NATIONAL INFORMATION PROCESSING INSTITUTE

A National Information Processing Institute
REPORT

REMOTE CONFERENCING **IN THE WORLD OF SCIENCE**

Dear Reader,

The research conducted at the National Information Processing Institute (OPI PIB) covers various areas of science. We constantly observe our reality and analyse current social phenomena. Development and innovation are the foundations of this activity. This approach enables us to provide the scientific and business communities with modern technological tools that are tailored to their needs. The results of our research help us better understand human-computer interactions. This is meticulously analysed by a team at the institute's Laboratory of Interactive Technologies – the staff of which are among the authors of this report. These scientists have spent several months studying how scientific activity transformed in 2020.

The *Pandemic Effect: Online Scientific Conferences* report is a valuable source of information, which I highly recommend to anyone who is interested in the impact of the COVID-19 pandemic on the Polish scientific community. The results of analyses conducted by the Laboratory of Interactive Technologies and the Laboratory of Databases and Business Analytics demonstrate that researchers have rapidly adapted to the near-constant recent changes in circumstances. The report includes not only research descriptions and results, but also practical recommendations directed both towards those who are responsible for the organisation of scientific conferences, and towards organisations that implement online conference tools. It seems, currently, that a restoration of the pre-pandemic status quo is highly unlikely; the process of presenting and promoting scientific achievements will also remain altered indefinitely. According to the analyses conducted, the new forms of scientific conference that have emerged during the pandemic have many more proponents than detractors. We are confident that due to the lower costs of online conferences, they will be permanently included in the repertoires of scientific units that organise events. For that reason, it is imperative that we listen to the opinions of conference participants, and endeavour to meet their new expectations. This report has been prepared with this purpose in mind.

Dr. Jarosław Protasiewicz
Head of the
National Information Processing Institute

Dr. Cezary Biele
Head of the
Laboratory of Interactive Technologies

The Covid-19 pandemic has changed our lives dramatically. Many processes that once involved in-person interaction have now become part of the digital domain: we work remotely, we organise virtual meetings and we participate in online events.

Online conferences are undeniably far more accessible and far less expensive than stationary ones. They also pose social, organisational and technical challenges, however. Without appropriate plans, online conferences can quickly unravel into a series of disconnected webinars, in which contact between speakers and participants is limited and anonymous. The key to satisfying the varying expectations of scientists is knowing their motivations, goals and concerns. This information facilitates the appropriate planning of online conferences.

A desire to discover the opinions of the Polish scientific community on online events served as the driving force for researchers at the National Information Processing Institute (OPI PIB) to conduct a study – the results of which are presented in this report.

The potential of online conferences is enormous. According to data gathered by OPI PIB, online conferences have more proponents than detractors – even among those who have not had opportunities to participate in such events.

Nevertheless, the scientists surveyed feared that online conferences will affect research collaboration, and that more time will be necessary for them to become recognised by the scientific community.

Motivating factors included respondents' safety (particularly during the COVID-19 pandemic), themes discussed during conferences, and the attendance of acclaimed speakers. It should also be noted that online conferences should be shorter in duration than stationary ones: the respondents expected online events to last two to four hours a day over the span of not more than two days. This can be explained by the necessity for participants to share their time between conferences and everyday duties. In the case of traditional conferences, it was much easier for participants to delineate these responsibilities. Scientists continue to appreciate live speeches and question and answer sessions, which they consider to deliver added value to every conference.

Although there are reasons to believe that the COVID-19 pandemic is coming to an end, and that conferences will once again be held in a traditional face-to-face format, I am convinced that online scientific conferences will remain a popular alternative to stationary events, as researchers have now experienced their advantages first hand. It is my hope that the data we have collected will facilitate the organisation of online conferences in a constantly evolving environment to ensure that they continue to be interesting and effective.

SAMPLING AND DESCRIPTION OF THE STUDY

Method:
Computer-assisted web interviewing (CAWI) via the LimeSurvey platform.

Period:
27 January 2021 – 8 February 2021

Sampling:
Random sampling.
Sample: researchers included in the POL-on database.

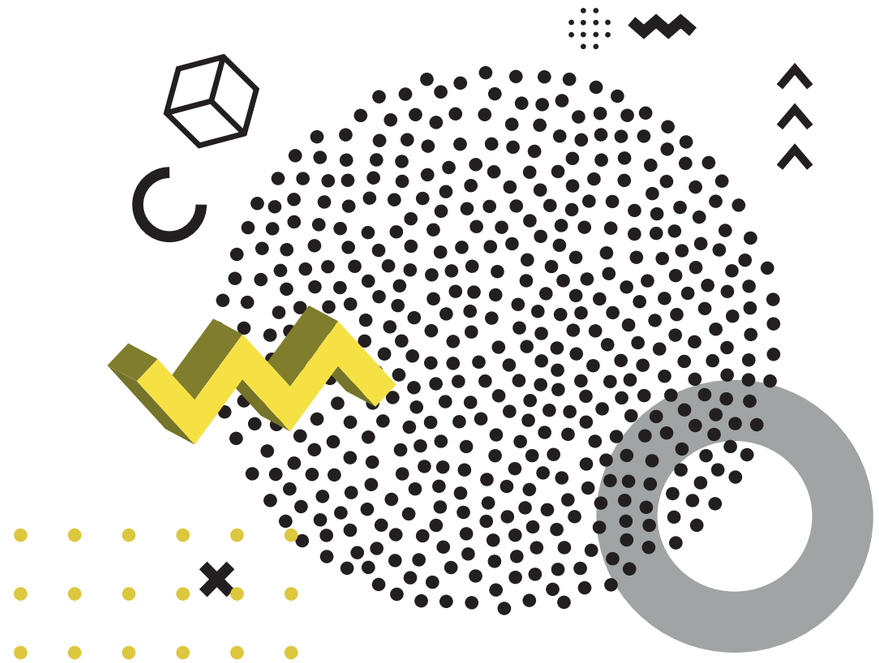
Study participants:
A total of 1,984 individuals participated – 1,575 of whom completed the study.

Research team at OPI PIB:
Dr. Grzegorz Banerski, Zbigniew Bohdanowicz, Dr. Anna Knapińska, Dr. Agata Kopacz and Adam Müller.

The study was conducted for:

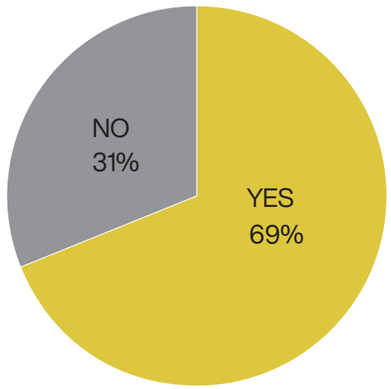
Ministry of Education and Science

THE POTENTIAL AND EVALUATION OF ONLINE CONFERENCES



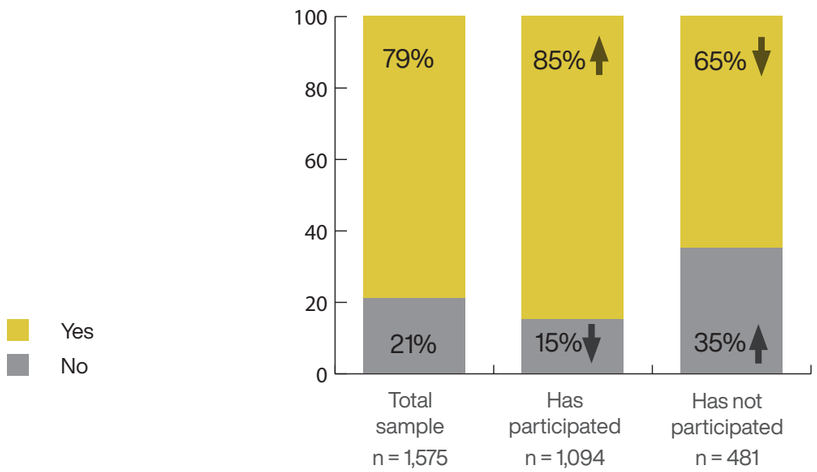
DESPITE SOME SCEPTICISM,
THE VAST MAJORITY OF RESPONDENTS
WERE ENTHUSIASTIC ABOUT ONLINE CONFERENCES

Participated in an online conference



n = 1,575

Considered participating in an online conference (during the COVID-19 pandemic), divided by experience level



