Attitudes Towards Electronic Voting and Commenting in Business, Private and Public Meetings

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Abstract

This paper analyses attitudes toward meeting app features that support collaboration in business, private, and public affairs and offers an entity relationship diagram of an electronic meeting system (EMS) that can be successfully applied in those three spheres. An empirical research was conducted on a sample of 120 (N) respondents from the Republic of Croatia, while the research instrument was an online questionnaire containing 15 mandatory and 2 open-ended questions. The analysis revealed a statistically significant positive and strong relationship between organisations that should use an EMS but do not use it and organisations that spend too much time and resources on managing official meetings ($\tau b = .576, p < .01$). 48.3% of respondents claim that their organisations should use an EMS in business operations, while 57.5% of respondents believe that the EMS improves productivity. 65% of respondents agree and strongly agree that it is desirable to use authorised electronic voting in public affairs, while 33.4% of respondents agree and strongly agree that they would like to use the electronic voting system in private affairs. The conducted research shows that followers are more inclined to vote anonymously ($U = 1109, z = -2.947, p = .003, r = .07$) and comment anonymously ($U = 1178, z = -2.580, p = .010$). , r = .06) from their leaders. For this reason, authors have designed an entity relationship diagram of an EMS that supports both anonymous and transparent interaction.

Keywords: *Electronic Meeting System; Electronic Voting, Anonymity, Attitudes, Productivity, Private Affairs, Public Affairs, Entity Relationship Diagram.*

Introduction

The Electronic Meeting System (EMS) is an IT system that enables users to carry out all activities related to a meeting (management of members' roles and mandates, preparation of the agenda and voting questions, invitations to meetings, exchange of documents, discussions, voting and reports) via digital technologies (Grohowski et al., 1990). From the beginning until today, humans are constantly developing new methods and techniques that improve their organisational capabilities. In 2023, the global market for video conferencing was estimated at USD 7.84 billion and is expected to grow to USD 22.26 billion by 2032, with a compound annual growth rate (CAGR) of 12.30% (Sukhanova, 2024). Although electronic group meetings have been studied by various researchers for almost half a century (Remp, 1974), many companies still do not use such solutions, while those who do use them face various problems and issues in their application (Carr & Ludvigsen, 2017).

There are at least four different reasons why many modern organisations have not yet implemented EMS. The first reason has to do with inertia and unwillingness to change. Implementing any IT system, including an EMS, requires a redefinition of organisational rules and behaviours through learning, which requires a significant investment of time and resources (Abu-Taieh et al., 2009). While employees are generally reluctant to adopt new IT systems that require additional training and professional development (Korunka & Vitouch, 1999), many managers do not want to improve the transparency of their decision-making process (Liou, 1992). Nevertheless, empirical results suggest that there is a significant positive relationship between employee perceptions of transparency and affective commitment (Bratley & Aloysius, 2019).

The second reason for the low popularity of EMS is related to infrastructure costs (Heller, 2010). All organisations need to back up their files, and only recently have cloud services become accessible to a greater number of users at an acceptable cost. Before fast internet connections and various smartphone

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features such as video calls, fingerprint control, mobile apps, to name a few, it was very difficult and impractical to conduct electronic meetings. Fortunately, technology has become more accessible and today there are many different EMS and video conferencing tools on the market, such as Microsoft Teams, Zoom, Google Meet, Webex, to name a few (Cavus & Sekyere-Asiedu, 2021).

The third reason is probably related to people's strong desire for live interactions and human contact (Pînzaru & Stoica, 2022; Binns et al., 2018). Although it is becoming more popular in practice, the phenomena of algorithmic management can evoke negative emotions in workers if they are treated only as numbers. Therefore, it is crucial nowadays to design EMS and human resource management systems (HRMS) to show empathy and explain each decision appropriately (Griep et al., 2021). Today, more and more scientists are discussing digital humanism, which is about the belief that technology should adapt to humans and not the other way around.

The fourth reason for the low popularity of electronic meetings lies in the legal boundaries, which in many cases do not yet recognise or accept electronic singing and electronic contracts (Ali et al., 2013). Since both public and private organisations have to bring their activities in line with the binding legal framework, many of them are unwilling to introduce innovations whose implementation is not officially approved and fully regulated.

The main objective of this study was to analyse the users' attitudes towards features of an EMS. To achieve its objective, this research has sought to find answers to the following questions:

- In which social sphere there is a strongest need for electronic meeting systems (EMS)?

- How many potential users are interested in anonymous voting and commenting?

The basic hypothesis was that EMS improves productivity. The first section, entitled "Introduction", explains the main problems associated with the introduction of electronic meeting systems and highlights the research objectives. The second section, entitled "Literature Review", presents conclusions and observations from recent studies on electronic and virtual meetings. The third section, entitled 'Methodology', explains the methodological basis of the research conducted, while the fourth section, entitled 'Results', provides empirical findings and insights into attitudes towards electronic meetings and voting. The fifth section titled 'Entity relationship diagram' shows the relationships between entities in an EMS database. The final section titled 'Conclusion' highlights the key findings, limitations and future research directions. This article is intended for all managers and decision makers who are interested in electronic organisational models. In addition, the conclusions of this research may be useful to all professors and students of business administration, information and communication sciences, and political science, as well as researchers interested in the development of e-collaboration solutions.

Literature Review

With the proliferation of various video conferencing apps, such as MS Teams, Zoom and Viber, over the last three decades, analysing attitudes towards electronic meeting systems (EMS) is gaining popularity (Martz et al., 1992; Klein & Krcmar, 2003; Aiken, 2008; Clark, 2021). According to Alavi (1993), negative effects of EMS may include missing nonverbal information that people convey in a normal face-to-face interaction, while positive effects include reduced typing, improved concentration, and increased enjoyment of the task, which can lead to increased creativity and productivity. Researchers Parisi et al. (2021) examined practitioner attitudes toward videoconferencing (VCD) for the delivery of evidence-based interventions (EBI) in elementary health and concluded that VCD can be successfully used for this purpose if corrections and barriers to implementation are addressed. Other researcher Kuhn (2022) found that the relationship between the frequency of self-observation in meetings and the aversion to virtual meetings depends on a dispositional trait: the user's level of public self-consciousness. In other words, the use of cameras during video conferences can be stressful for some people and is therefore not always necessary. Other researchers note a paradox in the development of electronic meetings: "Although research has shown that electronic

meeting systems (EMSs) can significantly improve meetings, EMSs are less common in organisations than the scientific community originally envisioned." (Klein & Krcmar, 2003, p. 421). According to Barao (2024), the main advantages of virtual meetings are cost efficiency, time savings, flexibility and convenience for participants, increased productivity, better work-life balance, low environmental impact, inclusivity and diversity, while the disadvantages include technical challenges, lack of non-verbal cues, distraction, fatigue and safety risks. In addition, EMSs are very useful for decisions that are highly emotional or require quick action (MacNeil, 1998). After analysing workers' attitudes towards electronic meetings, researchers (Palander et al., 2001) found that team members can be divided into three groups according to their feelings: The first group included the "willing to learn", with the most positive attitude towards EMS; the second group was the "conservative" group with a negative attitude towards EMS, but who considered the information flow to be functional; the third group included "dissatisfied" with a neutral attitude towards EMS, who rated the information flow as weak and their work competence as poor. This means that wider use of such systems requires tailored training for different types of people. However, recent research shows that attitudes towards virtual meetings depend on the way the technology is used. According to Aulanko-Jokirinne & Tiainen (2023), sleepiness during virtual sessions is due to lack of stimulation, not mental overload. Another study concludes that university students have a positive attitude towards Zoom because they perceive it as a user-friendly, flexible platform, but also show a stronger inclination towards traditional teaching because they have concerns about assessment fairness and privacy (Salhab, 2024). Some authors, such as Tømte (2007), emphasise that electronic meeting systems represent an entirely new genre that evolves from the complex relationships between the contexts in which organisational members interact. Finding ways to provide more positive experiences for meeting participants can have a lasting effect that goes beyond the meeting itself (M. A. Cohen et al., 2011). Last but not least, the EMS is a fundamental element of all cooperative networks and e-government systems (Molnar, 2019). It means that EMS can be used for referendums, elections, council meetings, public hearings and for numerous other socially beneficial purposes, such as the management of public facilities and consumer association meetings. Even though researchers confirm that the ability to provide anonymous feedback may be particularly useful in team collaboration (Dreher & Maurer, 2006), current market offer of EMSs that enable controlled anonymous feedback sharing is still very limited. In spite of the fact that implementing a controlled anonymous exchange of feedback allows individuals to openly express their views and opinions without fear of conflicting with those who may be disturbed by these (Rafajac & Jakupović, 2024), the most popular EMSs rarely offer such a feature. With this in mind, authors decided to analyse whether there is a need for anonymous voting and commenting among potential users and which types of users prefer such activities. Given that innovative e-collaboration systems reduce costs and act as a catalyst for a wide range of social activities, the development of EMS systems that enable more accurate feedback exchange can provide a strong competitive advantage to those using such systems. Unfortunately, in the Republic of Croatia R&D spending in e-collaboration systems does not shadow GDP trends (Kaštelan Mrak & Vretenar, 2024). When coupled with artificial intelligence (AI), advanced EMS could offer very interesting insights into different spheres of social interaction (Arora et al., 2024). Some of these insights include answers to the questions: How to run meetings more effectively? How to form voting questions? Which topics require more detailed discussion? etc. However, to reach such insights, it is first necessary to build a robust EMS that supports controlled anonymity on the one hand, but also ensures transparency in the design and presentation of results on the other. For this reason, it is particularly important to keep developing innovative EMSs that will reduce costs, improve collaboration experiences and quality of all social interactions.

