Using Behavioural and Psychological Insights to Increase Involvement in Participatory Budgeting

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Background

Participatory Budgeting (PB) is a democratic innovation in which citizens are invited to take part in the allocation of public money. It was first implemented in 1989, when the 'Brazilian Workers Party' came into power in Porto Alegre, Brazil, after 20 years of military dictatorship. PB was a radical step toward a democratic decentralization of power in this context (Baiocchi, 2005). It represents a type of deliberative democracy: dialog and constructive discussions between participants play a central role in the process (Calisto Friant, 2019). Decisions in deliberative democracy are the result of what Fung and Wright call "collaborative decision making", where "the central effort is to solve problems rather than to win victories, to discover the broadest commonality of interests rather than to mobilize maximum support for given interests" (Fung and Wright, 2003: 261).

PB is often cited as an example of a 'real utopia', which Wright (2011) describes in these terms: "The challenge of envisioning *real* utopias is to elaborate clear-headed, rigorous, and viable alternatives to existing social institutions that [...] take seriously the problem of practical design" (Wright, 2011: 36). It can also be analysed as a form of prefigurative politics, where the goals of a political movement are enacted within its means (Yates, 2015). The goal of PB in Brazil was to empower marginalized citizens to participate in decision-making and to reduce the soaring economic inequality through a joint management of public resources (De Sousa Santos, 1998). PB was thus implemented as a new way of governance which necessitated in-depth reforms of the administration (Harkins and Escobar, 2015).

Since PB's first implementation in Brazil, it has become increasingly popular, supported by large organisations such as the World Bank (Goldfrank, 2012) and implemented in more than 1500 cities worldwide (Baiocchi and Ganuza, 2014). As it developed internationally, PB has been adapted to local contexts, leading to variations in the role of PB within the political system. Processes also vary in their scope and design (Baiocchi and Ganuza, 2014). Maybe because of the variety of PB processes, we observed a lack of internationally aggregated statistics - which we address in our solutions. However, we aim to give an overview of the different types and scopes of PB across the globe in this section.

In contrast to Brazil where PB was seen as a new way of governance, PB in the global north has been implemented as a "community engagement tool" which doesn't imply deep changes in the administration (Harkins and Escobar, 2005: 14). Furthermore, in Europe as well as in the US, PB projects have often been implemented in the context of austerity: "making more with less" is the admitted goal of new participatory policies in Scotland (Campbell, 2011).

PB also varies in design and two broad types of PB models exist. First is the Brazilian model of PB, where the goal of deliberation is to define priorities for mainstream budget of the city

(Wampler, 2010). In 1996, 40% of the city budget of Porto Alegre was allocated through PB (Bhatnagar, 2003). The second model, which we will focus on in this essay is the grant-allocation type of PB, more common in Europe, the UK and the USA, where budget is assigned to specific projects within a community (Harkins and Escobar, 2005). Regarding the scope, in grant-allocation types of PB, the available budget rarely lies above 1-2% of the local authorities budget - for example, in New York City, each participating district has to allocate at least 1% of its budget (PBNYC Research Team, 2014).

PB is a complex process which yields both positive and negative potential. PB can backfire, leading to tensions within the community, delusion and augmented mistrust (e.g., Zepic et al., 2017; Wilkinson, 2019). However, as Swaner shows in her qualitative analysis of the NYC PB process, positive outcomes of inclusive PB are three-fold: a higher legitimacy and trust in local government, the enhancement of civic engagement and the development of stronger communities (Swaner, 2017). Furthermore, when participants can allocate the public budget, this can enhance their experienced sense of control and agency (Barnes, 2008). As Wampler rightly points out, Brazilian PB created more accountability and transparency in democratic institutions which lead to higher general levels of public satisfaction (Wampler, 2010). Finally, participatory budgeting is an effective way of learning valuable skills such as public speaking, budget-making, project-management and group work (Talpin, 2007).

Introduction

In this essay, we analyse Participatory Budgeting (PB), a type of deliberative democracy in which a public budget is allocated directly by local citizen's assemblies. We ask the question: how can behavioural and psychological insights increase citizens involvement in PB? We will create a practical framework for local authorities to strengthen involvement as well as address identified challenges through behaviourally-informed and empowering intervention proposals.

The essay is structured as follows: we first present our '8-step model of PB', which we developed as a framework for the efficient analysis of PB processes. We then analyse PB in light of Framing, Self-Determination Theory (SDT), Social Identity Theory (SIT) and Collective Efficacy (CE). Following the theoretical analysis, we used the 8-step model to investigate our case studies: The County of Durham (United Kingdom) and New York City (USA). In the penultimate part, we identify barriers to greater participation through a thematic analysis and present a set of generalised solutions applicable in grant-allocation PB. Finally, we will hold a discussion about the limitations of this project and present a conclusion.

