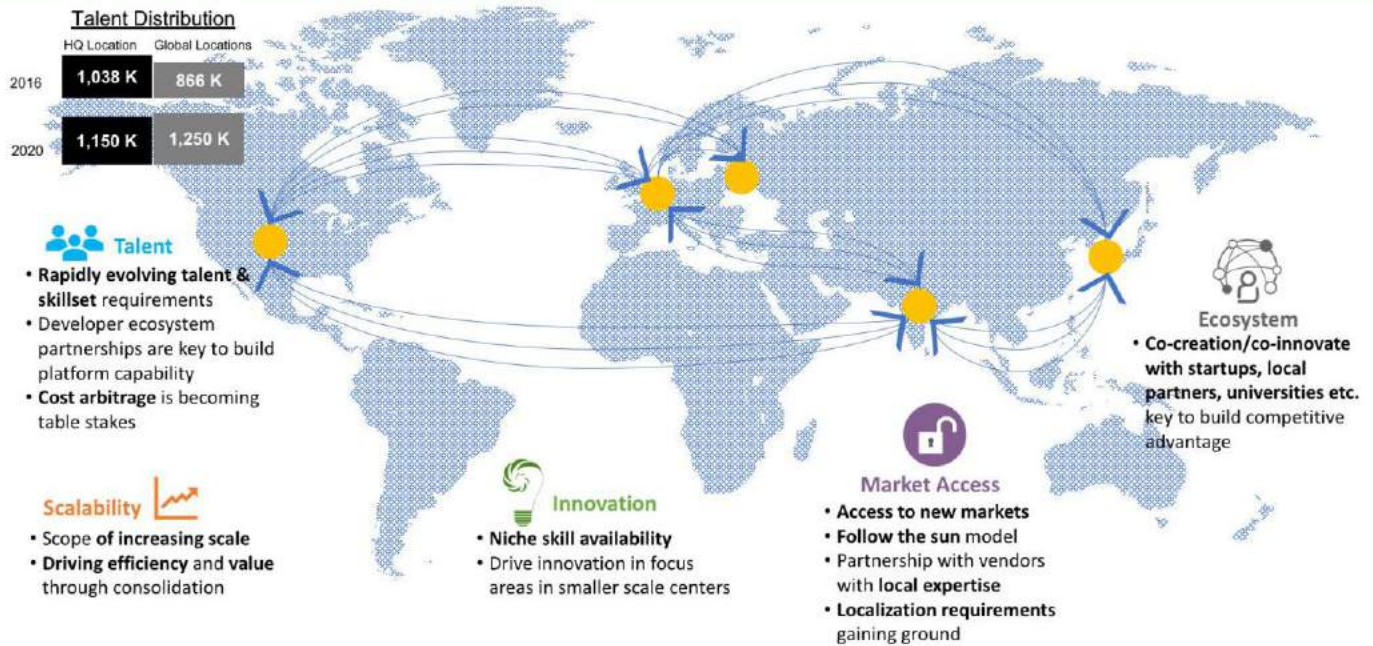
Talent is a key driving force shaping the R&D footprint of MNCs across the globe. By 2020, **R&D talent** working in global locations will outgrow the number in the HQ locations (refer to the above figure). In India alone, the growth in talent would be over 70%, which is much larger than the expected growth in China (45%), Eastern Europe (44%), and the U.S. (41%).

Apart from talent, MNCs are continuously targeting **new customers** to expand their global portfolio. Locations that are aligned with a company's business priorities automatically become attractive destinations for a new center. Companies from major industries such as automotive and healthcare have a major chunk of their revenues coming from non-HQ locations, and as markets evolve, this will proliferate across other verticals.

The impetus to be truly global will also be amplified by the rapidly evolving innovation ecosystems in countries like Israel, China, and India. Large MNCs such as Google, Amazon, and Microsoft have taken the partnership/**acquisition** route to expand their product portfolio and tap into newer market or customer segments. Others such as Bosch, Oracle, and Barclays have set up accelerators to engage with and leverage the lucrative **start-up ecosystem**.