Research Methodology

This research is based on the Design Science Research (DSR) methodology, where the creation and evaluation of artefacts is the main goal (N. Hevner et al., 2004) and where everything revolves around the "build and evaluate" approach. DSR artefacts can be in the broadest sense: Models, methods, constructs, instantiations and design theories (Gregor & Hevner, 2013), social innovations, new or previously unknown properties of technical/social/information resources (March & Storey, 2008), new explanatory theories, new design and development models and implementation processes or methods (Ellis & Levy, 2010). The main objective of this project is the development of EMS. The DSR methodology prescribes the conduct of this research in six elementary steps (A. Hevner & Chatterjee, 2010):

- Problem identification and motivation – Specification of the research problem and motivation. The defined problem is used to develop an artefact that provides the solution;

- Definition of the objectives for the solution – the objectives can be quantitative and/or qualitative. The objectives are set based on the problem definition;

- Design and development – creation of the artefact. This phase includes the specification of the functionality and architecture of the artefact, followed by the creation of the actual artefact;

- Demonstration – demonstration of the created artefact that solves the problems identified in phase 1. This phase includes experiments, simulations, case studies and proofs or other appropriate activities;

- Evaluation – observing and measuring how well this artefact supports the solution to the problem. In this phase, the goals of the solution (phase 2) are compared with the actual observed results of using the artefact in the demonstration (phase 4).

- Communication – communicating the results of the research – the problem and its importance, the artefact, its utility and novelty, the rigour of its design and its effectiveness.

The present project is currently in the third phase of the DSR methodology. Briefly, the results can be described as follows:

- Problem identification and motivation: The main problem is the lack of an EMS system that may support a controlled anonymous interaction in public, private and business affairs.

- Definition of objectives for the solution: The authors find a solution to this problem in the development of new EMS which supports both transparency and anonymity.

- Design and development: The authors have developed a conceptual information model of the EMS system that may support a controlled anonymous interaction which effectively implements its basic functions, objectives and information exchange.

To analyse users' attitudes towards specific features of EMS, the authors developed an online questionnaire consisting of 17 questions divided into three sections. The research instrument consisted of 15 mandatory and 2 open-ended questions. In order to gain as many different insights as possible, the answers to all questions were recorded anonymously. In the first section, there were four questions in which respondents were asked to define their role in the organisation, the size of the organisation, the ownership structure and the type of industry in which their organisation operates. The second part of the questionnaire included a multiple-choice question in which respondents could indicate which type of meeting they preferred most, as well as ten different statements about e-meetings, which respondents rated using a Likert scale, with 1 being "strongly disagree" and 5 being "strongly agree". Based on the literature review and authors' experience in developing e-collaboration systems, the authors independently defined ten statements to attitudes towards EMS. Considering that some user attitudes, such as attitudes towards video communication, have already been studied by other researchers, the authors focused on other features of EMS, which have not yet been analysed by other researchers.

The ten statements that respondents agreed or disagreed with were: 1) Our organisation already uses an electronic meeting system (EMS); 2) Our organisation should use an electronic meeting system (EMS); 3) We spend too much time and resources on administration, 4) The EMS greatly improves productivity (saves time and resources); 5) There are items in our meetings that I want to comment on anonymously (all members of the meeting see the comment but do not know which member made it); 6) There are items in our meetings that I want to vote on anonymously (all members of the meeting see the final result but do not know which member voted for which option); 7) The EMS improves security and reliability in the

implementation of important decisions; 8) Authorised electronic voting by smartphone is a very practical solution; 9) It would be desirable to use authorised electronic voting by smartphone in the implementation of public measures (e.g. referendums, elections, etc.); and 10) I would like to use the electronic voting system in private relationships (e.g. to arrange a place to go out, set a date for a meeting, etc.). In the third section of the questionnaire, respondents were asked two open questions. In the penultimate question, respondents could provide their contact information in case they wanted to try out new EMSs developed by the authors, while in the last question they were asked for a personal comment on their experience of using EMSs. The methods of descriptive statistical analysis, the Shapiro-Wilk test, the Mann-Whitney U test, the Kruskal-Wallis test and Kendall's tau-b test were used to analyse the data. By applying the methods of descriptive statistical analysis, the profile of the respondents, the preferred form of the sessions and the attitudes towards the various functionalities of the EMS system were described. The study is empirical, the sample is simple and randomly selected. The data was collected in the period from April 1, 2024 to May 23, 2024. The invitation to participate in the survey was sent by email to 3,000 randomly selected email addresses of various organisations in the Republic of Croatia. In addition, an invitation to participate in the empirical research was posted on the social networks Facebook and LinkedIn in open business groups with several thousand members in order to collect as many relevant responses as possible. The research sample consists of 120 (N) respondents working in organisations in the Republic of Croatia. In March 2024, 180,448 legal entities were active in Croatia, which means that this survey covered approximately 0.07% of the total population (DZS, 2024).

Results

In the first question, respondents could define their role in the organisation. According to the role of the respondents, the research sample included mainly owners, managers and executives, but also a considerable number of people who do not hold positions of power, such as employees and members, which served to test possible differences in attitudes towards EMS among different types of users. For a detailed look at the roles of respondents, see Table 1. In later analysis, owners and co-owners, managers and department heads were gathered into a group labelled "leaders" (N = 79) and employees and members of organisations were gathered into a group labelled "followers" (N = 41).

Table 1. Research Sample According to The Respondent's Role in Their Organisation.

The role of respondents	N	%
Owner or co-owner	26	21,7
Manager	21	17,5
Head of Department	32	26,7
Employee	39	32,5
Member	2	1,7
Total	120	100

 In the second question, respondents defined the size of the organisation by selecting one of the three options offered. Depending on the size of the organisation, the sample comprised 22 large, 23 medium and 75 small organisations (see Table 2). Although the relative proportion of medium and large organisations in the study sample is slightly higher than their actual market share in the Republic of Croatia, such results were expected as larger organisations with more employees and members have a greater interest in EMS. For the purposes of statistical analysis, medium and large organisations were gathered into one group labelled "larger organisations" (N = 54), while organisations with 49 or less employees remained a separate group labelled "smaller organisations" (N = 75).

