

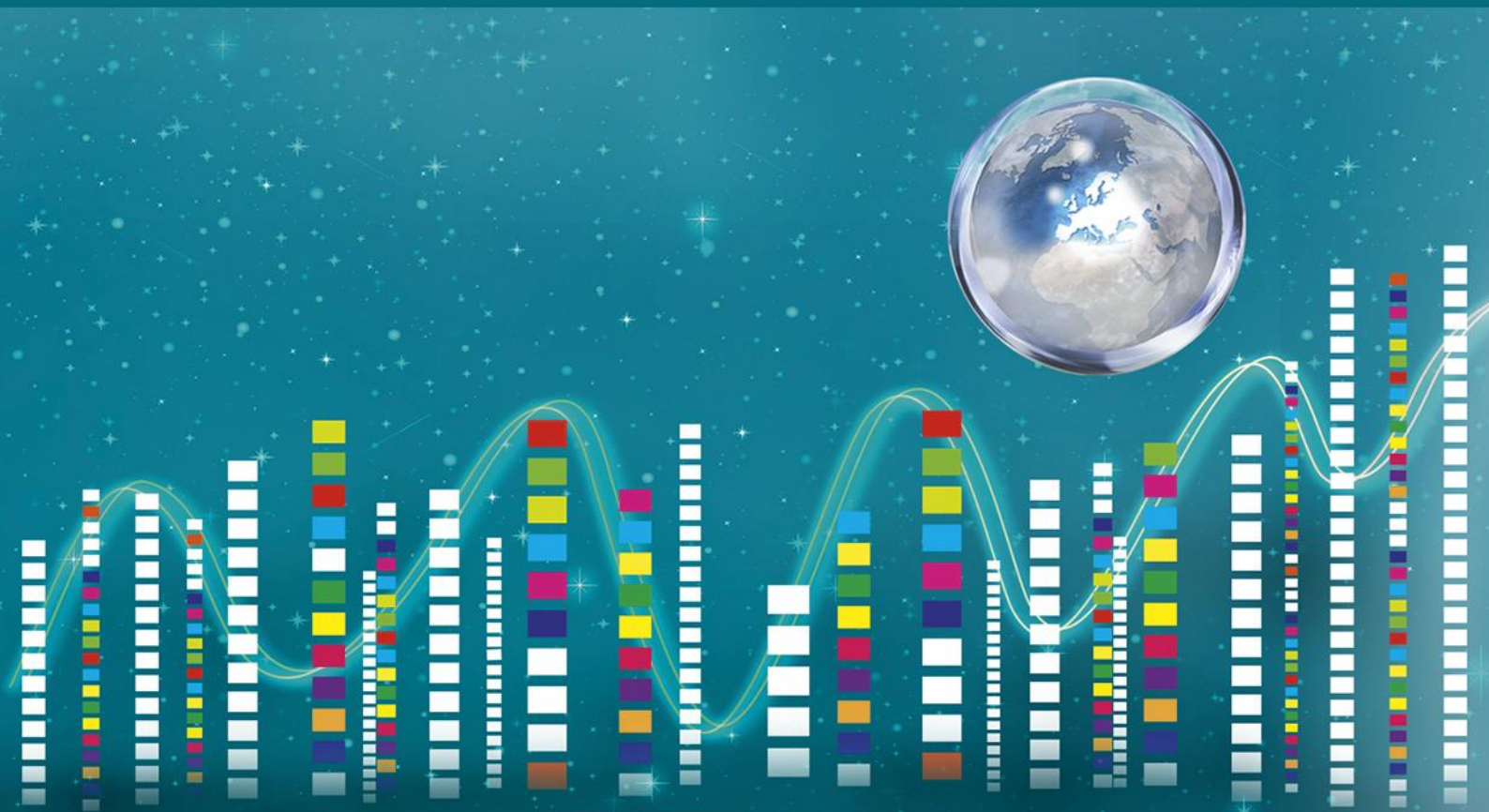


Foresight

Reframing Work

Targeted scenario N°15

**Glimpses of the future
from the BOHEMIA study**



Reframing Work - Targeted scenario N°15

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EUROPEAN COMMISSION

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Targeted scenario N°15

Glimpses of the future
from the BOHEMIA study

About BOHEMIA

BOHEMIA is a foresight study (contract N° Contract PP-03021-2015) designed specifically to support the preparation of the next framework programme.

The study put forward policy recommendations for the next framework programme, based on a foresight processes involving scenario development, a Delphi survey and an online consultation.

As part of its recommendations, the study identified 19 likely future scenarios with disruptive implications and associated priority directions for EU research and innovation.

The full range of the results of the study is available at <https://ec.europa.eu/research/foresight>

Targeted scenario N° 15

Reframing Work

Summary

By 2040, digitalisation has turned our understanding of work all around. Full time paid jobs are the exception rather than the norm. Working time, family time, education time, social time and leisure are all mixed. Work is framed as purposeful activity, and people work for the sense of purpose it brings. Basic income guarantees satisfy essential human needs. Retirement age is by and large flexible and self-defined.

UN Sustainable Development Goals (SDGs) most relevant to this scenario:



The scenario

It is 2040. Traditional jobs have all but disappeared. Many highly-skilled tasks have been automated and the related jobs have been lost to artificial intelligence. Full time paid jobs are the exception rather than the norm. New types of jobs and professions have been emerging. Most jobs nowadays demand decidedly creative capacities and empathy. Job definitions and skill requirements change rapidly. Training and skills certification are continuously challenged. People with specific training for specific jobs are hard to find.

Social media and new technologies, open up new opportunities for finding jobs when one wants to. Jobs allow earning or supplementing a living. Although framework conditions differ across countries, many flexible part-time work schemes have emerged. People alternate or parallel working time with family time, education time, social time and leisure. Basic income guarantees satisfy essential human needs. Retirement age is by and large flexible and self-defined.

But work is much more. For many, it stands for shared efforts to accomplish a challenge and contribute to common causes. Crowd work combines motivated people from different background (disciplines, countries, cultures, skills, sectors). Experimentation with innovative approaches is commonplace. In many cases 'work' means informal activities, which are sometimes paid for, sometimes not. They are core to the growth of local (e.g. social care, housing cooperatives) as well as global (e.g. NGOs) community activities.

