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Trust, transparency, and openness: How inclusion of cultural values shapes Nordic national public policy strategies for artificial intelligence (AI)☆

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ABSTRACT

Using textual analysis methodology with Hofstede's cultural dimensions as basis for cross-national comparison, the manuscript explores the influence of cultural values of trust, transparency, and openness in Nordic national artificial intelligence (AI) policy documents. Where many AI processes are technologies hidden from view of the citizen, how can public institutions support and ensure these high levels of trust, transparency, and openness in Nordic culture and extend these concepts of "digital trust" to AI? One solution is by authoring national policy that upholds cultural values and personal rights, ultimately reinforcing these values in their societies. The paper highlights differences in how Nordic nations position themselves using cultural values as organizing principles, with the author showing these values (i.e., *trust* through clear information and information security, *transparency* through AI literacy education and clear algorithmic decision making, and *openness* by creating data lakes and data trusts) support the development of AI technology in society. The analysis shows that three cultural values are upheld and influence Nordic national AI strategies, while themes of privacy, ethics, and autonomy are present, and democracy, a societal building block in the Nordics, is especially prominent in the policies. For policy development, policy leaders must understand that without citizen involvement in AI implementation or lacking citizen AI education, we risk alienating those for who these services are meant to utilize and improve access for.

1. Introduction

In what seems like the blink of an eye since its origins in the mid-1940s[1] to early 1950s[2], artificial intelligence (AI) is now everywhere in world: diagnosing NHS patients in the UK on a level with doctors' evaluations [3], predicting the best route for commuters on the many congested highways of China [4] and the EU [5], and even beating human competitors at humanity's most complex games [6]. Whether it is improving healthcare outcomes or optimizing travel routes, AI is foretold to transform our societies—in ways both positive and negative [7].

Countries around the world are jockeying to come out ahead (or at least get a piece) of the AI buzz, and, in doing so, are trying to position themselves as business-driven or trustworthy stakeholders in AI through niche areas such as "data ethics." [8] Nations are aware that competence in AI and related technologies might increase economic competitiveness [9], enhance academic research prowess [10], and employ legions of computer scientists and engineers locally. At the same time, they must contemplate the complexities that can arise from pursuing global reputations as "AI pioneers," a pursuit whose headiness can conflict with or unintentionally erode cultural values important to those nations—such as trust, transparency, and openness.

What Nordic values influence national strategic dialogues for adopting and using AI systems? Do Nordic nations share any values concerning AI? Do these values line up with the human rights and cultural values that Nordic societies espouse and celebrate?

One cultural value that often comes into conflict with the development of national AI policy is the value of trust. Trust is of great importance in both human relationships [11] and human relationships with technology [12]. It is a deeply ingrained cultural trait in Nordic—Norway, Sweden, Denmark, Finland, and Iceland—societies [13,14], where studies have shown that the *majority* of citizens trust others [15], to the extent that trust might be taken for granted in these countries. Trust requires purposeful action. It grows over time through mutually

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interacting societal processes, but can also be lost quickly [16,17], especially in digital interactions where "digital trust" is eroded, such as by hacking, fraud, or technological incompetence on the part of industry or government institutions.

Due to the great leaps that AI technologies are making every year and the increasing realizations of the need to respect citizens' trust and personal privacy (both legally, with the GDPR legislation [18], and ethically [19]), there has grown a great need to encourage digital trust to build models of consent for using personal data for machine-learning training in AI. Perhaps somewhat obviously, digital trust requires trust [20]—the trust of citizen stakeholders in public institutions and organizations, and trust in their fellow citizen, and trust in technology. Many AI processes, including important ones such as machine learning and algorithms [20], are proprietary technologies hidden from citizens' view; they create a "black box" effect [20]. Under such circumstances, how can public institutions support and ensure the high levels of social trust and institutional trust that characterize Nordic culture, and extend them to the concept of digital trust (a value held sacrosanct in the digital world [21]), to technologies such as AI? Ultimately, trust can be a large determinant for the adoption of a technology [22]. One possible solution is to author national strategic policy that upholds cultural values and personal rights. GDPR, for example, is heavily influenced by the EU's stance that privacy is a human right [18], and it is critical that national AI strategies explicitly incorporate cultural values. Failing to do so could damage the fabric of society [23].

In this paper, the author examines five national strategic plans for AI development to explore the distinctive ways in which the Nordic nations use their unique cultural values—trust, transparency, openness—as business principles to support the development and deployment of AI technologies in their societies. The author begins by defining the concept of cultural values, then exploring the unique cultural environment of the Nordic nations and their cultural values. Next, using Hofstede's comparative framework for considering cultural values across nations, the author compares how the three values of trust, transparency, and openness are defined and explored in Nordic AI policy documents. In the discussion section, the author synthesizes the textual analyses of the strategic plans through the lens of these cultural values and explores other themes that arise from the textual analysis. The manuscript concludes with some policy implications and potential future research topics.

1.1. Theoretical framework

1.1.1. Conceptualizing values

Values refer to a standard that must be adhered to or ideals that must be met [24]. They are abstract guiding principles [25], a "conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable which influences the selection from available modes, means, and ends of action." [26] Extrapolating from this, values are defined by the following qualities: (1) values are conceptions, not physical artifacts; (2) values are not always explicit—one might act in line with values without being fully conscious of them; (3) values must be acted upon and have useful magnitude; and (4) values consist, at their core, of "the desirable," in the sense of what is righteous [24]. It should be noted that values and traits, although in some ways alike in meaning, are distinct from one another as analytical concepts: Values are *motivational* variables (showing one's motivations, which are not necessarily reflected in one's behavior [27]) while traits are *descriptive* variables (describing or summarizing how people behave, feel, or respond) [28]. Cultural values are an important component of any society. They serve as shared notions of what is righteous, moral, and good in a society [29] and function as broad goals that members of a society are motivated to strive for [30].

Annual rankings and surveys often dub the citizens of Nordic nations the "happiest people" or refer to them as having the "best quality of life." Indeed, all five Nordic nations were ranked among the top seven countries in the 2019 World Happiness Report [31]. (The report ranked countries according to six key variables: GDP per capita, social support, life expectancy, freedom to make life choices, generosity, and corruption levels. [31]) Due to such rankings and other similar findings, the Nordic nations have become synonymous with the values of trust, transparency, and openness, so much so that national marketing strategies have been created to reinforce the association in international public perception [32].

While it is beyond the scope of this paper to address all the variables and historical events leading to the prominence of these particular cultural values in Nordic nations, the author will summarize some major historical influences. The values of trust, transparency, and openness can be attributed to the 19th-century voluntary associations characteristic of the Nordic nations. Coinciding with the transition from agricultural to industrial societies, these associations helped to hold society together, promoting norms of trust and respect [14]. The state's relationship with the associations was reciprocally beneficial. Even though the associations typically held critical views of the state, citizens could exert political influence through the associations, increasing trust in state authorities, while the state had open attitudes towards the associations, underpinning public perceptions of government transparency and fairness [14]. In addition to this unique relationship between associations and government, research also suggests that Protestantism, which played a prominent role in Nordic history, imbued societal interactions with a nonhierarchical quality that allowed social trust to flourish [33,34]. Moreover, the Nordic nations' welfare systems, which are grounded in the value of equality with universal access to basic services, prevent an "us versus them" mentality [35]. The similarities that Nordic nations share in their cultural and institutional values are especially demonstrable in the shared qualities of their work cultures [36].

The combined 2018 GDP of the five Nordic nations represents the 12th largest economy in the world [37], and the region's cultural unity is based greatly upon the nations' shared values of trust, transparency, and openness [38]. The Nordic Council of Ministers is the world's oldest regional intergovernmental partnership [39,40], and according to their *State of the Nordic Region 2020* report, "Similar cultures and languages support the development of a common Nordic identity with a unique trust in national, regional and local authorities." [37] The Nordic Council seeks "Nordic solutions wherever and whenever the countries can achieve more together than by working on their own." [41] The Council's numerous organizational proposals for collaboration include their "AI in the Nordic-Baltic region" policy document [42], and it has been suggested that Nordic countries share several values with respect to AI [43].

