



OMIDYAR NETWORK INDIA



BOSTON
CONSULTING
GROUP

TALENT NODE

Open Digital Ecosystem (ODE) Deep Dive



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The Talent NODE Deep Dive has been developed as a part of a larger study on Open Digital Ecosystems led by Omidyar Network India and Boston Consulting Group. It should be read in conjunction with the main report – [Building India’s Digital Highways: The Potential of Open Digital Ecosystems.](#)

1 Introduction

1.1 Context

India is one of the youngest nations in the world with roughly 65 percent¹ of its population in the working age group of 15-64 years. India's labor market is a large and complex entity, comprising approximately 520 million² workers, 93 percent³ of whom are employed informally with around 25 percent³ of these employed in casual labor. The labor force is expected to further expand with 8-12 million² new entrants each year.

However, a dichotomy exists in the labor market. On the one hand, employers claim that they are increasingly looking to hire skilled labor but express a paucity of such labor, with more than 50 percent⁴ reporting that they have difficulty finding relevant talent. On the other hand, unemployment in the country is at an all-time high with urban youth unemployment spiking to 24 percent.⁵ This gap is perhaps the result of a fragmented labor market, stemming from information asymmetries across stakeholders, trust gaps, and other frictions such as siloed data and unclear quality of training.

Individuals in the labor market in India have extremely variable skill levels that range from highly-skilled software developers to less skilled construction and household workers. An assessment of the labor force based on data from a People's Research on India's Consumer Economy (PRICE) and National University of Educational Planning and Administration (NUEPA) study reveals that almost 70 percent⁶ of the workforce in India has the following characteristics.

- Schooling up to class 12th.
- Predominantly in the informal sector.
- Tends to fall in the age group of 24-38 years.⁷
- Typically, potential jobs include plumbing, driving, delivery work, basic data entry work, etc.

Along with its large size, this category of workforce also faces more challenges compared to the educated workforce like degree holders. Access to solutions like Naukri.com, LinkedIn, etc., have lessened the information asymmetry for the educated category, thereby reducing their challenges. Hence, solutions should focus on this population, which we refer to as the "blue-collar" workforce.

The talent-related challenges are best understood when viewed from the vantage point of different stakeholders in the ecosystem.

From the Perspective of an Individual Job / Skill Seeker.

- **Lack of Information:** There is no 'single source of truth' on the availability of either job opportunities or training / skilling programs. 71% percent⁸ of students surveyed recently claim that they are unaware of the available skilling programs.
- **Uncertain Quality of Offerings:** There is limited information in terms of a consistent, standardized, and trustworthy rating for training centers to guide an individual skill seeker.

- **Fragmented Career Journeys:** 51 percent⁸ students report that a dearth of information and guidance in identifying jobs that are aligned with their skills sets is a key barrier when seeking employment opportunities. Students need a holistic, user-centric offering that allows them to undergo an End-to-End (E2E) journey that includes aptitude testing, identifying suitable job options, and then undergoing trainings to acquire the requisite skills.

From the Perspective of an Employer.

- **Lack of Access to Talent:** Employers are unable to access the required talent pool due to a fragmented labor market comprising multiple training providers, localized labor pools with varying skill levels, and limited visibility around supply.
- **Inability to Verify Skills / Experience:** The presence of a large informal sector and considerable 'on-the-job' training, in addition to the absence of a transferable credential to measure or record an individual's skill level, make it challenging for employers to verify whether a job seeker has the requisite skills.

From the Perspective of the Government.

- **No Holistic View of Supply and Demand:** The government has limited data on both supply and demand. This results in an inability to commit targeted investments, plan for skilling or launch appropriate and relevant policies and programs.
- **A Complex Labor Market with Different Needs:** The labor market in India has multiple tiers, each with varied requirements for skilled talent. The informal sector comprises 93 percent³ of the total workforce across a wide range of business sizes and industries. This further contributes to the complexity in the market.

From the Perspective of Other Service Providers (for example, Skilling Institutes, Employment Aggregators, etc.)

- **Difficulty in Gaining Scale:** Service providers like skilling institutes, counselling players, and employment aggregators struggle to access a larger pool of clients – both employers and individual job seekers – on a pan-India scale.
- **Limited Transparency around Labor Market Requirements:** Due to the absence of reliable data around both labor supply and demand, service providers are unable to tailor their offerings (skills courses, financing, etc.), to the needs of the labor market.

An analysis of the above reveals that the issues faced by the talent ecosystem are primarily driven by two factors.

1. **Lack of Data and Information Asymmetries:** Skill seekers are not aware of the jobs available while employers are not aware of the labor availability. Service providers and the government do not have a comprehensive view of labor demand and supply.
2. **Lack of Trust in the Talent Ecosystem:** Skill seekers have no reliable method to assess whether a particular skilling institute will provide the best training required to secure employment. An employer has no means to verify an applicant's work history or experience.

A talent ecosystem can bridge these gaps by enabling all stakeholders to access relevant data and interact with the other stakeholders in an environment of trust. The Talent NODE can enable the following shifts.

For the Skill Seeker: From lacking the information required to identify the best skill courses available based on their needs to be able to identify the local training centers that offer the desired skill courses. For skill seekers, this facilitates a comparison amongst training center ratings, thereby allowing them to apply to the highest rated center and receive quality training. Consequently, they will be in a better position to apply for and get matched with the relevant jobs.

For the Employer: From lacking information on the available talent to the ability to identify skilled labor and verify an applicant's skills and work history. This verification will allow the employer to have confidence in an individual's skill levels and ability.

For Government Institutions: From lacking a holistic view of the labor market to being empowered with the ability to take a holistic view of both the country's labor demand and skilling needs. This will enable data driven and accurate planning of skilling programs and funding.

For Service Providers: From using a manual approach to providing services to the ability to digitally manage accreditations, course registrations, and other offerings to enable performance management. In addition, service providers can evaluate the prevailing employment environment to ascertain the jobs and skills that are most in demand and accordingly adjust their curriculum.

These journeys can be woven together in a single ecosystem. In the subsequent sections, we will describe such an ecosystem in detail.

2 Talent Node Concept

The Talent National Open Digital Ecosystem (NODE) is an Open Digital Ecosystem (ODE) comprising multiple users each with their own journeys in the skilling and jobs domain. For example, the individual job seeker's journey may involve searching for job opportunities and the skill courses that he / she may need in order to qualify for that job. Separately, an employer's journey may involve searching for skilled candidates and verifying their skills and work history. A training provider's journey could involve applying for accreditation, marketing the courses to skill seekers, and directly offering online training.

The NODE will be able to facilitate and integrate these multiple journeys through both public and private participation. While a government platform alone may not build all of the services outlined in this document, through interoperable design, collaboration with the private sector, and inclusiveness amongst all end-users, one can build an ecosystem that enables an efficient integration of solutions and services.

Exhibit 1 outlines key use cases or journeys in the ecosystem and the interactions of key stakeholders. There can be multiple other possible journeys and community stakeholders.

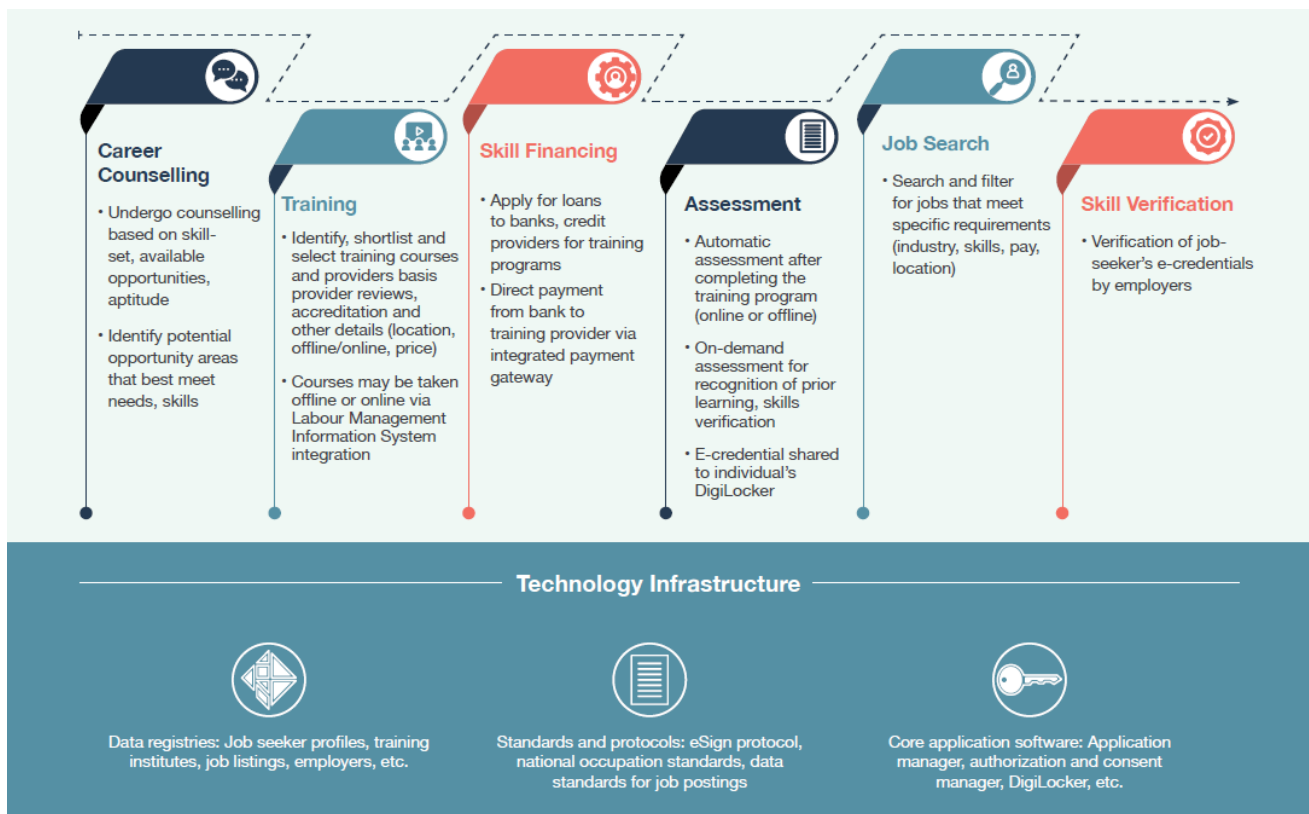


Exhibit 1: Talent NODE Concept

2.1 Goals of the Talent NODE

The Talent NODE will unlock a more efficient and reliable skilling and jobs ecosystem. With that in mind, the primary goals of the NODE include.