More and more people around the world – partly on a voluntary basis - are committed to form collective intelligence supported by global digital platforms. The common understanding that challenges like climate change, migration, terrorism, inequality etc. can be resolved by concerted efforts from all around the planet have motivated engaged people to connect to each other and find feasible solutions. This approach involves governments, NGOs, industry, science & technology, international organisations as well as creative individuals.

The platform-based approach is an important model for economic activities in industry and services. Creative problem-solving knowledge is not concentrated in a specific place or region, but is generated and shared in a virtual cooperative space and transferable to almost any location. Competitiveness in such an environment results from the ability to harness collective and distributed intelligence, and to motivate people to contribute to such endeavour.

Relevance for Europe

Europe, already with the highest levels of social protection in the world, is likely to be challenged by technological unemployment. The social rifts that this could cause are an important reason to experiment with universal income for sustenance and with participation for quality of life. Defining a new social contract for work will be essential to satisfy both economic imperatives and needs for social protection. It will be necessary to find ways to stimulate a spirit of enterprise and motivation for citizens to be involved, when work is not remunerated in the traditional way.

The pace of innovation requires policy-makers and industry to work together to meet the demand for continuously upgraded skills. Education systems need to work towards delivering transversal competencies beyond digital literacy (e.g. critical thinking, problem-solving, cross-cultural empathy, emotional intelligence).

Contribution towards the UN Sustainable Development Goals (SDGs)

This scenario assumes the end of poverty (SDG no 1) and can be instrumental in achieving “decent work for all” (SDG no 8). In achieving this, SDG no 4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) is a precondition. Education has a major role to play as a mechanism of social integration over and beyond the transfer of skills and the preparation of people for the labour market.

Implications for EU policy

The scenario assumes a technological backbone of a functioning and modern infrastructure providing the connections to the global network of communication and information. European policy in the area of Communications and Information Technology is closely related. Employment and social policy are also directly related, as employment rights, the rights of business owners and entrepreneurs, and the rights of people out of jobs need to be rebalanced. The quality of education in Europe is of paramount importance.

For global digital platforms to work effectively, a range of issues need to be resolved, including international trade in platform-based services (which may easily evade national sovereignty), and the handling of intellectual property. Digital platforms also provide new instruments for development policy and open up opportunities for integrating developing economies in the newly forming global digital value networks.

Future Directions for EU R&I policy recommended by the public consultation

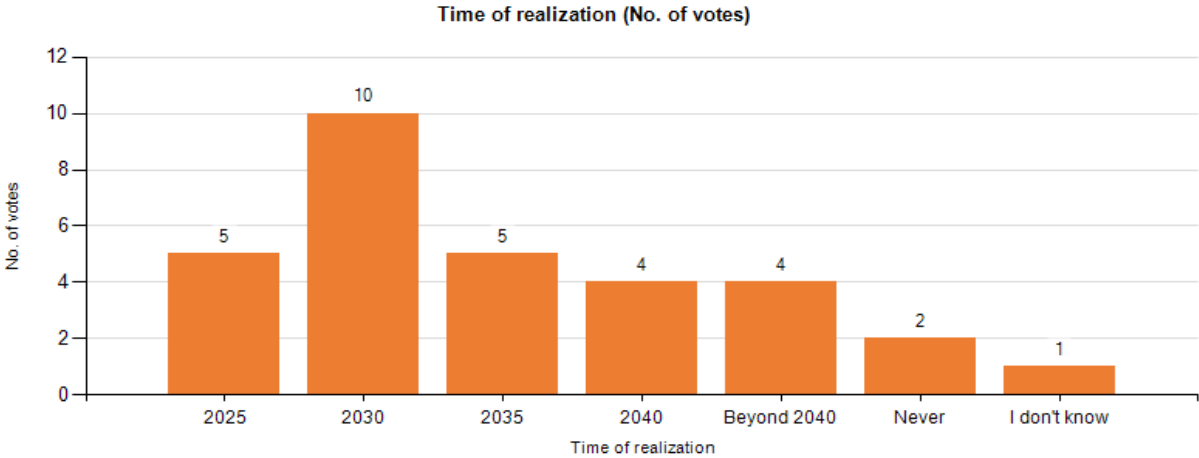
- **Research on new variants of entrepreneurship through collaborative research**
 - **Research on theoretical models and best practice models for basic income**
 - **Defining standards and benchmarks for continuous training on and off the job**
 - **Test fields for life-long-learning as an alternative to lifetime work models**
 - **Testing new human - machine interfaces for lucrative activities**
 - **Evaluation of technologies best supporting life-long learning**
 - **Development and evaluation of data security and privacy at work**
 - **Foresight on future work models for the marginalized in the EU**
 - **Assessment of best-practice models and future options of support systems for life-transitions**
-

Annex: Relevant Data from the Delphi Survey

The Delphi survey of the BOHEMIA study asked experts about the time of realization of 143 statements about the future, and about the relevance of Research and Innovation for that realization, or about the relevance of the realization for Research and Innovation policy. The experts were asked to justify their judgements with arguments. The whole data set has been published and can be found at: <https://ec.europa.eu/research/foresight>

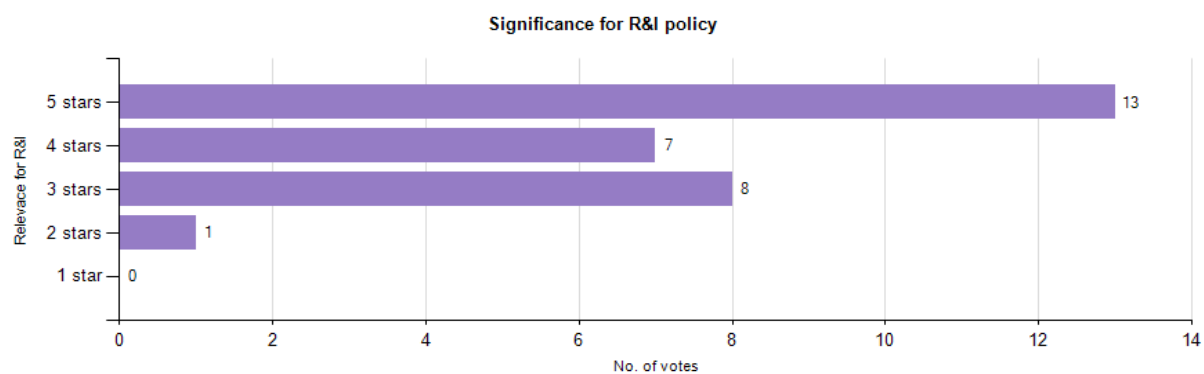
This annex includes the parts of the data set that are relevant to this scenario.

