IT - ITeS SSC
NASSCOM

IT-ITeS Sector Skills Council NASSCOM
4E, Vandana Building (4th Floor)
11, Tolstoy Marg, Connaught Place
New Delhi 110 001, India
T 91 11 4151 9230 F 91 11 4151 9240
ssc@nasscom.in
www.nasscom.in

N·S·D·C
National
Skill Development
Corporation

IT - ITeS SSC
NASSCOM

Occupational Analysis

Software Products

Occupational Analysis

Software Products

N · S · D · C
National
Skill Development
Corporation

IT - ITeS SSC
NASSCOM

Foreword

2013 is an important year for the Indian IT-BPM Industry as global markets struggle to emerge from their economic instabilities and environmental challenges. The situation, though challenging, also presents new opportunities to tap for the Indian IT-BPM Industry. One of the key imperatives for the industry is to continuously seek and develop the 'right' talent to drive its growth.

As per the National Skills Mission, 500 million professionals would need to be skilled by 2022 to make them employable. The Indian IT–BPM Industry currently employs about 3 million people directly and about 9 million indirectly. As per the *NASSCOM Perspective 2020* report, the industry has a potential to contribute to, as much as, 30 million employment opportunities (direct and indirect) by 2020.

The need is to focus on developing ready-to-deploy talent by laying standards for skill requirements in the IT-BPM Industry. These requirements merit defining consistent standards of performance and quality and standardising recruitment procedures. With this in mind, NASSCOM has come up with the Occupational Analysis report for the IT-BPM Industry.

Occupational Analysis report identifies job roles across the IT-BPM industry at the Entry, Middle and Leadership levels. Career Paths for entry-level job roles have been identified for the benefit of the students and academia to facilitate the clear understanding of the career opportunities provided by the industry. Several case studies of successful people have been included to make careers in our industry more attractive.

This Occupational Analysis report is one of the ways in which NASSCOM aims to streamline job roles across the IT–BPM industry and is the first step in the development of Occupational Standards for the industry.

We reaffirm our commitment to facilitate the growth of the industry and trust you will find the report useful.

Som Mittal
President

Acknowledgements

We would like to thank the entire NASSCOM Leadership: Mr Som Mittal, President; Mr Lakshmi Narayanan, Chairman, IT-BPM Sector Skills Council NASSCOM and CEO Cognizant; Ms Sangeeta Gupta, Sr VP; KS Vishwanathan, VP and Head of Industry Relations; Ameet Nivsarkar, VP; Rajiv Vaishnav, VP; Rama Vedashree, VP, for their strategic leadership and support to this important project.

We would like to particularly thank Dr Sandhya Chintala, Executive Director, IT-ITeS Sector Skills Council NASSCOM, VP NASSCOM for her invaluable Leadership and guidance throughout the project.

We are grateful to the officers of Ministry of HRD (MHRD), Ministry of Communications and Information Technology, Ministry of Labor and Employment (MoLE), Prime Minister's Office (PMO), and National Skills Development Corporation (NSDC), for willingly providing us with relevant information and support required for this report.

We are grateful to the members of the Project Board, namely, Mr Srikantan Moorthy-Infosys, Mr Kothandaraman Karunagaran-CSC, Mr Sameer Kohli-CSC, Mr Manjunatha Hebbar-HCL, Mr Vidyut Navelkar-TCS, Mr Arjun R-HCL, and Mr Anil Menon-IBM, for their continued support.

We want to acknowledge the continuous support received from other members of SSC NASSCOM team and NASSCOM Research Team, providing us with guidance on undertaking the quantitative and qualitative research required for this report.

We would also like to thank all NASSCOM member organisations that provided inputs for the preparation of this report. We are thankful to the teams of Accenture for carrying out this research work and putting together this document.

Table of Contents

EXECUTIVE SUMMARY

- Executive Summary
- Summary of Occupations Within Each Sub-sector

Executive Summary

The IT-BPM industry has received global recognition as the growth engine for India and the sectors it services across the world. It has established itself as a pioneer with the range of services it offers, the global customer base it serves and the numerous employment opportunities it has provided to the workforce in India.

As per NASSCOM's **Strategic Review 2013**, the industry aggregated revenues exceeding USD 108 billion and employed more than 3 million people. The industry accounts for almost 25 percent of the total exports and 11 percent of the total service revenues. In order to drive the acquisition of right talent and to ensure the development of an employable workforce for the industry, IT-ITeS Sector Skills Council NASSCOM (SSC NASSCOM) has taken up an initiative to develop Occupational Standards (OS) for all Entry-level (unique) job roles in the IT-BPM Industry. These OS are being developed in close association with the key member companies in the IT-BPM Industry. In the long term, they will provide a foundation for the skill development training and certification programmes.

There are four sub-sectors within the IT-BPM Industry. The sub-sectors are:

- IT Services (ITS)
- Business Process Management (BPM)
- Engineering and R&D (ER&D)
- Software Products (SPD)

The current report shall focus on the SPD sub-sector within the IT-BPM industry.

Occupational Analysis (OA) is the first step in the development of the OS for any industry or sector. It entails an industry scan and a process of identifying different occupations in the various sub-sectors.

Objective

The objective of this document is to describe the main features and characteristics of an occupation, within the IT-BPM industry, specifically the SPD sub-sector. It provides a high-level overview of an occupation in terms of the types of job roles that exist, workforce characteristics, key talent trends and a review of available education and training. OA, therefore, provides information on the opportunities that exist for progression through a career in a specific occupation.

The OA for the IT–BPM industry contributes to the context and background for the development of the OS for the SPD sub-sector.

Structure of the Occupational Analysis Report

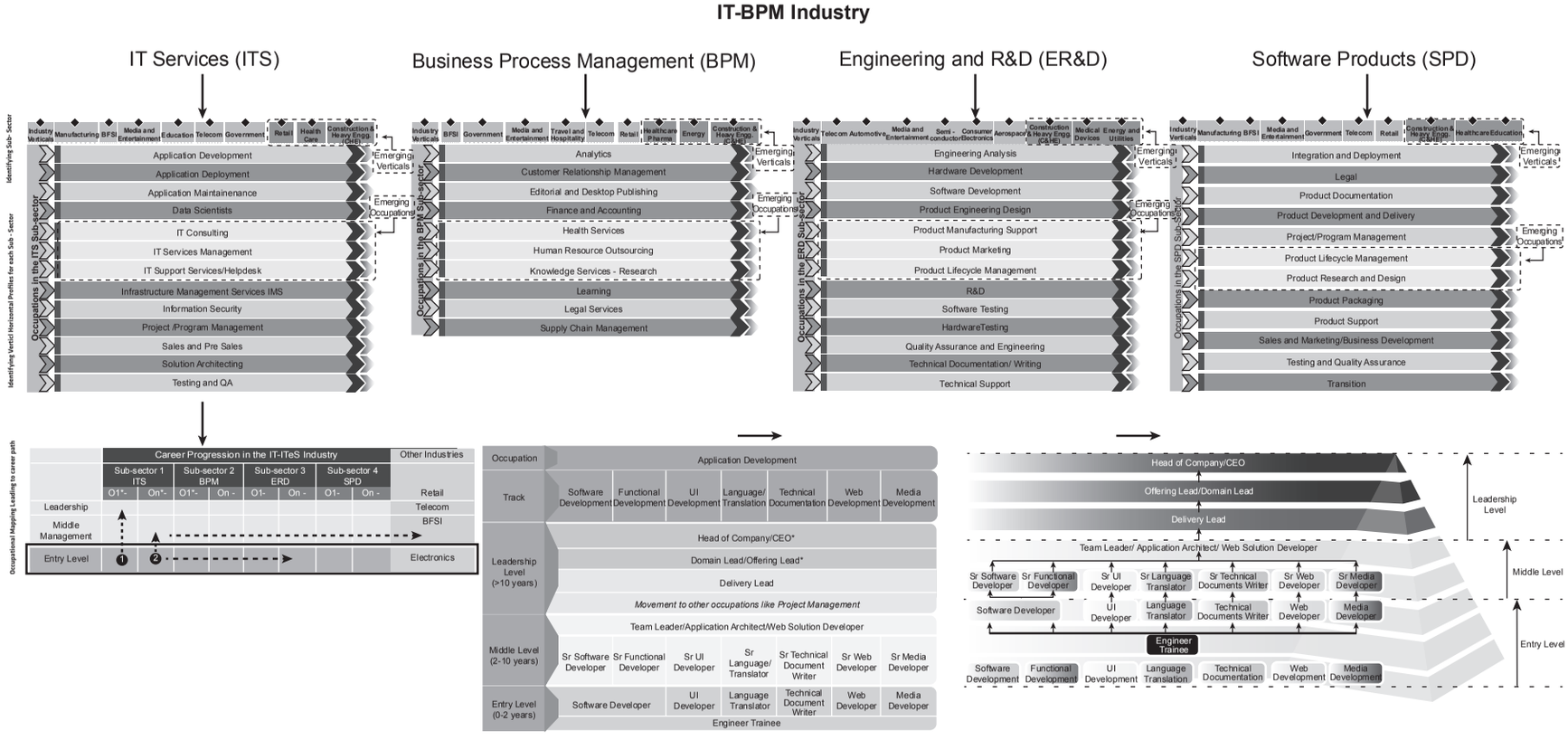
This report consists of the following sections:

- **Background to the Project:** A brief description of the National Skills Mission, Sector Skills Councils and their objectives leading to the process of the development of the OS is given in this section
- **About the IT-BPM Industry:** This section covers the structure of the IT-BPM Industry in terms of the types of organisations within the ecosystem
- **Occupational Mapping and Career Paths for the SPD sub-sector**

The SPD sub-sector is structured in the following chapters

- **Chapter 1: About the sub-sector:** A brief description of the structure, evolution and profile of the sub-sector is given in this chapter. It covers information on the size of the sub-sector, the workforce employed therein, and so on.
- **Chapter 2: Talent trends within the sub-sector:** This chapter provides an overview of the key drivers of change that have an influence on the workforce and talent within the sub-sector
- **Chapter 3: Entry-level roles – SPD:** This chapter provides an overview of the Entry-level roles within the sub-sector
- **Chapter 4: Middle-level roles – SPD:** This chapter provides an overview of the Middle-level roles within the sub-sector
- **Chapter 5: Leadership-level roles – SPD:** This chapter provides an overview of the Leadership-level roles within the sub-sector
- **Chapter 6: Occupations and job roles in the sub-sector:** Details of the types of occupational activity included in the scope of the sub-sector, associated occupations, job roles and typical career paths are addressed in this chapter

The steps undertaken to develop Occupation Mapping leading to 'Career Path' are summarised below



This figure does not depict any hierarchy

Summary of Key Occupations, Job Roles and Tracks within Each Sub-sector

Figure 1 indicates the key occupations identified in each sub-sector. These are differentiated on the basis of the unique skill-sets required for each occupation. Each occupation is further divided into tracks to highlight the specialisations that exist. Details of the tracks and the unique Entry-level job-roles have been indicated further on in the document. These occupations, tracks, and unique job-roles exist in various organisations under different classifications and level of detail. The list tries to establish a balance between the level of detail and brevity while defining these basic 'distinct' skill-sets

IT Services (ITS)

- Application Development
- Application Deployment
- Application Maintenance
- Data Scientists
- IT Consulting
- IT Support Services/Help Desk
- Infrastructure Management Services (IMS)
- Information Security
- IT Services Management
- Project/Program Management
- Sales and Pre-sales
- Solution Architecting
- Testing and QA

Business Process Management (BPM)

- Analytics
- Customer Relationship Management
- Editorial and Desktop Publishing
- Finance and Accounting
- Health Services
- Human Resource Outsourcing
- Knowledge Services - Research
- Learning
- Legal Services
- Supply Chain Management

Engineering and R&D (ER&D)

- Engineering Analysis
- Hardware Development
- Software Development
- Product Engineering Design
- Product Marketing
- Product Manufacturing Support
- Product Lifecycle Management
- R&D
- Software Testing
- Hardware Testing
- Quality Assurance and Engineering
- Technical Documentation/Writing
- Technical Support

Software Products (SPD)

- Integration and Deployment
- Legal
- Product Documentation
- Product Development and Delivery
- Project/Program Management
- Product Lifecycle Management
- Product Research and Design
- Product Packaging
- Product Support
- Sales and Marketing/Business Development
- Testing and Quality Assurance
- Transition

Figure 1: Occupational Mapping Summary

In each of the four sub-sectors, unique occupations were identified as listed earlier in the section. In each of these occupations based on the specificity of skill requirements, skill-based demarcations or tracks have been identified. These tracks define the specific skills that are required to perform a job role within an occupation. In each of these occupations and tracks, Entry, Middle and Leadership level roles have been identified. These job roles identify the unique positions that exist in an organisation for fulfilling the functions defined under an occupation. These job roles differ from each other with respect to the competencies, knowledge, skill, attitude and performance criteria requirements for the fulfilment of a role.

Based on our research, we have identified 13 unique occupations in the ITS sub-sector, which are further segregated into 39 tracks with 17, 91 and 25 unique job roles at the Entry, Middle and Leadership Level, and respectively. Similarly, we have identified 10 unique occupations in BPM sub-sector, which are further segregated into 27 tracks with 16, 111 and 30 unique job roles at the Entry, Middle and Leadership Level, respectively. For the ER&D sub-sector we have 13 unique occupations, which are further segregated into 15 tracks with 16, 48 and 54 unique job roles at the Entry, Middle and Leadership Level, respectively, while for SPD we have 12 unique occupations, further segregated into 23 tracks with 18, 63 and 21 unique job roles at the Entry, Middle and Leadership Level, respectively.

IT Services (ITS)

- 13 unique 'Occupations / Horizontals'
- 39 unique 'Tracks'
- 17 unique Job roles at the Entry Level
- 91 unique Job roles at the Middle Level
- 25 unique Job roles at the Leadership Level

Business Process Management (BPM)

- 10 unique 'Occupations / Horizontals'
- 27 unique 'Tracks'
- 16 unique Job roles at the Entry Level
- 111 unique Job roles at the Middle Level
- 30 unique Job roles at the Leadership Level

Engineering and R&D (ER&D)

- 13 unique 'Occupations / Horizontals'
- 15 unique 'Tracks'
- 16 unique Job roles at the Entry Level
- 48 unique Job roles at the Middle Level
- 54 unique Job roles at the Leadership Level

Software Products (SPD)

- 12 unique 'Occupations / Horizontals'
- 23 unique 'Tracks'
- 18 unique Job roles at the Entry Level
- 63 unique Job roles at the Middle Level
- 21 unique Job roles at the Leadership Level

Figure 2: Summary of Findings During Occupational Analysis

BACKGROUND

- Sector Skill Councils
- Occupational Standards
- Occupational Mapping as Part of OS Development
- OS Development Framework

BACKGROUND

Background

Sector Skill Councils

The Sector Skill Councils (SSCs) have been established based on the mandate of the National Skill Development Policy (2009). The aim of the SSCs is to complement the existing vocational education system for the industry in meeting the entire value chain's requirements. This includes developing appropriately trained manpower in quantity and quality across all levels on a sustained and evolving basis.

It is important to note that the SSCs in India have been envisaged taking into account the ground realities in India as well as international best practices.

SSCs are national partnership organisations that bring together all the stakeholders – Industry, Labour, and the Academia - for the common purpose of workforce development of particular industry sectors.

The SSC is envisaged to develop the skill ecosystem in the country, as shown Figure 3.

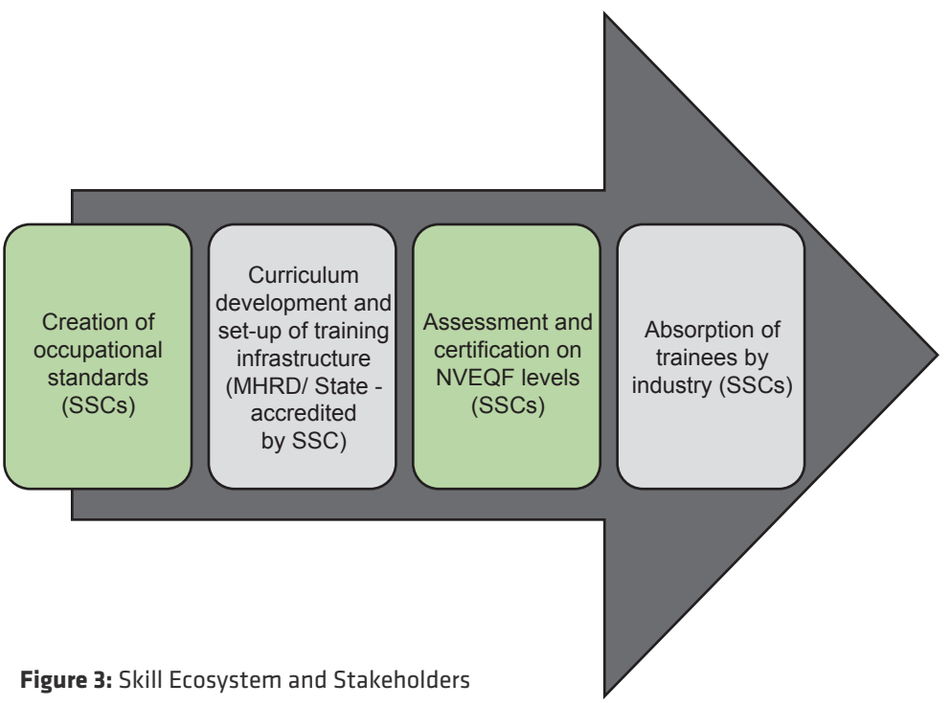


Figure 3: Skill Ecosystem and Stakeholders

Each SSC will create a repository of Occupational Standards (OS) for its respective sectors which will be an input to develop the relevant content, training infrastructure and other related needs for imparting the training. The SSCs are also responsible for the assessment and certification at all the NVEQF levels as described in the next section. It is envisaged that the SSC for a particular sector would be the supreme certification body for that sector. The SSC as an industry/sector body can link the skilling ecosystem to the demands of the industry/sector, to ensure that the content, assessment, certification and so on are relevant to the industry. With people trained under this framework, it can be visualised that there would be Industry absorption and retention.

Occupational Standards

OS are the statements of the standards of performance individuals must achieve when carrying out functions in the workplace, along with the specifications of the underpinning knowledge and understanding required. OS describe what an individual needs to do, know and understand to carry out a particular job role or function. The OS serve a number of purposes as shown in Figure 5.

Once the OS are developed, it is easy to define a focused training and development ecosystem based on it. The OS will be also helpful in defining a job description for a job role, providing measurable performance outcomes for individual performance appraisals, devising appropriate recognition programmes, defining competency frameworks and providing support for career planning and progression.

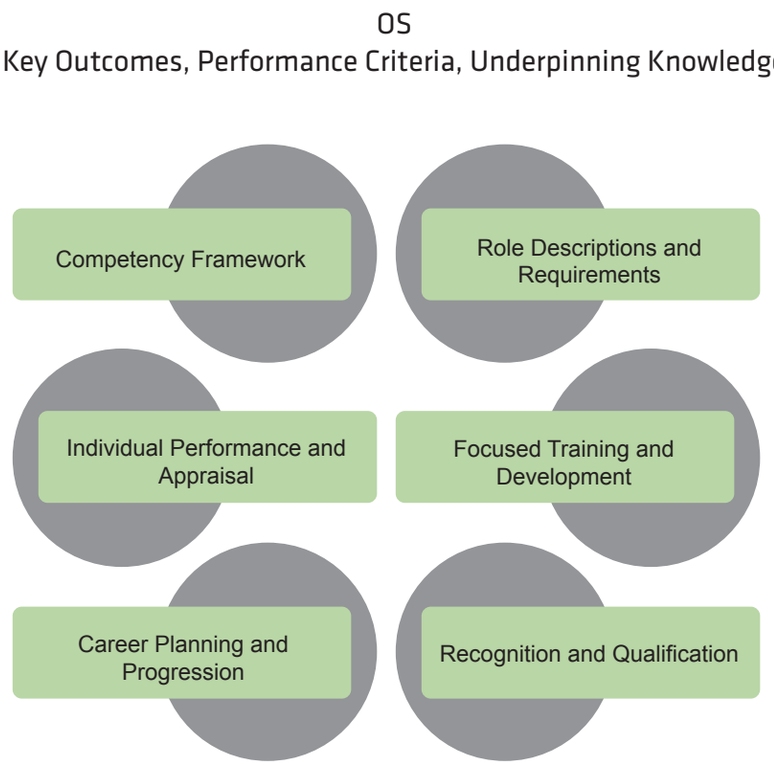


Figure 4: Uses of Occupational Standards

Occupational Mapping as Part of OS Development Process

Occupational mapping is the first step towards the development of OS. It leads to the identification of unique job roles that exist in the industry/sub-sector. In the context of the project, the key outcome of this exercise is the identification of ~67 unique Entry-level job roles for which Functional Analysis and OS are currently being developed. This is represented in Figure 6.

Figure 5: Occupational Mapping as Part of OS Development Process

Approach and Methodology

A step-by-step approach was followed to undertake the Occupational Analysis for the IT-BPM Industry which is presented in Figure 6.

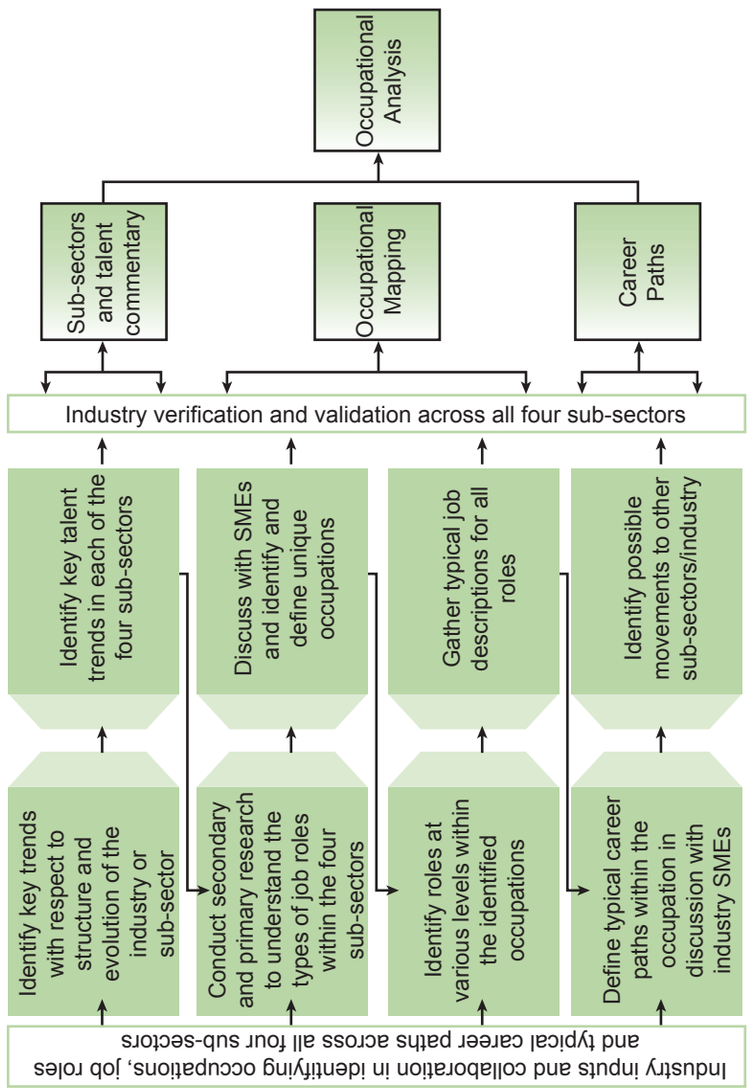


Figure 6: Occupational Analysis: Approach and Methodology

OS Development Framework

The following framework[1], has been used for OS development.

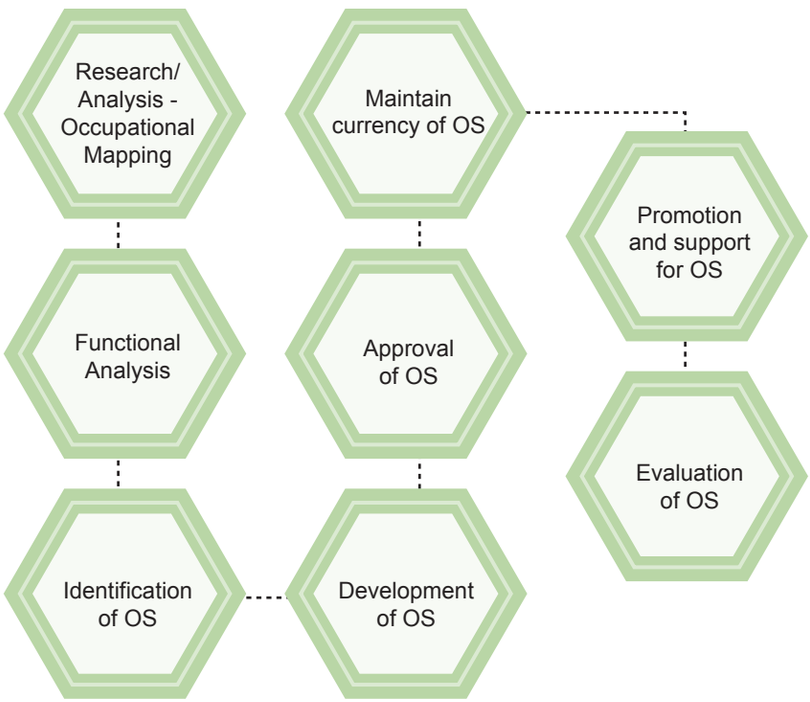


Figure 7: OS Development Framework

As indicated in the OS Development Framework in Figure 7, the outcome of Occupational Mapping will feed into the next steps namely. Functional Analysis and OS Development.