- **Ease of Connecting Job seekers with Employers:** Facilitate the efficient matching of job seekers and employers through access to a more holistic and quality-centric view of jobs information and verifiable skills.
- **Better Matching of Skills to Opportunities:** Create enablers to connect the skilling activities with the required skill training information and financing avenues to ensure that skill seekers meet the real job demand in the market.
- **Targeted and Efficient Spending by the Government:** Aggregation of labor demand will allow the government to better understand the country's jobs / skill needs and develop strategies to best meet those needs.
- **Improved Offerings by Training and Skilling Institutes:** Align training and financing offerings with real market demand, enabled by access to an aggregated view of the job market.
- **Low Cost of Transactions:** Migrate to a digital approach to services like e-credentials for skill verification, course registrations, and other offerings to reduce costs in the ecosystem.

3 Journeys in the NODE

As outlined in Exhibit 1, multiple use cases exist for the Talent NODE. Each use case describes the journey traversed by a user in the current skilling and employment ecosystem. Through the NODE, these journeys can be bridged together to offer an E2E user experience. Below, we describe the major user journeys in detail.

3.1 Job Seeker Performing a Job Search

In the current system, a job seeker is unable to view all the job opportunities that may be available to him based on his skill profile or needs. Similarly, employers do not have a holistic view of the available talent supply in the market that can meet their desired skills criteria. In a recent survey by Manpower Group, more than 50 percent⁴ of the employers revealed that they were having trouble finding skilled labor. On the other hand, 33 percent¹ of the skilled youth in the country remains jobless as per the official Periodic Labor Force Survey (PLFS). This underscores a stark mismatch between potential employers and employees.

In the Talent NODE, job seekers can conduct a comprehensive search to identify the available jobs and potentially apply for these roles. The job search journey would be as follows.

- Typically, the first step in a job-seekers' journey would be to identify the available job opportunities and assess whether they have the requisite skills for the position. Job seekers can register on the job search platform to gain access and search for available opportunities.
- Concurrently, employers can directly share or post job openings on the platform. Further, the platform will aggregate available jobs data across a range of sources, such as private job marketplaces, training institutes, state employment exchanges, government career services, local newspapers, and other jobs sources.
- The job seekers and employers can specify search criteria or preferences when looking for a job and posting requirements, respectively. The platform's smart search function will then generate a list of available job options along with a corresponding mapping to the National Skills Qualifications Framework (NSQF) and National Occupational Standards (NOS). Exhibit 2 provides such illustrative criteria which can be programmed into the platform to provide ranked search results based on the given constraints.

| Job Seeker Filters | Employer Filters |
|---|---|
| Industry | Work Experience |
| Job Family / Type | Education Level |
| Location / Distance | Skill Qualifications (based on National Occupational Standards (NOS)) |
| Desired Wage | Language Proficiency |
| Schedule (for example, part time / full time / night shift) | |

Exhibit 2: User Inputs for the Job Search Platform

- The job seeker can then apply for any number of opportunities via the platform or reach out to the employers directly (online / offline). Once the application is submitted and the job seeker provides consent for an employer to view his profile, the digital *Curriculum Vitae* (CV) can be verified by the platform. This will give employers confidence in the quality and validity of job seekers' credentials.

3.2 Job Seeker Undergoing Skilling

The need for skills training or upskilling is well understood. Yet, for a skill seeker, identifying the available skill opportunities is a challenge. For high-skilled jobs there are established educational institutes with rankings, specific course requirements, and curriculum that guide higher level education decisions. However, in the blue-collar environment, 71 percent⁸ of students are unaware of the skilling programs that are available and suited to their needs. There are also additional complexities around institute and course selection. For example, skill seekers find it challenging to ascertain the highest quality skill courses or attain their performance ratings with respect to trainer quality, placements, etc.

- The skilling journey is a three-step process that encompasses identifying all the available training courses, choosing the best training center, and completing the training course.
- Once a job seeker has identified a job that requires specific skills in accordance with NSQF standards and the NOS framework, the platform can be used to find the appropriate skill course(s).
- Job seekers can then search for a list of training centers offering the required course and filter the courses based on a set of input criteria. Exhibit 3 provides examples of such filters.

| Filter | Description |
|--------------------------------|---|
| Job Placement History | Percentage of students who have been placed in jobs |
| Ratings | Infrastructure availability, quality of training, customer reviews, etc. |
| Location | Commute time / radius from input location |
| Cost / Availability of Funding | Cost of a specific skill course and availability of government funding through schemes like Pradhan Mantri Kaushal Vikas Yojana (PMKVY) or Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDUGKY) |

Exhibit 3: User Inputs for Finding Skilling Opportunities

- Based on this comparison, job seekers can then apply to the training institute of their choice either via the platform or offline and participate in the training course. In a fully developed ecosystem, it will be possible to integrate online course content / training by public or private providers via a Learning Management System (LMS), considering the platform-based delivery mechanism.

3.3 Job Seeker Requiring Skills Credentialing

Once the training is completed, a skill seeker needs to be certified as having gained a set of skills (in line with the NOS). This certification can be delivered via an e-credential. Credentialing is relevant not just from the perspective of verifying whether an individual has completed a certain training program but also to validate skills gained via past work experience. According to an analysis by the World Economic Forum (WEF) and a yet to be published survey by the Center of Monitoring India Economy (CMIE), there are more than 390 million⁹ people in India who have acquired skills through informal means such as on the job learning. To enable economic mobility, this population needs a valid system that can verify the skills that they have gleaned informally.

The credentialing journey allows individuals to take an exam to prove that they have acquired the skills necessary for a particular job. There are typically three paths within the assessment journey which can be facilitated by the ecosystem.

1. After completing a skilling program, students typically take an exam that is administered by an accredited assessment agency to receive an approved e-credential. In the future, the National Council for Vocational Educational Training (NCVET) can administer the e-credentials stating that the job seeker has gained the specific skills. The assessment platform will allow training institutions to find accredited assessors to administer exams. Every training institution will need to partner with an assessment institution which will conduct an examination for the students in the skill training program.
2. For those who would like to prove that they have already acquired the requisite skills either via prior training or on the job, they can take an assessment directly to receive the e-credential. While this is similar to the current method of Recognition of Prior Learning (RPL), it provides the additional benefit of a transferable credential.
3. If a skill seeker is applying directly for a job, the employer can request the skill seeker to take an exam to verify that he has the requisite skills for the job. The employer or skill seeker can request an on-demand test from any of the accredited assessment institutes. The assessment platform can provide a list of accredited assessment institutions with their assessment offerings, organized by skill course and location. It may be possible for the exam to be directly delivered online via the platform, depending on the nature of skills to be tested.

3.4 Employer Performing Skills Verification

In the current ecosystem, when an employer receives a job application, he is unable to ascertain the veracity of the information received. This is primarily because many workers have acquired skills and gained work experience that have not been formally recorded. In the formal sector today, work experience can be verified through employer references, transcripts from academic institutions, and background check services. However, when it comes to blue collar workers in the informal sector, the challenges get amplified. For example, a plumber may have worked for a number of years serving multiple homes, however, this information is unlikely to exist anywhere in the ecosystem. Similar to the practices established in the formal sector, the skill verification use case will allow an employer in the informal sector to verify if the information provided on a job application is accurate. The skill

verification use case will introduce standardized processes to enable employees in the informal sector to demonstrate their skill history and employers to verify it.

This functionality is essential for building trust within the ecosystem. Skill history can be verified through the use of a digital resume functionality.

- Every individual will have a digital resume / locker (possibly linked to a DigiLocker or an e-credentials data registry linked to an individual's unique Identity (ID)). The digital resume will store both, skilling credentials as an e-credential and work history. The verification mechanism will verify three aspects of an individual's resume, biography, skill levels, and work history.
 1. Biographical information such as name and age can be verified using existing government data or ID mechanisms such as Aadhaar.
 2. Skilling credentials can be verified through an e-credential verification mechanism. The e-credential can be issued by the designated assessment institutes upon the completion of an exam.
 3. Similarly, an e-work experience credential can be created when work experience needs to be validated. Validation can occur through multiple channels. A few examples include.
 - Forms of payment: Formal pay stubs, invoices, etc., can be used to validate that an individual worked on a specific job for a certain period of time.
 - Letters of reference or validation from former employer: Applicants can submit letters of reference confirming their employment, to the platform.
 - Demonstration of skills through exams: Applicants can choose to take an exam via an accredited institution to demonstrate that they have the stated skills.