79% of respondents were planning to participate in online conferences

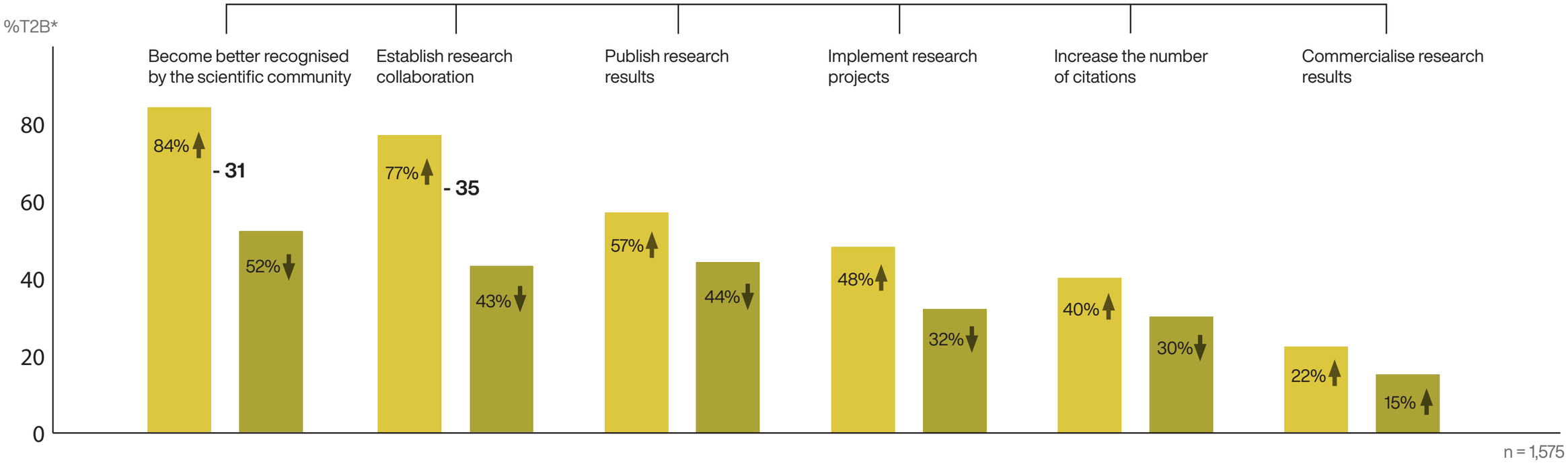
The difference between these groups is statistically significant

THE UNCONTESTED POSITION OF TRADITIONAL CONFERENCES IN THE ACCOMPLISHMENT OF SCIENTIFIC OBJECTIVES

Online conferences are exposed to significant shortcomings when compared with traditional events:

- limited opportunities to be recognised by the scientific community,
- limited opportunities for research collaboration.

Scientific objectives accomplished through conference participation

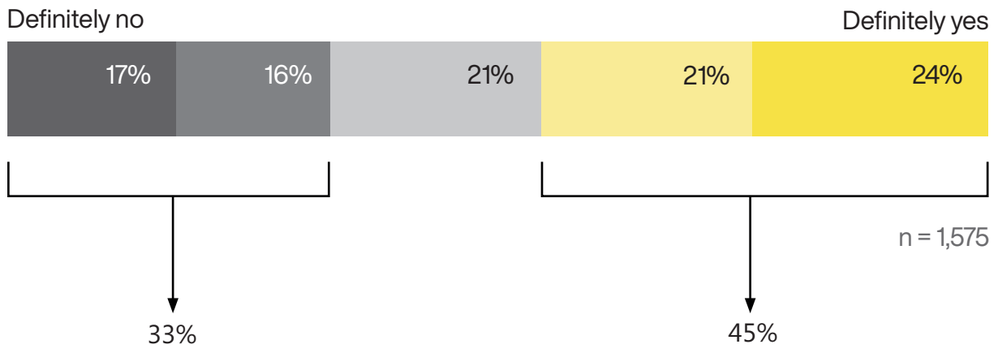


The difference between the evaluation of traditional and online conferences is statistically significant.

%T2B* - Total % of responses 4 and 5 on a scale of 1 ('definitely does not contribute') to 5 ('definitely contributes')
To what extent do you believe that participation in scientific conferences contributes to the accomplishment of the objectives listed above in your scientific activity?
To what extent do you believe that participation in online conferences contributes to the accomplishment of the objectives listed above in your scientific activity?

ONLINE CONFERENCES ARE HERE TO STAY **– THEY HAVE POTENTIAL**

Interest in online conferences after the pandemic

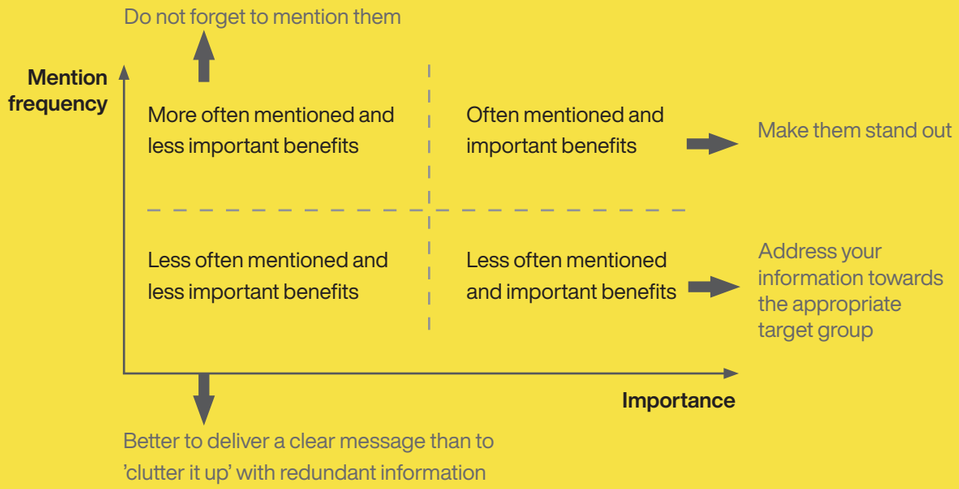


After the COVID-19 pandemic, online conferences are likely to continue, but are unlikely to supersede traditional, stationary conferences. It is expected that in the future both formats will coexist and complement each other.

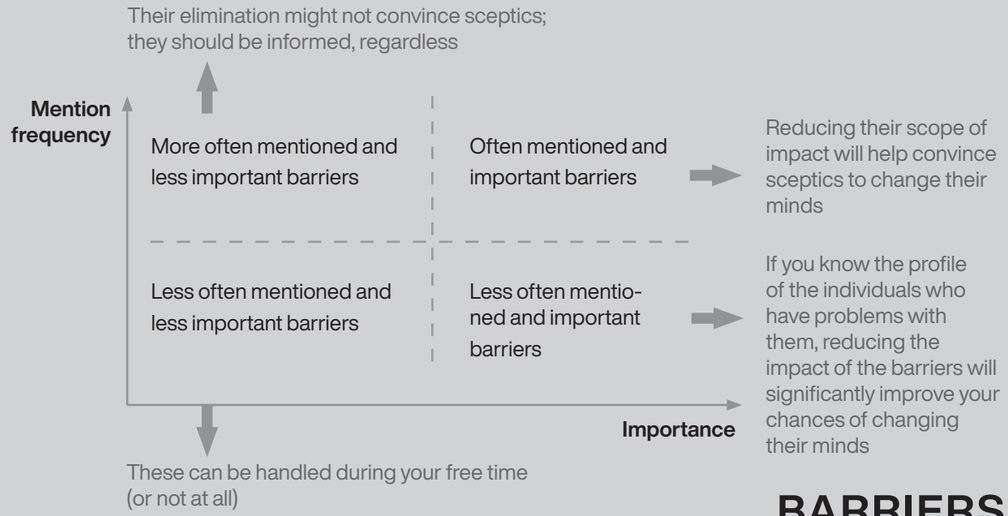
Almost a half of the respondents (45%) were interested in participating in online conferences – even after the pandemic is over. Some groups that demonstrate higher-than-average interest in online conferences are masters and doctors (50%), researchers who specialise in the humanities (51%), and researchers who have already participated in online conferences (50%).

MOTIVATORS

We asked the individuals who were interested in participating in online conferences to indicate what drove them to do so, and to specify how important each of those aspects was to them.
Using this approach, we were able to identify the primary motivators – those which were most often mentioned as key benefits.