The figure below is an illustration of how different companies are continuously globalizing, based on their needs and desired business outcomes.

Forces shaping up the R&D footprint of MNCs



Because of the continuous shift in global operations, companies will need to revisit their R&D footprint from time to time to stay ahead of the curve.

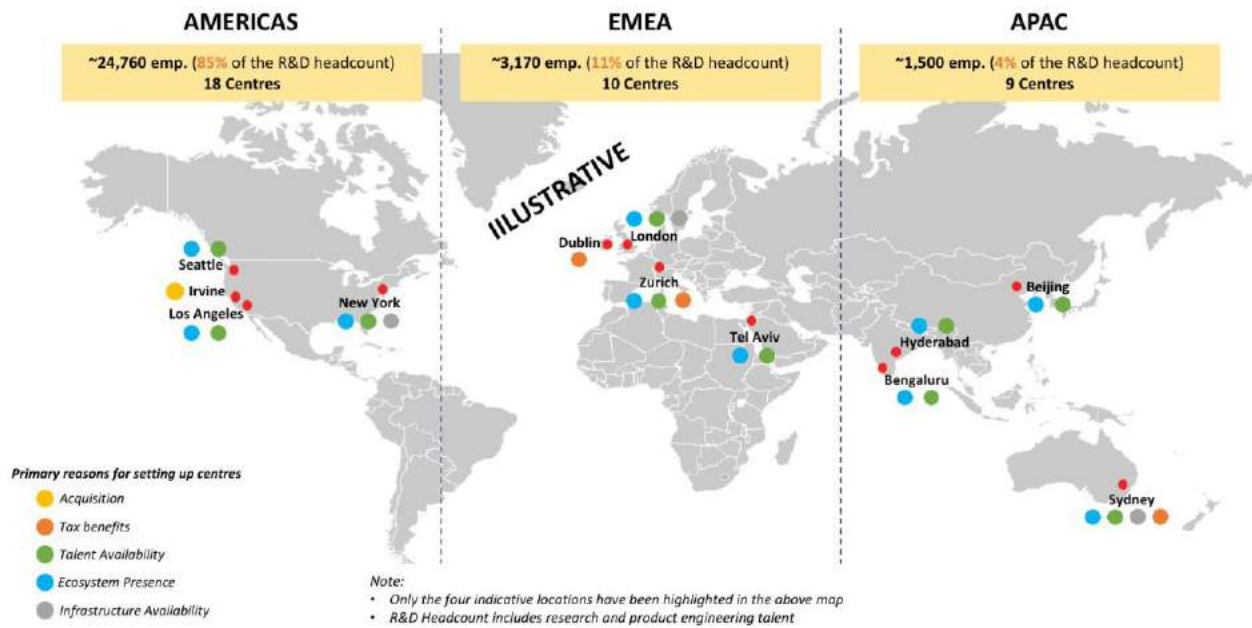
The strategic and systematic approach that enables rebalancing of an organization's existing R&D footprint to support the business objectives while enabling the organization to invest in new areas, is what we, at Zinnov, call 'Global Engineering 2.0'.

B. Why Global Engineering 2.0 is the Need of the Hour

When on a growth spree, companies tend to add resources and infrastructure to address immediate needs at hand. Some growth is opportunistic, and some are outcomes of decisions taken around M&A, outsourcing, etc. Effects of these decisions in many instances have forced not just large companies, but several late-stage start-ups and sub-billion revenue companies as well, to ride on the wave of globalization.

Let us consider a typical case of a company that, because of one or more of these growth drivers, a mix of acquisitions, talent, new markets, and favorable innovation ecosystems, has globalized its R&D to over 10 countries in 18 years.