Introducing the 8-Step Model of PB

Two models of PB are identified in the literature. The original Brazilian model, called mainstream-budget type of PB, is where citizens deliberate how to prioritise general budget allocation(Baiocchi, 2005). The second is grant-allocation PB, widespread in Europe and North America, where the budget is allocated to specific projects, especially infrastructure projects (Wilkinson, 2019).

We focus on grant-allocation PB and conduct a thematic analysis of the literature and on two case studies: Durham and NYC. We have identified three key stages of PB: Preparation, Implementation and Evaluation. In order to create a more practical tool, the stages have been divided by their respective tasks. The first and second step of the process (plan and communicate) are part of preparation. Implementation runs from the third to the fifth step (deliberate, develop and vote), and its evaluation covers the sixth to the eighth steps (the feedback-loop, analysis and adaptation). Below is a visual of this proposed framework for analysis:

Participatory Budgeting Through a Theoretical Lense

Little academic attention has been spent on the psychological and behavioral change-dimensions of PB. In this chapter we aim to address this gap in the literature by analysing PB through several theories. We focus our theoretical analysis on 'Preparation' and 'Implementation' due to their immediate relevance for citizens' involvement. Framing and narratives are introduced for 'Preparation' and are especially important in communicating PB. We then use 'Social Identity Theory' (SIT), 'Self-Determination Theory' (SDT) and the concept of 'Collective Efficacy' (CE) to analyse the second stage. Given the scope of this essay, we acknowledge that this analysis is limited and see it as a foundation for further research in social psychology and behavioural sciences.

PB Preparation

a) Narratives and Framing

According to structural anthropology discussed by Lévi-Strauss, narrative structures are "especially relevant to the analysis of organizational processes because people do not simply tell stories—they enact them" (Pentland, 1999). Narratives are a "common structure, open to analysis" (Barthes, 1975) and can be used to enhance PB participation, as we show in our solutions. We delve into the framing of PB, changing the way it can be seen by the public, and how it can be normalised through its visibility.

Framing refers to the effect of alternative description of a situation, which often gives rise to different choices (Kahneman and Tversky, 1986). As Kay and Ross (2003) showed, merely changing the name of a game with identical rules from "Wall Street Game" to "Community Game" has a significant impact on participants' behaviour. Cognitive linguist George Lakoff explains frames as patterns of associative thinking (2010) and emphasizes the importance of choosing the correct cognitive frame in political communication. Framing is a salient issue for PB, because it can shape a positive perception for potential participants, as well as backfire. We discuss these adverse consequences through our Durham case-study.

b) Functions of Utopia

Ernst Block defines Utopia as an expression of the desire for a better way of being (Block, 1986). Based on this definition, Levitas (1990) identifies three core social functions of utopia: compensation, critique and change. Compensation refers to escapism and daydreaming, criticism refers to constructive criticism of the current world in light of a hypothetical future (something that is missing) and lastly, change is where utopia can inspire and lead to concrete implementation and social transformation (Fernando, 2018). In our solution, we show how the criticism and change functions can be harnessed to improve participation.

PB Implementation

a) Social Identity Theory (SIT)

Social Identity Theory (SIT) is a major theory in social psychology. It discusses intergroup relations and group processes, the central tenet of which is that group behaviour arises from a shared sense of social category membership (Abrams et al., 1990). Group membership is an important factor in determining social identity and self esteem due to its sense of belongingness to the social world (Tajfel, 1979). The three mental processes that are associated with SIT are categorization, social identification and social comparison (Hornsey et al., 2008). The basic "psychological dynamic", proposed by Robinson is that people who have an unsatisfactory social identity would want to alter the state of affairs by re-establishing a sense of distinctiveness with their individual group memberships (Robinson et al., 1996). As Thomas et al. state, "social identities underpin engagement in a broad range of behaviors [...] that are aimed at changing the circumstances of disadvantaged groups" (Thomas et al., 2018). This shows how SIT can be effectively utilised for increasing involvement and inclusion of the underrepresented in PB.

b) Self-Determination Theory (SDT)

SDT is a macro-theory of human motivation which looks at the relationship between social contexts, generated motivation and outcomes such as self-development and well-being (Deci and Ryan, 2015). SDT is part of a body of "organismic meta-theory", which sees individuals as naturally inclined to self-development. In contrast, mechanistic theories, such as the operant theory (Skinner, 1971), see individuals as primarily motivated for action by external force.