[1] INSSO framework followed globally as a benchmark for OS development

BACKGROUND

ABOUT THE IT-BPM INDUSTRY

- Structure of the IT-BPM Industry
- Impact of the IT-BPM industry in India
- Sub-sectors within the IT-BPM Industry

ABOUT THE IT-BPM INDUSTRY

Structure of the IT-BPM Industry

The organisations within the IT-BPM Industry are categorised along the following parameters.

- Sector the organisation is serving
- Type as well as the range of offering the organisation provides
- Geographic spread of operations
- Revenues and size of operations

A broad structure of the industry based on the parameters identified in the Indian context is represented in Figure 8[2].

Multinational Companies (MNCs): MNC organisations have their headquarters outside India but operate in multiple locations worldwide, including those in India. They cater to external clients (both domestic and/or global).

Indian Service Providers (ISPs): ISPs are the organisations that have started with their operations in India. Most of these organisations would have their headquarters in India while having offices at many international locations.

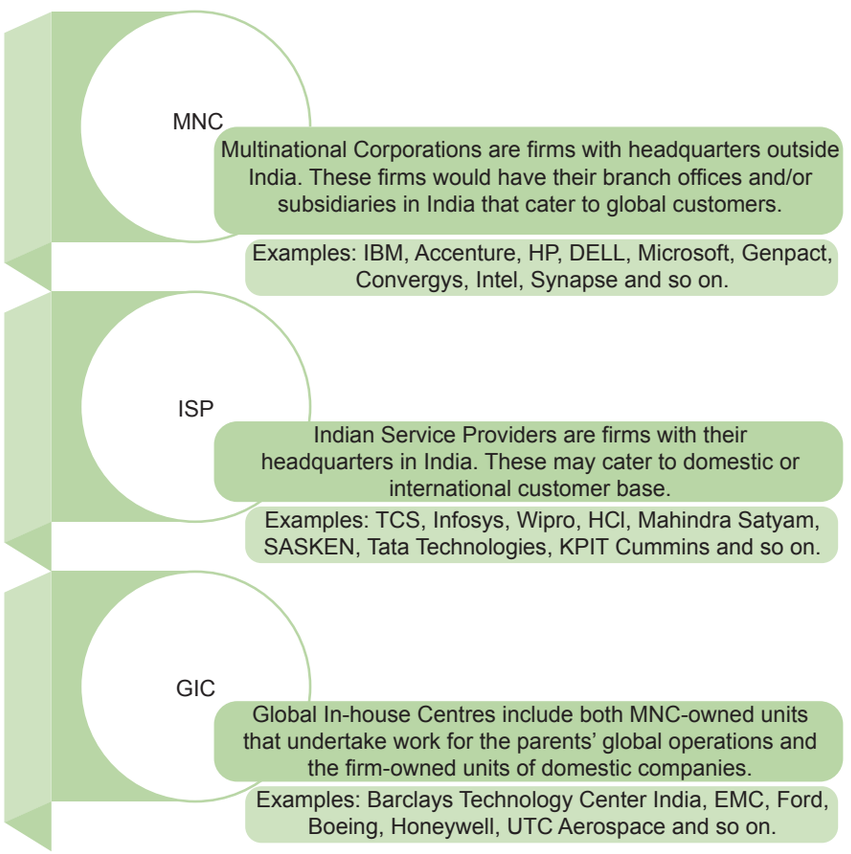


Figure 8: IT- BPM Industry Structure

While most have a client base, which is global as well as domestic, there are some that have focused on serving only the Indian clients.

Global In-house Centres (GICs): GIC organisations cater to the needs of their parent company only and do not serve external clients. This model allows the organisation the option to keep IT Operations in-house and at the same time take advantage of expanding their global footprint and offering opportunities for innovation in a cost-effective manner.

[2] NASSCOM Research

Impact of the IT-BPM Industry in India

The IT-BPM industry has been significant in fuelling India's growth story. In addition to contributing to the country's gross domestic product (GDP) and exports, the industry has played a big role in influencing the socio-economic parameters across the country. The industry has helped in providing employment and a good standard of living to millions. It has placed India on the world map with an image of a technologically advanced and knowledge-based economy[3].

The following illustration summarises the contribution and impact of the sector to the Indian economy and employment.

.

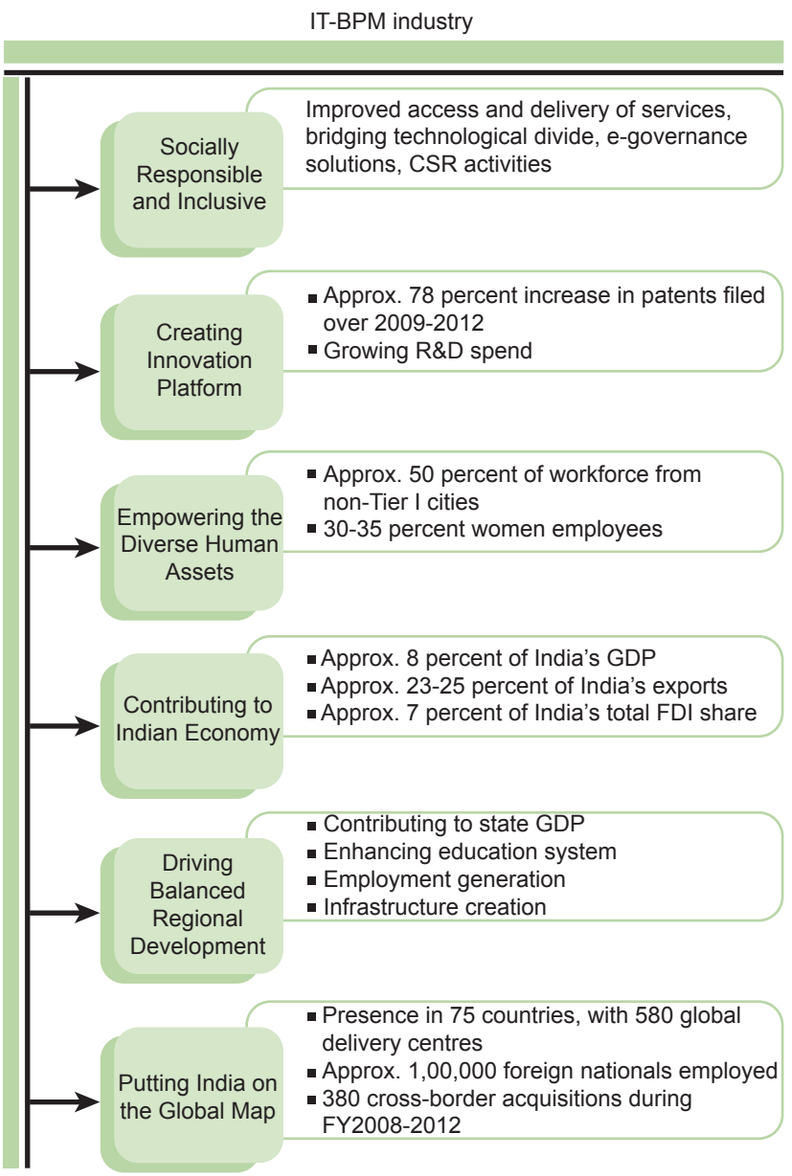


Figure 9: Impact of the IT-BPM Industry

Growth of the IT-BPM industry has provided India with a wide range of economic and social benefits, which include creating employment, raising income levels, promoting exports and significantly contributing to the GDP of the country. This sector attracts amongst the largest investments by venture capitalists and has been credited with enabling the entrepreneurial ventures of many in the country

[3] The IT-ITES sector in India Strategic Review 2012 by NASSCOM

Revenue Growth

The IT-BPM industry has almost doubled in terms of revenue and contribution to India's GDP over the last six years (2008-2013). This growth has been presented in Figure 10[4].

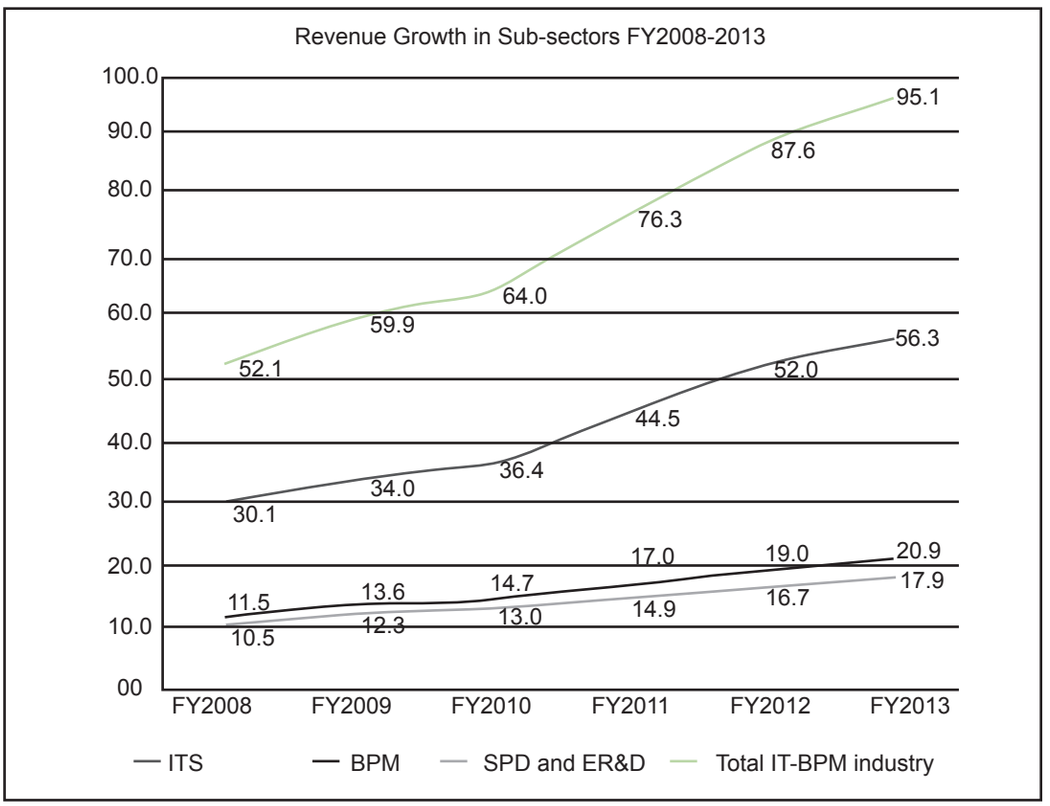


Figure 10: Revenue Growth across the IT-BPM industry, 2008-2013

[4] The IT-BPM sector in India Strategic Review 2013 by NASSCOM

Contribution of Different Sub-sectors

The contribution of ITS sub-sector is close to 59 percent of the total revenue for the industry followed by BPM at 22 percent. The contribution of the various sub-sectors has been presented in Figure 11[5].

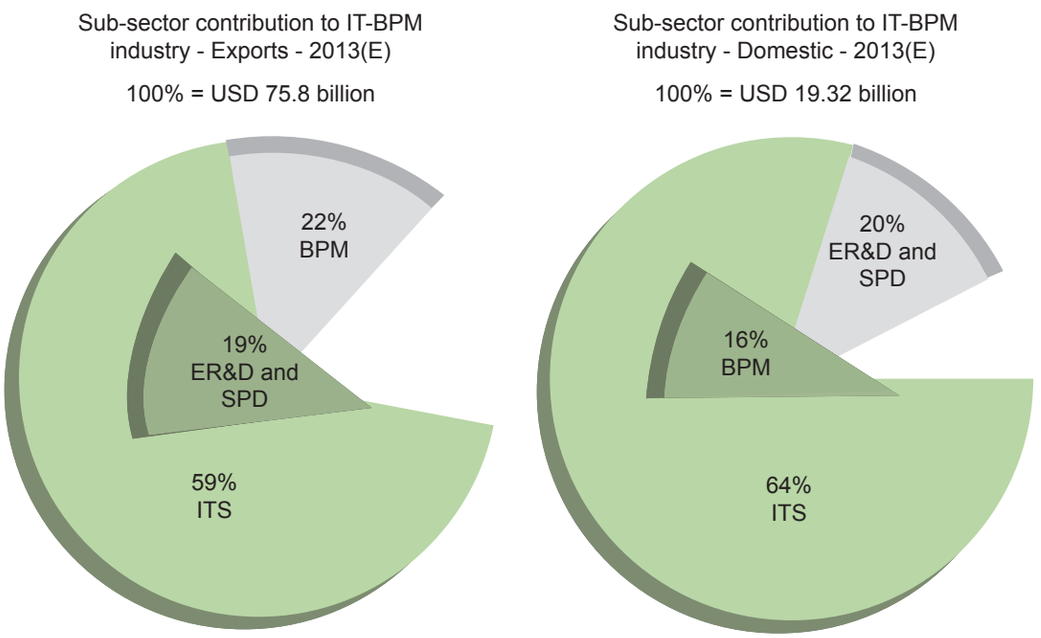


Figure 11: Contribution of Sub-sectors to IT-BPM Industry

Direct Employment Generated

The IT-BPM industry has contributed significantly towards the direct employment generation for the youth. The growth has been presented in Table 1.

Indirect Employment

While, the IT-BPM industry employs about 3 million people directly, it also provides indirect employment opportunities to another 9 million in industries like construction, catering, security services, retail and transport. The increased earnings and employment further drive the spending in services like food, entertainment, telecommunication and healthcare apart from contributing to tax coffers of the country.

[5] The IT-BPM sector in India Strategic Review 2013 by NASSCOM

The indirect-direct employment ratio multiplier has reduced from 3.6 in 2010 to 3.2 in 2012[6].

Table 1: Employment Generation in the IT-BPM Industry

Description	FY2010	FY2012	FY2013
Direct Employment	2.3	2.8	3.0
Indirect Employment	8.2	8.9	9.0
Ratio (Indirect: Direct)	3.6	3.2	3

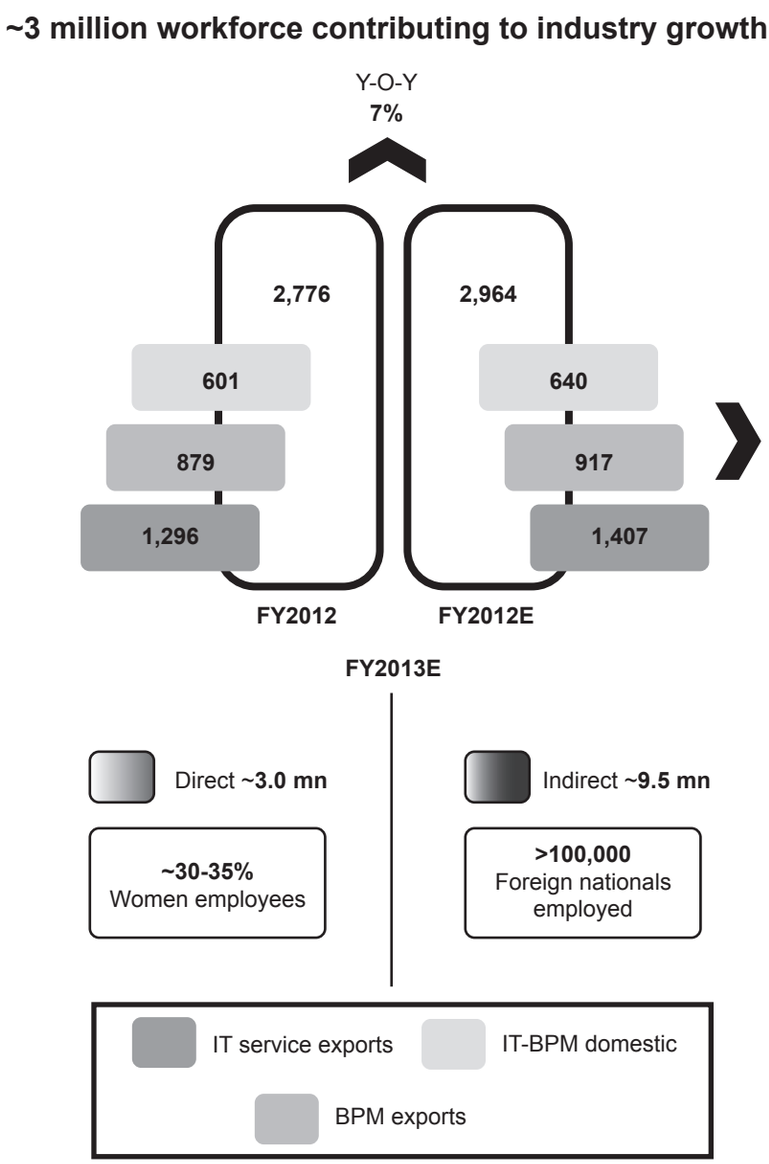


Figure 12: Employment Trends in the IT-BPM Industry

[6] The IT-BPM sector in India Strategic Review 2013 by NASSCOM

Sub-sectors within the IT-BPM Industry

The IT-BPM industry has four sub-sectors. The subsequent sections of the report describe Occupational Analysis conducted separately for the SPD sub-sector.

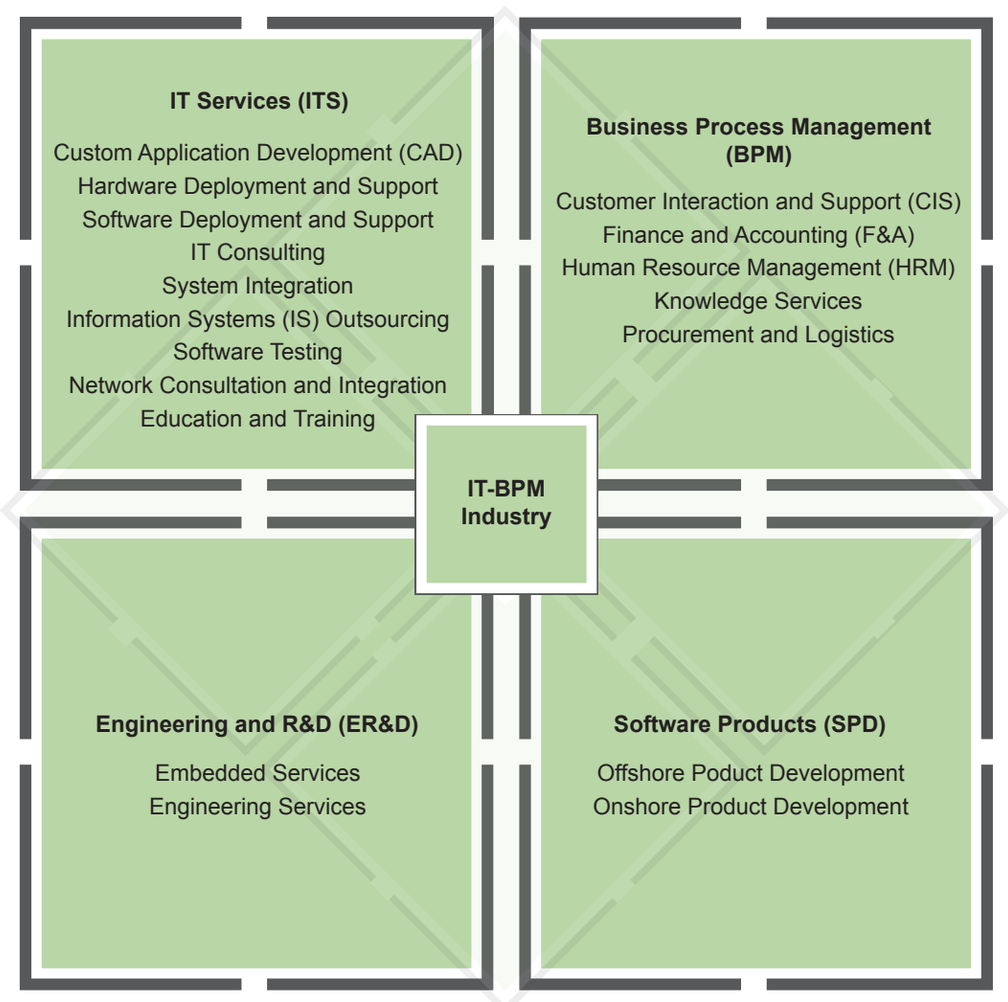


Figure 13: Sub-sectors within the IT-BPM Industry

Each of the four sub-sectors has been defined in detail subsequently. These terms/definitions have been used in discussion with NASSCOM and have been found to be consistent with the definitions used in the industry.

1. **IT Services (ITS):** ITS involves a range of engagement types that include consulting, systems integration, IT outsourcing/managed services/hosting services, training and support/ maintenance.
   a) **Custom Application Development (CAD):** CAD services focus on delivering customised (as per the client requirements) development of software applications and interface as well as enhancements to existing packaged applications or pre-engineered templates and support and provision of custom applications.
   b) **Hardware Deployment and Support:** The Hardware Deployment and Support services pertain to the installation and support of a specific hardware device. The service is focused on the device and its components rather than on software that is running on the device. Installation activities can include hardware staging, configuration, testing and debugging, deployment site preparation and physical installation of the device.

c) **Software Deployment and Support:** The Software Deployment and Support services are activities, expertise and systems providing the customer with proper installation and configuration of all packaged software products, custom applications as well as appropriate ongoing support, access to resources and distribution of software product releases, updates and upgrades.

d) **Information Systems (IS) Outsourcing:** IS Outsourcing services involve a long-term, contractual arrangement in which a service provider takes the ownership of and responsibility for managing all or part of a client's information systems operations or department, based on a service-level agreement. An IS Outsourcing contract usually includes data centre operations and may also include services such as desktop management, local and wide area network operations management, help desk support, application development and maintenance, disaster recovery services and related consulting and systems integration activities.

e) **Infrastructure Management Services (IMS):** IMS encompass all the services that relate to monitoring, managing and enhancing performance of a client's IT infrastructure. These include help desk services, server management, data centre management, network management, asset management, desktop support, IT security services, maintenance services and applications operations.

f) **IT Consulting:** IT Consulting includes IS Strategy, IT and network planning, architectural assessments, IS operational analysis, system and network designs, product-specific consulting, supplier assessment and maintenance planning.

2. **Business Process Management (BPM):** BPM is the management of one or more business processes by an external organisation that, in turn, owns and manages the selected processes based on defined and measurable performance metrics. The evolution of this sub-sector marks the shift in the delivery of business processes from high-cost destinations to low-cost ones. This shift is enabled by advancements in information and communication technologies.

   BPM sub-sector includes the following types of organisations with different horizontal offerings (those that can be leveraged across specific industries):

   a) **Business Process Management (BPM):** Traditional BPM offerings can be categorised into major categories and vertical-specific offerings (those that demand specific Industry vertical process knowledge):

      - **Customer Interaction and Support (CIS):** CIS includes all forms of IT-enabled customer contact; inbound or outbound, voice or non-voice based support used to provide customer services, sales and marketing, technical support and help desk services.
      - **Finance and Accounting (F&A):** F&A includes activities such as general accounting, transaction management (account receivables and payables management), corporate finance (for example, treasury and risk management and tax management); compliance management and statutory reporting and so on.
      - **Human Resource Management (HRM):** HRM services include payroll and benefits administration, travel and expense processing, talent acquisition and talent management services, employee and manager self-service delivery services, employee communication design, and administration.
      - **Supply Chain Management (SCM):** SCM services include the transfer of the ownership of some or all procurement, sales and fulfilment processes or functions to providers, such as an outsourcing agency. These could include administrative, delivery or management-related processes or functions.

   b) **Knowledge Services:** Knowledge Services include services such as business research, market research, data management and analytics.

   c) **Legal Services:** Legal Services include legal and intellectual property services.

3. **Software Products (SPD):** SPD are programmes or code sets of any type, commercially available through sale, lease, rental or as a service. Packaged software revenues typically include fees for initial and continued right-to-use packaged software licenses.
   a) **Offshore Product Development:** This involves offshore development of the customer's product, thereby taking up the responsibility of all aspects of the product lifecycle - R&D, prototyping, development, testing, maintenance and support and development of next generation of the products.

4. **Engineering and R&D (ER&D):** Engineering services are those that augment or manage processes. These processes are associated with the creation of a product or service, as well as those associated with maximising the life span and optimising the yield associated with a product or asset. This not only includes design elements of the product or service itself, but also encompasses the infrastructure, equipment and processes engaged in manufacturing/ delivering them.
   a) **Research and Development (R&D) Services:** R&D services involve providing research and development for hardware and software technologies, as well as development of software running on embedded systems.

Chapter
1

OVERVIEW OF THE SPD SUB-SECTOR

- Introduction to the SPD Sub-sector
- Evolution of the SPD Sub-sector
- Profile of the SPD Sub-sector
- Key Trends in the SPD Sub-sector

OVERVIEW

Introduction to the SPD Sub-sector

Software Products are programmes or code sets of any type, commercially available through sale, lease, rental, or as a service. Packaged software revenues typically include fees for initial and continued right-to-use packaged software licenses. The IT Industry segment catering services to this area – through all or any of the product lifecycles – is referred to as the Software Products (SPD) sub-sector.

This sub-sector also encompasses the offshore development of the customer's product or Offshored Software Products Development (OSPD). Responsibility of different aspects of the product lifecycle - R&D, prototype, development, test execution, maintenance, support and development of next generation of products - lies with an offshore team/vendor/organisation. Offshoring of non-core activities provides an organisation the opportunity to save on costs and focus on core activities. As the industry matures, more complicated and critical work is being carried out offshore.

