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<b>Description:</b>	<p>The following document contains the Intermediate Management Report of progress and activities of the KPLEX project (Grant Agreement No. 732340).</p> <p>The report is submitted on behalf of the KPLEX Coordinator (Trinity College Dublin), and the Project Consortium made up of 4 beneficiaries.</p>

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## 1. Project Objectives for the Period

The principal objectives for the KPLEX project for Months 1 – 6 were as follows:

- Recruitment and intellectual preparations for the project
- Instigation of the ethical review process and receipt of finalised ethical approval
- Desk Research and development of research instruments

The following sections of this Periodic Report outline the progress and achievements of the KPLEX Project against these objectives within the initial reporting period of the project, lasting from Months 1 to 6 (01/01/2015 – 30/06/2017).

## 2. Work Progress and Achievements During the Period

The work programme of KPLEX is divided across 6 work packages (WPs), detailed below.

Work Package No	Work Package Title	Lead Participant No	Lead Participant Short Name	Person-Months	Start Month	End Month
1	Project Management, Dissemination and Communication	1	TCD	3	1	15
2	Toward a New Conceptualisation of Data	1	TCD	15	1	15
3	Hidden Data and the Historical Record	2	KNAW-DANS	15	1	15
4	Data, Knowledge Organisation and Epistemics	3	FUB	15	1	15
5	Culture and Representations of System Limitations	4	TILDE	15	1	15
6	Ethics Requirements	1	TCD	n/a	1	15
				Total months	63	

Individual reports for WPs 1-6 are given below

## WP1 – Project Management, Dissemination and Communication

**Lead Participant:** Trinity College Dublin (Participant No. 1)

**WP Start Month:** M1

**WP End Month:** M15

### **WP1 Objectives:**

- O1.1 To coordinate the overall project with respect to administrative, financial and technical cooperation, and acting as the single point of contact for the Commission for the project
- O1.2 To maintain communication flow between partners
- O1.3 To provide strategic direction for the project and to monitor and manage the overall project progress
- O1.4 To ensure appropriate dissemination and communication of project results.

### **WP1 Progress towards Objectives and Details for Each Task**

#### **T1.2 Ensure the regular and recorded meetings of the K-PLEX Project Management Board (PMB).**

Details of the KPLEX PMB meetings are as follows:

Meeting No.	Meeting Date	Meeting Type	Location	Record
1	1 Feb. 17	Kick-off Meeting	TCD, Dublin	Minutes
2	6 April 17	Team Meeting	Skype	Minutes
3	11 May 17	Team Meeting	Skype	Minutes
4	6-7 June 17	Group Review of Work Plan, Deliverables and Milestones	The Hague	Minutes and Audio
5	21 June 17	Single Item Agenda re. Ethics Committee Approval	Skype	Minutes
6	12 July 17	Team Meeting	Skype	Minutes

#### **T 1.3 Consolidate, using inputs from all partners any reports and associated cost statements required and deliver them to the EC in a timely and accurate fashion.**

Ongoing

#### **T 1.4 Ensure that project progress and final results are disseminated as per the agreed dissemination plan.**

Project dissemination is ongoing. During this phase, the project has focused on the following areas of the dissemination plan:

- Building a project web-presence through the following channels:
  - Social Media:
    - Twitter (<https://twitter.com/KPLEXProject?lang=en>)
    - Facebook (<https://www.facebook.com/KPLEXProject/>)
  - Project Website (<https://kplex-project.eu/>)
  - KPLEX Project Blog:
    - To date, the project team have published 32 blog posts. The KPLEX blog posts have been extremely successful and have proven to be very popular.
- Dissemination of project results through participation in relevant events including conference panels and workshops.