The verification process gets triggered when an employer requests access to a verified resume and the job applicant provides consent. Once the applicant provides consent, the employer can view the full resume of the applicant and ensure that it has been verified by the platform.

3.5 Job Seeker Requiring Training/ Skills Financing

Once skill seekers have decided which course to take, they must assess their ability to finance the course. There are currently a number of government schemes that exist in the ecosystem, such as Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDUGKY), and Skills Acquisition and Knowledge Awareness for Livelihood (SANKALP), which can provide financing options to skill seekers. However, these schemes are generally not available for courses provided by private skilling institutes. In such cases, the students must pay for the course themselves. Consequently, it becomes difficult for skill seekers to determine the actual cost of a course and arrive at a suitable means for financing it.

The proposed Talent NODE will enable the skill seekers to gain the necessary financing to fund their skilling journey. When skill seekers see the list of available training courses, they will also be able to identify whether these courses are covered under government schemes. If the course is covered, the training institute covers the costs with funds from the government. If the course is not covered under

a scheme, the platform can provide the requisite cost information so that skill seekers can accurately estimate their total expenditure on the course.

Through the Talent NODE, the skill seeker will have access to multiple financial institutions offering financing options based on the skill seeker's financial history. The skill seeker can then apply for specific financing programs as determined by his needs and qualifications. As these skill seekers typically work in the informal sector, many may not have the financial history required for a loan approval. Thus, financing applications will need to be linked to other methods, such as employability post the completion of the skill course.

3.6 Government Accreditation of Training and Assessment Providers

The government accreditation use case allows training institutes and assessment providers to gain accreditation as a testament of the quality of their offerings. For this purpose, the NCVET has been appointed as the skilling regulator and is expected to establish a universal accreditation process, in the near future. Additionally, individual trainers and assessors can obtain individual accreditation as well, offering them the ability to have a transferable credential that is delinked from the institute.

Today, institutes can apply for accreditation via the Skill Management & Accreditation of Training Center (SMART) portal managed by the National Skill Development Corporation (NSDC) with support from Skill Sector Councils (SSCs). The portal functions as a single access point for institutes to manage the accreditation and the performance monitoring processes. In the future, the NCVET can evolve into an accreditation hub. For example, the NCVET can accredit training institutes to provide training and the SSCs can accredit both, the training institutes and the assessment agencies for the specific skills that they offer. Managed through an accreditation service, the process would work as follows.

- Institutes can apply and submit their credentials, experience, and staff details digitally for an overall accreditation. Governing institutes will issue affiliation based on a set of established qualifications.
- In parallel, training and assessing institutes will also apply for accreditation for specific courses with SSCs as they host industry specific knowledge.
- Training and accreditation institutes can upload performance metrics such as pass rates and job placement rates for performance monitoring.

4 Digital Platform Design

A platform should be designed for effective service delivery with key principles in mind. These principles are.

Principles for the Design of Digital Platforms

1. Be Open and Interoperable

Use and / or build open standards, licenses, databases, Application Programming Interfaces (APIs), etc., so that different digital platforms and their components can talk to each other .

2. Make Unbundled, Extensible, and Federated

Incorporate a modular or ‘building blocks’ architecture. Design such that (i) each block has minimal functionality allowing it to be used in different contexts, (ii) is extensible so that it can be combined with other blocks and repurposed in diverse contexts, and (iii) represents an autonomous data source which is interconnected with other sources rather than creating a single database covering all variables.

3. Be Scalable

Use elastic and flexible design to enable the platform to easily accommodate any unexpected increases in demand and / or to meet expansion requirements, without the need to change existing systems.

4. Ensure Privacy and Security

Adopt a ‘Privacy by Design’ (PbD) approach that embeds key technology and security features within the core design of the solution to ensure individual privacy and data protection.

5. Develop Minimally and Iteratively

Build incrementally to develop Minimum Viable Products (MVPs) to which additional features can be added in response to new use cases and as our understanding of user behavior gradually evolves.

In order to achieve these principles, the platform should comprise a set of core building blocks that are modular and interoperable. To highlight this concept, we allude to a quote by Richard Pope from his “Government as platform playbook”, in which he describes platforms as “systems that generally do one thing very well which are – small pieces loosely joined, rather than monoliths that try to handle every edge-case or be too smart”.¹⁰

In technical terms, a Federated Architecture (FA) which consists of modular and interoperable blocks that can be abstracted to a required degree for usage in diverse contexts would serve the required purpose. As described in the National Health Blueprint, “federated architecture is an architecture that allows interoperability and information sharing between de-centrally organized entities, systems, and applications”.¹¹ With a decoupled federated architecture, building blocks of a platform can be used by

a range of public and private sector stakeholders either directly or with minimal customization. This eliminates the need for building a separate functionality from scratch. For example, functionalities like a notification manager or a customer support module can be used by individual applications, thereby improving efficiency and time to market.

In this section, we offer a preliminary perspective on the design of the digital platform, based on the user journeys described above. This is intended to enable a more detailed assessment for creating a Detailed Project Report (DPR) for a full technical design.

A typical end-user solution will have five layers to ensure the requisite service delivery. Each of these layers will have a set of building blocks which can be used modularly for the development of the different services and solutions.

1. Infrastructure
2. Data Registries
3. Core Application Micro-Services
4. Analytics
5. Integration

4.1 Infrastructure

A robust infrastructure is needed to serve as a foundation for the NODE. Selecting the right infrastructure is integral, considering the initial investments involved and the future dependency of all platform services on the base infrastructure. The core components that enable service delivery will be hosted in the infrastructure layer.

Among the available infrastructure options, cloud provides certain key benefits in areas like .

- **Scalability:** Services deployed on a large cloud infrastructure can scale much faster versus the traditional infrastructure approach depending on the varying requirements of NODE services.
- **Reduction in upfront costs:** The pay-per-use model of cloud infrastructure helps in minimizing upfront capital investments.

Considering the benefits of cloud, a government cloud service like MeghRaj could be a potential option for usage by the Talent NODE. A detailed infrastructure requirement and analysis will need to be done as a part of the DPR.

4.2 Data Registries

The Talent NODE requires data from a number of sources. A key function of the NODE will be to identify these sources, set the requisite standards, and create the necessary Application Programming Interfaces (APIs) for data sharing and interoperability.

The required data should ideally not be stored in a single database and should be accessible by the appropriate stakeholders, as per requirement. A number of different types of data will be required. An exemplary list is shared in Exhibit 4.

| Data | Description |
|-------------------------------------|---|
| Unique Identifier | <p>A unique identifier for participants with basic details such as contact information. Participants include:</p> <ul style="list-style-type: none"> • Job Seekers • Employers • Training Institutes • Assessing Institutes • Trainers (individual) • Assessors (individual) • Counsellors • Financial Institutions |
| Jobs Data | Individual job listings (with characteristics such as employer, location, remuneration, etc.), ideally mapped to their skill requirements via NOS |
| Job Seeker Profiles | Data about individuals such as skill history linked to NOS with valid e-credentials, past work experience (also linked to skill levels), preferences, etc. |
| Training Institute Course Offerings | List of training courses offered by each institute with pertinent details such as course information, cost, location, contact information, etc. |
| Assessment Offerings | List of assessment offerings organized by accredited assessors who can conduct examinations. Data may include skill sector, skill level, location, reviews from training institutions, etc. |
| Institute Capabilities | Details of training institutes, relevant assessment providers, available infrastructure, equipment, teacher / assessor profiles, etc. |
| Finances | Individuals' financial history for financing applications |

Exhibit 4: Data Registries

4.3 Core Applications

A set of core applications enabled by micro services is needed to ensure that the end-users can perform specific tasks such as conducting a job search or applying for a job, within the NODE itself.

Exhibit 5 outlines the set of applications needed in the Talent NODE.

| Core applications | Description |
|--------------------------------------|--|
| Smart Search | Smart search to enable search based on a set of criteria and indexing across data sources |
| Digital <i>Curriculum Vitae</i> (CV) | Digital CV function to access and verify data related to individual profiles, including e-credentials |
| Consent Manager | Data consent manager for individual privacy protection. At each data sharing interaction, consent will be requested from the individuals sharing their personal information. |
| Application Manager | Application manager to enable training institutes, employers, and assessment providers to receive, track, and approve applications and registrations |
| Accreditation Manager | Accreditation manager will enable various institutes to conduct accreditation assessment using shared architecture but, based on their own set of criteria. Software will enable registration and assessment of institutes. |
| E-credential Issuer | E-credential manager to be utilized by assessing institutes to issue e-credentials for acquired skills. The e-credential is a transferrable digital token that can be carried by the students through their skilling career to verify their skill level. |
| Demand Aggregation | Demand aggregation to provide a holistic view of the labor needs in the country. Possible sources include: web-scraping job postings, offline demand generation through Micro, Small & Medium Enterprises (MSMEs), career fairs, state employment exchanges, direct sharing from private enterprises, Sector Skill Councils (SSCs), training institutes, and private job marketplaces. |
| Internal Applications | Internal applications for support, monitoring, data governance, and project management of the Talent NODE processes |

Exhibit 5: Core Applications Needed in the Talent NODE

These applications should be built in a manner such that they are reusable and interoperable in any context or need. For example, the consent manager can be used in the digital resume verification use case and also when signing up for a training course. The e-credential application can be used for skill assessments but also more broadly, for all educational institutes. The application manager can be used for training institute applications, job applications, and accreditation applications amongst a number of other uses.

