Introduction

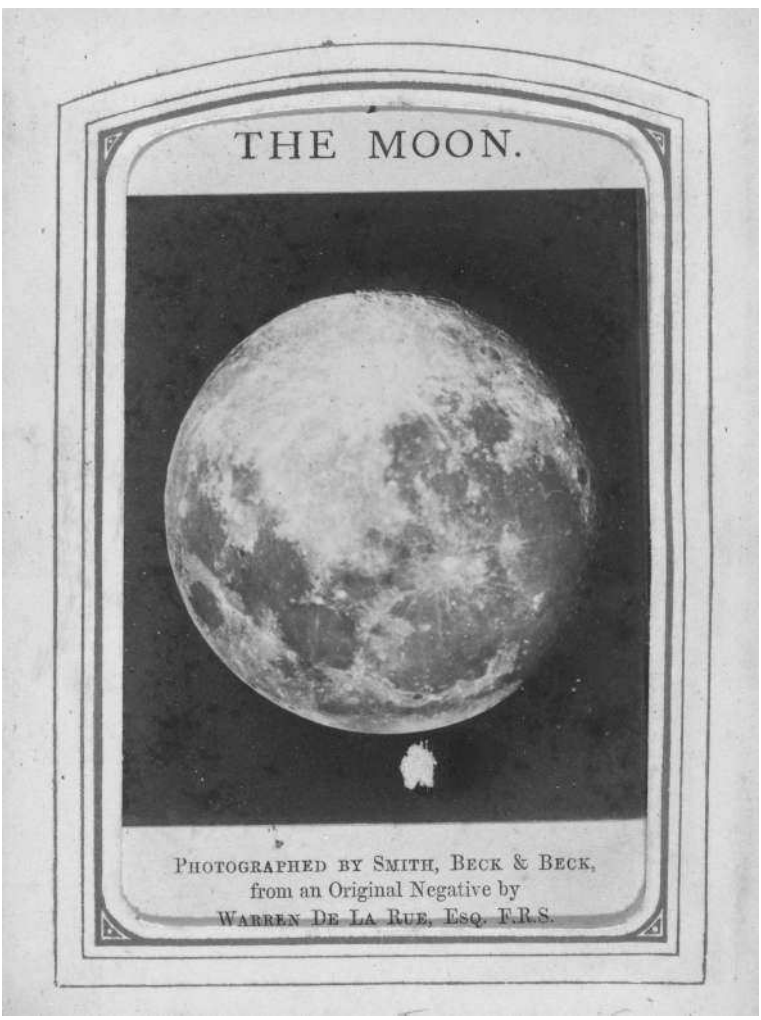

Figure 1. Wassende maan
Warren de la Rue and Beck & Beck Smith (Source: Rijksmuseum, Amsterdam)

This Element provides to leaders and the public the conceptual and imaginative power to engage with, to judge, and to employ in order to lead technology in an inclusive and peaceful manner.

Leadership is present in all major human endeavours: in wartime and in peacetime, during economic success and downturn, in political turmoil and stability, and within industries, schools, healthcare, and local, national, and

international society. Wherever individuals are, questions of leadership arise. In the twenty-first century, a significant and as yet underexplored leadership question concerns how leadership will be present within technology. How will human leadership function within this major societal change?

It is clear that there will not be one definitive approach or answer to the question of leadership and technology (Wilson, 2004). Technology has many aspects and elements to it, and it is a complex and evolving social phenomenon. As noted by Wilson (2004), there will be leadership questions within the technology community, for example in Silicon Valley, and there will be wider leadership questions in terms of technology, for example, regarding automation or retention of the workforce. Indeed, there will be questions of technology in almost all social endeavours, including in the educational context or in future weapons production, or in the way commerce will develop. Society will face questions of leadership and technology in a range of different areas and contexts.

Given the enormity of the impact of technology on society, the purpose of this Element publication is to offer one cutting-edge idea: a contribution to the conceptualisation of leadership and technology. To introduce the core question that this Element considers, I want to start with a story that illustrates the specific problems that leadership faces regarding its interaction with technology.