Details of event participation are as follows:

Conference Dates	Dissemination Type	Title	Location	Attending
10 May 17	Presentation	TCD – Local Event	Dublin	WP2
26-27 Apr. 17	Poster	DARIAH.EU Annual Event	Berlin	WP2-4
22 June 17	Poster	Science Foundation Ireland Review	Dublin	WP2
29 June 17	Paper	Irish Conference of Medievalists	Kildare	WP2
8-11 Aug. 17	Leaflets	DH 2017	Montreal	WP3
4-7 Oct. 17	Paper	German Anthropological Assoc.	Berlin	WP4
8-12 Oct. 17	Paper	CODATA	St Petersburg	WP2*
10-11 Oct. 17	Paper	Ways of Being in a Digital Age	Liverpool	WP2*
13-14 Nov. 17	TBD	Meta Forum 2017	TBA	TBD*
21-23 Nov. 17	Panel	European Big Data Value Forum	Versailles	WP1-5
28 Nov-1 Dec 17	Paper	Metadata and Semantics Research Conference	Tallinn	WP2*
11-14 Dec. 17	Paper/Workshop	IEEE Big Data Conference	Boston	TBD

\* Abstracts/papers have been submitted for consideration and the project is waiting on the decision of the conference organisers.

- The project team has actively sought to engage with the Big Data Value Association (BDVA) in their process of updating the Big Data Strategic Research and Innovation Agenda. Work in this regard is ongoing.

### **T 1.5 Lead the project development of an exploitation strategy for results after the project.**

Ongoing.

### **T 1.6 Coordinate actively with WP 6 on the development of the project Data Management Plan**

The first draft of the Data Management Plan has been finalised and forwarded to the KPLEX Project Officer.

### **WP1 Deviations from Annex 1:**

There were no deviations from the workplan described in Annex 1.

### **WP1 Resources:**

WP1 used 1.3 PMs during the first 6 months of the project, as outlined in the table below.

<b>Participant short name</b>	<b>Person Months</b> <b>Jan - Jun 2017</b>
TCD	1.3
<b>TOTAL</b>	<b>1.3</b>

WP1 was allocated a total of 3.0 PMs in the Project Plan and over the course of the first phase of the project it has used 1.3 PMs (43% of the total allocation was used). This is in line with expectations - the objectives of this work package are being met and all deliverables and milestones are on track.

### **WP2 – Toward a New Conceptualisation of Data**

**Lead Participant:** Trinity College Dublin (Participant No. 1)

**WP Start Month:** M1

**WP End Month:** M15

### **WP2 Objectives:**

- O2.1 To conduct desk research relevant to the concepts and approaches of data, and how they are being applied.
- O2.2 To interact with computer science researchers to develop an understanding of the extent to which they are conscious of and sensitive to issues of data being incomplete, subjective or otherwise, inappropriate for large scale aggregation, as well as to interrogate their strategies for dealing with these aspects of their systems inputs.
- O2.3 To synthesise findings into both a white paper for policy/general audiences and a journal article.

### **WP2 Progress towards Objectives and Details for Each Task**

Two of the five WP specific tasks (T2.1 and T2.2) were completed during this reporting period.

## **T2.1 Survey of the state of knowledge regarding the development of the concept of data (due Month 6, delivered Month 6)**

In this period, the WP2 team prepared and completed a draft version of D2.1 and shared it among the project partners, fulfilling our WP-specific task of providing a contextualised frame for the further development of the project. Drawing on a wide range of disciplines (primarily history, philosophy, science and technology studies, but also engineering and computer science), this first task establishes a taxonomy of models underlying various conceptions of what data is, as well as a historical overview of when and how certain conceptions came to be dominant, within what communities. This work will allow the project as a whole to base its further development within a contextualised frame. The completion of this task is a major achievement and represents significant progress towards the completion of the WP2 deliverable.

In M6, WP2 participants travelled to The Hague for a Group Review of Work Plan, Deliverables and Milestones. WP2 prepared a PPT presentation on the WP findings thus far and delivered it while in The Hague. This PPT was subsequently shared among the partners.

## **T2.2 Development of survey and interview questions (due Month 8, delivered Month 6)**

In preparation for the next phase of the project, WP2 prepared a series of interview questions that have been approved by the TCD Faculty of Arts Humanities and Social Sciences (FAHSS) Research Ethics Committee. WP2 met with representatives of the Trinity College Library Research Data Management team, and the ADAPT computing research centre at TCD to discuss the project and the continued development of the work package. WP2 will now leverage its connections with the ADAPT centre and recruit participants for its interviews.