Two types of motivations are identified in SDT: intrinsic and extrinsic. Extrinsic motivation is promoted through fear of punishment and/or "a contingency between the target behavior and some separable consequence desired by the individual" (Deci and Ryan, 2015). Intrinsic motivation is rooted in the enjoyability and pleasure linked with the action itself. It has been shown that extrinsic rewards can 'crowd out' intrinsic motivation (Deci, 1971). Moreover, three universal core psychological needs are identified for motivation: the need for competence, autonomy and relatedness (Deci and Ryan, 2015).

PB can potentially address the three core needs: it brings citizens together towards a common goal, (relatedness). Citizens are given the responsibility to decide about resource allocation (autonomy). Finally, PB highlights the importance of local knowledge and strengthens citizens' civic competences, (competence). Because PB participation isn't linked to external reward or sanction, we see it as mainly grounded in intrinsic motivation. We argue that, when extrinsic motivation is used to trigger participation, it results in competition and can create tensions within communities, which is supported by our findings on Durham.

However, as shown in Maslow's 'Hierarchy of Needs', non-monetary extrinsic rewards are important as long as they satisfy participant's basic needs (Gawel, 1996). This is why the provision of incentives such as food, paid public transport and childcare can strengthen the inclusion of low-income citizens in PB (Jerome, 2013). Having the time to participate in PB can be seen as a privilege, which is why it is important that the basic needs are provided as compensation.

c) Collective Efficacy (CE)

This essay will focus on psychological Collective Efficacy (CE). The concept first appears in Bandura's work in Social Cognitive Theory (1982), where he identifies three levels of human agency: individual, proxy and collective efficacy (MacNamara et al., 2013). CE refers to beliefs in a group's capability to organize and execute actions required to reach collective goals (Bandura, 1997).

We argue that CE is central for the analysis of PB for two reasons. First, creating a positive image of collective efficacy is crucial to induce first-time participation in PB, because individuals with a poor perception of their neighbourhood's CE are less likely to in PB than their peers. Second, Van Zomerer et al. (2012) have shown that participation in a successful collective action strengthens community identity and improves individual perceptions of CE. Thus, achieving high-level satisfaction during and after PB increases the likelihood of future participation through the enhancement of perceived CE (Drury and Reichner, 2005). PB hasn't been analysed through the lenses of collective efficacy, we acknowledge that the claims we make are hypotheses which require further research.

Case Studies: NYC and Durham

PB processes differ in regard to their resources, design and role in their political context. For this reason, we flesh out practical problems by grounding our analysis in two case-studies: the County of Durham, UK and New-York-City (NYC), USA. In Durham, PB began in 2009 between different Area Action Partnerships (AAPs) and PB in New-York City (NYC) began in 2011 (PBP, 2018).

The two case studies are both grant-allocation PB processes, but they differ widely in scope and design. The common challenges they face are thus by addressing them, we provide solutions which can be relevant for other grant-allocation PB processes. We acknowledge that, given the extremely limited size of our sample (N=2), the generalization of our findings ensue reflection.

We structure our case-studies around our 8-step framework: we begin with a brief stakeholder analysis, then, described through the 8 steps, we identify central challenges for the participation of citizens:

Durham

History and Stakeholders

The PB process in Durham began in 2009, following a reform in its governance structure (Wilkinson, 2019). The newly founded County of Durham and its vast territory (223,260 hectares) was divided into different Area Action Partnerships (AAP). The AAPs were created to "give local residents and organisations an opportunity to feed into decisions about how services are provided" (Durham County Council, 2013). AAPs are structured around a forum, a board and different project groups and have a budget to allocate to PB. In 2009, £500,000 was allocated, in 2013, £848,000 pounds were allocated. The main purpose behind PB was to enhance "empowerment, engagement, local action and performance" (Henig and Eliot, 2009).

PB Preparation

1. Plan

The PB process in Durham was planned around six annual meetings where up to £40,000 were distributed between winning participating projects (Wilkinson, 2019). The AAP project groups meet monthly to discuss and develop local plans as well as deciding how they want to advertise their PB. From 2009 to 2013, PB events were called "Market Place" (Wilkinson,

2019: 1011). Furthermore, AAPs created a 'PB toolkit' for participants to communicate about their project (Henig and Eliot, 2009).

2. Communicate

Participants with a project proposal are invited to campaign it through word of mouth, door knocking and call centres (Henig and Eliot, 2009). The aim is to get as many citizens as possible to come voting for their project at PB events (see: Vote).

3. Deliberate

From the literature, it is clear that Durham does not hold a process of deliberation about their projects - projects are presented and then voted upon. This is their main limitation in Durham, as they are essentially skipping a crucial step in the process.

