

Join Us in
Development of an
AI-Powered
Labour Market
Intelligence Tool
[LMINT]

REQUEST FOR PROPOSALS

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Submission Deadline:

July 26, 2021 at 4:30 PM EST

Eastern Ontario Leadership Council

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1. Executive Summary

The Eastern Ontario Leadership Council is releasing a Request for Proposals for development of an initial version (MVP — minimum viable product) of an AI-powered **Labour Market Intelligence (LMINT) Tool**. The EOLC initiative places deliberate emphasis on “intelligence” rather than simply “information” to reflect the urgent need within the region --- and beyond --- for a tool that senior decision-makers and data analysts can use to bring out previously hidden insights, accelerate workflows, design targeted support programs, prioritize labour market investments, or develop fast-track education and training options across sectors or occupational groupings. Our scan of the market indicates that a tool *with the required functionality* does not exist in the current marketplace.

The Business Case/Functional Specifications document attached to this RFP is an integral part of this process and should be referenced for **additional background information** about origins of the project, early work carried out to distill use cases, users, functionality (including “must have” and “nice to have/maybe later” features), and user interface/user experience considerations.

Given the survey of existing tools and platforms, the EOLC believes there are **commercialization opportunities** beyond this first/MVP development call but that there is no need to completely ‘reinvent the wheel’. The EOLC is interested in finding a vendor who can build the MVP and has longer term interests in future enhancements and building a long-term business model around this product.

Specifications for the proposed tool have coalesced around four core ideas:

- A tool/platform that works at an **aggregated/multi-jurisdictional level** rather than being focused on one employer/enterprise or one job-seeker. It is a strategic rather than operational/employment service delivery tool.
- **User Interface/User Experience** considerations are just as important as **technical functionality** in part because the targeted users are managers, executives, policymakers and program designers who are not necessarily tech-savvy. This approach will also expedite the work of tech-savvy users such as trained data analysts.
- Calculation and visualization of the “**shortest**” **path between occupations** of low or falling demand on one side and occupations of high or rising demand on the other.
- **The need for predictive capacity** to help stakeholders anticipate labour market changes and essential responses, not just react. Predictive functionality must be occupation-focused and provide for demand forecasts over multiple timeframes within the Eastern Ontario region.

It is the EOLC’s contention that **Artificial Intelligence**, Machine Learning and similar advanced technologies could be a potent force to help stakeholders address the preceding core ideas as well as overcoming serious data challenges and analytics capacity deficits, at both the local and regional levels. As is set out later in this RFP document, proposals will be evaluated through this lens.

Table of Contents

1. Overview of Goals, Requirements, Challenges & Opportunities in Development of an AI-Powered Labour Market Intelligence (LMINT) System	3
Overview of This RFP Document.....	3
Vision for the Proposed Tool	4
Goals for the Overall Project (Why Are We Doing This?)	6
Summary of Business Analysis: Recovery, Resilience and Growth	7
A Key Functional Requirement: Determination of “Shortest Path” Between Occupations	8
Challenges That Must Be Surmounted	10
2. Elaboration of Key Functional Specifications & UI/UX Design Elements.....	11
Overall Desired Functionality.....	11
Examples of Relevant Queries and Workflows	13
Important Example User Types and Their Goals.....	14
User Interface/User Experience Goals.....	15
Importance of Workflow Support.....	16
Support for Collaboration	16
Interoperability	16
The Use of AI — and AI Ethics Considerations.....	17
Most Critical Features for the MVP	18
Nice to Have/Maybe Later Features	19
3. Our RFP Process: Definition, Procurement & Development.....	20
The RFP Process	20
Eligible Bidders.....	22
Available Budget	22
Intellectual Property and Market Opportunities	23
Prospects for Project Success and Broader Commercial Success.....	25
Bid Structure and Requirements.....	26
Evaluation Criteria for RFP Submissions	30

Business Case/Functional Specifications Document Is Shared As An Attachment

1. Overview of Goals, Requirements, Challenges & Opportunities in Development of an AI-Powered Labour Market Intelligence (LMINT) System

Overview of This RFP Document

The Eastern Ontario Leadership Conference has received funding from the EOLC Ministry to lead the development of a labour market intelligence tool (LMINT) that will enable key stakeholders to better identify and address labour market gaps, for the purposes of economic recovery, resilience and growth.

Key requirements for LMINT include certain desired labour market intelligence functionalities:

- Forecasting of labour demand and supply;
- Moving fluidly between jobs, standardized occupations (e.g., NOCs), skills descriptions and ways of addressing skills gaps (training);
- Calculation and display of “Shortest path” between various occupations, in terms of skills gaps;
- Works at the local/municipal and multi-jurisdictional (aggregate of localities) levels.

Other requirements center upon the need to achieve the above-described functionality through UI/UX design that:

- Speeds up tech-savvy data analysts in their work;
- Enables less tech-savvy users (managers, executives, policy makers) to perform advanced analysis of labour market trends and gaps.

...And that supports collaboration and capacity building in our community:

- Facilitate saving and sharing of workflows;
- Interoperability with other key labour market information tools, at least at the level of standard file input and output formats;
- Training and documentation;
- Affordability for our core users.

The rest of this document will:

- Elaborate on these requirements, including describing some example user types and important use cases (Section 2);
- Describe some ways in which these requirements might be met, based on conversations with our Eastern Ontario labour market data community of practice (Section 2);
- Describe what we will ask vendors to provide, to help us evaluate their ability to meet our requirements (Section 3);
- Describe how we will assess and score what they provide to us (Section 3);
- Lay out the RFP process steps and timelines (Section 3).

The Appendix includes a previously shared Business Case/Functional Specifications document that provides other relevant information, including:

- Origins of this project and development of the key ideas;
- Goals and benefits of this project and LMINT system for important stakeholder groups:
 - The EOLC;
 - The Province of Ontario, and the Ministry of Labour;
 - Eastern Ontario municipalities;
 - The successful vendor(s).

Vision for the Proposed Tool

The Eastern Ontario Leadership Council ([EOLC](#)) has received funding from the Ontario Ministry of Labour, Training and Skills Development to develop an initial version (MVP — minimum viable product) of an AI-powered Labour Market *Intelligence Tool (LMINT)*.

The LMINT should help both technically savvy analysts and non-technical professionals to more easily identify and address labour market supply-demand gap challenges, and to answer questions like the following:

What's the projected demand for B.S. Chemical Engineers in [user-defined labourshed] in 5 years?

Which occupations have shortest path to Chemical Engineer, in terms of required hard and soft skills?

What different skills and credentials are required for Chemical Technician vs. Chemical Technologist vs. Chemical Engineer?

What occupations are likely to see the largest increases in demand in my region in the next 3 years?

What is the average/salary wages for jobs in those high-demand applications?

What occupations are closest (shortest path) to those high-demand occupations in terms of skills?

