

Digital Interaction Values and Platforms Design

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Abstract

The article reveals the methodology for determining the values that should be taken into account when designing digital platforms that ensure interaction between the state and citizens. An online survey was conducted. Using the obtained data, a network of values is constructed and visualized, supplemented with digital qualities of personality and competence. Their correlations with the indicators of active and passive digital behavior of citizens are calculated. The article reveals the value determinants of the population's governability through the media and during the quarantine period, as well as the frequency of participation in electronic hearings on topical issues of the country's life. The obtained results provide empirical confirmation of the recursive three-element structure of value-oriented design. It is shown that taking into account the value qualities associated with the target result of IT technology allows you to significantly limit their number for use in VSD.

Keywords

Digital values, value network, civic engagement, digital governability, value determinants, value sensitive design, recursivity

1. Introduction

Advances in computing, information and communication technology and the computerization of society have created and continue to generate vast amounts of diverse information and have made it possible to use it economically in a variety of areas of daily life. To take advantage of these benefits requires a digital transformation of "people, data, processes" and institutions across the social and/or organizational hierarchy.

In Russia, digital transformation turned into a practical plane when the Digital Economy of the Russian Federation program was adopted on July 28, 2017. Currently, it is developing in 7 areas. One of them is presented by the federal project "Digital Public Administration", which aims to provide citizens and organizations with access to public services and services in digital form, the development of e-government infrastructure, and the introduction of platform solutions. As expected in the Passport of the project, its implementation "will allow a final transition to electronic interaction of citizens and organizations with the state" and will make it "more convenient".

Key principles and design elements that should be taken into account when creating a digital government are discussed in the World Bank report [1]. Digital platforms are a necessary component in many of them. Let us draw attention to the principle of providing digital government services, including user-oriented service design. It "should reflect the needs of a wide range of citizens and not adapt everything to one template". Perspectives are seen "in individualized services with a high degree of personalization" [1, p. 12].

Let us distract from the "purely" technical or economic aspects of the digital government and look at it somewhat from the other side. The union of computer technologies and knowledge collected in the social sciences forms a new research direction - "Digital Socio-Humanities". In it, we highlight the

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problem of the influence of the socio-political nature of digital technologies on the governability of the public sphere.

As digitalization develops wide and deep, "the platform society" is approved and the "value - centric design" of the digital formats that implement it becomes relevant [2]. If previously the emphasis was placed on achieving the required functionality, then now a recommendation is added to it to take into account the values of the parties involved in the interaction. Taking this into account, the purpose of our publication is to identify the value component of digital interaction between the state and citizens in the context of value-oriented design.

2. Literature review

The importance of taking values into account in the interaction of the state and citizens is noted in many publications. Values are the "core of the most important guiding components of political activity", ideology, political culture, political system [3]. Traditionally common political and basic personal values are distinguished.

Political values include: Equality of Opportunity, Economic Individualism, Free Enterprise System [4]; Equal Opportunity, Limited Government, Traditional Family Values, Moral Tolerance [5]; Liberty, Equality, Economic Security, and Social Order [6]. This list is not exhaustive and other groupings can be cited. As an example of basic personal values, we give a list of S. Schwartz, which includes: Power, Achievement, Hedonism, Stimulation, Self-direction, Universalism, Benevolence, Tradition, Conformity, Security [7]. An overview of the work on the relationship between the values of citizens and political behavior is presented in article [8]. Its empirical part also confirms "the relationship between the basic values of [Russian] respondents and their voting preferences [in March 2012]".

Digitalization leads to a greater individualization of relations with citizens, so universal values are detailed to the level of personal traits. The list of their constituent groups and indicators is not constant and can be adapted to the specific problem being studied. Note that we are not aware of studies that reveal the inclusion of "digital" traits in the network of basic personality traits.