A High-tech company's R&D Footprint (Illustrative)



A resultant outcome is a scattered R&D footprint across the globe, without a holistic approach to the business objectives, most likely leading to operational issues and strategic challenges. As expansion becomes larger, it is increasingly difficult for the mothership to give equal amounts of attention to all its offshore centers. Our conversations with CXOs of large companies have brought out the following operational issues and strategic challenges faced by them to the top.

Structure

- Matrix reporting structure between the different engineering teams create management conflicts
- Distribution of projects across various sites increase complexity of communication between teams
- Sites lack charter and persona

Governance

- Lack of empowerment of global teams reduce their ability to make decisions
- Lack of clear metrics to measure productivity and value from these centers create perception issues

Talent

- Some of the emerging locations lack deeper technical skills
- Difficult for smaller companies to build brand in emerging locations
- Growth expectations of talent is different in emerging locations compared to mature locations

Innovation

- Lack of access to customers reduces the capability of teams to build new products
- Most teams spend more time on managing existing portfolio of products
- Lack of product management structure across engineering locations
- Lack of structured programs to support innovation

Leadership

- Mercenary leadership – short term leaders at global locations
- Early career glass ceiling for engineering middle managers

Process and Support

- Structural nuances required to successfully execute distributed agile engagements
- Support organizations (HR, Finance, and Legal) lack maturity and exposure to manage global centers effectively

As a result, very often, CXOs find themselves in situations where they are confronted with strategic questions around a global center's efficiency and efficacy, including:




- *Does the global center have clearly articulated outlook, business goals, and objectives?*
- *Is the product portfolio optimally mapped to the global locations to innovate faster, cheaper, and better?*
- *What are the skillset gaps and how to bridge them by leveraging global locations?*
- *How mature is the R&D in the global centers and what is the level of ownership?*
- *How tuned are global R&D centers to achieve the innovation objectives of the company?*
- *How can the global R&D centers be leveraged for local market insights in growth locations?*
- *How to manage the outsourced portfolio to create the right balance between innovation and efficiency goals?*

With more and more companies at this juncture in their journey, it has become imperative to find a way to address these questions. After a rigorous process of understanding both the depth and breadth of the problem, Zinnov has developed 'Global Engineering 2.0'. An approach through which global R&D companies can assess their existing portfolio and identify, or carve out opportunities to rebalance their R&D organization to accelerate business objectives. A desired intent is to enable the organization to focus on disruptive innovations, supported by strong local leverage.

C. How Companies Approach Global Engineering 2.0 In A Structured Way

Based on insights and extensive experience of working with CXOs of G500 companies (top 500 global R&D spenders), we have identified that there are primarily 3 approaches to drive successful Global Engineering 2.0 outcomes:

Potential Approaches to Global Engineering 2.0

 Emerging Location Maturity Approach	 Product Roadmap Approach	 Optimal Cost Structure Approach
<p>Criteria</p> <p>Based on:</p> <ul style="list-style-type: none"> - Level of engineering maturity at the emerging locations - Global leadership, ownership and accountability 	<p>About Approach</p> <p>Based on:</p> <ul style="list-style-type: none"> - Roadmap defined for product families - Presence in emerging locations 	<p>About Approach</p> <p>Based on:</p> <ul style="list-style-type: none"> - Revenue contribution - Cost structure of the team
<p>Advantages</p> <p>Helps with sustained success for the company with global maturity and ownership. Ability to hire top talent.</p>	<p>Advantages</p> <p>Helps in optimizing teams for products which are in sustenance mode and reduce costs</p>	<p>Advantages</p> <p>Helps every team achieve an optimal cost structure for the revenue that they deliver</p>
<p>Limitations</p> <p>Need the right level trust and collaboration and engineering process maturity to make this successful.</p>	<p>Limitations</p> <p>May result in the portfolio for emerging locations to be heavy on sustenance products and hence less attractive</p>	<p>Limitations</p> <p>Focus on investments in incubation and new products needs to be ensured. Sales opportunities should not get compromised because of optimization in cost structure</p>

Each of the approaches can be modified and applied to various business contexts and organization situations. The above visual provides the criteria, advantages, and limitations of each approach. The '**Emerging Location Maturity**' approach involves assessing the current maturity level of each product in *emerging* and *established* locations, and clearly demarcating the accountability and ownership of products at these locations. The '**Product Roadmap Approach**' allows the company to deliberate and decide which products it wants to modernize vs. optimize, in the near future. The '**Optimal Cost Structure**' approach involves evaluating the revenue contribution against cost of teams at each location.

