Designing Stories for Cross-sectoral Knowledge Transfer
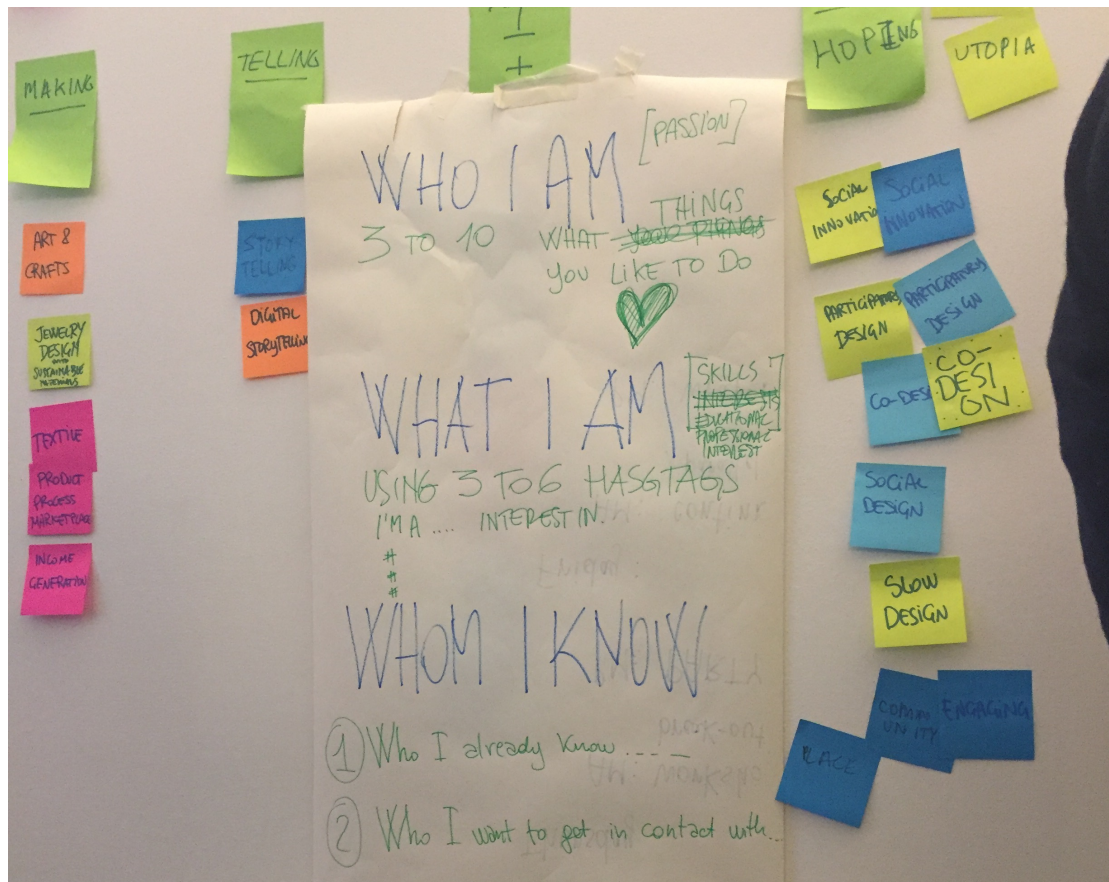
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1 INTRODUCTION

'Addressing global challenges requires a collective and concerted effort, involving all actors. Through partnerships and alliances, and by pooling comparative advantages, we increase our chances for success.'

Ban Ki-moon, UN Secretary-General

The increasingly complex nature of social challenges calls for new forms of collective action among stakeholders coming from different sectors (public, private and nonprofit) and from different fields (e.g. education, work and pension, business, science, technology, engineering, arts). This is a difficult undertaking, as traditionally, these sectors are disconnected, and have few incentives to actively collaborate. Cross-sector collaboration faces numerous challenges to address problems of global scale, such as youth unemployment, a lack of education, poverty. One of the important challenges faced is that with respect to effective knowledge transfer between various stakeholders, as they lack a common understanding of the problem and how to solve it, as well as an efficient process to foster collaboration (Selsky, and Parker, 2005; Bryson et al., 2006). To address social challenges, it is critical to develop a new system that enables various stakeholders to communicate, collaborate and create innovation that brings growth and social value at the same time (OECD 2011). Participative approaches, tools and arrangements aiming at facilitating dialogue and knowledge transfer, and promoting collaboration and implementations are required to enable such cross-sector collaborative social innovations (Chapin et al., 2010; Harayama and Nitta, 2011; Shintani, 2011).

Design as design thinking provides more than mere design (Kimbell, 2011). Agendas are beginning to shift from the preoccupations of professional designers conventionally focusing on problem-solving and embodied material practices to those of design consultancies, management educators and other scholars working with businesses and grappling with complex social issues (Kelley, 2001; Brown, 2009; Martin, 2009; Brown and Wyatt, 2010). Design is applied not only to the product or service an organisation produces, but also to the organization itself (Kimbell, 2011) as cultural intermediaries (Julier, 2006; 2008), or as the 'glue' in multidisciplinary teams (Kelley and VanPatter 2005). According to Brown and Wyatt (2010), 'design thinking crosses the traditional boundaries between public, for-profit, and nonprofit sectors'(p32), and design thinking process entails a system of overlapping spaces for creative cross-sector collaboration. Design thinking is not a one-stop solution for projects, rather the idea behind design thinking is to learn from experience, to communicate, to leverage opportunity for collaboration and to transfer knowledge and competencies among others. Design possesses instruments that would support knowledge transfer across sectors, and reinforce stakeholder engagement to address social problems.

The research presented in this report sets out to explore the use of the storytelling as a design thinking tool to facilitate effective knowledge transfer and collaboration in the 'meeting points' of the stakeholders. The purpose of the research is twofold. Firstly, it attempts to explore the potential of storytelling as a tool to transfer knowledge across sectors. Secondly, it explores the use of storytelling as an intervention to support stakeholder engagement, cross-sector learning, discovery, and innovation.

This report starts with a critical review of substantial literatures in relation to linguistics-related studies, information and communication management, business and knowledge management, design thinking and activity theory. A Storytelling Design for Knowledge Transfer (STD-KT) Model is proposed to facilitate cross-sector knowledge transfer, and stakeholder engagement. By bringing up knowledge transfer and design thinking, a design thinking framework for knowledge transfer is proposed for designing 'knowledge' stories in three stages of knowledge transfer process. The activity theory is used as a framework for planning three storytelling (workshop) activities. The cognitive map is applied to involve actors from various disciplines and sectors through a storytelling process where stories are designed for knowledge acquisition; for knowledge transformation and opportunities identification; as well as for knowledge association and implementation planning, to foster synergies and collaboration. This report then presents the on-going work as case studies that are planned to test the conceptual model in a multidisciplinary design research project. The analysis of these case studies will put forth what benefits 'storytelling' can make possible to transfer design knowledge between NGOs, NPOs, government, Universities, community leaders and youth-based service providers, and promote collaboration and spark action. The case studies will be conducted as part of Workpackage 7 Communication and networking of the Participatory Tools for Human Development with the Youth (PARTY) project. Finally, this report outlines the data collection activities that are planned for the next period of the project in 2017 and 2018.

2 STORYTELLNG FOR KNOWLEDGE VISUALISATION AND TRANSFER

This section explores the literature surrounding storytelling and knowledge transfer. It then outlines types of knowledge carried by stories, functions of storytelling and story in knowledge transfer, and barriers to cross-sector knowledge transfer that will be addressed through this research project in order to further understanding how storytelling as a design thinking tool can facilitate effective knowledge transfer across sectors.

