HUMANE

White paper

Roadmap for human-machine networks for Citizen Participation

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Abstract	This white paper presents a roadmap for human-machine networks for Citizen Participation. Based on a quantitative survey of 20 self-selecting stakeholders, key issues across stakeholders were identified along with potential conflicts between them. The challenges of developing and maintaining trust along with keeping motivation going are discussed. These are addressed in the first instance with manipulation of dimensions derived from the HUMANE typology to suggest ways in which conflict between stakeholders might be addressed. Finally, returning to the main concerns of trust and motivation, a non-linear timeline is proposed based on activities affecting HMNs and how such events might affect trust.
Key-words	Human-machine networks, citizen participation, roadmap.

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Introduction

Whilst the OECD report recognises the value of ICT technologies within democratic processes (Co-operation & Development, 2004; Coleman & Norris, 2005), not least because of the size and reach of the Internet (Dutt & Kerikmäe, 2014), there are still many problems which remain. There is a difference between on- and offline democratic processes (Dutt & Kerikmäe, 2014): people may be used to social networks and online debate, but this may not translate directly into participatory behaviour (Panagiotopoulos, Sams, Elliman, & Fitzgerald, 2011). eDemocracy and eParticipation may therefore complement rather than replace traditional processes (Coleman & Norris, 2005).

There may be differences at the level of debate. For instance, socio-technical systems may encourage the extent of debate but may not improve the quality of that debate (Loukis & Wimmer, 2012). In fact, the goal should not necessarily be about arriving at political decisions across different factions and interest groups, but perhaps more to encourage a given group to discuss and refine what they think to be the main issues (Kreiss, 2015). And providing tools to support discussion needs to strike a balance: very structured engagement may lead to more polished outcomes, though this may be to the exclusion of many groups (Loukis & Wimmer, 2012).

What is more, there is a need to understand how individuals react and behave online: simply put, how do we define an 'ePerson' (Dutt & Kerikmäe, 2014)? This is important, because individuals have a social identity which affects how they interact with others. Discussion online or offline is an inherently social activity (Kreiss, 2015) and will be influenced, therefore, by social forces (Ronson, 2015; Stott & Reicher, 2011). All of this leads to the complex integration of social, political and technical facets (Coleman & Norris, 2005; Macintosh & Whyte, 2008). In that context, there needs to be a balance struck between stakeholder interest and expectation on the one hand, and socio-technical issues such as acceptability, system adoption and willingness (Macintosh & Whyte, 2008).

In exploring the roadmap for citizen participation, therefore, there are multiple factors which need to be addressed. Online participation is clearly not about straight-forward transfer of offline processes nor about getting the technology right. We need to engage with appropriate stakeholders, therefore, to identify what they believe to be the ultimate goals and challenges for the domain. However, it will be important to consider too how HUMANE and the HUMANE approach to HMN categorisation might inform suggestions for understanding potential problems and proposing relevant solutions.

Creating the roadmap

Based on the outline described in (Jaho, Klitsi, Sarris, et al., 2017; Klitsi, Jaho, Pickering, & Walland, 2017), the roadmap for citizen participation is based on an iterative approach which is summarised

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in Figure 1 below. As depicted, this is very much a 'user-centric' method, involving direct participation in a meta-discussion of the type of activities which directly involves them or that they would be interested in.
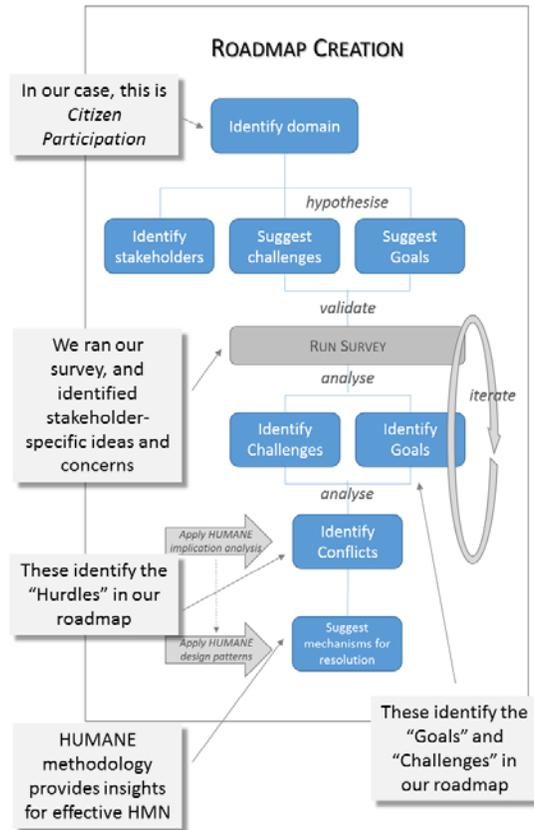