This story on leadership is told by the chief executive officer (CEO) of Microsoft, Satya Nadella, and it was recorded in a book by technology expert Tim O'Reilly (2017, p. 353). The story goes like this. Satya Nadella speaks about the future of technology and, in doing so, draws on a comparison with the inspirational leadership provided by President Kennedy when President Kennedy announced the aim of landing on the moon. Satya speaks about the moon landing as being 'grand, inspiring' (O'Reilly, 2017, p. 353; see also Nadella, Shaw & Nichols, 2017, chapter 8). The symbolism of the moon is clear. Satya is creating a visual metaphor to describe how the future of technology requires an inspiring and common vision.

O'Reilly then invites Satya to provide an example of what such an inspirational common aim would be (O'Reilly, 2017, p. 353). O'Reilly reports as follows:

> [Satya] spoke movingly of his disabled son. 'I have a special needs kid, and he's locked in, and so I always think, "Wow, if only he could speak". And I think about what a brain–machine connection could do. Someone who's got visual impairment could see or someone who's got dyslexia could read. This is finally that technology that truly brings inclusiveness' (O'Reilly, 2017, p. 353).

Here we have a stunning two-part story about the future of technology. The metaphor of a moon landing works to provide the imagery of a need to aim towards something. Then, the personal story and reflections that Satya shares provide the image of inclusiveness and accessible technology. In short, inclusiveness provides the purpose, a destiny, or a metaphoric moon to aim for. To restate Satya's point, technology's purpose could be to aim for inclusiveness through accessible technology. This aim, or destination, is unreservedly endorsed and accepted in this Element as an excellent aim for the future of technology.

So, what is missing then from this story? What needs to be added to assist in the leadership of technology for this inspiring purpose?

In the telling of the story, what is missing is that while the examples are poignant, miraculous examples of the change that can occur when technology is created for inclusiveness and accessibility, there is a sense of accessibility being about an individual's life. Of course, this is true. Being able to read or write creates a great change in a dyslexic person's life. Others, such as non-dyslexic people may feel great empathy and happiness at this state of affairs. But what about non-dyslexic people – do they *themselves* share a direct relationship with the accessible technology? To restate this question: beyond the referred sense of happiness on behalf of the dyslexic person, what direct relationship does the non-dyslexic person have with accessible technology?

Because of the power of the moon metaphor, we can all visualise this destiny. (On the background to this visual metaphor see also Nadella, Shaw and Nichols [2017, chapter 8] referencing a memo from the Microsoft Research Lab at Cambridge written by Christopher Bishop who argued for "interrelated moon shots".) The power of this visual metaphor is that we can all see the moon, and we can all imagine the journey and destination of landing on the moon. I want to show in this Element how, in a similar manner, leading the creation of technology that assists the dyslexic in reading or writing, or leading a range of other creations for the blind, visually impaired, or hearing impaired, is in fact like landing on the moon, *a common destination.*

I will argue that there is a direct relationship with accessible technologies *regardless of who you are.* We all have a direct stake in accessible technology and inclusiveness. Without being able to see this common purpose or a common relationship to accessible technology, it becomes almost impossible for the leaders of technology to galvanise support for inclusiveness and accessibility as a universal and common aim for technology itself.

To examine this common relationship that we all have with accessible technology, the correct tools are required. The first section of this Element provides these. Section one then closes by demonstrating that accessible technologies (artefacts) contain within themselves an aspect of transformational

leadership, that of inspirational motivation (Bass & Riggio, 2006, p. 6). In Section two, general inspirational motivational symbols and stories contained within each of the accessible technologies are drawn from around the world and include instances from Israel, Spain, Switzerland, Netherlands, and the United Kingdom. The prism of transformational leadership is crucial to unlocking the story contained within each of the accessible technologies examined. It is through the prism of leadership that it is possible to see these accessible technologies as a generalised statement, as an inspirational movement to a common 'future state' (Bass & Riggio, 2006, p. 6). This Element is about evoking the visual, the metaphors, the symbols contained within these technological creations so that the inspirational leadership that forms part of each of these accessible artefacts can be seen. It is important to note, the purpose of outlining these accessible technologies is not to explain their design, function or product description. I have not the expertise to judge the artefacts from that perspective. The descriptions are to capture their symbolic significance—that is, the leadership stories, as I interpret them, contained in these artefacts.