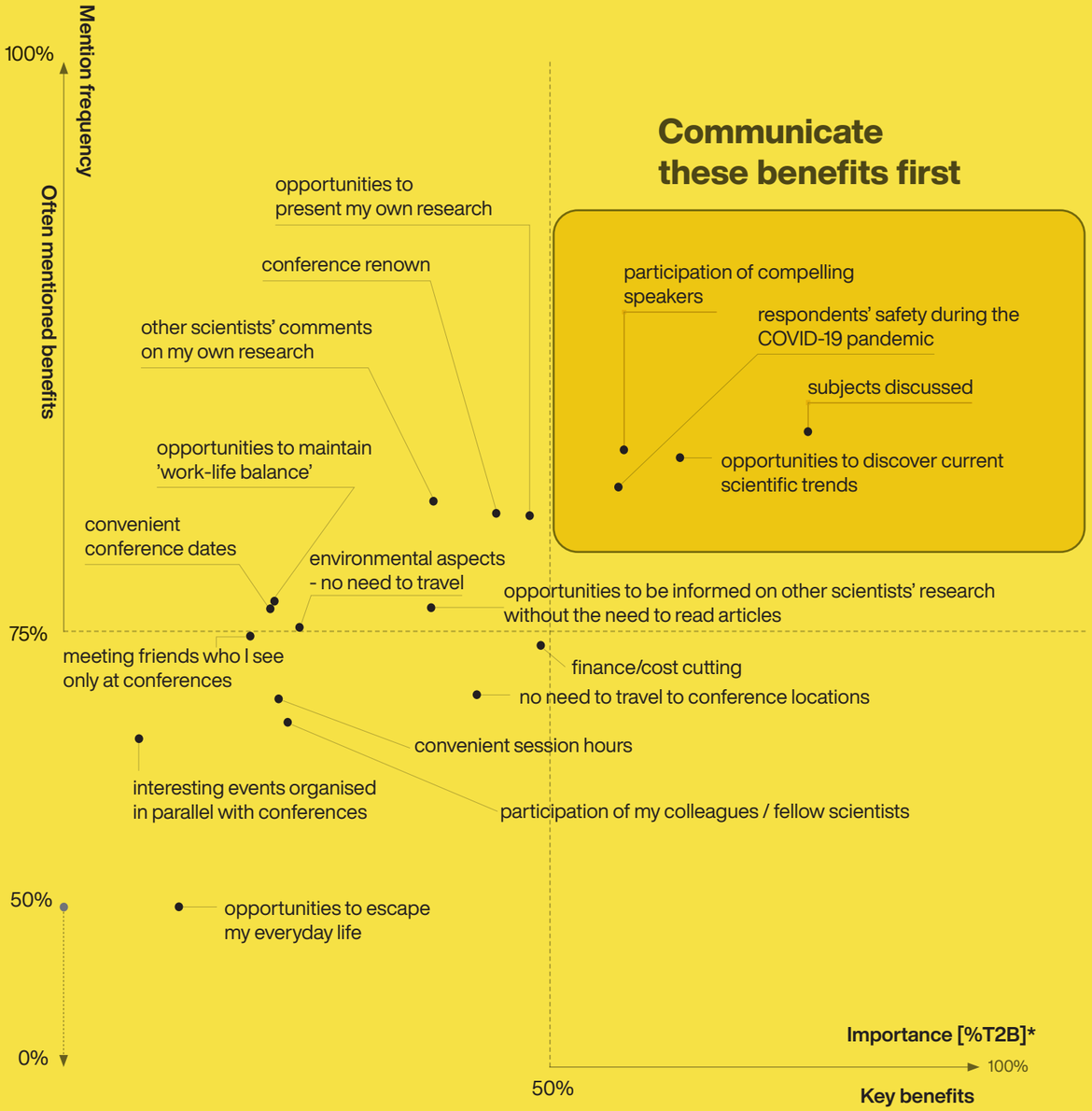


We also asked the respondents who were uninterested in participating in online conferences to indicate what dissuaded them from doing so, and to specify how much of a barrier each of those aspects was to them.
Using this approach, we were able to identify the key barriers – those most often mentioned and significant.



BARRIERS

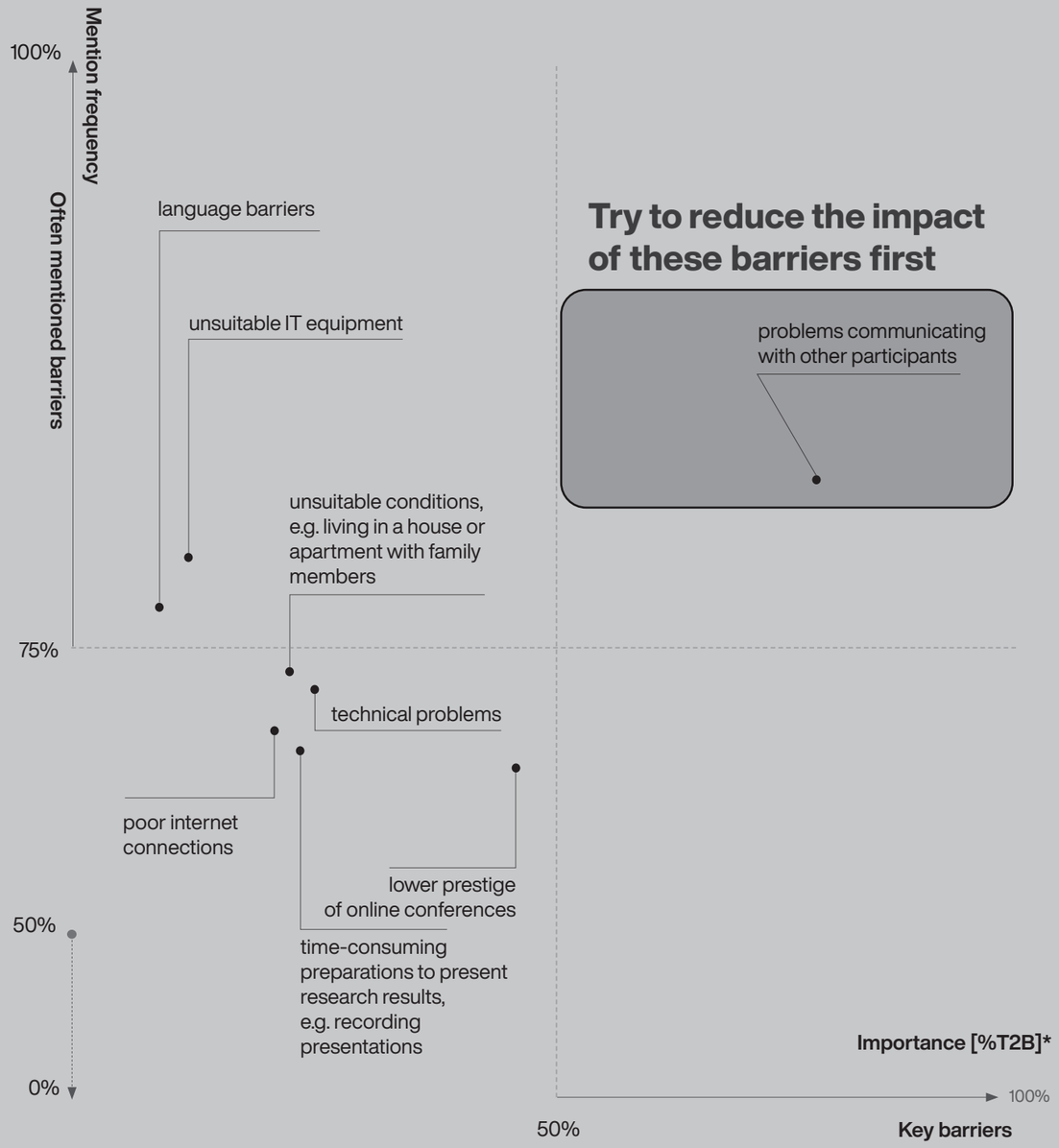
MOTIVATORS



Respondents interested in participating in online conferences, (n=1,245)

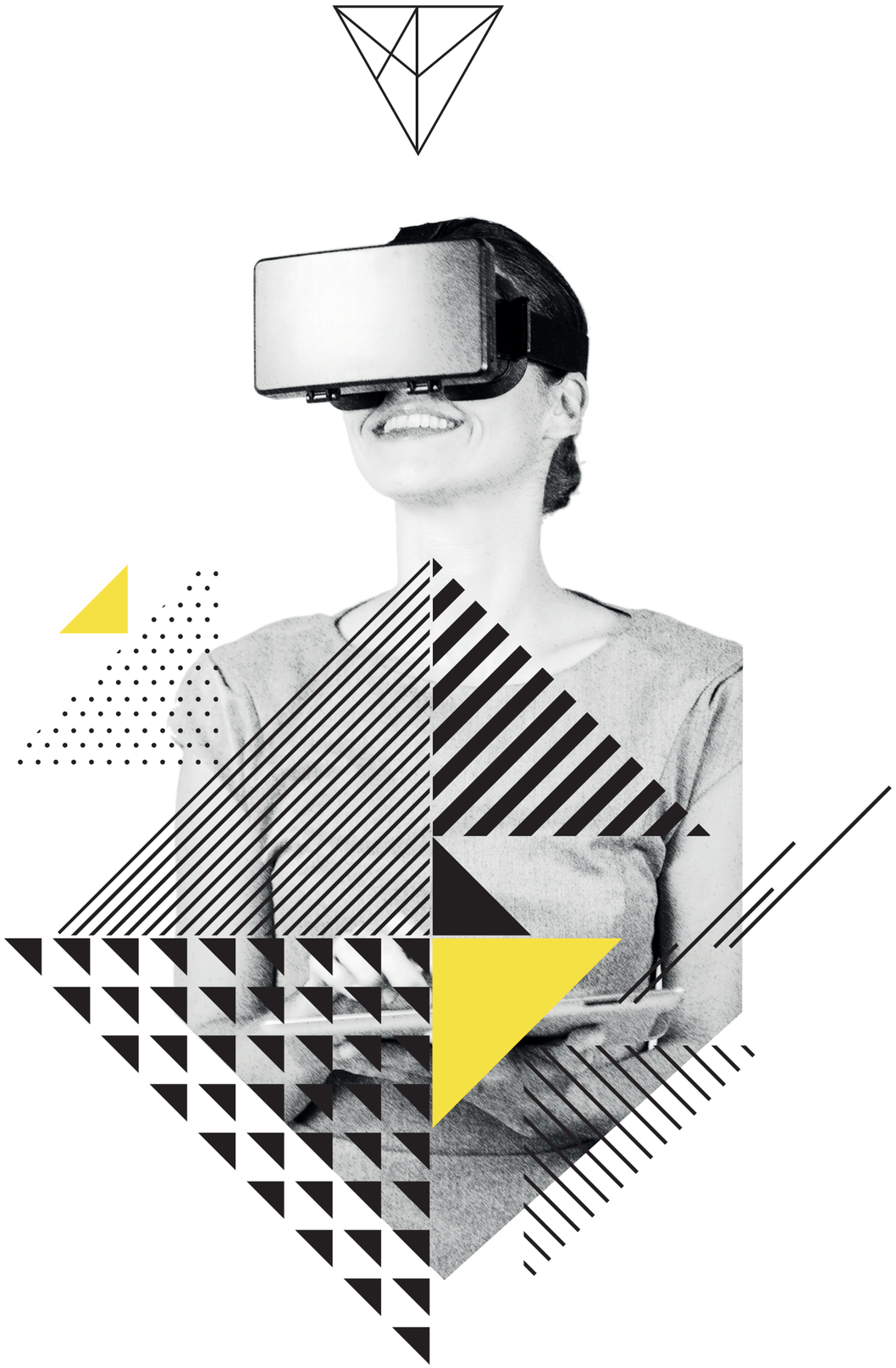
*T2B – Total % of responses 4 and 5 on a scale of 1 ('of little importance') to 5 ('of exceptional importance').