Figure 1: Summary of roadmap creation methodology

As outlined, the process involves a number of key activities. Within the context of HUMANE, of course, the HUMANE methodology (Følstad et al., 2015; Følstad, Engen, et al., 2016) provides an essential reference point towards the end of the process in order to be able to identify possible conflict resolution strategies.

Having identified the specific domain reviewed current knowledge and understanding of that domain (see the Introduction above), the first step is to review the ecosystem and identify those assumed to be the most relevant actors in the network. In the following sections, we summarise our approach. Further, by way of update to the results presented in Klitsi et al. (2017), additional responses have been included in the analyses reported here.

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Identify stakeholders

We need to be able to differentiate between expectations and perspectives of different players within the HMN. Only then do we know who we should approach.

In HUMANE, through some initial research and from experience with related projects, we identified a set of six stakeholder roles whom we felt would provide a useful perspective on the domain:

1. *Elected representative*: that is members of parliament (MPs) or similar elected officials. These would be important actors for citizens to engage with.
2. *Appointed official*: any non-elected official such as a civil-servant, or chairperson and participant on a consultation board or committee.
3. *Professional researcher*: anyone who provides research and intelligence to a political party or NGO or similar.
4. *Academic researcher*: their opposite number in academia, engaged in more theory-driven investigation.
5. *Activist*: those directly involved in representing specific groups (such as a lobbyist).
6. *Interested and engaged citizen*: that is anyone not otherwise involved professionally in the domain but who have a vested interest in participation.

We also asked these stakeholders to rank the importance of the following possible participants for citizen participation:

7. Citizen groups
8. Non-Government Organisations
9. IT Professionals and designers
10. Government
11. Policy makers

For this initial set of questions, we invited participants to add any additional comments they may have, or suggest other categories they may want to use. We had good coverage of the participant roles we had suggested ((1) to (6) above): of twenty participants using the categories we suggested, they were evenly split across *Appointed official, Academic researcher,* and *Interested and engaged citizen* (4 each); one identified themselves as a *Professional researcher*, and three as *Activists*. Of the remaining four, they described themselves as:

- Commission official involved with Open and Collaborative Government
- A Deputy MP

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- Facilitator (political tech)
- Someone working at a political research organisation

Participation was fairly varied, therefore.

With regard to those participant roles they felt important, overall[1] participants decided on the following ranking:

1st) Citizen Groups
2nd) Non-Government Organisations
3rd) Government
4th) Policy Makers
5th) IT Professionals and designers

This rank order therefore informs our proposed roadmap in the following section.

Suggest challenges

We need to check what potential blockers there may be to citizen participation

We asked participants to consider which of the following might be a barrier for citizen participation

a) Lack of interest from citizens in the process and final results
b) Lack of interest from politicians in the process or the final results
c) Disbelief that eGovernment will act on citizen contributions
d) Difficult in communicating results of citizen participation to responsible public administration
e) Small numbers of politicians participating in the process
f) Low digital literacy levels among certain demographics
g) Dissatisfaction with the degree to which politicians appear to take account of citizen contribution

In addition to the challenges we suggested above, we asked participants to rank the following factors in regard to motivating participants for public engagement

h) Motivation of citizens to engage
i) Motivation of politicians to engage
j) Trust in the system by citizens
k) Direct accessibility between policy makers and citizens

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[1] Only summary results are shown here. In the deliverable (D4.4) more detail is provided on responses per stakeholder category.

l)   Greater transparency in the policy making process
m)   Accountability of policy makers and politicians to citizens
n)   Accountability of contributors to online debate
o)   Regulation / Legislation of citizen engagement networks