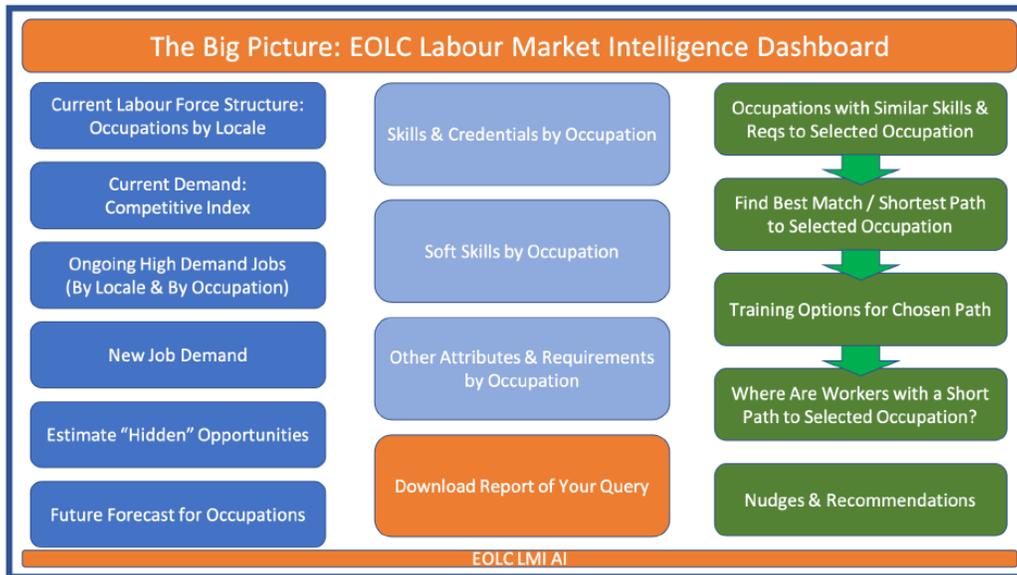
How large is the current regional pool of workers in those closest occupations?

As these examples suggest, the proposed tool:

- Must work at the aggregate level — it is not about matching individual job-seekers to individual employers.
- Must allow the user to define specific geographic locales and regions important to her work.
- Must have a predictive or forecasting element, answering questions about labour supply and demand both now and in the future.
- Must be able to shift or “translate” between jobs, occupations (for example, NOC codes) and some representation of skills.

- In analyzing occupations and skills, must be able to calculate some measure of how “close” one occupation is to another in terms of skills — and to find the “closest” occupations and describe a “shortest path”: Exactly which needed skills training or certifications are required for workers to move from one occupation to another.

To further illustrate the required main functionality of the proposed LMINT, here is a rough mock-up sketch that was done for our CoP focus group earlier this spring:



The above figure is not meant to be prescriptive of UI design, but rather just to suggest the kinds of queries possible and the kinds of steps that might make up a typical workflow. In this conception, the left column of “buttons” is mostly about job demand and occupation; the middle column is about skills and other requirements (e.g., valid driver’s license) for various occupations; and the rightmost column goes from queries into actions: Finding paths from one occupation to another, finding training options to address skills gaps, and looking into the relevant local or regional workforce to find workers who might be able (perhaps with some training) to meet particular current or projected labour demand. It is not assumed that all of these queries could be addressed in an MVP version of the tool but bidders are invited to comment on this in their proposals.

Goals for the Overall Project (Why Are We Doing This?)

This project was born out of the understanding that a flexible/mobile labour force is known to be important to economic recovery, resilience and growth, and that at least in Eastern Ontario, this mobility must include mobility across municipal boundaries. The advent of COVID-19, preceded by the designation of workforce development and *deployment* as a regional priority in mid-2019, prompted the EOLC to look for better ways to address the following related issues:

- The absence of a strategically-focused tool for labour force planning, program design, and resource allocation choices;
- The value of being able to “see”/analyze labour markets at a regional and sub-regional level. Many users work for organizations with labour market considerations that cross municipal boundaries. This has been accentuated by the acceleration of ‘work from home’ phenomenon;
- The potential importance of being able to understand the diversity of the regional landscape by providing insights at the Census Subdivision level, with roll-up capabilities to match organizational mandates; and
- The possibility that being able to “reduce friction” in labour market processes for employers, job-seekers and intermediaries, might be a competitive advantage especially for business and economic development.

All of these issues must be addressed in the current context as well as looking forward, and acknowledge that skills are increasingly seen as the most important mechanism (common language) that governs mobility between/within organizations and occupations.

Summary of Business Analysis: Recovery, Resilience and Growth

Successful development and deployment of the LMINT will address a number of important goals of public, private and community stakeholders in Eastern Ontario and beyond. These are summarized in the table below, and more detailed discussions may be found in the Appendix and on the EOLC website.

Table 1: Overall benefits of a "smart" labour market intelligence tool in terms of economic recovery, resilience and growth.

For Basic Recovery	For Building in Resilience	For Spurring Economic Growth
Reduced unemployment	Reduced 'structural unemployment' and the ability to re-allocate workers more quickly to available opportunities and societal needs	Reduced labour market friction (accelerate the match between workers and available jobs; get workers re-employed faster)
Increased labour market participation	Increased ability to draw from/contribute to labour markets in other regions/areas	Increased size of accessible labour market in a region/local area
Increased ability for employers to find and hire the "right" people	<p>Increased ability for employers to find and hire the "right" people either from new job seeker pool or by training from within</p> <p>Ability to "see" cross-occupation/cross-industry labour mobility opportunities and take action on them</p> <p>Ability to find shortest path and devise specific strategies to capitalize on them</p> <p>Ability to discern what the future "might" look like (e.g., degree of competition for high-value talent)</p>	<p>Increased ability of intermediaries to identify and address supply-demand gaps and work to address them, reducing 'structural' unemployment</p> <p>Reduced out-migration of labour force (seeking opportunity elsewhere) and faster ability to bring new talent on board... and productive!</p> <p>Increased ability of employers to access talent within the region or outside of it</p>

A Key Functional Requirement: Determination of “Shortest Path” Between Occupations

Discussions around specifications for the proposed tool have coalesced around a key concept: Calculation and visualization of the “*shortest path*” between occupations of *low or falling demand* on one side and occupations of *high or rising demand* on the other. A short path refers to the idea of a relatively small amount of training and skills upgrade or other supports required to assist employers in increasing their workforces as expeditiously as possible and to help workers move from one occupation to another — *whether in or outside of the occupational category* in which they have been most recently employed. This idea is critical to the success of LMINT, so merits further elaboration below.

Short paths, near fit and related labour market gap ideas have been pioneered by several groups in recent years, including the Brookfield Instituteⁱ and EMSIⁱⁱ. Illustrative examples from their work are shown below.

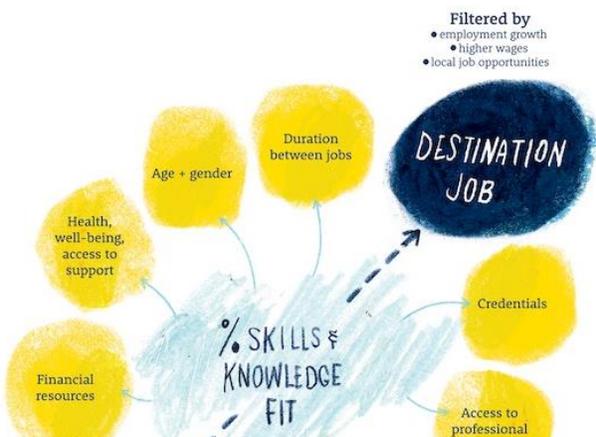
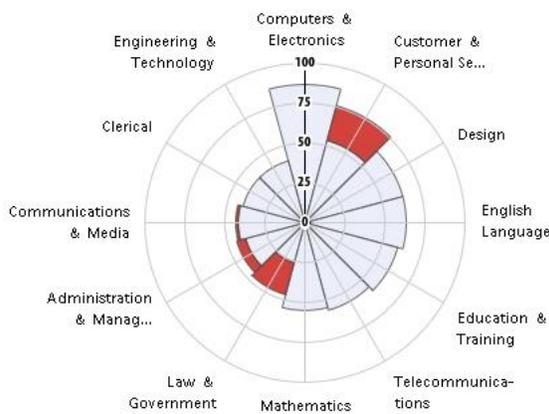


Figure 1: A Brookfield Institute project examined ways to find the best "destination jobs" for displaced workers in "origin jobs" as well as what training, commuting, financial and other requirements must be met for successful transition.