### **Additional Activities:**

During this phase, WP2 participated in two TCD-based research dissemination events where we discussed the KPLEX project. The WP has regularly contributed to the KPLEX project blog and has completed weekly eDiaries that will be developed into a cross WP white paper towards the end of the project.

### **WP2 Deviations from Annex 1**

WP2 aims to acquire rich rather than large responses to the WP interview and therefore, is no longer planning to conduct a large survey. In the place of a survey, WP2 will now conduct a data mining exercise across a corpus of computer science journals and proceedings from “big data” conferences so as to get a more informed picture of what inherent definitions of the word “data” are expressed in them, and how transformation processes like data cleaning or processing are viewed and documented. This will directly feed into WP2’s objective of providing a thorough taxonomy of the various definitions of data in use among different research communities. We will leverage our association with TCD’s

ADAPT centre to conduct this task. This data mining exercise will also inform the approach to the WP2 interviews.

### **WP2 Resources:**

WP2 used 3.3 PMs during the first 6 months of the project, as outlined in the table below.

<b>Participant short name</b>	<b>Person Months</b> <b>Jan - Jun 2017</b>
TCD	3.3
<b>TOTAL</b>	<b>3.3</b>

WP2 was allocated a total of 15.0 PMs in the Project Plan and over the course of the first phase of the project it has used 3.3 PMs (22% of the total allocation was used). This is in line with expectations – the work of this Work Package began in earnest in Month 4 and the deliverables and milestones are on track.

### **WP3 – Hidden Data and the Historical Record**

**Lead Participant:** Koninklijke Nederlandse Akademie van Wetenschappen (Participant No. 2)

**WP Start Month:** M1

**WP End Month:** M15

### **WP Objectives:**

- O3.1 To evaluate the issues and challenges surrounding the aggregation of historical data as knowledge, and in particular for those institutions which are not active participants of large national or international aggregations.
- O3.2 To further define a model of cultural heritage holdings as data (digital and otherwise) and investigate cultural and ethical barriers to big data approaches to historical and cultural sources, through interaction with cultural heritage institutions.
- O3.3 To synthesise and communicate the findings as a white paper for policy/general audiences and a journal article.

### **WP3 Progress towards Objectives and Details for Each Task**

Two of the five WP specific tasks (T3.1 and T3.2) were completed during this reporting period.

**T 3.1 Survey of the current state of knowledge regarding the presentation, representation, and archival practice & management of cultural heritage digital objects (due Month 6, delivered Month 6)**

In-depth desk research was conducted to refine research questions and situate the work package in discourses of big data and to critically position the research to further understandings of the effects of big data initiatives on the practice of cultural heritage institutions and the future of the historical record. As well as ultimately informing WP3's deliverable of a report on historical data as sources, this desk research informed the construction of a survey and interview schedule that will be used in fieldwork with cultural heritage practitioners.

**T 3.2 Development of survey and interview questions (due Month 8, delivered Month 6)**

In preparation for the next phase of the project, WP3 prepared a series of surveys and interview questions that have been approved by the TCD FAHSS Research Ethics Committee. These research instruments are now ready for testing ahead of the data-gathering phase.

**Notes and Comments:**

After thorough intellectual engagement with the key concepts framing the work package, the WP3 team took the decision to focus inquiry on the *use* of data and cultural heritage holdings more broadly, and to avoid potential hazards that may be thrown up by a pre-occupation with the status of 'hidden data' having been determined through deliberate policies or practices of active 'hiding'. Reference to data use opens up opportunities for inquiry into both measurement of researchers' engagement with diverse sources and the processes, practices and actors that may prove instrumental to perceptions of utility and the future standing of cultural heritage data in a changing knowledge landscape.

**Deviations from Annex 1 (if any)**

There were no deviations from the workplan described in Annex 1.

**WP3 Resources:**

WP3 used 3.94 PMs during the first 6 months of the project, as outlined in the table below.

Participant short name	Person Months Jan - Jun 2017
DANS	3.84
TCD	0.10

<b>Participant short name</b>	<b>Person Months</b> Jan - Jun 2017
<b>TOTAL</b>	<b>3.94</b>

WP3 was allocated a total of 15.00 PMs in the Project Plan and over the course of the first phase of the project it has used 3.94 PMs (26% of the total allocation was used). This is in line with expectations – the work of this Work Package began in earnest in Month 4 and the deliverables and milestones are on track.