2.1 Story and Storytelling

2.1.1 Narrative theory

Narrative theory explains the structure of a narrative, and seeks to understand how recurrent elements, themes and patterns produce a set of universal features that determine the composition of a story (Pradl, 1984). The literature highlights a distinction between a story and a discourse. A story is defined as a sequence of events that involves characters and their actions, that is, the content - what is narrated; whereas a discourse is defined as the expression or means by which the contents are communicated - how it is narrated (Chatman, 1978). In this report the 'story' is used to present the content of a narrative, the term 'storytelling' to indicate the expression of a story, and the term 'narrative' to represent storytelling and story as a whole.

Figure 1 illustrates the necessary components of a narrative that has two parts: a story, the content or chain of events (actions, happenings), plus the existents (characters, items of setting); and a discourse, that is, the expression, the means by which the content is communicated (Chatman, 1978). The expression of a story is twofold: the approaches for expression and the voice and viewpoint of a story as stated by the storyteller.
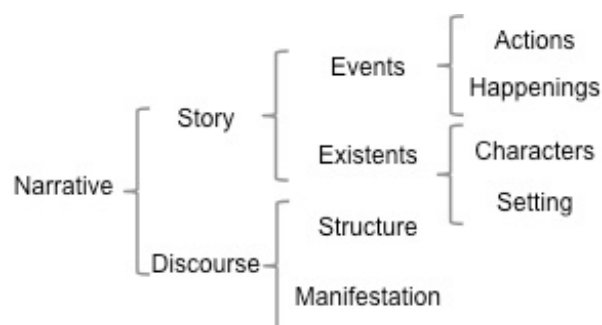

Figure 1. The elements of a narrative (adapted from Chatman, 1978)

2.1.2 Story Structure

A story schema is a system that aims to analyse the underlying structure of a story, and story grammar while supplementing a schema is a set of rules defining the units and their relationships (Mandler and Johnson, 1977). A type of tree structure containing basic units and their connections is used to represent the structure of a story. In the tree structure, the setting and episode are the highest levels of story constituents (Rumelhart, 1975). The setting of a story describes protagonist, the other characters and circumstances (social, physical or temporal) (ibid), as well as the habitual behavioural patterns of the characters (Stein and Glenn, 1979, cited in Leung 2014). The episode constituent of a story introduces both single and multiple events that develop at the beginning, middle and the end of a story with various connections between each consentient under the episode system. According to Leung (2014), the constituents and the subsequent events are similar expect for the ending event that initiates the consequent reaction of the characters and the

emphasis on the story. A typical story event contains natural occurrence and action, triggers a reaction, and might cause one or more internal events. It is suggested that this type of representation of stories can be used to form schemata which guide encoding and retrieval (Mandler and Johnson, 1977).

2.2 Knowledge Transfer

2.2.1 Knowledge
A popular working definition of knowledge is provided by Davenport and Prusak (1998, p5): 'knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information'. Knowledge mainly originates and resides in people's minds. It is information interpreted by the individual and applied to aid decision-making (Theirauf, 1999). The distinction, commonly addressed in the literature, is between data, information, knowledge and expertise (Figure 2):

- Data: raw facts and numbers (Theirauf, 1999; Alavi and Leidner, 2001), or a combination of signs regulated by a syntax (Aamodt and Nygård, 1995);
- Information: processed (contextualized, categorized, calculated and condensed) data (Davenport and Prusak 2000). Data needs semantics to become information (Aamodt and Nygård, 1995); it must be imbued with meaning, understanding, relevance and purpose (Bender and Fish, 2000);
- Knowledge: authenticated and personalised information (Alavi and Leidner, 2001). Information is transformed into knowledge, when the individual processes, internalizes, and integrates it into his/her existing knowledge structure resulted in new learning (Bender and Fish, 2000); knowledge with a pragmatic dimension is applicable to achieve a goal (Aamodt and Nygård, 1995), and provides the ability to make effective decisions, and take effective action (Senge, 1990).
- Expertise: specialised, deep knowledge and understanding in a particular area (Liyanage et al., 2009). It is developed through experience, training and education and is built up from scratch over a long period of time by an individual and importantly remains with that person (Bender and Fish, 2000).
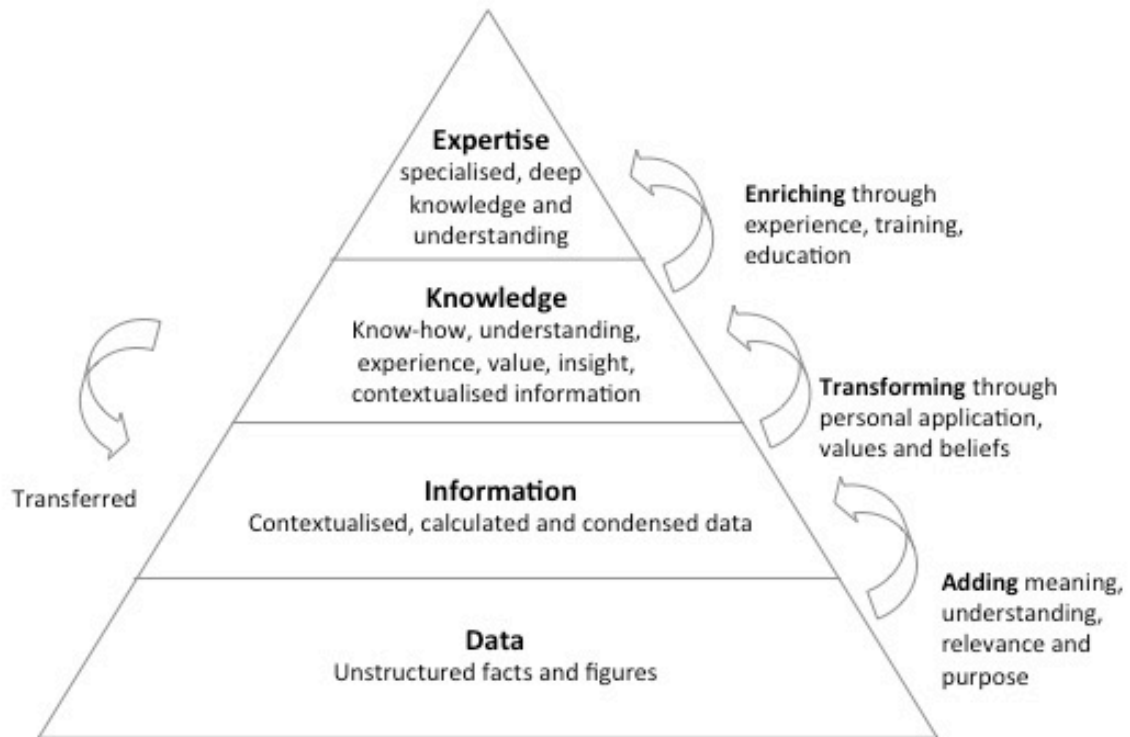
Figure 2. Knowledge Hierarchy (Davenport and Prusak, 1998; Theirauf, 1999; Bender and Fish, 2000).

The classical hierarchical model of knowledge and information, however, has been criticised in the literature. The boundary between information and knowledge is flexible, and the relationship between them travels in both directions. Once knowledge is made explicit, it becomes information; while information is internalised, it becomes knowledge (Alavi and Leidner, 2001).

Alavi and Leidner (2001) highlight the importance of understanding the concept of knowledge and knowledge type, as the design of knowledge management systems is influenced by the distinction among the different types of knowledge. Table 1 illustrates the multi-faceted nature of knowledge, underlines the variety of knowledge that coexists in organizational settings (Alavi and Leidner, 2001) and the learning economy (Lundvall and Johnson, 1994), which implies the need to develop knowledge management systems (e.g. IT-based knowledge provision) to include different knowledge types.