1.1.2. Nationality versus culture

One's nationality is commonly understood as being circumscribed by the borders within which one resides or has citizenship. In its basic function, it is a form of group identity [44]. Nationality has been defined as "the collective identity that the people of the nation acquire by identifying with the nation" [44] or the differences in behavioral patterns between people residing in one nation-state versus another [45]. Culture, on the other hand, has a more fluid relationship with national borders, and a series of six cultural dimensions have been identified by Hofstede as useful for distinguishing the nations and regions of the world [46–48]. These cultural dimensions, which are related to underlying cultural values, include *power-distance* (PDI), *individualism versus collectivism* (IDV), *masculinity versus femininity* (MAS), *uncertainty-avoidance* (UAI), *long-term versus short-term orientation* (LTO), and *indulgence versus restraint* (IND) [47]. Although not a one-to-one correspondence to nationality, culture directly influences the way people act and think in any specific nation, and Hofstede's cultural comparisons provide rationale for considering the Nordic nations a relatively unified cultural region [30]. Similarities among the five nations in the six cultural dimensions are discernible in Table 1.

Table 1
Cultural dimensions of Nordic nations.

Cultural Dimension	Denmark	Finland	Iceland	Norway	Sweden	Mean
Power-Distance (PDI)	18	33	30	31	31	**31**
Individuals vs. collectivism (IDV)	74	63	60	69	71	**66**
Masculinity vs. femininity (MAS)	16	26	10	8	5	**16**
Uncertainty-avoidance (UAI)	23	59	50	50	29	**45**
Long-term vs. short-term orientation (LTO)	35	38	28	35	53	**45**
Indulgence vs. restraint (IND)	70	57	67	55	78	**57**

Source: Hofstede [48]

1.2. Defining the cultural values of trust, transparency, and openness

1.2.1. Trust defined

As highlighted, the Nordic nations share a unique bond through cultural identity [38,37], creating an environment where these societies can exist with high levels of trust [13,14,49], transparency [50,51], and openness [52]. *Trust* is a broad concept that has been explored across many disciplines, and the high levels of trust seen in the Nordic region are globally unique [14,49]. In a 2020 study, when participants were asked to respond to the statement, "Most people can be trusted," more Nordic citizens responded in the affirmative (as a higher proportion of the population) than elsewhere in Europe [13]. Contrary to most countries, trust levels in the Nordic nations have *increased*, rather than decreased, over the past 30 years [15].

Although trust has been studied in many disciplines, there has been no general theory of trust [33]. From a psychological perspective, trust might be "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party." [53] Similarly, trust can also be defined as an individual's willingness to be vulnerable toward another individual or group that is grounded in positive expectations of the other's behavior [54]. As previously mentioned, trust is a critical value in both human relationships [11] and human relationships with technology [12]. Where human perceptions of technologies are concerned, for example, trust in the Internet has been explored through the concept of *cybertrust*, or "trust in the Internet and related information and communication technologies." [55] Separately, trust can be explored as individuals' perceptions of government, social, or public institutions or organizations [56].

Trust is an important concept that functions at various levels of society. It can be interpersonal, and it can also be about individuals' trust in organizations. The latter has been discussed by some as *institutional trust* [57], such as trust in government institutions [58,59] or public institutions [60–62]. The aforementioned rankings and "happiness" indices, such as the World Happiness Report, conceptualize trust as *social trust*, or the notion that people in general can be trusted [63]. Trust has therefore become a variable of great interest in the extension of cultural values to AI [64,65]. According to Mayer et al. [53], trust potentially exposes one to a vulnerability of some sort [65]. How can national strategic policies for AI enable and support trust between human and machine or AI (social trust), or citizen and government/nation-state (institutional trust)?

1.2.2. Transparency defined

Transparency has been observed to be crucial for creating trustworthy governments [66], but it is an element often overlooked when exploring differences between cultures [66]. The value of transparency can be defined as citizens' ability and right to access information about and produced by their government [67]. Nordic nations practice high levels of *transparency*, [50,51] and they are highly regarded within the EU for their innovations in guaranteeing the transparent operation of government [68,69]. More specifically, transparency involves the extent to which an organization or individual discloses relevant information about their performance, functioning, decision-making processes, and procedures [70,71]. The availability of information about the performance of a business or the internal workings of an entity are some of the many components that transparency might include, and they enhance the abilities of individuals or external organizations to monitor activities or decisions taking place within a given organization [66]. A holistic definition of transparency is "the availability of information about an organization or actor that allows external actors to monitor the internal workings or performance of that organization" [66].

There is a clear need for transparency in national strategic policies for AI. Even though transparency in algorithms and AI in general has been acknowledged to be ethically important [72], the public lacks understanding of even the basic functions of AI [73]. Efforts to make AI more comprehensible exist [74], including Finland's national online AI course initiative [75], which spawned a global course [76]. Multiple organizations and consortiums tasked with clarifying AI processes also identify AI transparency as a high priority [77–80]. Many individuals are unaware of and have misguided conceptions of how AI functions [81], and confusion abounds in conversations about AI [82]. Highlighting the need for AI transparency in national AI policy might lead to greater understanding of its basic functions, and would help reinforce notions of trust and openness and cultivate sociotechnical discernment.

1.2.3. Defining openness

In addition to transparency, the Nordic countries have high levels of *openness* [52]. The concept of openness is truly broad; it can be explored as a higher-order concept (the philosophy of openness), open or accessible resources (such as open APIs, open data), open or participatory processes (i.e., crowdsourcing, open innovation), or opening or democratizing effects (i.e., open government, open education) [83]. In defining a set of personality traits, being open means an openness to experience, demonstrated by one's willingness to engage in new activities or ideas, and being naturally curious [56]. The Organization for Economic Co-operation and Development (OECD) frames openness in the context of policies focusing on citizen engagement and citizens' access to information [84], or in the context of policies emphasizing access on equal terms including the lowest cost, or no more than cost of dissemination, with access being user-friendly, opportune, and timely [85]. A society that lacks regard for openness would foster anomie and abuse of power, while societies that value openness would enhance civic cohesion and overall system performance [86]. An open government is responsive to innovative ways of thinking and demands from citizens and other stakeholders and is accessible at all times, to all individuals [87]. A more holistic definition of openness applicable to AI development would therefore encompass "accessibility of knowledge, technology and other resources; the transparency of action; the permeability of organizational structures; and the inclusiveness of participation." [83].

Similar to the problem of transparency in AI, openness in AI is reportedly lacking [88–90], but a solution can be borrowed from Nordic nations' political values: Democratizing AI might be the key to overcoming the lack of openness of AI for public scrutiny [91]. The ensuing exploration of national AI policies will investigate how openness is upheld in these documents.

1.2.4. Inclusion of cultural values in technology policy

While the same values might be found across different cultures, the

different cultures might prioritize those values differently [92]. Hofstede's analysis using cultural dimensions illustrate the cultural similarities and differences between the Nordic nations (see Table 1). Because of such differences, technology policies from different countries may inscribe the same values in different ways; in other words, the cultural values that are protected may vary across even very similar cultures [93]. Furthermore, human interactions with technology are not uniform across cultures [94]; at both conscious and unconscious levels, humans encode culture within and through various technologies.

It is necessary to understand these cultural values and how they should be upheld in strategic AI policy [23]. If we fail to understand cultural diversity when creating AI policy, it negatively impacts a universal right to utilize advantages technology provides [95]. One method to ensure these values are present in technological developments, including AI, is through *machine enculturation*, or the teaching of cultural values, norms, and ideals to computers or robots [96]. An example of machine enculturation is the Learning from Stories (LfS) initiative, where machines are enculturated using a corpus of stories [97]. Another model for inculcating human values in new technologies, such as robots, is through mutual shaping, or paying attention to "how social and cultural factors influence the way technologies are designed, used, and evaluated as well as how technologies affect our construction of social values and meanings" [98].

1.2.5. Threats to trust, transparency, and openness in Nordic societies

Despite the seemingly ideal conditions for trust, transparency, and openness in the Nordic region, not all is rosy. As with anywhere else, these values are under constant threat in Nordic nations from political, economic, and even technological forces. For instance, even though levels of trust in government are high in the Nordic region, widespread use of surveillance technologies can erode citizens' levels of trust in government institutions like the national police. There are therefore real challenges in the five Nordic nations [99], some linked to increased cultural heterogeneity, perhaps arising through political polarization [100] or increased immigration [14].

What are the specific forces currently threatening, or perhaps reshaping, the Nordic values of trust, transparency, and openness? Political stalemates, as seen in the Swedish national elections of 2018, where a governing agreement required four months of political compromise and discussion, could erode trust [101]. Inequality can impact social cohesion and trust levels between citizens [14], and there have been findings of increasing income inequality in the Nordic region [102], which, as research has indicated, leads to a decline in trust [99]. Decreasing levels of citizens' perceived well-being also impact the level of trust in a society [103]. The most "trust damage" potentially occurs when people who have lost their trust in others experience difficulties reconstituting that trust, even if they are aware that all would benefit from increased partnerships [104].