Our focus in this whitepaper will be on the '**Emerging Location Maturity**' approach. This approach, if executed strategically, backed by standardized and scalable engineering processes, can help a company set up and operate highly matured global centers across all significant engineering locations.

Emerging Location Maturity approach

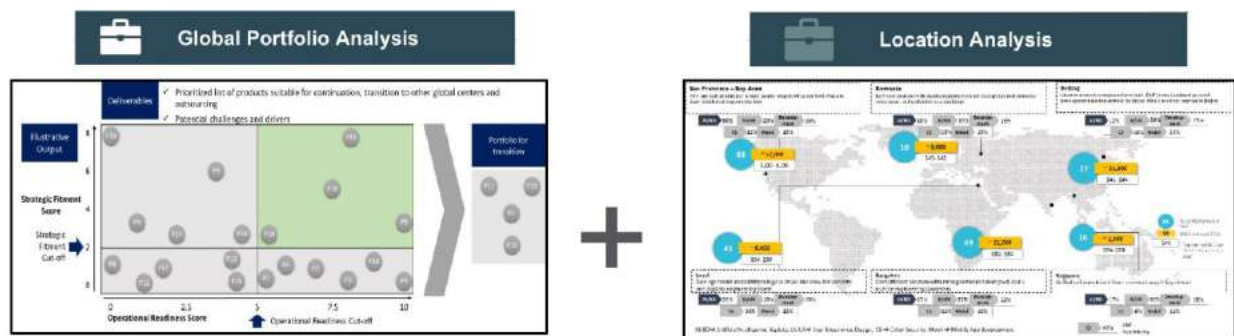
This inherent advantage of this approach is that it helps organizations restructure their global engineering footprint by enabling them to classify activities into two main areas: a) **Emerging locations (Evolving)** that are focused on headcount growth and maturity transformation, and b) **Established locations (Sustain and Optimize)** that are focused on driving thought leadership and customer connect from these locations. The benefits of the approach are to:

- Drive greater engineering collaboration;
- Empower teams with higher product ownership;
- Improve agility to drive higher innovations;
- Create engineering efficiency and optimization;
- Leverage the local ecosystem.

To define the as-is and to-be state of **Emerging Location Maturity approach** as part of Global Engineering 2.0, there are two key steps as illustrated in the illustration below. These are briefly described below:

(i) **Global Product Portfolio Analysis:** A methodical analysis of all product groups in the company to devise the optimal portfolio structure to be retained vs transitioned to other centers.

(ii) **Location Persona and Global Center Assessment:** To arrive at an understanding of talent hotspots and rebalancing the organization to enable a strong growth trajectory.



- Restructure portfolio for emerging and established locations based on:
 - Optimization potential in as-is state: team structure in distributed development scenarios, under-utilized tools/assets, sub-optimal ownership in emerging locations
 - Product complexity: Level of complexity based on customer proximity, business criticality, technology/infrastructure dependency etc
 - Product roadmap and impact on customers/partners because of transition
 - Transition readiness and time/investment needed for successful transition (KT/Travel/Branding in new location etc.)