The use of artificial intelligence and robots causes 30% of current jobs to disappear (jobs that existed in 2016)



Number of respondents: 30

Arguments for time of realization	No. of votes
Other jobs might be created.	24
New jobs will be created. What we need is more creativity about what people's jobs will mean in the future.	18
Job titles change very fast already. 30% in 10 years is not unlikely.	11
Less people in the EU countries means less workpower - robots are a long-term solution.	8
The problem is not AI or robots, but the marketisation of healthcare, social care and other types of work.	6
This is the assumption of a well-known study by a consultancy.	5
What AI can/cannot do can be discussed at length. Usually the future reality is rather different from the images created now.	3
When AI (bots) and also physical robots take more and more tasks and responsibilities, they will not need public healthcare, education etc. All job markets will be privatized, well, automatically.	2

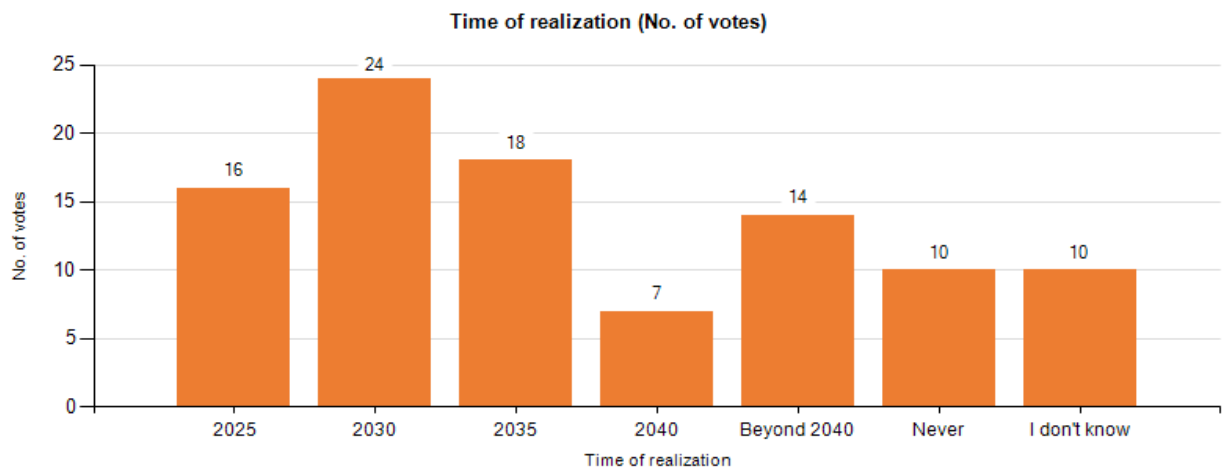


Average: 4.10

Dispersion: 0.88

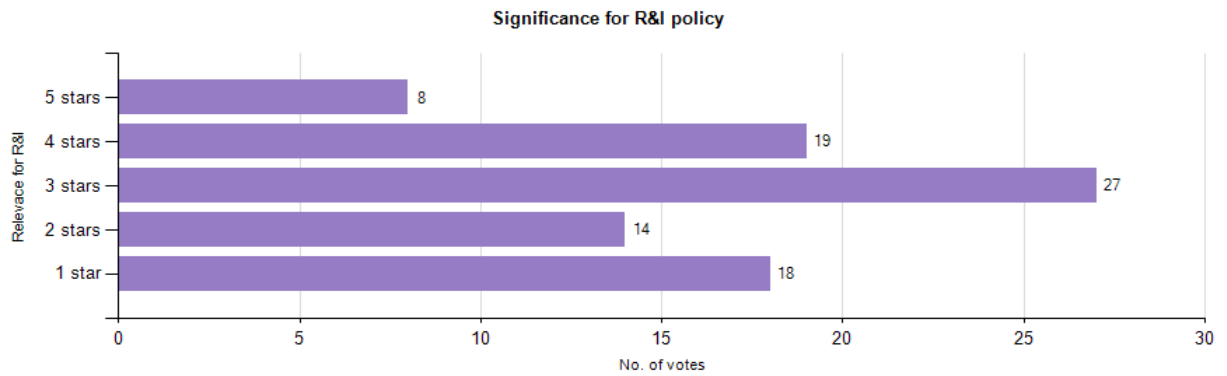
Arguments regarding the significance for R&I policy	No. of votes
Research on the evolution of labour, retraining and lifelong learning is required because of the potential explosive aspects of having a large population in situations of social exclusion.	22
The impact on the welfare state should be researched.	16
The use of artificial intelligence by industries may lead to abuses and this requires adapted regulation.	15
Job creation is a task of industry, but policies have to pave the way.	8
R&I policies should be linked to education policies, because this means our education system should change dramatically	8
R&I programmes may need to address new professional categories than "researchers".	6
Research on tasks to machines has to be leveraged to redistribute wealth	3

Half of the “top 500” companies in the EU let their personnel spend 10% of their paid working time on the pursuit of personal projects (creative works, community service, etc)