Suggest goals

We want to explore what the overall aims might be for online participation

We asked participants to identify which of the following they thought would benefit online participation

i.   Openness and transparency
ii.   Access to Open Government data
iii. Improved timeliness in policy creation
iv.   Creation of new markets and innovation mechanisms
v.   Generation of a culture of public engagement

In response to what participants thought which of the barriers we suggested ((a) – (g) above) to be important, of twenty-two responses, the following summary results were provided:

POTENTIAL BARRIER	RESPONSES
Lack of interest from citizens in the process and final results	11
Lack of interest from politicians in the process or the final results	12
Disbelief that eGovernment will act on citizen contributions	14
Difficult in communicating results of citizen participation to responsible public administration	14
Small numbers of politicians participating in the process	6
Low digital literacy levels among certain demographics	6
Dissatisfaction with the degree to which politicians appear to take account of citizen contribution	18

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This tells us that there is a lack of trust that politicians and government respond to and act on what participants contribute. This is a significant blocker then which needs to be reflected in the roadmap.

Given this, and looking specifically at what might improve participation levels ((h) to (o) above), the following overall[1] rankings were identified:

1st)   Trust in the system by citizens
2nd)   Motivation of citizens to engage
3rd)   Accountability of policy makers and politicians to citizens
4th)   Motivation of politicians to engage
5th)   Greater transparency in the policy making process
6th)   Direct accessibility between policy makers and citizens
7th)   Accountability of contributors to online debate
8th)   Regulation / Legislation of citizen engagement networks

Trust and motivation of participants (the citizens themselves) as well as accountability of politicians to those citizens seem to be the greatest challenges which might reap the greatest rewards.

As far as what we proposed as overall goals ((i) to (v) above), the following rankings were given:

1st)   Generation of a culture of public engagement
2nd)   Openness and transparency
3rd)   Access to Open Government data
4th)   Improved timeliness in policy creation
5th)   Creation of new markets and innovation mechanisms

Two participants also identified their own goals:

- The possibility to make use of gamification, augmented reality and other incentivisation mechanisms; and
- Direct link between citizen and elected representative or civil servant. Opportunity to ask questions.

The rankings and individual comments help identify specific goals which we should add to our roadmap.

Identify challenges

Based on our suggestions above, what did participants actually think?

The main challenges which have come out of the analyses set out above include:

- *Understand the real **role of technology**, including appropriate regulation*. This relates to HUMAN and MACHINE AGENCY within the network.

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- *Manage motivation: how and why do people participate*? This relates to encouraging participation either through incentive or understanding how the HMN operates.
- *Publicise outcomes: how to demonstrate that it's worth doing.* This relates to how best to ensure transparency about what happens in the HMN.
- *Manage Trust: what encourages participants to trust others and the system*?

These challenges are, of course, interrelated. Within the HMN, therefore, there appears to be four main issues. This has been modelled in relation to trust and trust relations (Pickering, Engen, & Walland, 2017).

As discussed in the HUMANE project (Følstad et al., 2017; Følstad, Engen, et al., 2016), identifying implications for the HMN – experience and motivation, behaviour and collaboration, innovation and improvement, privacy and trust, underlying technical infrastructure – offers a way to providing appropriate resolution of any related problems.

Identify goals

Based on the above, we suggest the following overall goals for the HMN:

- *Deal with issues of trust:* as the basis of participation, trust in outcomes, trust in the curation of data, etc., needs to be at the basis of the design and operation of any system;
- *Generate a culture of public engagement:* based on prioritisation from stakeholders, and the suggestion to capitalise on technology (e.g., gamification, AR and other incentives);
- *Create open and transparent debate:* as part of trust (see below) and accountability, the emphasis is on *debate* rather than specific policy making;
- *Motivation engagement (citizens and politicians):* keeping the HMN functioning requires continued participation, which is based on understanding and addressing motivation. Note that this applies both

> to citizens themselves but also policy makers and other politicians;
>
> - *Foster Accountability:* again as part of participation, motivation and trust, there is a need to demonstrate that the Citizen Participation HMN shows *that* it works and *how* it works.

> These goals form the basis to identify the way from the current situation to provide an effective HMN.