Knowledge

□ Level Overlap ■ Knowledge Gap



Skills

□ Level Overlap ■ Skill Gap

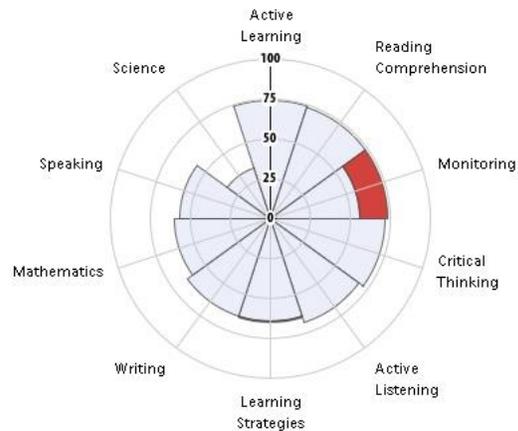


Figure 2: A "spider diagram" from an EMSI (UK) report is one good way to simultaneously display both overlap and difference in skill requirements for two related occupations (e.g., IT Analyst vs IT Manager).

Another recent example of similar work is McKinsey & Company's project and report (June 2021) entitled, "Unlocking experience-based job progressions for millions of workers", in which they outline pathways (including "Gateway" jobs) along which aggregations of workers can plausibly move from lower-paid "Origin" occupations to higher-paying "Target" occupations.

While the EOLC project team has discovered and reviewed a significant amount of related work being undertaken in various countries by public, private and academic sector groups, no existing product has been found that meets all the essential functional criteria for our likely Eastern Ontario user base (as described)

- Enables **granular views of labour demand, supply, gaps and pathways** (especially shortest path estimation). For the purposes of this project, 'granular' has a very specific meaning: geographically at the Census Subdivision level; in terms of occupations, at the most granular level of NOC or SOC codes.
- Computes and **displays paths between industry sectors, not just within them** (as several "career advancement" tools do).
- Works at the **aggregate level (dozens, hundreds or thousands of workers)** rather than focusing on individual jobs, employers and workers.
- Has **meaningful data and insights within the context of Eastern Ontario, including smaller municipalities and rural areas.**
- Allows users to **aggregate and analyze data from a subset of jurisdictions** to match organizational mandates / service areas.
- Includes **forecasting capabilities** (e.g., job demand one year or five years out).
- Includes sophisticated **processing of data around occupational skills** — both "hard" and "soft" skills.
- In data and workflows, takes account of requirements and arrangements in the areas of **commute vs. work-from-home** (WFH), childcare, etc.
- Works with **bi-directionality of gap and shortest path workflows** — from "origin jobs" to "destination jobs" and *vice versa*.

These essential features and functionalities were surfaced over several months of both formal surveys and informal discussions with a regional "Community of Practice" (CoP) comprising workforce development, economic development, post-secondary education (PSE) professionals, policy makers and funders with labour market mandates in Eastern Ontario. (The process is described in greater detail in the Appendix (Business Case/Functional Specifications document)).

Challenges That Must Be Surmounted

The nature of the region for which the LMINT is being developed poses several significant challenges that must be surmounted for the eventual product to be successful. These same challenges are likely to exist in other jurisdictions to which the LMINT might migrate and include:

- Severe data gaps – most user organizations do not have data that is granular, current, or comprehensive; this is an acute problem in rural areas/small towns and cities;
- Many stakeholders are small organizations with budgets to match; as a result, very few stakeholders have budgets for data acquisition (directly or indirectly) or subscriptions to tools (understandably) designed for large organizations;
- Very few stakeholders --- even those of a reasonable size --- have in-house analytics capabilities and have limited exposure to specific ways that AI could help them address labour market issues;
- Limited predictive capacity; must be done as “one-offs” and “from-the-ground-up”; must be “farmed out” to major firms at great expense with little/no knowledge transfer;
- Labour market intermediaries are in a period of significant change and not just due to COVID (ex. announcement of further steps in the Province’s [Employment Services Transformation](#); increased emphasis on [micro-credentialling](#) to meet employer needs). They need tools that help them work in this new environment.

2. Elaboration of Key Functional Specifications & UI/UX Design Elements

Overall Desired Functionality

Users should be able to ask / explore / solve a variety of different questions and problems related to local and regional labour demand, labour supply, supply-demand gaps and pathways towards bridging those gaps. The tool should provide smooth workflows and assistance for users in exploring their questions and solving their challenges. **That is to say, the proposed tool should be a labour market intelligence system, rather than simply another labour market information system.**

It is expected that many of the likely user queries and workflows will center on Jobs, Occupations, Industries and Skills. The selected vendor(s) will need to develop or adopt some efficient canonical representations of those object that support reasoning over them and translation between them. For example, Occupations can be represented in terms of NOC codes, and industry sectors with NAICS codes.

There has been significant work, including by our sister project in the city of Kingston, in developing a representational “languages” of job skills, and tools that translate between job ads, skills language, occupations and so forth. Practitioners in knowledge representation and machine learning will recognize that structures such as ***taxonomies, ontologies and/or knowledge graphs*** may be usefully applied in this context.

In presenting this outline of some of the key components of likely user queries and workflows, it is also important to acknowledge that:

- There are many issues associated with the **use of postings as a proxy for labour demand** including but not limited to: finding ways to estimate real job opportunities that are not posted digitally; understanding market churn (the same posting appearing repeatedly for essentially the same position because workers do not stay long in a particular job/occupation); and the impact of working from home on the definition of a local/regional market area and/or the activity of recruiting firms.
- NOCs and SOCs may be **defined differently** in Canada and the U.S., which may present an extra challenge if attempting to draw insights from U.S. data (typically from much more robust data sets). As a result, skills associated with specific occupations and inter-occupational skills gaps may require an extra level of discernment.
- For some relatively **new or emerging jobs, there is currently no matching NOC**. If NOCs linked to skills is the strategy for defining the shortest path, a workaround will be required. Otherwise, the new tool/platform/solution will not have much to offer for “new” --- and potentially high demand --- occupations of keen interest to the region’s stakeholders.
- In the Ontario context, some users --- particularly in higher education --- have begun to think in terms of **competencies rather than skills**. This may pose a challenge for educators and trainers trying to use a skills-based tool (as identified by employers) to design new training programs or services.

Early decisions will be required to determine how best to address these issues in what will undoubtedly be a Minimum Viable Product (MVP) approach to developing this tool in stages.