The limit case of "digital" individualization is achieved using recommender systems for targeted impact. There are known cases of their use for managing the choice of citizens based on "big" data (for example, [9]). Several publications are devoted to the description of this approach, including computer program [10], as well as recordings of the speech of the former head of the company who applied it [11]. The algorithm predicts the personal types of citizens and their political preferences, which allows you to form psychologically individualized messages in social networks or other forms of electronic interaction. It seemed that " government, internet provider... can infer their personal characteristics more accurately than their closest family members". As a result, there is a risk that "people might distrust or reject digital technologies" [12, p. 1039]. For its resolution, it has yet to be developed "a coherent set of legal, ethical and technical frameworks to regulate the collection, storage and exchange of such [big] data" [9, p. 14]. Given these limitations, our publication uses the detailing of universal values to the level of personal traits.

Digital platforms are a modern tool for implementing electronic interaction. Depending on the area of activity, "platform interactions" cover news and journalism (social media platforms), urban transport (ride - hailing platforms), healthcare ("integration of applications and technologies to provide a customized, end-to-end, Healthcare solution"; see <https://www.fingent.com/healthcare-application-platforms/>), education (online learning platform) and other areas. According to one of the definitions, "a digital platform is a system of algorithmized mutually beneficial relationships of a significant number of independent participants in the economy (or sphere of activity) carried out in a single information environment, leading to a reduction in transaction costs due to the use of a package of digital technologies for working with data..." [13].

The object of our work is electronic interaction between the state and citizens. One of the World Bank's 12 projections of the impact of the latest technologies notes that "more political parties will develop more of their policy and choose more of their candidates through dedicated digital platforms" [14]. Digitalization has led governments to incorporate citizens into their functioning. It realized by online service delivery platforms, open data portals, complaint redressal etc. Very important form of

digital platforms that involves citizens is Digital Citizen Engagement platforms which is «the use of new media/digital ICTs to create or enhance the communication channels» [15]. Russia has such platform called Active Citizen. This project was created as a means for conducting electronic voting on urban development issues among various groups of Muscovites. The Active Citizen platform now (29.05.2021) has 5110682 users, who have expressed 158315212 opinions and been invited to vote on nearly 4954 issues. Smaller systems are developing in other regions of the country. As an example of digital platforms created and introduced in Russia on a national scale, we will call the digital voting system with blockchain. In a single voting day of 2021, remote e-voting will be used in 7 regions.

Theoretical principles of connection between digital technologies and public administration were proposed in the works of L. V. Smorgunov [16] and D. Johnson [17]. The first of them gives "the political ontology of purely procedural fairness of blockchain technology, which relies ... on the technical and social immediacy of cooperation and joint production". In the second publication, digital platforms can act as "a dialogic forum" to increase civic participation, public discussion and democratic competition. Thus, the "danger of neglecting constitutional values" is reduced.

Formal ontologies are used to unify the representation of knowledge about the subject area. By definition, it is "a special type of semantic representations that can be defined as a model of observed reality, or as a hierarchical form of knowledge representations that reflects the structure of observed reality, or as a logical theory that allows you to systematize the categories of reality and / or the values..." [18]. The digital platform reference ontology is supposed to foster "a better understanding of digital platform functionality, better communication between stakeholders and eventually may facilitate future research and development of digital platforms" [19]. Proposed in this work (other materials are also available on the <http://model-a-platform.com> website) ontology generalizes knowledge in UML extension notation. It includes detailed diagrams of the elements of the digital platform (mainly commercial) and the connections between them. They are clearly technical and lack both a value component and such an important element of interaction as recursion [20].

Design techniques and human values are combined within an approach known as "value sensitive design" (VSD) [21]. Its feature is the integration "human values in technologies from the very start of the design process" [22]. Examples of applying VSD include such values as accountability, transparency, democracy and justice [23]. The peculiarity of our work is that it takes into account "digital" restrictions on social interactions and the values of the level of human traits.

We summarize the completed review. Values are an important element in the interaction of the state and citizens. Digital platforms are a modern tool for organizing such interactions. VSD enables values to be incorporated into digital platforms. Thus, it is initially necessary to identify a list of values that are important in a specific area of interaction. A further part of our publication is devoted to this.

