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Varied perceptions of environmental impacts from informal public transport hubs in two sub-Saharan African cities (Nairobi and Ibadan)

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Abstract: This paper explored perceptions of the environmental impacts of informal public transport (IPT) in Ibadan, Nigeria and Nairobi, Kenya. Based on a questionnaire survey supplemented by exploratory factor analysis the results revealed unanimous agreement that IPT hubs and the infrastructure around them are perceived as having adverse impacts on local people and their environment. There exist statistically significant differences on the perceptions, including the latent factors underpinning them, at city level and across respondent's backgrounds. The findings imply significant scope for urban planning practice and policy-making to find systematic methods to integrate the knowledge about IPT's perceived environmental impacts, from all urban citizens, as a means to pro-actively enhance their rights and inclusiveness. This will ameliorate a planning culture that often ignores the realities and concerns of the marginalised.

Keywords: informal public transport; IPT; environmental impacts; perceptions; Nairobi; Ibadan; urban planning.

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1 Introduction

The prevalence or expansion of urban informality can have adverse impacts on liveability and people's quality of life, often disproportionately affecting the marginalised (De Satge and Watson, 2018; Skinner and Watson, 2018; Douglas, 2013; Chavis and Daganzo, 2013; Davis, 2006). For example, informal public transport (IPT) has been observed to provide vital benefits to the urban poor through affordable on-demand access to various destinations (Olvera et al., 2003, 2016; Levy, 2008; Pucher et al., 2005). However, IPT is also associated with negative impacts, e.g., air and noise pollution, traffic congestion and accidents, uncleanliness, and encroachment on formal transport (Cervero and Golub, 2007; Witten et al., 2003). IPT hubs[1] often attract cognate activities, e.g., food kiosks, shops, barbers and hairdressers, spiralling into an organic expansion and growth (Badami and Haider, 2007; Golub et al., 2009) with other negative impacts, e.g., crime, insecurity, and poverty (Girardet, 2015; Lehmann, 2015).

Although research on the impacts of informality on society or the environment exist (see Gulob et al., 2009; Beirao and Cabral, 2007; Kudva, 2009; Valenzuela et al., 2005; Farrel, 2004), studies on how those who live around informality perceive its impacts remain relatively scarce. Furthermore, urban planners, plans and policies, especially from developing countries where informality is more pronounced, have to date shown little understanding and interest about how those living within informality perceive its impacts (Kamete, 2018; ILO, 2018; Hernandez and Titheridge, 2016; Orero et al., 2012; Duminy et al., 2014; Rakodi, 1993). This implies that the practice and knowledge base to inform

urban planning in a way that integrates all the urban communities' understandings of the implications of informality remains poorly developed (Duminy et al., 2014; Skinner and Watson, 2018; Ghani and Kanbur, 2013; Roy, 2012).

This knowledge gap does not inspire confidence if "planning is an institutionalised social technology for systematising knowledge pertinent for a particular kind of collective action and for marshalling the power required for its implementation" [Sager, (2012), p.26]. Especially when premised on the view that urban planning must not only cater for those who can articulate their interests, but also effectively consider and integrate the interests of those others who are excluded from the decision-making and planning process, as is now well established in the literature (De Satge and Watson, 2018; Skinner and Watson, 2018; Lee et al., 2015; Allmendinger and Hughton, 2012; Rydin, 2010; Roy and AlSayyad, 2004).

If informality's implications especially from the perspective of communities who experience it daily are poorly understood and not systematically addressed in urban planning (Douglas, 2013; Song, 2016), then future potentialities latent in the informal sector will remain under-utilised, as is well-argued in the case of sub-Saharan Africa (SSA) (Skinner and Watson, 2018). This is despite scholars like Roy (2009) noting that urban planning within informality can be challenging and somewhat paradoxical, with little success especially in SSA (Kessides, 2007). This is because informality has the contradictory distinction of combining its functional importance with being neglected in urban policy and plans, and with the political tensions in terms of what to do about it (Wu et al., 2013; Porter, 2011; Levy, 2008; Cervero and Golub, 2007).