PB Implementation

4. Develop

Participants develop their projects to meet priority guidelines of the AAPs. The priorities that were agreed upon by all the partners were "altogether wealthier, safer, healthier and greener" (Henig and Eliot, 2009).

5. Vote

Voting takes place in Durham at PB events called "Market-Places". Durham holds a standard procedure where anyone over 11 years of age can vote. There is one point per project, and a maximum of five votes. There is no standardisation, but a focus on the grant which is minimum £1,000 and maximum £5,000.

PB Evaluation

6. Feedback

After the process, a public feedback session was conducted by the Durham County Council, which facilitated a better understanding of the limitations and the effectiveness of the process.

7. Analyse

Problems identified in Durham are linked to a lack of trust between participants and toward the AAPs (Wilkinson, 2019), Mistrust is fuelled by the competitive nature of Durham's PB process, where members of a local community to work against one another in order to successfully win a vote (Wilkinson, 2019).

8. Adapt

Durham's framing of PB "Market Place" in 2009 was renamed "It's Up 2 U £500K" in 2013. The Council also standardized procedures and held regular budget consultations where participants could get support for their project. Furthermore, non-traditional voting techniques such as online voting could be adopted to improve and simplify the entire process, including online voting or "mass membership clubs" (Wilkinson, 2019: 1007) which secured the votes and the funding.

New York

History and Stakeholders

Unlike most PB processes outside of Brazil, which have been implemented in a top-down manner (Baiocchi & Ganuza, 2014), PBNYC has emerged as a bottom-up movement (Su, 2012). Two political groups have played a key role in the implementation of PB in NYC (Baez and Hernandez, 2012): Community Voices Heard (CVH) - a grassroot movement of marginalized residents of NYC funded in 1994 - and the Participatory Budgeting Project (PBP) created in 2009. In 2011, they persuaded four NYC councillors to pioneer PB in their district by allocating $1million of their discretionary funds to PB (Gilman, 2016). In 2016, 31 districts had adopted PB (Swaner, 2017).

PB Preparation

1. Plan

The first step of the PB process is its planning through each City Council, which runs approximately from June to September. The Council creates and strengthens partnerships with local key actors such as community groups, grassroot initiatives and schools. It also crafts an external communication strategy for the next step of the cycle. Finally, PB meetings have to be organised and their facilitators well-trained.

2. Communicate

During the communication phase, the City Council reaches out to local citizens by implementing the communication strategy developed in step one. Local partners such as organised neighbourhood associations and religious communities are also key to reach specific audiences (Elstub et al., 2016).

PB Implementation

3. Deliberate

The deliberation step takes place from September to November. The sessions happen in council facilities and community centers (Elstub et al., 2016), which reduces burden for first time participants. Deliberation sessions are also run on different days and times to accommodate for the different life rhythms of citizens (PBNYC Rulebook, 2016). Good facilitators are key for an ethical, efficient, and positive PB experience, therefore many resources are invested into training facilitators.

4. Develop

In November, budget delegates are elected or volunteer to develop ideas which emerged during deliberation (Castillo, 2015). They are trained and work together with members of the Council Hall and of relevant departments of the City Hall for projects which touch to the City's jurisdiction (Swaner, 2017). After five months, the projects are presented again to the community before the final vote.

5. Vote

The final vote takes place in April. Multiple voting channels exist for the attribution of the budget to specific projects. Citizens can either vote on an online platform or use ballot votes in various places in their neighbourhood. They have one week to cast their vote, a measure which aims at creating more inclusion (PBNYC Rulebook, 2016)

PB Evaluation

6. Feedback

A central mechanism for feedback and adaptation is the steering committee, a key actor in NYC PB, which meets after the final vote to gather impressions of different actors regarding the PB process (PBNYC Research Team, 2014). It is constituted of individuals from City Councils, members of the civil society and scholars. However, there is a lack of public information about how feedback is taken from citizens who have taken part in step three (deliberation) and five (vote) without being budget delegate.