Number of respondents: 96

Arguments for time of realization	No. of votes
If the 10% time is proven to be a value added for companies (in terms of innovation, public relations, or market penetration or maintenance), then such practices can become more widespread.	74
It might be just as advantageous to reduce working hours or increase high-quality training/work-experience placements if the idea is to improve productivity/creativity and R&I outcomes.	45
In economically bad times, companies acquire idea generating companies and their intellectual property, and do not spend much money on R&I.	18
This is impossible to control.	16
This is empty rhetoric. To some extent, many employees have had these opportunities for a good while - though not packaged in this rhetorical and political fashion.	16
10% is too much. First, companies have to understand that they need to foster the creativity of their personnel in R&I, and lessen the focus on hours worked.	13
This kind of practices will be a competitive edge for companies hiring the best personnel. And anyway, free time and work time have already blurred in many places.	8
A “20% time” policy has been introduced by Google, after observing that many creative ideas happened in this matter; in 2013, Google representative declared “20% time” to be “as good as dead” because it became too difficult for employees to take time off.	7
This will be significant rather due to automatization in all sectors. Probably 30-50% will be better for an enterprise to prosper sustainably.	4
This is a bit too arbitrary. 4 hours a week is not much time to make progress with creative ideas! There are other ways to achieve the goal.	4
This statement doesn't concern the future EU public policy in R&I. The personal projects of the personnel should remain personal, that means they should remain out of the working time.	3
Sharing staff with R&I performing organisations may lead to more impulses and ideas shared, (public) higher education organisations may also organise similar ear-marked time for teachers to keep up!	2

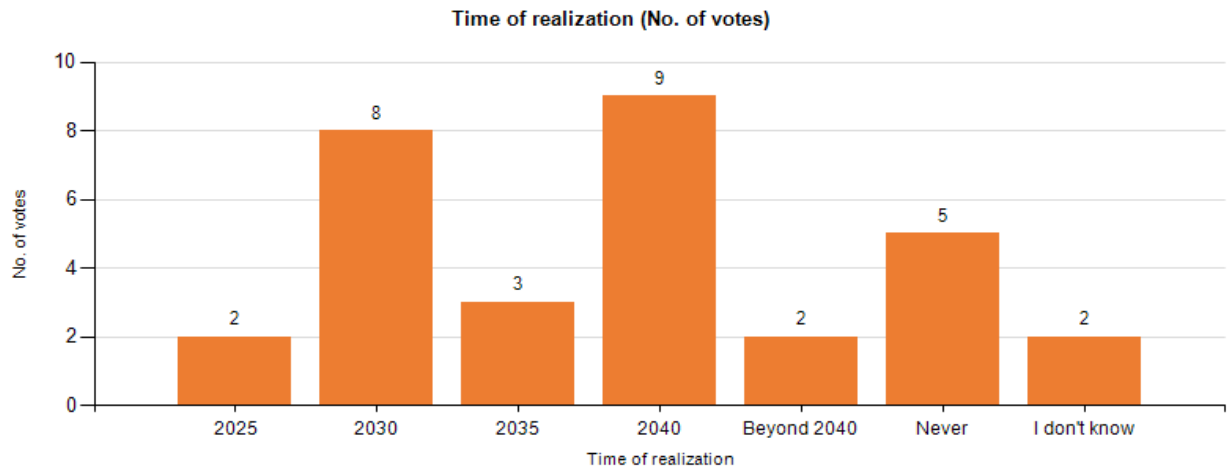


Average: 2.83

Dispersion: 1.54

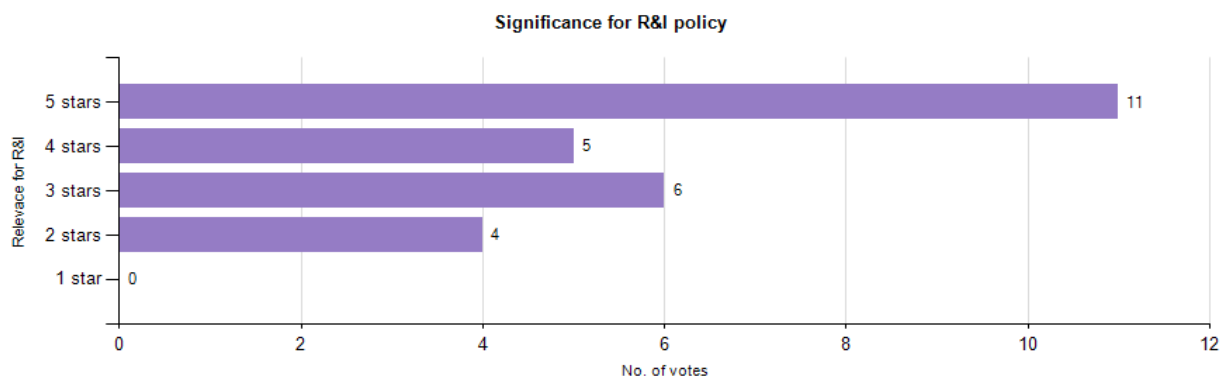
Arguments regarding the significance for R&I policy	No. of votes
There is a time lag between the creative outputs and the innovation or performance in R&I. There must be an incentive to prepare and perform creative R&I.	53
Companies will not move into this direction if it is not necessary or seen as fruitful. Political support is essential.	33
Notions of full time employment may need adapting in Framework Programme contracts.	25
It could significantly increase the effectiveness of EU funded efforts to promote firm interaction with University. This 10% reserve could be used by firm employees to engage in collaboration	16
This "permitted bootlegging" needs research and experiments.	13
Research is not necessary. Innovation comes out of ideas and that is not a matter of working time to be fostered by policy. People can do this in their free time if they like.	12
Government policy should not interfere with company policy.	8
Companies should surely be able to support the development of creative thinking (linked to better R&I) within the workplace without setting a 10% time out rule	6
Hopefully not. Research should be left alone and safe from such empty political rhetoric	4
Research and creative thinking does not per se be linked to innovation: impact on society often is forgotten in research.	4
This can have benefits both for companies AND for Society as a whole. Policy could incentivise this in order to enhance societal benefits of private sector knowledge.	3
If EU is searching for better creativity coming from personnel activities, then EU policy should favour working-time reduction.	2
If significant amount of the working hours will be spent on individual interests and the EU want to support this, then a fundamental change of project administration will be needed.	1