Table 2. Research Sample According to The Size of The Organisation

| Size of the organisation	N	%
Small (0 - 49 employees)	75	62,5
Medium (50 -199 employees)	23	19,2
Large (200 or more employees)	22	18,3
Total	120	100

In the third question, the respondents were asked to define the type of ownership of their organisations. The research sample included 59 privately owned organisations, 56 publicly owned organisations and 5 organisations that have public-private ownership structure (see table 3). On March 31, 2024, there were 180,448 active legal entities in the Republic of Croatia, of which 79.7% were privately owned, and 0.4% were in local public-private ownership, while other legal entities were state-owned, cooperative or undefined (DZS, 2024).

Table 3. Research Sample According to The Type of Ownership

| Type of ownership	N	%
Private	59	49,2
Public	56	46,7
Public-private	5	4,2
Total	120	100

In the fourth question, respondents were asked to select the industry in which their organisation operates. As shown in Figure 1, the survey sample only partially corresponds with relative numbers of active organisations in the Republic of Croatia regarding the industry in which they operate. On the other hand, this distribution of respondents by industry was not particularly important for analysing attitudes towards anonymous voting and commenting, nor for analysing attitudes toward application of voting in private and public affairs.

Figure 1. Research Sample by Industry and Active of Organisations by Industry in Republic of Croatia in % (120 N)
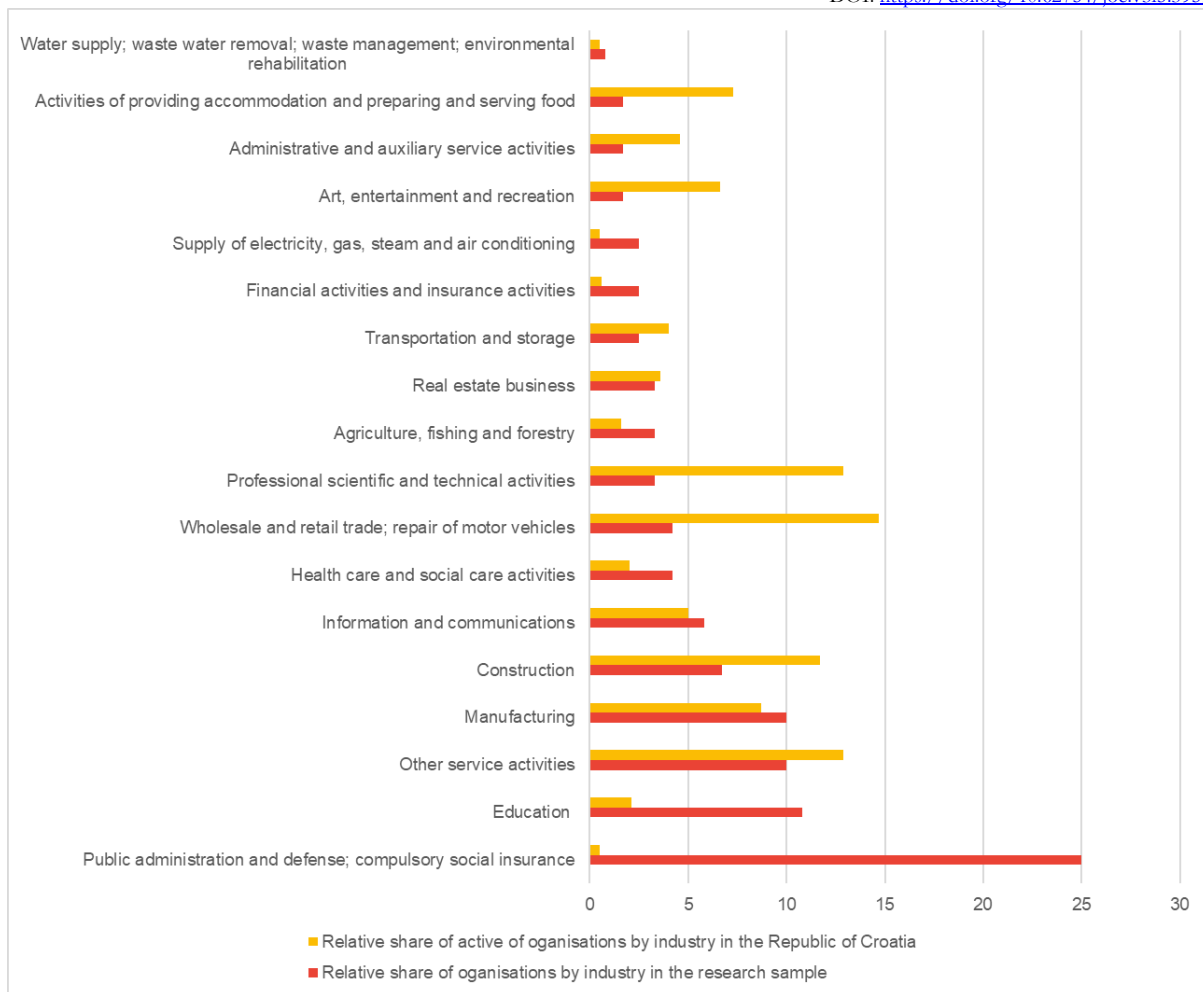
In the fifth question, respondents were asked to indicate which types of meetings they preferred. As shown in Figure 2, 53.3% of respondents prefer live meetings in a physical location that are not supported by electronic IT tools. Given that during COVID-19 most people were forced to attend virtual meetings, people now increasingly value meetings in a physical location and have a clearer picture of the pros and cons of online meetings. Interestingly, 20% of respondents still prefer online meetings to live meetings. Hybrid meetings are live meetings in a physical location supported by electronic IT tools. Although 26.7% of respondents prefer hybrid meetings, such meetings are still quite rare in practice, mainly because of the lack of meeting apps that are built for this purpose.

Figure 2. The Relative Share of Respondents According to Their Attitudes Towards Preferred Meetings Type (120 N)
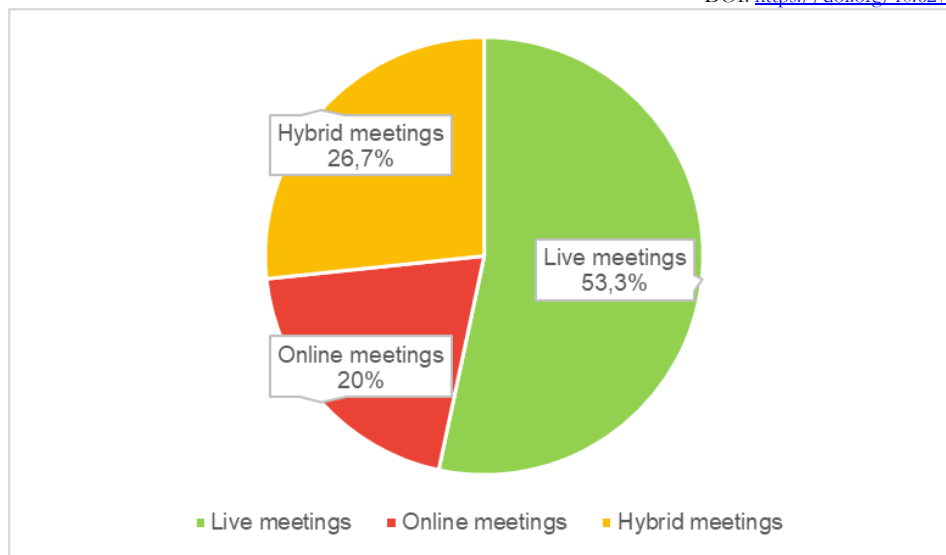
In the following ten questions, respondents rated their agreement with various statements about EMS using a Likert scale where 1 means "strongly disagree" and 5 means "strongly agree". As shown in Figure 3, 34.2% of respondents agreed with the statement that their organisation already uses an EMS, while 48.3% of respondents agreed with the statement that their organisation should use an EMS for its operations. These results indicate that almost half of all organisations could benefit from implementing an EMS. Interestingly, although they coud benefit from its use, at least 15% of organisations in the Republic of Croatia still do not use EMS. In addition, 37.5% of respondents agree with the statement that their organisation spends too much time and resources on the administration (e.g. preparation and reporting) of official meetings. This research suggests that there is a fairly strong demand for IT systems that support the preparation, conduct and management of official meetings.