Table 1. Knowledge Taxonomies and Examples (Adapted from Alavi and Leidner, 2001; Lundvall and Johnson, 1994; OECD 2000)

Knowledge Type	Definitions	Examples
Tacit	Knowledge is rooted in actions, experience, and involvement in specific context	Best means of dealing with specific customer
Cognitive Tacit:	Mental Models	
Technical Tacit:	Know-how applicable to specific work	
Explicit	Articulated, generalized knowledge	Knowledge of major

		customers in a region
Individual	Created by and inherent in the individual	Insights gained from completed project
Social	Created by and inherent in collective actions of a group	Norms for inter-group communication
Conscious	Explicit knowledge of an individual	Syntax of a programming language
Automatic	Individual's tacit, subconscious knowledge	Riding a bike
Objectified	Codified knowledge of a social system	An operating manual
Collective	Tacit knowledge of a social system	Organization culture
Declarative	Know-what/about: knowledge refers to facts or information	What drug is appropriate for an illness
Procedural	Know-how: practical and theoretical knowledge including competence, skill, personal knowledge	How to administer a particular drug
Causal	Know-why: knowledge about theories, principles and laws of motion in nature, in the human mind and in society.	Understanding how the drug works
Conditional	Know-when	Understanding when to prescribe the drug
Relational	Know-who/with: information about who knows what and who knows what to do; the social ability to co-operate and communicate with different people.	Understanding (who knows) how the drug interacts with other drugs
Pragmatic	Useful knowledge for an organization	Best practices, business frameworks, project experiences

2.2.2 Type of knowledge carried by stories

Grounded in the previous framework (Eppler and Burkhard, 2004), Burkhard (2005) introduces a Knowledge Visualisation Framework (Figure 2). Burkhard's framework consists of four perspectives that need to be considered when creating visual representations to transfer and create knowledge, and differentiates five types of knowledge that needs to be transferred: declarative knowledge (Know-what, e.g., facts), procedural knowledge (Know-how, e.g., processes), experimental knowledge (Know-why, e.g., causes), orientational knowledge (Know-where, e.g., knowledge sources), individual knowledge (Know-who, e.g., experts) (Table 1). A knowledge type perspective clarifies the nature of the content. A recipient type perspective differentiates four backgrounds of the recipient or audience, the visualization type perspective structures the main visualization types according to their individual characteristics. A function perspective distinguishes reasons for the knowledge visualisation and transfer.

FUNCTION	KNOWLEDGE TYPE	RECIPIENT	VISUALIZATION TYPE
Coordination	Know-what	Individual	Sketch
Attention	Know-how	Group	Diagram
Recall	Know-why	Organization	Image
Motivation	Know-where	Network	Map
Elaboration	Know-who		Object
New Insight			Interactive Visualization
			Story

Figure 3. The Knowledge Visualization Framework (Burkhard, 2005)

By understanding the structure of a story, Leung (2014) suggests conditional knowledge (Know-when, e.g. when a conduction is met) as another type of knowledge that can be carried stories. Together with the five type of knowledge in Burkhard's (2005), these six types of knowledge are used as a basis for our study to investigate the flow of storytelling in the knowledge transfer process from source (sender) to the receiver (Table 2). Moreover, Burkhard's framework highlights the six functions of visual representations (discussed in a later section), and gives some hints about the transfer mechanisms.

Table 2. Types of knowledge carried by stories

Declarative knowledge (Know-what)	Orientational knowledge (Know-where)
Procedural knowledge (Know-how)	Individual knowledge (Know-who)
Experimental knowledge (Know-why)	Conditional knowledge (Know-when)

2.2.3 Knowledge Transfer Models

Knowledge transfer is one of the key processes in knowledge management concerned with the conveyance of knowledge across the boundaries, from the creator of the knowledge and the implementer of that knowledge (Liyanage et al., 2009). Effective knowledge transfer would enable the receiver to develop the received information into the context of his/her knowledge, consequently accumulate or assimilate new knowledge (Davenport and Prusak, 2000; Liyanage et al., 2009; Wilkesmann et a., 2009). This indicates that knowledge transfer is not only about communicating and sharing the knowledge, but also the absorption of the knowledge by the receiver, and the application of that knowledge to the receiver's benefits. The process takes into account both the modes of transferring knowledge and modes of receiving knowledge, which can be explained using knowledge conversion model introduced by Nonaka and Takeuchi (1995). Figure 4 illustrates the process of knowledge creation and categorised knowledge into tacit and explicit (Nonaka and Takeuchi, 1995). It also reflects four types of learning process to support knowledge conversations. Each mode of conversion constitutes one means of knowledge transfer and creation (Liyanage et al., 2009).
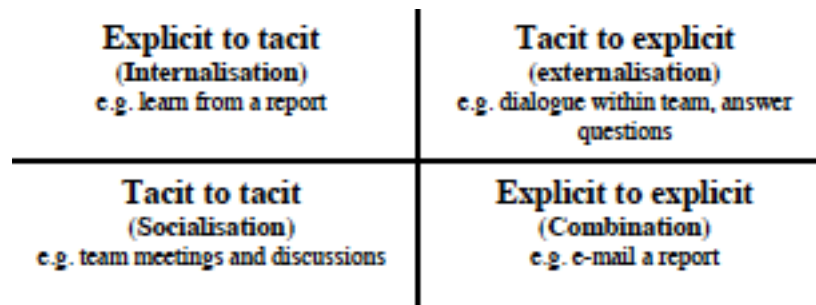
Explicit to tacit (Internalisation) e.g. learn from a report	**Tacit to explicit** (externalisation) e.g. dialogue within team, answer questions
Tacit to tacit (Socialisation) e.g. team meetings and discussions	**Explicit to explicit** (Combination) e.g. e-mail a report

Figure 4. SECI knowledge conservation model (Nonaka and Takeuchi, 1995)

Furthermore, knowledge transfer is a complex process that encompasses the content of knowledge, methods of transfer, objectives of transferring knowledge and the cognition of senders and receivers. Through the detailed reading of 193 papers on knowledge transfer. Ward et al., (2009) identify 28 different models that describe all or part of the knowledge transfer process. Thematic analysis of these models pinpoints five common components of the knowledge transfer process: (1) problem identification and communication; (2) knowledge/research development and selection; (3) analysis of context; (4) knowledge transfer activities or interventions; and (5) knowledge/research utilization. They also identify three types of knowledge transfer processes: (1) a linear process; (2) a cyclical process; and (3) a dynamic multidirectional process.