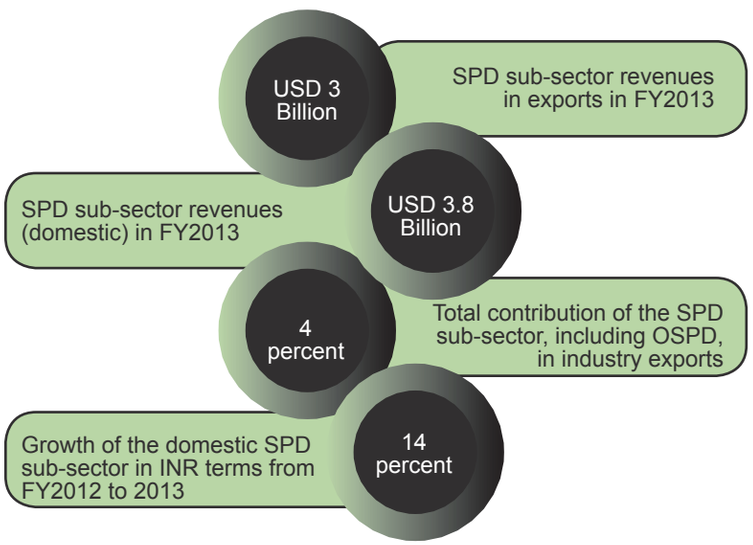


Figure 1: SPD Sub-sector: a snapshot

The Indian SPD market is small when compared to the ITS and BPM sub-sectors of the IT-BPM Industry. However, the market potential of this sub-sector and its impact on other sub-sectors and industries is significant. The SPD (and OSPD) sub-sector has grown by almost two times in the last five years to record estimated revenue of USD 3 billion in exports in FY2013.

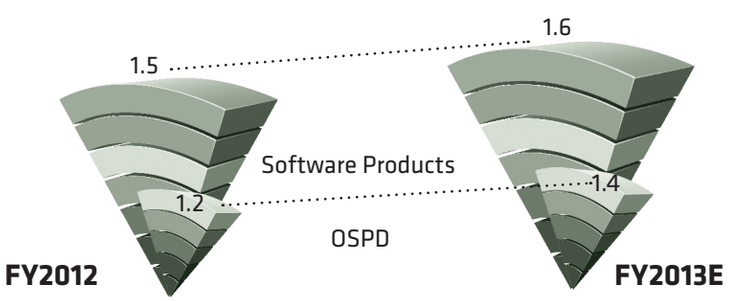


Figure 2: Growth of the SPD Sub-sector: 2012-2013 in Billion USD

Software Products built on new technologies like Cloud Computing, Social Media and Value-added Services have witnessed growth due to a strong support from venture capitalists. As a result, this space has seen a large number of entrepreneurs whose success stories have inspired and drawn many to the field. Many Indian software product organisations have emerged as top vendors globally for products across Banking, Financial Services and Insurance (BFSI) as well as telecom sectors. This has contributed to building a much needed brand for all other IT industry sub-sectors in both the domestic as well as global space as India is being viewed as a provider of high-end services. Innovation in other sectors is also fostered by this sub-sector as the time to market the product goes down with emerging technologies.

Evolution of the SPD Sub-sector

The evolution of the SPD sub-sector has been captured in the figure below and explained in detail subsequently.

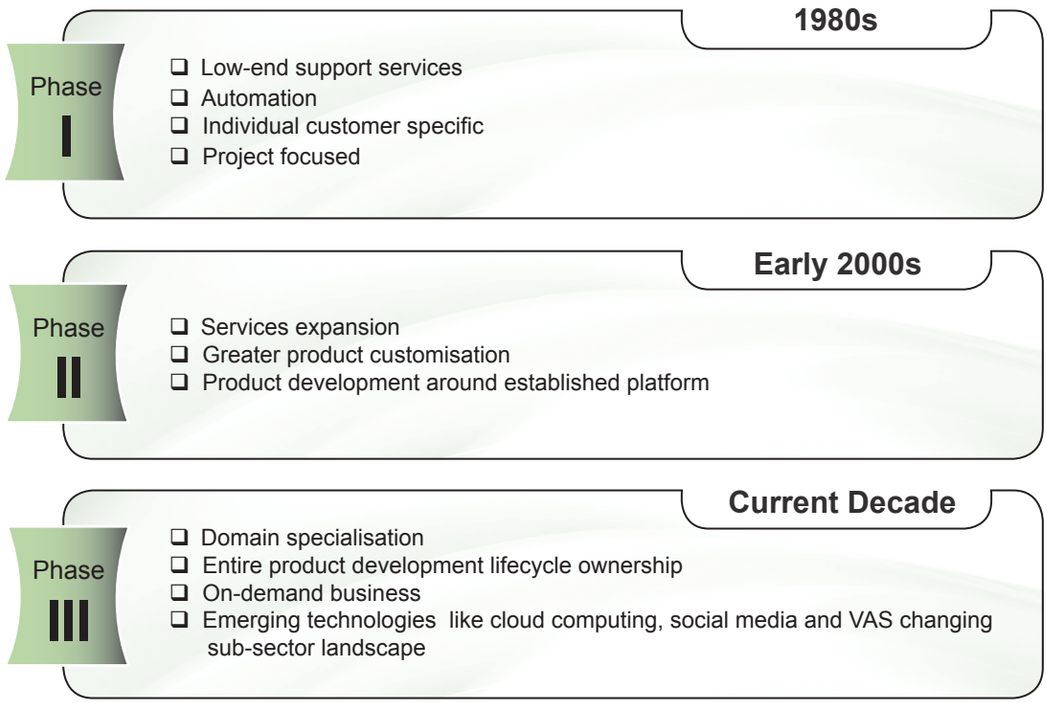


Figure 3: Evolution of the SPD Sub-sector

The SPD sub-sector started off along with other IT-BPM sub-sectors in the early 1980s. The sub-sector started by offering low-end support services as a source of cost arbitrage to the client companies. The Indian IT services firms, at that time, pioneered the software product development by launching their office application products. However, this segment was limited. As the requirements were customer driven, the products developed were very specific to individual clients and focused on improving efficiency by automating the process. The sub-sector faced the usual challenges of infancy such as lack of a distribution partner, low investments, absence of standards and so on. The initial work was mostly project focused. The industry evolved in terms of the quality of services it provided. The quality of offshore work done drew attention, and more global organisations started to offshore non-critical components of product development to India. Many also established their captives in India to take advantage of the cost benefits.

With time, the repertoire of services which the Indian firms provided in the SPD space expanded to include testing. SPD saw definite advances towards developing products which were more easily customised to different clients. The companies in the OSPD space also started developing new products simultaneously. Increased investments brought a further impetus to the growth of this sector, and an expansion in the number of small and mid-sized firms offering software products was seen. Most of the product development started to happen around established platforms.

The second half of the last decade has seen rapid progress towards providing high-end services to clients, both in terms of offshore work and software products. Companies have started providing services that are more strategic in nature. The evolution of new technologies like Cloud Computing, Value-added Services and Social Media have altered the landscape of the industry, providing new opportunities to even the small and medium players. Growing demands from other industry verticals and geographies have increased the business globally, which has positively impacted India. The recent period has been marked with innovation translating to rapid growth, with the service providers taking on the role of strategic partners.

Profile of the SPD Sub-sector

Software Product Development is the fastest growing IT-BPM sub-sector globally, generating revenue of USD 278 billion in FY2012 through package software products only. This is also reflected in the Indian market where the average growth of this industry has been in double digits with 14 percent for FY2013. While the product development segment has a revenue size exceeding USD 1.6 billion, the offshore market is estimated at USD 1.4 billion. The growth in this segment is not a sudden spurt. The sub-sector has been witnessing double digit growth over the last five years, while future growth is estimated at 14 percent.

Vertical Profile

BFSI is the largest driver in this space, claiming majority of SPD revenues. Other Industry verticals, like Healthcare and Education, have been on the upswing over the past decade. Education in particular has become a huge revenue driver owing to the Information and Communication Technology (ICT) focus in Education at the state and national levels. An illustrative view of the vertical and horizontal profiles is shown in the subsequent table.

Service Offering/Horizontal Profile

The industry started with performing work around support and gradually evolved to covering other stages of the product lifecycle, such as testing and providing professional services. The industry has now evolved, with the capability as well as demand for serving the entire product lifecycle, including R&D, product conceptualisation and prototyping.

Customer Segment

The increasing permeation of IT across various businesses, irrespective of their size, has resulted in a corresponding diverse customer segment for the SPD sub-sector. Earlier, the large enterprises were adopters of technology and were big revenue contributors. However, the small and medium businesses are the ones that form the core of the sub-sector; they have contributed to defining the trends in recent times, with this segment witnessing the highest IT adoption. Emerging technologies have created opportunities in the end-user segment and many providers are rushing to address this gap.

Market Segment

The SPD sub-sector closely mirrors the IT-BPM Industry in general, with US being the dominant market, and US and Europe combining to provide over 80 percent of revenue to the sub-sector. The domestic market is much smaller but is set to grow. With the entrepreneurial scenario in India booming, many new Indian players are also seeking services for developing and bringing to market the conceptualised idea.

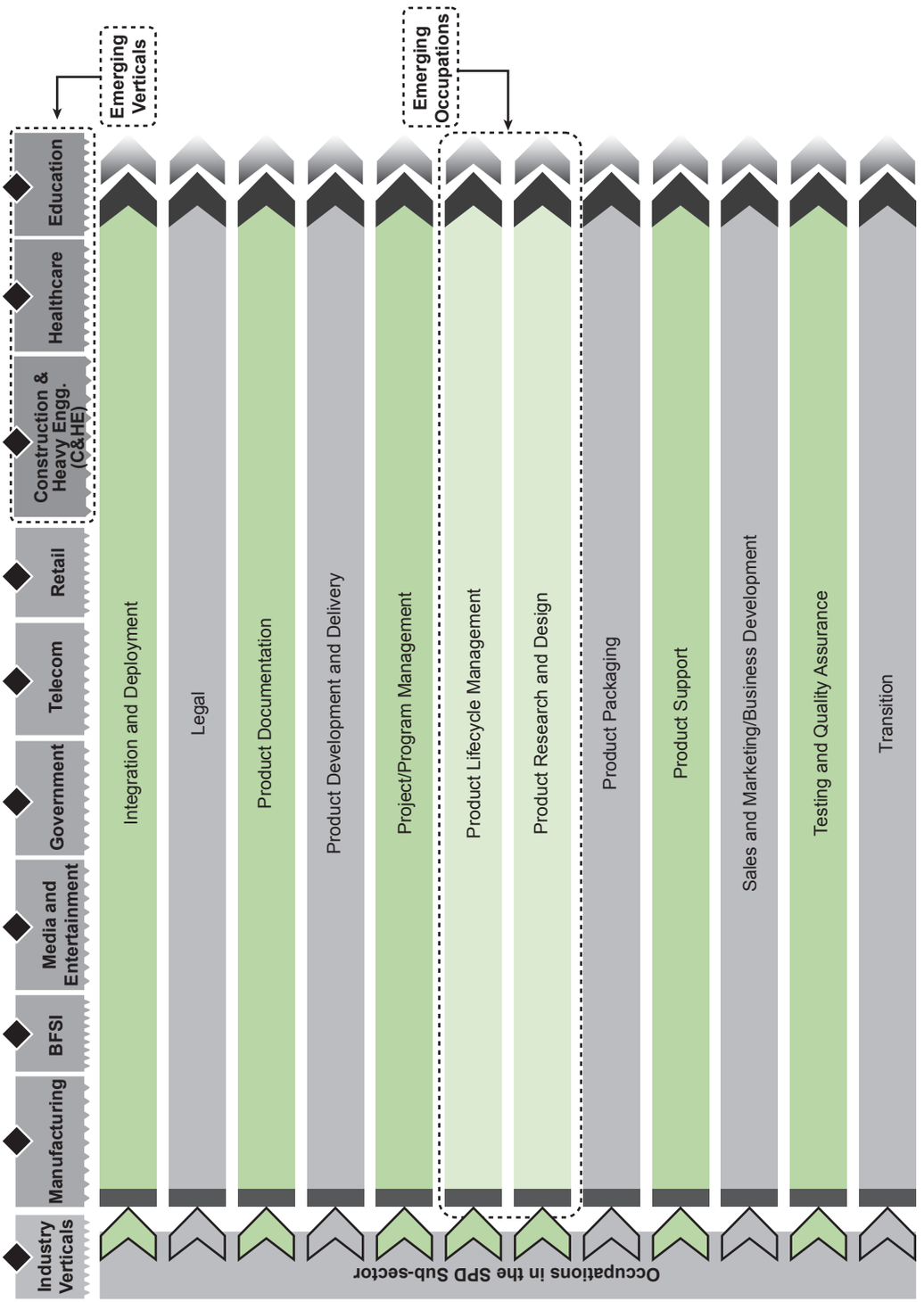
Player Segment

550+ players are estimated to be operating in this sub-sector. However, over half of the revenue generation for the sub-sector happens from the top 5 players. [1]The large players of the sub-sector have resources that enable them to offer end-to-end services through the product lifecycle for clients. The large players also generally provide services in other sub-sectors like IT services and BPM. The mid-range players account for another significant contribution to export numbers (~25 percent).

The smaller players focus on service lines/geographic lines/industry verticals, providing niche services.

[1] THE IT-BPM SECTOR IN INDIA, Strategic Review 2013; NASSCOM

Verticals and Occupations in the SPD Sub-sector



The table does not depict any hierarchy

Key Trends in the SPD Sub-sector

The SPD sub-sector is currently undergoing significant changes brought about by multiple forces, including market conditions, emerging technologies, evolving customer demands and increasing IT penetration. These forces are shaping the trends in this sub-sector. Some of the dominant trends are shown in Figure 4.

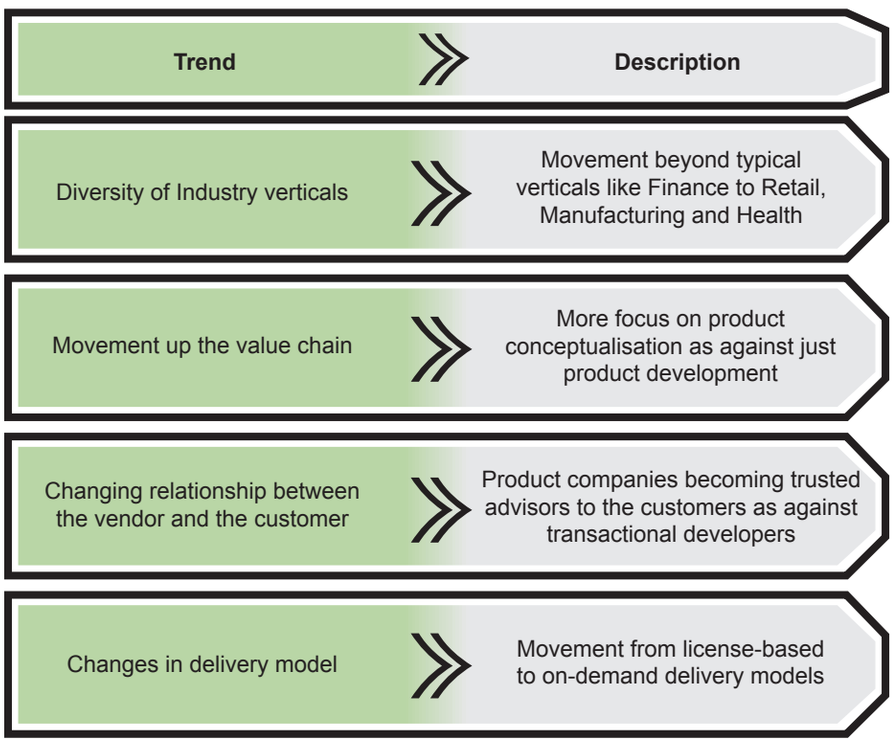


Figure 4: Key Trends in the SPD Sub-sector

Diversification of Industry Verticals: The growth of IT-BPM Industry and the SPD sub-sector has seen a spread in the number of verticals that are being serviced. This diversification has been driven by growing demand from other verticals as well as a conscious push by the players. Use of IT as a means of controlling costs and improving efficiencies has led to demands from most verticals. The growing size of these verticals has also created huge potential for business, and the need to diversify to reduce sector risk has encouraged the suppliers to diversify.

The small and medium businesses were among the first ones to explore the other emerging sectors. The larger players quickly realised the potential and have been pursuing these areas aggressively. While Financial Services still continues to be the dominant vertical to be serviced and is expanding with growing penetration yielding increasing revenue, the other verticals like Procurement and Customer Relationship Management (CRM) are witnessing good growth as well.

Movement up the Value Chain: In alignment with the maturing IT industry, the SPD sub-sector has established its credentials globally and is now seeing players focus on providing high-end services. The sub-sector is also witnessing more work being done in specialised areas like Product Conceptualisation and R&D, which was being traditionally done outside the country and at the client end. The providers have also started to offer services in associated areas like integration services and vendor management.

Changing Relationships between Vendor and Customer: Instead of focusing on one or a limited aspect of the product development lifecycle, companies as well as customers are now realising advantages of the parent company owning the product lifecycle – implementation, testing, maintenance and enhancement. While this provides an opportunity of increased revenue and more protection of the product Intellectual Property (IP), the clients see a quicker resolution time and enhanced quality of updates, among other advantages. The product companies are now in a position to act as advisors to not only the product, but also help in charting out the organisation's technology roadmap and marketing strategy.

Changes in Delivery Model: The dynamic market scenario has led to the demand for changes in the delivery model. Movement from license-based to on-demand service has been one of the dominant trends in this direction. This has reflected in changes in revenue models offered by service providers, which provide the customers flexibility to buy products on a need basis. Some of the popular emerging revenue models are subscription or on-demand, revenue sharing, risk sharing, transaction-based and ad-based models. Disruptive technologies – cloud, mobility, social media and big data/analytics - are playing a significant role in driving growth of OSPD and software products. The vendor-customer relationship offering is undergoing significant changes as organisations offer product consulting services, technology roadmaps, extended marketing team for clients and co-innovate product services.

Chapter
2

TALENT IN THE SPD SUB-SECTOR

- Emerging Talent Trends
- Qualifications, Knowledge and Understanding
- Skills
- Learning Opportunities

TALENT

TALENT IN THE SPD SUB-SECTOR

Emerging Talent Trends

Talent for SPD sub-sector holds the key to how this field will shape up. Though the sub-sector at the moment possesses abundant opportunities, availability of quality talent is becoming a critical factor.

Hiring is annual rather than seasonal as the requirement and supply gap for talent already exists. Hiring happens at both lateral as well as fresher levels. At the entry level, the sub-sector sees hiring from engineering colleges from IT and computer-related fields with a focus on the individual's analytical abilities. A shift towards hiring students from other streams is also happening, and many organisations believe that the functional skills necessary can be built through training programmes.

Organisations connect with potential recruits through multiple channels like roadshows, competitions, seminars, internships and so on. This helps to build interest towards the organisation in particular and the sub-sector in general, and promotes innovation, as these channels can be used to exchange new ideas. Lateral hiring happens at many levels, and movement across organisations is not uncommon.

Some of the important trends in managing talent in the SPD sub-sector are identified below:

1. Beyond Traditional Talent Pool: The growth of the sub-sector has made it necessary for the players to seek talent outside technical colleges in order to close the gap. Organisations are developing capability – in-house or through third parties – to train and equip fresh graduates from non-technical backgrounds with necessary productive skills.

2. Widening of the Skill Spectrum: The industry is undergoing significant changes on multiple fronts, which are expanding the skill needs drastically. Service providers in the SPD sub-sector are increasingly looking to provide additional services beyond the traditional gamut of offerings. The trend towards 'productisation' is also necessitating the industry to look for new partnering tie-ups. Legal aspects are growing because of the importance of emerging intellectual property issues. The evolving technologies require integrated product development. As a result of all these factors, the technical as well as non-technical skill set that the sub-sector requires is spreading.

3. Domain-specific Knowledge Focus: Software products are customised to organisations, and thus require industry understanding to build and modify products for the same. Domain knowledge is a critical skill in the SPD sub-sector. Organisations also look to develop these skills after hiring by encouraging industry-specific certifications, and by providing trainings.

Shortage of skilled talent has led to organizations increasingly looking beyond engineering and technical streams for their talent needs
Niranjan Subramanya Sarja ,
Head E-schools Campus Force, HCL Technologies

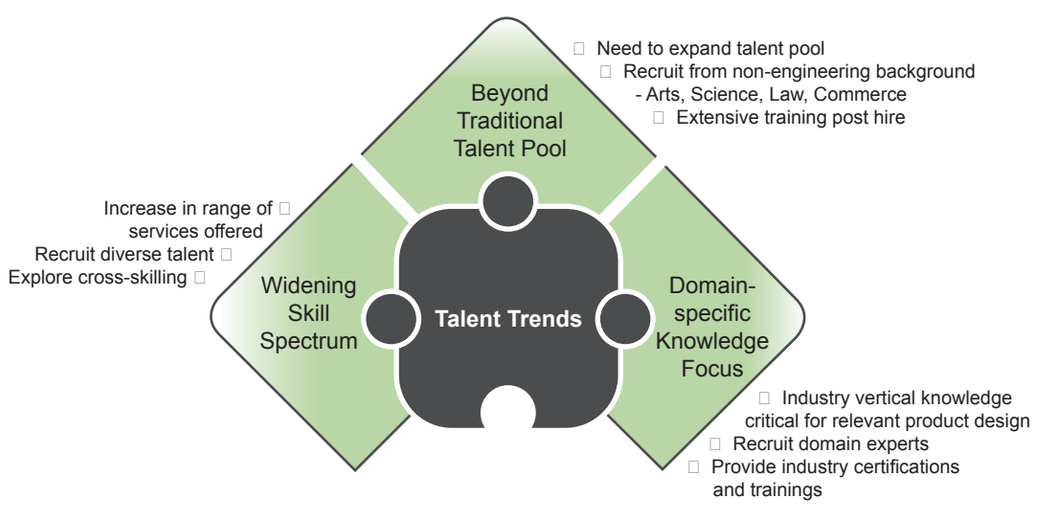


Figure 5: Talent Trends in the SPD Sub-sector

Qualifications, Knowledge and Understanding

Though the sourcing strategy may vary for different companies - barring a few that provide niche/ specialised services - the majority hire both laterally and at entry level.

The bulk of hiring happens at the entry level as organisations compete to attract the best talent from engineering colleges. While IT and Computer Science were the traditionally preferred branches, the sub-sector is now open to recruiting from other branches in engineering as well as graduates from other streams like arts, science, law, and so on.

For SPD, a majority of the recruitment happens through technical graduates - engineering institutes, BCA/MCA, and technical diploma holding candidates.

- Graduates with relevant certifications like graphics and media designing courses, are preferred for media/UI related tracks within Product Development.
- There is usually an advanced requirement for occupations like Sales and Marketing/ Business Development and Product Research and Design where candidates with a management degree are usually preferred.
- Increasingly, the focus is shifting away from 'formal education' related qualifications to having the right skills to successfully deliver the job responsibilities.

Occupations like Project/Program Management, Product Management, Sales and Marketing/ Business Development require additional skills.

Skills

The SPD sub-sector requires a wide range of skills, which vary with the value stream that the organisation is servicing, and at individual level, role and the position. Both soft skills and functional skills are crucial in the industry, and organisations take a lot of effort in building these. Major hiring at the entry level is done on the basis of communication/soft skills and analytical aptitude.

The sub-sector needs specialised skills, and the core talent need is technical in nature. However, like other sub-sectors in the industry, Software Products also house multiple roles, which require different competencies. While strong analytical skills are a prerequisite in this sub-sector, strong communication abilities are required in client-facing roles like sales, product documentation, testing, and product support.

Project management skills and relevant experience are essential for managing various aspects of project delivery. Product management again is a critical occupation where familiarity with software product development methodologies is important along with technical skills.

Similarly, Sales and Marketing/Business Development roles require a strong technical understanding of the product in addition to domain knowledge.

The need for having strong IP management also demands Legal to be an integral occupation within the SPD sub-sector, and skills corresponding to the same (such as patent review, preparation, IP strategy development, and so on) are also much sought after.

Key Generic Skills

- Good communication skills
- Analytical skills
- Problem solving
- Creativity and out-of the box thinking
- Working with influence

Key Functional Skills

- Industry/Domain skills
- SDLC concepts
- Programming skills
- Platform knowledge
- Automated testing
- ERP

Learning Opportunities

SPD is a knowledge-intensive sub-sector, and fresh graduates often have a steep learning curve, which they need to cover before becoming productive. The constant innovation of technology requires the employees to regularly update their knowledge to remain productive. Change in role or projects could also see the employees needing to learn new skills.

The sub-sector thus encourages and provides learning opportunities through different sources like certifications, training materials (online/class room), focused learning programmes, and on-the-job learning opportunities.

Increasing domain focus is leading to many software products organisations looking to acquaint the employees with domain-specific (retail, manufacturing, insurance, etc.) knowledge. Similarly, tie-ups with institutes or external vendors is used to provide training to employees for specific technical or platform skills.

The industry spends significant amounts of resources on providing learning opportunities. This not only provides for up-skilling of employees to meet business needs, but also helps to position the organisation as a preferred employer.

Learning opportunities are offered within and outside the organisations. Some of these options include:

- Advanced technical degree courses like MCA, MTech, ME, MSc and so on.
- Advanced business courses like MBA/PGDBM
- Domain-related certifications in software languages, infrastructure management, information security and so on.
- Industry-related certifications in various verticals like BFSI, telecom, retail and so on.

One of the key objectives of IT-ITeS SSC NASSCOM is to develop avenues for learning and skill development in the IT-BPM Industry. In pursuit of this, the SSC is planning to set up accreditation process for training providers, and tailor courses on Occupational Standards that are currently being developed for the industry.

Certified training courses based on Occupational Standards will ensure standardised formal and non-formal learning opportunities that are accepted and endorsed by the industry.

Chapter
3

ENTRY-LEVEL JOB ROLES - SPD

- Entry-level Job Roles
- Entry-level Job Roles in the SPD Sub-sector
- SPD Sub-sector: Occupations, Tracks, Verticals and Entry-level Job Roles

ENTRY

ENTRY-LEVEL JOB ROLES - SPD

Entry-level Job Roles

Across the IT–BPM Industry, there are three levels of management:

- Entry Level
- Middle Level
- Leadership Level

An entry-level job role is the first step to a career in the IT–BPM industry. It is the first level of employment in an organisation, and typically employs candidates with about 0-2 years of experience. The purpose of an entry-level job role is to give the candidate an understanding of the occupation and an opportunity to learn and enhance his experience, and to serve as a stepping stone to middle-level management.