The general confusion and fear surrounding AI could undermine trust in the technology before it is even properly implemented [82]. Scholars have explored the normative implications of existing AI ethics guidelines [105], but none, to the author's knowledge, explore how cultural values are adopted by or influence AI policy documents. The manuscript will explore the role that the three cultural values of trust, transparency, and openness, play in developing national strategies for implementing and using AI: Is the inclusion of cultural values inherent in Nordic national AI policy? This conceptual paper seeks to understand how these cultural values are reflected in Nordic national strategic policies for AI.

2. Methodology

In this study, the author applies textual analysis (also referred to as document analysis [106]), a systematic procedure for analyzing documents [106]. It is a post-structuralist methodology [107] that explores questions of how texts reflect, reject, or influence societal views [108]. In short, the researcher interprets texts by connecting textual messages to larger societal elements that suggest the meanings that might be gleaned by different individuals [108]. Textual analysis is useful for considering questions like "How does this text reflect or influence societal views?" [108] which can inform us of how cultural values may influence technology policy such as Nordic national AI policy implementation. For this textual analysis, the primary texts, or items of main focus [109], are the Nordic national AI policy documents, while the secondary texts are related journal articles and other national technology policy documents serving to support or challenge information presented in the primary texts [109].

One benefit of textual document analysis is the ability to cover a larger amount of material in a shorter period of time; [110] it involves data selection rather than data collection [106]. By thoroughly analyzing the policy in several iterations, the author was able to illuminate key themes to help generate a representation of the conceptual world of which the policy documents are a sample [111]. Importantly, textual analysis does not necessarily entail analysis of the entirety of the text under consideration. Rather, the researcher locates the most relevant, critical information in the texts for answering the research questions [108]. The degree to which textual analyses involve predefined procedures varies; in some studies, the analysis is guided by the theoretical presuppositions reflecting the cultures to which the texts belong [111]. Analyses of policy texts are valuable because they allow one to identify ongoing discourse between regulatory bodies [112], such as those writing national AI policies.

2.1. Material and sample

Currently, 35 national strategic AI policies exist globally, and six international agreements [113] have been identified; the OECD reports that 50 countries either have or are currently developing national AI strategies [114]. These strategies address the different components of AI (e.g., machine learning, object detection, algorithms etc.) that the general public might confuse, or the difficulty that the general public might have in understanding AI in general [77,81,82]. As the primary texts for the present analysis, the author identified four national Nordic policy guides outlining national strategies for AI. In order of publication date, they are the policy guides of Sweden (February 2019), Denmark (March 2019), Finland (June 2019), and Norway (January 2020). Iceland's guide, as yet unpublished, is expected to be forthcoming.

Denmark's policy guide, entitled *National strategy for artificial intelligence*, is 74 pages long, and was jointly published by the nation's Ministry of Finance and Ministry of Industry, Business, and Financial Affairs. Finland's guide, *Leading the way into the age of artificial intelligence: Final report of Finland's Artificial Intelligence Programme 2019*, is 136 pages long, and was published by the nation's Ministry of Economic Affairs and Employment. The Norwegian government's 67-page guide, *National strategy for artificial intelligence*, was authored by the Norwegian Ministry of Local Government and Modernisation. Lastly, Sweden's guide, *National approach to artificial intelligence*, was published by the Government Offices of Sweden, and is the most concise of the national strategy documents at only 12 pages.

Because of the Nordic/Scandinavian regions unique cultural unity [38,37], even argued that Nordic countries share several values with respect to AI [43], the author chose to textually analyze the available Nordic national AI policies exploring the inclusion of the cultural values of trust, transparency, and openness. Critically, within textual analysis methodology, knowing your research question guides the researcher in determining which texts are necessary for answering the research questions [107]. Relatedly, it is these national AI policies, critical for answering the research questions [107], that are the primary texts for the textual analysis [109].

Fig. 1. Cover pages of Nordic national strategies for AI (left to right, Denmark, Finland, Norway, and Sweden).

2.2. Procedure

The author approached analysis of each of the four policy guides (Fig. 1) in three stages: cursory examination, thorough examination, followed by interpretation [106]. In the first cursory examination, the author ran keyword searches, utilizing the quantitative keyword search component to lead to relevant portions of the texts for deeper qualitative analysis. Additionally, keyword searches helped the author establish *whether* trust, transparency, and openness were even present as a cultural value in the texts. Keyword searches in the PDF documents utilized both the Preview application and Adobe Acrobat Pro on a computer running Mac OS Mojave (10.14.6). The keywords used are presented in Table 2; both programs, Preview and Adobe Acrobat, were utilized to ensure that the keyword search results were reliable. Partial word strategies were implemented to account for variance in context, word tense, and plurality. For example, the search term "transparen" would account for both "transparent" and "transparency". In addition, "trust" revealed occurrences of "trust-based" or "trust-generated (in the Finland policy document). The only exceptions to this procedure were the words "openness", "privacy," and "autonomy," where the terms were searched literally. Due to this, the author did not solely rely on the partial word or full keyword searches, but combined keyword searches and thorough examination. By combining the computer-assisted keyword search using partial word strategies along with thorough examination of the documents, the author identified words or combinations (i.e., trust-generated), and in turn, was able to better understand the context of the search terms with the policy material both preceding and proceeding the search terms.

In the cursory and thorough examination, the central themes of trust, transparency, and openness were color coded for visual clarity, and efficient referencing when inspecting the documents. The author counted, and color coded the results of keyword searches associated with each value, which allowed the author to visually identify with more efficiency the thematic trends within the national policy documents for the Nordic countries covered by this study. Based on the author's cursory/thorough qualitative examination of the texts, additional related themes found throughout the strategy policies of the four Nordic nations are ethics, autonomy, privacy, and democracy – with these references speaking to values and principles championed by the Nordic nations. In the following section, the author will analyze and interpret each Nordic nation's strategic policy for AI in terms of the cultural values of trust, transparency and openness, and how these policies are influenced by these cultural values.

Finally, while the initial keyword search in the cursory examination explored *whether* key cultural values were present and upheld, the interpretation stage of the analysis determined *how* the cultural values were or were not upheld in the four Nordic policy documents. Even through cultural values might be explicitly absent in policy documents, related themes may indeed still be present.

Table 2
Total references in Nordic national AI strategy documents.

Search value (page length)	Denmark (74)	Finland (136)	Iceland[a]	Norway (67)	Sweden (12)
Trust[b]	6	41	-	40	2
Transparen[b]	10	15	-	14	3
Openness	1	1	-	0	0
Ethic[b]	54	132	-	45	11
Autonomy	1	4	-	7	0
Privacy	1	11	-	29	1
Democra[b]	3	11	-	5	2

[a] No published strategy (as of October 10, 2020).
[b] Partial word strategy to account for variance in context, word tense, or plurality.

3. Results and analysis

Each of the four national strategic guidelines for AI incorporates to some degree the cultural values of trust, transparency, and openness. This section analyzes how those values are included in each of the four documents. Based on the keyword searches and two-stage examinations of the documents, the cultural values of trust and transparency are indeed upheld in all four of the policy documents, while openness is only documented in Denmark's and Finland's policy document. The following sections will analyze each document, including *how* these cultural values were or were not upheld in national AI strategies.

3.1. Analysis of Denmark's national AI policy document

Published in March 2019, Denmark's policy guide, entitled *National Strategy for Artificial Intelligence*, is 74 pages long, and was jointly published by the nation's Ministry of Finance and Ministry of Industry, Business, and Financial Affairs. Overall, Denmark's guide excels at describing priorities for developing AI in Danish society. It provides clear real-world examples of AI, explaining concepts such as "Intelligent cyber security" (p. 26) and initiatives such as the development of AI education programs ("New education programmes on artificial intelligence" p. 44), the use of AI in healthcare ("Project with artificial intelligence in healthcare" p. 64), AI within agriculture (p. 68), and how AI can be implemented in transport services (p. 69). Second, the policy guide makes the importance of ethics in creating AI policy astonishingly clear. "Denmark should have a common ethical and human centered basis for artificial intelligence," (p. 8) it argues. Furthermore, it implies the Danish government's moral responsibility for making ethics a guiding framework for AI policy: "Europe and Denmark should not copy the US or China. Both countries are investing heavily in artificial intelligence, but with little regard for responsibility, ethical principles and privacy." (p. 8).

3.1.1. Trust

Denmark's national strategy for AI explicitly references trust five times (Table 3), and some of the references are especially influential on the text. One reference, a general statement about digital and technological development, links social trust directly to a sense of positivity:

Table 3
Total references of values in Denmark's 74-page national AI strategy document.

