

Linux Developers: Motivations & Challenges (preliminary insights) - Bianca Trinkenreich



NAU
NORTHERN
ARIZONA
UNIVERSITY

In collaboration with: The Linux Foundation
University of Victoria and Oregon State University





About the study



Anecdotal evidence to support strategies to increase and retain a diverse set of contributors

- Why do you participate?
- How do you perceive success?
- Do you feel belonging?
- What challenges do they face?
- Would make you leave?

Survey design and data collection aligned with Linux Kernel community managers

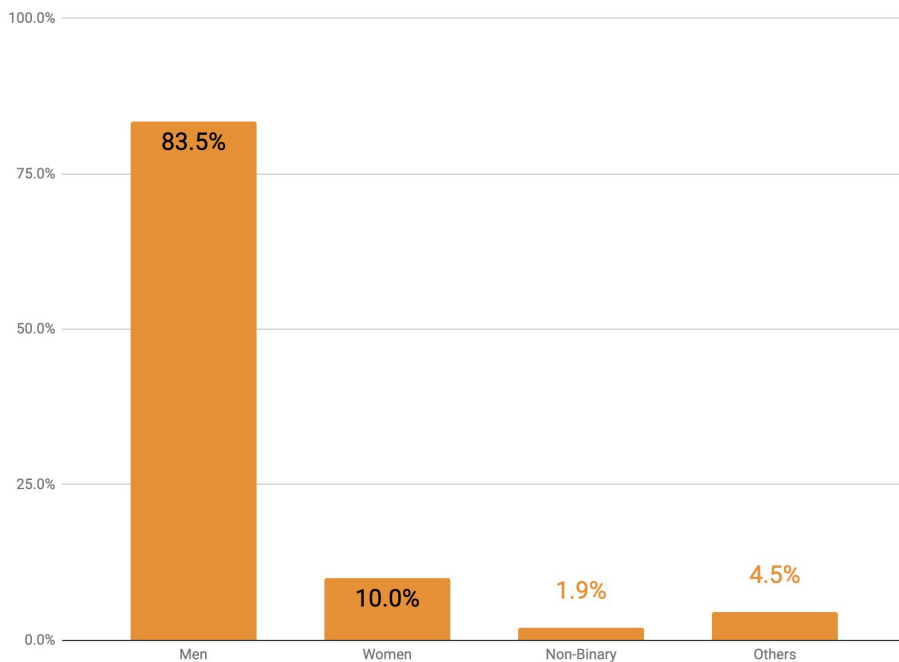
We received 309 answers



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Demographics

Gender identity



Gender Identity	
Man	258
Woman	31
Non-Binary	6
Others	14

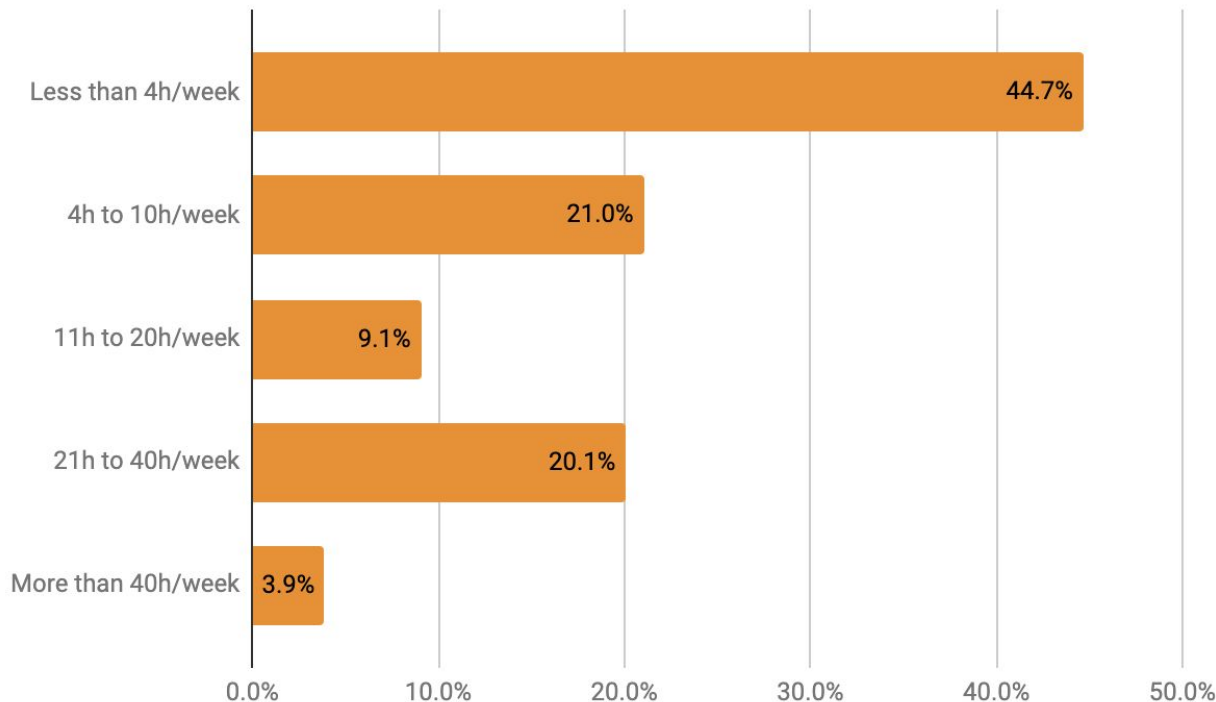
Gender identity (Other = prefer not to say + self describe + blanks)



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Demographics

Contributing Time



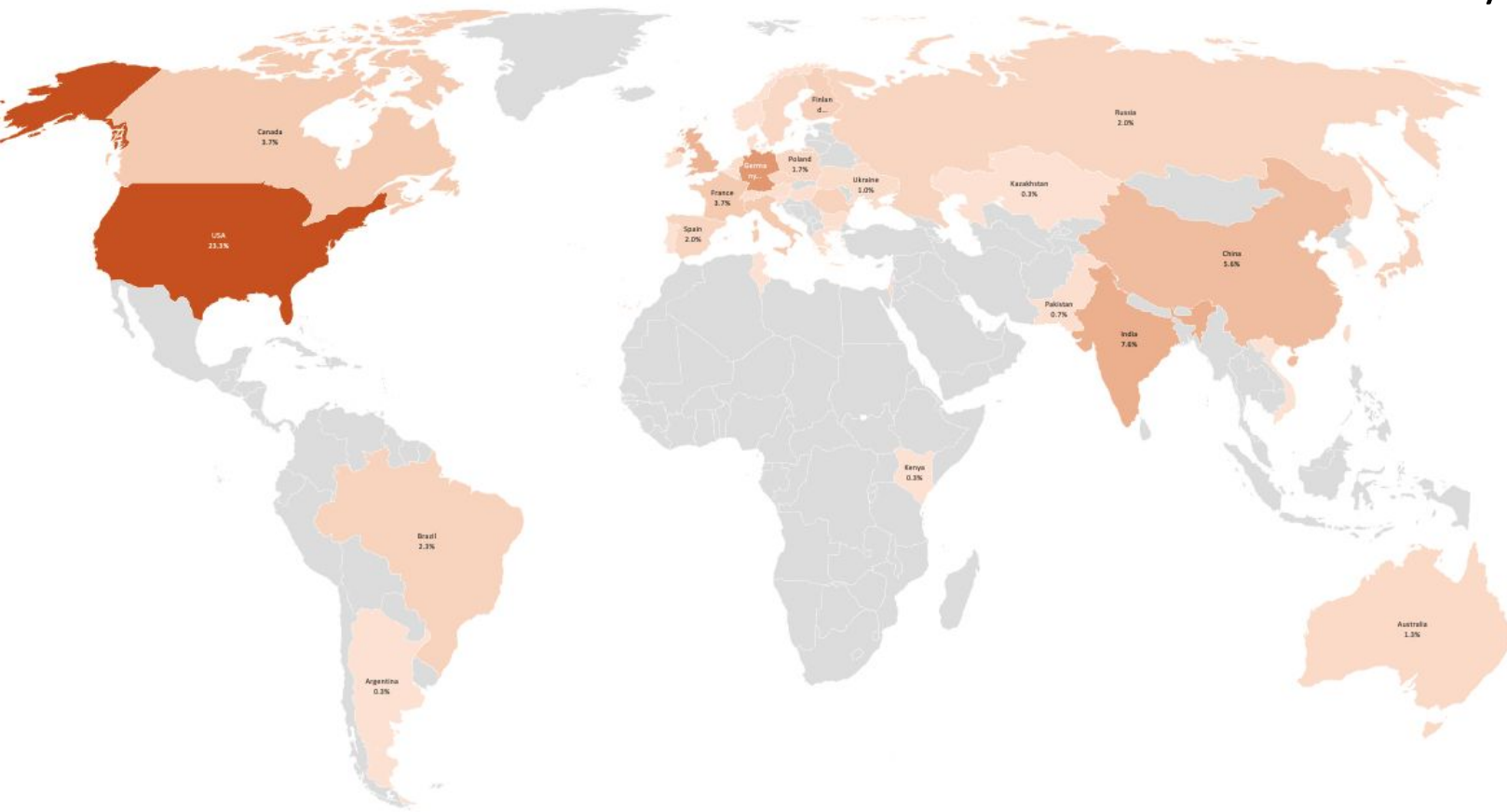
Contributing Time	
Less than 4h/week	138
4h to 10h/week	65
11h to 20h/week	28
21h to 40h/week	62
More than 40h/week	12



