

# Knowledge Transfer Network

## Expert Systems MVP

Invitation to Tender  
**Statement of Works**  
**KTN-ITT A0289-01**

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## Glossary of Terms

<b>CMS</b>	<b>Content Management System</b>
<b>CRM</b>	<b>Customer Relationship Management</b>
<b>IP</b>	<b>Intellectual Property</b>
<b>ITT</b>	<b>Invitation to Tender</b>
<b>KTN</b>	<b>Knowledge Transfer Network</b>
<b>ML</b>	<b>Machine Learning</b>
<b>MVP</b>	<b>Minimum Viable Product</b>
<b>NLP</b>	<b>Natural Language Processing</b>
<b>PoC</b>	<b>Proof-of-Concept</b>
<b>SME</b>	<b>Small, Medium Enterprise</b>
<b>T&amp;Cs</b>	<b>Terms and Conditions</b>
<b>UX/UI</b>	<b>User eXperience/User Interface</b>

Date of issue	27th November 2019
Prepared by	Jake Larsson
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# 1. Background

## About KTN

The Knowledge Transfer Network (KTN) is the UK's Innovation Network. KTN links new ideas and opportunities with expertise, markets and finance through our network of businesses, universities, funders and investors. From agri-food to autonomous systems and from energy to design, KTN combines in-depth knowledge in all sectors with the ability to cross boundaries.

KTN in numbers (2018/19):

- 3,000-5,000 web enquiries from a variety of web sources.
- 180+ staff (with new members constantly joining - 1-3 per month).
- 40,000+ organisations in our network (100,000 people).
- 55,000+ active newsletter subscribers.
- 420+ events held in 2018/19.
- 35,000+ delegates attended events.

These numbers will grow in the coming years and the current project looks to increase these numbers and the quality of service to the recipients. The content and nature of enquiries and company support is varied depending on company size, sector and their objectives. It is never as simple to classify a company enquiry from a-e as (a) SME, (b) have <1m turnover, (c) <10 staff, (d) within the infrastructure sector, and (e) need 1m in funding and for KTN to recommend funding, partners from our CRM or events based on these criteria. The project will need to dynamically deal with requests and make informed recommendations based on the variety of previous engagements in the past.

## About the project

We want to produce an automated self-service capability for our website that allows companies to access our expertise without necessarily talking to KTN personnel. We are looking to build this automated expertise through:

1. Building a graph database of all our staff, events, offerings and companies in our CRM, etc [*need: graph database*]
2. Building a machine-learning model based on the database [*need: Machine learning model*]

We are looking to serve companies through:

1. Automatically understanding their requests in natural language [*need: Natural Language Processing (NLP)*],
2. Automatically guiding them through a replica of process that our experts run now in person, successively recommending the appropriate resources based on the companies' interaction with the system [*need: ML model based on graph database, interacting with NLP*].

This all will need to be integrated with our website, internal processes and existing data architecture [*need: website, Gmail, CRM, etc integration*], which is the primary form of interaction the companies have with us.

## Success factors

Successful delivery will be defined as:

- Highly desirable UX and UI.
- Efficient and effective rank and recommendations for online enquiries.
- Automated data retrieval and cleansing.
- Efficient and effective interrogation and explainability.
- Handover and total control - updating data architecture/integration.

### **Previous work**

A Proof-of-Concept (PoC) has been produced that has shaped the requirements of this three-year Expert Systems project. The PoC is a context rich Knowledge Graph that maps the needs of KTN users to the offer of KTN events, funding opportunities, blogs, articles or even other people. Within this Knowledge Graph, we also host the 'Innovation Corpus' and that hosts the language of innovation in the UK and how we may translate across domains when talking about innovation.

The PoC has helped provide a vision for a three-year project that aims to intelligently meet the needs on KTN users in an intelligent and automated fashion as well as provide additional value by identifying challenges or opportunities that they had not realised. Additionally, several different User Interface (UI) wireframes have been generated and tested on prospective users. The PoC and UI wireframes are by no means expectations of the final product, but have been generated to inspire and inform the development of the Minimal Viable Product (MVP).

The MVP that this ITT looks to produce, aims to implement and test the desirability and functionality of this three-year vision. This ITT will be awarded to a supplier or partnership of suppliers that exhibit excellent technical development expertise and excellent UX/UI design expertise. KTN expects the chosen suppliers to work collaboratively providing the data architecture and the Machine Learning (ML) necessary to fulfil intelligent automation and an integrated, engaging and desirable user experience. Between Jan-April 2020, the successful supplier of the present ITT will deliver the most desirable elements of the three-year project and will pave the future development of the Expert Systems project for subsequent project work.

## **2. Services Required**

KTN are sourcing suppliers who can build on the foundations of the KTN's graph database and ML models and provide expert design and developmental skills in the creation of a highly desirable and engaging UI for a website that interfaces with the graph databases and ML data architecture to map user requirements with KTN support. The refinement of the 'Innovation Corpus' and how it helps KTN identify appropriate solutions for users' needs is essential.