The retirement age is 75 in all EU countries



Number of respondents: 31

Arguments for time of realization	No. of votes
The demographic change is a great challenge. Our Western societies are ageing, the younger generations who are supposed to pay the rent are getting smaller and smaller.	22
We should shift from the concept of "retirement age" to an assessment of a person's ability to do their job (which should vary according to job type).	16
Retirement age will have to be flexible, depending on health, the willingness to contribute to a 'GDP'-based economy, and other factors.	14
This will create a lot of problems for working class people in jobs where physical exhaustion, damage to health etc. is a reality; not everyone is a university professor!	10
Old people become a very strong voting force in most EU countries and determine greatly the outcome of elections. Their influence is contested, although not effectively, by younger generations.	8
Pension reforms are usually adopted with long transition periods, therefore an increase of the pensionable age for approximately 10 years will take a long time to materialize.	4
Flexible retirement becomes a trend. Finland recently introduced the early partial retirement concept, which will enable people to retire smoothly. Final retirement age may easily go up.	3
A new study says the same - because of the increasing student loan debt, rising rents and millennials' approach to money management.	3

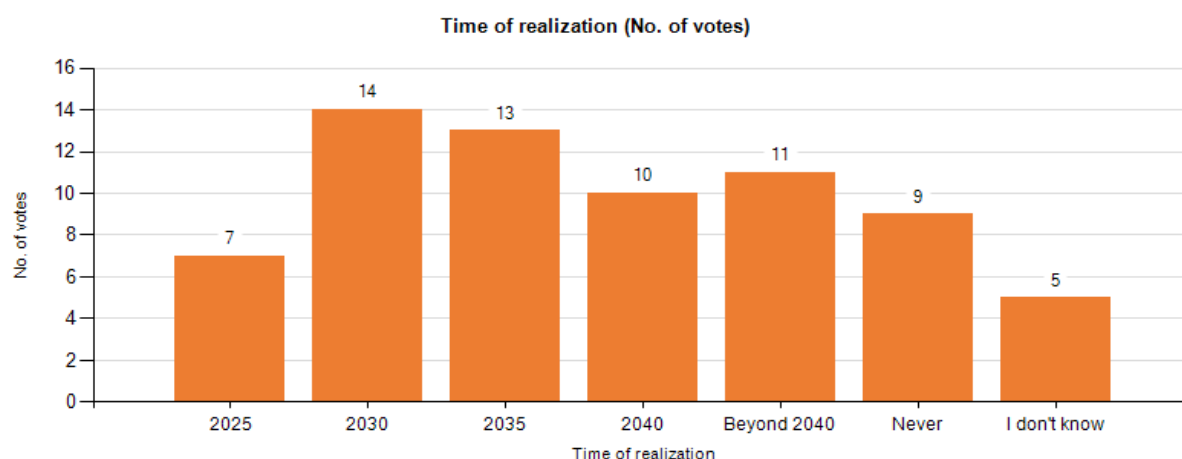


Average: 3.88

Dispersion: 1.29

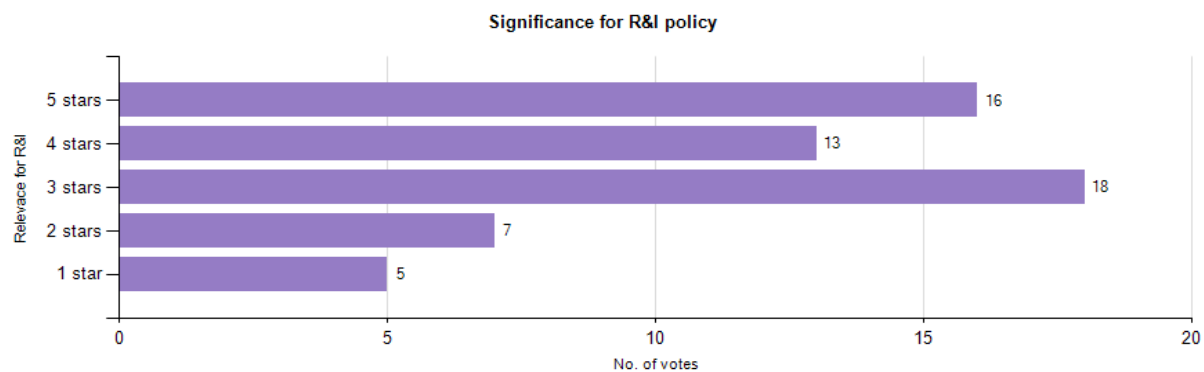
Arguments regarding the significance for R&I policy	No. of votes
The EU retirement system should also ensure the continuance of social integration among older people and their families.	17
EU programmes should aim to engage retired scientists and engineers in creative communities of citizens innovators.	12
The main issue is the extent to which the rapid changes in the age structure of populations can be managed in ways that maintain the relatively high levels of intergenerational solidarity in EU countries.	11
If people are to retire at a personalized age, then a set of incentives has to be offered to attract those being willing and able to continue working and really do so.	8
We need to define what retirement age is. Usually, the chronological age is used as a benchmark. However, it is not aligned with the retiree's biological and cognitive age.	6
How can we keep the pension system affordable?	4
EU R&I policies should work towards identifying how changes to the retirement age will affect disproportionately more working class people, women etc	3
More real time health checking would be needed, boosting IoT solutions development	2
Well-designed social science research projects would be needed to underpin several, related domains of policy-making and analyse socio-economic impacts.	1

A universal basic income exists in the majority of EU states



Number of respondents: 68

Arguments for time of realization	No. of votes
The increase in inequalities and poverty obliges governments to adopt this measure but with different patterns and scopes.	42
Political unrest and/or political apathy among the most vulnerable populations create the conditions for a renewed social pact or improved social policies.	30
This is a disruption to the major paradigm of economic drivers of nation states that are focused on gainful employment and social policies to enable participation in employment.	27
Employment for money might be a fading concept in a future economy where creativity and social care are central (and robots as well as 3D-Printers are producing goods).	13
UBI will cause more to choose entrepreneurship over traditional employment because of financial security.	13
Universal flat rate models have no incentives to contribute. The base level of UBI has to be low. It shall include a mechanism to gain more even with low value contributions. Monotonous curve!	10
Finland is the world's first country to test unconditionally basic income at the national level. In Ireland, the government "thinks about it".	6
UBI is a total nonsense. EU countries already spend 25-35 of gross product on social transfers. These need deeper focusing given demographics. UBI is the opposite of focus.	6
As people have an income, they can dedicate their (already paid) time to work in science. This can result in the doubling of the total EU scientific workforce.	6
Mobility leads to individuals choosing best universal basic income within EU.	6
Once the UBI is given, the inflation will rise and the UBI will be useless. We shouldn't give income but goods and services. If the people want money they go to work.	5
We cannot only look at a sum of money that everyone gets. Without a pact on sharing jobs and taxing financial capital the feedback loops of increased inequality will not be broken.	4
UBI is an important issue and a lot of its feasibility will depend on the conditions that embrace it. It has to be involved in a wider consideration about the organisation of our economic system.	3
The most economic way to implement social care.	3
The UBI might lead to a higher population growth rate.	1