## WP4 – Data, Knowledge, Organisation and Epistemics

**Lead Participant:** Freie Universität Berlin (Participant No. 3)

**WP Start Month:** M1

**WP End Month:** M15

### WP Objectives:

- O4.1 To conduct desk research relevant to the topic of the nature of research data and the factors (epistemic, ethical and practical) influencing its ability to be shared and aggregated
- O4.2 To interact with active humanities and other researchers in the field in order to produce a more refined understanding of the nature of the data and its personal, emotional, subjective or otherwise tacit qualities that make it resistant to easy digital “aggregability”
- O4.3 To synthesise findings into both a white paper for policy/general audiences and a journal article.

### WP4 Progress towards Objectives and Details for Each Task

Two of the five WP specific tasks (T4.1 and T4.2) were completed during this reporting period.

#### **T 4.1 Survey of the current state of knowledge regarding the creation of data by researchers (due Month 6, delivered Month 6)**

In-depth desk research was conducted to refine the research questions and situate the work package in discourses of big data and to critically position the research to further understandings of the effects of big data initiatives on the practice of various scientific disciplines focussing on emotion research. As well as ultimately informing WP4's deliverable of a report on data and epistemic impact, this desk research informed the construction of the survey and interview schedule that will be used in fieldwork with emotion researchers.

#### **T 4.2 Development of survey and interview questions (due Month 8, delivered Month 6)**

WP4 has prepared the empirical investigation of epistemic processes in various scientific disciplines focussing on emotion research. Major achievements so far are:

- Design of the survey. The draft survey was presented and discussed at the KPLEX-meeting in Den Haag beginning of June 2017. The survey has furthermore been pretested in an interdisciplinary setting (five researchers from psychology, anthropology, film studies, and statistics). The survey and the corresponding methodological statement was submitted to the TCD FAHSS Research Ethics Committee and approved.
- Composition of a list of more than 200 researchers in several disciplines who will be invited to participate in our survey.
- Design of interview guidelines for researchers, staff of research funding bodies, representatives of private companies, and software developers. The interview guidelines and the corresponding methodological statement have been submitted to the TCD Ethics Committee for their approval.
- Composition of a list of more than 30 potential interview partners.
- Tools for qualitative data analysis have been compared and tested for their functionality. Online survey tools have equally been tested.

### **Additional Activities**

In order to facilitate the write-up of a cross-workpackage White Paper a first outline of the structure of the White Paper has been developed. Additionally a template of an e-weekly has been designed which can be filled in by the researchers working in the KPLEX project to document the research progress and reflect on methodological decision processes and epistemological insights.

In terms of public relations a project homepage at Freie Universität Berlin has been established, a press release has been initiated, and the team has been interviewed by a journalist (the article has yet to be published). The KPLEX project was presented at the DARIAH-EU annual event in Berlin.

### **Deviations from Annex 1 (if any)**

There were no deviations from the workplan described in Annex I.

### **WP4 Resources:**

WP4 used 3.1 PMs during the first 6 months of the project, as outlined in the table below.

Participant short name	Person Months Jan - Jun 2017
FUB	3.0

Participant short name	Person Months Jan - Jun 2017
TCD	0.1
<b>TOTAL</b>	<b>3.1</b>

WP4 was allocated a total of 15.0 PMs in the Project Plan and over the course of the first phase of the project it has used 3.1 PMs (21% of the total allocation was used). This is in line with expectations – the work of this Work Package began in earnest in Month 4 and the deliverables and milestones are on track.

## WP5 – Culture and Representations of System Limitations

**Lead Participant:** Tilde (Participant No. 4)

**WP Start Month:** M1

**WP End Month:** M15

### WP Objectives:

- O5.1 To conduct desk research relevant to the topic of the impact of translation and other cross-cultural transmission processes on culturally and linguistically specific data, including good practice examples for the communication of cultural specificity and sensitivity in on-line environments.
- O5.2 To interact with experts in the field of cross-cultural transmission (including but not limited to translators) to understand the gap between their practices and priorities and current technological norms for similar practices.
- O5.3 To synthesise findings into both a white paper for policy/general audiences and a journal article.