Bringing all of these results together, we have developed a roadmap for Citizen Participation. This roadmap begins with the issues identify from the brief literature review, but works towards the overall goals just identified as part of the quantitative survey.

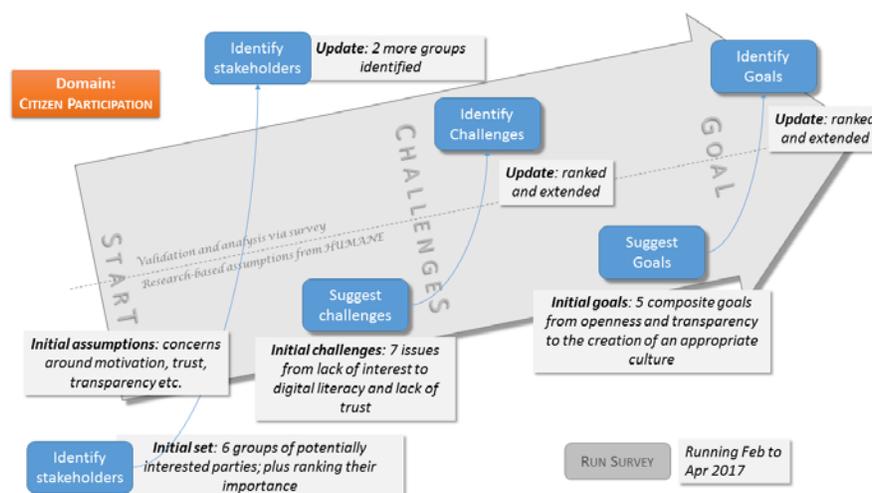## An initial roadmap for citizen participation

Figure 2: The development of the Citizen Participation Roadmap

Figure 2 summarises the steps to the generation of the Citizen Participation roadmap described below. To begin with, the roadmap starts with some of the conclusions from the introduction above and based on references cited. In relation to the overall process summarised in Figure 1, the figure shows the various steps taken and the outcomes of the quantitative survey run as part of HUMANE roadmapping (Jaho, Klitsi, Følstad, et al., 2017; Jaho, Klitsi, Sarris, et al., 2017; Klitsi et al., 2017). On this basis, and iterative engagement with stakeholders, a roadmap for the development of human-machine networks for citizen participation has been developed and is shown below.

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Figure 3: A Roadmap for Citizen Participation

The roadmap in Figure 3 clearly suggests a way forward from false assumptions based on existing online participatory activities translating directly to eParticipation. This is not the case, though, and fails to identify the types of goals and aspirations that users have of the HMN. As described in the previous section, the overall goals are not in the form of specific issues around technology or other ICT enablers, nor indeed about regulation of networks. Instead, they focus specifically on interaction and debate in the HMN: generating a culture for engagement is exactly what is needed to encourage public debate, but to keep participation going, there needs to be an appropriate willingness on all sides to trust each other and the process, and to prove that they are all working together to achieve the overall goals of the network. Along the way to these goals, specific challenges have been identified.

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Citizen Participation: HMN implications

In finalising the roadmap, it is important to validate that in addressing any specific challenge, a suitable result is reached for all stakeholders: no one stakeholder should be given any specific advantage over any other. In this section, we will consider cases where there may be conflicts between the goals and priorities of individual parties.

Identify possible conflict	In relation to the analyses described in the previous sections, it is obvious that there will be conflicts at various levels and between various stakeholders. These may be summarised as follows:

- *Stakeholder expectation*: attempting to control the network for fixed goals and towards fixed outcomes fails to recognise the dynamism of such networks and may even discourage or undermine healthy debate. The HMN must be allowed to develop as network participants allow. **This means that policy makers may not always get what they want.**
- *Trust:* as originally conceived, trust is about a willingness of an individual to expose themselves to vulnerability (Mayer, Davis, & Schoorman, 1995; Rousseau, Sitkin, Burt, & Camerer, 1998). However, this has to be trust in the overall process and not in specific outcomes, since not all political decisions almost by definition within a democracy will please all those who vote. **Not everyone will get the outcome they want; yet this should be used to underline and strengthen the perceived *integrity*, *competence* and *benevolence*[2] of the HMN itself.**
- *Motivation:* similarly, though not all outcomes will please all individuals, and although not all debates will provide quality outcomes, continued participation is essential for the HMN to flourish. Further, it's not just citizens but also other stakeholders who need to be seen to be active and accepting within the HMN. **This means that all**

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[2] Mayer et al., 1995; see also Söllner et al. (2012) Understanding the Formation of Trust in IT Artifacts. *International Conference on Information Systems*

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actors must agree to support the network and not just their own interests.