4.4 Analytics and Tools

The Talent NODE will be able to collect and aggregate data from multiple sources which could be used to supplement various analytics functions, thereby improving NODE services.

Exhibit 6 outlines the analytics and tools needed in the Talent NODE.

| Analytics and Tools | Description |
|---|---|
| Job / Talent Patterns | Identification of labor / job supply and demand patterns to better understand key trends that can be actioned by the government and private players |
| Personalized Job Matching Algorithms | In the future, algorithms can be used to directly match job seekers with employers based on a set of inputs and criteria from each party. Personalized algorithms can be developed based on employer / jobseeker preferences gleaned through historical data. |
| Prediction Models for Demand and Supply | Prediction models can be developed to forecast the expected jobs demand in future and the associated skill requirements based on current training efforts. Subsequently, the expected talent gap can be estimated. This could be used by the government as well as training and financing institutes. |
| Performance Analytics | Periodic performance analysis of training institutes, accreditation institutes, and other providers can be conducted to assist early interventions. |
| Geo Analytics | Aggregate performance analysis of NODE services by region can be done to recommend interventions |
| Impact Measurement: | Policy impact can be assessed at a granular level (region, industry, training institutes, skill courses) based on shifts in employment |
| Grievance Analytics | Root cause analysis and trends forecasting can be done based on identified grievance data sourced from multiple channels |

Exhibit 6: Analytics and Tools needed in the Talent NODE

The analytics function of the NODE includes both a data visualization layer and a data modelling layer. The data visualization layer will consist of the dashboards used by users like relevant authorities and officials from the Ministry of Skill Development & Entrepreneurship (MSDE), NSDC, and NCVET to track key statistics on employment patterns, hiring trends by sector, etc. Further, this layer will also help the NODE governance personnel to monitor key performance and governance related statistics, for example, data quality, data security, scaling, latency, etc.

The analytics or data modelling layer will support the NODE visualization layer and enable the processing of key insights. These insights will be shared with the relevant players in the ecosystem who can then apply them to their internal dashboards for improving their services depending on the respective functionalities. For example, skilling institutes can use these insights to customize their training programs.

4.5 Integration Layer

As the NODE is composed of distinct building blocks and solutions (both public and private), an integration mechanism will be required to allow them to function effectively. Typical features of the integration layer are explained in Exhibit 7.

| Integration Feature | Description |
|------------------------------|--|
| Enterprise Service Bus (ESB) | ESB will help in integrating all the backend systems of the NODE (translation of data models, deep connectivity, routing, and requests) and ensure that those connections are available as APIs for all the public and private applications of the Talent NODE |
| Secure Gateway | Secure gateway will help the NODE connect to external applications in a quick and secure manner |
| Data Orchestration | Data orchestration will enable the NODE to manage data formatting or transformation between separate services, where requests and responses from APIs need to be split, merged or re-routed |
| API Manager | API manager will help the NODE define and manage the entire API environment in an agile manner, for example, establish custom APIs without the need for interfering with the backend systems |

Exhibit 7: Integration Features of the NODE

5 Community

In the context of a NODE, a community is a group of actors using the platform, working together, and building on top of the platform to deliver shared value. The Talent NODE community primarily consists of three type of actors i) Builders, who either build the digital platforms or build solutions on top – these could include public institutions, private enterprises, and independent technology contributors, ii) End-users, who in this context can be employers, jobseekers, etc, who access the services provided by builders and iii) Facilitators – government bodies and Civil Society Organizations (CSOs) like foundations, think tanks, end user collaboratives, etc., that indulge in research, advocacy, raising concerns, etc., thereby contributing to the successful implementation of the NODE. Each actor shares information, delivers services, and facilitates interactions with other actors. This community of actors will transact and collaborate via the platform to help create new user-centric solutions and ensure that the potential of the NODE is harnessed optimally. For example, start-ups collaborating with local communities to create vernacular training content.

Five key principles must be adhered to for building a strong and vibrant community.

Key Principles to Build a Vibrant Community

1. Ensure Universal Access

Encourage the build of ODEs that minimize or overcome barriers to access (economic, technical, or social) to ensure inclusion, empowerment of end-users, last-mile access, and user rights, irrespective of their backgrounds.

2. Drive Participatory Design and End-user Engagement

Encourage the participation of all community actors throughout the ODE value chain, that is, plan, design, build, and operate, to facilitate and promote a culture of openness and collaboration, enable the development of user-centric solutions, and facilitate widespread and sustained adoption of the digital platform.

3. Cultivate a Network of Innovators

Proactively engage with innovators to spur the development of new solutions on top of the digital platform.

4. Be Analytics-driven for Continual User Focus

Leverage the data generated by the digital platform to acquire insights around user profiles and engagement, adoption barriers, and platform performance. Analyze user data to improve user-centricity, support robust policy-making, and incentivize the design of new solutions.

5. Enable Responsive Grievance Redressal

Define accessible and transparent mechanisms (offline and online) for grievance redressal, that is, user touch-points, processes, and responsible entities with a strong focus on actions for resolution.

5.1 Ensure Universal Access

Inclusivity is essential for building a vibrant community. Thus, the NODE must ensure that no individual or group faces exclusion from the ecosystem. Within the Talent NODE, the community comprises the following primary actors.

- Job and Skill Seekers
- Employers and Private Demand Aggregators
- Training Providers
- Assessment Providers
- Government

There are three key considerations that must be proactively managed in order to ensure that an inclusive community is built. First, is the presence of a large informal sector, second is a vast online and offline user base, and third is privacy concerns that may prevent actors from joining the community.

- **Large Informal Sector**

The informal sector poses unique challenges to ensuring inclusiveness. According to the Economic Survey of 2018-2019, 93 percent³ of employment in India is informal. Given the size of the informal economy and the fact that there are almost 60 million² Micro, Small & Medium Enterprises (MSMEs) in India, employment is highly fragmented with each MSME only hiring a small number of employees. Thus, it is important to ensure that each employer is included in the talent ecosystem, independent of its size and hiring ability. The rights of informal workers and employers should be protected through regulation if needed and appropriate grievance redressal mechanisms should be established. The platform and services should be designed in such a manner that all stakeholders, large and small, formal and informal, can productively engage in the ecosystem.

- **Diverse Online and Offline User Base**

The current skilling ecosystem consists of a vast number of offline actors such as training providers, students, Non-Government Organizations (NGOs), etc. Further, since the eligible population is fairly large, digital literacy naturally varies across the population and can frequently prove to be a barrier. Due to these factors, it is important that a user friendly user design and interface is incorporated into the various services within the NODE. Integral to achieving this is to use interfaces that function on both basic and smart phones, web and mobiles, as well as online and offline with support for vernacular content. For the offline user base, physical customer service centers can be set up for registrations, service facilitation, data updates, and grievance redressal. Onboarding trainings and active marketing can be done to ensure that the targeted population is reached. This multi-dimensional interfacing will enable both the online and offline actors to interact. Strong governance will ensure that each actor can efficiently interact with the platform.

- **Concerns of Employers and Skill Seekers regarding their Privacy in the Community**

Platform users have concerns regarding government data sharing policies and the usage of their data. For example, they are concerned that if they were to join the community, the shared data might be used for the purpose of levying punitive measures. In order to allay these concerns, it is important to establish privacy measures and ensure that the data collected is only used for fostering employment opportunities and not for regulatory or legal purposes, with an arm's length relationship with the government. A possible solution is to establish robust data protection mechanisms to ensure that shared data is not used for regulatory measures.

Lack of Awareness and Trust in the Ecosystem: Lack of trust in the ecosystem and its ability to improve employability could also be a key barrier to its adoption. This is especially relevant for a job seeker like a rural dropout with significant opportunity cost (alternate employment income and financing cost) who would need to take a leap of faith to undergo skilling and face the uncertainty of landing a better job. To address this, dedicated trust building activities need to be undertaken. These could include.

- Mass campaigns by the government along the lines of Skill India, highlighting tangible benefits achieved like improved employment rate, percentage improvement in income levels, etc.
- Encouraging job seeker friendly models like income sharing agreements that mitigate the job seeker's risks.
- Partnering with local influencers like successful youth – these individuals could share testimonials on their job search and skilling journey.
- Local skilling institutes could assist in areas like counselling on future opportunities, available government support, etc.

For employers, awareness of the robustness and accuracy of the skill verification process, a clear buy-in of the government and other prominent large-scale employers along with extensive adoption of the NODE services in areas like internal recruitment, would help inspire trust in the ecosystem.

5.2 Drive Participatory Design and End-user Engagement

Participatory design allows the ecosystem to crowdsource ideas, leverage expertise from different participants in the community, and help build optimal solutions. In order to facilitate this participatory design process, it is imperative for the different stakeholder groups in the community to interact in an efficient and productive manner.

- **Build Dedicated Feedback Loops**

Dedicated feedback forums or portals would help platform designers gather direct and regular feedback from end users like job seekers, employer organizations, etc. Jobseekers can provide inputs on common pain points across their user journey in addition to grievances around access and adoption. Other stakeholders like employers and training and assessment institutes can

share their respective inputs on compatibility issues, allowable data types, constraints on usage requirements, etc.

- **Encourage Partnerships with International Governments**

Deep and valuable talent ecosystems exist in other countries. Partnerships can be developed to share and leverage their knowledge and experience. Some examples include.