Grounded in the theories of communication and translation, Liyanage et al. (2009) propose a theoretical model for the process of knowledge transfer between and across entities (Figure 5). In this model, a network a prerequisite for close, tight interactions between individuals, teams and organisations subsequently efficient knowledge transfer is critical in organisations. Taking into account benefits gained at both ends (i.e. source and receiver), Liyanage et al.'s model considers the knowledge transfer in a feedback loop and consists of the following six main steps: (1) awareness – the appropriate or valuable knowledge is identified to be transferred; (2) acquisition – the knowledge is acquired from the source; (3) transformation – the acquired knowledge is transformed by simply adding or deleting knowledge or by means of translation as explained in SECI knowledge conservation model (Nonaka and Takeuchi, 1995); (4) association – the transferred knowledge is associated with the internal needs; (5) application – the useful knowledge is applied in the organization in order to create value; and (6) feedback - the accumulation of experience expands the transferred knowledge.
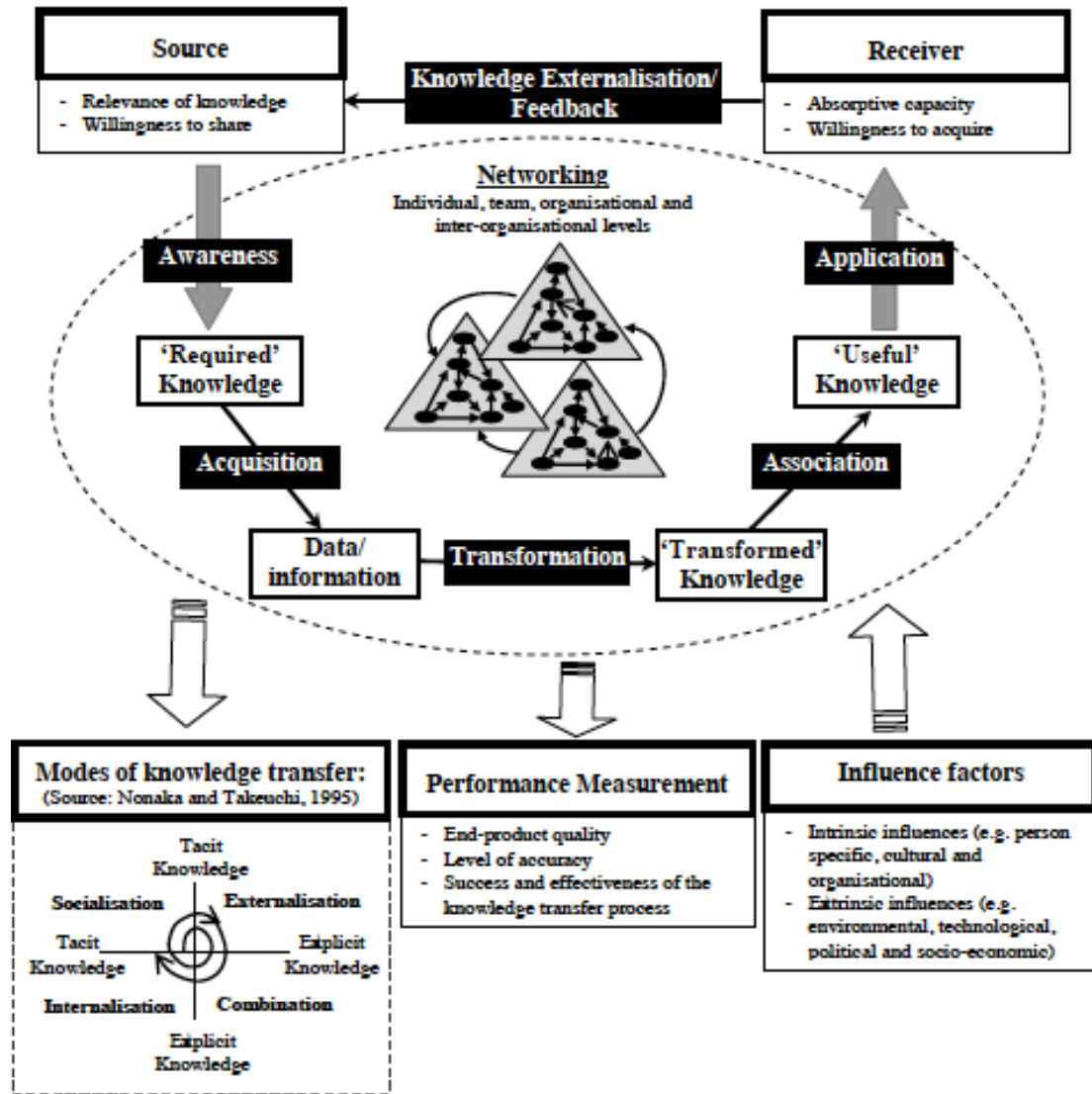
Figure 5. Knowledge Transfer Process Model (Liyanage et al. 2009)

Liyanage et al.'s (2009) model is chosen by this report as a theoretical framework to understand knowledge transfer, because it covers all five common components identified by Ward et al. (2009). Moreover, the usefulness and relevance of this model could be much more attributable to its identification of six stage of knowledge transfer on an individual level which is relevant for the purpose of this study – to transfer knowledge between individuals and engage stakeholders in collaboration across sectors.

Additionally, the context in which knowledge is created is also important, because knowledge is context-specific. High value information is depended on the context that would enable meaningful behaviour, and is embodied in the languages, in stories, concepts in the rules and practices (tacit dimension) (Singh, 2006). The context or a '*ba*' in Nonaka et al., (2000) where the knowledge can be shared, created and applied can be physical, social, cultural, historical or mental in nature (Figure 6).
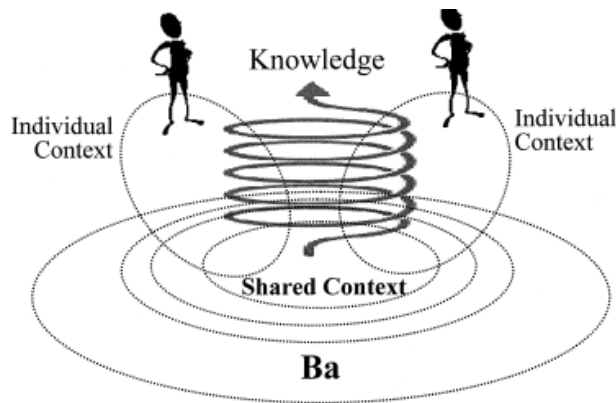
Figure 6. Ba as shared context in motion (Nonaka et al., 2000)

Nonaka et al.'s (2000) work identify four elements of the knowledge creation context or ba: interpretation, interaction, space and time, and four types of ba (Figure 7): originating ba, dialoguing ba, systemising ba and exercising ba, which is defined by two dimensions. One dimension is the type of interaction, namely, individually or collectively. The other is the media used in such interactions, namely, face-to-face contact and virtual media. When the two dimensions are applied to the ba concept, originating ba is defined by individual and face-to-face interactions, dialoguing ba by collective and face-to-face interactions, systemising ba by collective and virtual interactions, exercising ba by individual and virtual interactions.
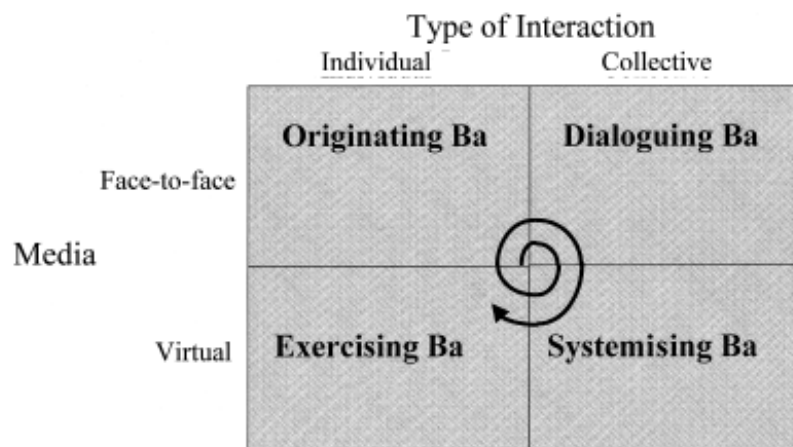

Figure 7. Four types of ba (Nonaka et al., 2000)

The context of knowledge creation relates to storytelling design activities and arrangements where an individual applies his/her knowledge, and where interactions establish.

2.3 Storytelling in Knowledge Transfer

There has been an increasing interest in storytelling as a way in knowledge management over the past few years, especially within an organisational setting (Swan et al., 1999; Simon, 2001; Their and Erlach, 2005; LeBlanc and Hogg, 2006; Kalid and Mahmood, 2010; Wijetunge, 2012; Leung, 2014). In general, stories have

been used as a way to impart and store knowledge, exchange and propagate complex ideas, make a connection and communicate experiences within organisations or across organisations.