### WP5 Progress towards Objectives and Details for Each Task

One of the five WP specific tasks (T5.1) was completed during this reporting period.

#### **T 5.1 Survey of the state of knowledge and practice regarding the representation of complex cultural phenomena as digital data (M 4-6)**

Tilde has analysed the current situation in respect to language coverage for language technologies, paying particularly attention to the current state of availability, coverage, and development of language resources and tools for each EU language. Analysed data include parallel corpora (DGT-TM, OPUS corpus, Microsoft IT strings, TAUS repository).

In analysing parallel data, Tilde focused particularly on multilingual open data in the so-called TILDE MODEL corpus, which consists of data from European Commission Press Release database (RAPID), European Medicines Agency documents (descriptions of medicines/medical conditions, instructions for use), European Economic and Social

Committee portal, European Central Bank website, and World Bank website (content on World Bank projects and activities in various regions).

Initial conclusions following analysis:

- Existing language resources are difficult to process, requiring special tools and processes
- Uneven domain coverage, mostly legislative/legal data
- Almost no availability of culture domain data
- Large volumes of data are available for larger languages, small volumes for smaller languages
- Larger data corpora tend to be much noisier than smaller corpora, requiring additional effort to process

Tilde also analysed the data needs of the CEF eTranslation platform, ascertaining the following lack of data:

- Languages where the EC doesn't have enough data and wants as much as possible: Croatian, Icelandic, Irish (Gaelic), Norwegian
- Languages where the EC has enough data, but could use more: Latvian, Lithuanian, Maltese, Polish, Romanian, Slovak, Slovene, Spanish, Swedish, Bulgarian, Czech, Danish, Dutch, Estonian, Finnish, Greek, Hungarian, Italian

This analysis of the data needs of the CEF eTranslation led to the conclusion that the European Union, and the expansion of the EU over time to include new Member States, has had an instrumental role in procuring new language resources for a wider range of languages, particularly for smaller languages.

Tilde also analysed the effect of language data in building MT engines with neural networks, so-called Neural MT (NMT), a high-powered approach to AI and machine learning. As opposed to traditional statistical MT (SMT) methods, NMT examines an entire sentence before suggesting the best possible translations. This new model provides translations that are often more fluent and readable than SMT translation. NMT achieves this success by taking into account elements like: word reordering, dependencies, morpho-syntactic agreements, and other features that are not handled well by SMT. In short, NMT takes into account context by approaching texts and translation on a sentence-by-sentence level (much like humans).

In conducting this analysis of the effects of language resources on NMT, Tilde found that neural networks are much more sensitive to mistakes in input data. The algorithms think these mistakes are a linguistic phenomenon, and thus are more likely to reproduce them in translations. Furthermore, traditional SMT is a complex system of modules, while NMT is an end-to-end system (single module). Therefore one small mistake in the construction of a system can lead to failure. However, this can also be a positive element: with SMT, input data mistakes are aggregated by each module (language module, parser, word ranking algorithms), though with NMT mistakes only affect a single module.

Finally, NMT errors are frequently semantic as opposed to linguistic, leading to biases in human evaluation (and therefore higher quality score and more 'hype'!). All of these errors hinge on the noisiness of data, or the imprecision of input data, or aspects of the data (alignment, etc.) that were in some way incomplete or overlooked. These, of course, will be

further exacerbated by the scarcity of data (e.g., smaller languages and overlooked domains).

To contribute to the formulation of language and Big Data policy in Europe – one of the primary aims of the KPLEX project – Tilde participated in developing an assessment report by Science and Technology Options (STOA) panel for the European Parliament, entitled *Language equality in the digital age: Towards a Human Language project*. The report focuses on several key issues: how human language technologies (HLT) are key to overcoming language barriers; the specific challenges in EU for minority languages and HLT; how language barriers present significant social and economic consequences; and why HLT are not properly considered in current EU policy.