- Singapore has developed a Skills Future program which has multiple digital services associated with it. One of these services is “OpenCerts”, a blockchain based platform to validate educational certificates. Insights from the building of this portal can be leveraged in the development of the e-credentials function outlined in this document.
- Another example is the Saudi Labor Platform, *Taqat*. This platform uses algorithms to match job seekers with employers based on each party’s specific criteria. This platform can be used as a benchmark when developing Smart Search capabilities for the Talent NODE

End-user engagement is critical to the NODE as each additional actor increases the value and efficacy of the ecosystem. Given the large size of the work force, the number of training institutes, and the number of employers there is a tremendous opportunity to drive end-users to adopt the platform. This adoption will not only create a large community but will also help solve the fragmentation challenge that currently exists within the ecosystem (a number of disparate initiatives in place that are not communicating with one another). In order to drive end-user engagement, the value proposition of the NODE must be clearly articulated and shared. There are four value propositions for end users that are found within the Talent NODE.

1. **Interactions with other Stake Holders:** The NODE will facilitate access to and interactions with a larger pool of stakeholders, thereby increasing the value of the ecosystem. For example, employers will have access to a larger labor pool of potential employees and skill seekers will have access to a larger pool of jobs than possible in the current system.
2. **Access to Data:** The NODE will facilitate access to an increasing number of verifiable data points. For example, skill seekers will have access to a full list of training institutes along with their course offerings and ratings. Further, employers will not only have access to digital resumes but will also have the ability to verify these resumes, lending confidence to the hiring process.
3. **Integration of Services:** The NODE will integrate disparate services into a holistic experience. For example, the job search functionality will illustrate the skills required for a particular job and integrate these requirements with the course offerings of training institutes. Further, additional value added services (for example, financing) can be integrated into the NODE so that skill seekers can understand and access financing options as a part of their assessment of training institutes.
4. **Time and Cost Savings:** The NODE will provide several tangible benefits through the integration of services. For example, users will save time by interacting with one platform versus multiple different platforms. Additionally, through access to one large data set, users will save time and money by having information at the touch of their fingertips instead of having to conduct manual searches.

Once these value propositions are properly articulated, the engage of end-users on the platform is likely to accelerate. Further, the target population of job seekers and employers should be made aware of these value propositions and assisted with the required onboarding process. In order to build a vibrant community, an E2E engagement plan should be developed and implemented. A few initiatives that can initially be included in the engagement strategy are shared below.

- **Roadshow:** A roadshow can be held across the cities with the largest pools of blue collar jobs, industry associations, and SSCs. The purpose of the roadshow would be to create awareness, generate enthusiasm, and register job seekers and employers.
- **Partnerships with Urban Local Bodies:** Partnerships should be developed with urban local bodies to access employers and job seekers that are not located in larger cities. Urban local bodies can also facilitate registrations.
- **Partnerships with Other Ministries:** Partnerships should be developed with other ministries that have direct relationships with the actors in the Talent NODE. For example, the Ministry of MSME can facilitate the onboarding of MSMEs onto the platform. The Ministry of and Employment (MoLE) can facilitate the transfer of individuals from the National Career Service (NCS) portal to the broader Talent NODE.
- **Digital Marketing:** A national digital marketing campaign can be launched to reach a wide band of potential community members. Targeted messaging articulating the value proposition of the platform can be effective in attaining the end goal.
- **Incentives:** Initial user adoption can be encouraged by offering incentives. For example, an initial waiver of API fee or subscription fees could act as an incentive for services to be developed on top of the Talent NODE. Similarly, dedicated financial grants or easier skilling loans by the government can incentivize adoption for a jobseeker.

5.3 Cultivate a Network of Innovators

Key stakeholder groups in the Talent NODE include job seekers, employers, training and assessment institutes, financing institutes, demand aggregators or employment marketplaces, and related ministries. Distinct stakeholder groups should be engaged with an intent for collaboration through mechanisms like workshops, hackathons, data sharing mechanisms, etc., to co-create innovative and user-centric solutions. These are further explained below.

- **Direct Engagements through Design Workshops and Hackathons**

Workshops and hackathon challenges can be used to create a single platform where different actors can combine their skills to solve a common problem. Hackathons can bring together start-ups, developers, and other community members to create innovative solutions. As a part of hackathons, aggregated and anonymized data from the Talent NODE can be published and shared with the ecosystem for soliciting solutions from diverse stakeholders for resolving market gaps.

Formal workshops can bring together stakeholders in the ecosystem to share experiences, provide suggestions, and facilitate co-creation. A number of ministries have established schemes and initiatives that directly impact the talent ecosystem. These ministries can

participate in the workshops to provide their expertise in the design process. For example, the MoLE will be able to provide inputs, data, and capabilities required to build a holistic view of talent supply and demand. Local NGOs and industry associations have a strong sense of the imminent local needs in the skilling ecosystem and can provide valuable insights. There are other stakeholders like employer associations that can share insights about skills that are in demand, and jobseekers and skill seekers who can share inputs on their user journeys. Each actor in the ecosystem has something tangible to contribute and their collective intelligence and experience can be leveraged to create user-centric solutions.

- **Encourage Data Sharing among Private Players through Incentives**

Private job market places like Quikr Jobs, Kormo (Google), OLX, and BetterPlace are aggregating demand and attempting to match job seekers with employers. Compelling and fair incentive structures in the form of revenue sharing agreements could be designed to foster partnerships among private demand aggregators, encouraging them to share data with the NODE for improved services.

5.4 Be Analytics Driven for Continual User Focus

Analytics can be used to gain insights to enhance service delivery to the community. The Talent NODE generates two types of data.

1. **Data Accessible by the Platform:** The inputs shared by different stakeholders for their respective use cases are accessible by the platform. This data includes job availability, skill credentials, and training institute offerings, etc. (Refer to Section 4.2 for further discussion).
2. **Data Generated by the Platform:** Through the various use cases, the platform will generate data that can enable further analytics. This data includes the institute’s historical performance ratings, skilling e-credentials, grievances, verified history, etc.

Analytics performed on top of both types of data would be useful in two ways.

1. **Platform Performance Monitoring and Improvement with Analytics**

Analytics generated by the NODE can be used for improving platform design, identifying new use cases, and enhancing user engagement. Some of these benefits are shown in Exhibit 8.

| Analytics Function | Description |
|--------------------|--|
| Customer Journeys | Based on the interactions that individuals have with the platform, the government can understand which services / features are most in demand and identify the points where users drop off, to increase engagement |
| Demographics | Based on platform adoption and engagement data, analysis can be done to assess which demographics are using the platform and are successfully finding employment |

| Analytics Function | Description |
|---------------------------|---|
| Grievance Redressal | Based on an analysis of grievance reported in the ecosystem, common pain points can be identified to incorporate improvements in the platform design |
| Matching Algorithms | Personalization of algorithms to be done in future to help match supply and demand based on employer and job seeker preferences |
| Institute Performance | Institute performance (registrations, pass rates, employment rates, expected salary) can be tracked and aggregated |
| Accreditation Performance | Accreditation and institute performance can be tracked and correlated |
| Hiring Trends | Based on employment data generated by the platform, the government can identify the employers that are hiring the most and the type of talent that is in demand |

Exhibit 8: Analytic Functions to be Used by the Digital Platform

2. External Planning and Decision-making for all Stakeholders in the Ecosystem

Insights generated through analytics could be used by the players in the ecosystem to improve their services. Potential insights that can be leveraged by the players are shown in Exhibit 9.

| Analytics Function | Description |
|------------------------------------|---|
| Future Supply / Demand Projections | Based on identified demand-supply gaps, the government can plan for the skill courses that need to be established, ascertain the programs that need more funding, and identify those programs that are no longer needed |
| Knowledge Gap Assessments | Based on the availability of skilled labor, analytics can identify where knowledge gaps exist in order to enable education providers to fill those gaps |
| Geographic Mapping | Based on location dynamics within supply-demand gaps, geographic areas where labor is needed or where jobs are readily available can be identified. This data would be useful for the government, training institutes, etc. |
| Policy Measurement | Based on shifts in employment, policy impact can be assessed at a granular level (region, industry, training institutes, skill courses) |

Exhibit 9: Usage of Analytics for Generating Insights to be Leveraged by Ecosystem Players

5.5 Enable Grievance Redressal

Grievance redressal is a key focus in the context of the Talent NODE. Due to the presence of multiple players and different stakeholders, concerns in areas like exclusion, accessibility, misuse of sensitive or personal data, breach of rules of engagement like data sharing agreements, etc., are inadvertent. Therefore, it is imperative that clear mechanisms are established to handle grievances. Possible solutions include.

- **Widespread Communication of Grievance Redressal Mechanisms:** SMS notification, landing page of career websites, campaigns on press, television, door-to-door campaigns, etc., could be used for creating awareness about the grievance channels.
- **Multiple Channels of Grievance Redressal (Offline and Online):** Dedicated online channels through call center, Interactive Voice Recording Service (IVRS), WhatsApp handles, and online forums need to be setup with continuous tracking of grievance redressal in-line with clearly established timelines. Offline kiosks at rural areas near schools or government offices could be used for assisting unskilled youth. Other stakeholders like service providers or startups could be provided with dedicated grievance redressal portals and a NODE level grievance redressal committee or office to oversee the activities.