Based on the narrative theory, storytelling, therefore, is recognised as an action to express a narrative that involves both a story and a discourse. From the perspective of communication, a story is a form of message formulated by a storyteller. Thus storytelling process entails three elements: a storyteller, a story and a story receiver (Leung, 2014). As the start and the end of the communication process, the storyteller and the audience can be individuals, groups or organisations. The storyteller conveys stories through one or more appropriate media to an audience, and the audience receives the story as a communication through a corresponding channel. A story provides a simple way of combining verbal and visual information, and exists either as a complete story with plot, sequences and one or more protagonists, or simply in fragments (Thier and Erlach, 2005). Story content delivers knowledge through the context in term of characters, setting, actions, and happenings under a specific story context. Storytelling is an interactive way to rely on both the text and context of a conversation that inspires the audience with a strong takeaway - leading to coordination, effective interpretation of the message and creating action (Barker and Gower, 2010). It is regarded as a cognitive instrument to evoke emotion and sensemaking, which, in turn, affect knowledge transfer (Herman et al, 2005).

By applying Liyanage et al.'s (2009) model, the alignment between storytelling and knowledge transfer, and the characteristics of storytelling towards knowledge transfer which are summarised below.

- **Storytelling in knowledge acquisition:**
Storytelling is considered as a socially oriented and persoanlisation approach to knowledge acquisition as knowledge sharing in Leung (2014). Storytelling results in social interaction with a high degree of social element in the story content. Story content is regarded as a resource for codification through storytelling, and can be codified in a narrative inquiry. Correspondingly, knowledge flow of applying storytelling is driven by the perspective of knowledge as a social creation. Telling stories can reach across individuals, and story content can span across time and geographical space with the support of knowledge management codification and technology. For example, a story circle is a technique to generate and gather collective stories, and simultaneously share stories. Sitting in a circle, participants share stories about a selected theme under the guidance of a facilitator. The use of stories and storytelling has a potential to build coalition networks, facilitate community collaborations, and capture knowledge from stories from social interaction. Leung (2014) claims that storytelling does not suit the organisational knowledge flows in the perspectives of knowledge as a solution and knowledge as an experience, since organisations require a real-time knowledge transfer process to seek, capture and store knowledge. Due to the sequential nature of the stories, knowledge from stories is captured and preserved in the memory of people.

DeLarge (2004) argues that storytelling constitutes a 'high-risk/high reward scenario'. Stories must be tailored for situational characteristics and audience attention span and personality, and highlight key communications points. The story content should properly match its form (DeLarge, 2004).

- **Storytelling in knowledge transformation:**

During the knowledge transformation, the acquired knowledge is transformed by means of translation, and story and storytelling involve cognitivist and constructivist paradigms of learning (Lueng, 2014). In the cognitivist learning paradigm (Ertmer and Newby, 1993), to achieve effective storytelling it is crucial to understand what learners know, how they acquire the knowledge and mental archives for coding and structuring knowledge though. In the constructivist learning paradigm, story plots formed from social interaction and individual experiences are considered as indirect experiences. These indirect experiences delivered by storytelling can lead to changes in cognition that reflect in interpretations, and that ultimately influence actions. Learners need to have an in-depth understanding of the story content before integrating into their own knowledge, which imply the creation of tacit knowledge among individuals in knowledge management. Learning by listening to and/or seeing stories stimulates a deep-level cognitive learning, possible influence individual beliefs, and ultimately actions.

- **Storytelling in knowledge association:**

By positing storytelling in the SECI model (Nonaka and Takeuchi, 1995) (Figure 4), storytelling in knowledge association is capable of converting context-specific explicit knowledge into tacit knowledge (internalisation); and creating new tacit knowledge through experience sharing and social interactions (socialisation) (Lueng, 2014).

- **Storytelling as a context of knowledge creation:**

Furthermore, storytelling can be used to provide a context or ba to create knowledge, as it contains the four essential elements that constitute the knowledge creation context: interpretation, interaction, space and time (Nonaka et al., 2000). As a form of communication, storytelling is a natural way of sharing and interpreting experiences and understandings to others, embedded in social interaction. In addition, story content delivers knowledge through the context in term of characters, setting, actions, and happenings under a specific story context. Setting refers to the time and place in which interaction takes place.

2.3.1 Functions of Storytelling in Knowledge Transfer

Burkhard (2005) describes the benefits of the story as a knowledge visual representation that stories are efficient in transferring and disseminating knowledge across time and space. To transfer knowledge, imaginary visualizations complement the other six visual formats (Sketches, Diagrams, Images, Maps, Objects, Interactive and visualizations), and are valuable to establish a shared vision, a mutual story, to motivate and activate individuals (Eppler and Burkhard, 2004; Burkhard, 2005).

For example, 'springboard stories' are used to create a new paradigm by not only introducing new ideas, but also enabling 'listeners to visualise the transformation needed in their circumstances and then to act on that realization' (Denning, 2004, p4). Table 3 provides a chart for creating stories to match the situation within the organisation (Denning, 2004; 2006).

Table3. Five story type patterns (Denning, 2004; 2006).

Objective	The story should:	You will need to:	Your story will inspire such phrases as:
Spark action	Describe how a successful change was implemented in the past, but allow listeners to imagine how it might work in their situation.	Avoid excessive detail that will take the audience's mind off its own challenge	'Just imagine...' 'What if...'
Share knowledge	Focus on mistakes made and show in some detail how they were corrected, with an explanation of why the solution worked	Solicit alternative–and possibly better– solutions.	'Wow! We'd better look out for that, too!'
Lead people into the future	Evoke images of the future you want to create, without providing too much detail (that may turn out to be wrong)	Have strong storytelling skills (Otherwise, use a story in which the past can serve as a springboard to the future)	'When do we start?' 'Let's do it
Foster collaboration	Recount a situation that listeners have also experienced, prompting them to share their own stories	Permit time to share stories	'That reminds me of the time that I...' 'Hey, I've got a story like that.'
Transmit values	Feel familiar to the audience and prompt discussion about the issues raised by the value being promoted.	Tell a story that is consistent with your own actions and uses realistic characters and scenarios.	'That's so right!' 'Why don't we do that all the time?'

2.4 The Challenges Facing Cross-sector Knowledge Transfer

Strengthening research and development, and education system in the EU countries is recognised as a prerequisite to the knowledge and technology transfer and innovation development (Figure 8). Knowledge and technology transfer is the communication medium, and creates collaboration between unrelated industries. Effective knowledge transfer is a two way process: firstly, transforming research into commercial or social value, and secondly, bringing feedback about the market demands to the higher education institutions (Kiskiene, 2015). As a result of this, innovations in products, services and business models might emerge, and social innovations might be also initiated. Such innovativeness and entrepreneurship are

now considered key driving forces of future economic growth and employment, which impact on all spheres of social life, and business and governance fields.
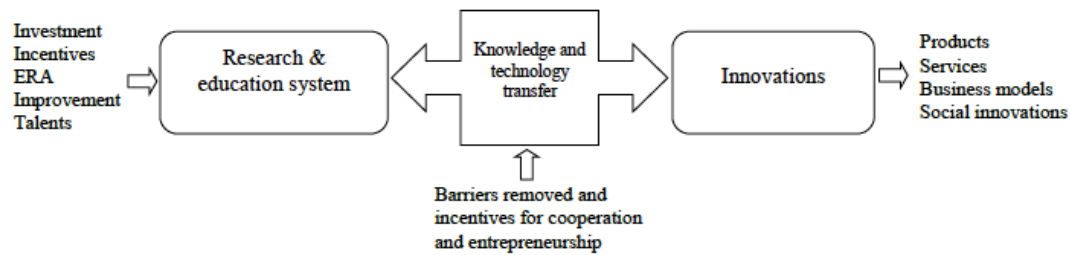

Figure 8. EU approach to the role of scientific knowledge and technology transfer process (Kiskiene, 2015).