Trust[a]	Transparen[a]	Openness	Ethic[a]	Autonomy	Privacy	Democra[a]
6	10	1	54	1	1	3

[a] Partial word strategy to account for variance in context, word tense, or plurality.

"The Danish population has a high degree of trust in each other, and we are generally positive towards digital and technological development" (p. 7). Another reference is made in the context of the word "trustworthy," specifically assuring the public that government will keep AI, its algorithms, and results trustworthy (p. 6). It is notable here that assurances of trustworthiness are made separately for AI and algorithms, rather than lumped (more typically) under the umbrella term of AI – trust is supported not only in general, but specifically illustrated within the distinct components of AI. However, ensuring AI and its algorithms are trustworthy is notable, as it would be "easier" to simply state "the Danish government will ensure trustworthy AI" simplifying and not singling out the technologies and responsibilities. But there are stark differences in how and why the Danish government should (and must) ensure trustworthy AI and separately, the algorithms. Unfortunately, why did the policy exclude trustworthy machine learning or automation?

The concept of "shared values" are explicitly mentioned in The Danish Government [115] strategic policy for AI:

> The Danish population has a high degree of trust in each other, and we are generally positive towards digital and technological development. However, the rapid development may make some feel insecure about the future. Therefore the government considers it crucial that Danes continue to feel secure and to be confident that developments in society and in the use of artificial intelligence will centre on our shared values … (p. 9)

In addition to noting shared values, the passage is also useful for exploring the relationship between trust and security. In fact, in this instance, trust is seen as key for continuing developments in society, including use of AI, and these developments must be built on shared societal values.

3.1.2. Transparency

Based on the analysis of the document, transparency is indeed upheld in the Danish government's AI policy document (10 mentions). But how is transparency upheld in the policy document? Not as thorough as Norway's explanation of AI and related technologies, Denmark's document does provide some technical definitions and explanations such as, "What is artificial intelligence? "(p. 6) "What are cloud technologies?" (p. 39) and sections detailing issues of "Challenges for the use of artificial intelligence in Denmark" (p. 16) or applications of AI, for example "Case: Artificial intelligence provides better food safety" (p. 46). Indeed, transparency is upheld in the Danish policy document by highlighting issues of algorithmic transparency in the public sector (section 1.5), and underscoring a strong focus on data ethics. The policy document notes the government will use AI for public sector decision making, utilizing public-sector methods and guidelines supporting statutory requirement for transparency, leading to a pilot project exploring responsible and transparent use of AI by public authorities for decision making.

Denmark has suffered its fair share of blunders related to transparency [116]. One major incident, now referred to as Gladsaxe (the municipality where the policy began), involved the Danish government compiling data from various registers [117] to assign points to families in order to identify "at risk" children [116]. Even in the face of several questionable policies (with the Gladsaxe incident occurring prior to publication of the Danish national AI strategy), the Danish government has still been willing to implement innovative and bold policies. In light of these events, it is extraordinary to read: "The [Danish] government will implement the following initiatives … Transparent use of algorithms by the public sector" (p. 27). The reference highlights the Danish government's intense commitment to transparency, even while the reference to transparency is politically risky for the Danish government given this past incident (i.e., Gladsaxe). History has not followed this statement, so Danish policy (such as the Gladsaxe incident) should serve as example for other governments of how poorly implemented and communicated policies can quickly erode public trust.

3.1.3. Openness

The Denmark policy guide is one of only two that explicitly call for openness. In the section titled "Explainability" (of AI, referring to logics of AI, describe and control data), the guide states that "public authorities have a special responsibility to ensure openness and transparency in the use of algorithms" (p. 28). It goes on to elaborate that "Explainability is not the same as full transparency of algorithms, as there are business interests in the private sector, for example" (p. 28). It seems that explainability needs to be a balance between openness and transparency, with public authorities in Denmark explicitly identifying when and how AI is used for interacting with citizens, as well as making decisions regarding access to and distribution of services to citizens.

3.2. Analysis of Finland's national AI policy document

At 136 pages long, Finland's policy guide, *Leading the way into the age of artificial intelligence: Final report of Finland's Artificial Intelligence Programme 2019*, is the longest of the four documents. It was published in June 2019 by the nation's Ministry of Economic Affairs and Employment, and is divided into four chapters. The Finnish guide is competent in many areas, and provides context for AI in Finnish society with real-world case studies of how AI is implemented in their society. The publication of the guide came after Finland's creation of its Artificial Intelligence Program [118]. A panel of AI professional and experts were commissioned to comment in the report (especially in Chapter 2, "International AI experts: Towards the third wave of artificial intelligence"). The combination of government and industry assessment and predictions for forthcoming implementations of AI ensures that numerous stakeholders were consulted and that the information provided is relevant across many arenas. Ethics is a focus of the document, with 132 explicit references to the idea. Notwithstanding the fact that 21 of those references are to the EU's *Ethics Guidelines for Trustworthy AI* [119], this illustrates Finland's priority of ensuring human rights in all decisions related to AI policy (see Table 4).

Table 4
Total references of values in Finland's 136-page national AI strategy document.

Trust[a]	Transparen[a]	Openness	Ethic[a]	Autonomy	Privacy	Democra[a]
41	15	1	132	4	11	11

[a] Partial word strategy to account for variance in context, word tense, or plurality.

3.2.1. Trust

Out of all four policy guides, Finland's guide explicitly references trust most often (41 mentions). While this figure is high, it is important to note that Norway's guide mentions trust only one less time (40 versus Finland's 41) even though it contains half the number of pages (67 versus Finland's 136). Nonetheless, as will be described below, the value of trust is substantially developed in the Finnish document. This emphasis on trust in the Finnish guide is unsurprising, given that no other European country ranks higher in citizen trust. 85% of respondents to the 2018 Eubarometer survey agreed with the statement that "generally speaking, most people in their country can be trusted" [120]. At the same time, this characteristic of Finnish society cannot be taken for granted. As the policy document states, "it practically obliges us to an active approach, understanding of the prerequisites of trust in the age of artificial intelligence, and agile implementation both nationally and as part of the international community" (p. 103).

Notions of trust in the Finland policy document are quite diverse, ranging from trust in the healthcare sector with the adoption of AI and the notion of trust as a factor in democracy to the importance of trust in a future Finland where AI is deeply integrated. The document highlights 11 key actions for "ushering Finland into the age of artificial intelligence" (p. 43). Key action 6, "Building the world's best public services," describes the creation and testing of an AI platform that gives organizations offering various services the ability to create interactions between smart services. It makes the following assertion:

> The precondition for the development of a trust-based society relying on information is that people feel being part of it. However, the building of trust requires transparency, accountability and reliability. Trust can be maintained by taking care of clear information management responsibilities and the understandability, information security and protection of digital products and services throughout their service lives. (p. 87).

This suggests that, for Finland, a trust-based society and maintaining trust are separate actions, both entailing participation by citizens and government. Another section of the document, "Artificial intelligence as a factor renewing society and democracy," suggests that social and institutional trust are critical for AI development: "Do we trust the organizations and people producing the AI-based services? Do we trust the technology solutions offered to us?" (p. 36). The guide also states that health care service providers and equipment manufacturers must ensure that both patients and professionals trust new AI technologies.

The Finnish emphasis on trust as foundational to the future of AI in Finland is evident in the last chapter of the guide, "A vision for Finland in the age of artificial intelligence in 2025." Looking to the future, it argues that "the age of artificial intelligence has not eroded people's trust in society or to each other and Finland remains a trust-based society" (p. 123). By asserting how the futuristic AI society must have trust in their own society, maintain trust between citizens, and remain a trust-based society, this declaration creates even more pressure for trust to be implemented and supported by AI. Its emphasis on the importance of trust seems motivated by the desire to guard against possible pitfalls with AI in society, clearly underscoring how a technology like AI can erode social and institutional trust.