The suppliers KTN appoints will be required to carry out development covering the six main objectives described below.

### Objective 1: Integration of KTN data with graph database

KTN has developed the data architecture (Neo4j on AWS) through the previous PoCs as aforementioned. A process of automated data retrieval and cleansing from KTN's current data sources is needed. KTN also has the ability to include external data sources via APIs and data scraping techniques into the graph database. KTN requires a refined process to obtain, cleanse and meaningfully integrate these data types into the graph database and an ML training model for intelligent resource mapping:

- Automated data retrieval cleansing (CRM, Google Analytics, events platform).
- Automated data pre-processing & cleansing.
- Refine rank and recommendations model (ML training model for needs mapping and corpus translation).

### Objective 2: Visualisation of Graph database and UI

The graph database maps the connections between what people want and what could meet their needs from other people, to events, to case studies, to funding opportunities. As part of the User eXperience (UX) (described below), the UI of the solution must intuitively visualise the relational data in KTN's graph database and meet the following objectives:

- Visualise the knowledge graph of persons, companies, events, funding competitions, case studies, and documents (KTN touchpoints) with metadata tagging and word associations.
- Visualisation of the 'Innovation Corpus' - a projection of the word associations and tagging above with the ability to translate across sectors and tags.
- Invite the sharing of data from users in an inviting and unobtrusive manner.
- Safe, secure and GDPR compliant software solutions where KTN will have full control of code and IP following the completion of the project.
- Interface and exchange seamlessly with the existing KTN website.

### Objective 3: Understand the needs of users and create an engaging UX

Contractors should work with KTN to understand what is important to users and how the design of the UI can maximise value to the user through an enjoyable, playful UX. Meeting the third point above, the UX should intuitively provide solutions to users needs (though not exhaustively) mapping details of people/companies with the capabilities of other people/companies, to upcoming events, funding competitions, KTN personnel, case studies, blog pieces, KTN programmes, newsletters, etc. including:

- UX mapping and problem framing.
- Demonstrate pathfinding and search.
- Demonstrate benefits centrality and importance analysis.
- Demonstrate community detection opportunities.

#### Objective 4: Explainability

KTN requires the ability to evidence the rationale behind the AI based decisions. KTN will want to update and renew our taxonomies and tagging of company requests and KTN sources of support; explainable algorithms will be crucial in allowing us to learn and build from this system:

- Interrogatable back-end for trend spotting and community detection (easy real-time access).
- Addition of new and modification of node and edge types in graph database.

#### Objective 5: A close working relationship with KTN to prepare for future activities

We are looking for contractors that will work closely with KTN and help shape a future ITT and the vision of the three-year Expert Systems project:

- Regular updates and creative exploration of ideas following an agile or sprint methodology. We expect multiple (2-3) proposed/draft solutions at key milestones to ensure that the decisions to proceed are well considered.
- We are expecting to have a close working relationship with the suppliers and we expect that KTN will own any IP that arises from this (foreground and ancillary/sideground IP) - please refer to the "*KTN's Terms and Conditions of Contractor Engagement – Company Edition*", which are provided separately.

#### Objective 6: Handover and total control

KTN will require total control of the system after completion of the project to aggregate future data sources or apply new solutions for the Expert System to guide KTN users to:

- Extract, Transform, Load (ETL) new data sources to graph database.
- ETL of Expert Systems data to other KTN platforms (through API or other).
- CMS to maintain and update frontend UI.

This is a non-exhaustive list of services we require, particularly with respect to the use and application of NLP and ML techniques for smarter pathfinding and community detection with the expectation of using KTN data as well as external-sensing data. An agile methodology and approach to development is preferred to ensure unforeseen or overlooked requirements may be included and resolved with little disruption to the project.

The total control and ability to improve and modify the MVP will be of utmost importance. There may be sources of data or sources of KTN support that currently does not exist, the Expert System must be adaptable and accommodating of KTN's future needs.

### 3. Deliverables

The deliverables will be phased according to the objectives described above and will require supporting documentation for KTN to review:

1. Graph database integration with KTN data architecture:

- KTN website.
  - CRM (Workbooks).
  - Events platform (currently Eventbrite soon to change).
  - IX.
  - Innovation Canvas.
  - Any future system.
2. Easy to use and desirable UIs:
    - Front-end website.
    - Back-end CMS.
    - Systems integration (Gmail interface/sync).
    - Intuitive data interrogation (easy real-time access)
  3. Regular progress updates (sprint reviews).
  4. Documentation of build process and UX design plan (Powerpoint, PDF or Word).
  5. Documentation of how to use back-end (Powerpoint, PDF or Word).