It is argued that knowledge and innovation should not be sector specific, however, several identified factors have impeded the effectiveness of cross-sector knowledge transfer. Besides geographical distance and time zones (Oshri, et al. 2008), other crucial challenges (Kiskiene, 2015) include

- Uncertainty and the lack of incentives for the potential actors to get involved (European Commission, 2007). Stakeholders, e.g. private investors, cannot be certain whether the research or even prototype, in the development of which they invested, will result in desirable (commercial) results;
- A variety of knowledge that can be transferred, such as competences, best practices and other tacit knowledge, theoretical calculations, schemes, measurement results, methods, prototypes, working mechanisms, etc. Such variety makes the knowledge difficult to record, analyse and assess the scope and quality of transfer processes;
- Differences in work ethics, goals, expectations and processes that result in a gap between different societal sectors in terms of communication and collaboration;
- The lack of non-formal communication and explicit networks that engage actors in the transfer process to share tacit knowledge, assess the potential of scientific ideas and research results, and develop viable business plans.

This section has extensively reviewed the literature concerning the knowledge visualization, storytelling and knowledge transfer process. The challenges of cross-sector knowledge transfer have also been highlighted. Knowledge type, Liyanage et al.'s model and the concept of ba have been introduced to understand storytelling in the context of knowledge transfer, which will be heavily drawn upon in the following sections.

3 DESIGNING STORIES IN CROSS-SECTOR KNOWLEDGE TRANSFER

This section distills the literature on design thinking and uses of design stories. The various ways of using storytelling in the design process are examined. Finally,

research into the potential of combining storytelling and design thinking as an enhancer of knowledge transfer and stakeholder engagement is conducted.

3.1 Design Thinking

Design as design thinking provides more than mere design (Kimbell, 2011). Agendas are beginning to shift from the preoccupations of professional designers conventionally focusing on problem-solving and embodied material practices to those of design consultancies, management educators and other scholars working with businesses and grappling with complex social issues (Kelley, 2001; Brown, 2009; Martin, 2009; Brown and Wyatt, 2010). Design is applied not only to the product or service an organisation produces, but also to the organization itself (Kimbell, 2011) as cultural intermediaries (Julier, 2006; 2008), or as the 'glue' in multidisciplinary teams (Kelley and VanPatter 2005).

More recent discussion on design thinking, Adams et al. (2010) locate designers' knowledge and thinking within the contexts in which they work, and highlight differences in knowing, acting, and being among designers. Kimbell (2011) applies design thinking into the characterization of the practices of designers: what designers know, and how they approach their own work, as well as how they actually do it (Table 4).

Table 4 Different ways of describing design thinking (Kimbell, 2011)

	Design thinking as a cognitive style	Design thinking as a general theory of design	Design thinking as an organizational resource
Key texts	Cross 1982; Schön 1983; Rowe [1987] 1998; Lawson 1997; Cross 2006; Dorst 2006	Buchanan 1992	Dunne and Martin 2006; Bauer and Eagan 2008; Brown 2009; Martin 2009
Focus	Individual designers, especially experts	Design as a field or discipline	Businesses and other organizations in need of innovation
Design's purpose	Problem solving	Taming wicked problems	Innovation
Key concepts	Design ability as a form of intelligence; reflection-in-action, abductive thinking	Design has no special subject matter of its own	Visualization, prototyping, empathy, integrative thinking, abductive thinking
Nature of design problems	Design problems are ill-structured, problem and solution co-evolve	Design problems are wicked problems	Organizational problems are design problems
Sites of design expertise and activity	Traditional design disciplines	Four orders of design	Any context from healthcare to access to clean water (Brown and Wyatt 2010)

Table 4 shows that design thinking an organizational resource, where design thinking

is suggested as an approach to business or even social innovation. Bauer and Eagan (2008) suggest design thinking as an organizational resource to make up for some of the shortcomings in management and its over-reliance on analysis. Brown (2009) offers design thinking as an answer to challenges facing organizations wanting to innovate but also societies grappling with complex social and public issues.

Brown (2009) argues that through a non-linear, iterative design process that consists of inspiration, ideation, and implementation, problems can be converted into opportunities. This design process echoes earlier IDEO's (1999). 'Hear, Create, and Deliver' process (Figure 9) in their Human Centered Design toolkit. The 'Hear' is where people gather insights to generate stories and inspiration. In the 'Create', people translate stories into themes, opportunities and solutions. The final 'Deliver' space develops an implementation plan concerned with prototypes, cost and capabilities.
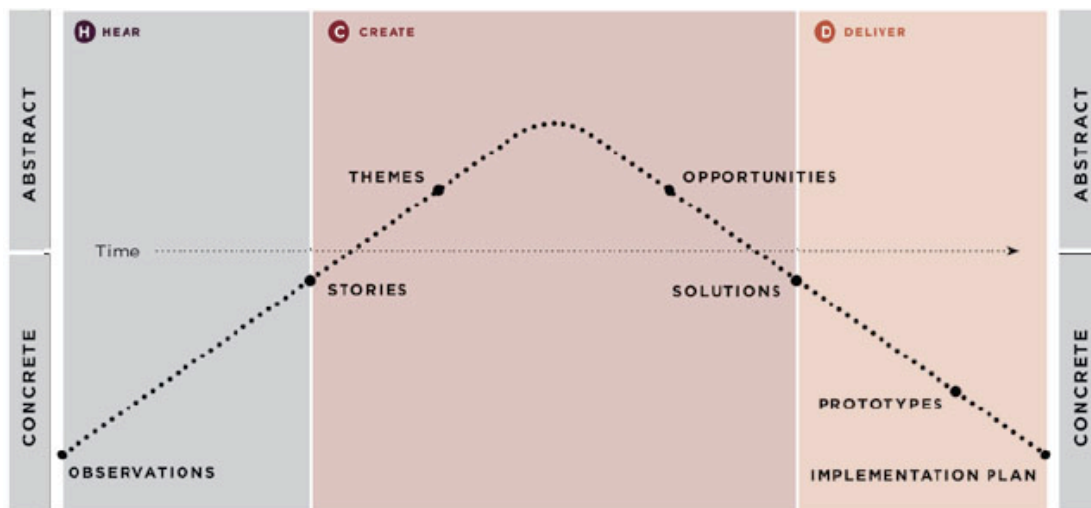

Figure 9 The HCD process (IDEO, 1999)

'Design thinking crosses the traditional boundaries between public, for-profit, and nonprofit sectors' (Brown and Wyatt, 2010, p32), has great potential for improving knowledge transfer and outcomes when they are consciously leveraged as a knowledge management approach. Design thinking is not a one-stop solution for projects, rather an approach allowing for the effective communication and collaboration between stakeholders. Design thinking process entails a system of overlapping spaces for (creative) cross-sector collaboration. Design possesses instruments that allow for the making sense, co-designing and prototyping of complex intangible projects, and thus potentially improve knowledge transfer and stakeholder engagement.