The following diagrams depict some of the likely core data objects and interrelationships.

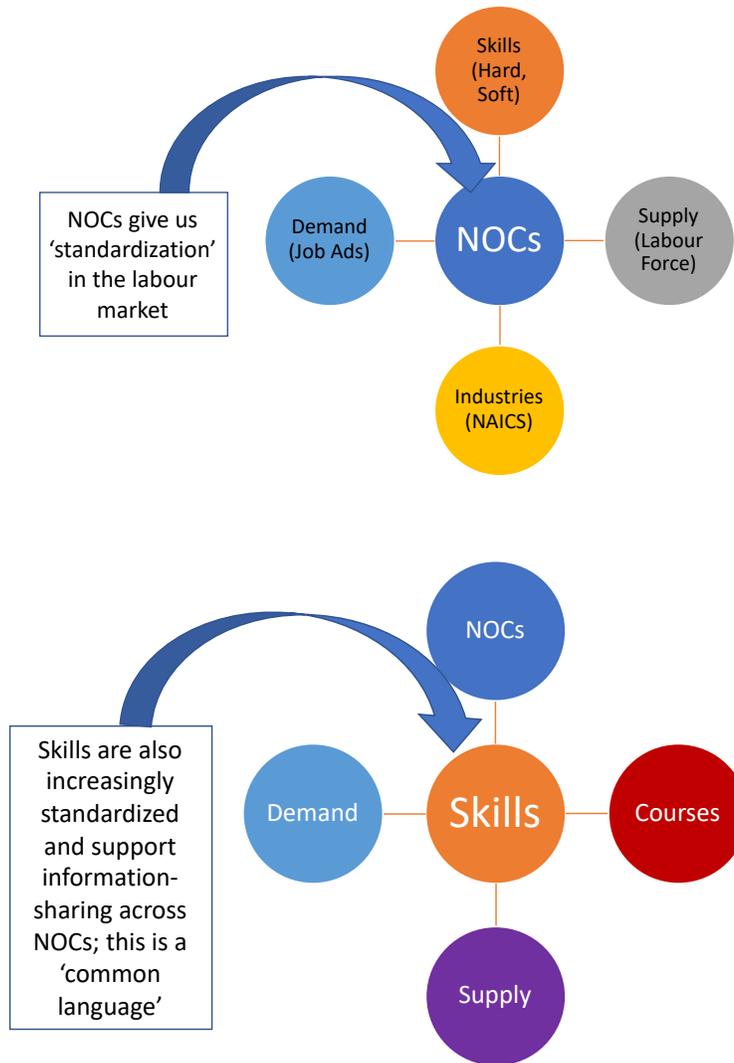


Figure 3: Very simple depictions of some important types of objects in labour market intelligence applications, and their interrelationships.

Examples of Relevant Queries and Workflows

By considering the intersections among the above-described entities (job ads, occupations, skills, courses, etc.) one can easily envision likely types of queries, and workflows that combine those queries. Some examples that resonated with our CoP focus groups are depicted below. Successful RFP respondents should be able to describe how they would support such queries and workflows.

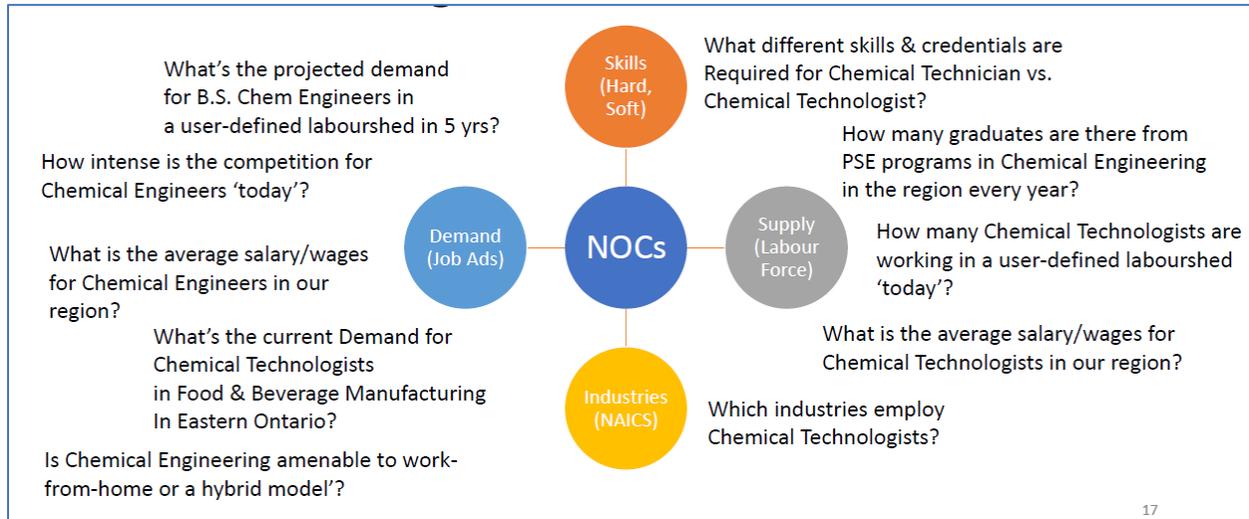


Figure 4 - Example of Talent Attraction Use Case

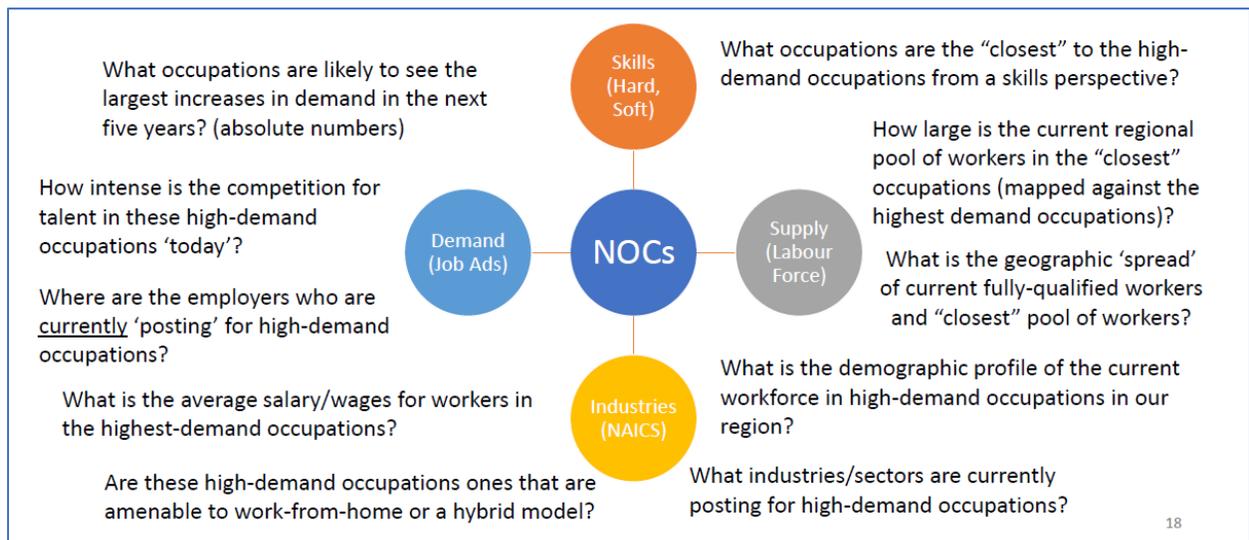


Figure 5 - Example of Program Design Use Case (Demand-Side)