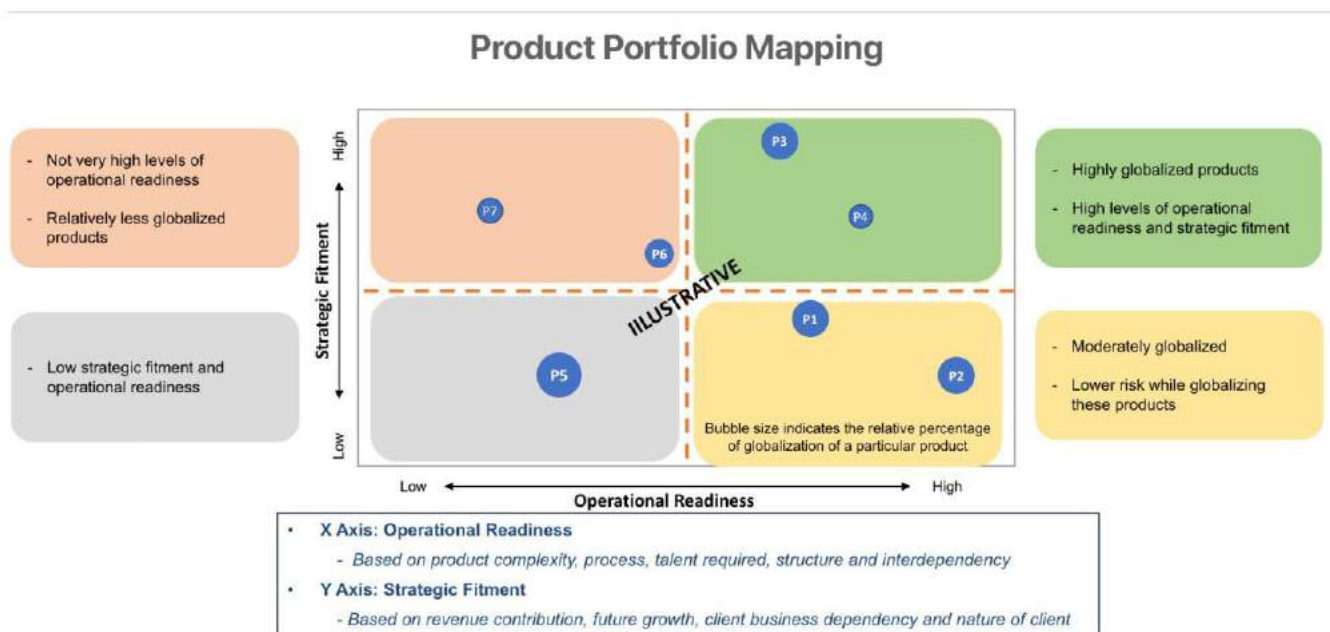
- Consolidated location footprint for R&D based on:
 - Current dependency of the location in terms of presence of critical resources, senior talent, customer/market connect
 - Skill availability in emerging locations
 - Growth potential in terms of talent availability and cost

(i) Global Product Portfolio Analysis

The Product Portfolio Analysis is based on a framework-driven approach that helps companies arrive at a clear and comprehensive understanding of how their products are placed across two dimensions: (i) **Strategic Fitment** and (ii) **Operational Readiness**. This analysis allows companies to make more informed and logical decisions, in effect setting up a rebalancing strategy geared towards success. The information obtained from this analysis will be key in implementing various Global Engineering 2.0 initiatives successfully.

The illustration below shows an organization's products mapped using the two parameters discussed above. Operational Readiness is mapped based on product complexity, process, talent required, structure, and interdependency. On the other hand, Strategic Fitment is mapped based on revenue contribution, future growth, client business dependency, and nature

of client. The size of the bubble is illustrative of the percentage of current globalization for that product, i.e., the percentage of product development that is being developed at global locations (outside of HQ).



The Outcomes That Will Matter

- A holistic view to assess which products should be globalized, relative to the current state;
- Rebalancing of the R&D organization which involves clearly defining roles and responsibilities at all levels and optimally designing leadership structure at all centers to align with parent organization;
- Automation and standardization initiatives to achieve reduced dependency on people, cost reduction, improved compliance, shorter time to market, and better governance.