If the overall goals of the network are to be achieved, such conflicts need to be resolved. Traditionally, this may be based on appropriate balancing of different stakeholder priorities (Clark, Wroclawski, Sollins, & Braden, 2005). Yet the overall goal of the network remains one of successful operation as a network rather than providing any specific outcomes for individual stakeholders.

Mechanisms for resolution   With that in mind, and as outlined in the previous section, we can exploit the design implications and design solutions proposed in Følstad, Engen, et al. (2016) to address such issues. This will be discussed in the following section.

Increasingly, it has become clear that the HMN itself is more than the sum of its individual parts. *Trust* for instance needs to be in the network rather than individual interests or goals; similarly, *motivation* must be based on contribution to the successful operation of the HMN rather than for individual outcomes or expected results. In developing this roadmap, therefore, it has become clear once more than an HMN assumes a purpose as a collaborative entity and not in serving an individual within the network.

Key goals for Citizen Participation networks

Based on an original set of constraints we identified for the original set of stakeholders (Jaho, Klitsi, Sarris, et al., 2017), the main issues of concern for citizen participation HMN users may be summarised as in Table 1.

	Local and National Government	Citizen Groups	NGOs	Industry	Security Services
Motivation	X	X			
Trust & Security	X	X	X	X	X
Control	X			X	
Accessibility	X	X			
Transparency	X	X	X	X	
Accountability	X			X	X

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Regulation/legislation	X	X	X	X	X
Subversion	X	X		X	X
Provenance	X	X	X		X

Table 1: Constraints and issues for different stakeholders in Citizen Participation

The issues of subversion and provenance reflect potential concerns that information is created and disseminated by bots. At the very least, this would distort perspectives. That aside, though clearly related to it, we identify provenance – where information or interactions originate from – as concerns for:

- *Local and national government*: if views do not reflect the citizens that the government agency seeks to represent, outcomes will not be representative or satisfactory to those citizens;
- *Citizen groups*: citizens may be influenced by incorrect or unrepresentative information; this could exacerbate any problems;
- *NGOs*: without assurance of where information comes from, NGOs cannot possibly represent suitable views; similarly, if it is unclear that interactions originate from actual citizens, this would cause the NGO to take action unnecessarily; and
- *Security services*: without knowing where information or interactions coming from, those responsible for security will not know whether a network is subject to attack or not, and whether corrective action needs to be taken.

All of this relates more specifically to behaviours and context around the HMN rather than any particular technical issues. Increasing machine agency will need to be managed sensitively, therefore, if the HMN is to evolve in ways that participants want.

Mechanisms for Conflict resolution

As identified in the previous sections, a number of specific conflicts have arisen as the roadmap has been developed. Such conflicts reflect issues related to stakeholder expectations and how these differ from stakeholder to stakeholder, to providing trust mechanisms, and to support motivation. To resolve these issues, the HUMANE typology and methodology provides a suitable set of design solutions which offer HMN-centric not necessarily specific to Citizen Participation networks. These are summarised below; the order is as they appear in (Følstad, Yasseri, et al., 2016). The design solutions were separately validated and are grouped into specific areas: *Experience, Motivation, Reputation, Behavioural Change, Collaboration, Loyalty, Shared Responsibility, Social Interaction, Innovation and Improvement, Product Quality, Network Growth, Privacy* and *Trust,* shown in brackets along with the respective design solutions examined. The range of such categories reflects the fact that resolving potential conflict requires many different HMN-centric issues.