### Technical considerations

- KTN requires its suppliers as organisations and the services they use to meet industry recognised security practices and as such it is expected that they hold Cyber Essentials Plus certification or higher (ISO 27001).
- The site will be assessed daily via NCSC web check tool and all security issues and recommendations must be resolved as part of the on-going maintenance within agreed time frames.
- An independent pen test will be required as part of the build.
- Industry standard non-proprietary intuitive CMS system should be used if required.
- Build must fully integrate with KTN's CRM (Workbooks) and Email (Gmail) and our marketing platform (DotDigital).
- Hosting will be on KTN's AWS platform, which KTN can supply on request. Development teams will be fully AWS competent (EC2, virtual server). The developers will be responsible for full maintenance of the site, including but not limited to patching, availability, security, backup and replication.
- Back-end development should be SSO with Google ID for all KTN users (anyone with a Google identity at ktn-uk.org should be able to use SSO authentication and stay signed in – we currently have a “are you human?” access page, which is unnecessary for anyone with the appropriate SSO credentials; there should be no captchas or checks for anyone within KTN).
- Multiple access levels:
  - admin - can change appearance and functioning of site
  - editor - can add and change all content
  - author - can add and change own content
  - commenter/subscriber/forum poster - comments and forum posts only
- Integration with the main KTN website as well as various external sources such as Workbooks, Eventbrite (or future events platforms), IX, Innovation Canvas.
- The site must be W3C WCAG standards compliant.

### Other Front-end Mandatories

- Video/photography enabled.
- Engaging home page (user-led navigation).
- Contact and data capture forms (synchronised with KTN's centralised database).
- Clear calls to action - Sign up for email updates; Contact a staff member etc.



- Editable Menu.
- Mobile and tablet optimisation (mobile first design).
- Social media integration (share buttons, follow buttons, live feeds etc.) .
- 6. Aligns with KTN Brand guidelines.
- 7. API Integration with KTN’s data architecture (Graph database, Workbooks and DotDigital).
- 8. GDPR compliant.

## 4. Quote for Services – Fees

KTN requires quotes for the above services, to include time, travel and expenses relating to initial pitch meeting in London and follow up design and progress meetings in Edinburgh and / or London.

### Budget

£70,000 inc VAT complete website design and build including an initial 3-month maintenance contract from launch to test, fix and support. Please quote separately for ongoing site maintenance and support contract.

Our anticipation is that frontend and UI work will account for approximately 40% of the proposed budget where backend, technical build and integration with KTN systems will account for approximately 60% of the budget, but we expect partnership proposals to allocate spend as they deem appropriate.

Expenses will be paid as per the “KTN’s Terms and Conditions of Contractor Engagement – Company Edition”, which are provided separately.

## 5. Term and Expiry Date

The work must commence on 8<sup>th</sup> January 2020, with the work agreed to be completed by 1<sup>st</sup> April 2020. We have included a timetable of key dates below.

Milestone	Date
ITT issued to interested parties	2 <sup>nd</sup> December 2019
Quotes & invite to interviews sent	2 <sup>nd</sup> January 2020
Supplier interviews	6 <sup>th</sup> January 2020
Project commences & Kick-off meeting at KTN London office	8 <sup>th</sup> January 2020
Project delivery	1 <sup>th</sup> April 2020
Delivery of Documentation	10 <sup>th</sup> April 2020

## 6. Submission

In response to this Statement of Works, please provide the information listed below. Shortlisted suppliers will be invited to pitch to KTN before a final decision is made. These pitches are expected to take place w/c 6th January 2020 in London.

**Key requirements:**

We would like to see initial ideas for as part of developers' application for this project:

1. Design plan – We expect the supplier to produce a user-led plan that details how UX will be prioritised in the creation of the MVP.
2. Produce a Technical Specification outlining your technical solution for this contract.
3. Produce an Implementation Plan – how the contractor proposes to deliver KTN's specification phased to meet each of the aforementioned objectives.
4. Examples - One or more examples of projects you have taken from concept through to roll out.
5. Legal information - Your standard T&Cs and description of your background IP. Please provide the information requested above by 17:00 2nd January 2020 at the latest. Submissions will be assessed on an ongoing basis until this date.

Additional Information. KTN invite suppliers to provide any additional information in the form of video content, imagery or links, which provide supporting evidence that suppliers recognise and work in accordance with KTN values as an organisation. Suppliers might include evidence of environmental management practices, environmental or social aims and social responsibility, diversity and inclusion policy and practices.

## 7. Main Contact for the Invitation to Tender

Please direct any questions or communications on this Invitation to Tender to:

Jake Larsson

Knowledge Transfer Manager Design

Jake.larsson@ktn-uk.org

## 8. Terms and Conditions

Any contract offered will be subject to *"KTN's Terms and Conditions of Contractor Engagement – Company Edition"*, which are provided separately.

Please note that KTN reserves the right to not select any supplier if we feel none meet our requirements and budget.