3. Data and methodology

The work is based on empirical data on the relationship between the value traits of Russian citizens and their behavior in some situations of digital public administration and state governability. The parties to this connection form two main sections of the developed questionnaire. In the auxiliary third part ("hard data") socio-demographic information is collected (sex, age, level of education, income). The list of main indicators is given in Table 3. Let us explain the content and methodology of the first two sections in more detail.

In our study, the list of values is selected from the work [24]. They are expressed through 24 personality traits, which are combined into 4 groups (entrepreneurial (hereinafter - group 1), communicative (2), "a good person" traits ("personal"), (4) and collectivist (5)) of 6 elements each. Following the original methodology, correlations between indicators are first calculated, then they are visualized in the form of a network, finally, its quantitative characteristics are calculated and interpreted. This algorithm is used for reference qualities and self-evaluation.

Further, it is accepted by us as the basis for identifying and building links not only between values, but also their links with interesting indicators of digital public administration. So that the total number of indicators does not become too large and difficult for respondents to perceive, we limited ourselves to the four most important traits in each of the groups. The selection took into account the

experimental results of comparing the network of values of student in cities of federal significance of the Russian Federation.

Table 3

List of indicators and their abbreviated names

Indicator groups	Indicators and their designations
	Section I. Universal and digital values, digital competencies
Groups of universal values	- entrepreneurial (group 1): Pragmatic; Successful; Purposeful; Leading; - communicative (group 2): flexible, slick, resourceful (Agile); understanding the needs of the other (Understanding); a good communicator (Communicator); "can inspire trust" (Prepossessing); - "a good person" (group 4): adequately assessing himself (Adequate); freedom-loving (FreedomLoving); open person (OpenPerson); Truthful; - collectivist (group 5): caring for others (Mindful); ready to provide assistance (ReadyHelp); professing team spirit (TeamSpirit); Benevolent
Group of "digital" values	"digital" (group 3): "algorithmic" (Algorithmic); "datacentric" (DataCentric); "Innovative"; "cybermen" (CyberMan)
Digital competencies	information and data literacy (DataLiter); communication and collaboration in a network environment (Comm & Coll); information security (InfoSecur); general level of the respondent's computer skills (CompSkill)
	Section II. Impact of digitalization on public administration and governability
E-participation	passive (online public service, frequency of use of the services, Frequency); active (satisfaction with the completeness of information on the life of the country/city (SatisfInf); frequency e-participation in electronic hearings, (FreqEPart)
Governability of the population through the media	whose opinion (official/informal) dominates the decision of respondents on the following issues: when buying currency or keeping money in rubles (AdvMonSav); at selection or change of place of work (AdvChWork); when voting in elections (AdvVoting); the level of compliance of respondents with the official recommendation to stay at home and other self-restrictions during the COVID-19 "high readiness" period (ImpRecomm)
Opinions on the impact of digitalization on public administration	influence on the control of corruption (ImpCorrup); influence on the ability of the Government to manage resources effectively (ImpEffGov); the current level of development of digital feedback mechanisms from the population to the Russian government (DigtFeedb); influence on change in political governance (ChGvrnAbl)
	Section III. General information
Overview of Respondents (hard data)	age (RespAge); level of education (RespEducat); income (per month, RespIncom)

Taking into account the stated focus of our work, some changes were made to the list of values. A fifth group has been added to the original groups, reflecting "digital" traits (group 3). It includes 3 of 7 attributes of the "digital" culture [25]. Other indicators of this culture are universal, not necessarily "digital". Thus, "agility and flexibility" and "open culture" are already part of the communicative group and "a good person", and "collaboration" - in the model of "digital" competence (see below). The "customer centricity" excluded because business applications are not considered. For better understanding by respondents, the names of the three attributes included in the group and their

explanations are slightly changed. In addition, the "algorithmic" traits is added. Thus, the formed new group contains indicators that concentrate on its "digital" orientation. Their list is as follows:

- "algorithmic" ("step-by-step", if-then-otherwise" type thinking in solving problems");
- "datacentric" ("emphasis on the use of diverse data and analytics in decision-making");
- "cybermen" ("obsessed" with the study and application of new digital technologies);
- "innovative" (the predominance of risky, creative-destructive thinking). Unlike the previous three, this quality is less specialized in "digit".