In addressing these issues, the report ascertained several key challenges:

- Unfair language gap exists in the EU
- Minority languages are in danger
- Low availability of multilingual public and private services
- Language barriers have a profound effect on DSM

To overcome these challenges and meet the multilingual needs of Europe, the report proposed multiple policy options:

- Create tools to properly evaluate HLT policies
- Refocus and strengthen HLT research
- Create a EU platform of data and services
- Bridge the technology gap between EU languages
- Raise awareness of the opportunities of HLT for companies
- Foster the translation of public webs and docs using HLT
- Increase the availability of qualified personnel on HLT
- Public procurement of innovative technology and pre-commercial public procurement

The proposed policy options for the European Union will be discussed in detail at a session on multilingualism and language technology organized by Tilde at the Big Data Value Forum in Versailles, France, in November 2017.

### **Notes and comments**

For the next 6 months of the project, Tilde will focus on surveying various members of the wider language community in Europe on issues related to language resource coverage for EU language, as well as the availability of tools. This survey will be analysed in detail, helping Tilde to formulate conclusions and policy recommendations in the final deliverable.

### **Deviations from Annex 1 (if any)**

There were no deviations from the workplan described in Annex I.

### **WP5 Resources:**

WP5 used 5.86 PMs during the first 6 months of the project, as outlined in the table below.

Participant short name	Person Months Jan - Jun 2017
TILDE	5.76
TCD	0.10
<b>TOTAL</b>	<b>5.86</b>

WP5 was allocated a total of 15.0 PMs in the Project Plan and over the course of the first phase of the project it has used 5.86 PMs (39% of the total allocation was used). This is in line with expectations – unlike WPs 2-4, the work of this Work Package began in Month 1 and the deliverables and milestones are on track.

## WP6 – Ethics Requirements

**Lead Participant:** TCD (Participant No. 1)

**WP Start Month:** M1

**WP End Month:** M15

### **WP6 Objectives:**

O1.1 This work packages sets out the 'ethical requirements' that the project must comply with.

### **WP6 Progress towards Objectives and Details for Each Task**

At the commencement of the project, the consortium led by TCD consulted with the Research Ethics Committee within the TCD Faculty of Arts, Humanities and Social Science. On 24 January 2017, the Committee granted initial approval for the KPLEX project and requested to review the project questionnaires when they were available. Deliverable 6.1, containing this initial approval, was submitted on time at the end of Month 3.

On 26 June 2017, the KPLEX project partners submitted the requested questionnaires to the TCD FAHSS Research Ethics Committee and received final ethics approval on 3 July 2017. The updated version of D6.1 was submitted as requested by the KPLEX Project Officer.

### **Deviations from Annex 1 (if any)**

There were no deviations from the workplan described in Annex I.

**WP6 Resources:**

Not Applicable

### 3. Financial Management

Category	Budget (TOTAL)	Total Expenditure (Jan - Jun 2017)	Comments
Personnel Costs (PMs)	63.0	17.5	<b>The level of PMs used on the project is 28% of the budget which is on track.</b>
Personnel Costs (€)	€375,033.00	€76,551.60	<b>Expenditure is at 20% of the total budget and is on track for this stage of the project work programme.</b> All deliverables and milestones are on track.
Other Direct Costs (€)	€20,830.00	€8,612.39	<p>Project Coordinator attendance at Project Open Day, Luxembourg, January 2017</p> <p>Kick-off Team meeting in Dublin, February 2017</p> <p>Attendance at Dariah meeting in Berlin (DANS), April 2017</p> <p>Meeting with EP on language technologies in Brussels (TILDE), May 2017</p> <p>Project Team meeting in The Hague, June 2017.</p> <p><b>Expenditure is at 41% of the total budget and is on track</b></p>
Subcontracting (€)	€5,150.00	n/a	Subcontracting expenditure is planned for the second half of the project
Indirect Costs (€)	€98,965.75	€21,291	<b>Expenditure is at 21.5% of the total budget</b>

Category	Budget (TOTAL)	Total Expenditure (Jan - Jun 2017)	Comments
<b>TOTAL</b>	<b>€499,978.75</b>	<b>€106,454.99</b>	Expenditure is at 21% of the total budget. All partners and work packages are on track and no corrective action for the financial management of the project is required.