7. Analyse

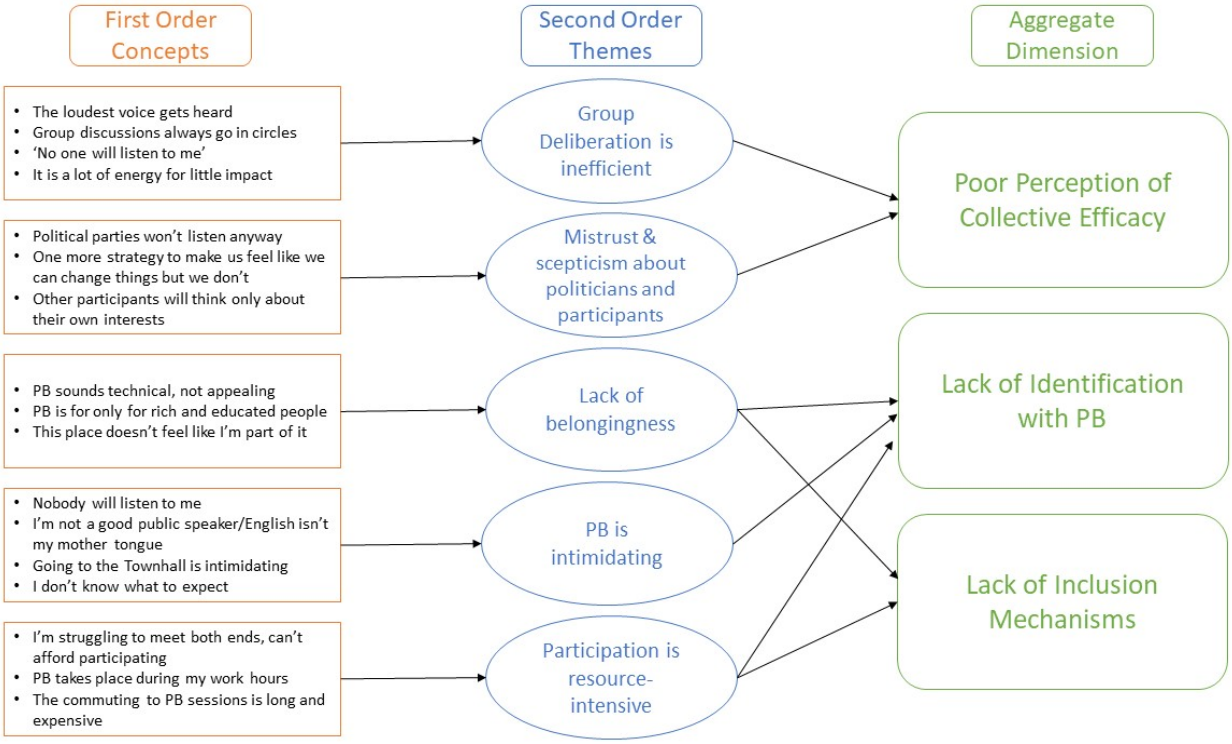
There is little information about the analysis of collected data and feedback in the NYC process.

8. Adapt

During its summer plenary session, the SC discusses the rules and principles for next year's PB process. This consensual re-creation of the 'Rulebook' is an essential outcome of the grassroot-led nature of PB in NYC (Hernandez and Baez, 2012). We argue that the adaptability and unceasing evolution of PB in NYC is a central reason for its success.

Common Identified Challenges and Proposed Solutions

To identify challenges and problems facing the two cities, we carried out a thematic analysis of secondary literature using the methodology proposed by Gioia et al. (2012). Given the limited amount of qualitative data available, we acknowledge the limitations of our analysis.



As this table shows, a set of three common challenges emerge from our thematic analysis, and the fourth is about lack of supporting tools and cooperation between global PB efforts.

a. Poor Perceptions of Collective Efficacy
b. Lack of Identification with PB
c. Lack of Inclusion of Underrepresented Populations
d. Lack of PB Behavioural Insights Tools, & Global Knowledge Sharing

In this section, we address the above-stated common challenges using the theories presented in section two and subsequently propose concrete solutions.

a) Enhance the Perception of Collective Efficacy (CE) through Framing and Visibility

The first common problem we identified is that citizens often have poor perception of CE, which means that they don't believe in the ability of people in their neighbourhood to achieve a positive change (Bandura, 2000). Additionally, PB is a new experience for most citizens, which complicates first-time involvement. Conveying emotions and crafting intrinsic motivation for involvement when the PB process is new and/or seen with scepticism, is a challenge we address in this section.

<u>Framing and the Criticism Function of Utopia</u>

We argue that the way local authorities frame PB is crucial for citizen's perception and whether they will take part in PB or not. As in the case of the competitive "Market Place" framing in Durham (Wilkinson, 2019), we saw that framing can create a divide within communities and potentially decrease involvement.