3.2 Storytelling in Design

Storytelling involves the use of imagery, either visual or narrative. Stories take on a variety of forms: storyboards, scenario generation, storytelling through videos, sketches or plays, animation, talk and image, text or image. It can take the form of

storytelling and the use of metaphor and analogies (Liedtka, 2015). Storytelling as a way of visual representations (e.g. drawings, photographs and storyboards) is a common feature of designing and used to help the designer explore, inform, analyse and communicate the design concept. In professional design practice, especially service design, there are 3 main reasons to use visualisation: (1) to articulate insights, (2) to keep empathy and (3) to communicate insight (Segelström, 2010). In design research, visuals are generally used for three purposes: (1) for reflection and exploration, (2) as a tool for analysis and knowledge generation and (3) as a communication, facilitation and discussion tool (Yee, 2012). In a design process, Storytelling can be used internally as a way of articulating insights and maintaining empathy with the user or context, while at the same time used as a communication tool with a diverse set of stakeholders, particularly across language and cultural barriers (Brown and Wyatt, 2010).

This research will apply design thinking as an approach to cross-sector knowledge transfer, so that the stakeholders would be more engaged and collaborative in understanding and pursuing innovations to address complex social issues. The development of a storytelling design model and workshop activities that would facilitate the effective knowledge transfer are described.

4 TOWARDS A DESIGN THINKING FRAMEWORK FOR KNOWLEDGE TRANSFER

Considering knowledge transfer with stakeholders across sectors as a storytelling design project and utilising knowledge transfer process, this report attempts to identify storytelling and design processes within the main stages of knowledge transfer. A basic assumption is that combining storytelling and storytelling activities in the design process as an enhancer of knowledge transfer practices, and stakeholder engagement and collaboration. Therefore, the Liyanage et al.'s knowledge transfer process and Nonaka et al.'s (2000) ba model that are basic instruments of transferring knowledge represents a design challenge. What this report has done is to examine the processes and typical activities that go from "awareness" to "application" stages of knowledge transfer process in the light of a design process (Figure 10). It considers the four stages of knowledge transfer and a context of knowledge creation as three storytelling design tasks within the knowledge transfer process. This report proposes an STD-KT Model as a theoretical model for storytelling design and activities in the knowledge transfer process (Figure 11).
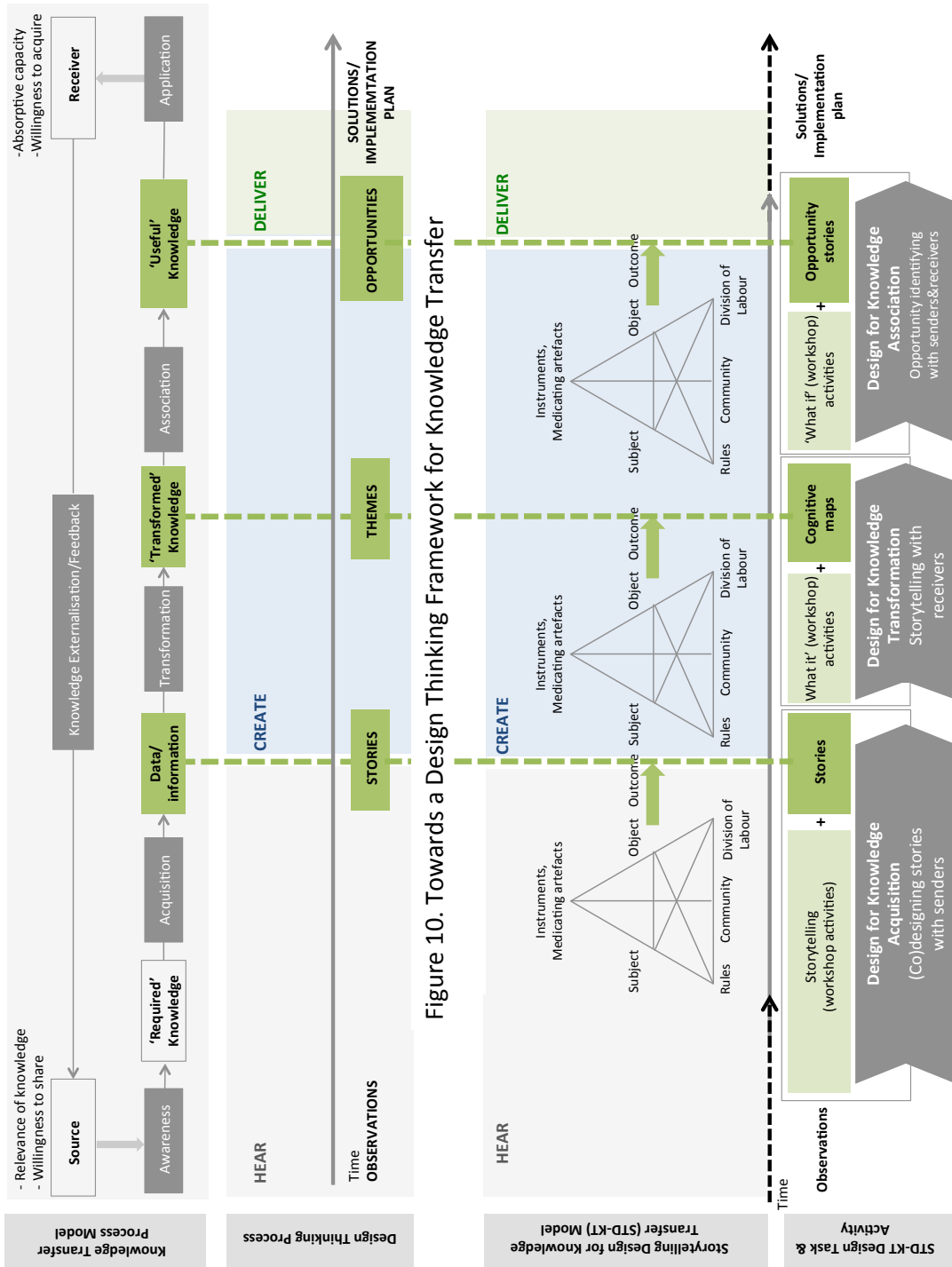
Figure 10. Towards a Design Thinking Framework for Knowledge Transfer

Figure 11. Storytelling Design for Knowledge Transfer (STD-KT) Model

4.1 The STD-KT model

A combination of design thinking and knowledge transfer processes resulted in the development of three design tasks of a knowledge transfer process which the authors consider suitable for formulating a storytelling design model for knowledge transfer. Figure 10 presents the design process as part of a knowledge transfer loop, providing a basis for formulating the conceptual model. Figure 11 depicts the conceptual model and the tasks of Design for Knowledge Acquisition, Design for Knowledge Transformation and Design for Knowledge Association in a knowledge transfer process. In STD-KT model, storytelling becomes a communications activity, and enables engagement, learning, discovery and innovation. The following is a discussion of the constructs that constitute the STD-KT model as proposed.

To facilitate the knowledge transfer and enable stakeholder engagement, Engeström's (1987) activity theory (Figure 12) will be applied to the design of the storytelling activities as the context of the knowledge creation in Nonaka et al. (2000). The premise of activity theory is that a collective activity, with the basic purpose shared by the participants (community), is undertaken by people (subjects) who are motivated by a purpose or towards the solution of a problem (object), which is mediated by tools and/or signs (artefacts or instruments) used in order to achieve the goal (outcome). The activity is constrained by norms and cultural factors (rules), and the division of tasks and roles among members of the community, and the division of power and status (a division of labour) within the immediate context and framed by broader social patterns (of production, consumption, distribution and exchange). Activity theory provides a conceptual framework from which the understanding of the inter-relationship between these elements can be gained. Engeström's Activity theory will offer a basis for the design of participatory (workshop) activities in the three knowledge transfer stages, as illustrated in Figure 11.
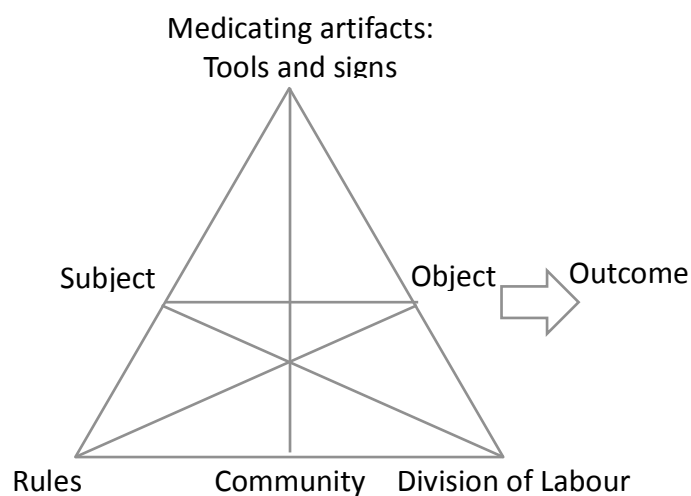
Figure 12 Activity theory