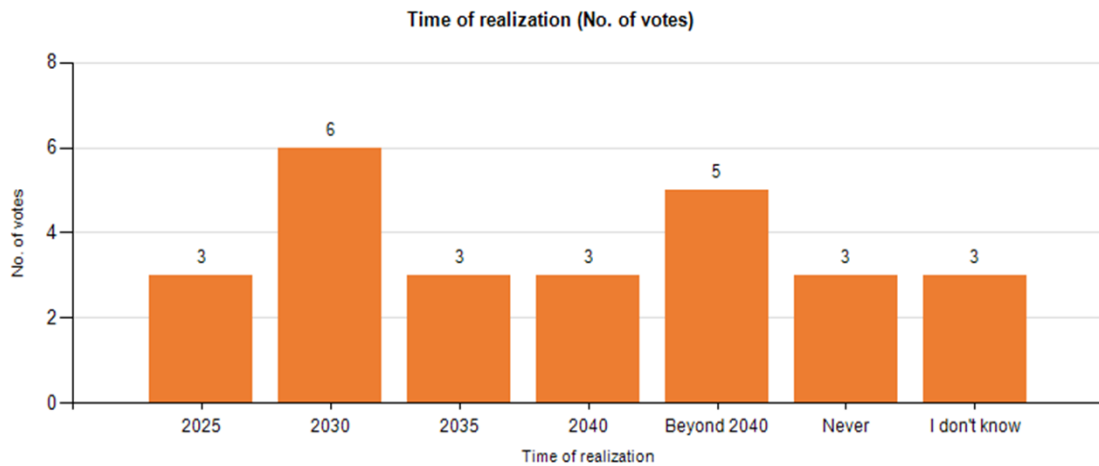


Average: 3.47

Dispersion: 1.57

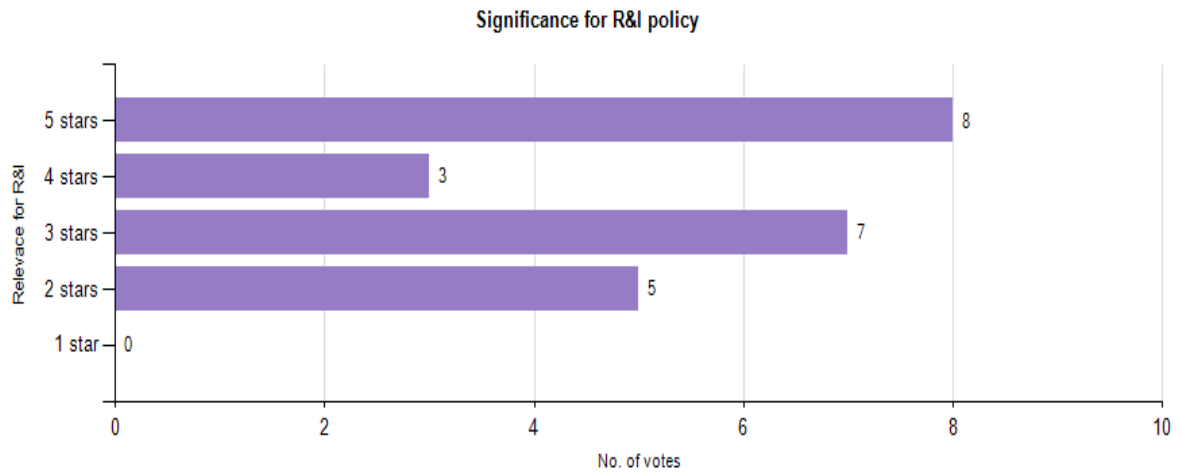
Arguments regarding the significance for R&I policy	No. of votes
The distribution of wealth and income become a key figure of our democracies with wealthy people lobbying governments for status quo. Research on equality-inequality becomes crucial.	48
The idea touches the core of our society in the digital age. It means the end of work out of sheer necessity.	31
Well-being has to include multiple dimensions, not money only. Stiglitz lists about 8 key dimensions. "UBI" shall consist elements from all of those. (.. health, education, social...)	22
A universal basic income would have a massive impact on the research workforce - in one way or the other.	16
This is a political decision coupled with power play.	11
UBI is to be financed by social budgets such as unemployment, social security, medicare etc...	4
R&I in social sciences will remain low	3
Due to a rise of inflation, it will be not significant at all.	1
UBI is motivated by a couple of emerging dynamic: stagnating and limited growth, jobless growth, and cheaper more efficient automation.	1
Automation historically has led to increase in GDP and welfare, this could turn into having a negative impact. In that case applying automation leads to external costs to be internalised by taxation.	1

More than 40% of the European workforce are freelancers (by choice or need)



Number of respondents: 26

Arguments for time of realization	No. of votes
Engaging with freelancers or self-employed is cheaper for traditional employers and service users.	15
Technology and infrastructure increasingly permit such organization of work.	13
Businesses are turning to the web to scout and hire talent because it's faster and cheaper to hire freelancers than go through the traditional hiring process.	7
In the States, over 53 million Americans freelance, accounting for a third of the U.S. workforce alone. By 2020, this number is expected to increase to 50% of the labour force.	7
Yes, as the risk is increasingly individualized.	4
SME's are probably more attractive - the administrative chores of being a freelancer are a hindrance. Cutting 'red tape' might be worthwhile.	4
Freelancing also comes with the benefit of flexible working hours.	3
National borderlines are part of the traditional model to control work, including power of governments and unions. Borderless Europe and globalization will drive freelancing.	2
Unless the private employers change their mind, often a person aged 50+ laid off for different reasons can find his/her self-employment the only solution while waiting for retirement.	2
Europe has a unique social protection system for employees, so we need more SMEs and large companies. Freelancers are unprotected.	2
Freelancing is usually just another euphemism for insecure work.	2