(ii) Location Persona and Global Center Assessment

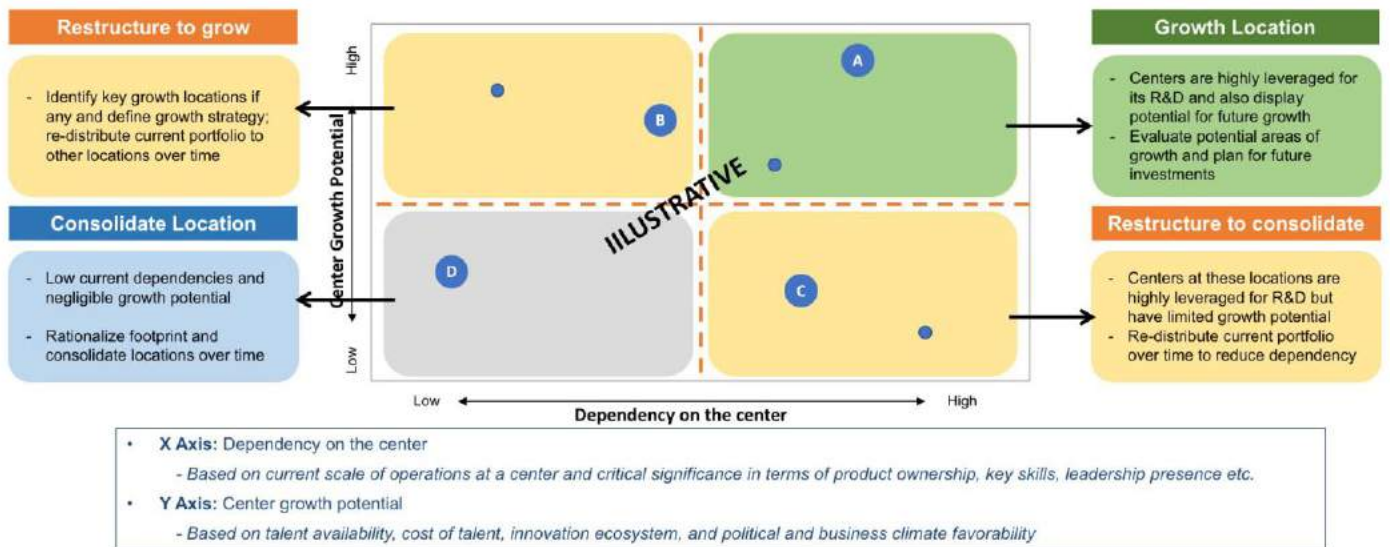
After a thorough evaluation of the products, the next step is to analyze all global locations based on: (i) **Dependency** on that location and (ii) **Growth potential** of that location, factoring in one of the following criteria:

- Growth
- Restructuring to grow (top left quadrant)
- Restructuring to consolidate (bottom right quadrant)
- Consolidation

This assessment has another positive fall out, where companies identify new locations where the company can establish centers.

Over the years, we have studied the MNC GIC landscape and have evaluated companies based on the future growth outlook. A product company's assessment is illustrated below.