3.2.2. Transparency

Transparency is mentioned 15 times in the Finnish guide, the most of the four guides under analysis (though it should be remembered, again, that Finland's is the longest, being 62 pages longer than the second longest, Denmark's), including within case studies of Finnish companies implementing AI technologies (p. 19, 21). It first appears with conceptual significance in the section "Artificial intelligence as a factor renewing society and democracy," (p. 35) where the transparency of decision making in AI algorithms is described as a concern in Finland and elsewhere (this is mentioned again on p. 104). More importantly, transparency is described in the context of the black box effect (see also Section 3.2.4), where algorithmic processes are seen as candidates for improved transparency. Crucially, the Finnish guide tries to downplay the relevance of this concern: "But is this [algorithmic transparency] really needed and is it even possible?" (p. 36). Noting how humans don't necessarily understand how 4G technology handles the transmitting of calls across continents, the Finnish guide (controversially) argues that transparency of processes is irrelevant because "we trust the data communications system and the parties operating it" (p. 36). Transparency is upheld in the Finnish policy document, mentioning transparency in algorithm-based decision making, and the value of involving cross-sectoral actors in assessing the acceptance of AI in public services: "Transparency must be enabled in a way that takes account of the competences of the person doing the assessment." (p. 108).

3.2.3. Openness

The Finnish policy guide, like the Danish guide, explicitly references openness, but only once in the entirety of the document. Moreover, it does so in the context of the Finnish economy (p. 76), not as a cultural value. Nonetheless, similar to other guides in the analysis, mentions of democracy, or social equality, which are related to or enable openness, are present.

Finland's policy document has a two-page section devoted to AI and democracy titled "Artificial intelligence as a factor renewing society and democracy" (p. 35). Explicit mentions of democracy are notably missing from this section, however, except for a single bullet point within a five-bullet-point list summarizing international experts' recommendations from Chapter 2. Pithily, it states, "Respect the principles of democracy and freedom," (p. 38–39) and goes on to summarize the importance of democracy in "Western" nations and the need to balance this with stakeholders' "benefits" derived from AI.

The Finnish policy document situates democracy as a component in the process of AI development, but does not provide clarity to how it will be upheld. It says: "Solutions based on artificial intelligence should be seen as a way of reinventing society and increasing citizens' participation in decision-making and democratic processes" (p. 39). Democracy is also highlighted in Chapter 3, "Eleven key actions ushering Finland into the age of artificial intelligence," which mentions how democracy (along with environmental affairs) can be promoted if investments in AI are made (p. 80), how AI concerns raise issues affecting human rights and democracy (p. 103, 106), and how ethical issues of democracy are inherent in AI systems and automated decisions (p. 103, 123).

Although the Finnish guide espouses the ideal that "AI ethics must not be seen as a factor posing limitations on the activities only, but also as a factor that creates something new, and provides increasing opportunities" (p. 106), the aforementioned references suggest a recurring sentiment of democracy as a limitation to the potential of AI. Moreover, a section in Chapter 3 titled "Artificial intelligence, human rights and democracy" (p. 106) still falls short of vividly protecting democracy in the adoption of AI technologies across Finnish society. Even though democracy is mentioned in 11 instances (including the words "democracy" and "democratic"), it seems that an opportunity for making decisive actions reinforcing democratic values within AI policy was squandered.

3.3. Descriptive analysis of Iceland's national AI policy document

Communication with ministries informed that no current publication exits, however a national strategy is potentially expected in 2020.

3.4. Analysis of Norway's national AI policy document

The Norwegian Ministry of Local Government and Modernisation published their 67-page policy guide, *National Strategy for Artificial Intelligence*, in January 2020. It comprises five major sections, beginning with "What is AI?" and concluding with "Security". The guide opens

Table 5
Total references of values in Norway's 67-page national AI strategy document.

Trust[a]	Transparen[a]	Openness	Ethic[a]	Autonomy	Privacy	Democra[a]
40	14	0	45	7	29	5

[a] Partial word strategy to account for variance in context, word tense, or plurality.

with a one-page, pro-AI message from the Minister of Digitalization that ends on the following positive statement: "Together we will explore the potential that lies in this exciting technology!" (p. 1).

The Norwegian guide, at 55 pages longer than Sweden's, takes a more holistic and deeper approach to AI development. It explicitly identifies its audience as the civilian sector, both private and public, and it mentions trust extensively, including a whole chapter devoted to the topic of trustworthy AI. Transparency is not only explicitly referenced, but also reflected in the guide's provision of basic explanations of AI technologies to educate citizens in how AI functions and explain how AI processes can improve Norwegian society. Lastly, although openness is not explicitly mentioned, notions of democracy are highlighted with discussion of AI built on democratic values and the designing of AI to avoid negatively impacting Norway's democratic society.

Bridging the values of both trust and transparency, it is stated when case management systems with AI are implemented, "the algorithm's judgement must be at least as sound and as trustworthy as the human discretion it replaces. To ensure this, we need systems that are transparent and explainable." (p. 27–28). But who decides what level of human discretion is "sufficient" – sound and trustworthy decision-making capabilities can be results of a variety of conscious decisions and unconscious opportunities, including formal education, opportunities for leadership, exposure to diversity of theories, religions, politics, social systems. The burden of proof in ensuring algorithms are "as sound and transparent" as human actors is beyond actuality (see Table 5).

3.4.1. Trust

Trust is explicitly mentioned 40 times in the Norwegian policy guide and, notably, features in an 8-page chapter titled "Trustworthy AI". Trust is also discussed in the guide's introduction and in five other sections of the document: "Data and data management," "Regulations", "Research and higher education", "Industrial policy instruments", and "Security".

The guide asserts that "Norwegian society is characterized by trust" (p. 5), and specifies, in the context of how the government might use automated decision making (or ADM) to provide services to citizens, that "More consistent implementation of obligations can lead to higher levels of compliance and to a perception among citizens that most people contribute their share, which in turn can help build trust." (p. 27). While not clarifying social trust or institutional trust, the reference is important as it demonstrates how equality through fair automated decision making (ADM) has a reciprocal effect on trust – if we trust our government to implement AI solutions in access to and dissemination of welfare services, in fair and just ways, this will reinforce citizens' trust. The guide asserts ADM and automation can promote equal treatment of citizens seeking services, and through consistent implementation of regulations, will prevent unequal practice. And when decisions about grant benefits are automatically decided when conditions are met, it enhances the implementation of rights and obligations, especially for the most disadvantaged in society. Norway's policy document makes a strong case for the equality and fairness that arise when ADM is utilized in welfare services, and in return, the reaffirmation of trust. (However, news to the contrary regarding use of ADM in Sweden, where automated decision making systems for providing state services that unknowingly leaked personal data [121], actually conjure the opposite and erode trust.)

Trustworthy AI is a prominent theme in the guide. The chapter "Trustworthy AI" states that "research, development and use of artificial intelligence in Norway should promote responsible and trustworthy AI," and that "supervisory authorities should oversee that AI systems in their areas of supervision are operated in accordance with the principles for responsible and trustworthy use of AI" (p. 56). Furthermore, the chapter makes clear the Norwegian government's hopes that AI development would help reinforce social and institutional trust: "Norway is known for the high level of trust citizens have in each other and in public and private institutions. The Government wants to maintain and strengthen this trust at the same time as artificial intelligence is adopted in new and innovative ways" (p. 56). The explication of trustworthy AI and how the government will approach implementing and supporting trustworthy AI is well reasoned and should be commended – it makes clear the challenges faced with implementing AI systems (not all policy documents do this) and also methods for safeguarding individuals' rights. Versus their southern neighbor, Denmark, one might reflect Norway's implementation of AI policy, through clear communication and how they will enforce trustworthy AI, contrasts positively with Denmark's mixed record on AI policy [116,117]. (In fairness, Norway's policy was published ten months later than Denmark's, allowing for additional historical and technological observations to inform national policies.)

3.4.2. Transparency

The Norwegian guide not only explicitly references transparency as an important value in AI development, but makes a serious effort to practice transparency in its discussions of AI within the guide itself. Four pages of the guide explain what AI technologies entail, including such processes as machine learning and automation. This provides a foundation for any stakeholder reading the document to acquire basic AI literacy and be better prepared to understand and consider the strategies proposed in the guide. This is a notable departure from the other Nordic policy documents, which either do not explain AI technologies or provide only truncated or highly technical overviews. Crucially, the Norwegian guide informs its reader of the "black box" problem (p. 12) and identifies "lack of transparency" as an issue that might be resolved in two ways. First, it explains, not all systems are "black boxes." Moreover, in systems where explainability is especially important, deep learning might be more appropriate as a path to transparency (p. 58). Second, it proposes that explainable AI, or encouraging the explainability of black box algorithms, could help analyze data's significance for an outcome, or what significance other elements might have (resulting in clear logic behind the outcome) (p. 58).

The Norwegian policy guide also supports transparency by simplifying the process for citizens trying to access public or government information and services. Access to information requires citizens to identify themselves, a process that can become onerous when the information is stored with many different government and public institutions. The guide reports that "the Government has established a 'once only' principle to ensure that citizens and businesses do not have to provide identical information to multiple public bodies" (p. 14), thereby lessening citizens' burdens, increasing access to services, and ultimately supporting perceptions of transparency.