Figure 3. The Relative Share of Respondents According to Their Attitudes Toward Statements That Measure Need for EMS (N=120)
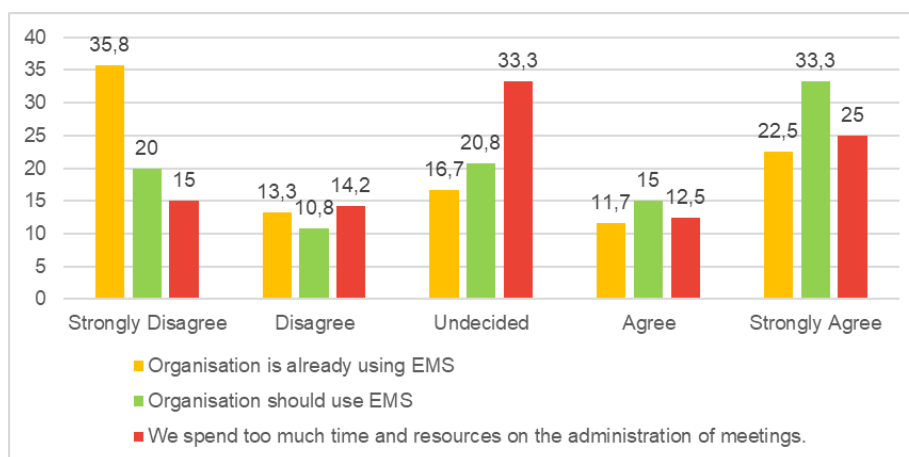
Shapiro-Wilk test (p > .05) and visual inspection of histograms, normal Q-Q plots, and box plots showed that perceived attitudes towards the statement "Our organisation uses EMS" were not normally distributed for larger and smaller organisations, with a skewness of 0.633 (SE = 0.277) and a kurtosis of -1.087 (SE = 0.548) for small organisations and a skewness of -0.285 (SE = 0.354) and a kurtosis of -1.449 (SE = 0.695) for larger organisations (Doane & Seward, 2011). As a Shapiro-Wilk test (p > .05) conducted for the remaining nine statements also showed that the data were not normally distributed, in further analysis non-parametric tests were used.

To assess the difference between smaller and larger organisations in their attitudes towards EMS, the Mann-Whitney U test was applied. The test showed that there are statistically significant differences between smaller (Mdn = 2.00, n = 75) and larger organisations (Mdn = 3.00, n = 45) in their attitude towards the statement "Our organisation already uses EMS", U = 1116, z = -3.205, p = .001, r = .09. Although these differences are statistically significant, according to J. Cohen (2013) it is a rather small effect.

The Mann-Whitney U test was used to assess the difference between smaller and larger organisations in terms of their attitude towards the need to introduce EMSs. The test revealed that there were no statistically significant differences between smaller (Mdn = 4.00, n = 75) and larger organisations (Mdn = 3.00, n = 45) in their attitudes towards the statement "Our organisation should use the EMS", U = 1534.5, z = -.855, p = .393, r = .006. The third test revealed that there are no statistically significant differences between smaller (Mdn = 3.00, n = 75) and larger organisations (Mdn = 3.00, n = 45) in their attitudes towards the statement "Our organisation spends too much time and resources on administration of meetings", U = 1631.5, z = -.313, p = .754, r = .0008.

The results suggest that there are more larger than smaller organisations using EMSs, but that there are no differences between smaller and larger organisations in terms of the need for implementation or the time and resources required for meeting management.

The Mann-Whitney U test was used to assess the difference between private and public organisations in terms of their attitude towards the statement "Our organisation already uses the EMS". The test revealed that there were no statistically significant differences between private (Mdn = 2.00, n = 59) and public organisations (Mdn = 3.00, n = 56) in their attitudes towards the statement "Our organisation already uses the EMS", U = 1439, z = -1.236, p = .216, r = .001.

The Mann-Whitney U test was used to assess the difference between private and public organisations with regard to their attitude towards the statement "Our organisation should use the EMS". The test revealed that there are no statistically significant differences between private (Mdn = 3.00, n = 59) and public organisations (Mdn = 4.00, n = 56) in their attitudes towards the statement "Our organisation should use the EMS", U = 1474.5, z = -1.022, p = .307, r = .008. The results indicate that there are no statistically significant differences between private and public organisations in terms of the use of EMS or the need for its implementation.

The Kruskal-Wallis test was used to compare the differences between three different groups of respondents in terms of the preferred types of meetings related to the application of EMS in their organisations. The analysis showed that there were statistically significant differences between respondents who preferred live, online and hybrid meetings in their attitudes towards the statement "Our organisation already uses an EMS", H (2) = 15.933, p < .05. The Mann-Whitney U post-hoc test conducted with Bonferroni adjustment (.015) showed that there is a statistically significant difference between the groups that prefer live meetings (Mdn = 1, n = 64) and online meetings (Mdn = 4, n = 24) in their attitudes towards using EMS in their organisations, U = 392, z = -3.687, p < .001, r = .16. Given the relatively small number of respondents in the "online meetings" group, these results should be taken with a grain of salt.

Table 4. The Median and The Interquartile Range (IQR) For the Three Statements That Measure Need For EMS

Statement / Size		Already using EMS	Should be using EMS	Organisation spends too much time and resources on administration of meetings
Smaller organisations	N	75	75	75
	Mean	2,36	3,41	3,21
	Median	2,00	4,00	3,00
	St. Deviation	1,504	1,462	1,426
	IQR	3	3	3
Larger organisations	N	45	45	45
	Mean	3,31	3,13	3,13
	Median	3,00	3,00	3,00
	St. Deviation	1,564	1,618	1,254
	IQR	3	4	2

To analyse the relationship between organisations that use an EMS and organisations that spend too much time and resources managing official meetings, Kendall's tau b test was applied to the sample of 41 organisations. The analysis revealed that there was no statistically significant relationship between using an EMS and spending too much time and resources preparing for official meetings ($\tauب = .047$, $p = .745$). To analyse the relationship between the organisations that should use an EMS but do not use it and the organisations that spend too much time and resources managing official meetings, Kendall's tau-b test was applied to the sample of 59 organisations. The analysis revealed a statistically significant positive relationship between organisations that should use an EMS but do not use it and organisations that spend too much time and resources managing official meetings ($\tau b = .576$, $p < .01$). This correlation is statistically significant at 1% risk ($p < .01$), and the relationship is rather strong since the coefficient is $\tau b > .30$ (Walker, 2003).
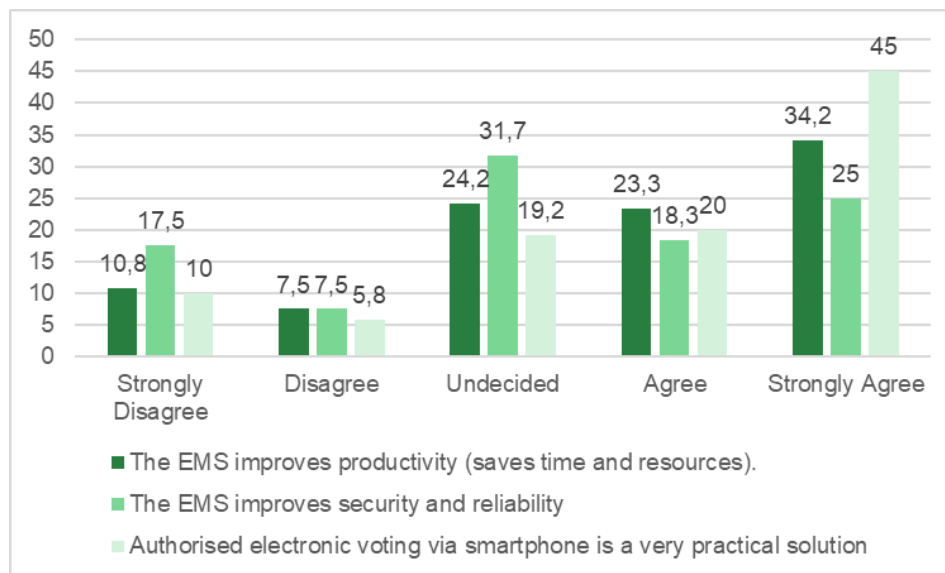
To assess the difference between leaders and followers regarding their attitude towards the statement "Our organisation spends too much time and resources on administration of official meetings", the Mann-Whitney U test was applied. The test revealed that there were no statistically significant differences between leaders (Mdn = 3.00, n = 79) and followers (Mdn = 3.00, n = 41) in their attitudes towards the statement "Our organisation spends too much time and resources on administration of official meetings", U = 1323, z = -1.693, p = .090, r = .003.