Location Persona and Global Center Assessment



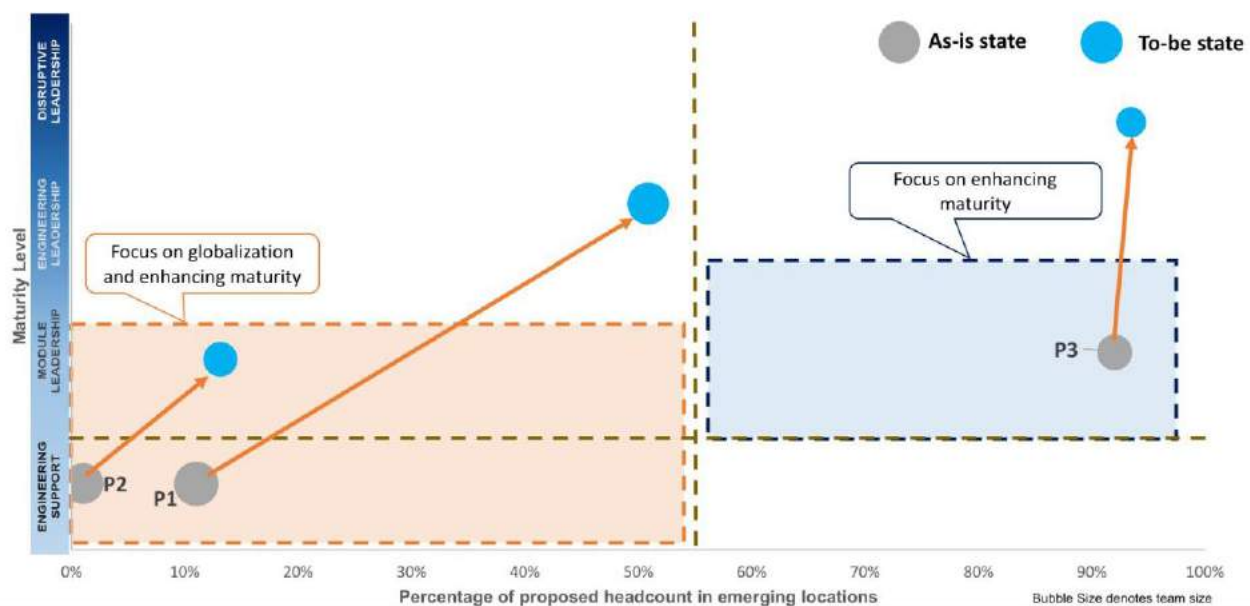
A key factor that makes the model is a mathematical approach that is used to assign quantitative values to the different parameters that determine the dependency on and growth potential of any global location. Case in point is an example of Center C. Today, this center has availability of niche skills and a strong market presence in the region that it is located. In order to sustain its competitive advantage, this center has well defined and mature processes as well as the presence of a strategic team with critical leadership to drive growth. This has led to a high level of dependency on this center from both HQ locations and other centers. We recommend redistribution of the current portfolio to reduce dependency.

The Outcomes That Will Matter

- Companies will get a clear picture in terms of which centers to grow, restructure or consolidate;
- It also allows companies to assess if they need a new center at a location;
- It will help them better gauge whether a center has been able to utilize the potential of a location and accordingly consider restructure the business model of that center.

Using the above approach, a clear understanding of the as-is and to-be states can be designed to represent the Global Engineering 2.0 Architecture plan:

Emerging Location Maturity Approach



To understand the thought process for designing the to-be state, we have taken a few examples of Product teams identified for transition.

P1: Only 10% of the product teams are in an emerging location, but it is a small team that is operating at a very low level of maturity. This means the team has very low level of ownership in this location, with all decisions being taken by the teams elsewhere. Depending on the outcome of Product Portfolio and Location Persona assessments, if P1 is a strategically important product for the organization and there are relevant skills available in that emerging location, the organization should make an informed decision to increase the maturity of this product team in emerging locations to 'engineering leadership,' while also globalizing the product teams.

P2: The entire product team for P2 is based out of the established location. The decision to be made here is whether there is a reason for the whole team to work from an established location, and will it be possible for this product team in an emerging location to have high maturity. If the latter holds true, the company can choose to globalize the product and this globalized team can operate at module leadership, with design and architecture decisions based in established locations.

P3: The team is almost completely globalized and the globalized team in the emerging location is operating at a maturity level of module leadership. Thus, there is room to improve the maturity level and the company decides to aim at a 'disruptive leadership' maturity for this team in emerging location and 100% team in the emerging location. The focus here is to define measures to give the team in emerging location more ownership, having senior product leaders at the emerging location, knowledge transition to enable product architecture and technology ownership.

Thus, by engaging in a similar in-depth analysis for each product team, a clear picture of 'as is' and 'to be' states are arrived at. Organizations can hence redesign their R&D globalization footprint to drive higher innovation by empowering teams at emerging locations on one hand, while freeing up bandwidth at the established location to invest in new areas on the other. Thus, it helps in increasing the overall efficiency and innovation quotient of the R&D organization.