BARRIERS



Respondents uninterested in participating in online conferences, (n=330)

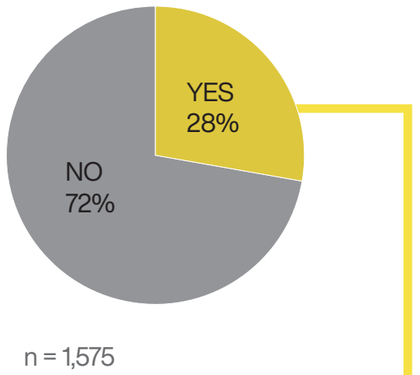
*T2B – Total % of responses 4 and 5 on a scale of 1 ('barrier of little importance') to 5 ('barrier of exceptional importance').



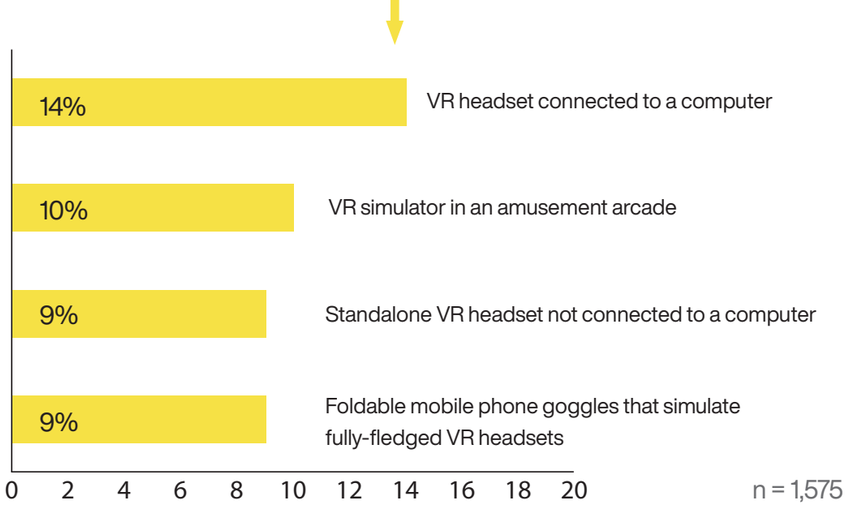
POTENTIAL AND EVALUATION OF ONLINE VIRTUAL REALITY CONFERENCES

INVARIABLY RARE EXPERIENCES
WITH IMMERSIVE VIRTUAL REALITY (IVR)

Most study subjects (72%) had never had contact with IVR technology.



n = 1,575

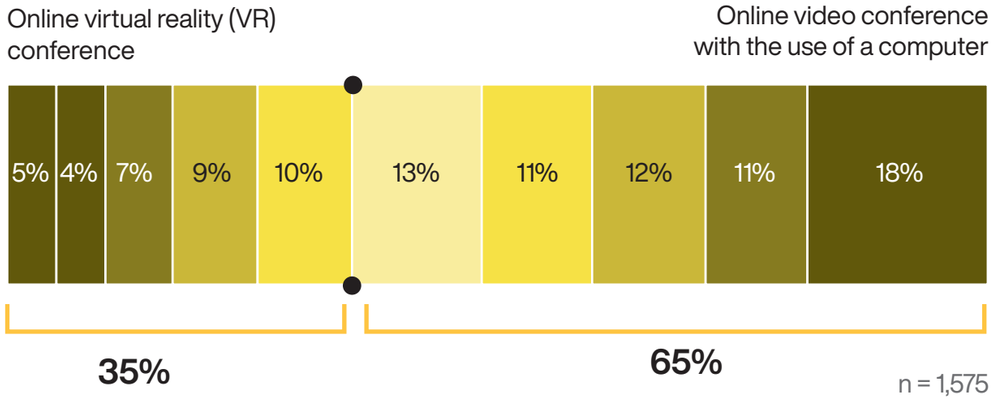


n = 1,575

As few as 28% of the respondents had had contact with VR technology. Those who had most commonly used VR headsets connected to computers (14%), VR simulators available in amusement arcades (10%), standalone headsets (9%) and simple mobile phone goggles (9%).
The results indicate that very few individuals are familiar with virtual reality, which might translate into relatively low interest in using the technology in the conduction of online conferences.

LOW INTEREST IN VIRTUAL REALITY
ONLINE CONFERENCES

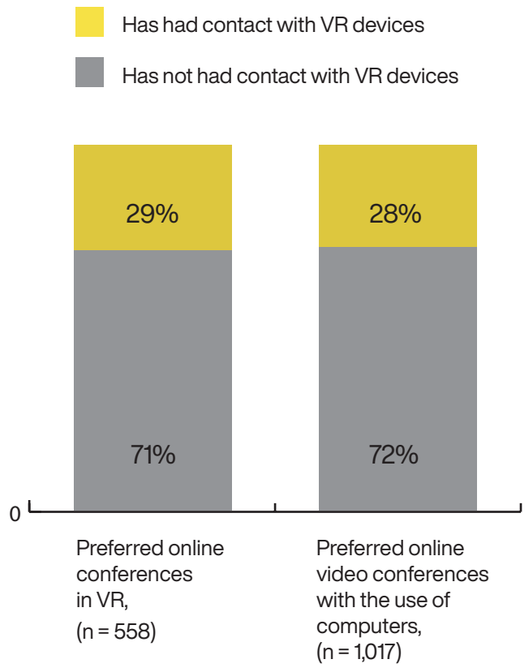
Preferred online conference format



n = 1,575

Virtual reality enthusiasts might change their preferences – most of those who said 'yes' to VR conferences had never had contact with the technology (71%), and formed their opinions on the basis of their visions of it rather than their experience.

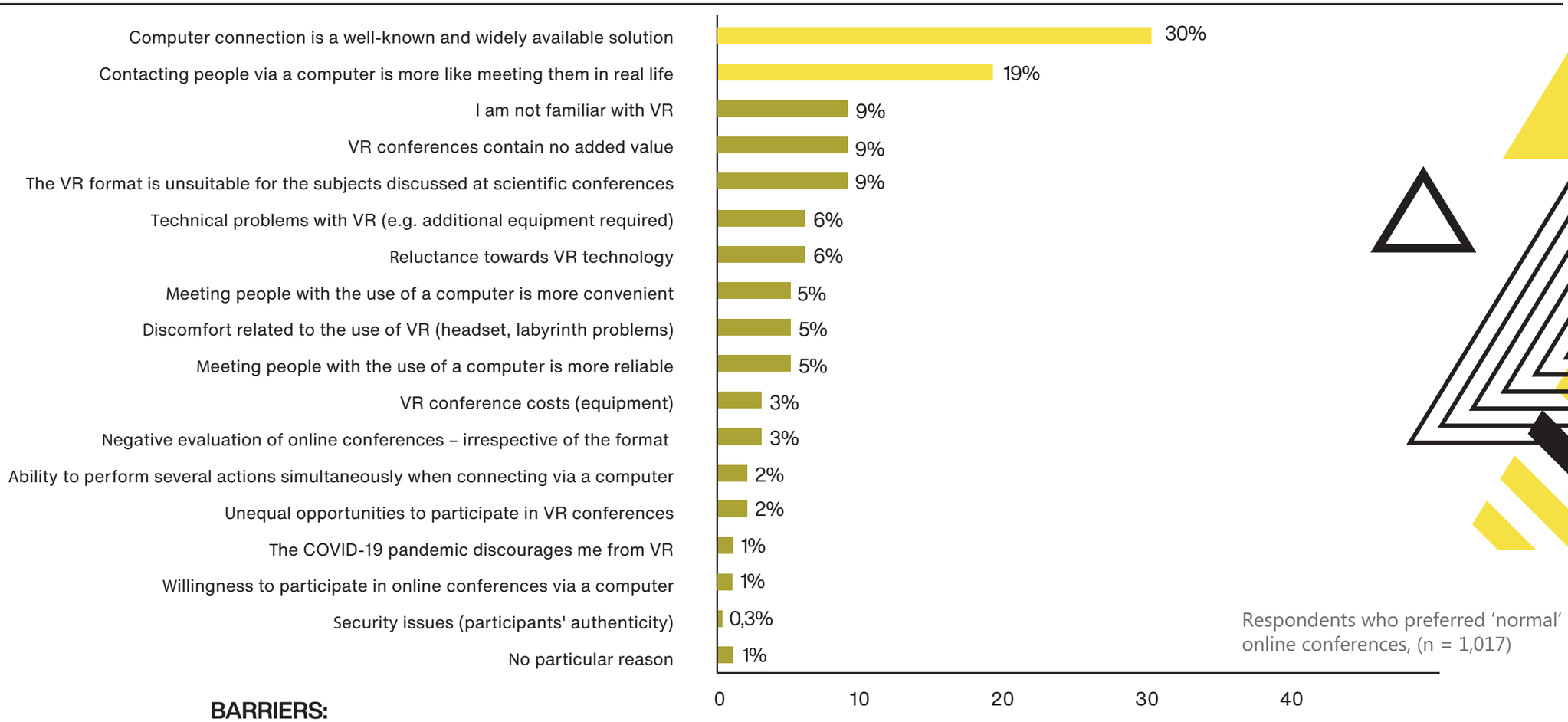
Of the respondents, 65% were willing to participate in online conferences with the use of computers, while only 35% were willing to participate in VR events.
Analysis of each of the respondent subgroups demonstrates no significant differences to the results presented above.