Regarding the statement "Our organisation spends too much time and resources managing official meetings"," a Shapiro-Wilk test ($p > .05$) and visual inspection of their histograms, normal Q-Q plots, and box plots showed that the data for private and public organisations were not normally distributed, with a

skewness of 0.396 (SE = 0.311) and a kurtosis of -0.805 (SE = 0.613) for private organisations and a skewness of -0.445 (SE = 0.319) and a kurtosis of -0.502 (SE = 0.628) for public organisations. To assess the difference between private and public organisations regarding their attitude towards the statement "Our organisation spends too much time and resources on administration of official meetings", the Mann-Whitney U test was applied. The test revealed that there is a statistically significant difference between private (Mdn = 3.00, n = 59) and public organisations (Mdn = 3.50, n = 56) in their attitude towards the statement "Our organisation spends too much time and resources on administration of official meetings", U = 1009.5, z = -3.708, p < .001, r = .12.

Figure 4 shows the respondents' attitude towards the impact of the EMS on organisational performance. 57.5% of respondents believe that the EMS improves productivity, while 43.3% believe that the EMS improves safety and reliability in the implementation of important decisions. 65% of respondents think that authorised electronic voting via smartphone is a very practical solution.

Figure 4. The Relative Share of Respondents According to Their Attitudes Towards Statements That Measure the Impact of The Ems on Organisational Performance (N=120)

The Mann-Whitney U test was used to assess the difference between private and public organisations in their attitudes towards the impact of EMS on productivity". The test revealed that there is a statistically significant difference between private (Mdn = 3.00, n = 59) and public organisations (Mdn = 4.00, n = 56) in their attitude towards the statement "The EMS significantly improves productivity", U = 1371.5, z = -1.626, p = .104, r = .02. Considering the fact that public organisations usually have more complex organisational processes whose productivity can be increased by implementing an EMS, such a result is to be expected.

To analyse the relationship between the organisations that implement an EMS and the organisations that agree with the statement "EMS significantly improves productivity", Kendall's tau-b test was applied to the sample of 41 organisations. The analysis revealed no statistically significant relationship between organisations that use an EMS and organisations that agree with the statement "EMS significantly improves productivity" (τb = .204, p = .157).

To analyse the relationship between the attitudes of respondents who indicate that their organisations use an EMS and the attitudes of respondents who indicate that the EMS improves safety and reliability in the implementation of important decisions, Kendall's tau-b test was applied to the sample of 41 organisations. The analysis revealed no statistically significant relationship between the attitudes of respondents who state that their organisations use an EMS and the attitudes of respondents who claim that the EMS improves safety and reliability in the implementation of key decisions (τb = .201, p = .162).

In the tenth and eleventh questions, respondents were asked to express their own opinions on anonymous votes and comments on various items in the meetings. As shown in Figure 5, only 25.8% of respondents agree and strongly agree that there are items in their meeting that they would like to comment on anonymously, while 34.1% of respondents agree and strongly agree that there are items in their meeting that they would like to vote on anonymously. Despite significant improvements in technology the political goal of having accurate, anonymous and voter-verifiable elections has not yet been realised (Carroll & Grosu, 2009). The good news is that in the last five years, controlled anonymous feedback has been increasingly introduced as a feature of ICT systems that support e-collaboration. For example, in October 2020 Zoom introduced Anonymous Zoom Polls, which do not collect or display information about participants. Although anonymity can lead to more feedback, and improve experience and engagement (Frampton et al., 2017), the EMS administrators should be able to control who and in which period can provide their feedback in an anonymous way.

The Mann-Whitney U test was used to assess the difference between leaders and followers with regard to their attitude towards anonymous comments on meetings. The test revealed that there is a statistically significant difference between leaders (Mdn = 1.00, n = 79) and followers (Mdn = 3.00, n = 41) in their attitudes toward anonymous comments in meetings, U = 1178, z = -2.580, p = .010, r = .06. To assess the difference between leaders and followers in their attitudes toward anonymous voting in meetings, the Mann-Whitney U test was applied. The test revealed that there is a statistically significant difference between leaders (Mdn = 2.00, n = 79) and followers (Mdn = 3.00, n = 41) in their attitudes towards anonymous voting in meetings, U = 1109, z = -2.947, p = .003, r = .07. Given the fact that many leaders, managers and owners tend to have absolute control over decision-making processes, such results are also to be expected. However, it is clear that anonymous comments and votes are sometimes the only way in which employees and organisational members can freely express constructive criticism. The results gathered suggest that anonymous voting and commenting on important issues at meetings are fundamental elements of the EMS that can improve organisational learning.

Figure 5. The Relative Share of Respondents According to Their Attitudes Towards Anonymous Comments and Voting (N=120)
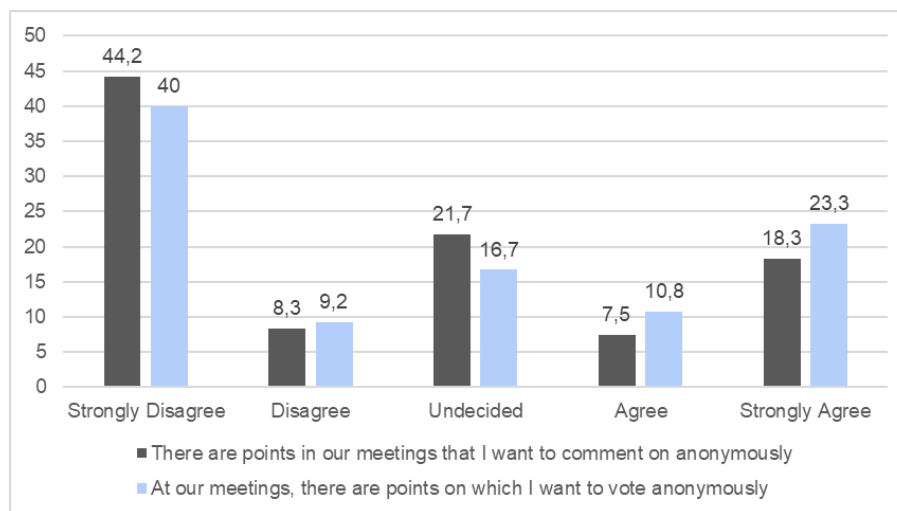
In the twelfth and thirteenth questions, respondents were asked to express their own opinion on the use of EMS in public and private contexts. As shown in Figure 6, 65% of respondents agree and strongly agree that it is desirable to use authorised electronic voting (e.g. via smartphone) in the implementation of public policies (e.g. referendums, elections, etc.), while 33.4% of respondents agree and strongly agree that they would like to use the electronic voting system in private relationships (e.g. when arranging a place to go out, setting a time for a meeting, etc.). Estonia was the first country in the world to use online voting in 2005 (Masterson, 2024). Today, many other countries such as France, Norway, Switzerland and Mexico are introducing e-voting, but still not on a full scale. Although a significant number of respondents in this research are interested in e-voting in connection with public affairs, the Republic of Croatia still does not

use e-voting. In 2019, Rakuten Viber has introduced polls in its group chats, followed by Instagram, which also introduced polls in comments and chats in 2023, to expand the scope of user interaction. Although they don´t offer anonymous voting, their polls can be used to decide on a discussion topic, a gift for friends, a place for a night out, or just for fun. Since more than a third of the respondents in this research claim that they want to use e-voting in their private relationships, there is no doubt that the need for such solutions will continue to grow in the future.