Not only will appropriate grievance redressal mechanisms solve specific issues and increase an individual's satisfaction, but will also enable a culture of knowledge sharing and continuous improvement. For example, filed grievances can be tracked and analyzed to identify and solve customer pain points. Further, common grievances can be shared across NODES for knowledge building.

6 Governance

The talent ecosystem is a complex, multi-stakeholder ecosystem with a variety of end-user journeys. The governance framework design needs to ensure fair value sharing while policing stakeholder behavior and implementing clearly articulated preventive and corrective measures. Accountability for the NODE needs to be ensured by both the laws and rules that govern the ecosystem as well as the institutions that uphold them. This will serve to increase trust, build confidence, and further accelerate engagement in the ecosystem.

Five key principles must be adhered to in order to establish a strong governance framework.

Key Principles for Strong Governance

1. Define Accountable Institutions

Ensure a designated institution for the ODE and create the right legal and organizational structure, operating processes, etc., in line with its objectives. Promote multi-stakeholder governance involving key stakeholders, including government bodies, private actors, and individuals to enhance transparency.

2. Establish and Align with Robust Rules of Engagement

Define clear rules around the responsibilities, rights, and liabilities of all actors in the ecosystem (government bodies, private sector participants, individuals), in adherence with domain specific laws and rules and other overarching national policies and frameworks.

3. Create Transparent Data Governance

Outline clear standards and policies on data ownership, collection and contribution, consumption, and sharing, especially with respect to sensitive personal data. Ensure that these are easily understood and readily available to all users. Establish a set of mechanisms to monitor and drive adherence.

4. Ensure the Right Capabilities

Nurture partnerships and establish Human Resource (HR) policies and practices to attract and retain the relevant talent required to successfully build and operate the digital platform. A

5. Adopt a Sustainable Funding Model

Develop a sustainable long-term funding model, which is aligned with the overall goals of the platform, to ensure uninterrupted operations and continuous user-focused enhancements.

In the following sections, we will discuss how each principle can be followed to develop a strong governance model within the Talent NODE.

6.1 Selecting an Accountable Institution

In order to ensure the proper functioning of the NODE it is imperative to select an accountable institution as a home for the NODE. While there will be multiple stakeholders responsible for different journeys and platform building blocks, this institution will be the single point of accountability and will drive the success of the NODE. With a multitude of stakeholders and different components, an accountable institution also acts as a fail-safe to ensure adherence to the legal and organization structure, operating processes, drive builder and end-user adoption, and setting the rules of engagement in the ecosystem, etc., in line with the objectives of the NODE.

When selecting an accountable institution, it is crucial to establish a set of principle to guide the selection process to ensure that the institution can responsibly carry out the functions of the NODE. Thus, an accountable institution should be appointed based on its ability to.

- Be the single point of ownership for E2E delivery and for the successes and failures of the NODE. While delivery in distinct use cases may be the responsibility of different stakeholders, the institution needs to have both the accountability and the authority to facilitate this across the ecosystem.
- Be the primary fiscal decision maker and own the budget and budgetary decisions related to the NODE.
- Make strategic decisions to set the future course and evolution of the NODE including influencing relevant policy decisions and rules and standards of the ecosystem.
- Drive user adoption of the NODE and the relevant services.

Identifying Options for the Accountable Institutional Home for the Talent NODE

Today, there are several existing agencies within the skilling / jobs space. Each such agency has its own defining characteristics which could make it a viable option to serve as the institutional home for the Talent NODE.

Existing options include the NSDC, the future NCVET, and the MSDE. Each body, in varying degrees, meets the criteria outlined in the principles, and trade-offs must be assessed before a final decision is made. In this discussion, we highlight some potential options and exemplary characteristics of each institution.

The NSDC is a not-for-profit public limited company with the MSDE holding 49 percent share capital and the private sector holding 51 percent share capital. Given its public-private nature, the NSDC already has existing relationships with training institutes, employers, skill seekers, as well as other government institutions, making it a potential candidate.

The NCVET, as the future skilling regulatory authority, could provide supervision and the right accountability and authority for the NODE. Its positional power can help ensure that stakeholders abide by their roles and responsibilities and follow the rules set by the institution. As both the Talent NODE and the NCVET are new concepts, the NCVET could be the home of the Talent NODE, ensuring minimal disruption to the operations of other institutions.

The MSDE is the overarching body of the skilling ecosystem responsible for the coordination of all skill development efforts and elimination of gaps between the supply and demand of labor, as stated by the MSDE. Given its broad mandate and mission, the MSDE is aligned to the vision and ultimate goals of the Talent NODE and could serve as the accountable institution.

Considering the benefits offered by multiple institutions like NSDC, NCVET, and MSDE, a shared ownership model could be explored.

Leadership Structure

Having the right leadership team is critical to drive decision making and optimize the performance of the Talent NODE. A potential illustrative structure is indicated in Exhibit 10. Please note, this structure is indicative and will require further elaboration.

| | Role | Composition |
|--------------------|---|--|
| Board of Governors | <ul style="list-style-type: none"> Develop the long-term skilling strategy and make strategic decisions for the platform Sign-off on key strategic and operational decisions Ensure the right financing models and availability of funds Acquire the right expertise to guide decisions, for example, those related to risk and ethics, technology choices; form sub-committees as appropriate for special projects | <ul style="list-style-type: none"> Chief Executive Officer (CEO) Ministry of Skill Development & Entrepreneurship (MSDE) representative National Skill Development Corporation (NSDC) representative National Council for Vocational Educational Training (NCVET) representative Ministry of Labour and Employment (MoLE) representative Employer / Industry Association representative(s) Technology experts |
| Management Team | <ul style="list-style-type: none"> Develop the short and medium term strategy for the platform Oversee the operational implementation of the NODE Planning and budgeting Ensure smooth operations; stakeholder management, partner management, etc. Implement new and relevant policies established by the NODE. Develop strategic partnerships with public and private sector | <ul style="list-style-type: none"> Management team, led by the CEO |

| | Role | Composition |
|-------------------|--|---|
| | stakeholders to engage in the NODE <ul style="list-style-type: none"> • Drive user adoption and engagement • Set, monitor, and review Key Performance Indicators (KPIs) for the platform; identify new features, capabilities required • Resolve technical and operational issues | |
| Expert Committees | <ul style="list-style-type: none"> • Provide technical and policy implementation advice to guide specific initiatives • Design adequate policies for platform governance (approved by the Board) For example, establish data sharing standards | <ul style="list-style-type: none"> • Subset of board members and external experts (for example, labor economists, platform architecture experts) |

Exhibit 10: Leadership Structure of the Accountable Institution

6.2 Rules of Engagement

In addition to a strong accountable institution and robust leadership structure, a clear delegation of roles and responsibilities across the ecosystem is required to ensure that the NODE functions effectively.

Based on the interactions within the ecosystem, there are three types of roles and responsibilities i) those of the accountable institution, ii) those shared across the ecosystem, and iii) those for individual stakeholders.

Points (i) and (ii) are outlined in Exhibit 10 and point (iii) is outlined in Exhibit 11.

| Body Roles and Responsibilities | Type | Description |
|---------------------------------|--|---|
| Accountable Institution | Specific to the overall management and functioning of the NODE | <ul style="list-style-type: none"> • Set NODE policy guidelines and business rules with regard to the integration of various platforms / building blocks • Set interoperability standards and incentive structures for data sharing • Develop financing model • Analyze supply and demand data to understand the talent environment |

| Body Roles and Responsibilities | Type | Description |
|---------------------------------|--|--|
| | | <ul style="list-style-type: none"> • Generate demand and onboard stakeholders, for example, job seekers, skilling institutes, and employers • Handle grievances |
| Shared across the Ecosystem | Relevant roles that must be adhered to by all members of the ecosystem | <ul style="list-style-type: none"> • Adhere to all the established rules, guidelines, and policies • Share requisite data in standardized formats in accordance with interoperability standards and assume responsibility for the quality and accuracy of data |

Exhibit 11: Roles and Responsibilities of the Accountable Institution and Shared Across the Ecosystem

| Stakeholder | Role | Responsibilities |
|---------------|--|--|
| MSDE | Manage national skilling strategy and programs | <ul style="list-style-type: none"> • Establish platform policies and guidelines in adherence with the National Skilling Policy guidelines and national skill efforts • Establish goals and KPIs for the platform • Leverage supply / demand data to plan skill programs and resources • Anchor research efforts and facilitate the development of any required additional groups (for example, forum focused on development of new services) |
| NCVET | Manage accreditation and ratings of institutes (training and assessment) | <ul style="list-style-type: none"> • Establish and regulate accreditation and rating standards; issue e-credentials • Establish a mechanism to track performance and review training and assessment institutes at regular intervals |
| NSDC and SSCs | Onboard and manage institutes | <ul style="list-style-type: none"> • Engage with employers, training institutes, and generate demand • Drive user adoption and onboarding • Develop industry partnerships |

| Stakeholder | Role | Responsibilities |
|---|---|---|
| | | <ul style="list-style-type: none"> Handle grievances |
| Training Institutes | Provide training to skill seekers | <ul style="list-style-type: none"> Upload data (course offerings, performance data) in a timely manner Be responsive to the needs of job-seekers (applications, requests for information, etc.) Integrate value added services into the platform (for example, content, counselling) |
| Assessing Institutes | Conduct exams and issue e-certificates | <ul style="list-style-type: none"> Be responsive to the needs generated via the platform for optimal user experience Offer value added services |
| Private Sector Employers and Demand Aggregators | <ul style="list-style-type: none"> Hire employees based on enterprise needs Aggregate and share demand data | <ul style="list-style-type: none"> Engage with the ecosystem to learn about employees' needs and requirements (for example, skilling institutes) Aggregate job listings from private sector employers (or directly provide listings data) Leverage data from the platform to improve reliability and usability |

Exhibit 12: Roles and Responsibilities of Individual Stakeholders

6.3 Key Capabilities needed for a Highly Functioning NODE

The accountable institution will need to develop a set of core capabilities to build and operate the digital platform and efficiently manage the ecosystem. The right talent and expertise that is critical for the success of the NODE can be sourced either in-house or outsourced to partner organizations or vendors.