The resulting list of personality qualities and their designations are given in the Table 3. Such a separation is made for greater clarity. To obtain quantitative values in the questionnaire, respondents were asked to present and evaluate on a scale from 0 to 5 a person who could "act as a positive standard in life or be closest to such a standard... for imitation" ("positive standard"). Then the procedure was repeated for a negative standard (that is, "a person whom the respondent did not want to resemble in any way") and in relation to himself ("I myself").

The first section of the questionnaire also contains questions about the "digital" competence of respondents. They are based on the Conceptual Reference Model DigComp 2.0 [26]. It includes 5 competencies, from which we selected the following: literacy in the field of information and data, communication and collaboration in a network environment, information security. The two remaining areas (digital content creation and problem solving) are priority components of digital competence. However, the relevant knowledge and skills are not yet widespread among the population and therefore are not included in the questionnaire. We limited ourselves to a simpler and more understandable assessment of the respondent's overall computer skills.

The second section of the questionnaire consists of three blocks of questions related to digital public administration and governability. Most of them are chosen in such a way as to include direct relations with citizens. In the first block, they act as passive consumers of various electronic public services and as active participants in electronic hearings on topical issues of state/city/district life. It determined the frequency of use/participation, satisfaction with the services provided and the completeness of the information provided. These issues reveal important components of e-government and "digital" participation. [27]

Another block contains questions related to the governability of the population through the media. It turned out whose opinion (official/informal) dominates when people make decisions in a number of life situations. In particular, when buying currency or saving funds in rubles, when choosing or changing a place of work, when voting in elections. A peculiar case for governability, which is also included in the questionnaire, was the degree of compliance by respondents with the official recommendation to be at home and other self-restrictions during the COVID-19 "high readiness" period.

Finally, in the third block, the opinion of respondents was found out about the impact of digitalization on public administration and governability. This includes questions about indicators from the World Bank list [28], such as control over corruption, the ability of the government to effectively manage resources, the current level of development of feedback mechanisms from the population to the Russian government. In addition, a particular interest was the influence on the change in political state governability.

The developed questionnaire was available online in May - June 2020; 153 people responded; the snowball technique was used. The average age of respondents was 30 years; 50.7% has a higher education diploma.

4. Empirical results and discussion

The material in this section is divided into two parts. The first examines and compares value networks. In the second, their connections with public administration indicators are revealed. In both cases, a list of values is defined and discussed in the context of the possibility of their subsequent use in the VSD.

Figure 1 shows the value network for the case of a positive standard. The links correspond to correlation coefficients whose value modules exceed 0.5. The size of the nodes (black squares in the illustration) is proportional to the weight of the traits, that is, the average sum of the points they

scored in the respondents' questionnaires. According to the average values of each group, the groups are ranked in the following order (descending):

- communicative - 4.0;
- entrepreneurial and collectivist - 3.8 each;
- the qualities of "a good person" - 3.7;
- "digital" - 3.4.