3.4.3. Openness

An open government is responsive to innovative ways of thinking and demands from citizens and other stakeholders, and is accessible at all times, to all individuals [87]. Although there are no explicit mentions of openness in the Norwegian guide, there are direct mentions, similar to Sweden's document, of democratizing AI and its processes. The guide asserts that "[AI] that is developed and used in Norway should be built on … democracy" (p. 6), and democracy is mentioned a total of five

times in the document, including in statements that AI must foster a democratic society (p. 59) and that AI must have no adverse consequences for democracy (p. 60). Even in the absence of explicit references to openness, it is clear that the Norwegian government regards democracy and the openness of AI as fundamental to the deploying of AI in Norwegian society and government.

Norway's strategic AI policy also addresses data openness—openness for and with data—in a number of ways. The guide explores data lakes, or a "central repository for storing data" (p. 17); it also explores data trusts, where trusted external entities decide with whom data can be shared according to the purposes for which the legal structure of the data trust was set up. The guide also discusses the creation of synthetic data, where various stakeholders can share data without concerns of privacy or anonymization associated with real data sets (the guide takes care to note that synthetic data must mirror features found in the real data sets in order to be useful). Finally, the guide mandates that public agencies ideally provide information using APIs, with information accessible in standardized, machine-readable formats. Norway is a vanguard in the extent to which it has considered data openness, as no other Nordic policy mentions data trusts or synthetic data. Only one other policy mentions data lakes—Chapter 3 of the Finnish policy, which briefly mentions it in the context of the effective use of data (p. 52). Overall, Norway's guide provides clear, applicable examples of how data can be shared between different stakeholders, and demonstrates the relevance of this discussion within a national policy for AI implementation.

3.5. Analysis of Sweden's national AI policy document

Sweden's policy guide, *National approach to artificial intelligence*, was published in February 2019 by the Government Offices of Sweden, and is the most concise of the national strategy documents at only 12 pages. The purpose of the document is to "identify an overall direction for AI-related work in Sweden and lay the foundation for future priorities" (p. 4). The guide focuses on four areas of AI development—(1) Education and Training, (2) Research, (3) Innovation and Use, and (4) Framework and Infrastructure—and describes how they will encourage the full realization of AI in Swedish society.

The brevity, generality, and vagueness of the Swedish policy guide is concerning, given that Sweden's economy is the largest among the Nordic nations [122] (474 million EUR in 2019). The guide's self-described goal is to "be the world's leader in harnessing the opportunity offered by digital transformation" (p. 4). It also claims that, "by international standards, Sweden is in the vanguard" (p. 4), and argues that "Sweden can take the lead in ethical, safe, secure and sustainable use of AI by actively working on this issue nationally and promoting it internationally" (p. 8). Unfortunately, the guide accomplishes little more than the making of vague references to the power of AI and grandiose claims of how it will change Swedish society. In stark contrast to the Danish, Finnish, and Norwegian guides, the Swedish guide lacks clear direction in how Swedish government organizations will ensure trust, transparency, and openness in adopting AI throughout their society. Also absent are any strong policies and principles by which Swedish society can compete on a global scale. Nonetheless, it is useful to see how the values of trust, transparency, and openness appear (or do not appear) in this document (see Table 6).

3.5.1. Trust

Trust is mentioned twice to rather negligible consequence in the 12-page document. The first, a reference to "loss of trust," is buried in a general statement about possible negative consequences of using AI: "There may be unintended or unforeseen consequences of using AI as a result of biased or manipulated data, lack of transparency, misuse or hostile use. This may lead to discrimination, loss of trust, financial damage and consequences for the functioning of democracy" (p. 4). The second lists "trust" alongside privacy, ethics, and social protection as elements that must be part of "appropriate frameworks of principles, norms, standards and rules" for implementing AI: "Appropriate frameworks of principles, norms, standards and rules are therefore important prerequisites if Sweden is to realise the benefits of AI in society. Such frameworks must balance fundamental needs for privacy, ethics, trust and social protection with access to the data needed to realise the potential of AI" (p. 10). Trust is upheld in the Swedish national AI policy document although not fully developed. The appearance of "trust" in these two instances does at least seem to support the notion that trust is an important value—even if the brief Swedish document only mentions it twice. The most striking statement related to trust might be in relation to use of and managing data necessary for AI: "*Such frameworks must balance fundamental needs for privacy, ethics, trust and social protection with access to the data needed to realise the potential of AI*." (p. 10).

3.5.2. Transparency

Of the three cultural values under examination in this study, the Swedish policy guide references transparency most often—three times. But, like the value of trust, it is not developed. Two references to transparency simply state its necessity in AI processes: "A cross-cutting theme should be sustainable AI, meaning that AI applications should be ethical, safe, secure, reliable and transparent" (p. 5), and "The use of AI algorithms must be transparent and comprehensible" (p. 8). A third reference points out the possibility of danger if transparency is lacking: "There may be unintended or unforeseen consequences of using AI as a result of biased or manipulated data, lack of transparency, misuse or hostile use" (p. 4).

3.5.3. Openness

In Sweden, openness and transparency are touted as vital public values [123], and it's discouraging there are no explicit references to openness whatsoever in the Swedish policy guide. Nonetheless, the Swedish guide does make statements related to openness, addressing the potentially negative consequences of AI for democratic processes. Importantly, it notes the threat that disinformation presents to democracy: "AI may also lower the thresholds for attacks against democratic practices such as through disinformation" (p. 8). The guide also makes reference to the challenges associated with AI—i.e., discrimination, loss of trust, financial damage, and a less well-functioning democracy—but it does not offer solutions. It merely states that "the countries that succeed in harnessing and realizing the benefits of AI while managing the risks in a responsible manner will have a great competitive advantage internationally" (p. 5).

3.6. Summary of analyses

The analysis of the four Nordic national AI documents found three cultural values (trust, transparency, and openness) are mentioned and upheld to various degrees, whether being explicitly mentioned, or present through related themes (i.e., ethics, autonomy, privacy, and democracy) being examined. In summary, explicit or related themes of trust, transparency, and openness have clear impact on the national strategic AI policies for Denmark, Finland, Norway, and Sweden.

Table 6
Total references of values in Sweden's 12-page national AI strategy document.

Trust[a]	Transparen[a]	Openness	Ethic[a]	Autonomy	Privacy	Democra[a]
2	3	0	11	0	2	2

[a] Partial word strategy to account for variance in context, word tense, or plurality.

4. Discussion

The textual analysis of the Nordic AI policy documents has revealed particular ways in which the cultural values of trust, transparency, and openness have shaped discussions about AI. Other salient topics arising from this analysis will also be addressed in the ensuing discussion, such as sustainable models for data sharing and additional factors in the policy-making process, including the influence of existing policy documents and the multi-facing nature of public strategic planning documents.

4.1. From social and institutional trust to digital trust

In light of how rapidly AI is changing many industries (e.g., banking with cryptocurrency, infrastructure sectors and IoT sensors and other digitization, multiple manufacturing sectors with increasing automation), trust is needed to assuage concerns, lower perceived risks, increase AI adoption, and increase willingness to embrace these changes. Identifying the cultural value of trust—as both social trust and trust in government and organizations (institutional trust)—and understanding how it is implemented in national policies, such as those covered in this analysis, can help conceptualize and build digital trust. Conceptualizations of digital trust must take into account trust in technology, which is an important determinant for the adoption of a technology [22]. Mediated trust has been suggested as a complimentary approach, looking beyond trust mediation, focusing on digital technologies innovative reasons for producing trust [124]. Technically, digital trust can be created and maintained through strong digital security, with information security being part of a wider concept of digital safety highlighting the importance of situational management [125]. Government institutions have a clear role in maintaining high standards of information security, and these very institutions, as mediators of trust, must remain transparent and credible for creating digital trust. Beyond information security, citizens and other stakeholders must be able to audit government institutions' AI systems through accountability mechanisms, including explainability of decisions, transparency mechanisms, and fairness in ADM systems used by the public sector. However, it should be noted that auditing government technical systems as means to increase digital trust is not always the answer - while algorithmic transparency is touted as one tool for increasing trust in AI systems [126], the opposite effect has been observed where transparency can have negative impacts on trust [127]. Clearly, the challenge of defining, creating, and supporting digital trust is a worthy task to be confronted, one requiring the input and resources of all stakeholders.