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Demographics

Country of residence



Countries	
USA	70
Germany	34
India	23
UK	21
China	17
Canada	11
France	11
Italy	11

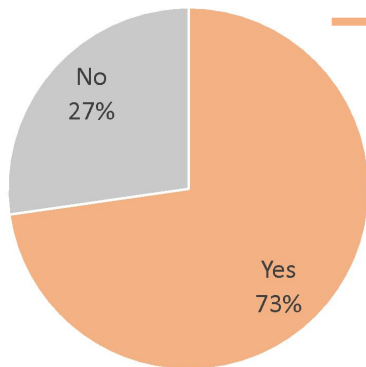


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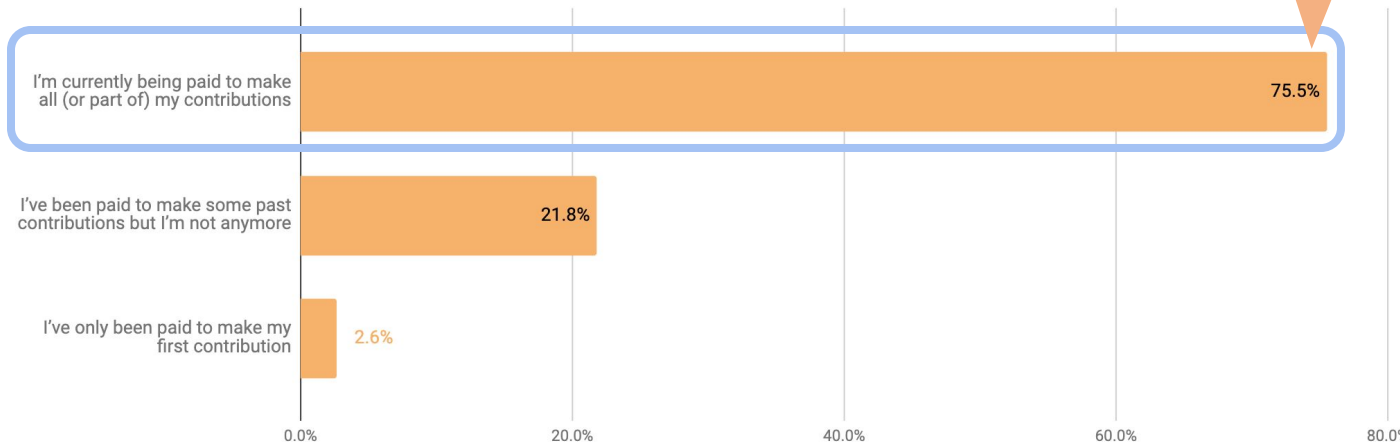
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Incentives

Have you ever been paid to contribute to the Linux Kernel?



When have you been paid to contribute to the Linux Kernel?



Most of the respondents are currently being paid to contribute



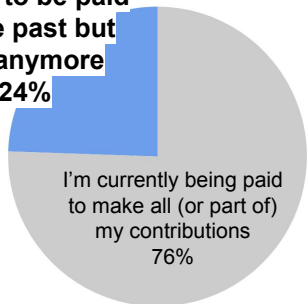
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Past Decisions

When you were **no longer paid** to contribute to the Linux Kernel **what did you do?**

I used to be paid in the past but not anymore
24%



I found another employer to be able to continue contributing to Linux Kernel

10.1%

I stopped contributing to the Linux Kernel

15.2%

I contributed to the Linux Kernel during my own time as a volunteer to new code

29.3%

I contributed to the Linux Kernel during my own time as a volunteer to help in community building efforts

15.2%

I contributed to the Linux Kernel during my own time as a volunteer to maintain own code

30.3%

0.0%

10.0%

20.0%

30.0%

40.0%

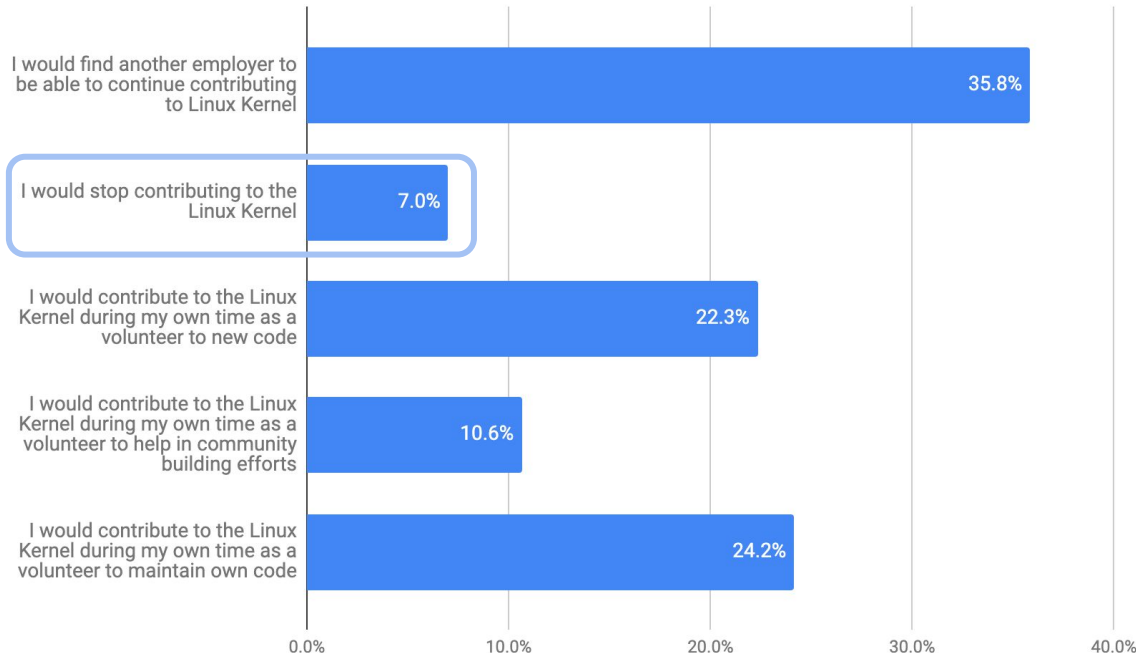
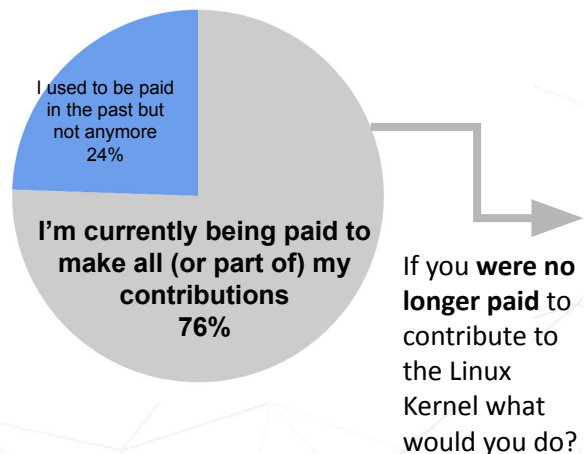
Respondents could select more than one option

Most of the respondents **volunteered to code (new or their own) when not paid**



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Possible Decisions



Most of the respondents **would not leave** the project if not paid.



Motivations

Reasons to contribute to Linux Kernel

Career/Professional Development

I'm paid, sell products/services, seek career opportunities, improve my skills, enhance my reputation, or was asked to as part of a course work

15%

Philosophy/Ideology

I feel personal obligation because I use, want to improve the quality of the project I'm working on, or believe source code should be open

15%

Hobby/Enjoyment

I have fun contributing

12%

Collaboration/Kinship

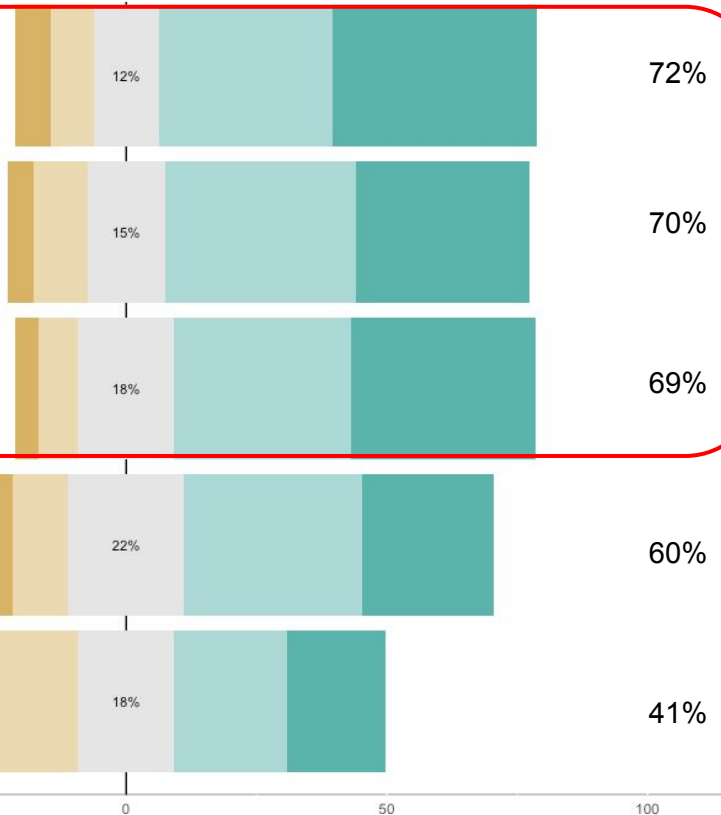
Like the collaborative environment, deeply enjoy helping others, want to share knowledge or participate in the scene, or like to work with this team