Important Example User Types and Their Goals

The following potential user / use-case summaries were identified in earlier project stages and many resonated with our informal EOLC Community of Practice (CoP) group members. In no particular order, these use cases are:

- Post-secondary education administrator uses the tool to design training modules targeted to **shortest path for high-demand jobs (based on skills)**.
- A Provincial Ministry manager provides targeted funding for groups of **displaced workers with clear, immediate employment prospects**.
- A business association partners with organizations that can help them **identify candidates with 'short path' potential**, to address **widespread need/chronic shortages** for certain types of workers.
- An economic developer uses the app to develop a talent attraction program for **known occupation-based shortages** among existing employers or for a **new employer with 'known' jobs openings** (often of different types).
- Municipal leaders use the tool to **prioritize initiatives to address oncoming labour market issues** (e.g., demographics) or **opportunities** (e.g., intercommunity migration); or **COVID impacts** (for example on tourism and hospitality, retail, healthcare workers).
- Outplacement firms working with employers to assist in **major layoffs**.

As mentioned elsewhere in this document, it is important to recognize that, across the different sectors and professions and work goals, our likely LMINT users will also fall into two broad categories with respect to data/technical sophistication and usability needs:

- Less Data-Savvy Professionals
 - For example, managers, economic development officers, business & government executives
 - They formulate policies & strategies
 - Want to drive decisions with data, but less adept with data science tools
 - Probably adept with Word, PowerPoint, maybe Excel
 - May have analysts on their staff
- Their Goals: ability to find relevant data; Intuitive workflows enable them to formulate & solve labour market “gap” problems.

- Data Pros and Technology Fans
 - For example, workforce data analysts
 - They may work in post-secondary educational institutions (PSEs), workforce development boards (WDBs) or provincial ministries/divisions
 - Adept w/ Excel, PowerBI, perhaps some specialty labour market information software
 - May have some statistics or data science training
 - Their Goals: Accelerate their work; share analyses, workflows, reports & to lead others

Given these profiles, goals and needs, certain UI/UX suggestions logically follow, and are described below.

User Interface/User Experience Goals

For the purposes of this project, the EOLC is using the following definitions:

- The **user interface (UI)** of a software system, tool or product is the means by which a user interacts with the system. It typically encompasses the screen (and what appears on it) and the input and output devices (e.g., keyboard, mouse, sometimes camera, microphone and speakers).
- *UX refers to user experience*, the overall ease and pleasure (or difficulty and annoyance) felt by the user when interacting with the system.

Together, “good” UI/UX and high *usability* are critical success factors in the adoption, use and value derived from a software product.

Two major broad usability goals for the proposed AI-driven Labour Market Intelligence tool are:

- **Reduce the time needed** for trained, tech-friendly labour analysts to answer questions and surface relevant information about labour supply, demand, gaps and shortest transition paths.
- **Enable non-technical managers to perform** some of the same types of labour market queries and problem-solving now performed only by the analysts.
- Towards achieving those goals, and based on discussions with members of our EOLC Community of Practice, the following recommendations emerged as important design specifications:
- Emphasize Graphical user interface (GUI) approaches — use intuitive icons & graphics where possible.
 - Use simple drop-down menus — rather than, for example, command line inputs.

- Minimize the re-typing of NOCs, NAICS codes, geocodes, etc. Use context, drag-and-drop, auto-fill and similar features to achieve this.
- Enable intuitive data visualizations; and, where possible, offer more than one alternative way to visualize data. (For example, suggestions as provided in *MS Excel*).

Importance of Workflow Support

A feature mentioned as desirable by some of our Community of Practice group members is the ability to save workflows in some form. Workflows were highlighted for several reasons/uses:

- The system should “remember” where a user was within a given workflow, in case work is interrupted for a period of time.
- User can save a workflow in the form of a detailed methodology, so that others may check the user’s calculation steps, assumptions, etc.
- User can save a workflow for future use by herself on a similar problem/question/example. (For example, a workflow is needed to address a new question/query that is similar but not identical to a workflow just created for another purpose).
- User can use the same workflow for consistency when the same report is required daily, weekly or monthly.
- User can save a workflow to share with colleagues within the same or a different organization.

Support for Collaboration

In the area of collaboration support, a feature mentioned as desirable by some of our Community of Practice group members is the ability to save workflows in some form for sharing with colleagues within the same or a different organization. Community of Practice members noted that for the foreseeable future, it is unlikely that a full, built-in simultaneous online collaboration capability would be required for this tool/platform/ solution. Rather, collaboration will most likely be via screen-sharing on a platform like Zoom. Saved, exported workflows and exported reports are also likely to be key components of these collaborations.

Interoperability

The product should offer some relatively “self-contained” workflows. By this we mean that the user should not have to expend extraordinary efforts to find, obtain and “load in” special datasets or plug-ins in order to complete the main workflows around local and regional labour supply, demand, gaps and paths.

However, the product should also follow now-standard approaches to ensuring some reasonable forms and degrees of compatibility with other software tools favoured by our user base. Such compatibility can be achieved through relatively simple means such as standard input and output formats, or deeper integration at the level of APIs.

In terms of input/output formats, PDF, CSV and image (jpeg) files were mentioned by Community of Practice members as enabling at least basic compatibility with MS Office tools (*Word, Excel, PowerPoint*). This is important to the intended user base. *PowerBI* was mentioned by several members as a favoured, and common data visualization and reporting tool. Note that the EOLC does not intend to specify preferred vendors and/or forms of interoperability; developers should be guided by feedback from the user community as well as their own experience.

Some of our CoP members also have subscriptions to the EMSI Analyst platform, Vicinity Jobs and Burning Glass labour data and analysis tools, among others. Some (e.g., EMSI) publish their APIs and support integration with specialized applications built atop their own. (A recently announced [merger](#) between EMSI and Burning Glass may be relevant here as well)ⁱⁱⁱ.

The Use of AI — and AI Ethics Considerations

One of the mandates for the funding of this project is that the procured product or tool must employ some degree of AI in order to achieve advanced functionality and/or enhanced usability. Work from earlier stages of this project --- including discussions on UI/UX --- suggest that there may be many ways in which AI, machine learning (ML) and natural language processing (NLP) might be used as described below.

The first area ripe for AI is construction of data structures (such as ***taxonomies, ontologies, knowledge graphs***) that permit ***translations (“mappings”)*** between different entities of interest:

- The mapping of job ads and job titles to Occupations (e.g., to NOC codes);
- Similarly, the mapping of NOCs to some representation of Skills;
- Further, the mapping of Skills to various options to close skills gaps (e.g., courses, certifications, training programs);
- NOC interrelationships (like “adjacent” occupations or “career ladders”) & shortest path calculations.

Another important AI application for this product is ***prediction*** — for example, local forecasts for job demand and for rising or declining occupations at some points (6 months, 1 year, 2 years, 5 years, 10 years) in the future.