Provide what is desired, not just what is known (*Experience*)	This design solution is geared specifically towards ensuring that relevant information is provided and not just standard messages. As such, this would mean that participants would be given access to information related directed to any given interaction, i.e., the particularly discussion that the individuals are engaged with. This might be expected to relate to **Trust** and **Motivation** as potential sources of conflict.
Motivating users to contribute content in HMNs (*Motivation*)	This solution is aimed at making it easy for users to contribute and engage. Of course, this may be different depending on user category – e.g., whether the user is a citizen or policy maker. This obviously relates to conflicts between **Stakeholder Expectation**s, and suggests that all expectations need to considered and designed for. Clearly, this will also have relevance to **Motivation**.
Reward users to keep them motivated (*Motivation*)	Although this is ostensibly an obvious design solution; gamification, for example, is often used to encourage participation. However, motivation may not simply be a product of 'badges': prosocial behaviours for instance are not necessarily motivated this way. It is therefore important that the reward be associated with the goals and expectations of users. For example, for Citizen Participation, this might be providing direct access to policy makers for a specific discussion. This relates specifically to **Motivation**. However, if the reward includes appropriate transparency and information about the network and how it functions may promote **Trust**.
Strengthen social ties to keep users motivated (*Motivation*) **Preserving reputation of an individual, company or organization in HMNs** (*Reputation*)	This group of design solutions relate specifically to exploiting the social nature of online interaction (see, for instance, Kreiss, 2015). Clearly, much can be learned from understanding social forces, including social identity and intergroup factors. This clearly relates to

Behavioural change through social motivation (*Behavioural change*)

Motivation; but as social engagement also includes factors of **Trust**.

Collaboration between machines and humans through machine learning (*Collaboration*)

This may seem a surprising design solution. However, allowing AI techniques to identify patterns of behaviours or activity would provide valuable information which could be used by all participants in the network to understand each other's motives and drivers. This would help support issues of understanding **Stakeholder expectation,** and might encourage **Trust** and **Motivation** in consequence.

Apply loyalty ladder to build and maintain a sustainable user base (*Loyalty*)

This design solution relates back to *reward systems* outlined above. As such, it may support **Motivation** and **Trust**.

Encouraging shared responsibility HMNs (*Shared Responsibility*)

If participants can be encouraged to take ownership for the HMN, then this may be expected to contribute to the success of the network. In so doing, this would help **Motivation** and **Trust**. It may also help participants understand **Stakeholder expectation**, and may lead to increased participation.

Supporting social interaction through strengthening within-platform communication (*Social Interaction*)

This design solution relates back to the *social forces* mentioned above.

Contributors learn to improve by being consumers first (*Innovation and Improvement*)

This design solution relates especially to **Stakeholder expectation**: allowing different participants to gain a perspective of other players in the network may encourage a better understanding and appreciation of those different players. As such, this may support **Trust** and **Motivation**.

Strengthen innovation through infrastructure for informal

This design solution explicitly recognises that HMNs may develop in unexpected directions. However, designing for serendipitous interaction between

collaboration (*Innovation and Improvement*)	participants at different times might encourage ***Trust*** at the very least, but also ***Motivation***.
Employ automatic quality control (*Product quality*)	This relates back to machine learning and AI within the network. However, in respect to the quality of contributions (Loukis & Wimmer, 2012), having an automated system prompt participants to improve the quality of their input privately rather than publically across the network may encourage participation, i.e., relate to ***Motivation***.
Protect new users for beginning (*Network growth*)	As above, allowing new users to find their own way, possibly even via making mistakes, then this may encourage ***Motivation***, and possibly ***Trust*** in the network.
Managing privacy (*Privacy*)	This is an obvious design solution: participants need to know that their personal data *but also* their interactions are protected. This would support ***Trust*** as well as ***Motivation***.
Strengthen trust through efficient handling at first point of contact (*Trust*)	
Strengthen interpersonal trust through rich profiles and recommendations (*Trust*)	Related to the *social forces* comments above, and obviously related to ***Trust*** and ***Motivation***, these design solutions provide obvious support to the ongoing success of the HMN.
Supporting trust across HMN interactions (*Trust*)	

For the conflicts identified in the previous sections and which may introduce an additional layer of challenge in moving toward the overall goals of the HMN, the HUMANE methodology offers helpful informative design solutions as described above. Derived from a set of HMN use cases which were not related to Citizen Participation, this suggests that the design solutions are not specific to any particular type of HMN. Instead, they provide network-centric, rather than user-centric, solutions and patterns which resolve network level issues. In so doing, the HUMANE design solutions help

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finalise the roadmap creation as shown previously by providing solutions to possible conflicts which might otherwise mean that the challenges identified cannot be addressed.