With an increasing wave of domain and vertical specialisation across the IT–BPM industry, many people are now focusing on acquiring experience through entry-level job roles in the industry.
Some of the functions of an entry-level job role are presented in Figure 6.

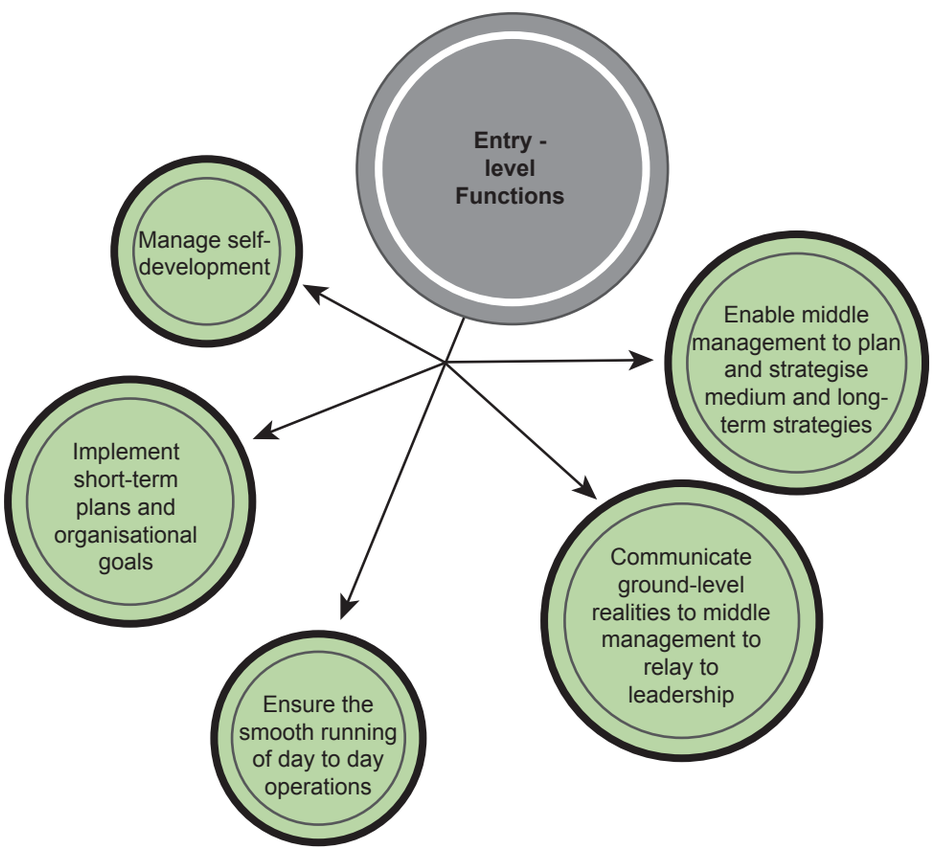
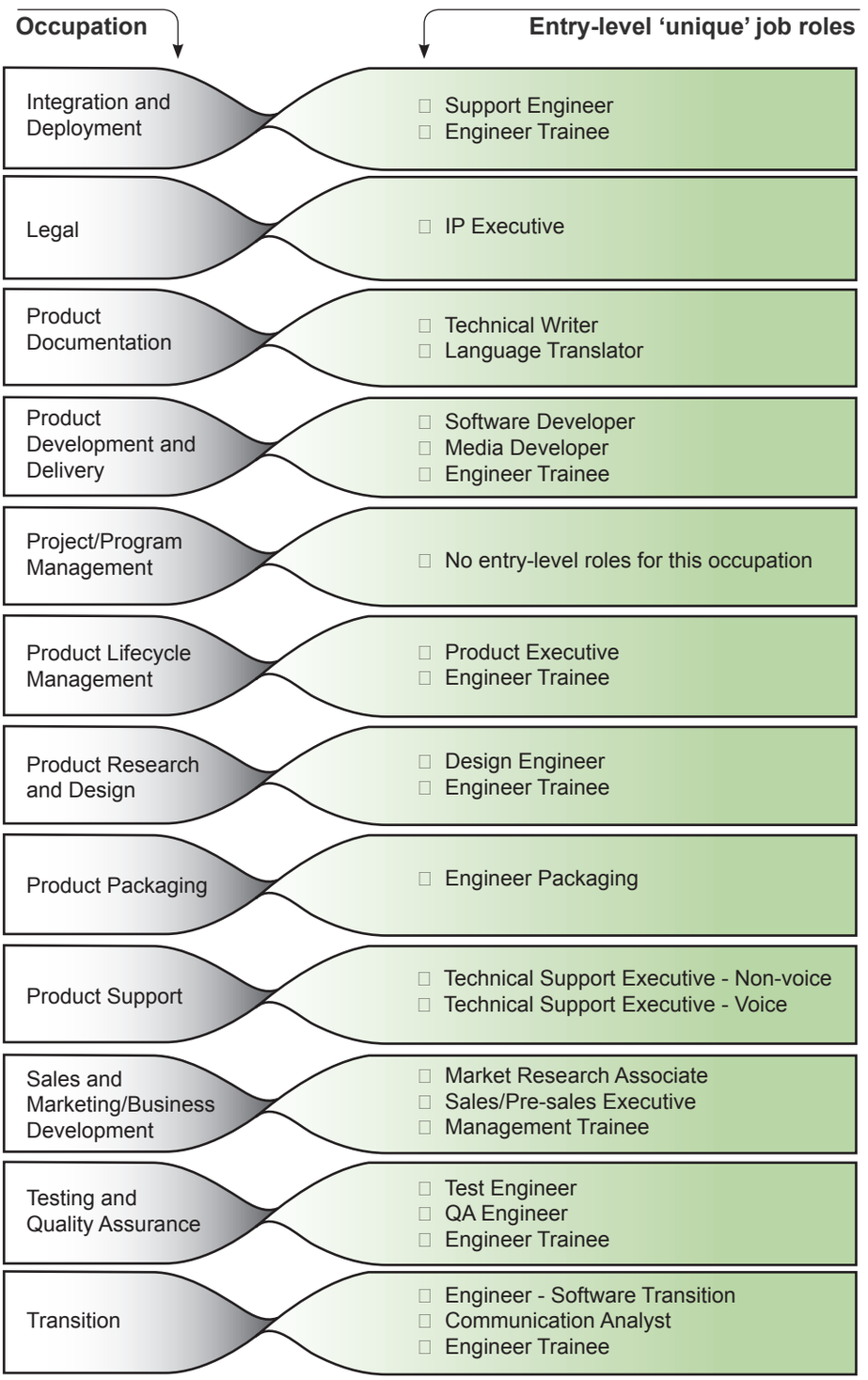


Figure 6: Functions of Entry-level Job Roles

Entry-level Job Roles in the SPD Sub-sector

Entry-level job roles in the SPD sub-sector exist across almost all the occupations. For most of these job roles, the basic qualification remains engineering graduates, preferably from computer sciences background, though graduates from other disciplines are also hired for some other positions in Legal or Transition.

A list of different entry-level job roles that exist across each occupation in the SPD sub-sector is presented below.



The table does not depict any hierarchy

SPD Sub-sector - Occupations, Tracks, Verticals and Entry-level Job Roles

The IT-BPM industry in India is one of the ever-expanding industries in the country, and offers myriad opportunities to fresh graduates for employment. According to NASSCOM estimates, the industry is estimated to aggregate revenues of USD 108 billion in FY2013. During this period, direct employment is expected to reach nearly three million, an addition of 188,300 employees, while indirect job creation is estimated at 9.5 million. About 95 percent of this hiring is of fresh graduates.

The SPD sub-sector offers a variety of opportunities across occupations like Integration and Deployment, Legal, Product Documentation, Product Packaging, Testing and Quality Assurance, Product Research and Design, Product Support, Transition, and so on.

In total, there are about 18 unique job roles at the entry level across different occupations, tracks, and verticals in the SPD sub-sector.

The subsequent table shows how each of these job roles is mapped to different tracks and occupations in this sub-sector,

Key Definitions
Occupation is a set of job roles, which perform similar/related set of functions in an industry.

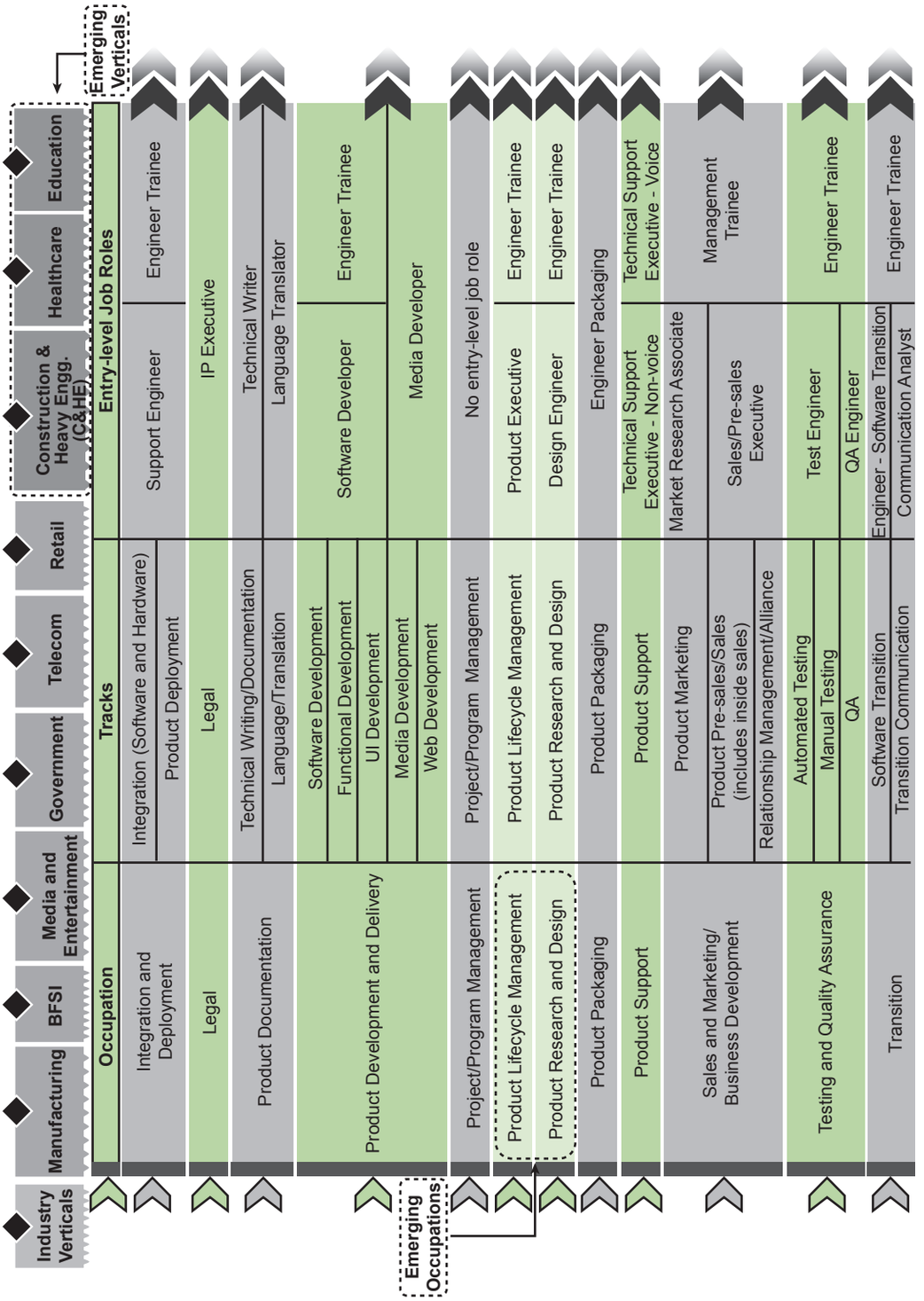
Tracks *are a sub-set of occupations having similar set of functions under the larger gamut of the occupation they belong to.*

Unique Job Roles *defines a set of functions that together form a unique employment opportunity in an organisation.*

Entry Level: *0-2 years*
Middle Level: *2-10 years*
Leadership Level: *>10 years*

SPD Sub-sector - Occupations, Tracks, and Verticals

For most entry-level job roles, there is a possibility of a vertical or horizontal movement in their tracks, and also into other occupations.



The table does not depict any hierarchy

Figure 22: Occupations, Tracks, and Verticals in SPD Sub-sector

Chapter
4

MIDDLE-LEVEL JOB ROLES - SPD

- Middle-level Job Roles
- Middle-level Job Roles in the SPD Sub-sector
- SPD Sub-sector: Occupations, Tracks, Verticals and Middle-level Job Roles

MIDDLE

MIDDLE-LEVEL JOB ROLES - SPD

Middle-level Job Roles

Across the IT–BPM industry, there are three levels of management:

- Entry Level
- Middle Level
- Leadership Level

A middle-level job role is the first step to a management career in the IT–BPM industry. It ranges from first-level supervisors to managers who manage supervisors, and sometimes even managers of managers. They are responsible for carrying out and implementing the goals set out by top management. Often they assist and motivate the entry-level employees to achieve business objectives. Their role also includes acting as a liaison between the top level and the entry level by offering suggestions and feedback to both the groups.

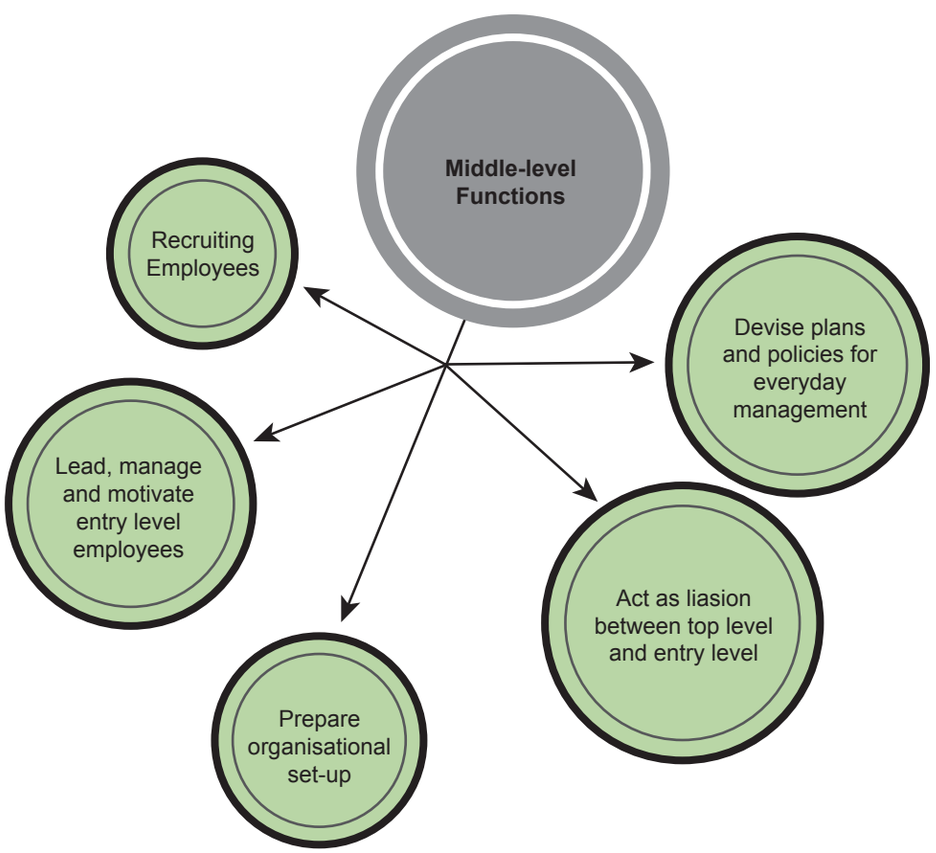
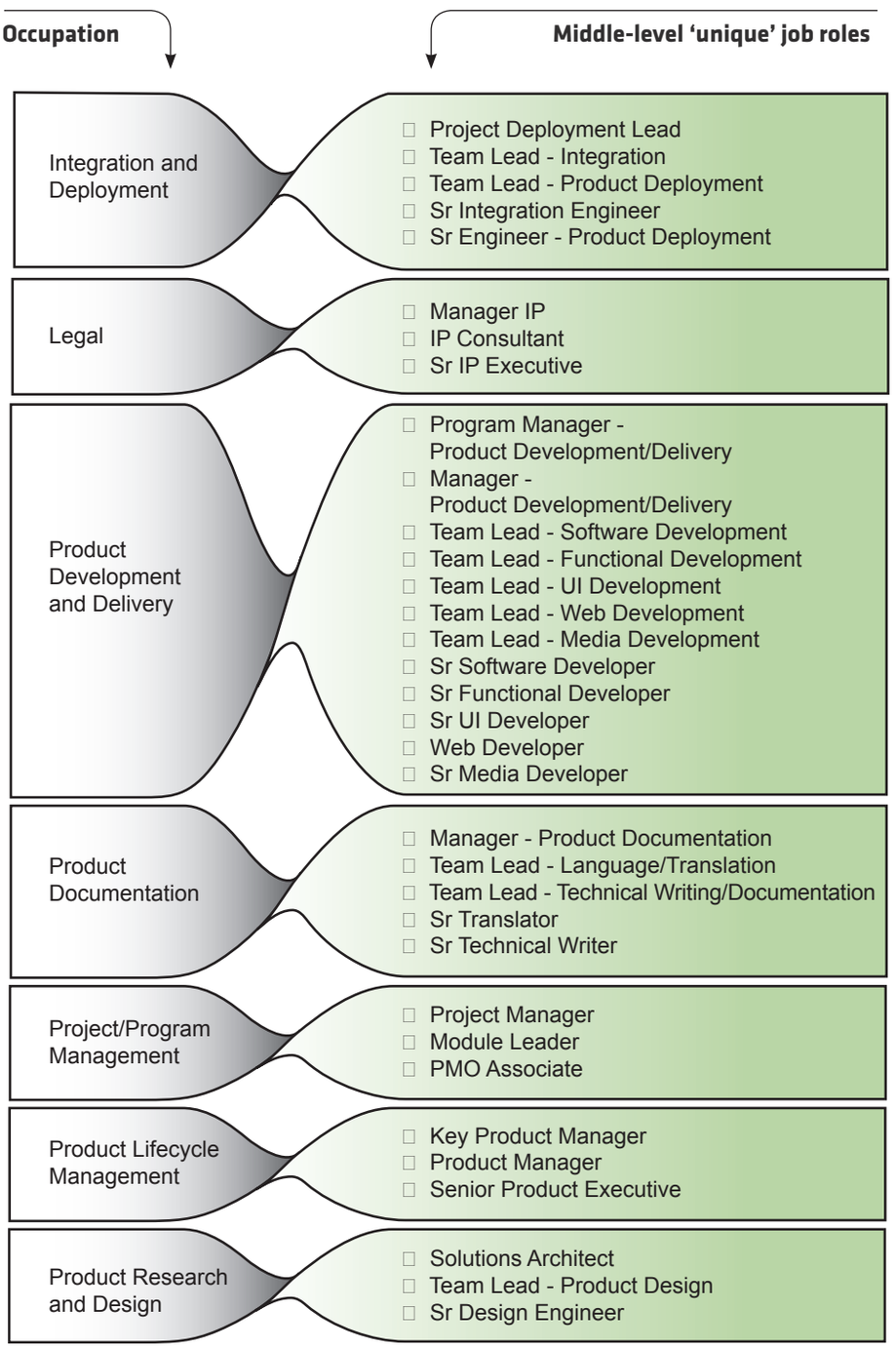


Figure 7: Functions of Middle-level Management

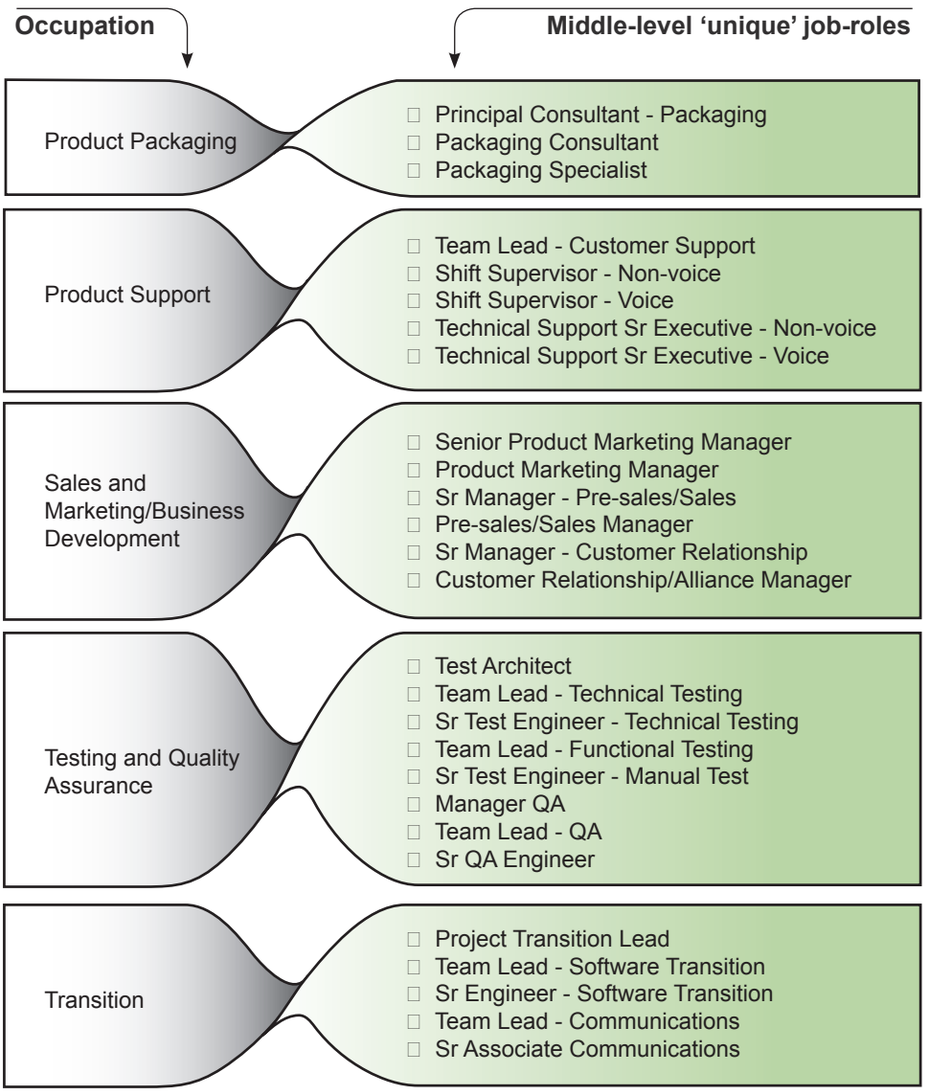
Middle-level Job Roles in the SPD Sub-sector

Middle-level job roles in the SPD sub-sector include technical and specialist roles like Sr Engineers, First-level Supervisors, Packaging and other specialists, and also employees in the managerial domain like Senior Managers and Managers with specific occupational specialisations.

The table below lists unique middle-level job roles in the SPD sub-sector.



Middle-level Job Roles in the SPD Sub-sector (Contd)



The table does not depict any hierarchy

SPD Sub-sector - Occupations, Tracks, Verticals and Middle-level Job Roles

The IT-BPM industry in India offers unparalleled employment opportunities across the entire spectrum of its service offerings. Middle-level management has the maximum number of job roles as it encompasses people with 2-10 years of work experience. In smaller organisations, there may be only one layer of middle-level of management, but in larger enterprises, there may be multiple layers of middle-level management. This includes first-level supervisors, managers of supervisors, and managers of managers as well.

In total, there are about 63 unique job roles at the middle level across different occupations, tracks, and verticals in the SPD sub-sector.

The subsequent table shows how each of these job roles is mapped to different tracks and occupations in this sub-sector.

Key Definitions
Occupation is a set of job roles, which perform similar/related set of functions in an industry.

***Tracks** are a sub-set of occupations having similar set of functions under the larger gamut of the occupation they belong to.*

***Unique Job Roles** defines a set of functions that together form a unique employment opportunity in an organisation.*

***Entry Level:** 0-2 years*
***Middle Level:** 2-10 years*
***Leadership Level:** >10 years*

SPD Sub-sector - Occupations, Tracks and Verticals

The table does not depict any hierarchy

Figure 24: BPM Sub-sector- Occupations, Tracks, Verticals, and Middle Level Job Roles

MIDDLE-LEVEL JOB ROLES - SPD

Chapter
5

LEADERSHIP-LEVEL JOB ROLES - SPD

- Leadership-level Job Roles
- Leadership-level Job Roles in the SPD Sub-sector
- SPD Sub-sector: Occupations, Tracks, Verticals and Leadership-level Job Roles

LEADERSHIP

LEADERSHIP-LEVEL JOB ROLES - SPD

Leadership-level Job Roles

Across the IT–BPM industry, there are three levels of management:

- Entry Level
- Middle Level
- Leadership Level

A leadership-level job role is one of the top level job roles in the SPD sub-sector. The top-level management generally consists of occupation leads as well as Assistant Vice President (AVP), Vice President (VP), and Senior Vice-President (SVP) level roles. The top-level management determines the objectives, policies, and plans of the organisation. They devise long-term strategy, organisational objectives, and goals, and are also involved in mobilising resources. The top-level management are the final authority in the organisation. They are directly responsible to the major stakeholders.