WHY NOT VR?
– I STRONGLY PREFER THINGS I ALREADY KNOW AND USE

Online video meetings are well-known and highly regarded.

Why do I prefer 'normal' online conferences to VR conferences?



ADVANTAGES:

- opportunities to observe real people and their expressions and emotions, which acts as a substitute for in-person contact,
- the availability of equipment; the only thing you need is a computer,
- strong knowledge of the technology and confidence in its stability and reliability.

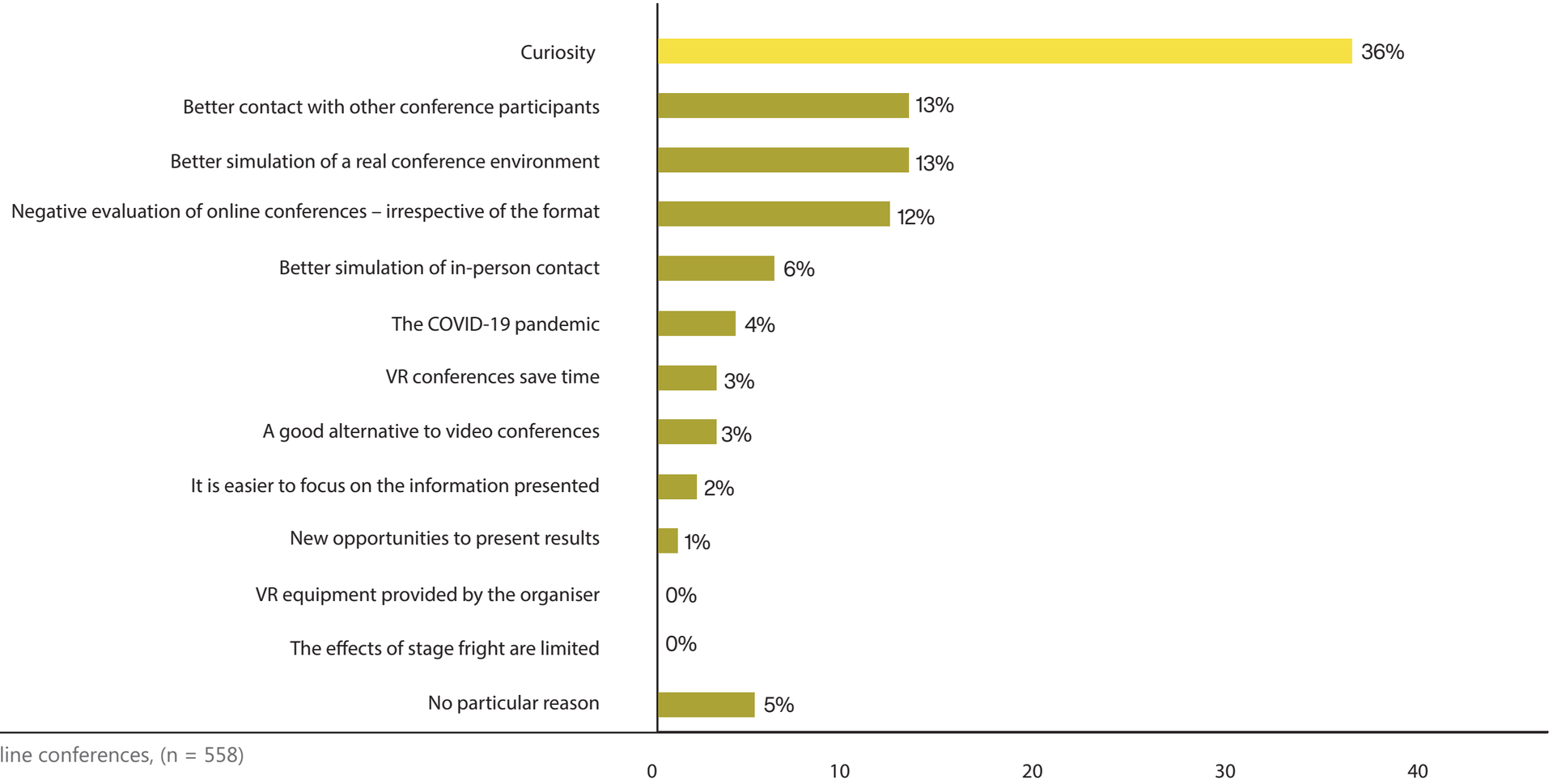
BARRIERS:

- insufficient knowledge of the technology,
- the format is unsuitable for conference subjects (respondents perceived VR as a technology best suited to entertainment purposes),
- belief that VR offers no new possibilities that would justify investment in new equipment and the effort necessary to learn how to use the technology,
- general reluctance towards VR perceived as a manifestation of the creeping computerisation of human life,
- discomfort related to VR use – e.g. nausea, dizziness, uncomfortable headsets,
- difficulties in joining conferences by elderly people who lack access to the technology, are not tech savvy, and feel uncomfortable being immersed in VR.

WHY NOT ’NORMAL’ ONLINE CONFERENCES?
– CURIOSITY!

The primary motivation for participation in VR conferences is respondents’ curiosity to experience an unfamiliar format.

Why do I prefer VR conferences to ’normal’ online ones?



Respondents who prefer VR online conferences, (n = 558)

The respondents expected this format to ensure better contact among conference participants and better simulation of being physically present at a conference.

Other advantages included:

- improved contact in comparison to video connections,
- improved concentration on the information presented,
- new ways to present results,
- VR conferences save time compared to traditional ones.

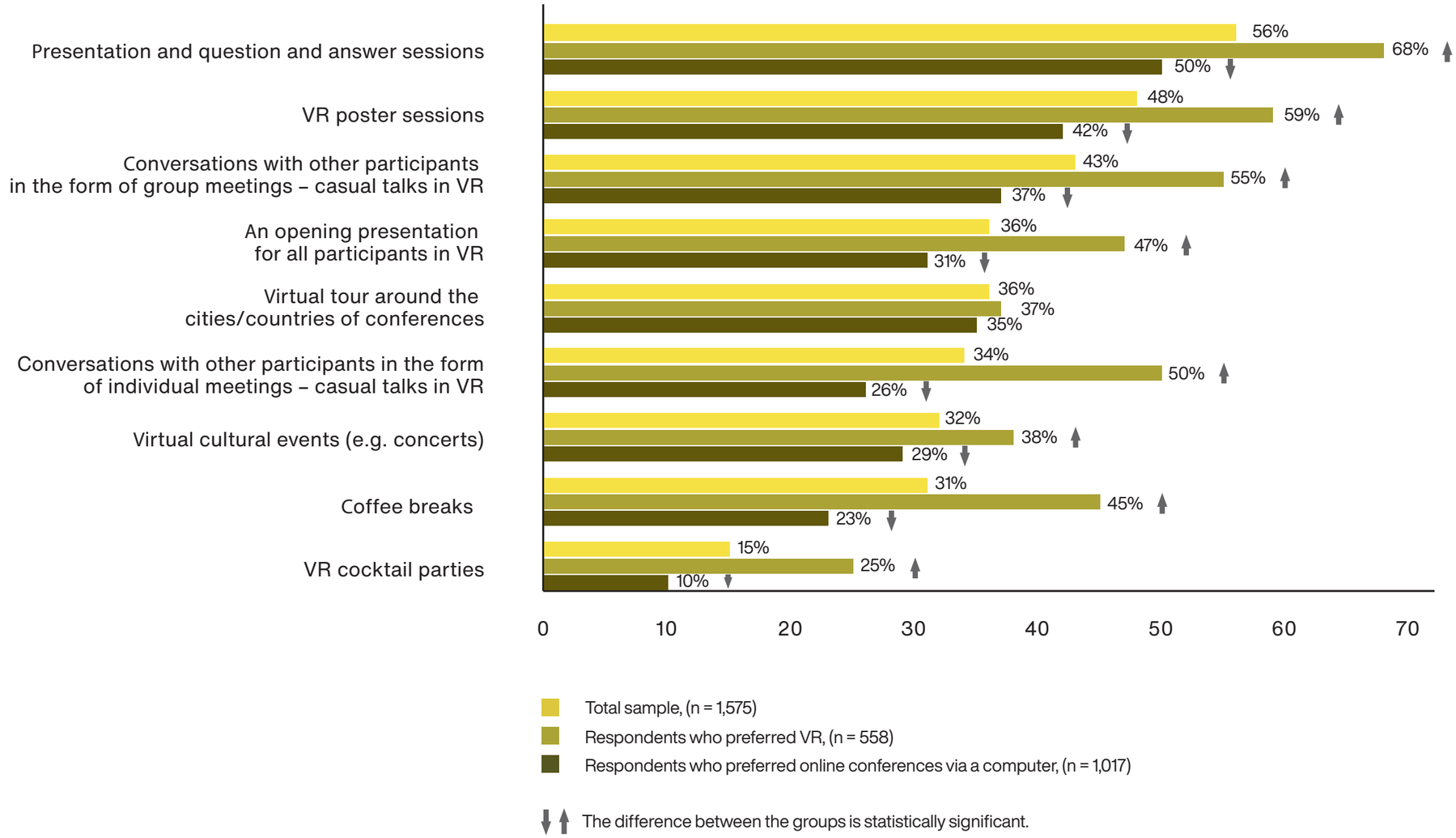
INTERESTING VR EVENTS
CHOSEN REGARDLESS OF PREFERENCE

Preferred VR conference events

According to the respondents, the most attractive elements of VR events include: presentation and question and answer sessions (56%), poster sessions (48%) and group meetings (43%).