We suggest that using the criticism and change function of Utopia can be a fruitful way to frame PB, which could prime more cooperative and far-sighted behaviours and thus improve the quality of involvement. When people use the criticism function of Utopia, they look at the present in the light of a better future and identify missing elements (Levitas, 1990). The concrete ideas of a better future can also inspire action, which is where PB becomes important as a channel for participation, below is an illustration:

(Image created in Canva)

Nonetheless, we acknowledge that this strategy could backfire: once citizens have identified what is missing in their neighbourhood and want to tackle it, expectations arise. However, PB mostly funds physical infrastructure whereas citizens may have other ideas to push for change

(e.g. addressing lack of staff in schools and hospitals). Therefore, there should be a 'policy channel' for these ideas to be considered in wider policy-making. This could prevent frustration and distrust amongst citizens, which could deter further participation.

Visibility: Embodying PB Narrative into the Public Built Environment

We argue that the perception of CE would improve with an increased visibility of the impact of PB in public built environments. The idea is to create a visual feedback mechanism for participants, in order to remind them of the positive impact of their involvement. This way, participants could acknowledge that PB reaches its goals and is thus meaningful, which would increase the probability of future participation.

Creating more visibility for PB in the public environment would be an innovative way to advertise PB towards citizens who are unaware of its existence and create the motivation to be part of it. Generally, it would normalise PB and show the efficacy of participation to ordinary citizens.

One idea to make the impact of PB visible would be to attach to a sign saying "proudly created through PB" to every finished project. This could include a QR Code linked with the story of the project and the key participants, below is an example:

(Image created in Canva)

b) **Create Positive Social Identities Linked to Involvement**

Reaching a Consensus

Thomas et al. (2018) identify the emergence of consensus within a group as a catalyst for the creation of a new social identity, which nurtures commitment to change. Where deliberation

is absent in PB, such as in Durham, no common social identity can be created. Furthermore, in grant-allocation types of PB, competition for funding strengthens social identity within project groups and results in tensions and mistrust within the community.

Applying the hypothesis of Thomas et al. (2018) to the deliberation step of PB, we argue that an inclusive and efficient facilitation is fundamental for the creation of an in-group consensus and of shared social norms. This creates an optimal environment for positive social identities linked with PB involvement.

PB in Schools and at Work

Because most citizens have never participated in PB, communicating it can be complicated. A long-term, institutionalised solution for this challenge, as well as a very powerful strategy to normalise deliberative democracy from a young age, is to implement it in schools and universities. The very localised scope of schools is a perfect context to shape children's perception of CE in a positive way. Creating a positive experience of PB for the young generation is also a strategy of choice to reach parents and older relatives.

The same can be argued in the context of businesses. We believe that a kind of 'social-private partnership' can be efficient in fostering positive social identities linked with the workplace. Local employers who let their employees take part in PB could be recognised as 'democracy-friendly entreprise' by the local authorities. In this context, PB could be framed as an opportunity for team-building and personal growth of employees.

c) **Inclusion Mechanisms: Providing Basic Needs to Enable Participation**

Non-inclusionary PB leads to underrepresentation of specific groups that PB could be most beneficial for. This included low-income citizens and ethnic minorities (McMara et al., 2013). Basic incentives like food and childcare can bridge some of these participation gaps. Here, we identify some inclusion techniques that can be adopted to ensure maximum inclusivity.

In some places like NYC, many potential PB participants may not be native English speakers (Hayduk et al., 2017). To ensure their participation, interpreters could be arranged for PB events. Furthermore, the voting website could be available in the most spoken languages of the area.

Moreover, one of the major limitations of PB is the lack of participation due to a clash in scheduling. PB processes should be conducted at different times to ensure maximum participation. PB in the morning can lead to more elderly participation, PB at lunchtime (through social-private partnerships) is for corporate integration and PB in the weekends can facilitate the involvement of those working long hours during the week. Furthermore, subsidies for transportation should be granted in order to enhance accessibility. The same

goes for the one-day voting policies, like in Durham, which lead to lower rates of participation. For this reason, a voting week, as in NYC, can substantially increase participation.

d) **PB.AI: Behavioural Insights "Toolkit" & Global PB Knowledge Sharing Platform**

As discussed, there are important psychological and behavioural aspects to consider and utilize throughout the 8-Step PB Process. While there's a plethora of qualitative and quantitative Behavioural Insights that can be gathered and analyzed, the scope of knowledge and tools required to do so is an investment most cities won't be able to operate and/or maintain.

In addition to Behavioural Insights, learning from global best practices can provide value for new and existing cities to PB, and that can be done through global knowledge sharing (Birch and Keating, 2011). While it makes sense for a city to utilize global best practices to decrease implementation time and save costs of operations (reduces trial & error), each city has its own unique characteristics (context, linguistic, and cultural differences) to cater for and build strategies around, and replicating the same practice across cultural boundaries can lead to failure (Pan and Leidner, 2003). Therefore, while a global knowledge sharing platform can provide value for PB managers, it would require an analysis and adaptation of the global insights to their own context. This process by itself would require tools and knowledge that demand large financial investments.