Timeline

Unlike other roadmaps, there is something both unique and critically context-dependent about any timeline associated with Citizen Participation. This is summarised in Figure 4 below.
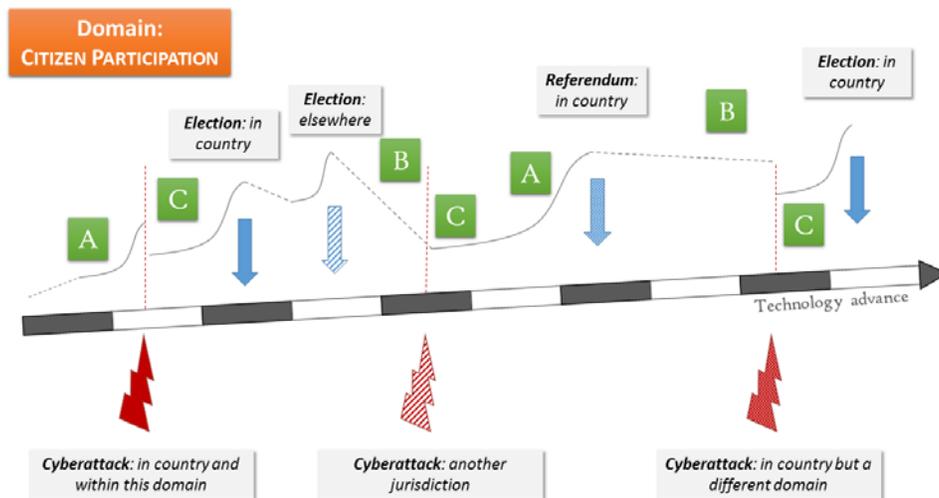

Figure 4: Context-dependent timeline for Citizen Participation roadmapping

Although we would expect technology (and associated regulation) to improve and increase in power and complexity over time, there are different factors which will affect how Citizen Participation develops dynamically. Not least given issues around trust and motivation outlined above, we would expect technology adoption to be rather less linear. Especially in the run-up to an election of some sort (shown as "A" on the diagram), there may be expected *a priori* to be increased interest and participation. Note that elections may be in country (both local and national) and in which local citizens will be assumed to take part; or they may occur elsewhere, with citizens in one country interested (or affected by) the outcomes of elections in other countries. Elections may also be parliamentary or presidential, involving a potential change in legislature, or to gauge public opinion which may influence the legislature and / or the executive, such as opinion polls associated with elections or referenda. Between elections (or referenda etc.), there may be a decrease in interest and engagement (shown as "B" on the diagram). However, in response to a cyberattack, there may also be a sudden resetting of the level of citizen engagement ("C"). A cyberattack may include a simple breach of security, or a more subtle manipulation of information which may affect future decisions or events. As with elections and referenda, these may take place in country or abroad.

The evolution over time and in response to technological improvement may involve increased citizen participation. However, this will not be a straight-forward progression towards any specific goal. Instead, there is likely to be a *quasi*-cyclical development which will be facilitated by inclusion of the HUMANE design strategies we outline above which were selected to address the specific HMN challenges we had identified in the preceding steps described in this section.

Conclusion

Looking at issues for Citizen Participation processes has highlighted both the overall aims for the HMNs that might be used to support participation in this domain. In developing a suitable roadmap though it is important not only to identify potential challenges along the way but also any particular conflicts which may hamper progress towards the ultimate goals of the network. Using design solutions derived from a consideration of implications associated with HMNs in other domains (Følstad, Engen, et al., 2016), possible conflicts can be resolved to enable the successful growth and continuous development of HMNs aimed at support for Citizen Participation. Development of the roadmap highlighted specifically that trust and motivation are significant factors which may affect the success of citizen participation networks. How the two constructs relate to one another and how this might affect participation needs further investigation (Walland & Pickering, 2017).

Acknowledgement

The presented work is drawn from the HUMANE project deliverable Final Roadmap of Human-Machine Networks (HUMANE, D4.4). This deliverable will be made public following project review, but may be made available before this on request; please contact the roadmap author.

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