AI methods may also support ***“Hints” and guidance*** on useful workflows and next steps, for example:

- Based on current context
- Based on general common use
- Based on specific user’s history

Our CoP members expressed interest in such intelligent assistance. The chosen vendor(s) may wish to consult further with our group or other potential users to tease out more details as to what kind of functionality of this type is most likely to be accepted and considered useful.

A fourth potential application of AI in an analysis tool is a *natural language interface* of some kind — for example, a “chatbot”. Although our community members thought this might be useful “at some point”, it did not rank among the “must have” features for the near term. Good intuitive workflows, graphical user interface, drop-down menus and online help (e.g., “tool tips”) seem to elicit more trust and comfort, at least with our current interviewees in discussions so far.

AI Ethics Considerations: Consideration of AI/ML raises the need for consideration of AI Ethics — Bias, transparency, privacy, security and so forth. These issues have not been discussed extensively by our project team or CoP, but the selected vendor(s) should discuss this with the project team. At the very least, developers of the tool and associated datasets will be expected to follow all applicable regulations as well as recognized good practices around security and privacy. Interpretability/explainability of predictive models, as well as clarity around data provenance and quality should also be discussed.

Most Critical Features for the MVP

Summarizing from the above descriptions and stakeholder discussions, some of the top requested “must have” features are listed here:

- Ability to compute/estimate a “shortest path” between two different occupations (in terms of skills/competencies required). More generally, the ability to move fluidly between Job demand (ads), Occupations, Skills, Training, and Industries.
- Geo-coding: Data, queries, inference can be focused on particular geographic areas — including regions and municipalities. (Where possible, down to Census sub-division level).
- Predictive / forecasting capability, especially around job/occupation demand — and with appropriate documentation and guidance around the inherent statistical uncertainty, key assumptions, etc.
- Interpolation, for example to estimate key variable values for a geographic region smaller than the default granularity of a dataset.
- Ability to save workflows for sharing, examination and re-use.
- Ability to save results in standard formats that promote sharing and interoperability (PDF, CSV, jpeg, perhaps MS Word, Excel).
- Key variables persist throughout a workflow — “I don’t want to have to remember a 4-digit NOC”.
- Ability to tabulate and distinguish between full-time, part-time and casual employment.
- User training; in-product “help”.

Nice to Have/Maybe Later Features

Some “attractive”, “nice to have” and “maybe later” features mentioned in our CoP discussions include:

- “Drag and drop” to import files or saved workflows, or to move an object (NOC, NAICS, geocode) from one query or workflow to another.
- “Live” collaboration, perhaps similar to how two or more users can simultaneously edit the same Google Doc.
- Natural language queries / “chatbot” functionality.
- Later add-ons or plug-ins such as:
 - A method for tracking and visualizing where graduates of a PSE institution “end up” (locale, occupation). Might generalize this into a tool for tracking the career trajectories of groups of workers, perhaps after a training program or other labour market / policy intervention.
 - Opportunity to develop answers to FAQs, and to incorporate them into the chatbot or online hints/help functions.

3. Our RFP Process: Definition, Procurement & Development

The EOLC seeks suppliers for LMINT who:

- Can deliver the desired functionality and user experience, as described in Sections 1 and 2 above — especially with respect to the “Must Have” elements listed in Section 2 — on time and within the defined budget.
- Use sound process and best practices in the development, user testing, deployment and support of data analytics software.

The EOLC will therefore assess potential suppliers on the basis of a submitted Proposal that includes a Project Plan (and MVP Vision), Budget and Supplemental Information, through a process that is described in more detail below.

The RFP Process

- **Pre-RFP Vendor Briefing Meeting**

Prior to releasing a formal Request for Proposals, a pre-RFP vendor briefing meeting was organized (virtually) for June 29, 2021 for organizations that appeared to have developed similar products or were known to have an interest in improved labour market tools.

The objectives of the meeting were to provide potential bidders with background information on the origins of the Labour Market AI project and the proposed development of a Minimum Viable Product (MVP) tool that demonstrated the potential for AI to help stakeholders address strategic labour market challenges. With improved analyses and insights from such a tool, stakeholders are expected to make better decisions, design better responses to labour market issues and challenges.

Participation in the pre-RFP meeting was not deemed mandatory for submission of a bid in the following RFP process. The format for the meeting was a brief presentation about the project followed by a Q&A session. The meeting was not recorded.

More detailed background was consolidated into a Business Case/Functionality Specifications document and provided to meeting registrants along with a PowerPoint slide deck that formed the basis of the presentation. This information is considered part of the formal RFP process and is considered an appendix to this RFP. The original versions will be provided to anyone interested in submitting a bid whether or not they attended the pre-RFP vendor briefing meeting.

- **Request for Proposal Process**

The timeline for this RFP process is set out below.

RFP Stage	Date Open	Date Closed
RFP Release Date <i>(Release includes posting on EOLC website plus direct email to anyone registered for pre-RFP vendor meeting or signaling the intention to bid by email to contact@eolc.info)</i>	July 6, 2021	4:30 PM on July 26, 2021 THIS IS THE DEADLINE FOR SUBMISSION OF RFP BIDS Bids to be submitted electronically to contact@eolc.info .
Questions about this RFP <i>(any questions should be directed by email to: Kathryn Wood Project Coordinator, EOLC contact@eolc.info)</i>	July 6, 2021	July 9, 2021
Circulation of responses to questions about RFP	July 9, 2021	July 13, 2021
Close of RFP submission period	July 6, 2021	4:30 PM on July 26, 2021 THIS IS THE DEADLINE FOR SUBMISSION OF RFP BIDS. Bids to be submitted electronically to contact@eolc.info . PDF format is preferred.
Evaluation of RFP submissions	July 27, 2021	July 30, 2021
Notification to Preferred Proponent and Potential Negotiations (if required) <i>Note that interviews may or may not be conducted to address any outstanding questions and/or confirm probability of reaching an agreement. The EOLC reserves the right to interview several potential preferred vendors if their proposals are extremely close in evaluation results.</i>	July 30, 2021	August 6, 2021
Notification to Unsuccessful Proponents	No earlier than July 30, 2021	No later than August 6, 2021
Completion of Contracting Process/Execution of Agreement	July 30, 2021	August 13, 2021
Project Launch	No earlier than July 30, 2021	No later than August 20, 2021

- **Key Contact for RFP Process**

Kathryn Wood, EOLC Project Coordinator
contact@eolc.info
613-376-6006

Eligible Bidders

As noted in the invitation to the pre-RFP vendor briefing, the EOLC is prepared to consider RFP submissions based on any of the following business models:

- Single firm/organization bids
- Multiple firms submitting a collaborative bid (assuming one bidding firm agrees to act as the contractual host)
- Arrangements that combine public and private sector, although just private and just public/institutional bids are also acceptable (one bidding firm must agree to act as the contractual host)
- Multiple parties from institutions, research and development institutes or other similar combinations (one bidding firm must agree to act as the contractual host)
- Hybrid models of the preceding options that help bidders bring together the necessary skill sets to complete a project of this type.

Proposals from individuals seeking to be hired temporarily or full-time by the EOLC will not be entertained.

Note: the EOLC will accept submissions that do not address all the requirements set out in this RFP or that can provide certain services but not others. Proponents should, however, be mindful that (all other things being equal) the EOLC will favour bids/submissions that demonstrate ability to address all project requirements.