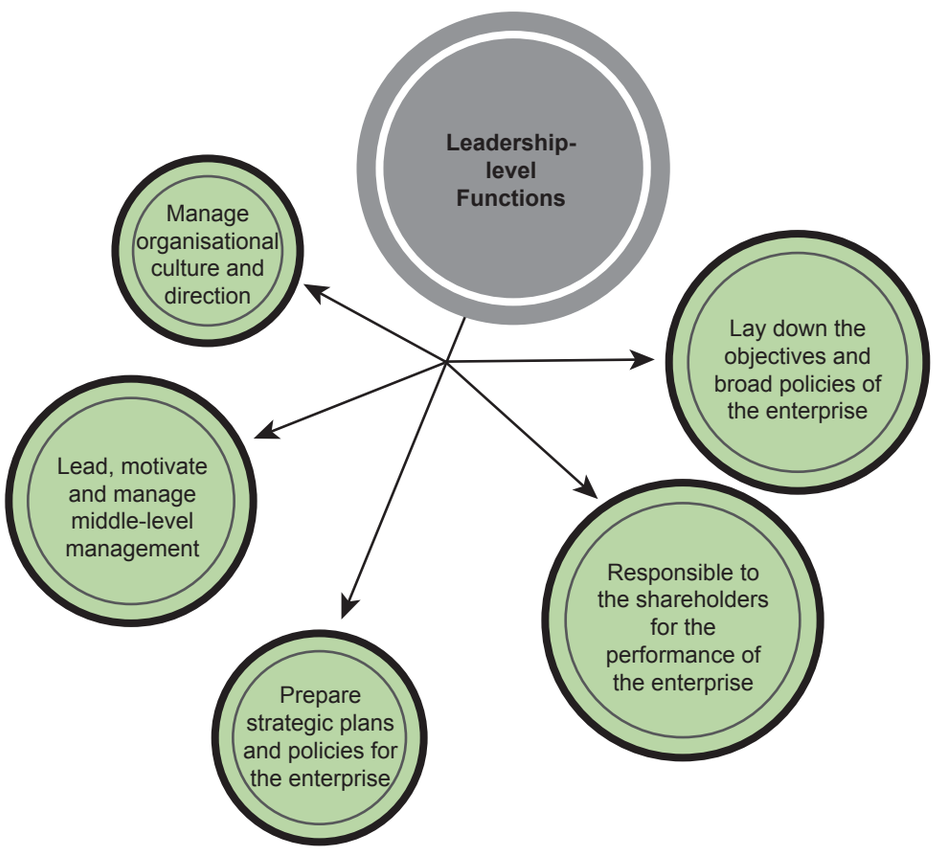
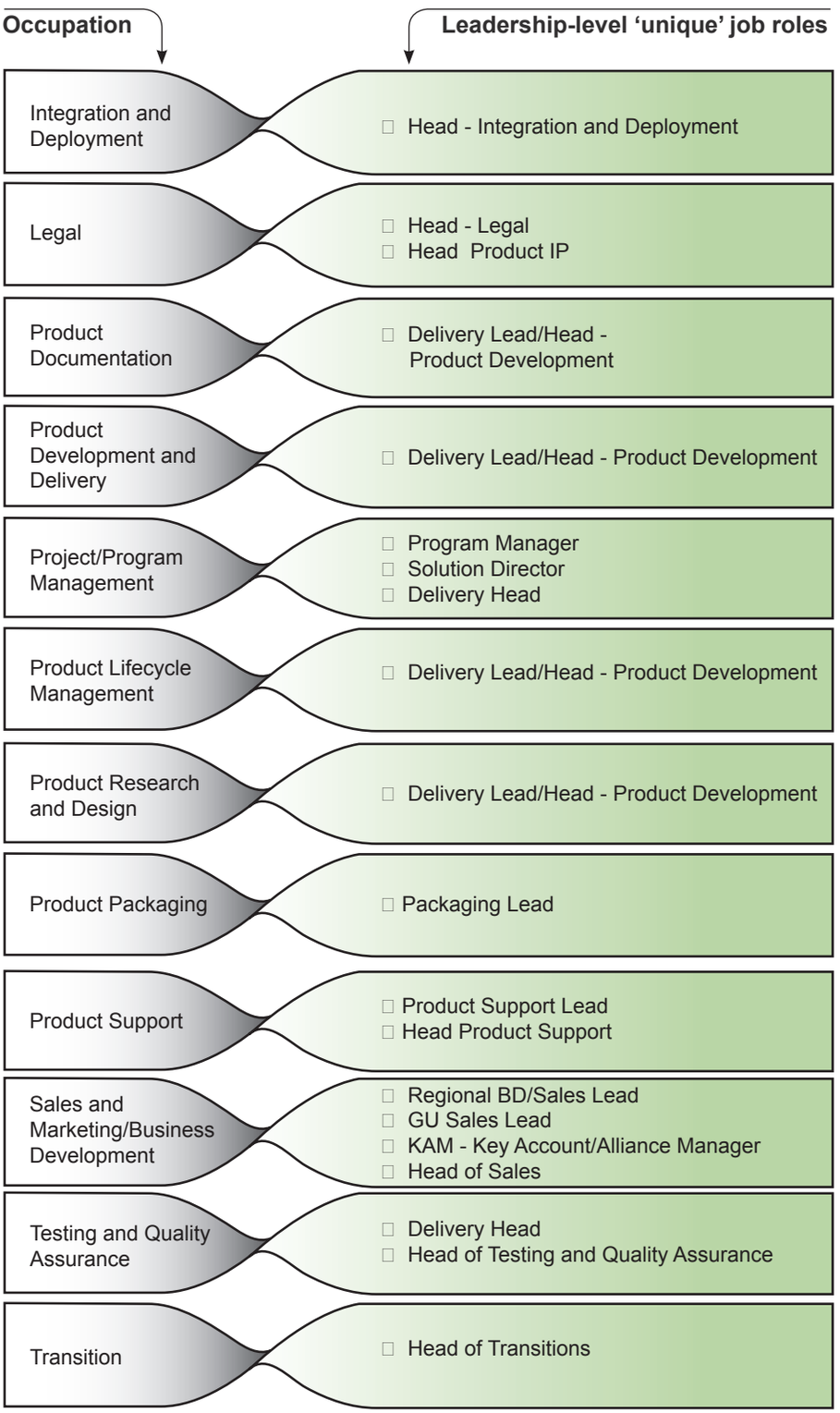


Figure 8: Functions of Leadership-level Management

Leadership-level Job Roles in the SPD Sub-sector

Leadership-level job roles in the SPD sub-sector include roles such as Heads of Departments, Chief Architects, and Department Leads. The table below lists the unique leadership-level job roles in the SPD sub-sector.



The table does not depict any hierarchy

SPD Sub-sector - Occupations, Tracks, Verticals and Leadership-level Job Roles

The IT-BPM industry in India offers unparalleled employment opportunities across the entire spectrum of its service offerings. The leadership-level job roles are the top level roles in any organisation, and require managerial and strategic decision-making along with expertise and domain knowledge of the industry. Employees may move up the ranks in the same organisation to reach these levels, or may move from one organisation to another, sometimes even from outside the industry.

In total, there are about 21 unique job roles at the leadership level across different occupations, tracks, and verticals in the SPD sub-sector.

The subsequent table shows how each of these job roles is mapped to different tracks and occupations in this sub-sector.

Key Definitions
Occupation *is a set of job roles, which perform similar/related set of functions in an industry.*

Tracks *are a sub-set of occupations having similar set of functions under the larger gamut of the occupation they belong to.*

Unique Job Roles *defines a set of functions that together form a unique employment opportunity in an organisation.*

Entry Level: *0-2 years*
Middle Level: *2-10 years*
Leadership Level: *>10 years*

SPD Sub-sector - Occupations, Tracks and Verticals

Industry Verticals	Occupation	Tracks	Manufacturing	BFSI	Media and Entertainment	Government	Telecom	Retail	Construction & Heavy Engg. (C&HE)	Healthcare	Education	Emerging Verticals
			Leadership-level Job Roles									
	Integration and Deployment	Integration (Software and Hardware)	Head - Integration and Deployment									
		Product Deployment										
	Legal	Legal	Head-Legal							Head Product IP		
	Product Documentation	Technical Writing/Documentation	Delivery Lead / Head - Product Development									
		Language/Translation										
	Product Development and Delivery	Software Development	Delivery Lead / Head - Product Development									
		Functional Development										
		UI Development										
		Media Development										
		Web Development										
Emerging Occupations	Project/Program Management	Project/Program Management	Program Manager						Solution Director		Delivery Head	
	Product Lifecycle Management	Product Lifecycle Management	Delivery Lead/Head - Product Development									
	Product Research and Design	Product Research and Design	Delivery Lead/Head - Product Development									
	Product Packaging	Product Packaging	Packaging Lead									
	Product Support	Product Support	Head Product Support							Product Support Lead		
	Sales and Marketing/ Business Development	Product Marketing	Regional BD/ Sales Lead							GU Sales Lead	Head of Sales	
		Product Pre-sales/Sales (includes inside sales)										
		Relationship Management/Alliance	KAM-Key Account/ Alliance Manager									
	Testing and Quality Assurance	Automated Testing	Delivery Lead							Head of Testing and Quality Assurance		
		Manual Testing										
		QA										
	Transition	Software Transition	Head of Transitions									
		Transition Communication										

The table does not depict any hierarchy

Chapter
6

OCCUPATIONS AND ROLES IN THE SPD SUB-SECTOR

- In Summary
- Occupations Within the SPD Sub-sector
- Description of Each Occupation
- Occupational Map for each Occupation
- Typical Career Paths

OCCUPATIONS

In Summary

Based on industry research as part of the Occupational Analysis, the occupations in the sub-sector have been classified as follows:

12 unique 'Occupations'

23 unique 'Tracks'

18 unique Job roles at the Entry Level

63 unique Job roles at the Middle Level

21 unique Job roles at the Leadership Level

Key Definitions
Occupation *is a set of job roles, which perform similar/related set of functions in an industry.*

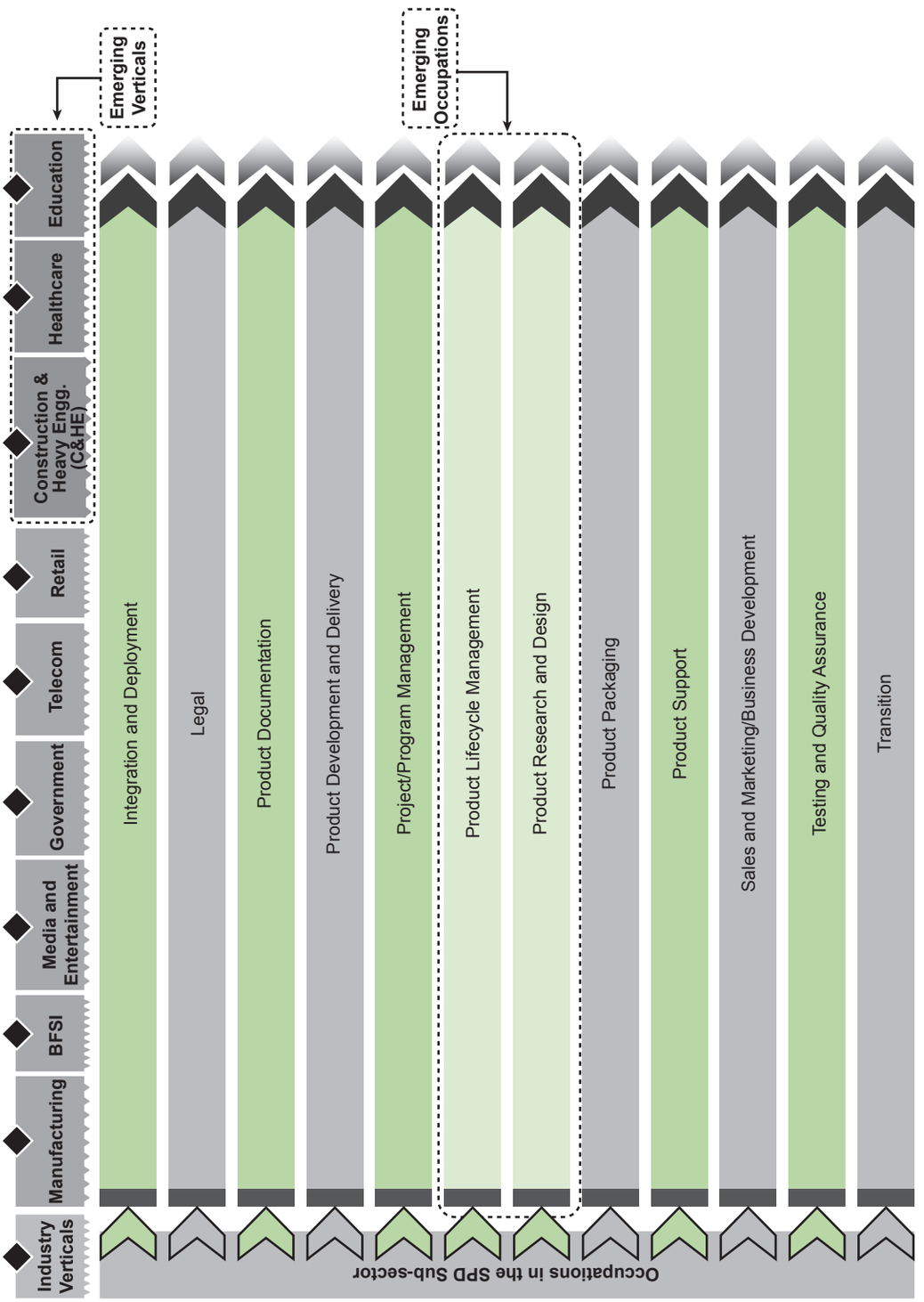
Tracks *are a sub-set of occupations having similar set of functions under the larger gamut of the occupation they belong to.*

Unique Job Roles *define a set of functions that together form a unique employment opportunity in an organisation.*

Entry Level: *0-2 years*
Middle Level: *2-10 years*
Leadership Level: *>10 years*

Occupations in the SPD Sub-sector

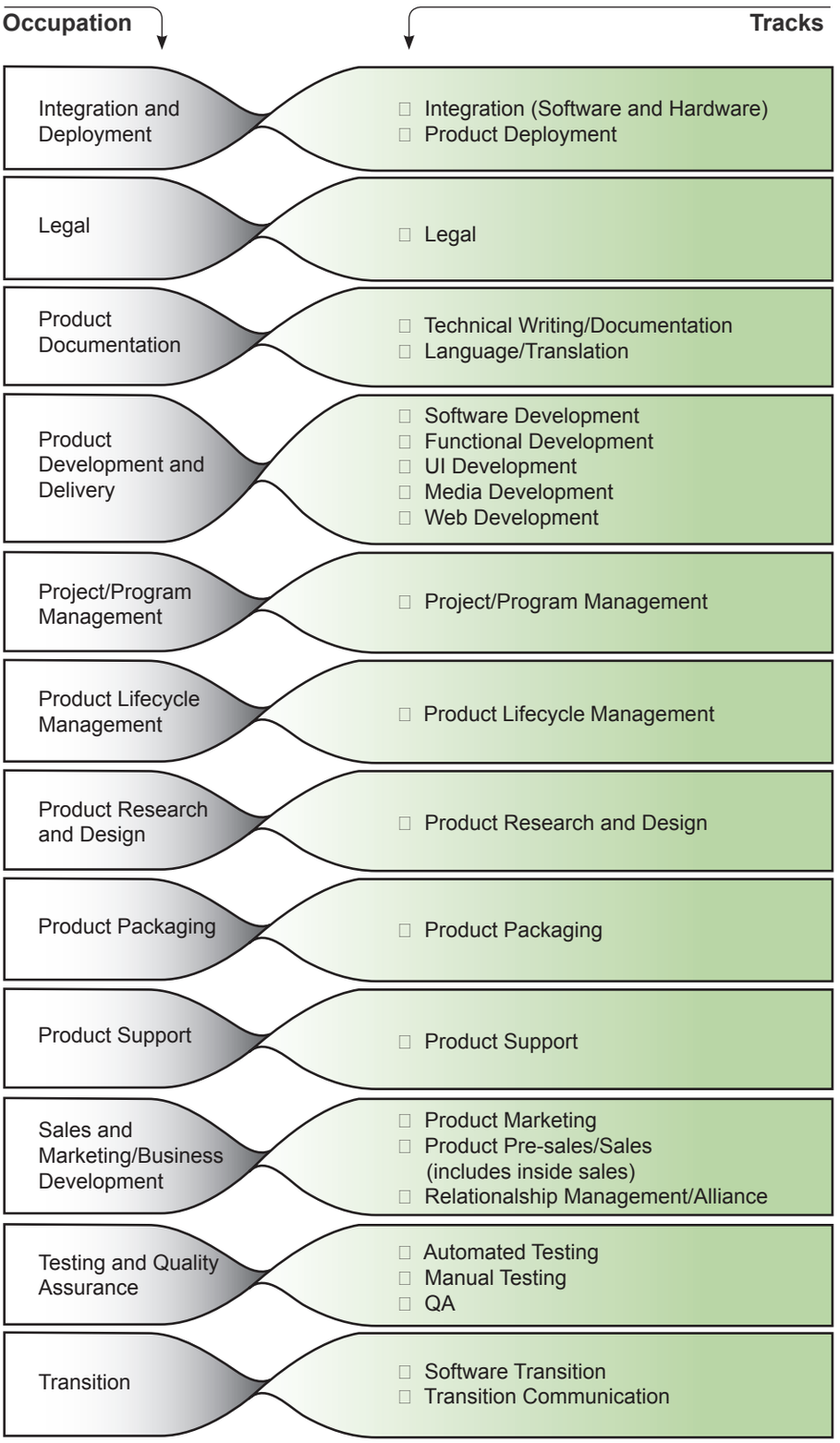
Occupations identified under the matrix below have been classified further to indicate 'tracks'. Some occupations like 'Legal' did not require a further split, and hence they have a single track (same as the occupation name).



The table does not depict any hierarchy

Figure 27: SPD Sub-sector industry structure

Occupations have been classified into 'Tracks' to capture further skill-based specialisations



Additionally, typical career paths have been identified, and drawn out for each of the occupations. These too have been indicated in the following pages.

Occupational Map – Reading Guide

Figure 28: Occupation Map - Guide

Career Map – Reading Guide

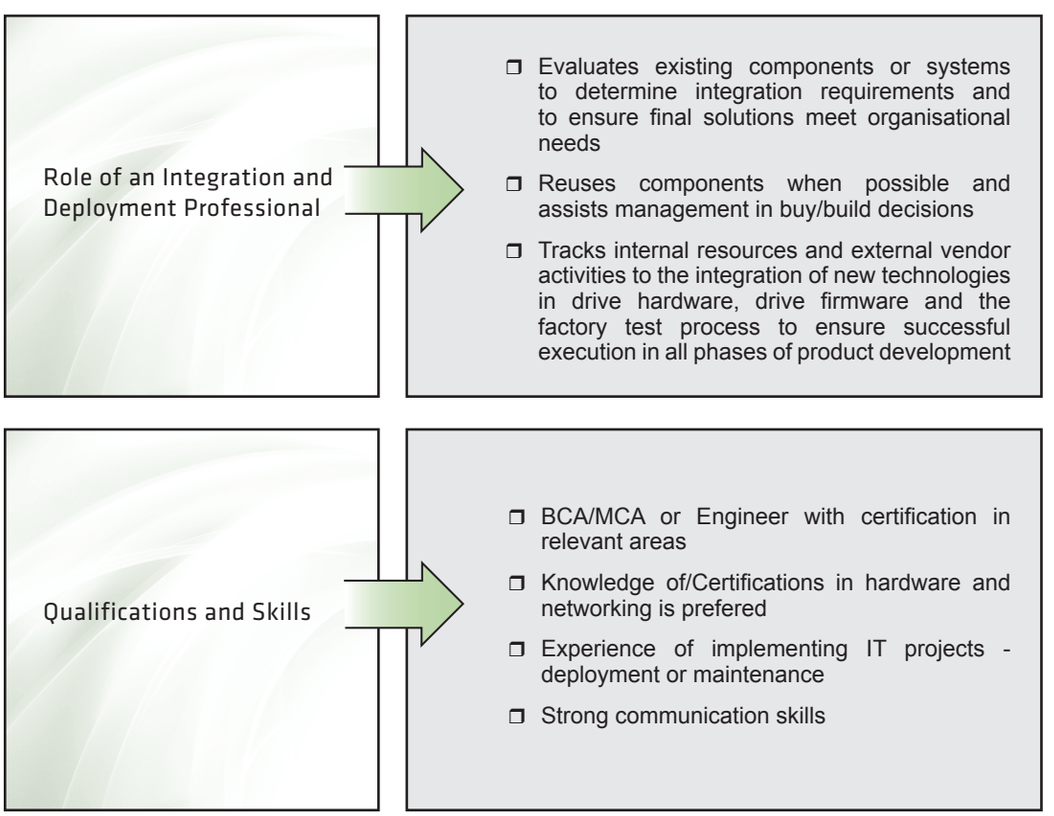
Integration and Deployment

Integration and Deployment involves development and implementation of solutions, and coordinating applications across the enterprise or its units/departments. Professionals in this occupation are responsible for planning and managing project-related activities for the integration of new hardware and software to the client site as well as migration to the desired platform.

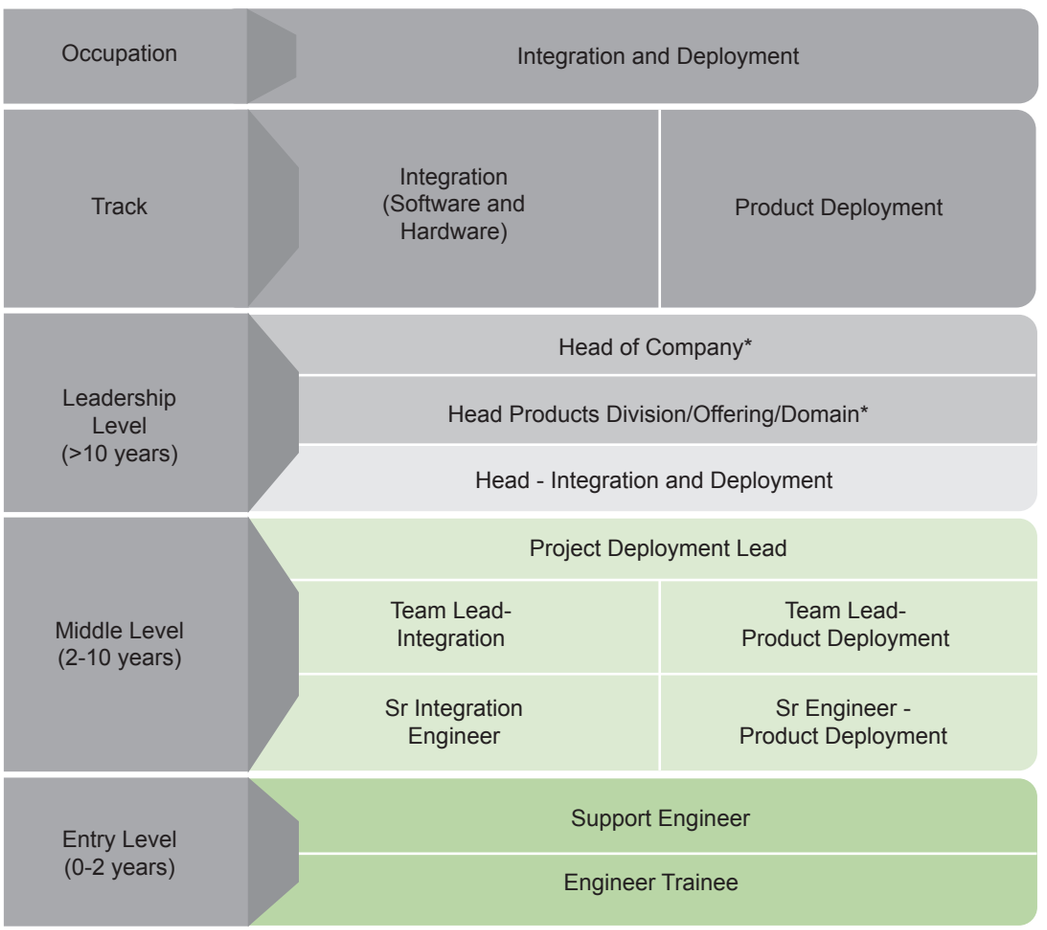
Deployment services include activities, expertise, and systems that provide the customer with proper installation, and configuration of all packaged and customised software products. Deployment professionals are responsible for ensuring that hardware and software systems are fully deployed, implemented, and functioning.

Hardware Deployment and Support: Hardware Deployment and Support roles are responsible for installation and support of a specific hardware device. The service is focused on the device and its components rather than on the software that is running on the device. Installation activities can include hardware staging and configuration, testing and debugging, site preparation, and physical installation of the device.

Software Deployment and Support: Software Deployment and Support roles are responsible for providing the customer with proper installation and configuration of all packaged software products as well as with appropriate ongoing support, access to resources, and distribution of software product releases, updates, and upgrades.