By creating a software with an advanced algorithm, municipalities can be equipped with inexpensive tools that gather and analyze Behavioural Insights, while also democratizing accumulated global cities insights to assist needed cities with real time recommendations in regards to policy directions, budget allocation, and behavioural modelling strategies that fit their given context.

The Core Technology of the Proposed Software:

Artificial Intelligence (A.I): Processes data automatically (Togelius, 2018)

Machine Learning (M.L): Supports A.I by learning through time which data is relevant for the context, and then improves the algorithm automatically. (Brynjolfsson et al., 2018)

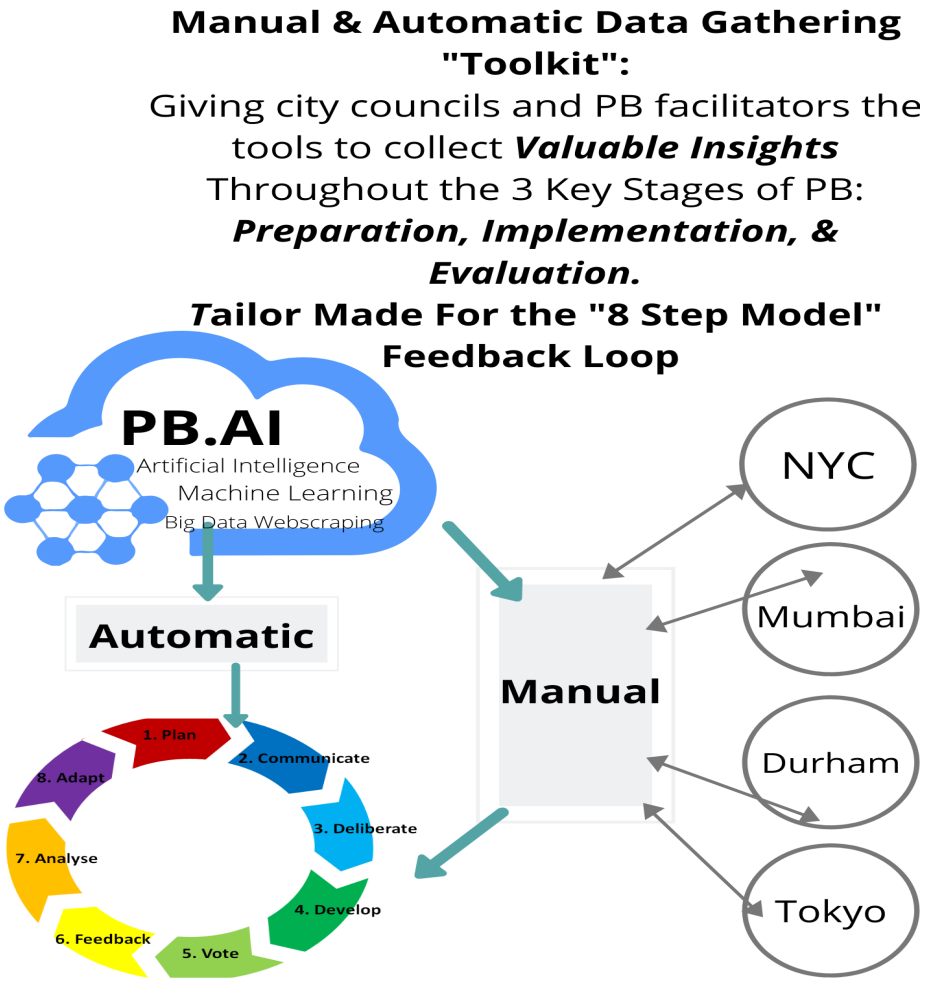
Big Data Web Scraping (WS): Automatically searches the internet for relevant data, and inserts it into the algorithm.(Broucke and Baesens, 2018)

How It Works:

1. Manual & Automatic Data Gathering Toolkit (Figure 1):

Manual: The software provides tools that can be used by managers along the PB Process, in which they track, record, and define events that are happening. For example: during the planning stages the managers will have the option to input decision making processes that they're going through, PB facilitators during the voting stages will be able to track and record the behaviour of voters, and during the feedback stage all data can be plugged in the software.