18%

Own Use

I need the software for own professional or personal purposes

41%



Response



Not Important



Slightly Important



Moderately Important



Important

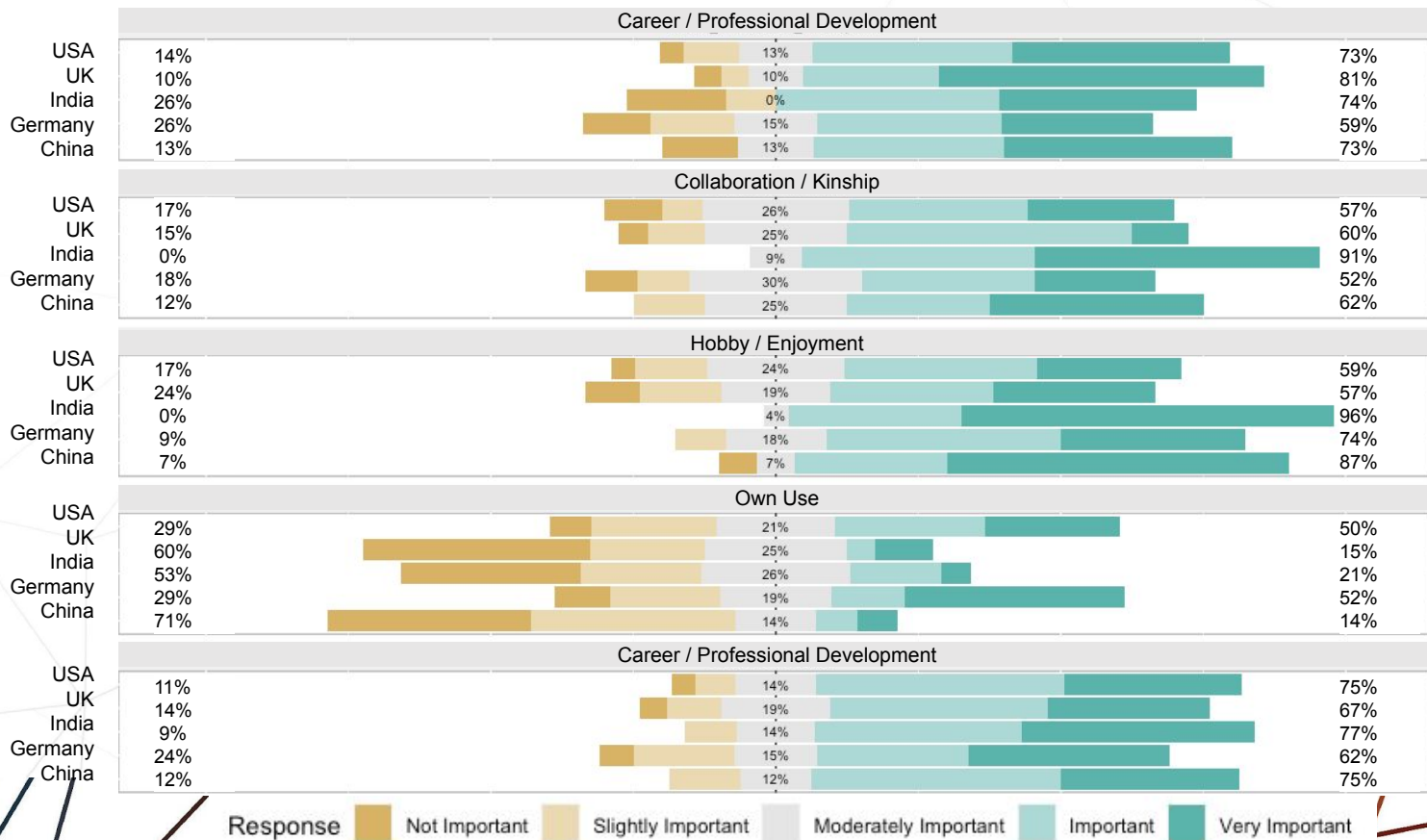


Very Important



Motivations

Per Country



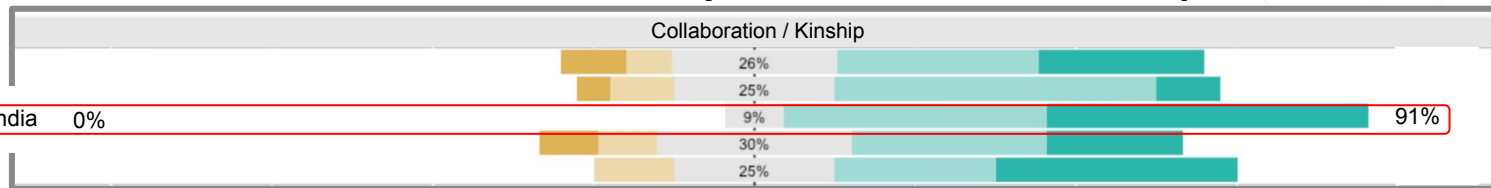


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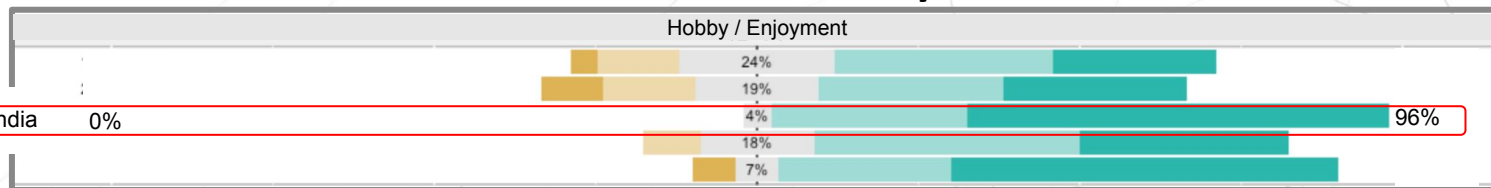
Motivations



91% of contributors are motivated by collaboration or kinship



96% of contributors are motivated because they have fun



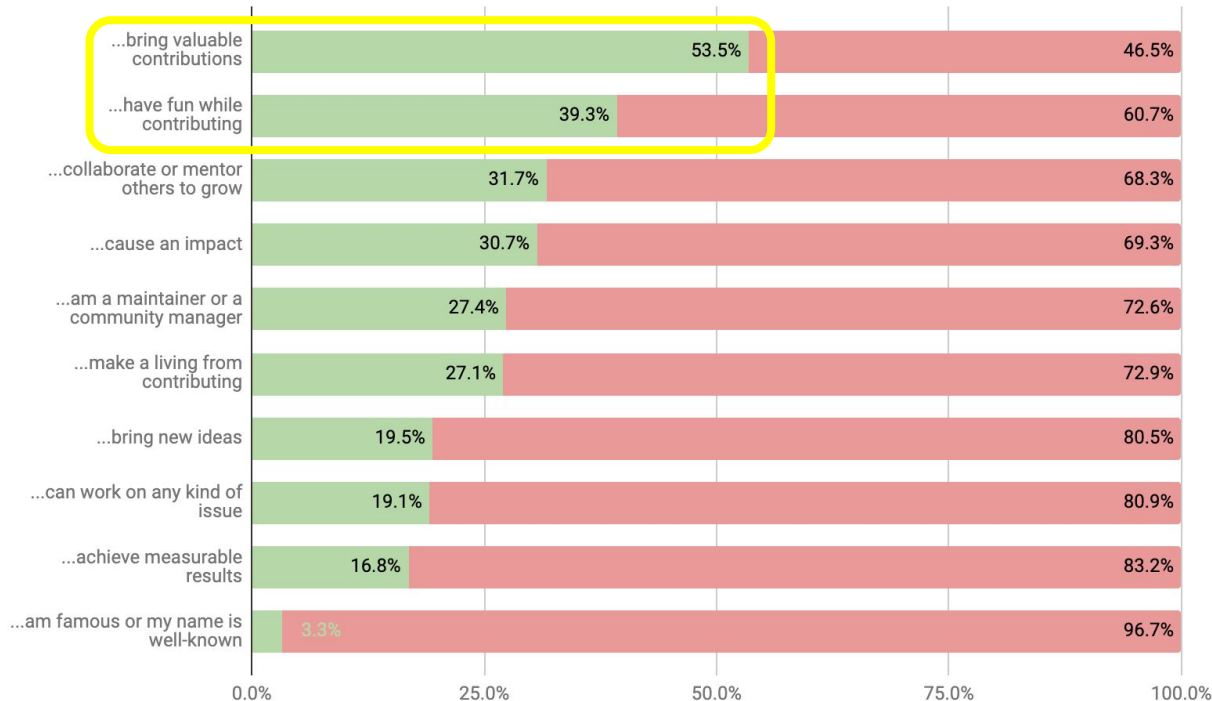
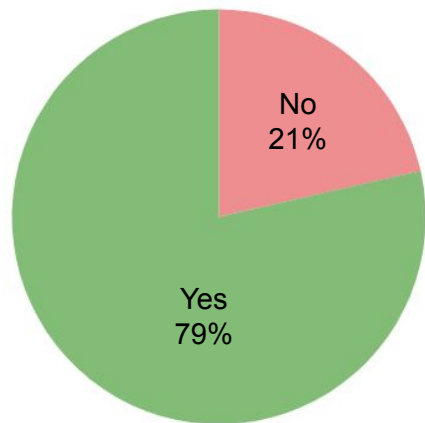
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree



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Meanings of Success

I am (I would be) a successful contributor to Linux Kernel because (if) I...