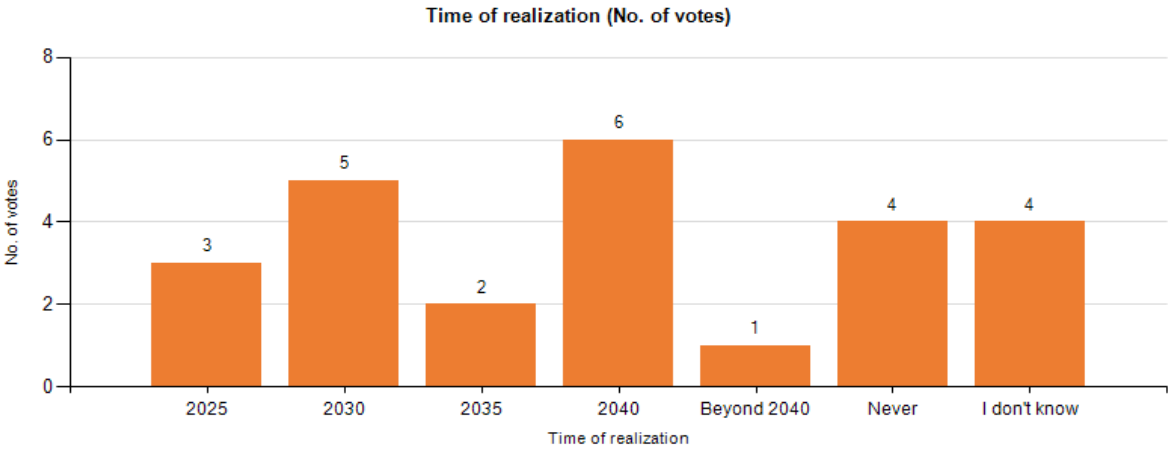


Average: 3.61

Dispersion: 1.36

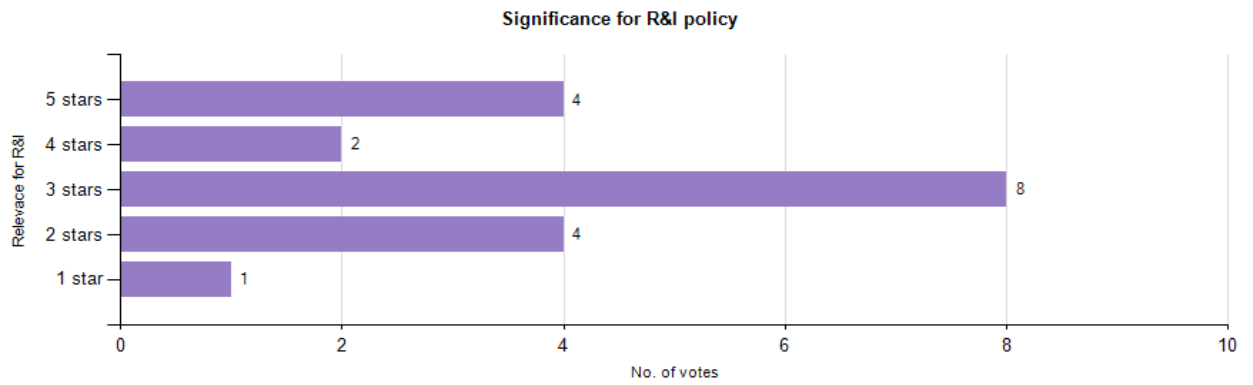
Arguments regarding the significance for R&I policy	No. of votes
It will turn around the way we work today - there must be policies around the social aspects of freelancing. There is the danger that freelancers become a new kind of impoverished class.	21
Research should be conducted to develop a novel model for ensuring appropriate working conditions, taxation arrangements and social security in a society that is based on self-employed / freelancing.	17
Regulation for an adequate payment even for freelancers is needed. Otherwise, there will be no effort in research and innovation because a large part of the workforce is busy with trying to survive.	9
The EU R&I policy delivery mechanism would need to change: e.g. "money follows researcher" may need to be expanded; rules of participation may need to facilitate freelancers etc.	7
There has to be an implementation of a "social salary"	2

Globally and professionally managed human work clouds make up 40% or more of all teams in science and business



Number of respondents: 23

Arguments for time of realization	No. of votes
We do not want human work clouds, we need safety, security and a stable life - to establish a family is impossible with this lifestyle. Hopefully, the 40% will never happen.	16
Human workclouds are easier and more flexible to organize and to handle for the employers.	9
This is just a catchphrase to define precarious lives.	8
Properly used, human work-clouds allow for a better work-life balance.	8
Workclouds provide a suitable way to mix competencies with higher efficiency and to fulfil employees' needs for personal development	6
We already know from observations that some of these catchy concepts are extremely short-lived.	4
The share of 40% is too high as there will be ever more tasks that can't be done "in the cloud". Standardized work will be automated anyway.	3