Section three reflects on how these accessible artefacts and the leadership lessons they contain contribute to the understanding of authenticity in the context of transformational leadership. Last, Section four takes the leadership lessons from this Element and applies them in the context of a Google hypothetical technological leadership dilemma. In summary, it shows how the leader who creates accessible technological creations (or artefacts) is creating an inspirational future for all. This publication offers no original theory or synthesis of leadership. Rather, it engages with an existing leadership approach – that of transformational leadership. The cutting-edge element is apparent in how this leadership publication uses this traditional approach. It uses the particular aspect of inspirational motivation to chip away at and uncover the hidden inspirational leadership for all that is embedded in accessible technologies. The result is in accordance with the observations below:

> In a criticism of the state of leadership studies, Alvesson and Deetz (2000: 52) wonder if Yukl's (1989) agenda to define 'What is Leadership' could have misled leadership research. They suggest that more might be learned from questions regarding 'what can we see, think, or talk about if we think of leadership as this or that?' (Parry & Hansen, 2007, p. 282).

This Element provides real-life and yet imaginative and creative examples of technology and leadership to 'see, think and talk about' (Parry & Hansen, 2007, p. 282). In Section two, the lessons from accessible artefacts are rich and evoke an inspiring future in which, for example, we comprehend the diversity in each other; become more aware of our thinking; observe public spaces change and

expand through the alchemy of light and sound; hear our name called again and again, creating a sense of community; listen to others in humility; witness unconditional public participation; and are invited to participate in the future. All these inspiring futures await the reader. At its core, this publication is a celebration for all of the symbolic and metaphoric stories of inspirational leadership that are contained within these accessible artefacts.

1. The Tools for Examining the Story of Leadership Contained in Accessible Artefacts

The role of stories in the context of leadership has been examined by Parry and Hansen (2007, pp. 283–4): 'Stories do things, they create things, bringing notions and ideas to a level where they can be represented coherently and acted upon'. Indeed, they argue that stories, because they have 'powerful and concrete effects' can 'operate and function just as leaders do' (Parry & Hansen, 2007, p. 284).

This Element is about telling the story of how accessible technologies hold within them inspiring leadership stories for the future of technology. Section two

Figure 2. Knielende figuur met hamer en beitel
Jan Toorop (Source: Rijksmuseum, Amsterdam)

records six accessible technologies, each of which is examined for its leadership story, and Section three applies these leadership lessons. However, first it is necessary to have the tools to unpack these leadership stories contained within the six accessible technologies. Therefore, Section one is dedicated to outlining the tools needed to unpack the stories of leadership contained in the accessible technologies.

Broadly, there are three conceptual tools required to unpack the leadership stories contained within the case studies that follow: first, leadership and storytelling; second, leadership and artefacts; and third, transformational leadership as a tool to examine accessible technological artefacts. Leadership and storytelling entail a broad appreciation of the connection between leadership and stories. To examine leadership and artefacts entails an overview of the literature supporting the claim that leadership values can be contained within technological creations. That is, it is possible to study and reveal leadership stories not only via human case studies but also by looking at our material creations. The literature refers to these as 'artefacts'. There is then a general and brief introduction to the multi-disciplinary area of accessible technology followed by an overview of the well-established framework of transformational leadership as outlined by Bass and Bass (2008, p. 10).

What is new and innovative about this leadership approach is *how* all the steps outlined above are then employed. These tools are used to reveal a common inspirational future contained in material technological creations. It is the use of leadership theory as a way of seeing leadership itself. Through applying an element from a pre-existing leadership approach to artefacts that are material, it is possible to see symbolically and metaphorically how these material objects lead, 'inspire', and offer a 'shared vision' (Bass & Riggio, 2006, p. 6) for all.

1.1 The Value of Story in the Context of Leadership

1.1.1 Leadership Stories are 'Sense-making' and 'Symbolic'

Stories in the context of leadership offer several advantages. They are known for 'sense-making' (Parry & Hansen, 2007, p. 287). They can also operate as 'symbols that represent organisational understanding' (Parry & Hansen, 2007, p. 287). One of the great advantages to the concepts of sense-making and symbols in the context of the leadership of technology is that we are currently in uncertain times. Therefore, considering the unknown consequences of technology and its effect on society, the desire for sense-making is paramount.