Please note that as part of their bid, proponents will be expected to provide any essential terms and conditions that they would expect to see reflected in a fully executed contract with the EOLC

Available Budget

The available budget for the MVP 'build' phase is between **\$120,000 and \$150,000 CDN**. This allocation is intended to cover:

- Probing the business case/functional specifications (provided as part of the RFP process) and preliminary discussions with the EOLC's designated representatives.
- Development of a wireframe suitable for review with the EOLC's designated representatives and if desired, a cross-section of potential users including but not necessarily limited to Community of Practice members.
- Any and all aspects of the 'build' process to arrive at a testable MVP or prototype.

- At least one 'round' of user testing in a format specified by the development team, and participation in preliminary discussions with the EOLC's designated representatives on matters related to the build (examples: proposed deployment of AI/ML/NLP, AI ethics, security and cybersecurity, intellectual property considerations).

Even within the budget range identified above, proponents should not assume that low-price bids will necessarily be advantageous. The evaluation criteria (to be set out in the RFP document) will be based on a "value for money" approach.

Within the project budget, there is a separate allocation for additional user testing and development of user-oriented training materials, as well as addressing issues identified in preliminary discussions identified in the build phase.

Intellectual Property and Market Opportunities

Over the past two years, the EOLC's approach to innovation has become one of providing seed funding for prototype (or Minimum Viable Product) development that enables a vendor to get to the point where they have something tangible to show to a potential customer. In short, the EOLC strives to reduce barriers to innovation and to be — or connect developers to — a "first customer".

Financial support is just one part of the EOLC's approach. Other assistance may be rendered by:

- Identifying issues for which innovative approaches are highly desirable and appear to hold significant potential for positive impact.
- Developing and helping to validate business cases.
- Developing and implementing new approaches to procurement that are well-suited to innovative products and services.
- Seeking out funding for projects that engage innovation partners and firms in addressing high-priority issues.
- Providing project management support so that investments of time, energy and finances deliver learning and tangible benefits to partners, key stakeholders and the communities served.
- Sharing progress reports, setbacks and successes with funding partners and influencers with interest in the EOLC's work.

From the Labour Market AI project's inception, it has been understood that its product will be a Minimum Viable Product, developed using Agile (or similar) development approaches. Put another way, the successful proponent is not expected to deliver a complete, fully tested solution that is ready for immediate commercialization.

The successful vendor is expected to have a commitment to serving early adopters and continuing development of the solution (at their own expense) to close remaining gaps in essential functionality and to take the solution into the commercial marketplace.

There are three important implications of this approach:

- **The successful vendor will retain the intellectual property for whatever tool/platform/solution is developed through the Labour Market AI project.** The EOLC prefers to put the successful vendor on an unfettered commercialization pathway of its own making. As part of the funding agreement with the Ministry of Labour, Training and Skills Development, the EOLC does reserve the right to prepare and release (into the public domain) general information about the project and its outcomes. These materials would be posted in accordance with Creative Commons licensing (4.0).
- **The EOLC, its partner(s) and other stakeholders involved in this project may or may not become “first customers” of a tool/platform/solution developed through the Labour Market AI project.** That will depend on how well the successful vendor does its work on the MVP/prototype, the further development work (post-MVP project) undertaken by the vendor, and the business model and pricing offered by the vendor. The EOLC --- and the funder --- are especially concerned that an eventual commercial product be affordable for the users for which this project is being undertaken. Bidders are encouraged to comment on this and other aspects of intellectual property considerations in their submissions.
- **Proponents should not assume that the budget available for this project will cover all the development costs of a commercializable tool/platform/solution.** Rather, proponents should consider how much of the identified functionality (especially the ‘must haves’), they can include in the MVP/prototype phase and the additional expenses likely to be incurred to complete the development process to the point where there is a desirable return on investment (ROI) for the vendor.

“Whilst innovation does indeed build economic resilience, this is unlikely to be achieved simply through support for R&D activities and science and technology-led innovations. For economies to have the capacity to respond to shocks, enabling resistance or recovery, policies need to also promote the capacity for doing, using and interacting. Resilient economies are likely to have agile innovation systems which promote new combinations of activity, where organizations are willing to accept risks, and where adaptability is built into the behaviour and responses of key actors in the region.”

Source: Bristow, G, and A. Healy. (2017). Innovation and regional economic resilience: an exploratory analysis. The Annals of Regional Science, July 2017.

Prospects for Project Success and Broader Commercial Success

Our preliminary market research indicates a large and rapidly growing market for products and services in the areas of labour market intelligence, workforce development, AI-enhanced HR and career planning, and so forth.

Thus we expect that the successful vendor will have plenty of opportunity to monetize their work even beyond this project and the provision of LMINT to our Eastern Ontario user base. Moreover, although the requirements call for some sophistication in designing intuitive and efficient labour intelligence workflows, EOLC's technical experts believe there is little need to radically "reinvent the wheel"; that certain required methods mostly already exist, are published and practiced and might even be adopted or in-licensed if needed.

Some other factors that we believe should help ensure project success include:

- The budget allocation for the entire project and for the 'build' phase of the project has been approved and can be expended in this fiscal year.
- The funder (Ministry of Labour, Training and Skills Development) is engaged and supportive of the project.
- A Steering Committee (Multi-stakeholder Working Group) and Community of Practice are already in place and have been engaged in project-related activities for several months now. Their engagement has generated much of the content included in this RFP. Many of the members of these groups could serve as nucleus for testing/feedback on interim deliverables and prototypes. Both groups continue to meet roughly every two weeks to maintain project momentum
- Client-side (EOLC) project management resources are in place as evidenced at the pre-RFP vendor briefing meeting.
- Some data sets already available in csv format, at the Census Subdivision level with geocodes. For details, see the Business Case/Functional Specifications document (appendix).
- A Minimum Viable Product (MVP) approach is a deliberate choice, signalling the EOLC's recognition that this RFP may generate a functional product but not necessarily the desired long-term solution.

Bid Structure and Requirements

Bidders are invited to use the following structure and encouraged to ensure that all requirements are addressed. There is no limit to the number of pages for a submission but bidders are encouraged to provide the essential information in the template itself and supply other supporting documentation in appendices.

Company/Organization Name and Background

- **Include the names of the lead company/organization as well as any other firms or organizations** you are proposing as part of your team, identify the expertise they bring to the team and any specific project roles they play (see examples below).

Organization	Expertise (Rationale for inclusion on the team)	Role(s) (examples shown below)
		Contract Lead
		Subcontractor
		Subcontractor

- **Provide sufficient background** to help the evaluation team understand the basis for your interest in this project (ex. background related to labour markets, to software/platform development, to AI and/or Machine Learning or other advanced technologies that you believe are relevant to this project). Specific background related to regional initiatives and/or rural/small towns and cities is especially encouraged.
- **Describe the strategic fit** a project like this would have for your organization (ex. extends an existing product line, enables entry into a new market segment, helps achieve scale to be globally competitive etc.) Help the evaluation team understand why this MVP project is important to your organization beyond a conventional 'build' contract.