Based on the user journeys and proposed design of the NODE as outlined in this document, we have identified seven key capabilities that are needed for the Talent NODE to operate successfully.

- Strategy and Planning:** Includes strategy setting, short and long term planning, creation and implementation of business rules, and policy implementation capabilities.
- Product:** Includes user journey mapping, user-centric product design, product development and platform integration, and ensuring that technology and data architecture is in line with global benchmarks.
- Data:** Includes setting interoperability standards and data management and security capabilities.

4. **Analytics:** Includes capabilities to identify business logic / requirements and translate them into algorithms.
5. **Partnerships:** Includes the identification and onboarding of partners and vendors and contract management capabilities. This requires expertise in Request for Proposal (RFP) creation, contract negotiation, reporting, Service-Level Agreement (SLA) tracking, due diligence, and vendor audits.
6. **Marketing and User Engagement:** Includes marketing, outreach, identification and on boarding of users, and monitoring engagement.
7. **Operations:** Includes capability assessment to ensure that the requisite infrastructure and human resource capabilities are in place along with talent management, performance monitoring, and grievance redressal capabilities.

6.4 Data Governance

Data governance is a critical issue for the Talent NODE for several reasons. First, the scale of data exchanged is likely to be unprecedented and will require appropriate rules for its collection, storage, sharing, and access by both public and private players. Second, considerable personal (for example, individual skill history, credentials) and non-personal data (for example, training information, ratings) will be exchanged by both public and private entities. Mechanisms for access, sharing, and reuse of this data should be instituted and followed. Third, vast amounts of data will also be generated by public and private players due to interactions in the ecosystem – this data can be further leveraged to unlock new solutions (for example, personalized career counselling or training services). Lastly, the quality and reliability of data in the ecosystem is likely to pose a key challenge (for example, quality of training institutes based on user feedback and ratings or available job opportunities in the informal sector).

Considering the sensitivity, complexity, and variety of data to be leveraged within the Talent NODE, a robust governance mechanism is needed to ensure that the benefits are unlocked, while managing for key risks like data aggregation risk, sensitive data exposure, data misuse, and decrease in trust due to poor data quality.

Across the different stages of the data value chain, from collection and storage to sharing and usage, concerns need to be addressed around key data governance areas like i) data security and privacy, ii) data quality, and iii) compliant or fair usage of data.

1. **Data Security and Privacy:** Given the confidential nature of the data on the platform, it is especially important to ensure that security and 'Privacy by Design' (PbD) principles¹³ are incorporated. For personal data, these include.
 - Privacy by default which requires clear purpose specification at the time of data collection.
 - Limitation of collection to only what is necessary for the specified purposes.
 - Minimizing identifiability, observability, and linking of personal information.
 - Storing data only for the required duration.
 - Adapting to existing personal data regulations.

- Further sharing and usage with detailed consideration for consent and acceptable data usage where needed.

Additionally, E2E lifecycle protection must be applied to the data to ensure that it is kept secure, encrypted, and access controlled. Further, the platform needs to ensure strong accountability, openness, and transparency with respect to its policies and a clear complaint and redressal mechanism. Decisions need to be made regarding liability, considering that ownership of data lies across multiple stakeholders. Clear regulations and frameworks need to be established to ensure data security. Furthermore, to promote trust across the ecosystem, acceptable data security and privacy practices or standards need to be promoted by the NODE owner and adopted by different NODE players.

2. **Data Quality:** With data coming from multiple sources and applications, maintenance in terms of quality and adherence to interoperability lies with the respective institutions who generate and / or own the data. (For example, accuracy of job postings, updated training information, employment history). Unless each of these institutions undertakes a set of actions, including regular data updates, reliability checks, etc., the ecosystem will face challenges. Detailed data quality guidelines and policies need to be established so that the collected data can be used in a reliable manner and for the intended usage. A team led by a Chief Data Officer (CDO) together with a set of Data Stewards can be created within the accountable institution for the NODE and dedicated data owners for respective datasets can coordinate with this team. This team can monitor adherence to acceptable quality standards and can intervene when needed to handhold the institutions in driving better standards in quality and interoperability.
3. **Data Usage:** Given the variety of data within the NODE, clear rules around data usage and sharing need to be established, along with a liability policy. Access to the data should be provided through a strict registration process which would require strong compliance to the terms of use. Different categories of users and service providers need to be created for selective access to the data. Non-compliant entities will need to be held responsible under the requisite rules and regulations, for example, under the Personal Data Protection Bill 2019 (PDPB).¹⁴ Service providers should agree to be monitored through an audit framework.

For promoting trust and supporting the entire process, clear data sharing agreements and data usage policies backed by legal regulations need to be formulated and enforced. For example, data sharing agreement between a niche job market place and the Talent NODE. Data sharing and usage agreements need to be based on clear delegation of rules and responsibilities across different categories of stakeholders like overarching authorities, NODE owners, data providers, and data consumers or service providers. These agreements are imperative in certain key areas including data ownership, accountability for data security and privacy during different stages of the transaction, dispute resolution mechanisms, etc.

In order to ensure robust data governance, three types of actions can be taken i) a set of robust rules and regulations can be established, ii) a set of institutions can be appointed to create and enforce these rules, and iii) a set of enabling tools and mechanisms can be actioned to provide support.

1. The domains / matters for which clear rules and regulations are required are shown in Exhibit 13.

| Policy | Description |
|---------------------------|---|
| Data Quality | <p>Define acceptable data quality at scale. Clearly articulate responsibilities of the platform and data owner on issues related to quality (for example, acceptable community ratings from verified users at a minimum scale)</p> <p>References: Data Quality Guidelines – US General Services Administration¹⁵</p> |
| Master and Reference Data | <p>Definition of the principles and tools needed to maintain a single version of reference for data and their attributes (for example, multiple job advertisements of the same posting)</p> <p>References: CDER (FDA) Master data management policy¹⁶</p> |
| Metadata | <p>Definition of data attributes to characterize them in an unequivocal way and locate them in their lifecycle (for example, authorized institution and date for a training program)</p> <p>References: e-GOV Metadata Standards¹⁷ CEDAR Template Model¹⁸ National Skills Qualifications Framework (NSQF)¹⁹ NOS²⁰</p> |
| Data Security | <p>Define the target best practices and standards adopted in terms of security. Definition of the responsibilities of stakeholders for security, confidentiality, and privacy.</p> <p>References: National Cyber Security Policy (NCSP)²¹ Data Security Council of India (DSCI) Security Framework²²</p> |
| Data Architecture | <p>Description of the target technologies, methodologies, standards, and best practices in data architecture</p> <p>References:</p> |

| Policy | Description |
|------------------------|---|
| | Development and Environmental Professionals Association (DEPA) by IndiaStack ²³ |
| Data Interoperability | Define interoperability standards with consensus across stakeholders (for example, fields in skill attributes) References: Interoperability Framework for e-Governance (IFEG) ²⁴ |
| Data Privacy | Adoption of consent framework by Ministry of Electronics & Information Technology (MeitY) and Free, Prior and Informed Consent (FPIC), data anonymization, best practices in PbD (for example, 7 principles of Ann Cavoukian) References: Electronic Consent Framework (ECF) by MeitY ²⁵ FPIC Standard by United Nation ²⁶ DSCI Privacy Framework ²⁷ International Organization for Standardization (ISO) 27701 ²⁸ (Adapting to data privacy bill) ISO / International Electrotechnical Commission (IEC) 27018:2019 ²⁹ |
| Data Sharing and Usage | Articulate data sharing agreements and data usage policies with rules and guidelines on usage, re-sharing, terms of violations, penalties, etc. References: Australian Data Sharing Framework ³⁰ Singapore Data Sharing Framework ³¹ |

Exhibit 13: Required Policies across Data Governance Activities

2. A few innovative data governance bodies can be created within and outside the accountable institution to drive the creation of policies and conceive strategic decisions related to data. Two such bodies could be.
 - **Data Council:** Decision-making committee for all data-related matters, for example, policy approvals, conflicts on data quality and data management, etc., involving CDO, Chief Information Officer (CIO), Data Owners, etc.
 - **Data Architecture Authority:** Working group composed of CDO, CIO, Data Architects, and CDO and CIO resources for the design and development of the NODE and technology roadmap to enable the services.

3. Finally, a set of supporting tools like data quality tools, master data management tools, and metadata tools can be created to support the data governance process. For example, clear data structures need to be established with the relevant artefacts to help manage and understand data. This can include.
 - Data Glossary: Data terms and their commonly agreed definitions.
 - Data Owner Map: Indicates the data owner and the individual / team responsible for the quality of data.
 - Data Dictionary: Describes the metadata (for example, location, type)
 - Data Flows: Functional and technical flows of the data in different processes and systems.