Over a third of the respondents who preferred online conferences organised with the use of computers also expressed interest in these elements of virtual conferences.

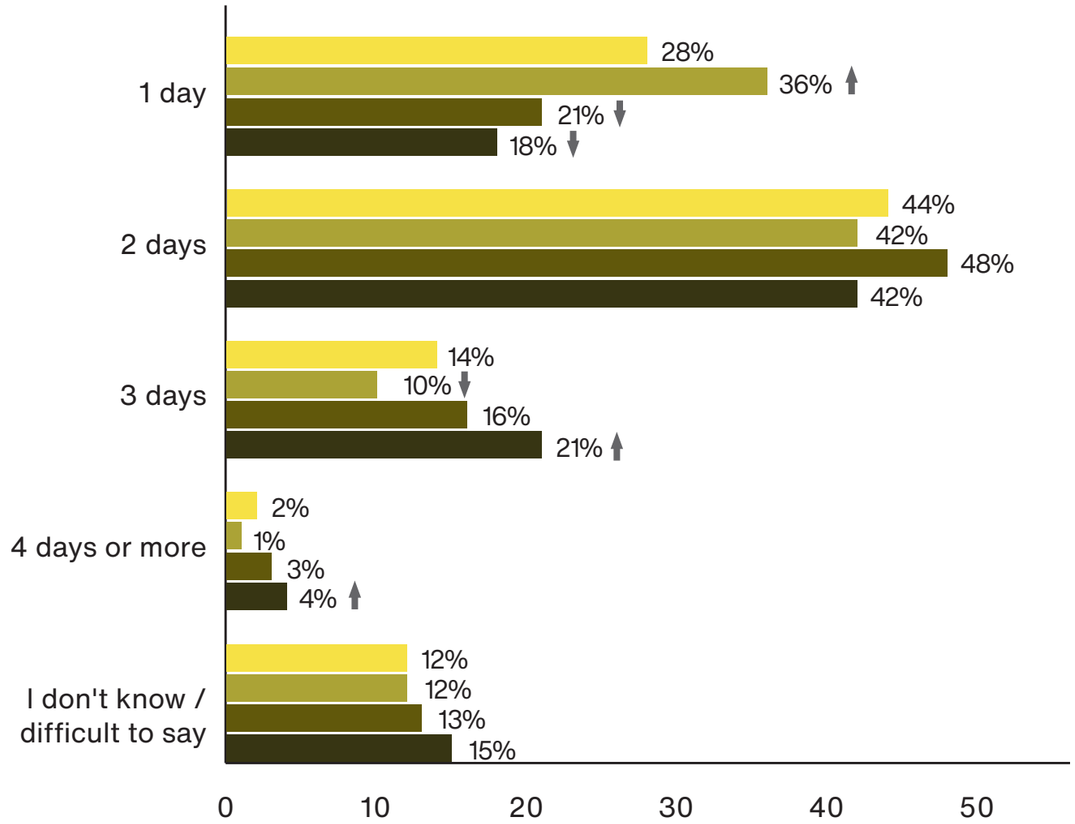
The respondents who were more inclined to participate in VR conferences than in traditional ones were more often interested in various types of event organised in VR.



ORGANISATION OF EVENTS DURING ONLINE CONFERENCES

– OPINIONS OF RESPONDENTS WHO PREFERRED THE ONLINE CONFERENCE FORMAT

ONLINE CONFERENCES
– MAKE THEM SHORTER, BUT FULL OF CONTENT



Respondents who preferred the online conference format, (n = 1,245)

Respondents who had participated in at least two conferences in 2019, (n = 799)

Respondents who had participated in one conference in 2019, (n = 376)

Respondents who had not participated in any conference in 2019, (n = 365)

The difference between each subgroup and the total number of respondents who preferred the online conference format is statistically significant, (n = 1,245)

*no results have been included for respondents who did not know in how many conferences they had participated in 2019.

Three quarters of respondents who preferred the online conference format believed that a conference should last one or two days. Nearly half stated that two-day conferences were the most desirable.

Shorter, one-day events seem particularly attractive to active scientists who had participated in several conferences in 2019.

Longer conferences are usually craved by respondents who had not participated in any conferences in 2019 – they would attend a three-day conference more willingly (21%) than the average respondent (14%).

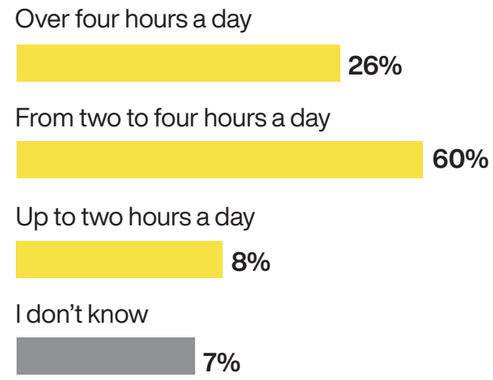
The respondents almost unanimously agreed that they were uninterested in any event that lasted longer than three days.

ADDITIONAL INFORMATION:
The largest groups that expressed willingness to participate in three-day conferences include technical scientists (23%) and employees of scientific institutes (20%), compared with 14% of the total number of respondents who preferred the online conference format.

Researchers of the social sciences and humanities (SSH) (39%) and those employed at non-public higher education institutions (38%) would rather participate in one-day events, compared with 28% of the total number of respondents who preferred the online conference format.

How much time would you be willing to spend at an online conference a day?

As many as 60% of the subjects would ideally spend two to four hours a day at an online conference; 26% would be willing to spend longer than four hours.



THE CENTREPIECE OF THE PROGRAMME
– LIVE PRESENTATIONS

Live sessions are a key element of all scientific conferences. This remains true during online conferences – the vast majority of respondents considered live sessions to be crucial.

Conversely, keynote speeches, which are usually delivered by acclaimed scientists and used primarily as a tool to promote conferences, were only indicated to be a key element by only a third of the respondents.

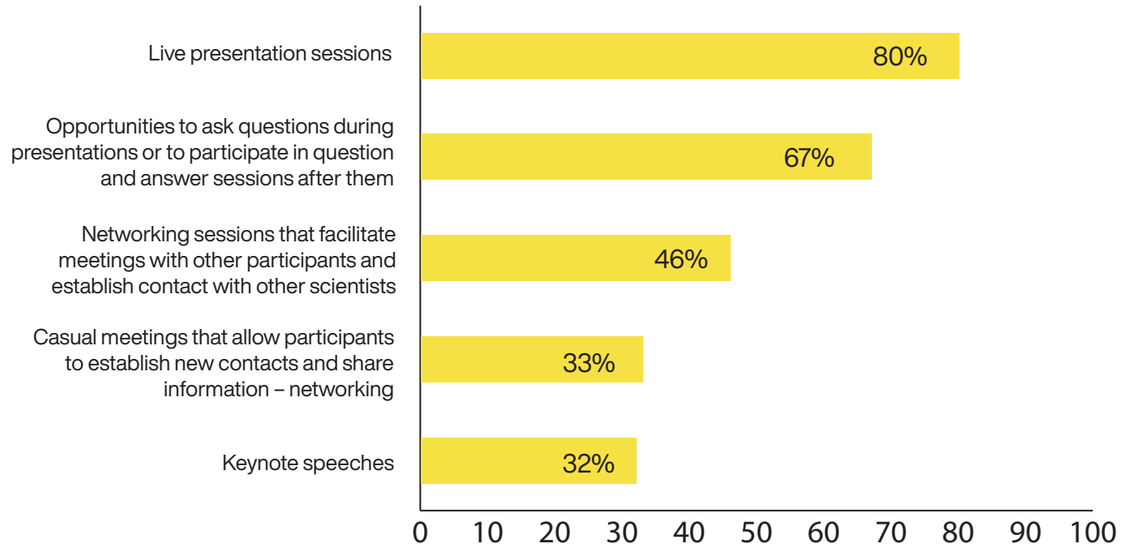
The respondents mentioned other events in which they would be interested when participating in online conferences:

- discussion panels,
- workshops,
- poster sessions,
- virtual concerts, trips and other cultural events.