Experience and Expertise Directly Related to RFP Requirements

- **Describe the “top three” projects or assignments** your organization has undertaken that are, from your perspective, the most relevant to successful execution of this AI-Powered Labour Market Intelligence Tool. Specific notations related to on-time, on-budget performance are encouraged. (References are requested separately).

Links to public or private on-demand demos, live launched MVPs and/or commercialized products, training materials or other UI/UX work are encouraged. However, under no circumstances are bidders being encouraged to violate confidentiality or licensing agreements with clients or other third parties in the provision of these links or information incorporated directly into the RFP response.

- **Names and qualifications of proposed team members** to be assigned to this project. Qualifications can include both professional qualifications (ex. certifications, specialized training and/or education) as well as previous employment or project assignments. Include a description of any situation(s) that would prompt the contract lead organization to request substitution for a team member. Unless identified in the RFP proposal, the EOLC will assume that the proposed team members will be the individuals undertaking their assigned tasks for this project.
- **Provide the geographic location(s)** of operations for any/all organizations included in this proposal. This should include but not be limited to the head office of any organizations. A brief description of the jurisdictions in which each organization operates and/or has undertaken project work is also encouraged. Please note that the EOLC’s procurement processes adhere to provisions to prevent discriminatory business practices as set out in federal trade agreements and reflected in the [Ontario Discriminatory Business Practices Act](#) as amended in 2019.
- **Describe your preferred approach to project management** within the contract lead organization including any specific methodologies recommended for this project, and the tools to be used to ensure tight project tracking and coordination with both the EOLC and any other organization(s) that are part of the proposal.

Proposed Project Plan

- **A summary description of the proposed approach** to executing this project. Describe the major stages envisaged in your proposal and any best practices that would govern your approach to the project. Describe the in-project deliverables that the EOLC should expect, based on the proposed approach. The final (MVP) product (LMINT) is the final deliverable and must be fully functional for the “must haves” outlined in this RFP. Describe your software development process, including the role of user testing.
- **A vision of the final (MVP) product.** Help the evaluation team see what you see for the MVP version of the tool. Do you see additional use cases or additional users than those described in the RFP? Even a sketched (legible) illustration could be useful in conveying your vision. The final (MVP) product (LMINT) is the final deliverable and must be fully functional for the “must haves” outlined in this RFP; It may have other functionality as determined/recommended in your proposal. The vision should include the means of delivery, user onboarding and support (e.g., locally installed or web-based), and what the IT requirements are for user organizations to successfully use the product.
- **A project plan** including a timeline, identification of project phases and/or stages, and organization(s)/team members linked to each phase/stage. The project plan must include at least one round of user feedback and/or testing. Note that the EOLC has additional resources not included in the budget allocation associated with this RFP, to support further user testing if/when that is warranted. The project plan should align to the proposed approach and vision of the final (MVP) product; it should help the proposal evaluation team understand how the contract lead organization and other organizations that are part of your proposal will deliver the described vision, in-project deliverables, “must have” functionality, robust user interface/user experience considerations, and the final (MVP) product/LMINT).
- **Approaches to Addressing Five Key Issues** Mentioned in the RFP. These are solutions to challenges of:
 - Use of AI, Machine Learning and/or other similar advanced technologies to help users address priority use cases and data challenges, with ease of use.
 - Privacy, confidentiality, security and cybersecurity.
 - AI ethics, including but not limited to bias and explainability.
 - Suitability of the MVP LMINT for regions as well as rural areas, small towns and cities.
 - Proposed plan for commercialization and/or further development of the MVP LMINT. Expectations for intellectual property protection should be included.

Proposed Project Budget

- A proposed project budget should be broken down by phases/stages of project activity, a payment schedule that may include a project advance. The payment schedule should reflect the basis for payment (ex. milestone-based, signoff on deliverables etc.) as well as EOLC's expectation of a 10% holdback on the approved budget, releasable no later than 30 days after the final MVP product (LMINT) is complete, whether or not the LMINT has been commercially deployed.
- This component of the proposal should also include any special considerations related to HST treatment or other taxes (otherwise the EOLC will assume that any project budget excludes HST and that any other taxes are payable by the vendor out of revenues earned from this project).

Any additional costs such as travel, space or other rentals, subscriptions to third party tools *required for carrying out the MVP LMINT development project*, printing or other incidental costs should be identified in the proposed project budget. Otherwise, the EOLC will assume that the budget total is "all-inclusive".

Supplementary Information

- **References.** Please provide a list of clients you have worked for where the assignment was similar to/the same as what is being requested in this RFP. Note two or three references that the EOLC could speak to as references for you if your organization is selected as the preferred vendor. If your organization's work is available online (ex. live platform, on-demand demo), please include links for exploration prior to reference checks.
- **Essential Terms and Conditions. Terms and Conditions.** As an integral part of the proposal, identify and contractual terms and conditions that your organization (or its partners if appropriate) consider to be non-negotiable. Non-negotiable means the EOLC should not expect to negotiate an agreement with your organization (or partners) if a specific term or condition is excluded from a contract.

Please note that the EOLC will not hire a vendor/proponent as an employee to work on this project; nor will the EOLC provide ongoing workspace (although assistance in identifying and/or booking temporary space for meetings, user testing or similar is available upon request).

Evaluation Criteria for RFP Submissions

Criteria	Explanation	Points (Out of 100)
Company/Organization Name and Background	<ul style="list-style-type: none"> • Organization or team structure • Background to interest • Strategic fit 	20
Experience and Expertise Directly Relation to RFP Requirements	<ul style="list-style-type: none"> • “Top three” projects • Team members • Geographic location(s) • Approach to project management 	15
Proposed Project Plan	<ul style="list-style-type: none"> • Proposed approach • Vision of final (MVP) product • Project plan including timeline, assignments 	25
Approaches to Addressing Six Key Issues	<ul style="list-style-type: none"> • Use of AI/ML, etc • Confidentiality and Cybersecurity etc. • AI ethics • Suitability for regions, rural and small areas • UX/UI and capacity building • Plan for commercialization 	20
Proposed Project Budget	<ul style="list-style-type: none"> • \$120,000 to \$150,000 	20
TOTAL		100
<p>Note that Supplementary Information will be used either to eliminate a bidder from consideration as the preferred proponent (ex. references do not support attestations in the bid documents or a non-negotiable term/condition is not acceptable to the EOLC) or to aid in the choice between several bidders whose scores are very close. Note that in either case, the EOLC reserves the right to contact the bidder and confirm its understanding of the content of the proposal.</p>		

i “Building Pathways from Disruption to Employment: A Playbook”

2019, Brookfield Institute for Innovation & Entrepreneurship

<https://brookfieldinstitute.ca/wp-content/uploads/Playbook-ONLINE-6.pdf>

ii “How O*NET Classification Helps Us Match Jobs and Skills”

June 2013, R. Slane, EMSI Report

<https://www.economicmodelling.co.uk/2013/06/11/how-onet-classification-helps-us-match-jobs-and-skills/>

iii “Burning Glass Technologies and Emsi Announce Merger to Provide Deeper Labor Market Insights and Advance Workforce Development”

June 2021, BusinessWire

<https://www.businesswire.com/news/home/20210614005192/en/Burning-Glass-Technologies-and-Emsi-Announce-Merger-to-Provide-Deeper-Labor-Market-Insights-and-Advance-Workforce-Development>