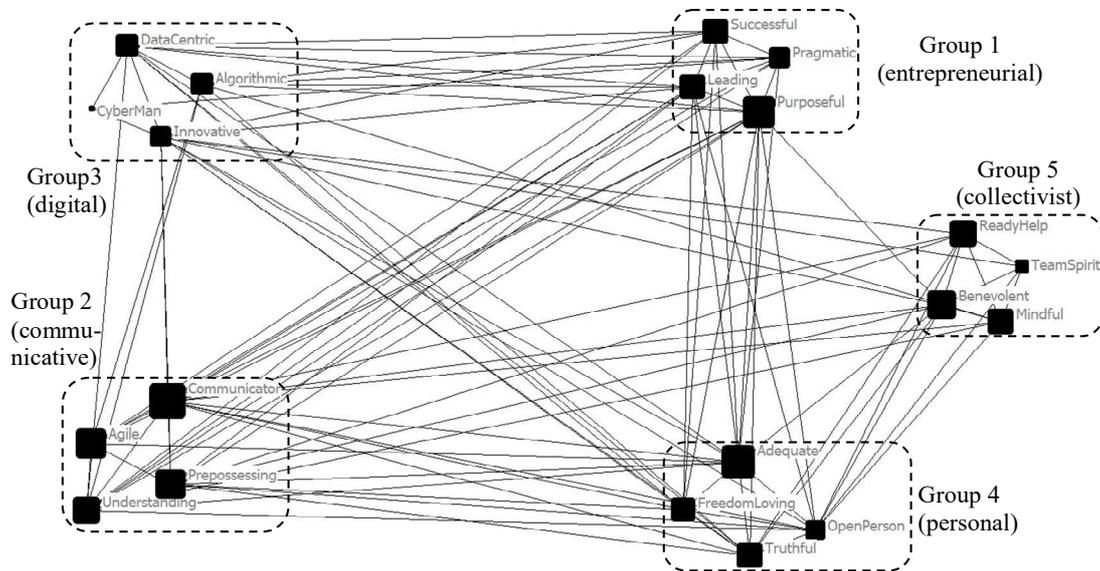


Figure 1: Value network for positive standard

For the case of self-evaluation, the values of the group quality weights are noticeably smaller and the order changes:

- qualities of "a good person" and collectivist - 3.3 each;
- communicative - 3.1;
- entrepreneurial - 3.0;
- "digital" - 2.7.

As can be seen, in the case of self-evaluation, the total weight of qualities in groups is noticeably less than for a positive standard. A similar observation is true for bond densities. For a positive standard, it is almost 2 times higher than for self-evaluation: 0.542 versus 0.284. Table 1 and Table 1 show the densities within and between groups for the two cases considered. Indicators of "digital" qualities and qualities of "a good person" differ more (in difference between a positive standard and self-evaluation) from other groups, and entrepreneurial ones in the smallest. As for the first two, the "digit" is still being fixed in the structure of values, and is not easy for a "good person" to integrate into the current realities of life. Another thing is entrepreneurial. Here, the differences between the positive standard and self-evaluation, both within the group, and its connections with communicative and collectivist traits are practically absent.

Table 1

The density of links within / between groups for a positive standard

	Group 1	Group 2	Group 3	Group 4	Group 5
Group 1	1.000	0.750	0.688	0.688	0.063
Group 2	0.750	0.833	0.313	0.688	0.375
Group 3	0.688	0.313	0.667	0.500	0.250
Group 4	0.688	0.688	0.500	1.000	0.438
Group 5	0.063	0.375	0.250	0.438	1.000

Table 2

Density of links within / between groups for the case of self-evaluation

	Group 1	Group 2	Group 3	Group 4	Group 5
Group 1	1.000	0.813	0.125	0.250	0.063
Group 2	0.813	0.833	0.250	0.188	0.188
Group 3	0.125	0.250	0.333	0.063	0.000
Group 4	0.250	0.188	0.063	0.000	0.375
Group 5	0.063	0.188	0.000	0.375	0.667

The results obtained clarify the idea of values, which should first be taken into account. For our sample, they are ranked by weight in descending order as follows (first 5 for a positive standard): "Communicator" ("Good communicator"), "Adequate" ("Adequately evaluating himself"), "Purposeful", "Agile" ("Flexible, agile..."), "Prepossessing" ("can inspire trust"); the values of the remaining indicators quite closely follow the "leaders"; "digital" traits are in the lower third of the list. For self-evaluation, the indicators are different, and their values are less: "Freedom-loving", "Benevolent", "Ready to help", "Truthful", "Mindful" ("Caring for others"); 3 out of 4 "digital" values occupy places in the lower third of the ranked list, and "Algorithmic" - in its middle. It is not yet clear how to use additional information about the centrality of nodes in the value network in VSD (not given here). Knowing the list of ranked "universal" values is useful for customizing existing or creating new affordances of digital systems, regardless of their field of application. In our sample there are no indicators with a wide separation from the rest. Thus, a rather voluminous list of indicators is obtained, which makes it very difficult to take them into account in VSD.