Figure 6. The Relative Share of Respondents According to Their Attitudes Towards the Use of Ems in Public and Private Contexts (N=120)
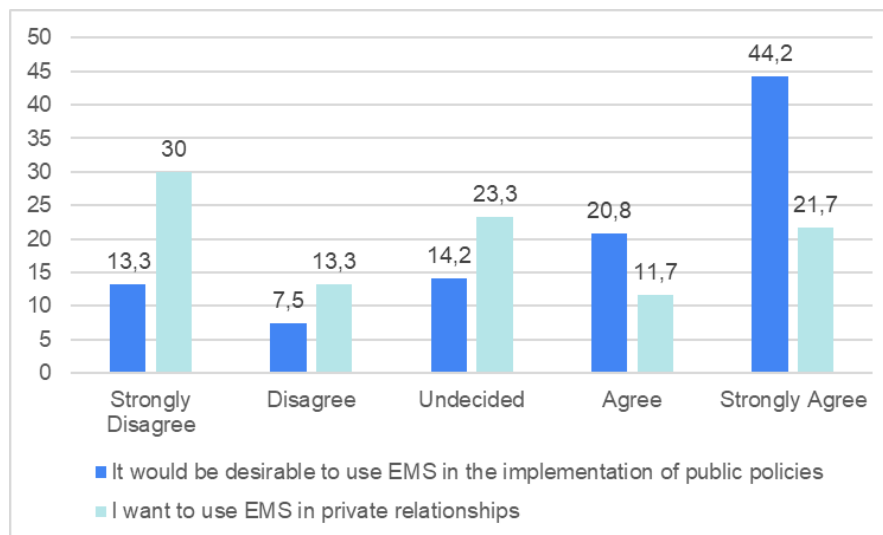
To assess the difference between leaders and followers in their attitudes towards the desirability of using EMS in public policy implementation, the Mann-Whitney U test was applied. The test revealed that there were no statistically significant differences between leaders (Mdn = 4.00, n = 79) and followers (Mdn = 4.00, n = 41) in their attitudes toward the use of EMS in public policy implementation, U = 1379, z = -1.403, p = .161, r = .02. Moreover, the Mann-Whitney U test was used to assess the difference between respondents from private and public organisations in their attitudes towards the desirability of using EMS in public policy implementation. The test revealed that there were no statistically significant differences between private (Mdn = 4.00, n = 59) and public (Mdn = 4.00, n = 56) organisations in their attitudes towards the use of EMS in public policy implementation, U = 1530, z = -.717, p = .474, r = .004.

To assess the difference between respondents from private and public organisations regarding their attitudes toward the desirability of using EMS in private relationships, the Mann-Whitney U test was applied. The test revealed that there were no statistically significant differences between respondents from private (Mdn = 3.00, n = 59) and public organisations (Mdn = 3.00, n = 56) in their attitudes toward the use of EMS in private relationships, U = 1640, z = -.069, p = .945, r = .007. The research results indicate that the implementation of EMS is desirable in both the public sector and private relationships.

To analyse the relationship between attitudes toward the claim that EMS improves productivity and attitudes toward the claim that EMS should be used in implementing public policies, Kendall's tau-b test was applied to the sample of 120 respondents. The analysis revealed a statistically significant positive relationship between respondents who claim that EMS improves productivity and respondents who agree that EMS should be used in public policy implementation (τb = .260, p = .001). These correlations are statistically significant at a 1% risk level (p < .01), and the relationship is moderately strong (March & Storey, 2008). Such results are entirely to be expected. Those who believe that EMS improves productivity also believe that EMS can improve public affairs.

In the penultimate question, respondents could provide a phone number or contact email if they wanted to try EMS, which 14 respondents did. In the final question, respondents could provide an open-ended

comment on the research topic. Four comments were collected. One respondent openly praised the research and development of EMS as being in line with modern trends and technologies that support the development of socio-economic relationships. Another respondent claims that EMS is only useful in emergency situations and that reflection and live discussion can hardly be fully replaced by EMS. After 13 years of participating in e-meetings, another respondent claims that the use of cell phones during voting can lead to fatigue and lack of concentration, resulting in incorrect input. The last comment was simply a reference by the interviewee that his organisation already successfully uses EMS, through which it provides materials for local council meetings. The authors used all the above insights in the design of the new EMS that is presented in the next chapter.

Entity Relationship Diagram

By analysing the requirements of potential users, the authors have developed an entity-relationship diagram of an EMS that effectively explains the basic functions, subsystems and information links. The entity-relationship diagram (Figure 7) was created using the basic Martin notation (Martin, 2008). The basic concepts used in the model are extended by additional concepts: key inheritance, weak entity type, aggregation and weak aggregation (Martin, 2008). The concept of key inheritance (Figure 7, Label 1) makes it possible to pass on the key of a stronger entity type (line origin) to a weaker entity type (line end, arrow position), whose key it forms. By analysing the requirements of potential users, the authors have developed an entity relationship diagram of an EMS that effectively explains the basic functions, subsystems and information links. The Entity Relationship Diagram (Figure 7) was created using the basic Martin notation.

The basic concepts used in the model are extended by additional concepts: key inheritance, weak entity type, aggregation and weak aggregation (Pavlić, 2011). The concept of key inheritance (Figure 7, label 1) makes it possible to pass on the key of a stronger entity type (line origin) to a weaker entity type (line end, arrow position) whose key it forms. The concept weakens the entity type (Figure 7, label 2) shows an entity type that is weakened by the entity type from which the concept of key inheritance originates and is existentially dependent on it. A weak entity type key is composed of a strong entity type key and additional internal key attributes. The concept of aggregations (Figure 7, label 3) represents a doubly weakened entity type that is weakened by two stronger entity types. Stronger entity types that pass their keys to the aggregation constitute its key. The concept of weak aggregation (Figure 7, label 4) similarly to aggregation is weakened by two stronger types of entities. A weak aggregation key is composed of keys of stronger entity types and additional internal key attributes. The basic entity type of the e-session system is 'esession'. Various entities, i.e. e-sessions, are stored in this type of entity. It is a weak entity type, which means that the existence of an entity in 'esession' is existentially dependent on the existence of an entity in the entity type 'esession type' (each e-session belongs to some type of e-session).

Figure 7. The entity-relationship diagram of an EMS
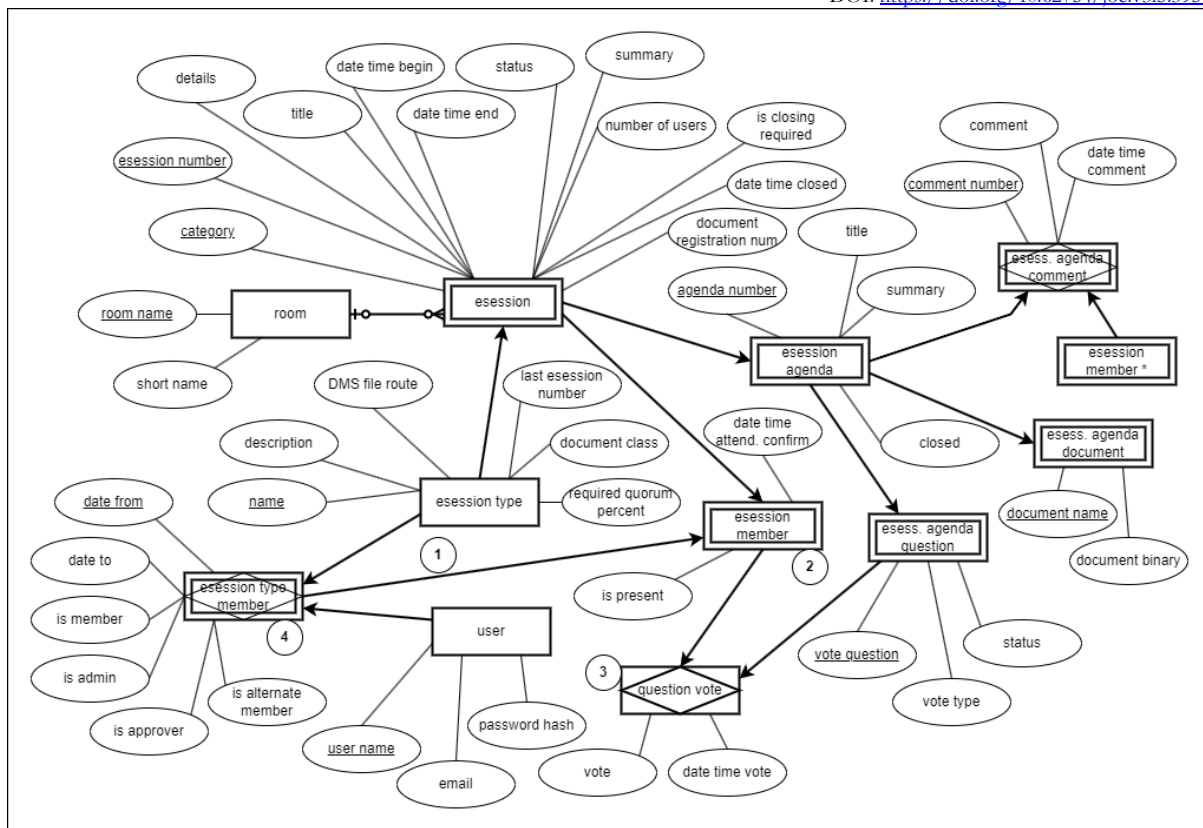
The type of e-session is described by attributes: 'name', 'description', 'DMS file route' (path to the folder for saving documents), 'last esession number', 'document class', and 'required quorum percentage'. Each type of e-session has its own members, which are stored in the entity type 'esession type member', where the type of membership (member, administrator, approver, alternative member) and the term of the member's mandate are defined on top of the membership. Members of the e-session type are system users who are saved in the 'user' entity type. The e-session is announced at the beginning and data is saved: 'category' (regular or special), 'esession number', 'title', 'details', beginning and ending date and time, 'status' (initial value is: In Preparation), 'is closing required', 'document register number' (reference number), and is connected to a specific room (an entity in the 'room' entity type).