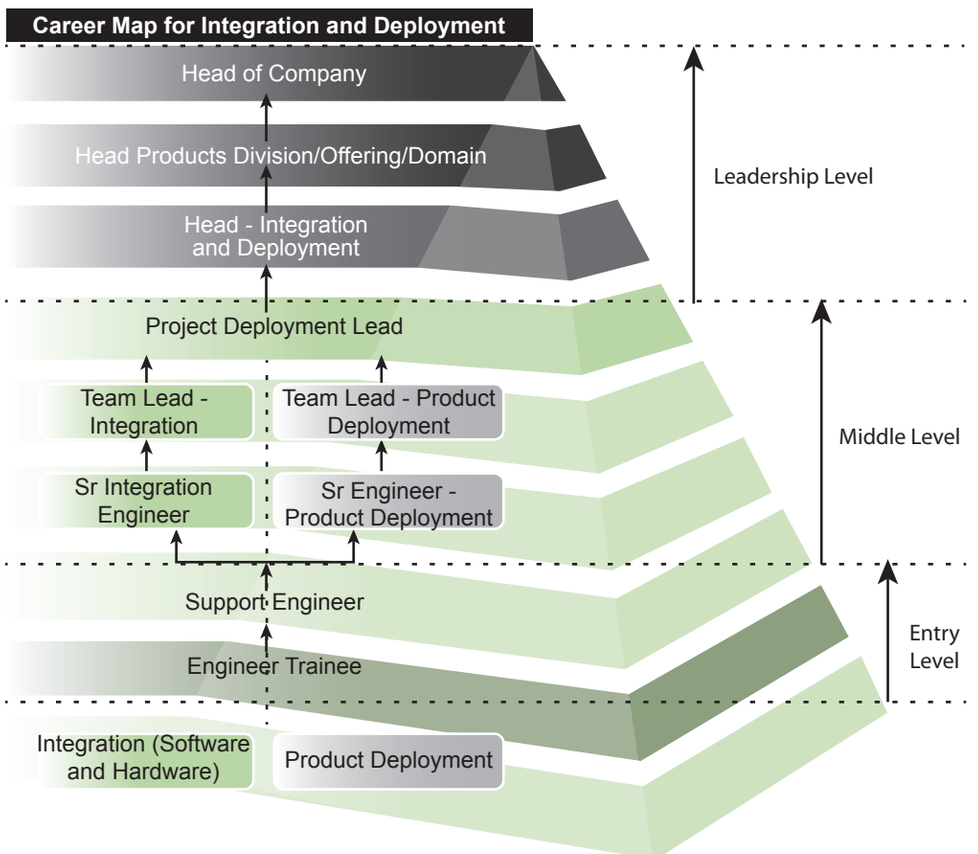


Integration and Deployment - Occupational Map



*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

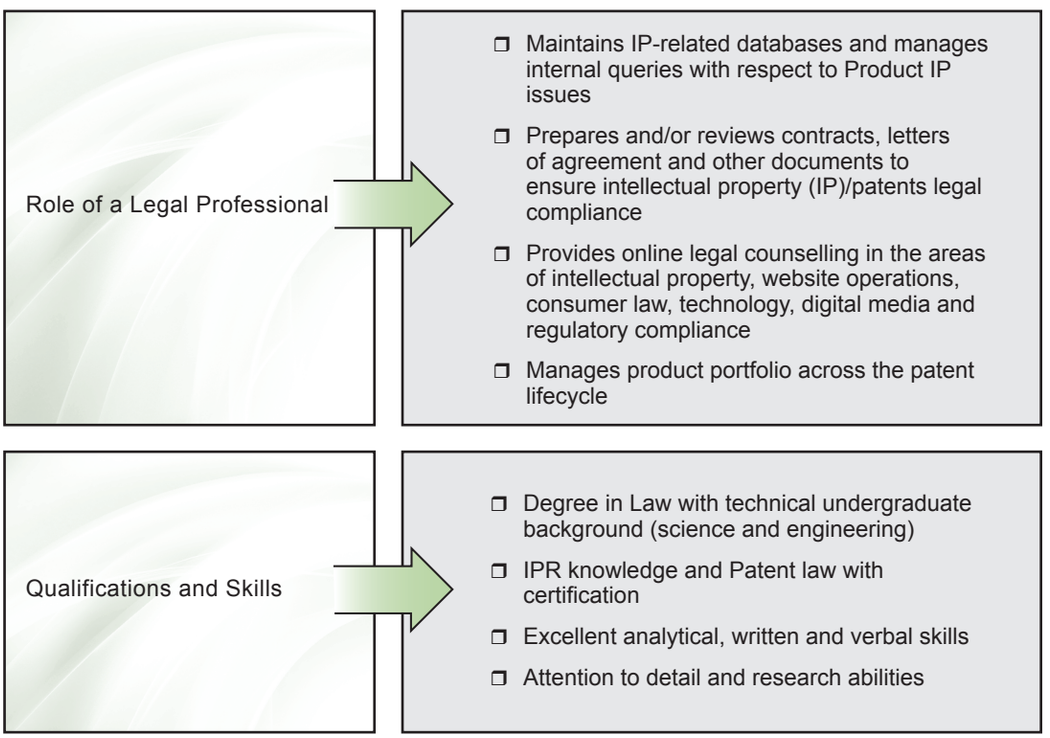
Integration and Deployment - Typical Career Paths



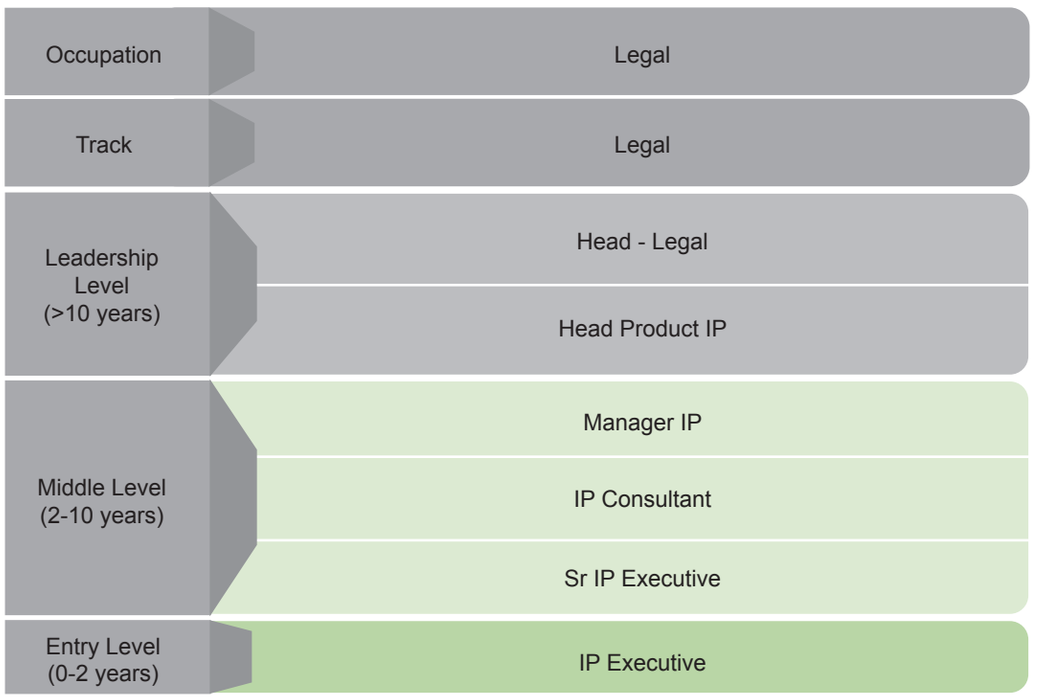
*Note: Career growth across the Leadership Levels is usually governed by cross functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Legal

The Legal occupation within the SPD sub-sector is responsible for drafting and maintaining licensing and commercial agreements to ensure protection of the company's intellectual property/patent. They are responsible for providing legal support for different business entities, and contribute towards moulding the business strategy by highlighting the legal aspects of the options being considered.

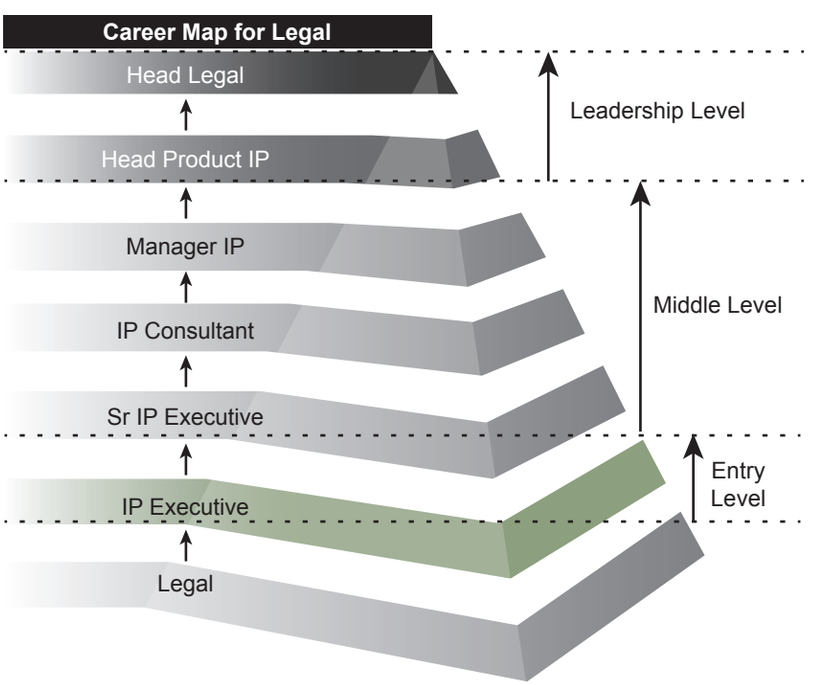


Legal - Occupational Map



The map does not depict any hierarchy

Legal - Typical Career Paths



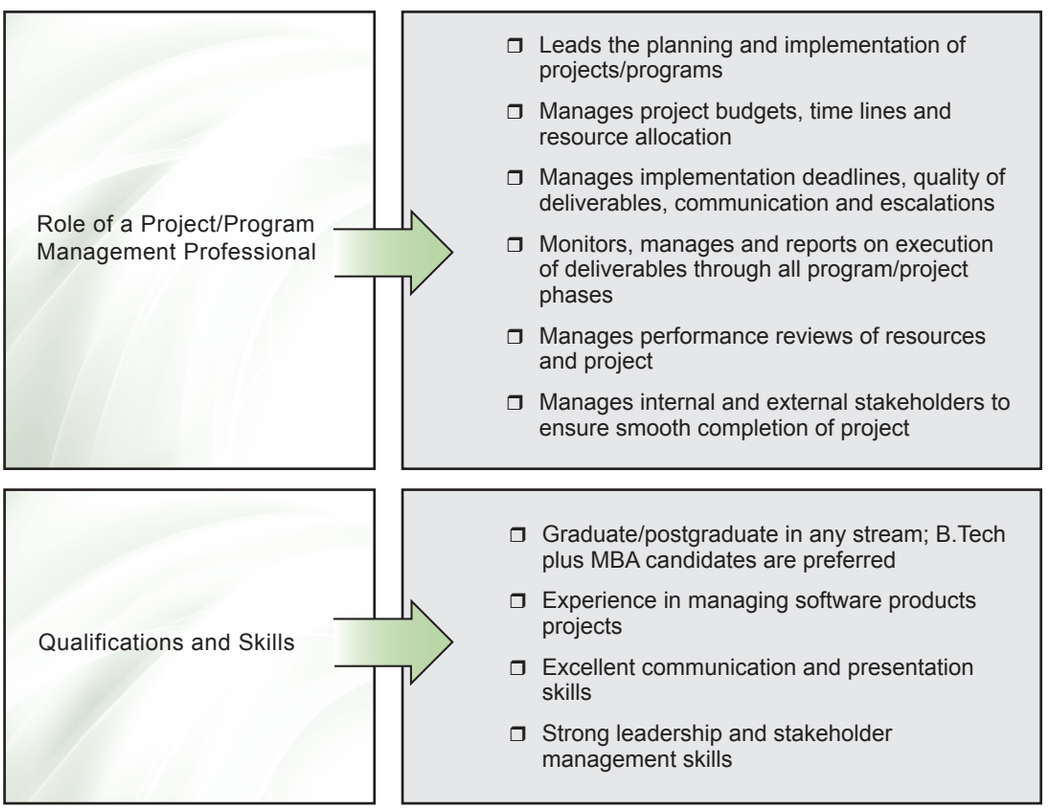
*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. Since Legal is a highly specialised and a support function only we have not linked a movement to Head of the Offering/Company level roles. The map does not depict any hierarchy.

Project/Program Management

Project/Program Management includes the set of activities to plan, implement, monitor, and control projects. It includes managing project financials, overseeing delivery, reporting, and stakeholder management.

The scope of project management will vary depending on the project nature – product design, integration, or end-to-end development, etc.

Program Management involves managing multiple smaller projects under the gamut of a larger 'programme'.

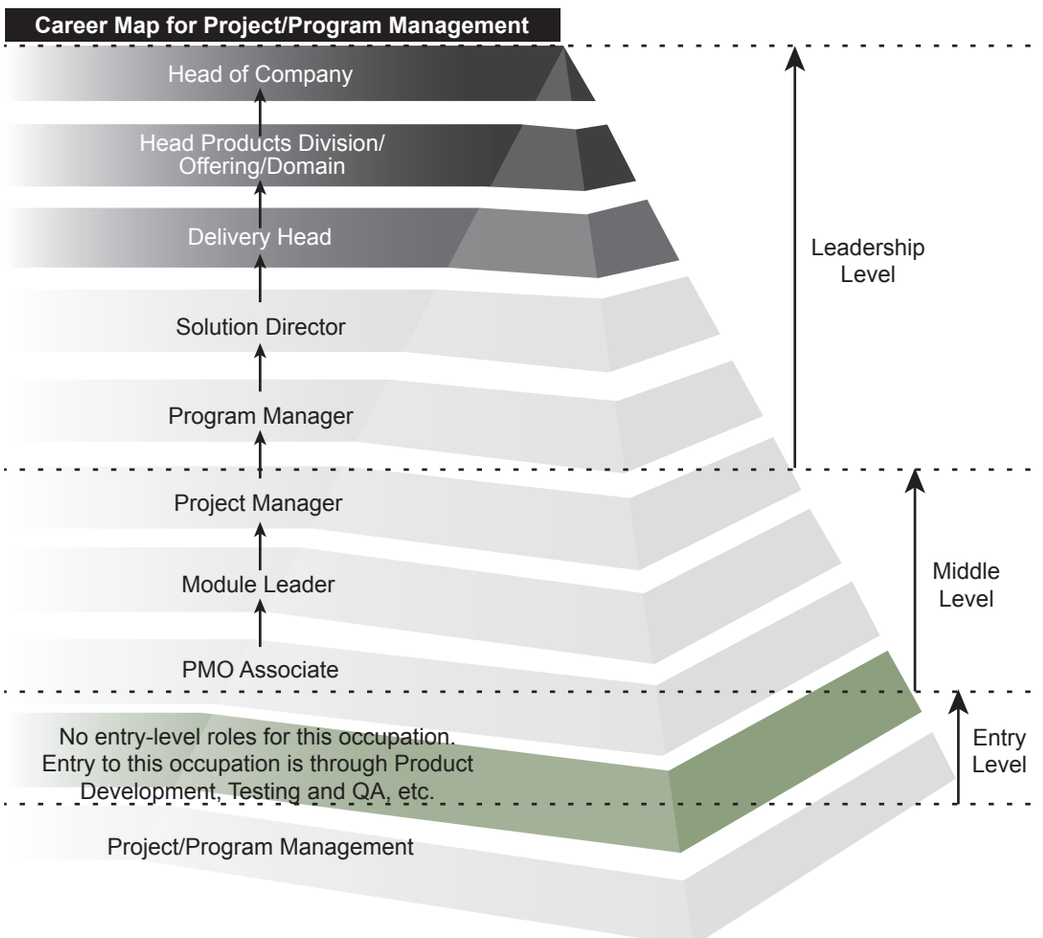


Project/Program Management - Occupational Map

Occupation	Project/Program Management
Track	Project/Program Management
Leadership Level (>10 years)	Head of the Company*
	Head Products Division/Offering/Domain*
	Delivery Head
	Solution Director
	Program Manager
Middle Level (2-10 years)	Project Manager
	Module Leader
	PMO Associate
Entry Level (0-2 years)	*No entry-level roles for this occupation.* *Entry to this occupation is usually through Product Development, Testing, and QA, etc.*

*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

Project/Program Management - Typical Career Paths



*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Product Management

Product Management involves handling the product through the entire lifecycle – from inception to its phasing out – performing associated tasks with each phase.

Professionals in this occupation manage different versions/releases of products and support customers.

Product Management has been further divided into four key occupations:

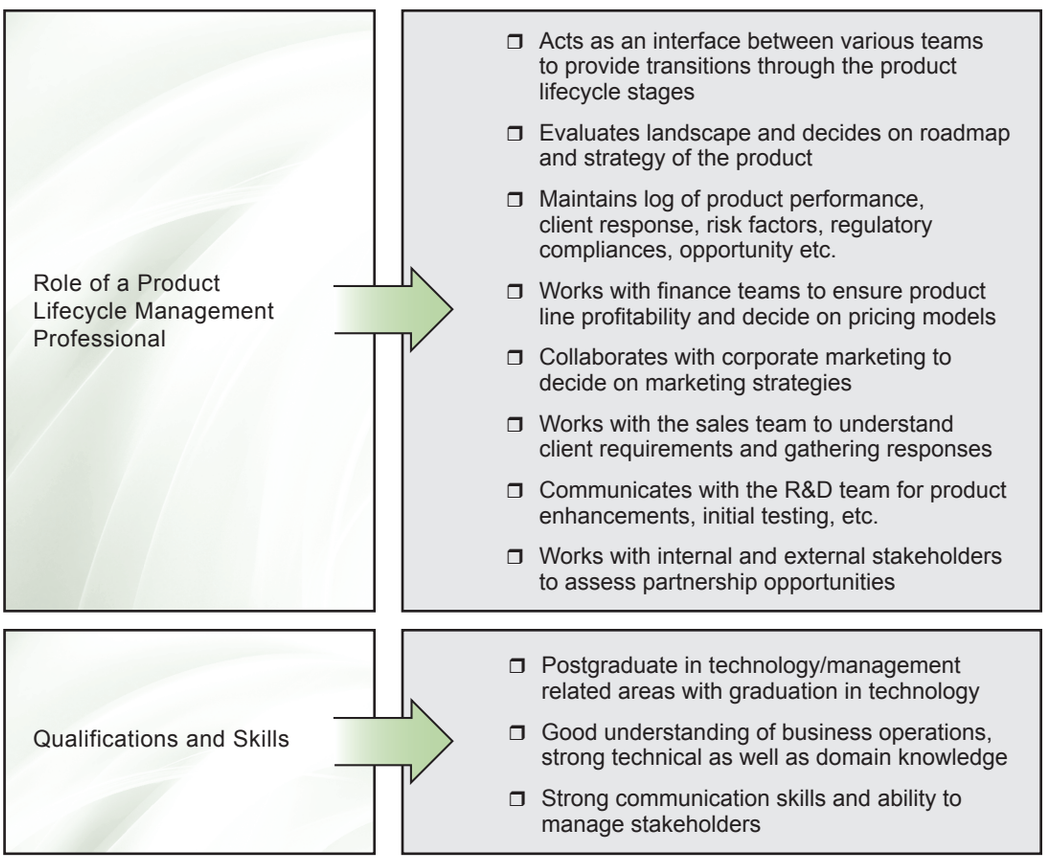
a) Product Lifecycle Management
b) Product Research and Design
c) Product Development and Delivery
d) Product Documentation

Each of these has been described in detail followed by the occupational map and career paths for Product Management as a whole.

Product Lifecycle Management

Product Lifecycle Management (PLM) is the process of managing the entire lifecycle of a product from its conception, design, manufacture, and service to disposal. PLM integrates people, data, processes, and business systems, and provides a product information backbone for companies and their extended enterprise. PLM systems help organisations to cope with the increasing complexity and engineering challenges of developing new products.

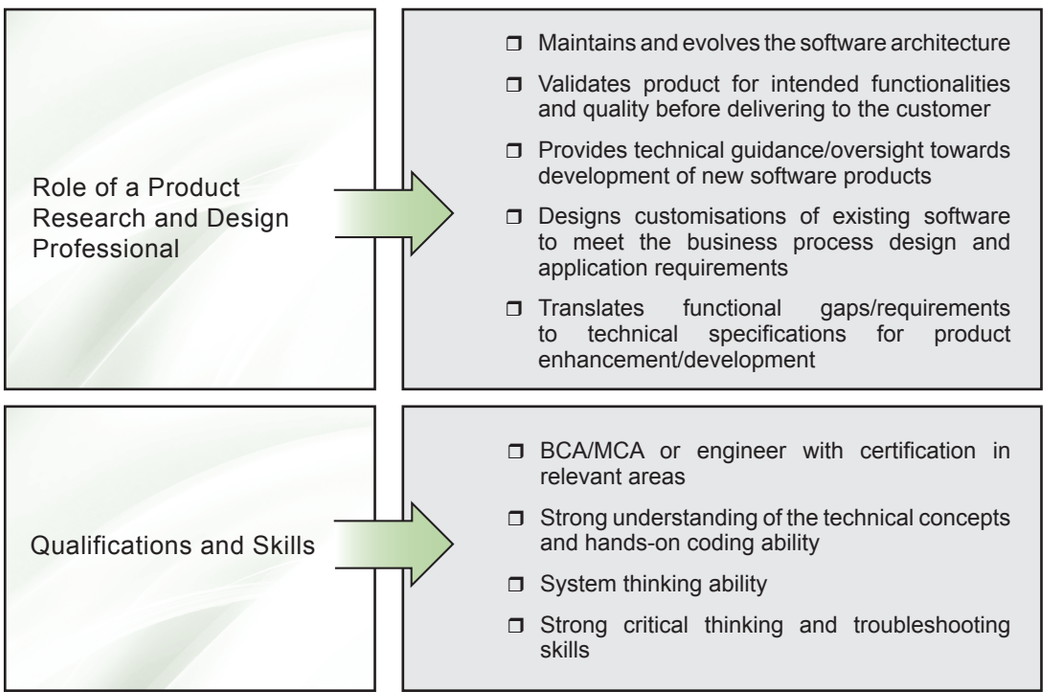
PLM roles involve, but are not restricted to, research, representing and advocating products to the customers and marketplace, product market opportunity identification, competitive landscape analysis, developing partnership/ alliance opportunities with third parties, facilitating contractual, product positioning, and pricing strategies.



Product Research and Design

Product Research and Design involves conceptualising and developing a product based on customer/ market needs.

Professionals in these roles contribute during all aspects of software development lifecycles, including requirement analysis, design, implementation and testing.



Product Development and Delivery

Product Development and Delivery is the set of functions, job roles, and activities involved in the development of a software product.

It includes the development of relevant software, graphics, media, and documentation required to make the product ready to be implemented and used.

Software Development: Software Development roles are responsible for developing software applications as well as enhancements to existing packaged applications as part of the development of a software product.

Professionals involved in software development use specialised knowledge of software programming languages, software integration, and delivery platforms to build software products and deliver business solutions. The job also involves application enhancement, debugging, maintenance, and documentation.

Web Development: Web Development roles are responsible for designing and maintaining web-based applications including static and dynamic content. These may be stand-alone or work along with application/functional developers as part of the overall solution that includes a web-based component.

User Interface Development: User Interface (UI) Development roles are responsible for designing UIs for the developed application. These may be standalone or work along with application/functional developers to include specific functionalities in the UI as part of the overall solution.

Media Development: Media Development roles are responsible for designing and improving the look and feel, functionality and graphic appeal of the developed application. These may work stand-alone or along with application/functional developers to improve the aesthetics of the application being developed.

Role of a Product Development and Delivery Professional	❒ Captures data and translates and transforms it into a processing language ❒ Develops codes from relevant information and performs the tasks required for scheduling, processing and monitoring them ❒ Tracks all defects and provides bug fixes ❒ Media developers, Web developers and UI developers use software to develop front-end applications with smart graphics and enhanced look and feel and usability features
Qualifications and Skills	❒ Product developers in the identified tracks require significantly different entry-level qualifications and skills ❒ Software developers, Functional developers and UI developers require relatively higher end qualifications and skills ● BCA/MCA or engineer with certification in relevant areas ● Problem solving and strong analytical capability ● Functional skills like software languages (Java, C/C++, dot net, Perl) are highly essential for professionals in the Software/ functional development tracks ❒ Media and Web developers ● Any graduate/diploma course with a specialist training program in Media designing; for a relevant skill, even undergraduate candidates are eligible ● Knowledge of programming logic and SDLC is desirable ● Creative thinking and attention to detail are the key skills for these roles

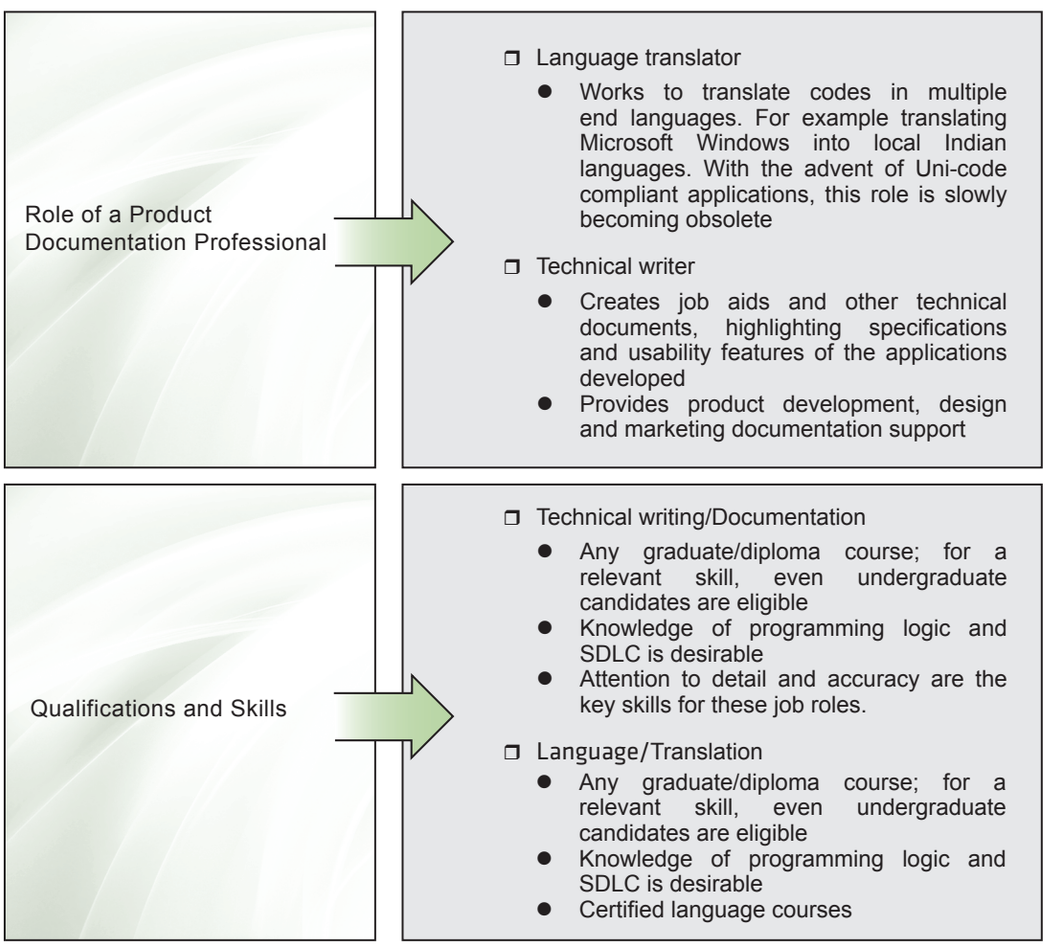
Product Documentation

Product Documentation involves understanding the audience, and developing a range of documentation including technical manuals, user manuals, help documents, and training material in order to meet specific transition/education needs.