The respondents also highlighted useful organisational facilities:

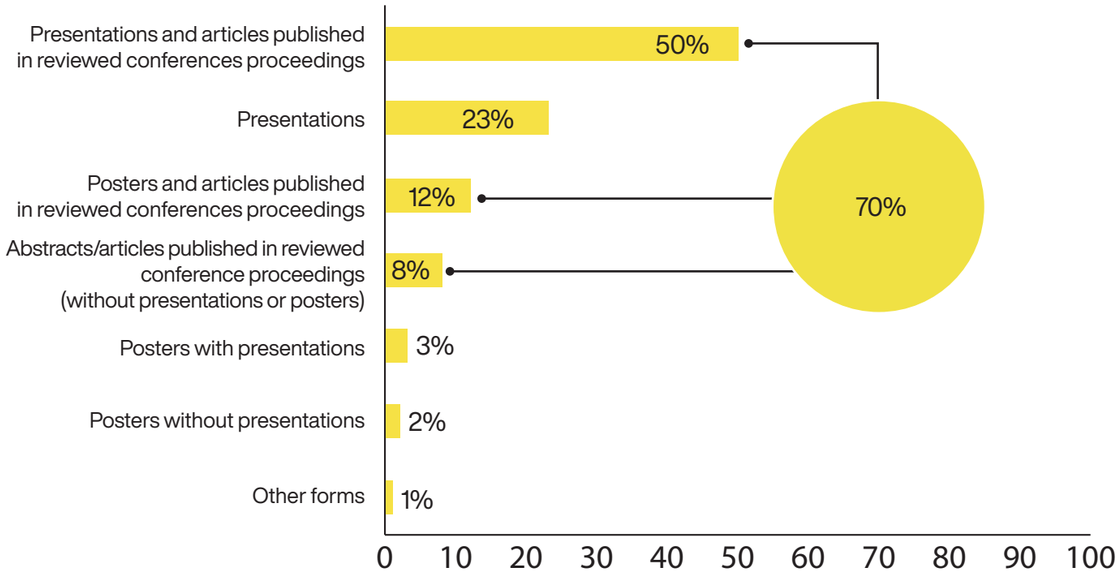
- downloadable conference proceedings,
- recorded presentation sessions that can be consumed at participants' convenience,
- information on the speakers published on conference websites,
- information on other conferences – e.g. upcoming papers and articles.

Which events at online conferences do you find the most interesting?

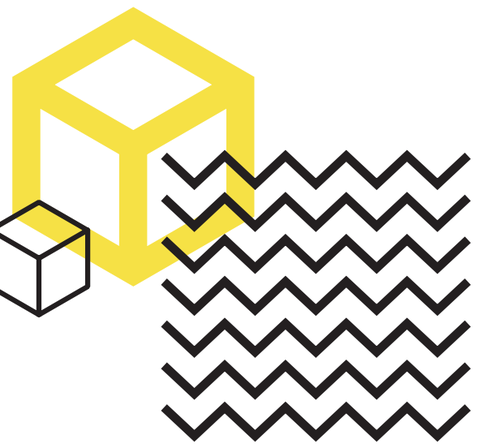


Respondents who preferred the online conference format, (n = 1,245)

CONFERENCES ARE FINE
BUT REVIEWED ARTICLES ARE EVEN BETTER!

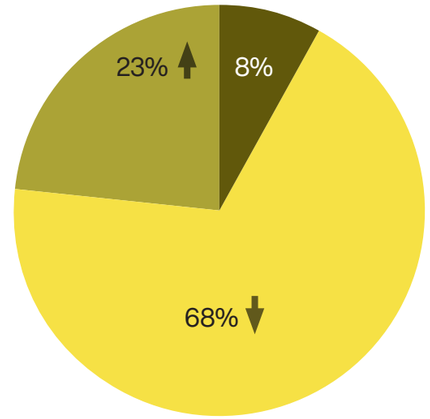


n = respondents who preferred the online conference format, (n = 1,245)



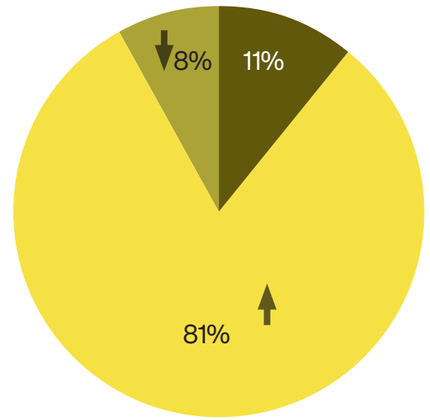
Of the respondents, 70% who preferred the online conference format wanted the research results presented at conferences to be made available as papers and articles in reviewed conference proceedings.

Exact and natural sciences



n = 720

Social sciences and humanities (SSH)



n = 525

Presentations
Posters
Other forms

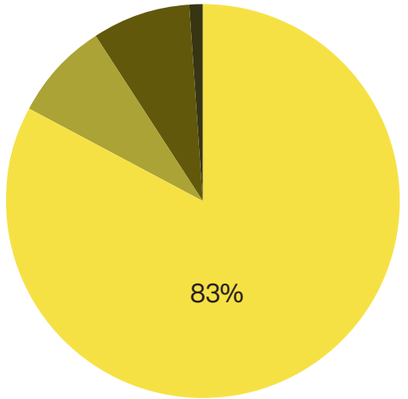
The difference between respondents who specialised in exact and natural sciences and those who specialised in SSH was statistically significant.

Statistically significant differences appear in the case of subjects specialised in different fields. Exact and natural science researchers (68%) are less willing to share their results in the form of presentations than those of SSH (81%), but were more inclined to create posters (23% compared with 8%). This can be explained, at least somewhat, by the differing nature of their research.

SIMILARITIES BETWEEN ONLINE AND STATIONARY CONFERENCES
– THE TRADITION CONTINUES

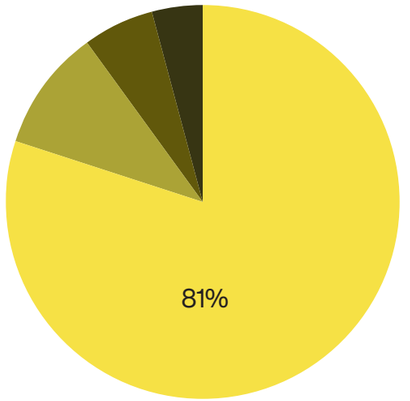
According to the majority of respondents, the formats of online and traditional conferences should be similar: standard fifteen-minute speeches should be followed by a series of questions and answers – and incorporating messaging applications. All of the above should happen 'live'.

The similarities between traditional and online conferences might be explained by the direct substitution of the former for the latter during the COVID-19 pandemic. It might also mean that researchers cannot imagine how modern online scientific conferences might look in the future.



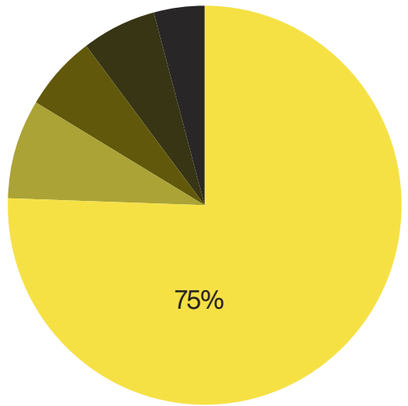
How long should a presentation last?

- About 15 minutes
- About 30 minutes
- 3-5 minutes
- I don't know / difficult to say



How should the results be presented to conference participants?

- In the form of live sessions
- They should be pre-recorded and played during sessions
- They should be pre-recorded and made available before the conference
- I don't know / difficult to say



How should speakers be asked questions?

- Live, immediately following their presentations
- Before conferences (the presenters should answer them during conferences)
- By e-mail, after conferences
- At individual meetings during conferences
- I don't know / difficult to say

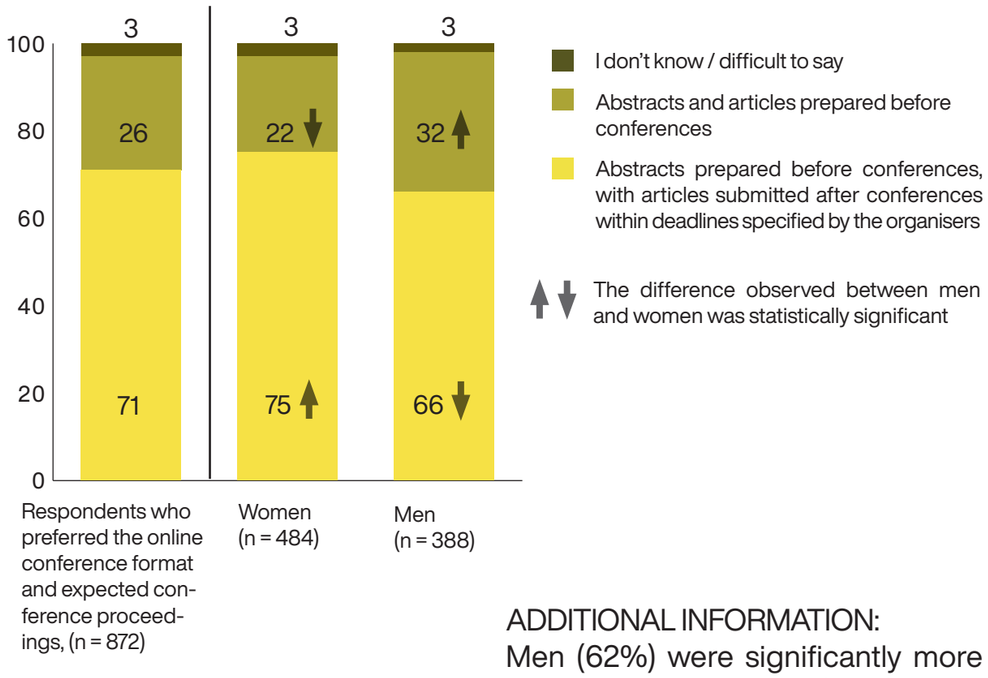
Respondents who preferred the online conference format, (n = 1,245)

MEN AND WOMEN, OLD AND YOUNG
ON ONLINE CONFERENCES

DIFFERENCES BY SEX

Only 25% of respondents who preferred the online conference format and expected conference proceedings to be published reviewed the abstracts and articles prepared prior to conferences.
This approach is adopted by men (32%) significantly more often than women (22%).