During the preparation of the e-session, the agenda of the e-session is defined. The agenda items of the e-session are saved in the weaker entity type 'esession agenda'. When preparing the e-session, the agenda items are described with the attributes: 'agenda number' (values: 1, 2, ...) and 'title'. The item on the agenda of the session may include voting questions that are saved in the weaker type of entity 'esess. agenda question' when preparing the e-session. Documents that are saved in the weaker entity type 'esess' can also be added to the agenda item. agenda document'. Additionally, during the preparation of the e-session, the members of the e-session are also saved in the entity type 'esession member'. Depending on the date of the e-session that is announced, members whose mandate is still valid for the type of e-session to which the announced e-session belongs are taken from the entity type 'esession type member'. When the preparation of the e-session is completed, the e-session announcement is made, which changes the status of the e-session from 'In Preparation' to 'In Announcement', and all members of the e-session ('esession member') are sent an e-mail message about announce e-sessions. When the deadline for the implementation of the e-session arrives, the process of opening the e-session can be carried out, which changes the status of the e-session from 'In Announcement' to 'Opened', and the invited members of the e-session are enabled to log into the e-session, which in type entity 'esession member' records data: 'is present', and 'date time attend. confirmation'. Members of the e-session who have the tag "is admin" or "is approver" included in the data of the entity type 'esession type member' carry out e-session management activities.

When an agenda item that includes voting questions occurs during the implementation of the e-session, the status of the voting question changes from 'In Announcement' to 'Opened', and the present members of the e-session are enabled to vote on the voting question. When the members present vote on a voting question, the status of the voting question changes from 'Opened' to 'Closed' and further voting on the current voting question is disabled. During the implementation of the e-session, upon completion of a certain agenda item, the agenda item is marked 'closed'. While the agenda item is being implemented, the present members of the e-session can give their comments, which are saved in the form of entities in the 'esses' entity type. agenda comment'. At the end of the e-session, the user, administrator or approver can manually close the e-session, which changes the status of the e-session from 'Opened' to 'Closed'. If the 'is closing required' flag is included in the e-session, the e-session must be closed manually. If the 'is closing required' flag is not included in the e-session, the e-session will automatically close when the set end time of the session ('date time end') expires. In both cases (manual or automatic) of closing the e-session, the data "date time closed" is saved in the e-session. When the e-session is in 'Closed' status, it is no longer possible to carry out updates that were enabled while the e-session was in 'Opened' status, namely voting on voting questions, commenting on agenda items. In this e-session status, it is possible to save data in the 'summary' of the agenda items ('esession agenda') and the e-session itself ('esession'). After recording the conclusions and description by points, the status of the e-session changes from 'Closed' to 'Summary Report'. When the e-session is in the 'Summary Report' status, all changes and updates of the e-session and its parts are disabled, and only the printing of the e-session minutes report is enabled.

Conclusion

The conducted research suggests that EMS is useful in different business and private activities, but that the strongest need for such a system is actually in public affairs. Given that at least one-quarter of respondents prefer anonymous feedback sharing, while a significant number of respondents prefer online and hybrid meetings, new meeting apps that support these features will definitely find their audience. Expectedly, this research confirms that followers are more inclined to anonymous voting and commenting than leaders. One of the reasons why there are no more EMSs that support anonymity, is probably hidden in the fact that leaders usually decide which type of EMS will be used. After analysing user attitudes, the authors have developed the entity-relationship diagram of an EMS that can be used in both online and live interactions and that allows anonymous feedback exchange. The main drawbacks of the study are the relatively small sample size and the focus on only one (Western European) culture. Further research should investigate whether there are differences in attitudes towards EMS in different markets and cultures. It would also be interesting to investigate in which industries the need for EMSs is greatest. Furthermore, it would be desirable to investigate to what extent the possibilities of anonymous voting influence the quality of decisions and to what extent the possibilities of anonymous commenting influence the number of comments at meetings.

References

Abu-Taieh, E. M. O., Sheikh, A. a. E., & Abu-Tayeh, J. M. (2009). Challenges in implementing Information Technology Plan. In IGI Global eBooks (pp. 250–259). https://doi.org/10.4018/978-1-59904-687-7.ch013

Aiken, M. (2008). Multilingual collaboration in electronic meetings. In IGI Global eBooks (pp. 457–462). https://doi.org/10.4018/978-1-59904-000-4.ch070

Alavi, M. (1993). An assessment of electronic meeting systems in a corporate setting. Information & Management, 25(4), 175–182. https://doi.org/10.1016/0378-7206(93)90066-3

Ali, H. M., Zainol, Z. A., Hassim, J., & Samat, N. H. A. (2013). Some legal uncertainties in electronic corporate meetings. International Journal of Computer Theory and Engineering, 284–287. https://doi.org/10.7763/ijcte.2013.v5.694

Arora, A., Vats, P., Tomer, N., Kaur, R., Saini, A. K., Shekhawat, S. S., & Roopak, M. (2024). Data-Driven Decision Support Systems in E-Governance: Leveraging AI for Policymaking. In Lecture notes in networks and systems (pp. 229–243). https://doi.org/10.1007/978-981-99-8479-4_17

Aulanko-Jokirinne, T., & Tiainen, M. (2023, October 27). Virtual meetings tire people because we're doing them wrong. Aalto University. https://www.aalto.fi/en/news/virtual-meetings-tire-people-because-were-doing-them-wrong

Barao, J. (2024, July 11). The advantages and disadvantages of virtual meetings. Azeus Convene. https://www.azeusconvene.com/articles/advantages-and-disadvantages-of-virtual-meetings

Binns, R., Van Kleek, M., Veale, M., Lyngs, U., Zhao, J. & Shadbolt, N. (2018). It's Reducing a Human Being to a Percentage: Perceptions of Justice in Algorithmic Decisions. Proceedings of the 2018 CHI Conference on Human Factors in

Computing Systems (CHI '18). Association for Computing Machinery, New York, NY, USA, Paper 377, 1–14. https://doi.org/10.1145/3173574.3173951

Bratley, K. J., & Aloysius, S. M. (2019). Transparency in managerial practices and affective commitment. Journal of Business Studies, 6(2), 61–81. https://doi.org/10.4038/jbs.v6i2.47

Cavus, N. & Sekyere-Asiedu, D. (2021). A comparison of online video conference platforms: Their contributions to education during COVID-19 pandemic", WJET, vol. 13, no. 4, pp. 1162–1173.