1.1.2 Leadership Stories in the Post-industrial Age:

Leadership stories of technology therefore potentially provide not only a concrete, positive dimension to future action but also a point of contrast when technology is veering towards problematic destinations. It is significant that the stories about technology and its destination are themselves made accessible and appreciable for the community at large. Without making the stories regarding technology accessible themselves, an elitism exists regarding how the development of technology will occur. Therefore, stories provide an egalitarian role in the sense-making aspect of the future of technology. The importance of stories in the context of technology has been specifically acknowledged by Watts et al. (2018, p. 290), who noted that:

> With the shift from the industrial age to the information age, organisations have been described as increasingly complex, interactive systems, requiring leadership strategies that are capable of managing the chaos (Thiel, Bagdasarov, Harkrider, Johnson, & Mumford, 2012; Uhl-Bien, Marion, & McKelvey, 2007). As organisations and their environments become more complex, the 'gray' and ill-defined situations calling for ethical decision making emerge more frequently (Mumford et al., 2008). Stories appear to provide a narrative structure that helps followers with organising, or making sense of, complex information from the organisation's past and present, such as why particular decisions were made (Boal & Schultz, 2007). Our findings indicate that stories of leadership may serve as a vehicle for the protagonists' cognitive-motivational patterns, or mental models – at least with regard to the personalized or socialized goal structures of these mental models. Because stories may be used to shape followers' perceptions and behavior by signalling what is normative and non-normative, storytelling may be a critical aspect of leadership.

This finding is intuitively correct. Since we are all individual participants in a world that will be shaped by technological creations yet to come, we will be faced with decisions regarding what is ethical or unethical, what is 'normative and non-normative' Watts et al. (2018, p. 290). Having access to stories that provide examples of ethical leadership of technology will be, as Watts et al. (2018) note, critical to providing the capacity to navigate this complexity. The proposition by Watts et al. (2018, p. 290) is endorsed with their statement that, 'story telling may be a critical aspect of leadership'.

The advantage of starting with the extract from the CEO of Microsoft, Satya Nadella, is that he has already created a story about the leadership of technology. It is a story with two parts. The first part concerns how technology requires an inspirational galvanising destination, such as President Kennedy's leadership of the moon landing. The second aspect of Nadella's story is that such an inspirational purpose resides within accessible and inclusive technologies. The

storytelling has been largely done. However, the missing element of the story concerns how accessible technology might be achieved as a 'collective goal' (Watts et al., 2018, p. 277). How does everyone have a relationship with the story of accessible technology such that we can use it to navigate the future with this normative goal? Section two deals with that specific issue – which is how to draw out of a technological creation, or, as it is referred to in the literature, an 'artefact' – a common leadership story so that we can see symbolically and metaphorically the accessible technologies acting as a leader. Using the metaphoric story as told by Satya Nadella, the thesis of this Element is that accessible technologies lead as President Kennedy did. This section gives the tools to imaginatively experience the inspiring voice of general and powerful leadership emanating from these creations.

1.2 Leadership Values Are Contained within Artefacts

1.2.1 Artefacts as Containing Politics

This section concerns the tool required to extract the story of leadership from accessible technologies. Langdon Winner (1980) wrote a famous piece titled, 'Do Artifacts Have Politics?'

It is worth recapping his central thesis:

> In controversies about technology and society, there is no idea more provocative than the notion that technical things have political qualities. At issue is the claim that the machines, structures, and systems of modern material culture can be accurately judged not only for their contributions of efficiency and productivity, not merely for their positive and negative environmental side effects, but also for the ways in which they can embody specific forms of power and authority (Winner, 1980, p. 121).

It is also worth recapping Winner's example. First, he uses the atom bomb, suggesting that it is an 'inherently political artifact' (Winner, 1980, p. 131). He goes on to note that:

> Taking the most obvious example, the atom bomb is an inherently political artifact. As long as it exists at all, its lethal properties demand that it be controlled by a centralized, rigidly hierarchical chain of command closed to all influences that might make its workings unpredictable … The state of affairs stands as a practical necessity independent of any larger political system in which the bomb is embedded (Winner, 1980, p. 131).

Winner (1980, p. 135) considers, therefore, that we 'ought to attend more closely to technical objects themselves'.

1.2.2 Technological Artefacts and Values

The same point in terms of artefacts is made in the work of Flanagan et al. (2008, p. 322), who developed a comprehensive approach to the idea of looking to values (in the context of an experimental computer game prototype). The authors noted that:

> The idea that values may be embodied in technical systems and devices (artefacts) has taken root in a variety of disciplinary approaches to the study of technology, society and humanity (Winner, 1986; Latour, 1992; Hughes, 2004; Mackenzie and Wajcman, 1985).