Respondents want to **keep bringing valuable contributions and having fun**

Respondents could select more than one option



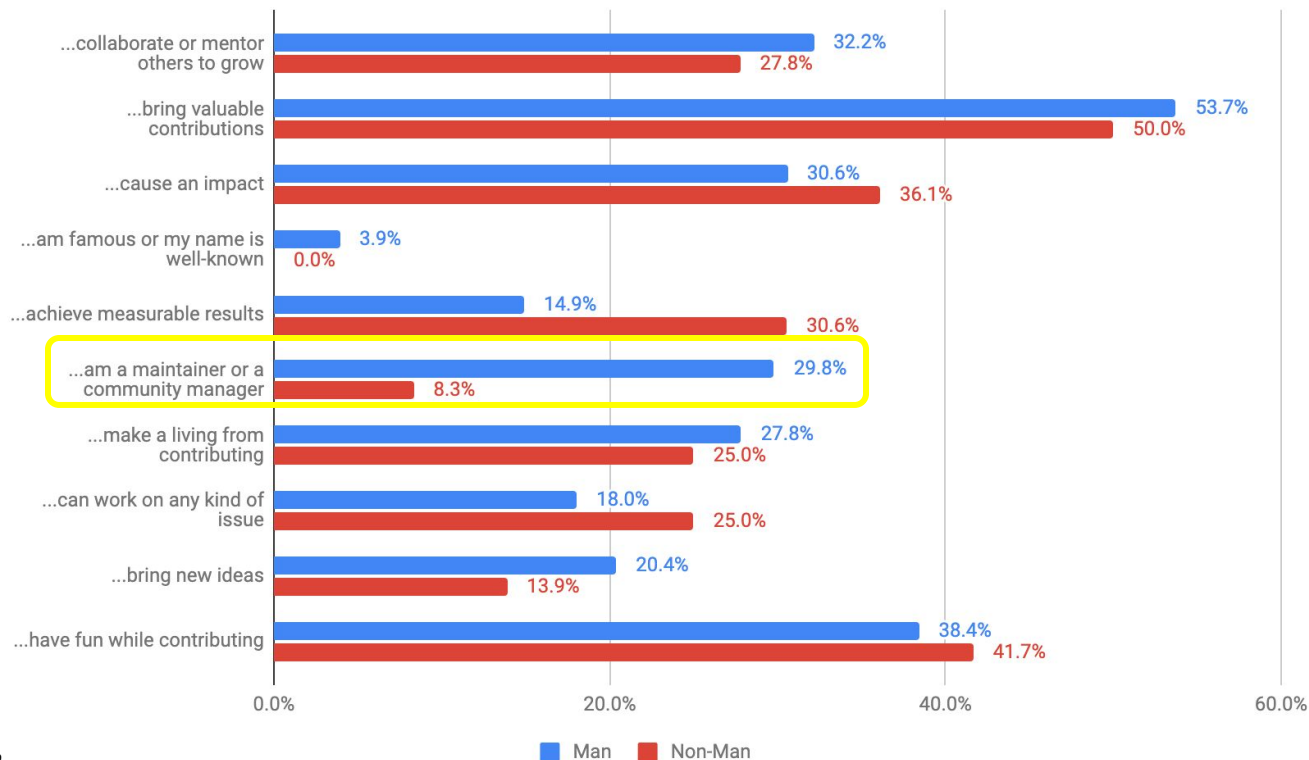
Meanings of Success

Per Gender

I am (I would be) a successful contributor to Linux Kernel because (if) I...

All genders value bringing contributions and having fun, but...

... contributors in gender minorities do not see laddering the career as much as men



Respondents could select more than one option



Meanings of Success

Per Country

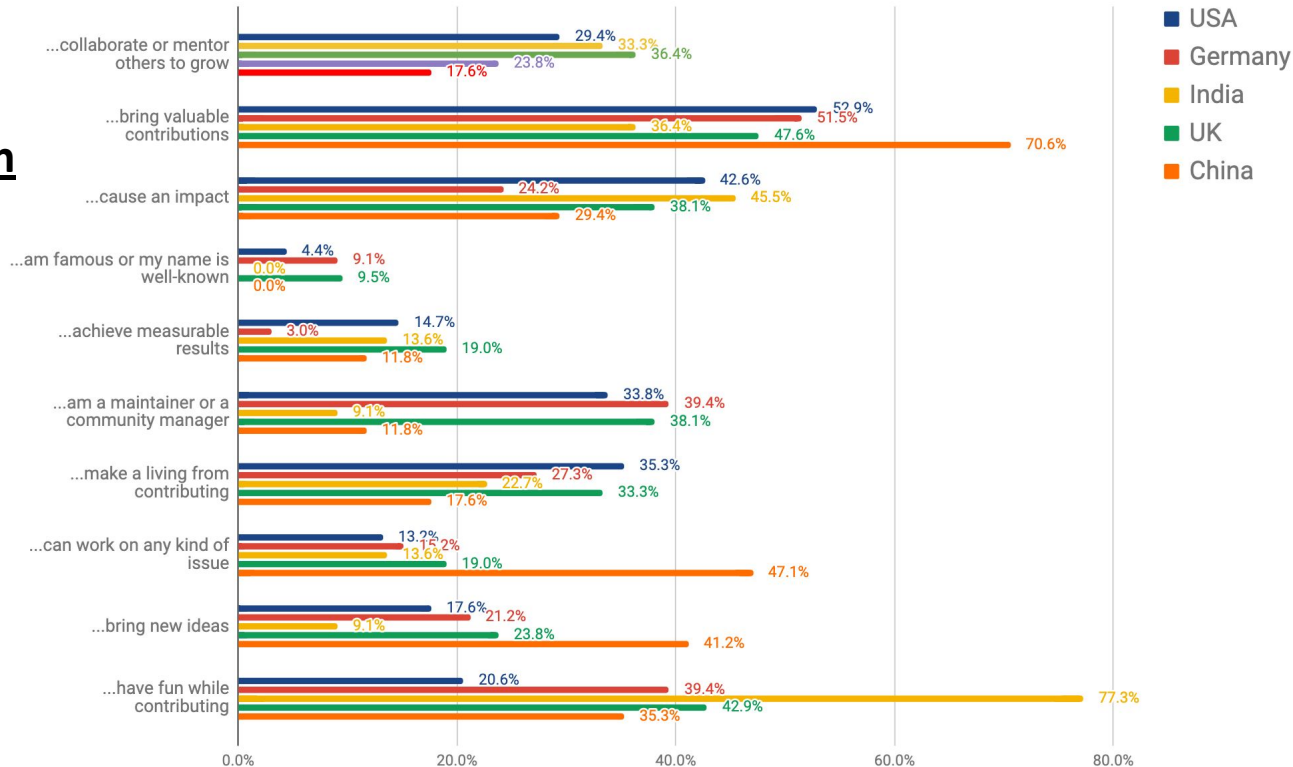
I am (I would be) a successful contributor to Linux Kernel because (if) I...