4.2. Trustworthy AI

The Danish policy guide distinguished between discussions of AI trustworthiness overall and the trustworthiness of algorithmic components of AI. This orientation to detail in discussions of AI trustworthiness is important: we need to ensure that *all* components of AI are trustworthy and verifiable. A blanket statement of "trustworthy AI" does not provide the specificity or rigor necessary to build the real, enforceable policies needed to maintain the trustworthiness of all processes of AI technologies. Unfortunately, notions such as trustworthy machine learning or trustworthy automation are not as popularly studied. (As an anecdotal note, a Google Scholar search for "trustworthy AI" yielded 882 results, while "trustworthy automation," "trustworthy algorithms," and "trustworthy machine learning" yielded 82, 64, and 53 results respectively.)

It is important to note, however, that at least some precedent for a solid basis for discussion of trustworthiness in AI has been established by the EU's 2019 publication, *Ethics Guidelines for Trustworthy AI*, which was authored by the Independent High-Level Expert Group on Artificial Intelligence set up by the European Commission. The first draft of the document was made publicly available in December 2018 [119], and the final version was unveiled in April 2019. While the Norwegian (p. 58, 62), Finnish (p. 104–105), and Danish (p. 27) strategic AI policy guides all referenced this document, the Swedish policy merely referenced the GDPR in one instance (p. 10) and otherwise stated that "Many of the regulatory frameworks and guidelines that Sweden must take into account come from the EU" (p. 11). Was this oversight merely because Sweden's guide was published before the final version of the EU *Ethics Guidelines for Trustworthy AI* was released? It would benefit Sweden's AI policy stakeholders to know which EU "regulatory frameworks and guidelines" Sweden took into account in their policy guide.

4.3. Openness and transparency: mutually affecting values

Although transparency and openness are different cultural values, the value of transparency tends to be ambiguously related to openness in the AI policy guides, and discussions of transparency often crowd out potential conversations about openness. Only the Finnish and Danish guides explicitly mention openness, and then only once each (coming to a total of two mentions of openness across four policy documents). In contrast, transparency is mentioned 42 times across all four policy documents (Denmark 10 mentions, Finland 15 mentions, Norway 14 mentions, Sweden 3 mentions).

Openness can be defined using the idea of transparency: "accessibility of knowledge, technology and other resources; the transparency of action." [83] Openness is also referred to in the policy guides through the idea of explainability. The Danish guide, regarding the "explainability" of AI, states that "the public authorities have a special responsibility to ensure openness … in the use of algorithms" (p. 28). The Norwegian guide, while not mentioning openness explicitly, describes explainable AI in sections about transparency. Finally, democracy, a method for ensuring openness, is also clearly discussed in a number of the policy guides. Norway's guide, for example, encourages democratizing AI and ensuring that AI does not negatively influence their democratic society.

Conceptualization of what entails democratic AI is imperative, but more importantly, the policies analyzed attempt to address openness and transparency in AI policy – easily overlooked but arguably necessary for burgeoning technologies like AI. What is the relationship in the policy documents between openness and transparency, and how are they linked through explainability? While conceptualizations may vary across societies [128], a better understanding of the connection between these concepts is useful for policy makers and citizens, alike. Based on the policy document analysis, it appears explainability, openness, and transparency are linked, and explainability needs to be a balance between openness and transparency – as mentioned in the Danish document, public authorities must make decisions concerning access to and distribution of public services to citizens, as well as identify how and when AI are utilized when communicating with citizens.

4.4. The influence of democracy on national AI policy

Democratic institutions are present in all Nordic nations, and democracy is an important component of many parts of Nordic society. Indeed, it is referred to by the Nordic Council of Ministers as the cornerstone of Nordic society [129]. The influence of democracy on AI policy and the democratization of AI technology is apparent in the Nordic policy guides, which freely express the notions that AI must be built on democratic values [43], that AI must not negatively impact a nation's democratic society [43], that disinformation is a realistic threat to democracy, and that the openness of society is desirable [130]. Thus, despite the general paucity of explicit references to the cultural value of openness in the Nordic policy guides, related ideas such as the democratization of technology and democracy in policy making are influential in national AI policy. Recollect that Finland's policy document, with a two-page section devoted to AI and democracy (p. 35–37), has no direct declarations of democracy in the section. Sadly, it seems that democracy

is only referenced as a component in AI technologies, rather than an end-goal that must be upheld. Democracy is not merely a "means to an end" (*means* value it instrumentally; for what democracy enables us to do, whereas *ends* are valued intrinsically: we value democracy for itself) – democracy is vital for European and Nordic societies; *it is a building block upon which all Nordic societies have thrived.* AI policy has direct impacts on democracy - when citizens are not aware of data collected by data-driven AI applications, and without proper regulation of such data, citizens can be influenced towards certain political causes [131]. As a result of this analysis, the author suggests that democracy might be better served if policy makers would actually focus on openness directly, rather than vague references to openness and related concepts in public policy documents.

4.5. Promoting transparency by sharing education models with the world

Transparency in algorithms and AI in general has been recognized as ethically important [72], but most individuals lack understanding of even the basic functions of AI [73]. The author argues that adding "AI literacy" to media literacy and digital literacy initiatives is essential for ensuring technology comprehension among people in society in general. Several of the policy guides recommend incorporating such curricula into primary education. Mentioned in the Norwegian and Finnish policy document, there is a globally accessible online course, "Elements of AI", created by Finnish higher education [75] and Norwegian industry [43] to educate citizens about the basics of AI that requires no previous knowledge of AI [43]. The Norwegian policy document, in a section titled "AI for everyone: Elements of AI" (p. 44) asserts the government will make the course available in the Norwegian language in 2020, and the Finnish document mentions the course in the context of "Versatile education programs" (p. 75) stating more than 100,000 Finns completed the course within months of its launch. This global AI education campaign might reinforce notions of Nordic trust, transparency, and openness, in turn influencing positive attitudes towards conducting business in the Nordics.

4.6. The relationship of ethics to trust, transparency, and openness in AI

Recent literature has confirmed the need for initiatives to assess the societal and ethical impacts of AI technologies [128]. Further, ethics and cultural are mutually linked – to comprehend one, we must acknowledge and understand the other [132]. All of the Nordic policy guides reference ethics in some form, and they bring to light some very worrying aspects of AI that must be addressed, including the use of AI algorithms in managing crime or violations and other situations where AI intersects with freedom, autonomy, and control. Without addressing these and related issues, we undermine the very trust, transparency, and openness that national AI policies seek to establish in citizens' relationships to AI.

Importantly, we must limit opportunities for government control of citizens that AI enables [128]. The Norwegian policy guide addresses the use of AI for such purposes:

> Such controls can involve, for example, identifying individuals who *may be* violating regulations (that is to say where an algorithm identifies a high probability for this). For applications like these, consideration must be given to rule of law and protection against self-incrimination for individuals subjected to regulatory checks. The risk and consequences of false positives – i.e., of someone being wrongly identified and of the undue hardship this would impose on them – must be part of a data protection impact assessment, which must be included when a solution is under evaluation (p. 53)

Denmark's Gladsaxe scenario [116,117] serves as example of how much society has to lose when AI technology is deployed without ethics, control, and autonomy in mind. As noted, this incident serves as example for other governments of how poorly implemented and poorly communicated policies can quickly erode public trust and impact perceptions of government transparency. Problems of algorithms and AI incorrectly identifying individuals are realistic concerns, too: algorithms utilized by the United States FBI were inaccurate in 14% of attempts. The algorithms were more likely to misidentify African American individuals [133], and the accuracy of facial recognition algorithms are very much dependent on controlled environments where high-quality cameras can be utilized [134]. Undoubtedly, it is necessary to increase assessment of the societal and ethical impacts of AI technologies [128].

Regarding transparency, the Finnish policy, in one section authored by an external expert, attempts to downplay concerns about transparency in AI: "But is this [algorithmic transparency] really needed and is it even possible?" (p. 36). Noting how humans don't necessarily understand how 4G technology handles the transmitting of calls across continents, the Finnish guide argues that transparency of processes is irrelevant because "we trust the data communications system and the parties operating it" (p. 36). Not only is this a dangerous precedent attempting to discount genuine concerns of citizens, but it assumes that only individuals of high technical understanding can appreciate the complexity of systems, with effectiveness of systems and underlying infrastructures outweighing any legitimately societal concerns related to the technology. Conversely, by devaluing and downplaying citizen's legitimate concerns, one also potentially erodes citizen's trust.