Carr, T., & Ludvigsen, S. R. (2017). Disturbances and Contradictions in an Online Conference. International Journal of Education and Development using Information and Communication Technology, 13(2), 116-140.

Carroll, T. E., & Grosu, D. (2009). A secure and anonymous voter-controlled election scheme. Journal of Network and Computer Applications, 32(3), 599–606. https://doi.org/10.1016/j.jnca.2008.07.010

Clark, J. W. (2021). Bringing life to online meetings. In Advances in higher education and professional development book series (pp. 460–475). https://doi.org/10.4018/978-1-7998-8275-6.ch027

Cohen, J. (2013). Statistical Power Analysis for the Behavioral Sciences. In Routledge eBooks. https://doi.org/10.4324/9780203771587

Cohen, M. A., Rogelberg, S. G., Allen, J. A., & Luong, A. (2011). Meeting design characteristics and attendee perceptions of staff/team meeting quality. Group Dynamics Theory Research and Practice, 15(1), 90–104. https://doi.org/10.1037/a0021549

Doane, D. P., & Seward, L. E. (2011). Measuring skewness: a forgotten statistic? Journal of Statistics Education, 19(2). https://doi.org/10.1080/10691898.2011.11889611

Dreher, H., & Maurer, H. (2006). The Worth of Anonymous Feedback. 19th Bled eConference eValues Bled, Slovenia.

DZS (2024, June. 11). Number and structure of legal entities in the Republic of Croatia in March 2024. State Bureau of Statistics. https://podaci.dzs.hr/2024/hr/77009

Ellis, T. J., & Levy, Y. (2010). A guide for novice researchers: Design and Development Research methods. Informing Science and IT Education Conference. https://doi.org/10.28945/1237

Frampton, A., Fox, F., Hollowood, A., Northstone, K., Margelyte, R., Smith-Clarke, S., & Redwood, S. (2017). Using real-time, anonymous staff feedback to improve staff experience and engagement. BMJ Quality Improvement Reports, 6(1), u220946.w7041. https://doi.org/10.1136/bmjquality.u220946.w7041

Gregor, S., & Hevner, A. R. (2013). Positioning and presenting design science research for maximum impact. MIS Quarterly, 37(2), 337–355. https://doi.org/10.25300/misq/2013/37.2.01

Griep, Y., Vranjes, I., Van Hooff, M. M. L., Beckers, D. G. J., & Geurts, S. a. E. (2021). Technology in the workplace: Opportunities and challenges. In Springer eBooks (pp. 93–116). https://doi.org/10.1007/978-3-030-74128-0_6

Grohowski, R., McGoff, C., Vogel, D., Martz, B., & Nunamaker, J. (1990). Implementing Electronic Meeting Systems at IBM: Lessons learned and success factors. MIS Quarterly, 14(4), 369–383. https://doi.org/10.2307/249785

Heller, R. (2010). A cost-benefit analysis of face-to-face and virtual communication: Overcoming the challenges (CAHRS White Paper). Ithaca, NY: Cornell University, ILR School, Center for Advanced Human Resource Studies. https://core.ac.uk/download/pdf/219376656.pdf

Hevner, A., & Chatterjee, S. (2010). Design research in information systems. In Integrated series on information systems/Integrated series in information systems. https://doi.org/10.1007/978-1-4419-5653-8

Hevner, N., March, N., Park, N., & Ram, N. (2004). Design science in Information Systems Research. MIS Quarterly, 28(1), 75. https://doi.org/10.2307/25148625

Kaštelan Mrak, M., & Vretenar, N. (2024). Future prospects for jumpstarting technological innovation in enhancing the competitiveness of Croatia business sector. The Fourteenth International Conference: Challenges of Europe, Bol, Croatia.

Klein, A. (2004). Adoption von Electronic-Meeting-Systems: Die Erfolgreiche Einführung von Technologien Zur Sitzungsunterstützung. Wiesbaden: Deutscher Universitäts-Verlag.

Klein, A., & Krcmar, H. (2003). Electronic Meeting Systems Paradox. WIRTSCHAFTSINFORMATIK, 45(4), 421–433. https://doi.org/10.1007/bf03250907

Korunka, C., & Vitouch, O. (1999). Effects of the implementation of information technology on employees' strain and job satisfaction: A context-dependent approach. Work & Stress, 13(4), 341–363. https://doi.org/10.1080/026783799500019798

Kuhn, K. M. (2022). The constant mirror: Self-view and attitudes to virtual meetings. Computers in Human Behavior, 128, 107110. https://doi.org/10.1016/j.chb.2021.107110

Liou, Y., I. (1992). An assessment of electronic meeting centres, Journal of Information Technology Management, vol III, no. 2, 1992, pp. 1- 5, https://jitm.ubalt.edu/III-2/article1.pdf

MacNeil, A. J. (1998). The electronic meeting system and case study method for school principal preparation. Journal of Information Techology for Teacher Education, 7(3), 309–319. https://doi.org/10.1080/14759399800200037

Masterson, V. (2024, April 4). What is e-voting? Who's using it and is it safe? World Economic Forum. https://www.weforum.org/agenda/2024/04/what-is-electronic-voting

March, N., & Storey, N. (2008). Design Science in the Information Systems Discipline: An introduction to the special issue on Design Science Research. MIS Quarterly, 32(4), 725. https://doi.org/10.2307/25148869

Martin, J. (2008). Information Engineering Book III: Design and Construction. Pearson Technology Group; Facsimile edition.

Martz, W. B., Vogel, D. R., & Nunamaker, J. F. (1992). Electronic meeting systems. Decision Support Systems, 8(2), 141–158. https://doi.org/10.1016/0167-9236(92)90005-a

Molnar, A. (2019). Strategic management and Innovative applications of E-Government. Advances in electronic government, digital divide, and regional development book series. https://doi.org/10.4018/978-1-5225-6204-7

Palander, T., Toivonen, M., & Malinen, J. (2001). Attitudes of team Workers towards New Information and Communication Technology. ResearchGate. https://www.researchgate.net/publication/317401772_Attitudes_of_team_Workers_towards_New_Information_and_Communication_Technology

Parisi, K. E., Dopp, A. R., & Quetsch, L. B. (2021). Practitioner use of and attitudes towards videoconferencing for the delivery of evidence-based telemental health interventions: A mixed methods study. Internet Interventions, 26, 100470. https://doi.org/10.1016/j.invent.2021.100470

Pavlić, M. (2011). Oblikovanje baze podataka [Designing a database], Odjel za informatiku Sveučilišta u Rijeci [Department of Informatics, University of Rijeka].

Pînzaru, F., & Stoica, V. (2022). Virtual Versus Face-to-Face meetings: A study Regarding the Perceptions of the Romanian Managers during and after the COVID-19 Pandemic. Proceedings of the International Conference on Business Excellence, 16(1), 1306–1315. https://doi.org/10.2478/picbe-2022-0119

Rafajac, O., & Jakupović, A. (2024). Integral communication and digital identity. https://doi.org/10.1007/978-3-031-47460-6

Remp, R. (1974). The efficacy of electronic group meetings. Policy Sciences, 5(1), 101–115. https://doi.org/10.1007/bf00155721

Salhab, R. A. (2024). The Zoom Boom: Assessing Videoconferencing Attitudes among College Students. International Journal of Information and Education Technology, 14(2), 204–213. https://doi.org/10.18178/ijiet.2024.14.2.2041

Sukhanova, K. (2024, July 22). Video Conferencing market Statistics. The Tech Report. https://techreport.com/statistics/video-conferencing-market-statistics/

Tømte, C. (2007). Electronic Meeting systems – A New Digital Genre? ResearchGate. https://www.researchgate.net/publication/288837961_Electronic_Meeting_systems_-_A_New_Digital_Genre

Walker, D. A. (2003). JMASM9: Converting Kendall's TAU for Correlational or Meta-Analytic Analyses. Journal of Modern Applied Statistical Methods, 2(2), 525–530. https://doi.org/10.22237/jmasm/1067646360.