Bringing valuable contributions and being able to work in any kind of issue



Having fun while contributing



Respondents could select more than one option



If I have a problem, I know
members who I can ask for help

11%

The majority of the developers and
I want the same thing

10%

I feel that I belong to the group

18%

A majority of the developers in the
group know me

38%

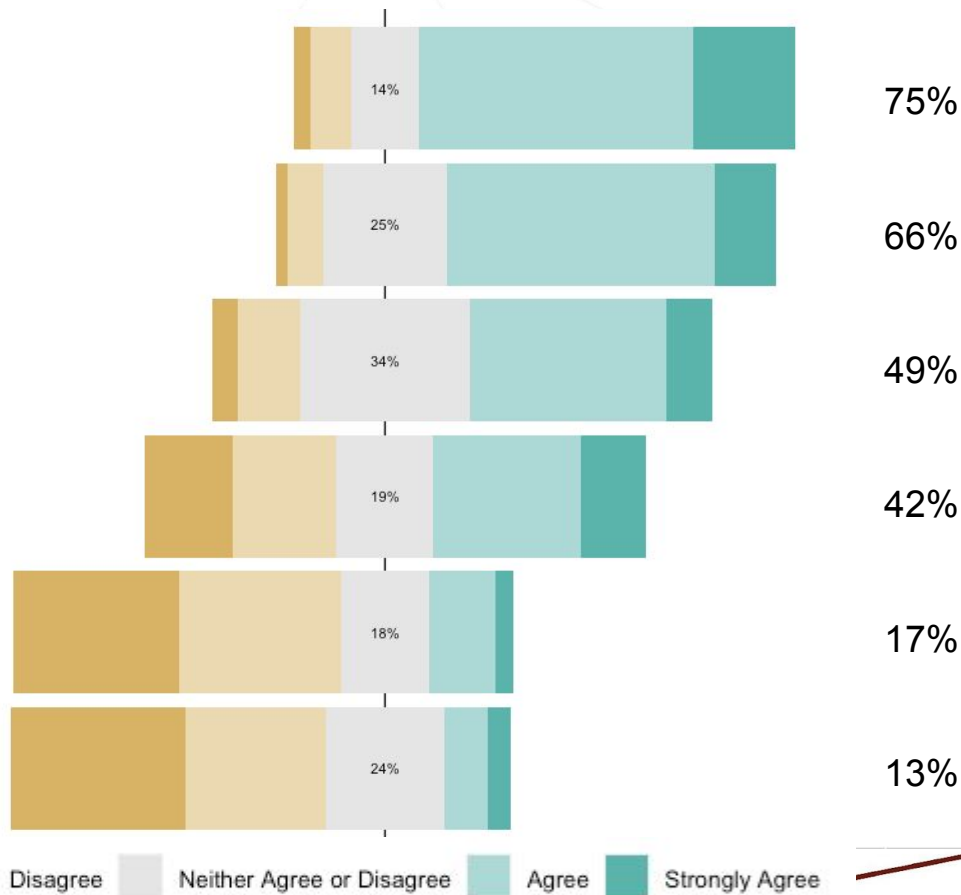
I want to contribute more but I don't
feel valued

65%

I don't feel at home in the group

63%

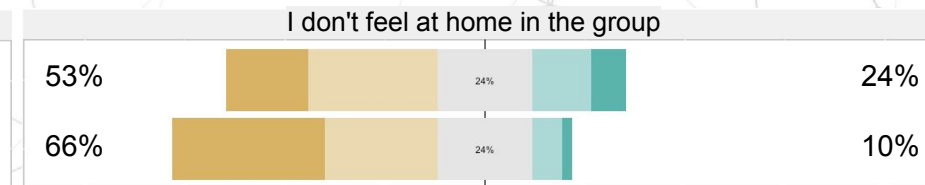
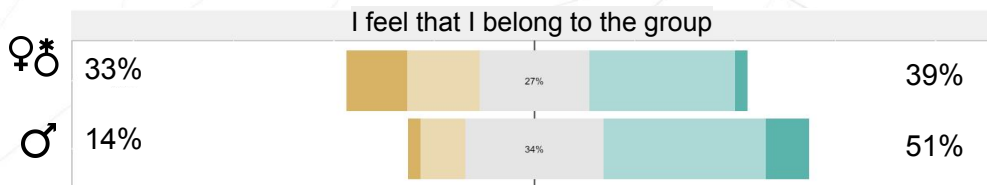
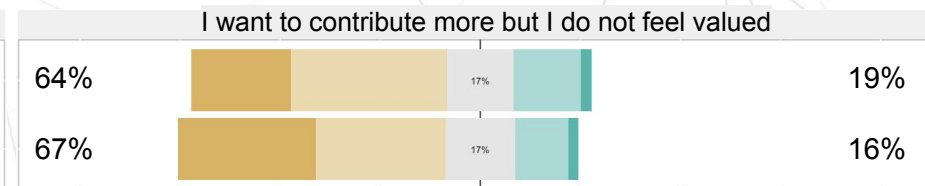
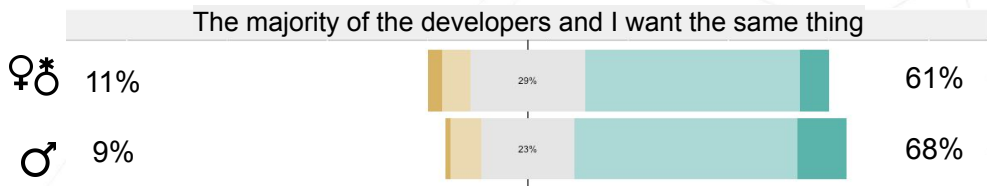
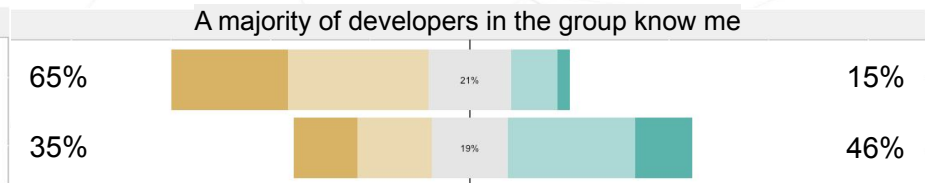
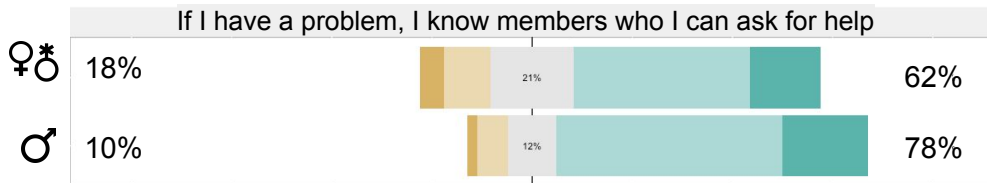
Sense of Belonging





Sense of Belonging

Per Gender Identity



Response Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

Non-Man = Women +
Non-Binary (concatenated
only due to comparison
use of small numbers)

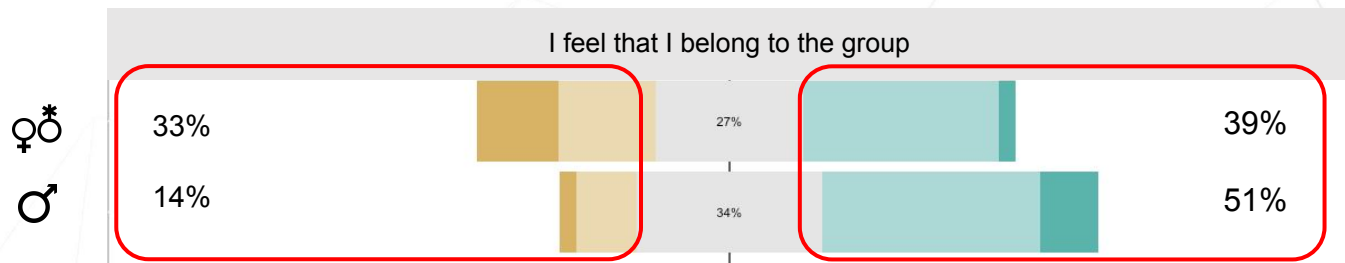
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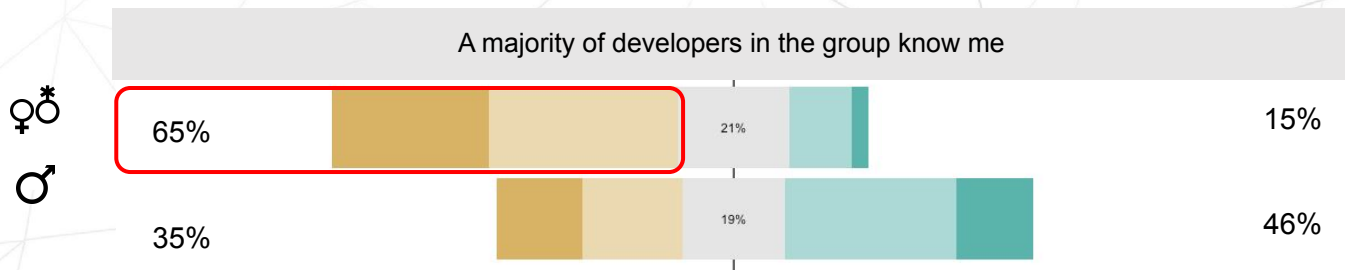
Sense of Belonging

Per Gender Identity

Slight differences between genders regarding the sense of belonging, but they exist...