Preferred method of submitting conference materials [%]



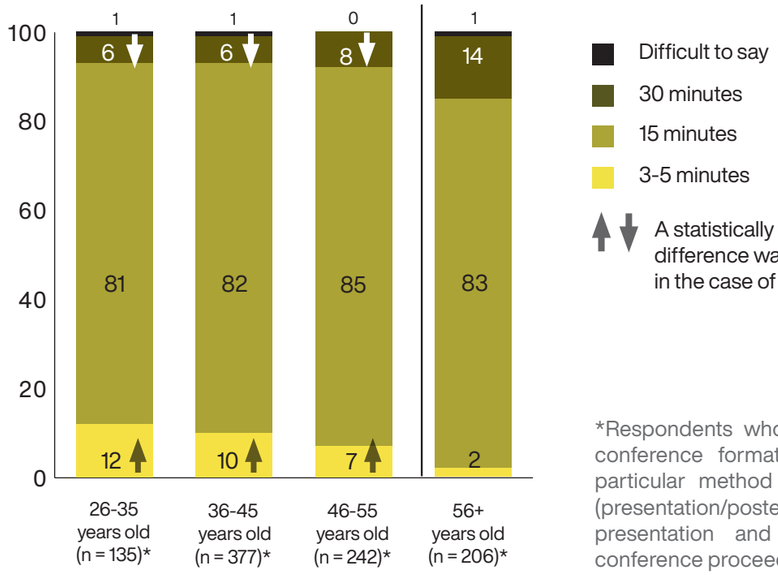
ADDITIONAL INFORMATION:
Men (62%) were significantly more reluctant than women (47%) to attend organised networking sessions that are intended to facilitate communication between conference participants.

DIFFERENCES BY AGE

The vast majority of respondents, regardless of age group, maintained that presentations should last 15 minutes – as is commonly the case during traditional conferences.

The eldest group of scientists (56+) preferred longer, thirty-minute speeches (14% vs. 6% of the 26-35 group).

Preferred presentation duration [%]



*Respondents who preferred the online conference format and opted for one particular method of presenting results (presentation/poster with presentation/presentation and article in reviewed conference proceedings; n = 960)

ADDITIONAL INFORMATION:
Organised networking sessions are the least popular among the youngest respondents aged 26-35 (63% compared with 54% of the total number of respondents).
Compared with other age groups, however, the youngest researchers were more willing to deliver presentations without their articles appearing in reviewed conference proceedings (35%, compared with 21% in the 56+ group).

CONCLUSIONS AND RECOMMENDATIONS

	Online conference potential	Accomplishment of scientific objectives	Motivators	VR conferences (potential)	Organisation of events during online conferences
Description	During the COVID-19 pandemic, online conferences have had many more proponents (79%) than detractors (21%). This is true even for respondents who have never participated in any such events (65% of proponents and 35% of detractors).	Traditional conferences enable more efficient accomplishment of scientific objectives. This pertains in particular to: ▪ opportunities to be better recognised by the scientific community, ▪ opportunities to establish research collaborations.	There are a host of aspects related to online conferences, but only a handful that truly motivate the proponents to participate in events. These aspects should be identifiable and positively evaluated by prospective participants.	'Standard' online video conferences conducted via computers (65%) are much more popular than those conducted in VR (35%). Enthusiasts of VR conferences were often curious about the format (36%). Most of those who said 'yes' to VR conferences had had no contact with the technology (71%), and formed their opinions on the basis of their visions of it, rather than on empirical experience. There is a risk that this group might change their minds after having contact with VR technology.	The majority of respondents believed that online conferences should last one or two days. The respondents almost unanimously agreed that conferences should not exceed three days. Sixty percent of the scientists were willing to spend two to four hours a day participating in conferences. The respondents were primarily interested in participating in live presentation sessions. Keynote speeches attracted markedly less interest. The respondents expressed a desire to have their presented results published in reviewed conference proceedings. They also believed that the formats of online and traditional conferences should be similar: standard fifteen-minute live speeches should be followed by question and answer sessions.
Recommended actions for conference organisers	Permanently include online conferences in your repertoire of events – even after the COVID-19 pandemic ends.	Change the way online conferences are perceived by prospective participants: ▪ find a way to make the participants feel fulfilled (improved recognisability) ▪ bring the participants together.	Communicate and draw particular attention to the following benefits: ▪ subjects discussed ▪ opportunities to be informed about current scientific trends ▪ compelling speakers ▪ physical safety due to the COVID-19 pandemic. Communicating other information should be considered of secondary importance.	Avoid organising online conferences that are held exclusively in VR. Make your conferences more attractive by organising additional VR events. Gather opinions about such events.	Organise two-day online conferences (four-hour blocks), which will help attendees focus and participate actively in the events. Identify the needs of target groups (e.g. one or two days in the case of SSH and two or three days in the case of technical science). Promote conference subjects and speakers rather than keynote speeches. Publish reviewed (scored) conference proceedings. Make online conferences more attractive by organising additional activities, such as workshops, discussion panels, and cultural events.
Examples of actions / good practice, or how to deal with problems		▪ Make speakers' profiles available –biographies should be updated immediately after participants' registration. ▪ Make breakout rooms accessible on digital platforms (e.g. Zoom or Microsoft Teams). These dedicated social spaces are reserved for speakers and conference participants who are interested in particular speeches or subjects. Make breakout rooms accessible after every session. Allow participants to leave and enter breakout rooms and to chat with different speakers in small groups. ▪ Implement a system to organise individual meetings between conference participants. The system should automatically match the time of a meeting, while considering the time constraints specified by the participants (Swapcard, B2Match).	▪ Create a dedicated conference website. ▪ Make your website stand out – use search engine optimisation and specify tags that might be searched for by prospective conference participants.	Offer optional VR services: ▪ presentation and question and answer sessions ▪ poster sessions ▪ conversations with other participants in the form of group meetings – casual talks in VR These elements of virtual conferences were attractive for a considerable share of the respondents (over 1/3), who preferred online conferences to be conducted using computers.	▪ Make conference proceedings available as downloadable files. ▪ Make presentation session recordings available to be watched and/or listened to before or after conferences. ▪ Upload information on the speakers, including their contact details, to your conference website. ▪ Organise question and answer sessions to follow presentations. Enable the use of online messaging and chat applications.

NATIONAL INFORMATION PROCESSING INSTITUTE (OPI PIB)

The National Information Processing Institute (OPI PIB) is an interdisciplinary scientific institute and a leader in IT system and software development for Polish science and higher education. It holds knowledge on almost every Polish scientist, including their projects and research apparatus. The institute gathers, analyses and compiles information on the research and development sector, which allows it to influence the shape of Polish scientific policy. OPI PIB develops intelligent information systems for the public sector and for commercial use.

The institute's key areas of research include: machine learning algorithms, natural language processing algorithms, sentiment analysis, neural networks, discovering knowledge from text data, human-computer interaction, computer assisted decision-making systems and artificial intelligence.

OPI PIB's research activity is driven by inter-disciplinarity. Research is conducted in seven laboratories, which employ specialists in a variety of fields. The institute's team of IT experts is supported by economists, sociologists, lawyers, statisticians and psychologists. This convergence of approaches is conducive to in-depth analysis of research issues, and serves as a driving force for innovation.

THE LABORATORY OF INTERACTIVE TECHNOLOGIES, OPI PIB

The Laboratory of Interactive Technologies conducts projects that fuse technology and social sciences with a focus on humanity and its needs. The laboratory studies phenomena related to human-computer interaction and its social context. The laboratory comprises a group of specialists in a variety of fields, including IT, sociology, psychology, neuroscience, statistics and user-oriented design (User Experience).

THE LABORATORY OF DATABASES AND BUSINESS ANALYTICS, OPI PIB

The Laboratory of Databases and Business Analytics compiles interactive reports and summaries on the higher education sector, science, and research and development policies. The laboratory's team of highly specialised programmers and analysts are involved in comprehensive business processes – from the design, implementation and integration of databases to multi-aspect data analysis.

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