4.7. Data sharing as a sustainable model, and synthetic data for privacy

The policy documents illuminate an interesting way forward in the development of AI. The Nordic nations have identified the sharing of data—via cooperation through the Nordic Council of Ministers—as a potential competitive advantage for the Nordic region that could also uphold the values of trust, transparency, and openness: "A working group has been formed to identify datasets that can be exchanged between Nordic countries and create added value for Nordic enterprises – public and private alike – while still respecting the ethical aspects and the trust and values particular to the Nordic countries." (p. 14) In addition, Norway's policy document comments on the sustainability of such an initiative: "Data can be regarded as a renewable resource. Sharing data with others does not mean that one is left with less data. In fact, the value of data can increase when shared because it can be combined with other types of data that can offer new insights or be used by organizations with the expertise to use the data in new and innovative ways." (p. 13).

Might the Nordic nations utilize their data sharing platform as a new sustainable business model? As the Norwegian policy guide points out, data can be "re-used," and there are energy savings to be had from not needing to generate new data. However, sustainable initiatives like data sharing are not without concerns. According to Norway's policy guide, "The costs of making datasets genuinely reusable must be weighed against the benefit to research communities and society." (p. 15). On the other hand, data sharing or pooling has benefits for the Nordic nations, as "Scandinavian companies are small, so data pools are not so big (like Google)" [Personal Communication, 2020]. In short, data sharing gives the Nordic region a competitive advantage over larger national or even private companies with massive amounts of data. One example of data sharing in Norway includes the sharing of daily production figures from all oil wells in the Norwegian sector, which are then published on the Norwegian Petroleum Directorate website [135].

In addition to data sharing, the use of synthetic data for ensuring privacy also appears in the policy guides as a potentially innovative way forward. Synthetic data is a privacy-enhancing process that produces realistic synthetic data using properties of the original data set, creating useable data without many of the privacy issues related to real, original data [136]. Norway's policy document states: "Synthetic data can in many cases be an alternative to identifiable data or anonymized data. If synthetic datasets can be produced with the same features as the original

dataset, they can be used to train algorithms or be used as test data. This means that even datasets which normally would be considered sensitive could be made openly accessible for use in research and innovation" (p. 17). The use of data sharing and synthetic data holds much potential for enhancing privacy and sustainable data usage.

4.8. Limitations

As with any project, this study had some limitations that need to be highlighted. First, the author was not able, due to Nordic language deficiencies, to study the policy documents in their native language. As such, some critical nuances were probably lost during the analyses. Methodologically, the textual analysis the author performed also had specific shortcomings, namely the inability of Adobe Acrobat to do synonym or semantics searches (see Beall (2008) for a thorough overview). It should also be noted that, due to the rapidly changing advances in AI, the policy documents the author analyzed do not include the most recent updates in AI technologies.

One concern of textual analysis as a method is that it might be too liberal when drawing inferences about the relationships and impacts in a specific study. It should be acknowledged that concepts such as fairness and privacy are not static, and subtle but important cultural differences can be missed [132].

When utilizing Hofstede's cultural dimensions framework, it is important to note critiques of the framework. Some scholars highlight issues regarding specific dimensions of the framework (Long-term Orientation [LTO] inconsistencies [137], Uncertainty–Avoidance [138], Individualism–Collectivism [139]), while others focus on how culture is defined as implicit [140]. More specific concerns include the framework's lacking of construct validity [141], "ecological fallacies" [142] in the research design [143], failures of framework predictive capabilities [144], and the age of the data [145].

4.9. Future research

Future research could explore conceptualizations of trust, transparency, and openness across cultures, as related to social policy making. Cultural values like trust can vary, and individuals in different countries may differ in their comprehension of trust [125]. Currently, there is a lack of explanation for differences in trust across countries and states [63]. Furthermore, policy makers understanding digital trust and its impact might help increase adoption of cost-saving, time-saving nationally developed platforms (such as Finland's Aurora AI platform).

It would also be interesting to explore further how the two different types of trust [57]—social and institutional trust—impact the adoption of technology policy. Empirical work could be carried out to investigate citizens' actual perceptions of individual and societal trust and organizations' trust in other organizations and national governments, and how those trust levels impact adoption of national technology platforms. Finland's Aurora AI platform, a trial national technology platform "where services seek their way to people in a timely, information secured and ethically sustainable manner" (p. 86), could be a candidate for such study.

Finally, because three of the four policy guides refer to the EU's *Ethics guidelines for trustworthy AI* (all except Sweden's), it would be meaningful to understand how these EU guidelines have been implemented in other national AI policies. Do EU member states recognize the importance of these guidelines? How might they be adopted and altered so as to better fit with potentially clashing cultural values? Scholars have explored normative implications of existing AI ethics guidelines [105], but none exist that explore how cultural values are adopted by or influence (non-Nordic) AI policy documents.

4.10. Policy recommendations

National governments would benefit from cooperating with human rights and digital rights entities—such as the Electronic Frontier Foundation (EFF), Amnesty International, Algorithm Watch, Human Rights Watch, and the Algorithmic Justice League—to ensure that human rights are protected and upheld when developing national AI policies. Transparency is highlighted by these entities as an important issue in automated decision making and other aspects of AI, and continuing to explore and ensure transparency is vital to fostering citizens' trust. National consumer protection agencies (i.e., Denmark's Forbrugerrådet Tænk, Finland's Kuluttajaliitto-Konsumentförbundet, Norway's Forbrukerrådet, and Sweden's Konsumentverket and Sverigeskonsumenter) are invaluable for protecting consumers, and must continue to be strengthened, properly funded, and not be subject to politicization.

While some national policies are lacking in clarity and specificity (i.e., Sweden), there are documents lucidly illustrating how cultural values can result in value-laden technology policy. By setting clear expectations and recognizing the impact that cultural values can have in implementing technology policy, the nations of Denmark, Finland, and Norway should be applauded for their efforts. Rather than minimizing them, such as Sweden, they clearly state the value and necessity of applying trust, transparency, and openness in AI policy. A disservice is provided to citizens, industry, and researchers when policy documents are haphazardly published. The purpose of these documents are to inform these stakeholders how a nation might address challenges of AI, what issues are faced in implementing AI across different sectors, and to set forth guidelines for how the public sector will embrace AI. The value of government policy documents are diluted when they lack clarity, specificity, and depth – especially when addressing flourishing foci, such as AI, where stakeholders need clarity as to how the technology works, what changes might occur in society due to AI, and how cultural values will be sustained in light of the technology. Clearly, Sweden missed an opportunity, while the governments of Denmark, Finland, and Norway delivered what industry, citizens, and researchers needed – reassurance that AI will not erode trust, transparency, and openness, but rather AI will provide new, challenging opportunities to reinforce and build upon these societal values.

Nation-states must make it a priority to educate their citizens about technologies, including AI. The Finnish-Norwegian global online course is a model for how this might be done, and continuous outreach and public education initiatives like these are key for enhancing mainstream knowledge of AI and related technologies. Ultimately, if citizens do not understand how the systems work, they will not be able to properly consent to the use of their personal data that is necessary for these systems to function. Citizen involvement and education are critical, and one of the biggest problems facing citizens is the lack of information about the types of data analyzed in AI systems [128]. Although it would seem to be the sensible solution to this problem, the involvement of citizens in decision-making processes around the implementation of new AI services or platforms is not always the standard. This can be seen in Smart City initiatives [146], where the perspective of the citizen is disregarded, or ignored, in discussions about the Smart City [147]. Already, there exists a globally accessible online courses, "Elements of AI", created by Finnish higher education [75] and Norwegian industry [43] to educate citizens about the basics of AI that requires no previous knowledge of AI [43], with more than 100,000 Finns completed the course within months of its launch. It is this example of public education about AI that is needed to increase citizen awareness and knowledge about AI. Without proper citizen education initiatives and the involvement of citizens, we risk alienating those who these very services are meant to utilize and improve access for. For policy makers, developing and extending these public education initiatives are key for increasing societal AI literacy.

5. Conclusion

After examining each of the four national strategic guidelines for AI, it is evident that each Nordic policy guide incorporates to some degree

the cultural values of trust and transparency. The cultural value of openness, however, is lacking or only minimally included. In addition to trust and transparency, an amalgamation of privacy, democracy, ethics, and autonomy arise as themes in Nordic national AI policies. Democracy, a societal building block in the Nordic region, features in all four AI policy strategies. In order to ensure that cherished cultural values are reinforced rather than eroded by the adoption of new technologies, it is critical that policy makers, legislators, industry, and citizens have the opportunity to understand how cultural values interact with policy discussions about technologies such as AI.

CRediT author statement

Stephen Cory Robinson: All work on the manuscript was completed by the sole author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.techsoc.2020.101421.

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