...65% of women and non-binaries don't consider they are known by the group



Non-Man =
Women +
Non-Binary
(concatened only
due to comparison
because of small
numbers)

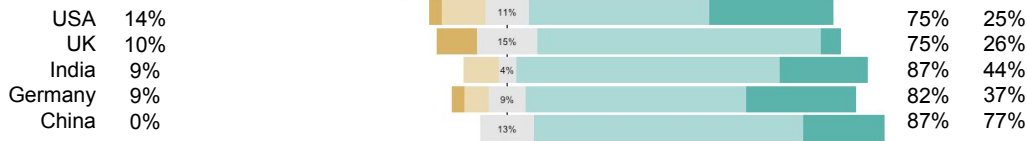
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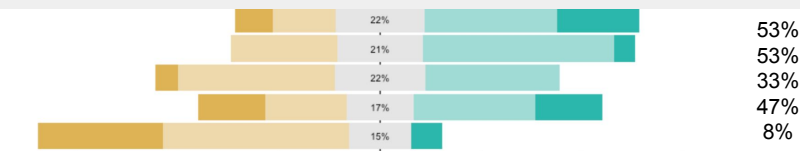
Sense of Belonging

Per Country of Residence

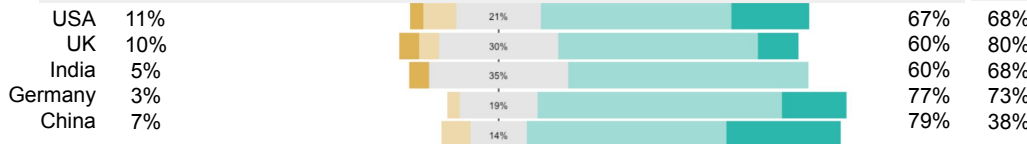
If I have a problem, I know members who I can ask for help



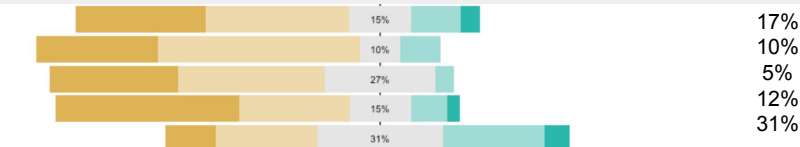
A majority of developers in the group know me



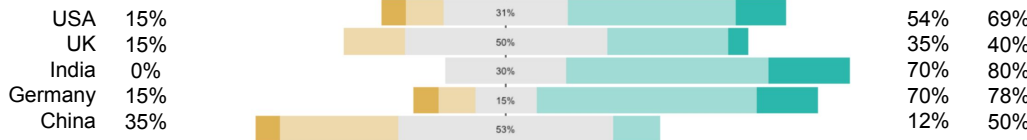
The majority of the developers and I want the same thing



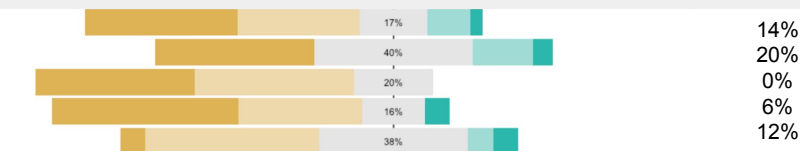
I want to contribute more but I do not feel valued



I feel that I belong to the group



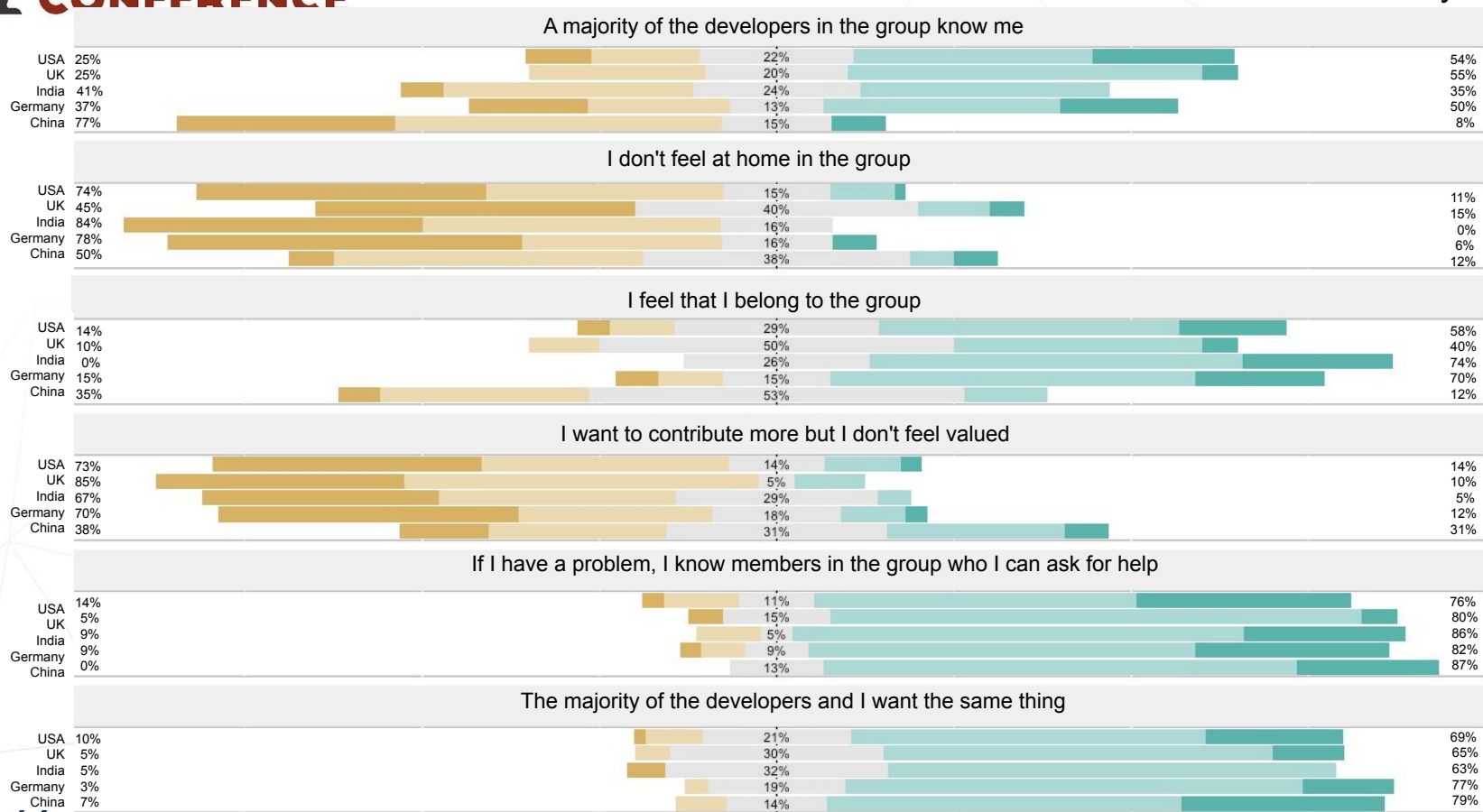
I don't feel at home in the group





Sense of Belonging

Per Country



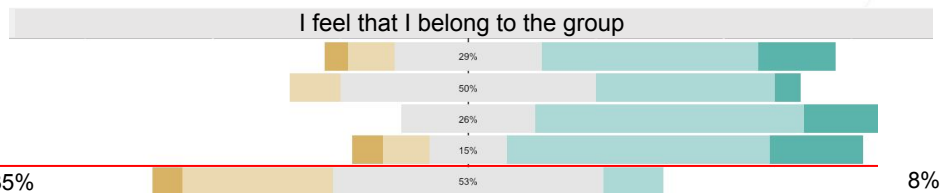


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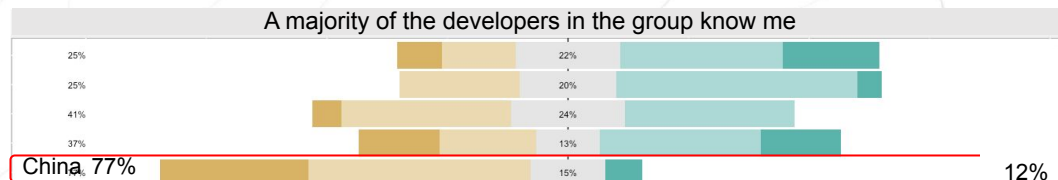
Sense of Belonging



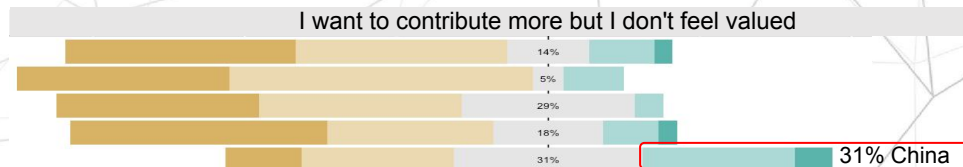
35% don't feel belonging to the group



77% don't consider they are not known by others



31% want to contribute more but feel they are not valued



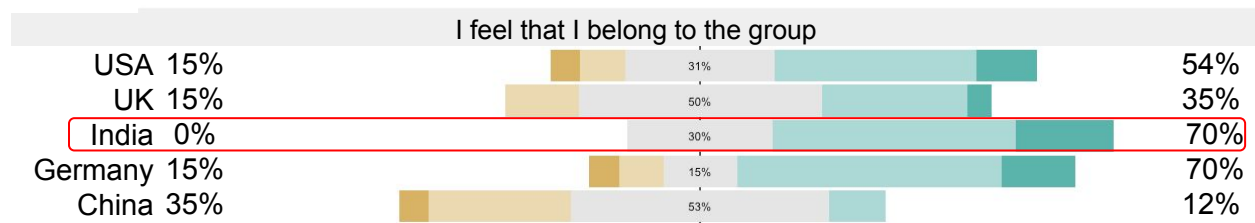
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree



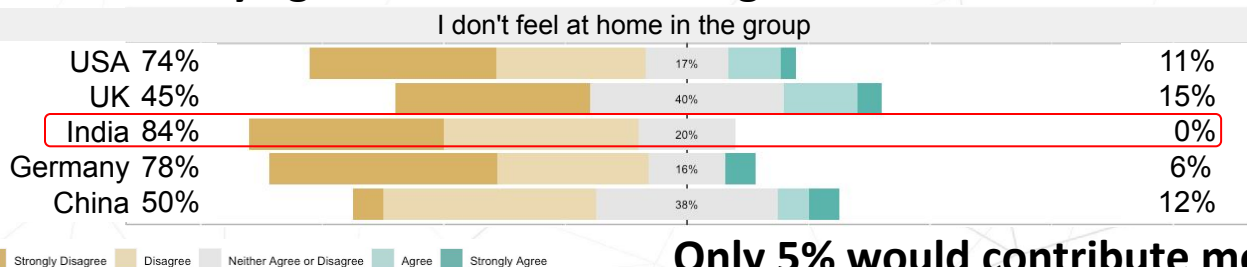
Sense of Belonging



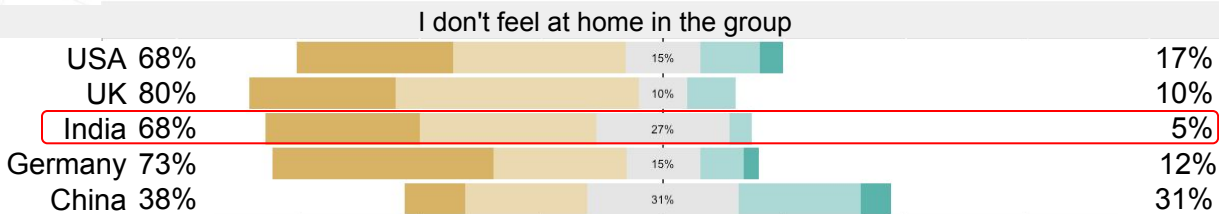
Nobody answered that do not feel belonging



Also, nobody agreed that is not feeling at home

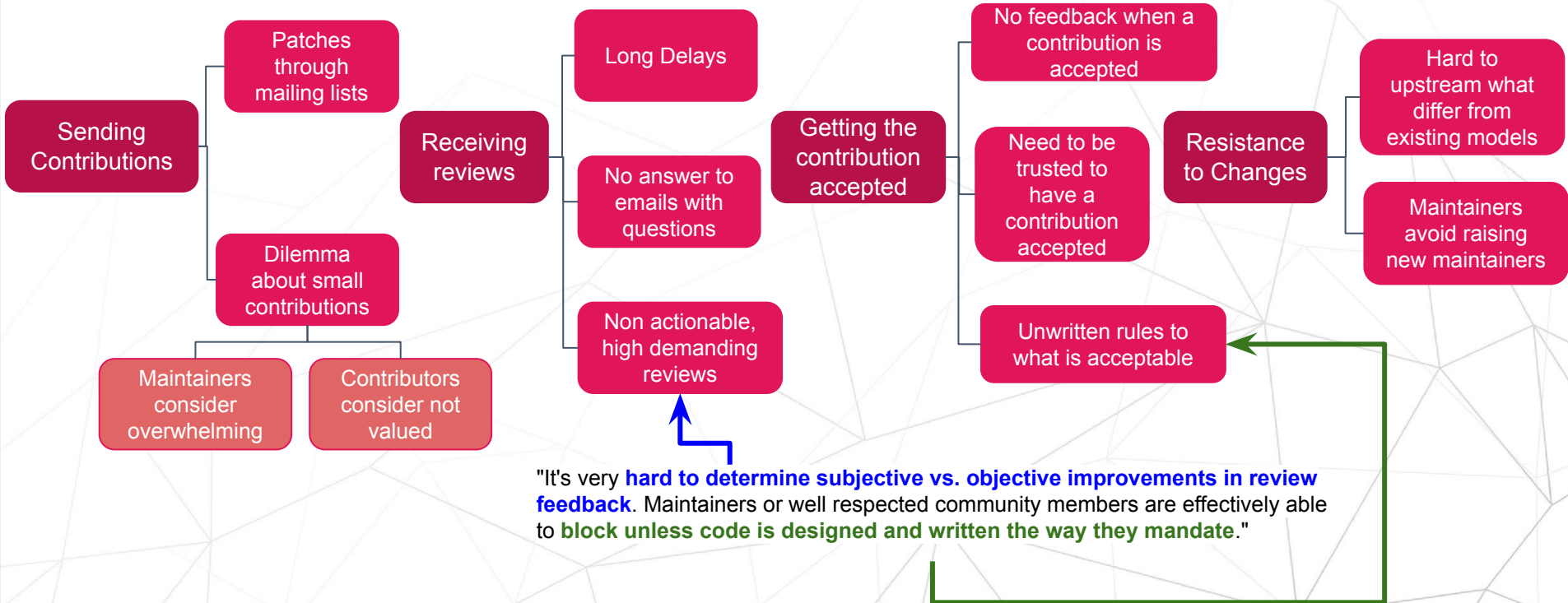


Only 5% would contribute more but feel they are not valued





"**Delay in feedback to patches** [...]. I currently have a series submitted for almost 6 months and have no feedback from maintainer on it"

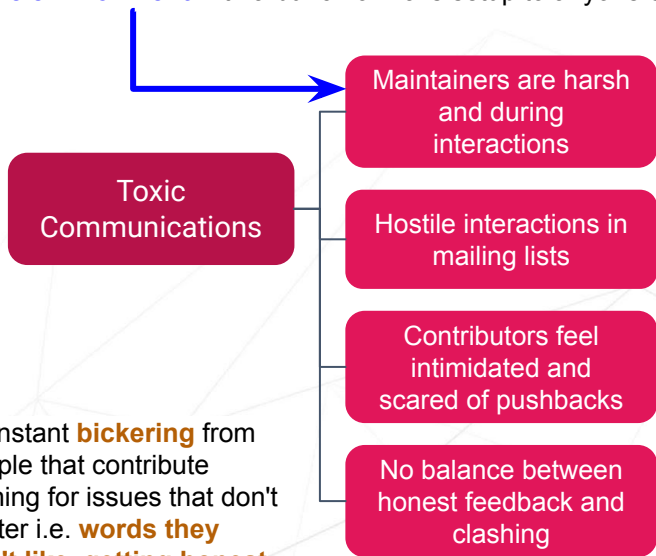




Challenges

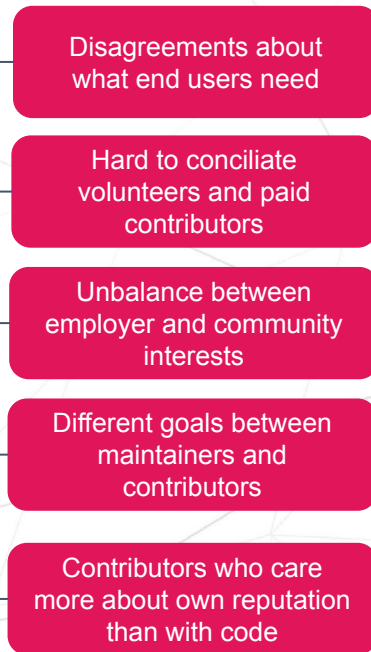
The many frictions

"Some subsystems, maintainers and community members are great & fun to work with. And **some are just annoyed, abusive and breed a toxic environment** with a bunch of walls setup to anyone contributing."



"Constant **bickering** from people that contribute nothing for issues that don't matter i.e. **words they don't like, getting honest feedback that hurts their feelings**"

Conflicting views and interests



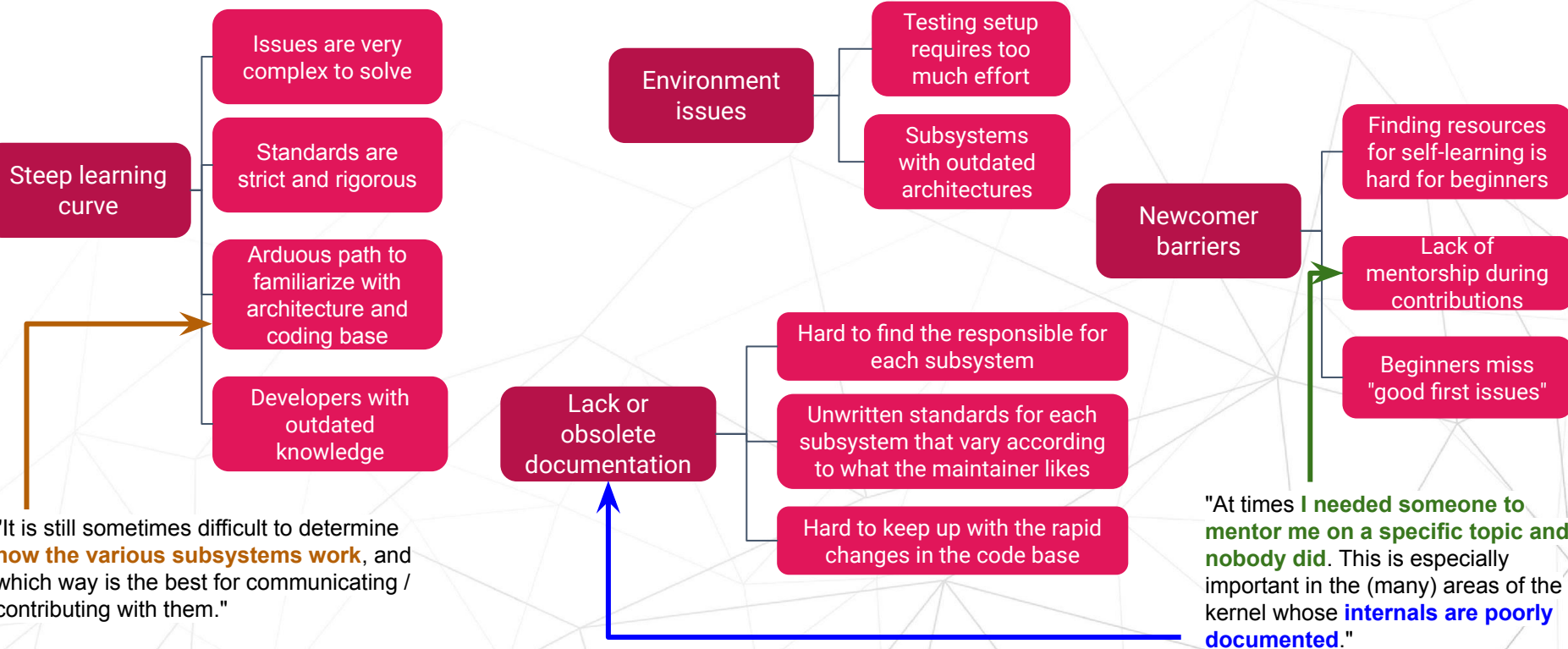
"The hardest part is **convincing** the maintainer or reviewers that **your contribution solves a problem which is worth solving**."