The case study described in the next section elucidates how the above approach was implemented for a global software organization. The case study also highlights the critical success factors needed to successfully drive organization-wide transformation through Global Engineering 2.0.

D. Case study

Case study of how Zinnov has helped other organizations:

A mid-sized software product company which has grown through acquisition of products was operating in a highly distributed fashion with R&D operations in 20 plus countries. The talent was highly globalized based on locations of the companies/teams acquired.

Challenges Identified:

- **Highly distributed workforce**, since most acquired teams were retained making it challenging to collaborate
- **Knowledge silos created**, due to same set of people working on a specific product for a long time, and moreover, products spread across different technologies, customers, and geographies making knowledge-sharing and succession planning very difficult
- **Inconsistent engineering processes**, since the teams continued to follow legacy development methodology through the product lifecycle making it difficult to drive productivity
- **Low center maturity**, as global support teams were operating with lack of ownership and had high dependency on partner teams for guidance; thereby, the global talent was underleveraged, impacting the growth potential

Zinnov redrafted the company's globalization landscape by using a structured approach as defined in this section and optimized productivity while leveraging global talent by implementing the following initiatives:

- **Identified global engineering hubs** to drive and own technology while supporting spokes to achieve the same. Some centers were consolidated after center assessment
- **Implemented mechanisms for succession planning**
- **Automated and standardized processes** to reduce cost, time to market, and dependency on people while improving compliance and creating a better governance model
- **Created maturity transformation strategy** to ensure they lead product engineering

Benefits:

- Recommended to consolidate global R&D location footprint by 50%
- Recommended to build strong and influential leaders in global locations to drive ownership as less than 5% leadership based out of global locations was managing more than 50% of workforce
- Recommended to drive automation and standardization initiative. By doing this, the company could reduce the varied number of tools used across global locations and realize more than 15% savings in testing and release effort
- Recommended to set up centers of excellences to create talent pipeline and engage in cutting-edge work

Zinnov's vast experience of working with the G500 companies shows that they need to premeditate a few **critical success factors** and take measures to manage them adequately:

- **A well-defined outlook** that is aligned with central strategic business goals;
- **Strong transition strategy** covering the center charter and governance strategy;
- **Optimally designed leadership**, including clear roles and responsibilities of global leaders;
- **Change management** that helps manage the impact on products, customers, employees, and vendor relationships;
- **Communication with stakeholders**, ensuring timely and well-planned communication to minimize the impact on business continuity, relationships, and company brand.

E. Summary and Key Takeaways from this paper

- Multiple driving forces such as talent, new customers, acquisitions are shaping the R&D footprint of global corporations. As a result of the continuous shift in global operations, companies will need to revisit their R&D footprint from time to time to stay ahead of the curve.
- The strategic and systematic approach that enables rebalancing of an organization's existing R&D footprint to support the business objectives while enabling the organization to invest in new areas, is what we, at Zinnov, call 'Global Engineering 2.0'.
- There are primarily 3 key approaches to Global Engineering 2.0 that include **Emerging Location Maturity** approach, **Product Roadmap** approach, and **Optimal Cost Structure**. The Emerging Location Maturity approach uses a 2-step methodology to design the as-is and to-be states of the Global Engineering 2.0 architecture that includes –
 - **Global Product Portfolio Analysis**: A methodical analysis of all product groups in the company to devise the optimal portfolio to be retained vs. transition to other centers
 - **Location Persona and Global Center Assessment**: To arrive at an understanding of talent hotspots and rebalancing the organization for the future
- Clear transition strategy, optimal leadership structure, and well-planned communication and change management are necessary to successfully transform operations through Global Engineering 2.0 approach.

Siddharth Jhawar – Consultant & Zayer Wadood – Associate Consultant have contributed to this whitepaper.