Comparing the results for a positive benchmark and self-evaluation leads us to recursivity. The data for the positive standard "best show the value horizons" [24, p. 188). They "act as a kind of model of vision for themselves in the future, perhaps a projection of their future, that is, what they should strive for and what they should imitate". The observed significant discrepancy between the positive standard and self-evaluation complements the content of the recursive three-element structure of VSD in the sense that it is necessary to recursively take into account the possible "migration" of values during the operation of digital technologies.

A step in the development of value-oriented design in the development of specialized platforms for digital citizen engagement is the identification and consideration of values related to requirements, in addition to the main functionality, required for the digital system. Let us consider what has been said in relation to public administration with examples of increased public engagement in electronic discussions on a variety of important issues of public life and governability in specific situations. For this purpose, as mentioned above, questions were included in the questionnaire.

Nonzero for confidence probability +0.95 significant associations (modules of values of correlation coefficients) obtained after questionnaire processing are visualized in Figure 2 (for a positive standard). The following blocks are highlighted (outlined with a rectangular dotted border):

- groups of values:
 - 1, 2, 4, 5 (universal; "Group 1,2,4,5");
 - 3 (digital; "Group 3 (digital)");
- digital competencies ("Dig. competencies»);
- indicators of active / passive electronic participation ("e-participation");
- governability of the population through the media:
 - (1) in typical situations ("Mass media governability");
 - (2) governability of the population through the media in the context of COVID-19 ("Governability COVID-19");
- Socio-demographic data ("Hard data");
- respondents' opinions on the impact of digitalization on public administration ("Opinions on dig. impact»).

As expected, the age of the respondents is related to values, and their income and level of education - to digital competencies (all included in the Hard data block). It is also logical to link the indicators of digital competencies with some universal and "digital" values. In this respect, our results

are consistent with the existing practice of taking them into account in the design of many digital systems. Opinions on the impact of digitalization have proved useful only for descriptive information and are not considered further.

Let's pay attention to the part of the figure that is surrounded by a rectangular continuous frame. This area includes "boundary" values. They are of main interest in our work, since they are directly related to public administration indicators.

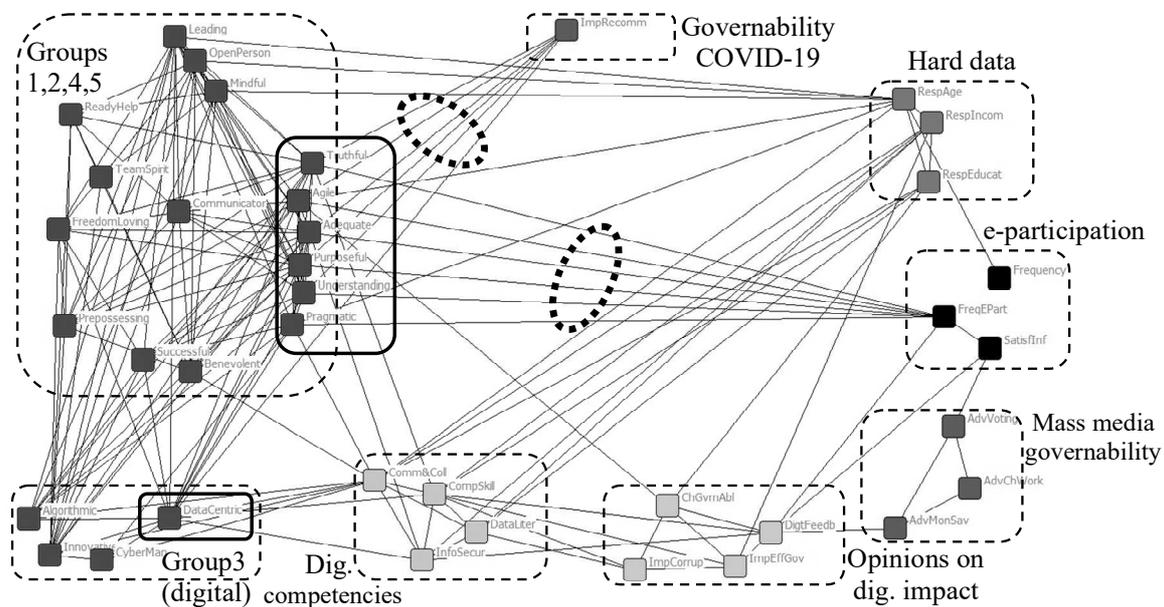


Figure 2: Linking values to governability and e-participation for positive standard