"Reaching a consensus amongst other **contributors and maintainers, who may have different goals**."



Challenges

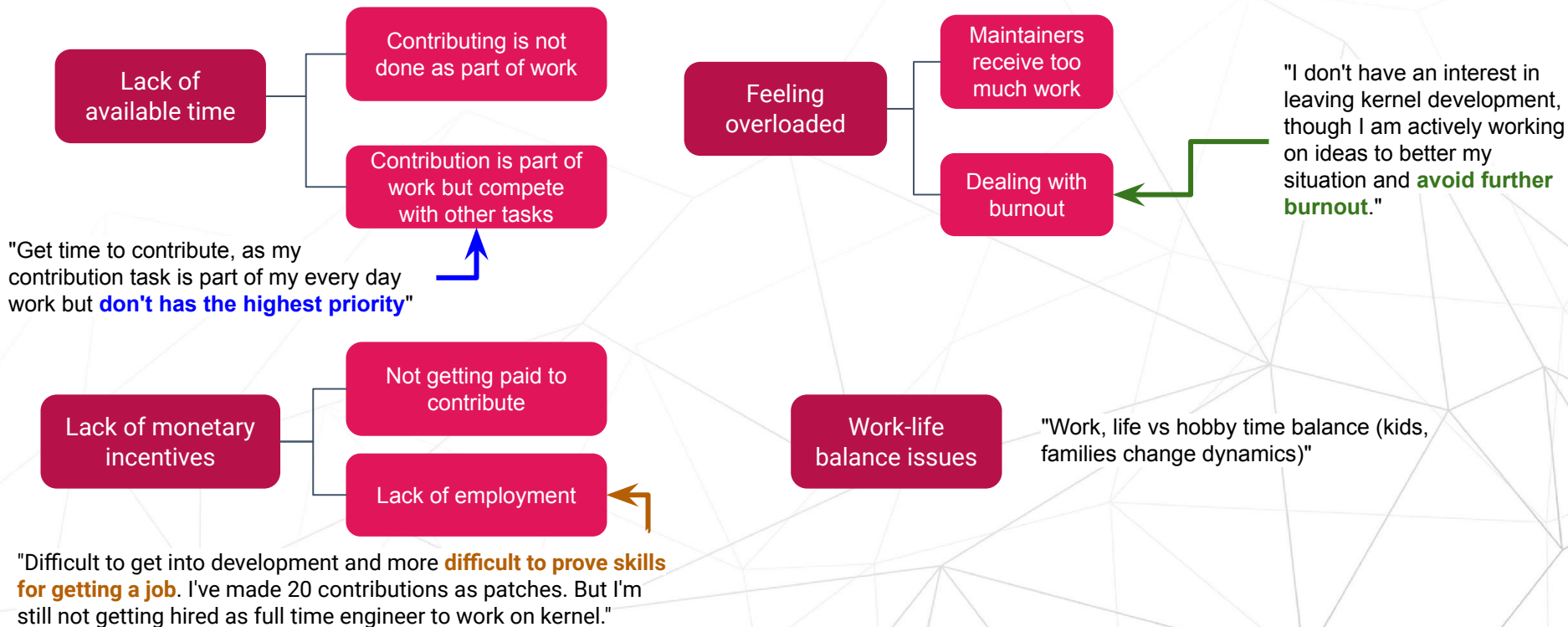
Technical





Challenges

Personal

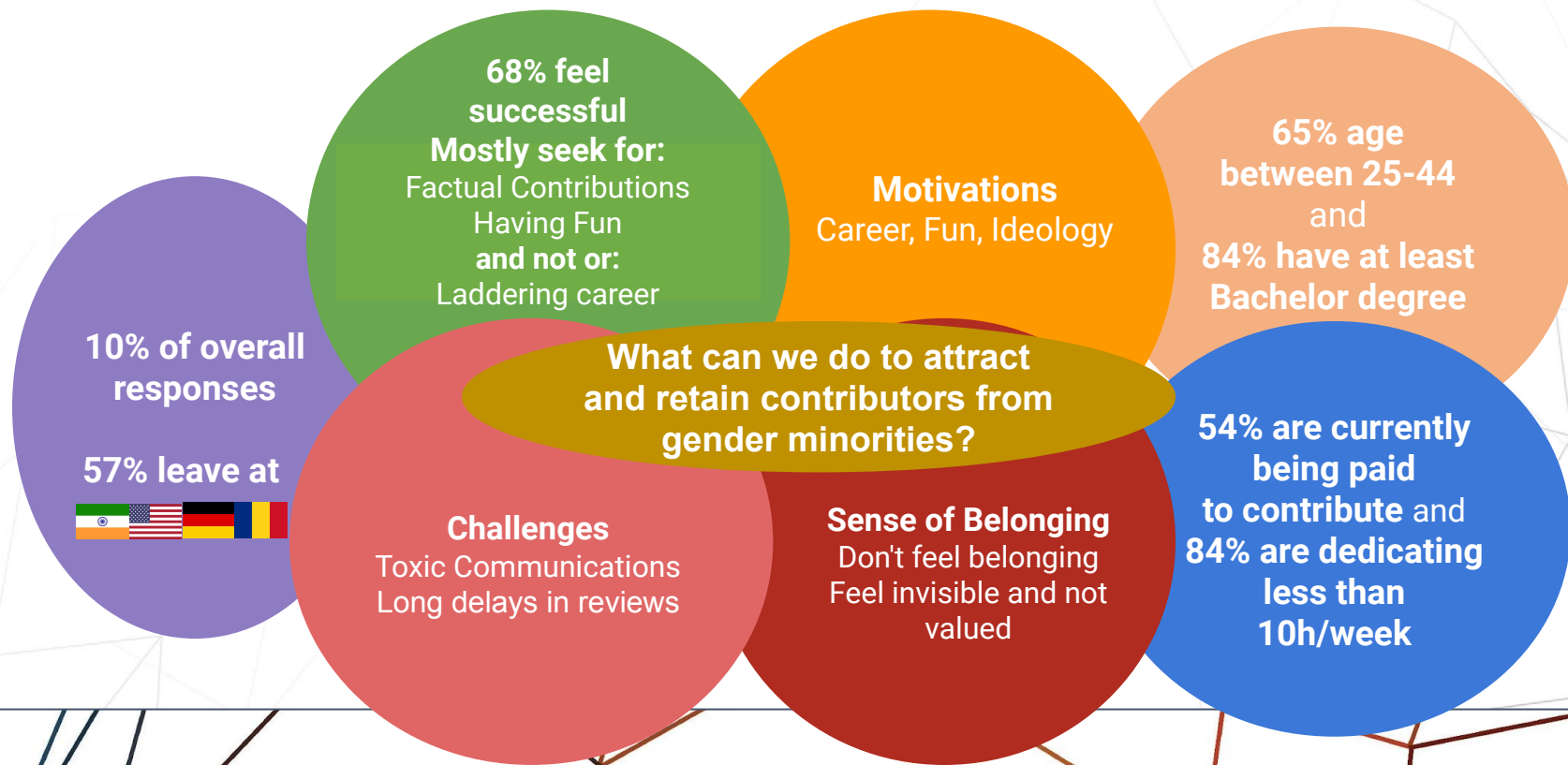




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Let's look at gender minorities

Answers from contributors who identified gender as women and non-binary





Discussion

- Which challenges do you face and are more impactful to you?
- What would you recommend the Linux Kernel community do to mitigate the reported challenges?
- What advice do you have for other contributors in gender minority who are willing to contribute to the Linux Kernel?



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Next steps

- Interviews for deep analysis
- Design actions to mitigate the reported challenges and avoid contributors to leave



Thank you