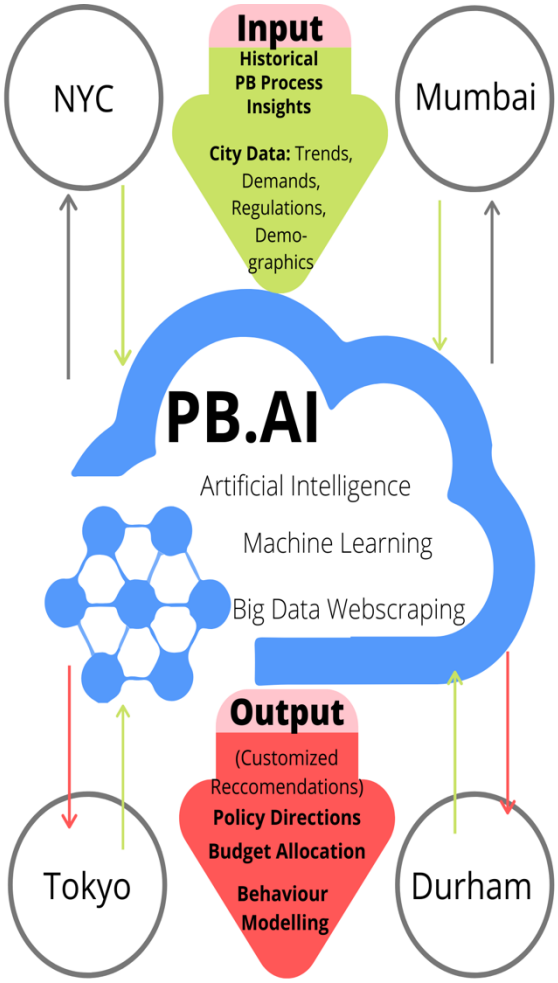
Automatic: The software provides PB managers with recommendations according to the stage they're in. For example: A manager in charge of planning a communications strategy will receive recommendations on how to approach their target audience. This works by A.I correlating the input manually provided by the local council, to the vast amount of data points online (WS), and in the PB.AI database. During the final steps (analyse & adapt), after accumulating data throughout the PB process, the manager will have a clear visualization of the insights and the software will "learn", improve, and adapt itself for the next process (M.L). The goal of the software is not to replace the manager, but to provide visibility, clarity, and assistance when needed.



2. Global Knowledge Sharing Process (Figure 2):

There'll be valuable insights aggregated through use of PB.AI by global cities, and by using the same technologies (A.I, M.L, WS), these insights will be accompanied by open source online databases to provide new and current PB processes valuable recommendations.

The partners define which of their data they allow to enter the global database, which will automatically aggregate with the other cities data. In correspondence, the algorithm automatically adds open source data about the city context and global trends(WS) to the equation. Finally, the city/PB manager defines category needs (budgets, regulations, policies, demographics,etc) and the algorithm provides real time recommendations.



Limitations: While the software will act as a "mediating structure" (designed to facilitate information processing) for the managers involved, adding such artifacts to an installation can possibly impact behaviour in the environment (Lahlou, 2017). Therefore while it's important to remain transparent with operations, the use of the software should not be visible during voting.

Conclusion

In this essay, we developed an 8-step framework to analyse PB processes in order to identify where participation can be increased. Using a thematic analysis of two case studies, we have pinpointed four challenges faced in grant-allocation PB: poor perceptions of collective efficacy, lack of identification, lack of inclusion, and lack of global knowledge sharing. Using theories from social psychology and behavioural sciences, we provide four respective solutions. We propose to make PB-impact visible in public spaces and frame PB using the criticism function of Utopia to address the poor perceptions of CE. Providing good facilitation of deliberation to reach consensus and implementing PB in schools as well as at work addresses the lack of identification. It achieves this by creating new positive social identities linked to involvement. Diverse inclusion mechanisms such as multi-lingual meetings and voting platforms as well as providing food and childcare can increase participation of underprivileged groups. Finally, the lack of inexpensive behavioural Insights tools and democratization of global PB knowledge, which are both fundamental to help build, support, and develop global PB initiatives, can be gapped through technology.

Given the scope of this essay, there are several limitations which are important to discuss. The main problem we faced was the limited amount of information about the case study of Durham, in comparison with NYC. We addressed this problem by extensively using the available qualitative data. We acknowledge that in order to generalise our solutions more robustly, more case studies would be needed for a substantial comparative analysis. More variety could have provided deeper insights into PB challenges. We also acknowledge that the budgets that local authorities hold are limited and some of our proposed solutions may cost more than what the local authorities can afford.

Studying Participatory Budgeting from a psychological and behavioural lens is a gap in the literature which we have attempted to address. PB has a strong potential to achieve social cohesion and make citizens feel more included in their given societies. Improving this process would develop an incredibly important democratic innovation that started in Porto Allege, Brazil only 30 years ago.

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