Product documentation is usually the last set of activities in product development and delivery process, and aims to capture the technical and usability related specifications of the developed product.

Technical writing/Documentation: Technical writing roles are responsible for creating technical documentation related to an application; for example, job aids, help documents, and training materials. These documents serve the core purpose of transferring knowledge between application development teams and user teams.

Language/Translation: Translation roles are responsible for translating software applications into end-user languages. These extend beyond regular translator roles as they require understanding of software languages and platforms.



Product Management - Occupational Map

*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills, and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

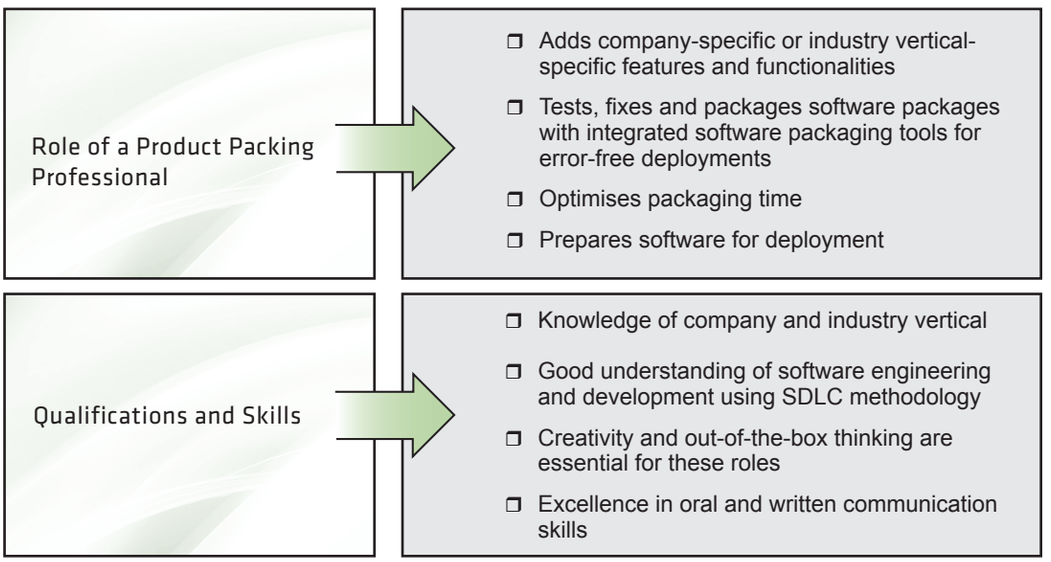
Product Management – Typical Career Paths

*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised The map does not depict any hierarchy.

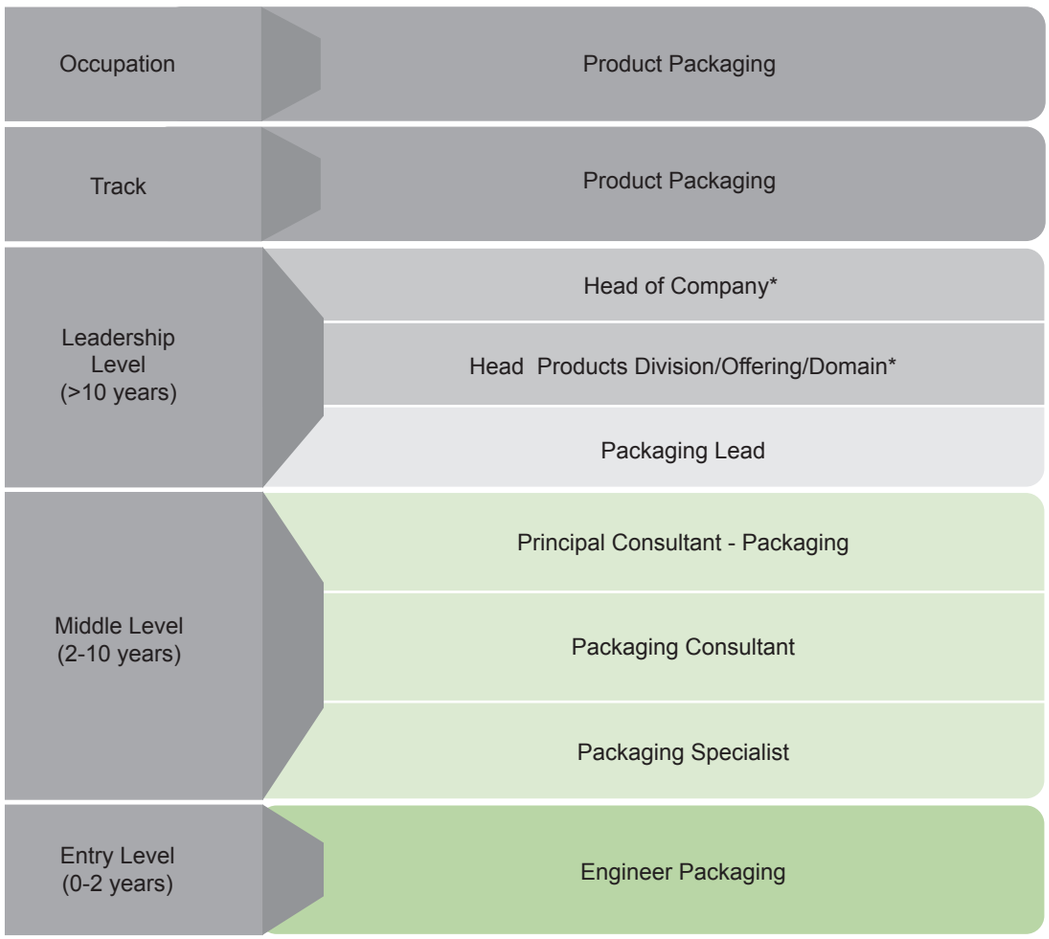
Product Packaging

Product Packaging involves creating a new, company-specific or industry vertical-specific image of a software product before releasing it. The benefits are easier implementation, reduced customizations efforts, and lower total cost of ownership.

It could also involve adding a collection of related application or utility software.

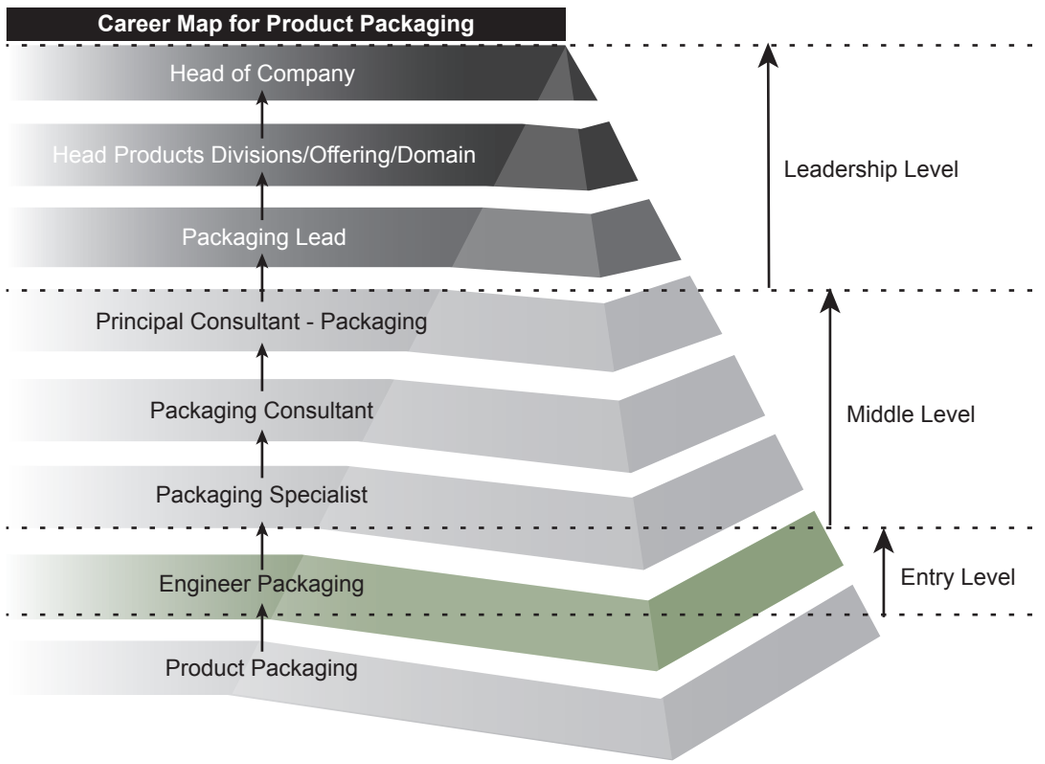


Product Packaging – Occupational Map



*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills, and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

Product Packaging – Typical Career Paths



*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

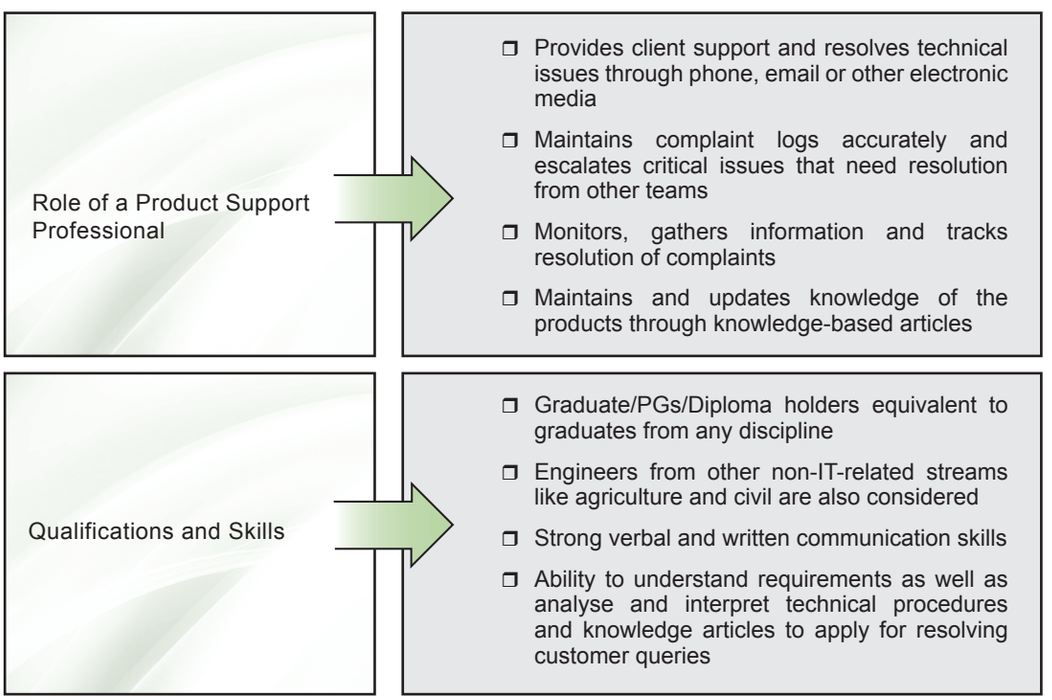
Product Support

Product Support includes help-desk services and desk-side support. Customer relationship management (CRM) entails all aspects of interaction that a company has with its customers, whether sales or service-related, through any media. It is primarily the process of managing and resolving all client queries and issues.

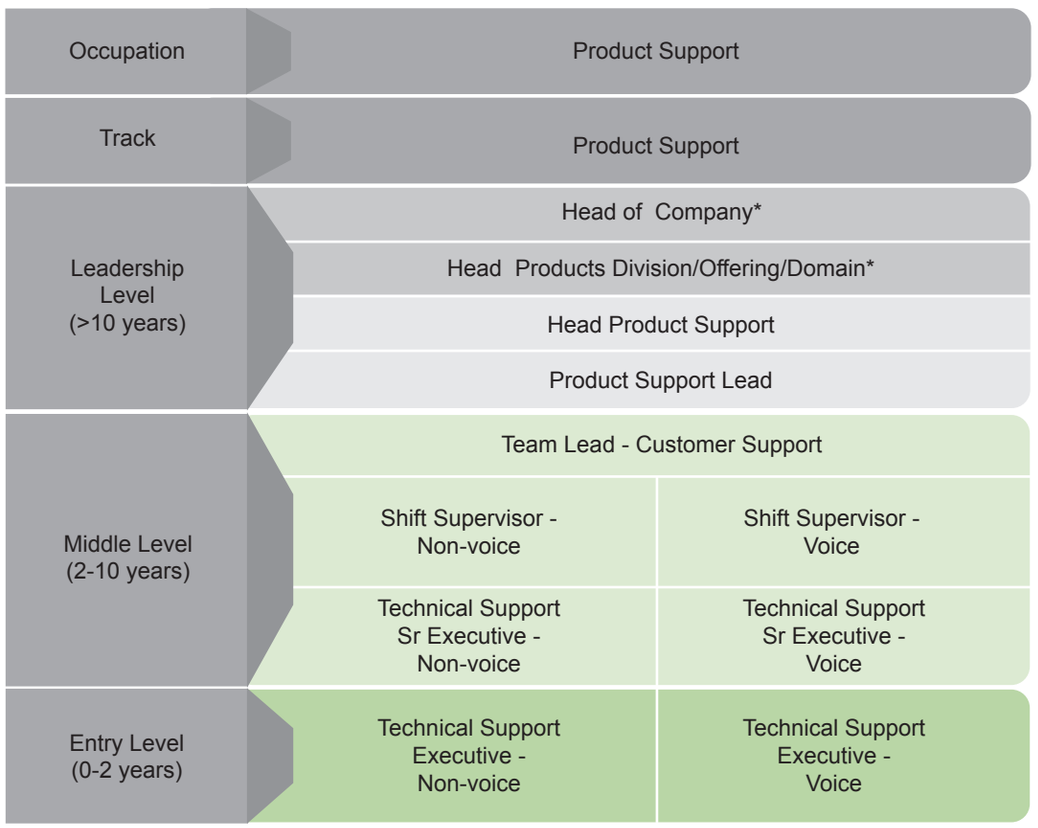
Product support professionals form the primary layer of contact with the customer. They are required to have a broad understanding of the industry and domain as well as the product and services portfolio to aid and enable quick and effective resolution of queries.

Customer Care (Non-voice) - email and chat: The professionals engaged in this occupation perform query resolution and customer care over Web-chat or email. Responses may be made on either pre-existing email templates or framed mails customised to the requirement of the query. For slightly complex queries/situations, this may require greater interaction.

Customer Care (Voice): This activity involves managing and resolving client queries/issues primarily through telephonic calls. They are required to resolve queries, and direct unresolved queries to the appropriate group. These professionals are required to have a broad understanding of all the products/services portfolio of the organisation to aid in responding to queries. An illustrative list of this process may include companies across sectors like banking, financial institutions, insurance firms, hardware/software vendors, utilities, travel & tourism, automotive and so on.

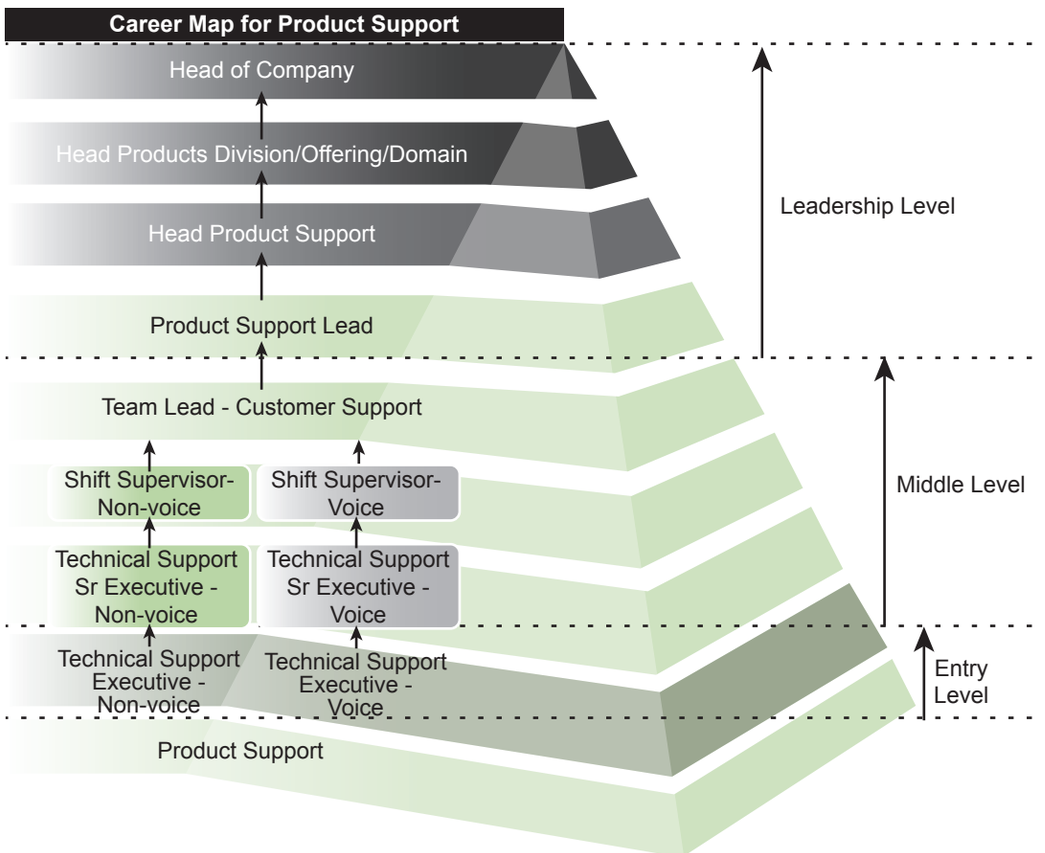


Product Support - Occupational Map



*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills, and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

Product Support – Typical Career Paths



*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Sales and Marketing/Business Development

Sales and Marketing/Business Development generates and develops business for the organisation. This involves developing business relationships, marketing, managing brands, and driving sales for the organisation.

These professionals develop a go-to-market strategy with entity leadership and OU/industry leads for assigned territories, and the strategic accounts within it. This could include build-outs for inside sales, field marketing, and alliance activities.

Product Marketing involves detailed market research to create product backlog or product funnel. The professionals working in this profession gather data and undertake exhaustive analysis including competitive analysis, to gather intelligence and provide inputs to teams involved in design, manufacturing, or management of product lifecycle.

Sales and Marketing/Business Development professionals develop and present technical products and services of an organisation to customers. They ensure the customers get a clear understanding of the technical capabilities the product and organisation can provide; technical questions are answered, and the presentation approach demonstrates the technical excellence of the organisation. In the SPD sub-sector, this includes the set of activities from pre-bid stage leading to the conclusion of the bidding process. Pre-sales teams collaborate heavily with delivery teams to prepare the solution, and bring in industry perspective.

Relationship Management involves developing and maintaining relationships with key clients to ensure development and implementation of plans, resources, and processes for the effective delivery of services. This requires proven project management skills. Relationship management also covers change management, contract management, and customer loyalty with the aim to maximise business opportunities. The alliance management part covers managing these relationships with key alliance partners like ERP vendors and product organisations to co-develop sales relationships.

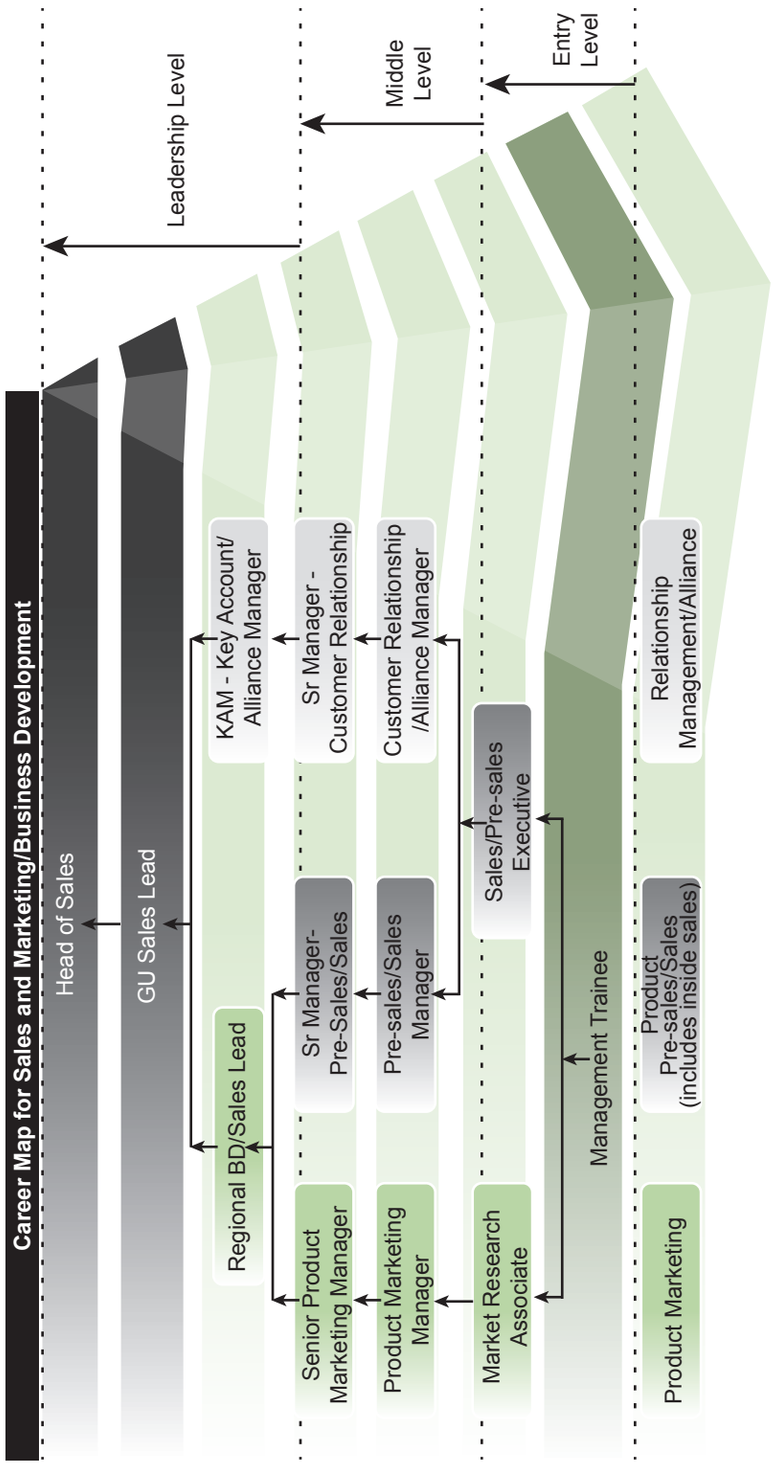
Role of a Sales and Marketing/Business Development Professional	❒ Gathers information about new/changed technical offerings from Business Model and Strategy and Technology Integration and summarises as per client requirements ❒ Manages alliances and relationship with sales partners like ERP product organisations ❒ Develops demonstrations of the technical and functional capabilities of the organisation to develop sales ❒ Supports key accounts by conducting demonstrations and defining special agreements with the clients ❒ Provides inputs about client requirements to product development teams
Qualifications and Skills	❒ Postgraduate in Technology/Management related areas with graduation in Technology areas ❒ Graduates can move laterally into Sales and Marketing/Business Development after developing experience and requisite skill set ❒ Good command over English language ❒ Action orientation and a go-getter spirit are the key skills needed in a Sales and Marketing/ Business Development profile

Sales and Marketing/Business Development - Occupational Map

Occupation	Sales and Marketing/Business Development		
Track	Product Marketing	Product Pre-sales/Sales (includes inside sales)	Relationship Management/ Alliance
Leadership Level (>10 years)	Head of Sales		
	GU Sales Lead		
	Regional BD/Sales Lead		KAM - Key Account/ Alliance Manager
Middle Level (2-10 years)	Senior Product Marketing Manager	Sr Manager- Pre-Sales/ Sales	Sr Manager- Customer Relationship
	Product Marketing Manager	Pre-sales/ Sales Manager	Customer Relationship/ Alliance Manager
Entry Level (0-2 years)	Market Research Associate	Sales/ Pre-sales Executive	
	Management Trainee		

*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills and attributes required for that role through exposure to different occupations as demonstrated in next page. The table doesn't depict any hierarchy.

Sales and Marketing/Business Development – Typical Career Paths



*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Testing and Quality Assurance

Testing and Quality Assurance includes conducting scheduled and unscheduled tests in the areas of integration, performance, and application, etc. Testing and Quality Assurance professionals act as the final check between the solution developed by the application developers and go-live.