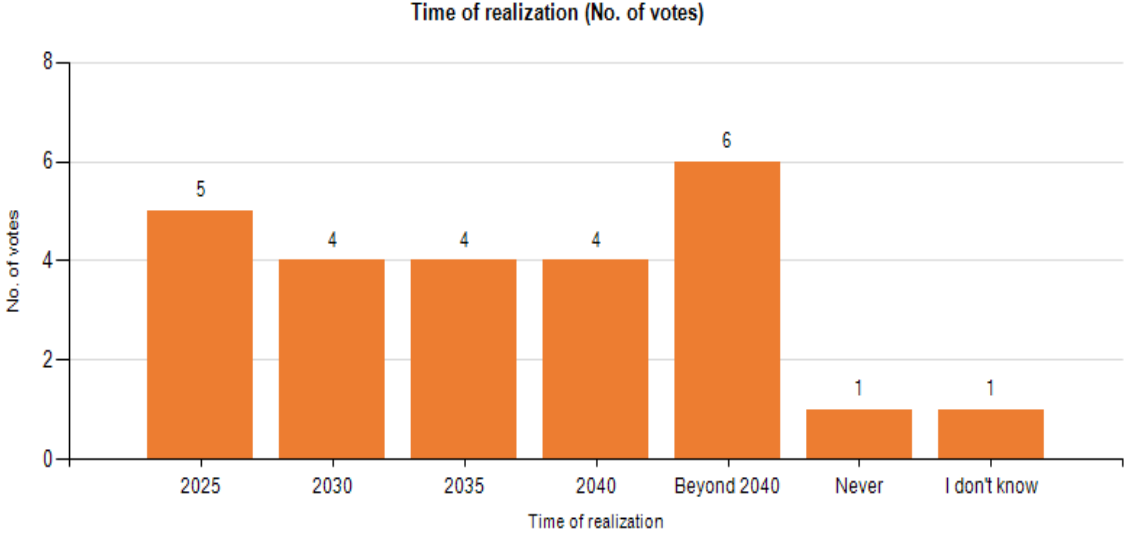


Average: 3.21

Dispersion: 1.33

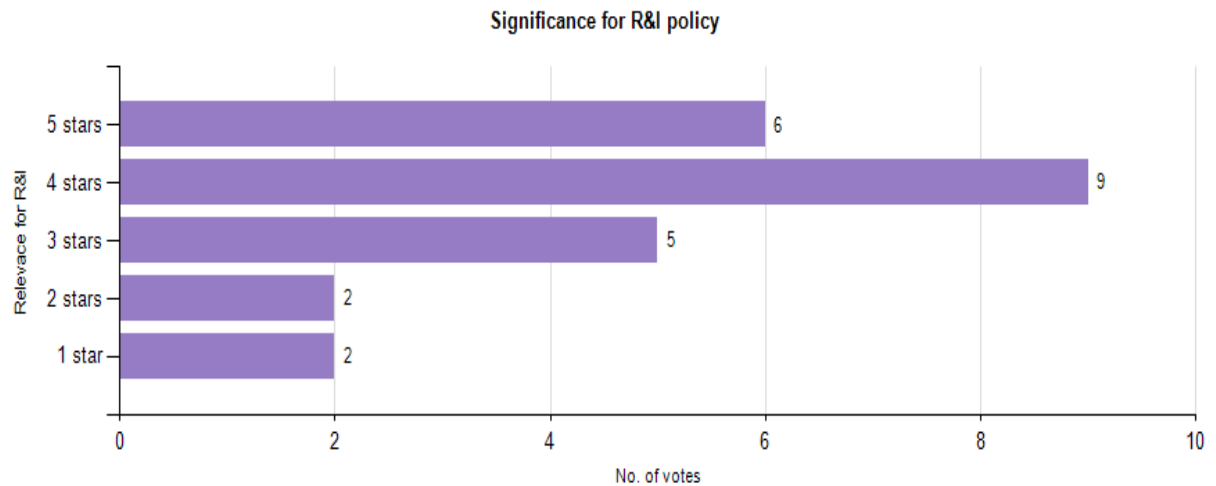
Arguments regarding the significance for R&I policy	No. of votes
Legal questions arise from this topic: when should an independent worker actually be classed as an employee?	14
Research upon work-life balance in case of human workclouds is key to understand how such working-lifestyle can be managed in a such a way that increasing quality of life is not hampered.	9
Regulation is needed: Who is allowed to manage human work clouds?	7
Problems need to be address when they arise. Anticipated problems are endless.	4

Affordable systems using artificial intelligence provide legal and financial advice so that they replace the services of more than 50% of the bankers, lawyers and other employees working in legal and financial advice organizations (compared to 2016)



Number of respondents: 25

Arguments for time of realization	No. of votes
Self-learning systems are able to conduct professional service tasks alone in areas like law, science, and financial services; and they are cheaper, more reliable, free of biases ... etc.	15
Such artificial intelligence systems are already giving advice in financial services.	14
Artificial intelligence develops strongly but commercial abuses and greed also lead to disasters like the 2008 crisis. Regulation is needed.	12
The digital disruption has come closer for these professions: For the future it means that the qualifications for these jobs need to be adapted to the new digital challenges.	7
It will also impact in other industries, like drivers and transportation etc.	5
"Human advice" will not vanish. It will be of better quality once machines do standardized, repetitive part of the work.	4
Systems like IBM's 'Watson' are improving very fast. They might soon be trusted more than 'human advice'.	3
In 2016 the first robot-lawyer has been hired in the States by one of the country's biggest law firms. The robot will assist with bankruptcy cases.	2



Average: 3.62

Dispersion: 1.44

Arguments regarding the significance for R&I policy	No. of votes
Research work on the social, cultural, political and economic limits of artificial intelligence is very much needed.	20
The challenge for tomorrow's workplace is an increase in inequality in employment and pay chances and the question of how to ensure adequate training and qualification for the most affected workers.	11
Regulation is needed to define the limits of the systems - what are they allowed to provide, e.g. advice only or decisions, signatures, send out official letters...	10
Multi-discipline research is needed. Isolated technology, economics, sociological etc. research can not solve the issues.	8
"Artificial intelligence" is already gradually superseded by "Augmented Intelligence", indicating the role of people is needed but a lot of routine work will be automated.	5
As these systems will replace lawyers, scientists, bankers etc, policies are needed that support the creation of new jobs to avoid unemployment.	3
It is necessary to realize that artificial systems can be of great help, but they never can replace the human expert. The simple reason is that they cannot think in the proper meaning of the word	2
Public-private partnerships between the EU and the resented "tech elite" companies could be one solution.	1

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By 2040, digitalisation has turned our understanding of work all around. Full time paid jobs are the exception rather than the norm. Working time, family time, education time, social time and leisure are all mixed. Work is framed as purposeful activity, and people work for the sense of purpose it brings. Basic income guarantees satisfy essential human needs. Retirement age is by and large flexible and self-defined.

Studies and reports



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