Let us turn to indicators of electronic participation. First, descriptive statistics about them are given, then their relationship with values is revealed. The values for the passive form are as follows (use of electronic public services): satisfaction with the services provided - 2.8 (close to the grading of the assessment "rather satisfied"); frequency of use - 1.3 (about "rarely"). None of the "passive" indicators is statistically significantly related to the values of the list we use. The values of the indicators of the active form of electronic participation are as follows: satisfaction (completeness of information on state/municipal sites) - 1.7 (the estimate lies between "rather not satisfied" and "uncertain attitude"); frequency of participation is 0.6 (between "never" and "very rarely"). The frequency of participation is inversely associated with the following value traits: entrepreneurial ("Pragmatic", "Purposeful"), communicative ("Understanding the needs of another...", "Agile..."), "qualities of a good person" ("Adequately assessing himself", "Truthful"). These links are highlighted by a dashed oval in the center of the figure. Thus, the initial list of 20 qualities, as in our study, is significantly narrowed. The obvious link between the frequency of participation and the completeness of the information was confirmed. For our respondents, the identified links should be taken into account in the value-sensitive design of digital platforms with an active form of electronic participation. The above qualities (with two highest gradations) are expressed in 73.3%, 71.7%, 69.3% of respondents who are respectively members of the communicative, "a good person" and entrepreneurial groups. That is, the digital platform becomes value-related with a significant audience of users.

Let's move on to the governability of the population through the media. As indicated above, in the questionnaire this issue was clarified for 4 situations: when buying currency, when choosing a job and voting in elections; a case of behavior of people during the "high readiness" period is separately highlighted. There is a high positive correlation between the first three situations. Voting in elections is connected with satisfaction with the completeness of the information provided and here people take into account official opinion to a greater extent compared to two other situations. In general, in the first three cases, there was no statistically significant association between the increase in the proportion of official information taken into account in decision-making and their value traits. It can

be assumed that the population has already developed a certain attitude towards external sources of information.

Separately from these three cases, there is an indicator of governability in the first months of the "covid" quarantine. Compliance by respondents with official recommendations is associated with 6 values. Five of them are similar in sign and direction to those identified for the frequency of active participation (all except "Pragmatic"). The sixth quality was the connection with "Datacentric" which is part of the group of "digital" values. This quality is important for 59.3% of respondents. Figuratively speaking, events in the spring of 2020 "reached the depths of the soul", when the importance of obtaining operational information was keenly felt. In this case, as in the previous case, we can talk about a significant reduction number of values for their inclusion in VSD.

5. Conclusion

Thus, the following main results are obtained in the work:

- The content of the recursive three-element structure of VSD is supplemented by a recommendation on the need to take into account the possible shift of values to a positive standard during the operation of the designed digital technologies. It is based on the revealed difference between the positive standard and self-evaluation.
- The VSD approach is supplemented by a provision on the importance of taking into account the values associated with the target result of IT technology; the methodology implementing it is proposed and disclosed on specific cases.
- An empirical sociological study of electronic participation of the population and governability through the media was conducted. It is shown that the implementation of our methodology allows to significantly limit the number of values for accounting in VSD.

The results of the work allow us to propose some areas of further research. So, the question arises what and how values are taken into account in existing digital platforms; are they set initially in the engineering specification or implemented "by default", as a property of used information technologies (for example, blockchain). The next step is to develop recursive algorithms to give digital platforms the desired values with the ability to adapt in the process of functioning to changes in their severity, composition and random effects. Finally, the ultimate case of taking into account values is their use in recommender systems. It is still restrained by ethical and legal restrictions on the use of personal data.

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