The three storytelling design tasks and (workshop) activities are proposed:

- **Designing Stories for knowledge Acquisition**

During the Hear phase in IDEO's (1999) HCD process responding to the Awareness and Acquisition stages in Liyanage et al.'s (2009) knowledge transfer process, facilitators collect insights and inspiration from/with the senders, and (co)design stories that carry the knowledge Intended to transfer. This stage takes a "story" approach that can benefit the design process or knowledge acquisition as a tool for richer expression of 'knowledge', e.g. project information, organisation and brand personalities, values, and consequently, more effective design and communications solutions. In this stage, the stories emerge from participatory storytelling (workshop) activities where the facilitators gather the insights/required knowledge, (co)design the 'knowledge' story with the senders.

- **Designing 'What It' Maps for Knowledge Transformation**

In the Create phase/the Transformation stage in the knowledge transfer process, the stakeholders/receivers work together with the facilitators (and senders) in a workshop format – a 'what it' workshop - to translate what the stakeholders/receivers acquire from 'knowledge' stories into a 'what it' map - a cognitive map. During this phase, stakeholders/receivers will move together from the Acquisition stage to the Transformation stage in identifying themes from the stories with the aid of a cognitive map.

- **Designing 'What if' Stories for Knowledge Association**

The 'what it' cognitive map based on stories will be generated into future facing opportunities using 'what if' - a story structure tool in the Deliver phase responding to the Association stage. Once "what if" story is created, they will be used to construct the solutions, prototypes and/or an implementation plan in the Knowledge Application. Stakeholders will be able to tell stories of the transformed knowledge from painting a future to crystalising opportunities and emerged from the 'what if' (workshop) activities. A story structure tool will be designed in a way to help stakeholders who will associate transferred knowledge with their internal needs and cement stakeholders engagement to address social problems.

5 PARTY PROJECT, CASE STUDIES AND FUTURE RESEARCH

This chapter presents an overview of the PARTY project and background to this present research. A literature review is also conducted to explore the design knowledge. Two case studies are planned to apply the STD-KT Model developed and test the design knowledge generated from the PARTY research project, with the aim to improve the STD-KT Model.

5.1 Background to the Research: PARTY Project

PARTY is an international and cross-sector research and concerned with the development cooperation through research and innovation staff exchanges and transfer of knowledge between researchers, design practitioners, the target group, non-profit and business sectors in Southern Africa.

The challenges faced by the marginalised youth in developing countries, such as unemployment, are not simple or easily solved. This is influenced by a number of factors, including levels of education, gender, self-esteem, geographic location, physical ability and transport. Employment and educational opportunities are two one of critical factors in the success of young people. PARTY aims to endorse human development and assist in reducing youth unemployment by increasing the involvement and inclusion of young people in service development in South Africa and Namibia by using participatory and explorative service design tools.

5.1.1 Project Aim and Objectives

This project aims to endorse human development, and assist in reducing youth unemployment by increasing the involvement of young people in service development in South Africa and Namibia using participatory and explorative service design tools. The project focuses on San youth and young adults (13–24 years of age), especially living in poor or otherwise marginal conditions.

The objectives of the project are:
- To provide tools for the service development integrating into the everyday life of the young people: These tools support the motivation and abilities of young people to participate in their own community development. Young people's opinions and participation are the main focus in this development process.
- To facilitate the dialogue between the marginalized youth and the interest groups working with them: The project works towards agile and human-centred methods and processes for service development with the NGOs and other service providers. The usage of design tools supports the development of local innovation in service structures and systems.
- To support the uptake of service design methods and tools in practical development work: The project disseminates information about the service design methods for the people working with the development of services for young people. The project aims to encourage the use of service design and design methods in the local service development field.

5.2 Multidisciplinarity and cross-sector collaboration

This research project has practice based research orientation, which enables cross-sector collaboration and multidisciplinarity. Academic participants represent Human-centered and Transformation Design (University of Leeds), Service Design (University of Lapland) and Informatics and Design (Cape Peninsula University of Technology and Namibia University of Science and Technology). Non-academic partners represent variety of sectors: indigenous people's rights and development issues (South African San Institute, SASI), and social innovation (PACO Design Collaborative).

The project addresses a socio-economical development with the service design methodology. Thus a multidisciplinary approach is taken through a cross-sector collaboration as represented through the different partners. Researchers from service design, ICT, social innovation and human-centered design and practitioners form the humanities/development sector jointly investigate, and work towards a sustainable solution. Through continuous exchange of knowledge and ideas and a rigorous management the project partners will contribute different perspectives as needed to resolve a challenge - marginalised unemployed youth in Southern Africa

5.3 Design Knowledge

In current knowledge society, creative industries, social innovations and the design sector are gaining more and more importance. Design as a field of research offers a range of structured framework, approaches, methods and tools, as well as solutions for understanding and pursuing innovation in ways that contribute to organic growth. It is important to note that, not only technological knowledge, but also design knowledge can be transferred (Ashton, 2007), applied and commercialized (Kiskiene, 2015). Within design research, there is little provision for any form of facilitation, favourable conditions and support for the knowledge transfer. Actions are required to inspire and equip design researchers and professional designers to work across boundaries, and help businesses, non-profits to start-up and grow.

Müller and Thoring (2010) develop a typology of design knowledge, a theoretical framework, which consists of four different types of design knowledge and three interjacent transitions (Figure 13). They propose that design knowledge can be represented in physical artifacts, as tacit gut feeling, as codified knowledge, or as scientific theories. They also present examples for each knowledge type and transition, and suggest prototypical approaches for transferring these types of design knowledge in the context of design education.

Figure 13: Four-Level Framework for Design-Specific Knowledge (Müller and Thoring,

2010)

Müller and Thoring's (2010) suggested framework is relevant for the understanding of the PARTY project knowledge, and the design of stories and the testing case studies that will transfer the knowledge generated from the PARTY project, a multidisciplinary design research project between various stakeholders from public, private and nonprofit sectors.

5.4 Case Studies and Future Research

Since the preliminary work on the STD-KT Model has been developed, the further work will be continued. Two case studies, 'PARTY design' and 'community stories' have been and proposed and planned to put the STD-KT Model tool into the test in workshop environment which will take place in 2017 and 2018. This will allow the work undertaken so far (towards the deliverable on the 'cross-sectoral model for knowledge transfer') to be developed, with the aim to accomplish the final deliverable for WP7 (D7.1. 'Operational Communications Model') to be established towards the end of the project. The research objectives of the future research are

- To develop a dialogical approach to finding 'story' through 'community' identification through the 'community stories' action project;
- To explore the potential of storytelling as an approach to design knowledge transfer across sectors (research institutions, NGOs, NPOs and other youth-based service providers);
- To explore the use of storytelling as an intervention to support stakeholder engagement, cross-sector learning, and innovation activities;
- To develop an 'operational communication model' that would facilitate cross-sector knowledge transfer and collaboration.

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