The work of Flanagan et al. (2008) is significant because it gives a sense of how broad the potential is for examining values within artefacts. Listing a number of potential values, such as liberty, justice, enlightenment, comfort, trust, and sustenance (Flanagan et al., 2008, p. 322), the authors then take these values and apply them to a particular design of a prototype: 'RAPUNSEL, a large multi-disciplinary collaboration aimed at designing and implementing an experimental game prototype to promote interest and competence in computer programming among girls of middle school age, including girls from disadvantaged home environments' (Flanagan et al., 2008, p. 331). The significant point about their work is the endorsement of the pluralistic values for which artefacts can be examined. This Element examines artefacts for leadership stories rather than design values. However, the work of Flanagan et al. (2008) supports the concept that artefacts contain multiple and plural values and are therefore a rich area of study.The concept of artefacts is also employed as a method in engineering and artificial intelligence (AI) ethics, for example, in Sekiguchiand and Hori (2018). The frame of using artefacts as a method of exploration and discussion has also been used the context of International Law (Hohmann & Joyce, 2018) and Philosophy (Korsgaard, 2008, pp. 322–324). In the context of AI for engineers and design, the authors commented on the idea that 'society would be a better place if ethically designed artifacts are more clearly realised and the same artifacts change their surrounds to be more ethically valuable' (Sekiguchiand & Hori, 2018). The aim of their work was to bridge the gap 'between ethical discourse and engineering practice' (Sekiguchiand & Hori, 2018). In a similar way, the aim of this work is to bridge a gap between artefacts and the leadership ideas they contain and communicate.

1.2.3 Accessible Technology as Artefacts

The concept that artefacts can contain human values is extensively discussed by Chamberlain and Bowen (2006), specifically in the context of accessible design

and accessible technology. The authors also examine images of artefacts in their work (Chamberlain & Bowen, 2006, pp. 70–71). This visual bent to the study of artefacts is significant for this Element.

The artefacts discussed in Section two are not large public sculptures or visible public displays. For example, one of the case studies is the OrCam which sits on the side of your glasses and is described as 'tiny'.[1] To evoke the values of leadership contained in these often tiny artefacts, the visual and the impressionistic are necessary to release the leadership stories that the artefacts contain. Therefore, the work of Chamberlain and Bowen (2006) is important for endorsing a creativity and freedom in the study of artefacts. The authors reinforce the point made by the writers discussed above (Flanagan et al., 2008; Winner, 1980) that 'artefacts can be effective vehicles for communication: to make statements, encapsulate ideas and illustrate knowledge' (Chamberlain & Bowen, 2006, p. 68). However, it is their overview of the role of artefacts in stimulating thinking about ideas and accessibility that is relevant to this Element. They write in the context of engineering and design, but their work is significant for how artefacts can be studied and used. For example, they state that 'Gaver and Martin (2000) apply such artefacts as a way of "mapping the design space", exploring the territory where future solutions could be positioned' (Chamberlain & Bowen, 2006, p. 68). They go on to note that:

> Design provides ways of thinking and skills that can deliver artefacts as tools for creating new scenarios of the world we live in. These scenarios can simulate unfamiliar experiences and allow users to make imaginative extensions into unfamiliar areas. Thus designers can create new 'contexts' for others to experience and explore as part of human-centred design (Chamberlain & Bowen, 2006, p. 68).

This Element is centred on leadership, not design (see generally on accessible and inclusive design, Clarkson et al., 2006). Nevertheless, Chamberlain and Bowen's (2006) approach is important for Section two of this work. The accessible artefacts are examined with the 'tool' of leadership in order to 'creat[e] new scenarios of the world we live in' (Chamberlain & Bowen, 2006, p. 68). These leadership stories from the artefacts will then 'simulate unfamiliar experiences and allow [the viewer] . . . to make imaginative extensions' (Chamberlain & Bowen, 2006, p. 68). In summary, the approach by Chamberlain and Bowen (2006) is to use the examination of artefacts with an emphasis on the visual, on the imaginative, on the future of things. This is the style of the artefact descriptions given in Section two. These artefacts are not

1 https://www.orcam.com/en/myeye2/