6.5 Funding

For the Talent NODE to have longevity, it needs to have a sustainable funding model to ensure operational continuity. The Talent NODE needs to consider funding needs across its lifecycle, including the design, build, and operate phases.

- **Initial financing** to bear the cost of design, build, and deployment of the Talent NODE. Cost of build includes pay-out to technology service providers and the cost of hiring and salaries for in-house talent. Deployment cost includes the cost of running awareness campaigns (offline, online) and beta testing groups before full scale launch.
- **Operational financing** to recover the cost of ongoing operations and new developments (upgrades / enhancements). Operations cost include cost for scaling, maintenance, employee retention, and user support.

Initial Financing of the Talent NODE

The Talent NODE needs to be initially financed using public sector or philanthropic capital. This is also important since the financing decision impacts the choice of accountable institution for the NODE, which in turn determines the rules of engagement for the ecosystem. Public sector or philanthropic financing aids in the creation of a true level-playing field, facilitates a competitive rather than monopolistic market, and keeps vested interests of different actors at bay (for example, it prevents unfair value capture by private enterprises). These two financing mechanisms have been further detailed below.

- **Public Sector Financing:** Includes central / state specific Information and Communications Technology (ICT) budgets or a portion of MSDE budget.
- **Philanthropic Financing:** Grants typically stem from three types of sources. These include, i) private foundations or development finance institutions, ii) corporate foundations, and iii) individuals via crowdsourcing campaigns or donations. In addition to monetary support, philanthropic contributions can also be extended through the provision of technology products and / or services, either free or at subsidized rates for the development of the Talent NODE.

Operational Financing of the Talent NODE

Funding is required even post the launch of the NODE to ensure operational sustainability. This sparks the need for large, recurring investments, which might become difficult to sustain with public sector / philanthropic grants alone. The Talent NODE also needs to explore other funding models beyond public sector / philanthropic grants to enable self-sustainability while also being mindful of exclusion risk.

The Talent NODE can adopt cost recovery models for long-term sustainability by charging a fee for the services delivered and channelizing service fees to finance the ongoing operations. These models need to be agile so that they can change over time depending upon the adoption of the NODE. Initially, services can be offered free of charge to encourage adoption. With sufficient scale, revenue generation strategies can be implemented while ensuring that they don't become too prohibitive in nature.

Possible alternatives for cost recovery via user fee charge include.

- **Pay-per-transaction model:** Within the NODE, there are multiple interactions between stakeholders that can be identified as transaction points. A few examples include:
 - Employer hiring a job seeker
 - Employer verifying a skill seeker's digital CV
 - Training institute registering a skill seeker
- **The "freemium model",** which consists of two components (specifically for end-user services that may be integrated into the digital platform):
 - **Free Services:** These could be the base services of the platform such as registration, job search, skill course search, accreditation, etc.
 - **Premium Services Available at a Charge:** These could include services such as career counselling, resume building, analytics services, smart matching with jobs, access to top profiles within the NODE, etc.

User service fees: For example, employers can be charged a small fee when they hire a job seeker or verify work history.

- **Download Charges:** External actors such as start-ups or financial institutions can be charged a fee for accessing APIs to build on top of the NODE or downloading necessary data.
- **One-time Charge:** Each employer, training / assessing institute, or other external service provider (for example, education provider, financial institute) that registers on the platform can be charged a fee.
- **Recurring Subscription Fee:** A subscription fee model could also be explored for users like employers and job market places for the continued use of NODE services combined with a variable pay-per-use model.

7 Impact Potential

The potential benefits of a Talent NODE are immense, both from an economic and societal perspective. **The estimated economic impact is over USD 150-200+ billion (INR 11-15 lakh+ crore) by 2030 with 50-80 million people expected to benefit from new jobs or jobs that are better matched to their skills.** These benefits are driven by three primary factors.

| Driver | Description |
|-------------------------------|--|
| Reduced Unemployment | Those currently unemployed will be able to access a broader spectrum of job opportunities than would normally be possible. This increased awareness of more job opportunities will lead to more employment opportunities, thereby decreasing unemployment. |
| Increased Labor Participation | The current labor force participation rate in India hovers around 50 percent. Due to the skill search and job search functionality of the NODE, those not actively looking for work can search for and identify opportunities to increase their skill levels. Upskilling will enable them to enter the workforce, increasing the labor force participation rate. |
| Improved Job Matching | For those currently working, there is an opportunity to find better jobs that match their skill levels. This will increase their wages and their value to the employer. Secondly, for casual or marginal workers who cannot find full time work, the NODE can identify opportunities that can provide more consistent and secure work that is in line with their skill levels. |

Exhibit 14: Drivers of Impact

The benefits from the Talent NODE will lead to an increase in labor participation within the country, the formalization of the labor force, and result in higher job satisfaction. In addition to these specific benefits, the Talent NODE will also increase the individuals' trust in the government. The NODE will save individuals' time, increase convenience, and enable the creation of a number of solutions and services that do not exist today.

8 Way Forward: Roadmap

In order to initiate work on the Talent NODE and implement these ideas, a feasible starting point needs to be identified. This section presents a brief roadmap for the NODE owner to take this idea forward. We envision this to be an over three-year journey to build a scaled up platform across the three phases as explained below.

1. Establish a Committee to prepare a DPR to Guide the Design and Implementation of the NODE (3-6 months)

Committee Representation: Need to have a mix of representation from NSDC, NCVET, MSDE, MoLE, and other personnel who have the experience of building a large platform like Aadhaar, Unified Payments Interface (UPI), etc. Private sector participation like employers and industry associations should also be encouraged to articulate their needs and perspectives in the initial design stage itself.

Expected Output of DPR: The DPR needs to address the detailed design and implementation plan for helping deliver the required digital platform, governance, and community layers required for the success of the NODE. Some of these are further explained below.

- Detailed design across all the layers of the digital platform to be laid out with an assessment based on the existing state of data maturity, available applications aided by detailed ethnographic research on job seekers, skill seekers, employers, and others. An initial Minimum Viable Product (MVP) design needs to be created as a part of the initial pilot for collection of quick feedback. DPR will also develop the RFP guidelines for onboarding of Managed Service Providers (MSPs) to assist with the building of the MVP and the digital platform.
- Governance design and implementation to be detailed with an analysis of potential options around ownership, design of rules of engagement, financing options, guidelines for data sharing, etc.
- For the community, strategies around inclusion and adoption by job seekers, small scale employers, identification of ground level touchpoints, strategies for involving start-ups with support for co-creation, etc., along with the required grievance redressal mechanisms need to be detailed.
- A detailed financial modelling exercise to be performed covering projections for initial capital expenditure and ongoing costs. Based on the projections, suitable financing models to be explored along with guidelines (for example, cost-recovery, non-prohibitive in nature) for acceptable revenue generation mechanisms.
- A project phasing plan needs to be prepared and key milestones need to be identified to track progress and adapt the project management activities.

2. Establish an Initial Core Organization and Onboarding of MSPs for delivery of the MVP (6-9 months)

An initial organization needs to be established for delivering the required MVP. The structure should focus on developing capabilities around strategy and planning, technical architecture and design, etc., for the design and delivery of the MVP. The core organization structure would oversee the MVP implementation in coordination with MSPs. Some of the goals of the organization are detailed below.

- Onboard MSPs for supporting the build of MVP and digital platform only after undertaking adequate due-diligence based on RFP guidelines created as part of the DPR.
- Establish supporting governance activities like launch of policies and guidelines around rules of engagement, promotion of interoperability standards through required rules and incentives, etc., to create trust and engagement in the ecosystem.
- Engage with the community by setting up initial contact points, launching awareness campaigns, etc., for improving adoption. Establish of online and offline feedback loops to monitor the progress of the initial MVP.

3. Scale up (12-24 months)

The scale up phase of the platform would require the following.

- Scale the platform by opening up the ecosystem to more use cases combined with efforts to scale the existing use cases. This needs to be done only after the digital platform design has reached stable state and through learnings from MVP.
- Expand the developer and builder community by launching technical partnerships, creating developer friendly sandbox models, launching custom APIs to help scale the type of services built in the ecosystem, etc.
- Onboard large-scale institutions (major job portals, large scale government and private employers) by providing handholding support with activities like the launch of Project Management Units (PMUs) to guide the transition to NODE services.
- Drive end user adoption through large scale awareness campaigns and scaling of offline networks to support the job seeker adoption process. The grievance processes also need to be scaled and streamlined with dedicated policies and committees to ensure that scaling happens in a sustainable fashion.

Appendix 1: List of existing initiatives:

| Use Case | Initiatives |
|--------------------------|---|
| Job Search | <ul style="list-style-type: none"> • National Career Service • State Employment Exchange • Skill Connect • Better Place • Quikr Jobs • Kormo • OXL |
| Skilling | <ul style="list-style-type: none"> • Skill India Portal • E-Skill India • SWAYAM • dSaksharta • Learning Management System • ICT Academy • India Skill Capital • Future Skills Portal |
| Skills Credentialing | <ul style="list-style-type: none"> • Aspire Minds • eLitmus |
| Skills Verification | <ul style="list-style-type: none"> • AuthBridge • VSkills • Recognition of Prior Learning |
| Skills Financing | <ul style="list-style-type: none"> • Various bank programs |
| Government accreditation | <ul style="list-style-type: none"> • Skill Management & Accreditation of Training Center (SMART) Portal • Takshashila |
| Analytics | <ul style="list-style-type: none"> • Labor Management Information System |

Exhibit 15: Existing Talent Initiatives

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