Depending upon the structure of the organisation, QA professionals may be responsible only for laying out quality assurance processes and programme like TQM, ISO, etc. QA teams conduct periodic audits and drives compliance.

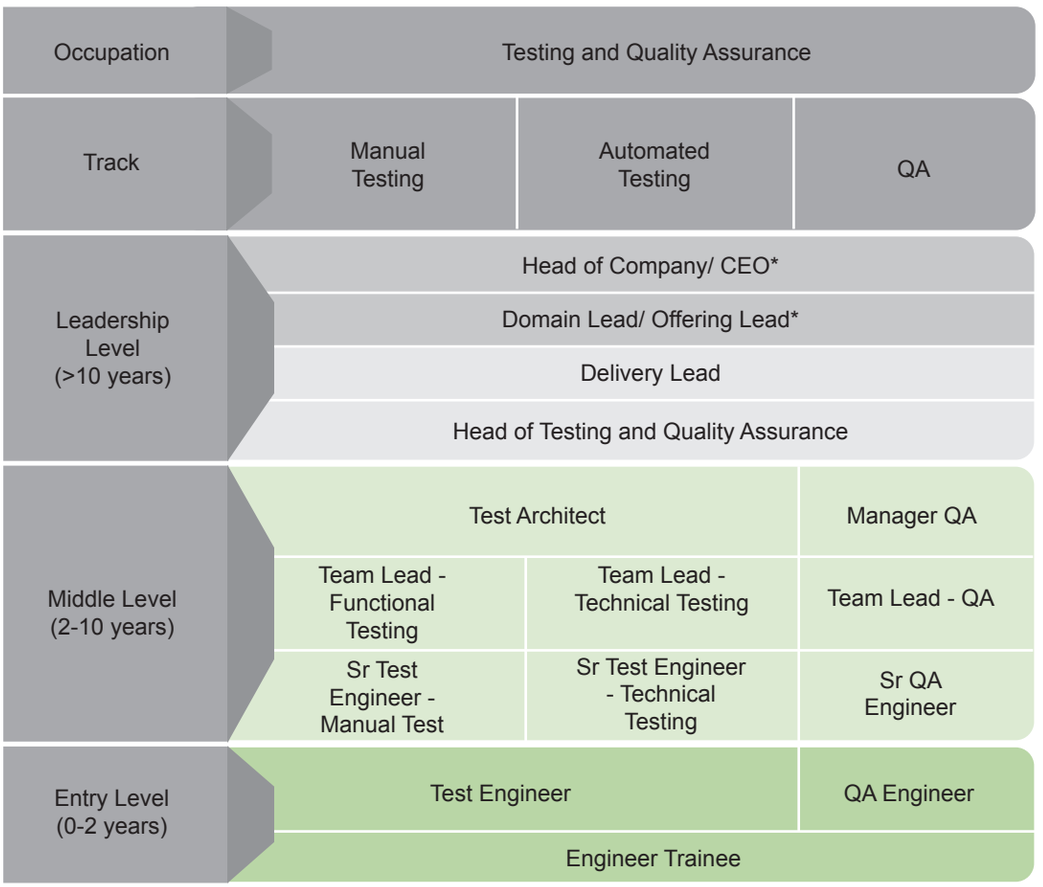
Functional Testing: Functional testing roles are responsible for testing the software/products as end-users. They test all functional features of the product without evaluating its internal structure to ensure desired results. They do not understand internal code or design, and typically do not resolve them as well.

Technical Testing: Technical testing roles develop and automate test cases. They understand the internal code and working of the software or product, and can resolve and fix bugs. These roles require extensive knowledge of the software language to ensure that they detect, and, in some cases, resolve the bugs.

Quality Assurance: QA roles are responsible for setting quality standards for products, systems, and processes within the organisation. These implement quality norms like TQM, ISO and so on and conduct audits and compliance-related activities. Depending upon the organisation, they may be responsible for conducting a final quality check on every application that is delivered to the client.

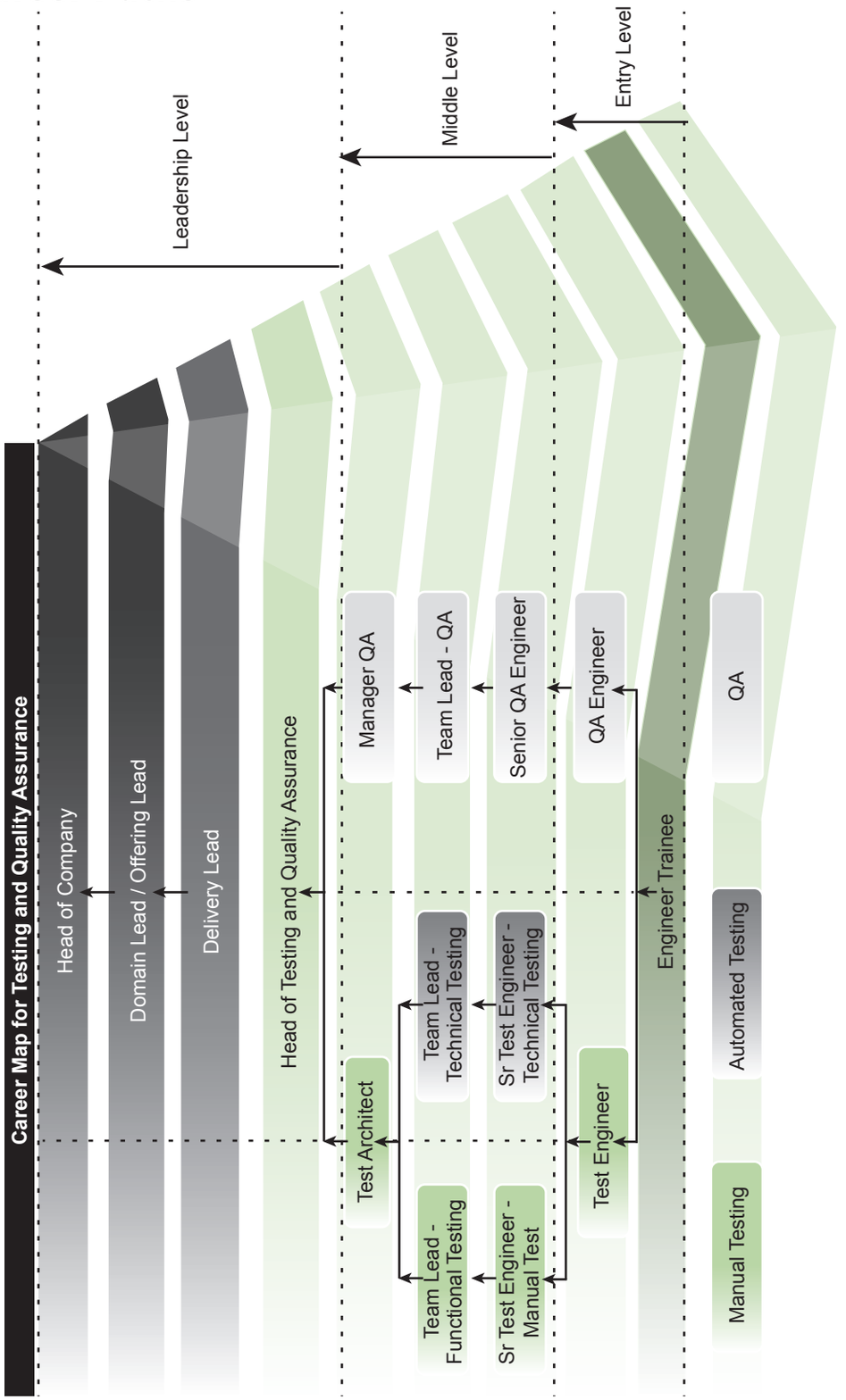
Role of a Testing and Quality Assurance Professional	❒ Develops and coordinates test plans ❒ Checks documents, reports and tracks for software defects manually using testing software ❒ Conducts software compatibility tests with programs, hardware, operating systems, or network environments
Qualifications and Skills	❒ BCA/MCA or Engineer with certification in relevant areas ❒ Strong communication skills - written and verbal ❒ Attention to detail and perseverance are the key skills to success at Testing roles

Testing and Quality Assurance - Occupational Map



*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills, and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

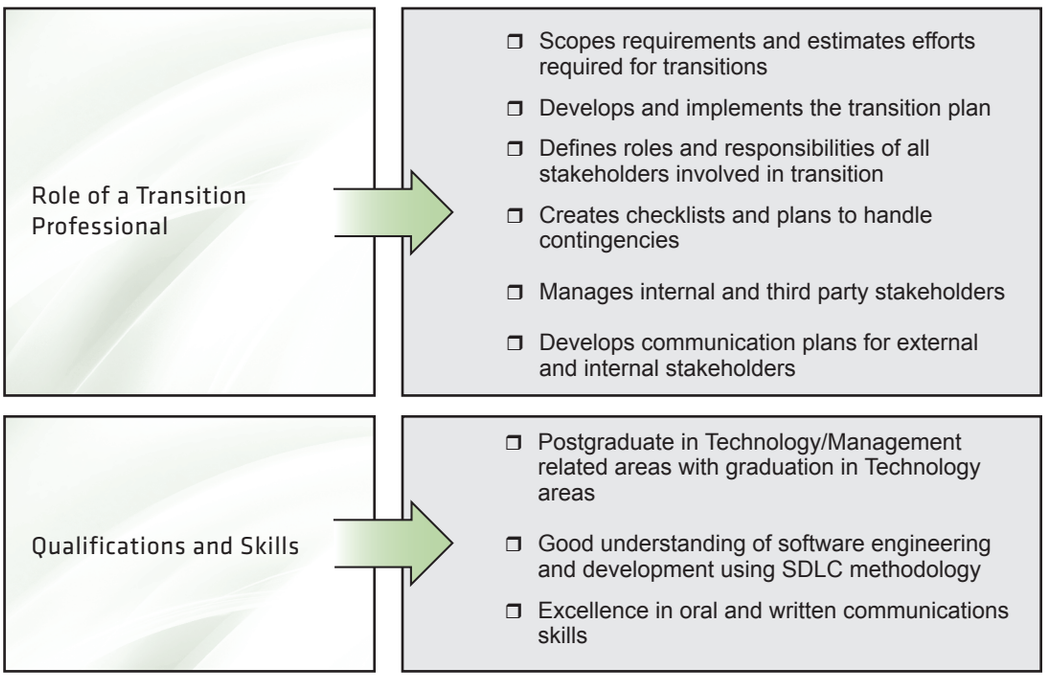
Testing and Quality Assurance – Typical Career Paths



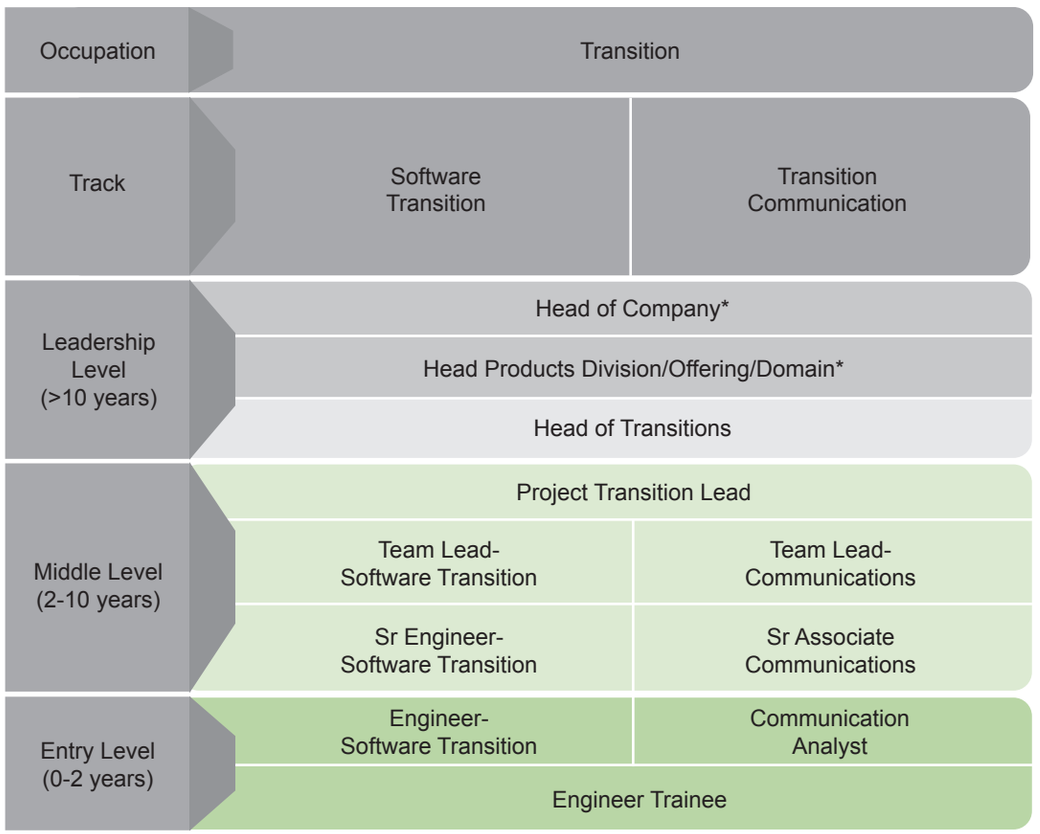
*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Transition

Transition involves the shifting or phasing out of one process, and the implementation of another. Transition professionals are involved in phasing out strategy creation, change management for implementing new products, and the intended communication to all stakeholders.

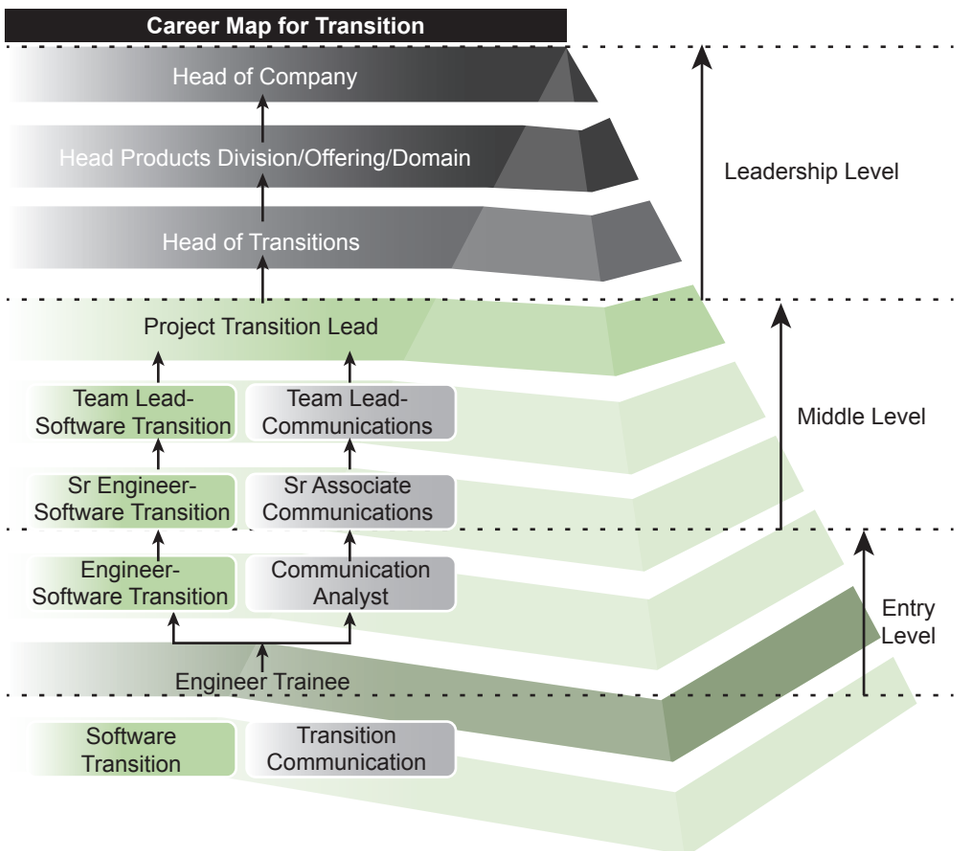


Transition - Occupational Map



*Job roles such as 'Head of Company' and 'Head Products Division/Offering/Domain' do not fall under this occupation, but can be a career progression for a person, provided he acquires business knowledge, skills, and attributes required for that role through exposure to different occupations. The map does not depict any hierarchy.

Transition - Typical Career Paths



*Note: Career growth across the Leadership Levels is usually governed by cross-functional exposure to other occupations. While a possible movement has been indicated in the map, this is usually highly 'person specific' and should not be generalised. The map does not depict any hierarchy.

Movement to Other Occupations, Sub-sectors and Industries

The SPD sub-sector and the occupations within provide ample opportunities for movement outside the core occupation.

Individuals can move freely in 'related' occupations within the sub-sector at a similar level by displaying the relevant skill-set. The level of joining varies highly with the organisation. While some organisations ensure parity in terms of providing similar vertical-level role, others have defined entry-level criteria for specific occupations.

For example, an individual from a Team-Lead Software Development willing to move to Sales and Pre-sales may join as a Sales and Pre-sales Executive or Pre-sales/Sales Manager, depending upon the organisation's grade structure.

The horizontal career movements from one occupation to another occupation within the sub-sector, to another sub-sector, or to another industry occurs typically at middle or leadership levels after a professional has acquired expertise in one particular occupation or more than one related occupations at entry level.

A detailed table indicating possible career movements to related occupations, sub sectors and industries has been given on the subsequent page.

Movement to other Occupation, Sub-sectors and Industries

Occupation	Horizontal Movements		
	To other Occupations	To other sub-sectors	To other industries
Integration and Deployment	Product Lifecycle Management, Testing and Quality Assurance, Product Packaging	ITS, BPM, ER&D	IT-specific roles in any industry
Legal	NA	ITS, BPM, ER&D	Legal roles in any industry, esp. BFSI, Media, Telecom, etc.
Product Documentation	Product Support	ITS, BPM, ER&D	IT-specific roles in any industry
Product Development and Delivery	Product Lifecycle Management, Project/Program Management, Sales and Marketing/Business Development, Testing and Quality Assurance, Integration and Deployment, Product Support	ITS, BPM, ER&D	IT-specific roles in any industry
Project / Program Management	Sales and Marketing/Business Development, Product Lifecycle Management, Product Development and Delivery, Product Packaging	ITS, BPM, ER&D	All services industries
Product Lifecycle Management	Sales and Marketing/Business Development,Project/Program Management, Product Development and Delivery	ITS, BPM	FMCG, Telecom
Product Research and Design	Product Packaging, Integration and Deployment	ER&D, BPM	IT-specific roles in any industry
Product Packaging	NA	BPM, ER&D	Marketing roles in a product-focused industry
Product Support	Product Development and Delivery, Product Documentation, Testing and Quality Assurance	BPM, ER&D	Infrastructure department in all industry.Esp.Media, Telecom, BFSI etc.
Sales and Marketing/ Business Development	Product Lifecycle Management, Product Research and Design, Product Support	ITS, BPM, ER&D	Sales and Pre-sales in all industries
Testing and Quality Assurance	Product Lifecycle Management, Project/Program Management, Sales and Marketing/Business Development, Product Development and Delivery, Integration and Deployment, Product Support	BPM, ER&D	IT-specific roles in any industry
Transition	Integration and Deployment, Testing and Quality Assurance	ITS, BPM	IT-specific roles in any industry

ANNEXURE

- Annexure A: Glossary of Terms and Abbreviations
- Annexure B : Case Studies of Career Paths

ANNEXURE

Annexure A: Glossary of Terms and Abbreviations

Keywords /Terms	Description
IT-ITeS	Information Technology - Information Technology enabled Services
BPM	Business Process Management
BPO	Business Process Outsourcing
KPO	Knowledge Process Outsourcing
LPO	Legal Process Outsourcing
IPO	Information Process Outsourcing
BCA	Bachelor of Computer Applications
B.Sc.	Bachelor of Science
OS	Occupational Standard(s)
NOS	National Occupational Standard(s)
QP	Qualifications Pack
UGC	University Grants Commission
MHRD	Ministry of Human Resource Development
MoLE	Ministry of Labor and Employment
NVEQF	National Vocational Education Qualifications Framework
NVQF	National Vocational Qualifications Framework
BFSI	Banking Financial Services and Insurance
ITS	IT Services
NASSCOM	National Association of Software Services Companies
SSC	Sector Skills Council
BPM	Business Process Management
ER&D	Engineering and Research and Development
SPD	Software Products
CRM	Customer Relationship Management
IMS	Infrastructure Management Services
RIM	Remote Infrastructure Management
SCM	Supply Chain Management
HRO	Human Resources Outsourcing
IP	Intellectual Property
QA	Quality Assurance
F&A	Finance and Accounts
PLM	Products Lifecycle Management
B.A.	Bachelors in Arts
B. Com.	Bachelors in Commerce
B. Tech.	Bachelors in Technology
L.L.B	Bachelors in Law
M. Tech.	Masters in Technology
L. L.M	Masters in Law
UI	User Interface
CEO	Chief Executive Officer
VP	Vice President
AVP	Associate Vice President
SVP	Senior Vice President
GM	General Manager
TL	Team Leader

Annexure B: Case Studies of Career Paths

LIPI DAS
System Analyst
ANZ Technologies and Operation

Entry to IT-BPM industry

How did you start your professional journey? Which organization and at which designation?
I joined Infosys Technologies Ltd. in Oct 2005 after completing my B.Tech as a Software Engineer. As a part of my role as a functional tester , I was involved in functional testing of asset products, impact analysis, and follow up with product team for fixing of functional issues. Later, I was a part of the customization team, and was involved in discussing functional and customization requirements of Finacle with the clients.

Certifications/Trainings Undertaken

Did you add to your knowledge base by undertaking any certifications ?

Internal Certifications in Basic banking fundamentals.

Career Movement and Growth

How have you moved through your chosen career over the years ?

In August 2012, I joined ANZ Technology and Operations as a System Analyst. I am a part of the Transaction Banking team, and my role involves preparation of Business Requirements Documents and specifications for business requirements, which is further an input for estimates, technical build, and testing. Having started as a software engineer and tester in functional design team in Finacle in Infosys Technologies, I have grown into a Business Analyst role, and am looking forward to grow in this direction as a domain expert.

Learning for people looking forward to enter the IT-BPM industry

What were the key things that you learnt along the way ?
In my career journey, I have learnt the business is the driving force for any industry, and exploring the domain space more and more helps to grow professionally, apart from technical expertise or skills of a person. Even after spending 7 yrs. in banking domain, the fact that there is still huge opportunity and space to explore more, is the factor that still drives me in the industry.

Annexure B: Case Studies of Career Paths

NARASINGHA PANIGRAHI
Principal Consultant
SAP Labs India Pvt. Ltd.

Entry to IT-BPM Industry

How did you start your professional journey? Which organization, and at which designation?
In 2005, I joined Tech Mahindra as a graduate hire, I joined in the position of a Technical Associate. At Tech Mahindra I was able to improve and get the best of training in both the skills. This provided me with a perfect platform to launch my professional career.

Certifications/Trainings Undertaken

Did you add to your knowledge base by undertaking any certifications?
Although I did not do any certifications I undertook trainings in various technologies like Siebel CRM, Siebel Incentive and Compensation Management, SAP ABAP, SAP Workflows, SAP CRM in addition to other trainings.

Career Movement and Growth

How have you moved through your chosen career over the years ?
During my initial days at Tech Mahindra I got trained in multiple technologies, but finally started working on projects as a Siebel CRM consultant. I got an opportunity to move to SAP CRM. I was able to ramp up quickly as a SAP CRM technical consultant.
2 and half years later, I joined SAP CRM Deloitte in 2008 as a senior analyst. During my stay in Deloitte, I worked in multiple projects, and was able to grow as a SAP CRM expert.

In August 2008 I moved to IBM as a Package Solution Consultant, and further enhanced my skills as a SAP CRM. After spending 3 and half years in IBM, I moved to SAP in 2012 as a Principal Consultant where I am working currently.

Learning for people looking forward to enter the IT-BPM industry

What were the key things that you learnt along the way?
In my experience, it is imperative for a person to be confident of her/his abilities, and be ever ready to take up new and difficult challenges. I also learned that it is important to have a balance between work and life, otherwise we run the risk of burning ourselves out too quick. And it is very important to feel passionately about the work we do.

Annexure B: Case Studies of Career Paths

RAVTISH SHARMA
Area Manager
DELL

Entry to IT-BPM industry

How did you start your professional journey?
After completing BE electronics from Pune University in 1998, I started working with Modular systems making power supplies as a trainee. Thereafter I switched over to ADG technologies, which was into software development. I joined Dell in 2001 at Bangalore as TSR, and since then have worked across all Dell sites in India in various roles.
Presently, I am working as Area Manager for India Tech Support process at Gurgaon.

Certifications/Trainings Undertaken

Did you add to your knowledge base by undertaking any certifications?
Dell BPI Green Belt Certification
CBI Certification

Career Movement and Growth

How have you moved through your chosen career over the years ?
Worked as an effective team player and participated in all activities relating to the team.
Maintained healthy competition amongst team across the floor, and excelled in all areas.

Responsible for handling a team of highly charged and motivated team members at Bangalore.
Pivotal in assessing the individual team members performance against the deliverables.
Responsible for bigger teams.

Driving process improvement strategies, monitoring, and auditing the deployed processes for effectiveness and efficacy.
Preparing performance reports.
Instrumental in transitioning the entire L2 process at Dell Hyderabad, 24/7 Chennai and Dell Chandigarh.
Part of the standardization process - a key initiative run across all Dell sites.
Running six sigma methodology to fix the issues.
Worked for Global Deployment of Windows Vista Operating system as program manager

Learning for people looking forward to enter the IT-BPM industry

What were the key things that you learnt along the way –?
Analyze your options.
Seek counsel of mentors and others both inside and outside organization.
Never take a job based solely on pay or promotion.