The SSA context, to which this paper focuses upon, is of interest as its urban population has grown rapidly from 15% in 1960 to 40% in 2010 (Awumbila, 2017); with cities like Lagos, Cairo, Dar es Salaam, Kinshasa, Luanda and Addis Ababa each projected to grow into megacities of over 10 million inhabitants by 2050 (UN, 2016). Experiencing an annual urban population growth rate of 4.1% compared with a global rate of 2.0% (Saghir and Santoro, 2018), SSA cities are described by Simone (2004) as lively intersections where informality and formality operate resourcefully without clearly delineated notions. With an additional 560 million people expected by 2040 to move into SSA cities that already contribute about 50% of the region's gross domestic product (GDP) (Saghir and Santoro, 2018), informality and its impacts cannot be ignored any longer (La Porta and Shleifer, 2014; Olvera et al., 2016). Countries like India see informality adding 1% to 1.5% to annual GDP growth (Sankhe et al., 2010), thus justifying the rationale for planning to focus on creating urban areas that conform to the potentialities and needs of also those within urban informality (see De Satge and Watson, 2018; Skinner and Watson, 2018; Parnell and Pieterse, 2014). The International Labour Organization (2018) estimates that informal employment in Africa is 85.8%, 68.2% in Asia and the Pacific, 68.6% in the Arab States, 40% in the Americas and 25.1% in Europe and Central Asia, making it relevant beyond SSA.

This paper assumes that future urban areas will be products of decision-making following sound evidence (Carrati et al., 2004; Waas et al., 2014) to capture and address the concerns, aspirations, and values of all urban citizens. Whether planning as understood and practiced in the western countries exists in SSA is moot. Many SSA cities have had decades of producing urban plans and are aiming to transform as a result of policy measures and the community engagement processes as a part of their urban planning (UN-Habitat, 2018, 2019; World Bank, 2017; Parnell and Pieterse, 2014;

Watson and Agbola, 2013; Berrisford, 2013). Therefore, exploring how future urban planning in SSA can align itself with the reality of its informal sector, and exploit informality's positives while mitigating its negative impacts, has been justifiably made in for example, Kamete (2018), Napier et al. (2015), Duminy et al. (2014), De Satge and Watson (2018) and Kessides (2007). It is herein argued that if this is to occur within evidence-based decision-making as discussed in Krizek et al. (2009), Watson (2016) and Watson and Odendaal (2013), then sound knowledge on informality's impacts on various urban constituencies is required. Song's (2016) study of multimodal transport planning in Solo, Indonesia, where IPT is prevalent, underscores the importance of incorporating diverse knowledge systems to deliver outcomes such as inclusiveness and equitability.

Whilst public participation can elicit and capture stakeholder perceptions during planning (Lee et al., 2015), public engagement exercises are themselves inadequate for several reasons (Allmendinger and Haughton, 2012; Fung, 2004; Innes, 1996), and; often fail to reach a significant number of stakeholders thereby not being truly representative or result in better planning (Fainstein, 2011). Hence the motivation for this paper is to establish stakeholder perceptions of the environmental impacts of IPT more systematically, as a body of knowledge. A key research question is: what perceptions do the local communities assign to the impacts of the IPT hubs around them? The insight can inform future urban planning policy, practice and outcomes (Rose et al., 2020) within the conventional wisdom that planning helps societies set their visions of desired futures and meet their goals of urban design and planning (Van Assche et al., 2013; Wilson and Piper, 2010; Allmendinger, 2009). Herein, informality refers to a class of developments, firms, workforces, and related activities, which may or may not be functioning within the legal frameworks (La Porta and Shleifer, 2014; Innes et al., 2007; Neuwirth, 2004).

Therefore, it is vital for planners and policy-makers to have sound information on how IPT differentially affects various stakeholders and their environment, in order to respond with apt targeted and specific tools, e.g., area plans. Otherwise, the assumption that stakeholder perspectives are similar and uniform, ignores the salient significant differences, and can result in omissions in adequately addressing crucial concerns of certain stakeholders during the planning process. While IPT users and operators may want to protect their health and wellbeing by reducing or eliminating adverse impacts from IPT; it is only when planners and policy-makers possess appropriate detailed knowledge of these concerns, and correlated factors, e.g., who is affected and to what extent, that appropriate solutions may be formulated (Moyo and Olowosegun, 2021). The perceptions are useful in conveying values, beliefs and interpretations of the confluence of stakeholders, IPT infrastructure, and the socio-econo-environmental context, which can be given expression in the tools of urban transport governance.

Therefore, the aim of the paper is to establish the various perceptions and associated factors that local communities attach to IPTs impacts. Following the introduction, Section 2 presents key ideas linking the notion of community perceptions to the quality of places they live, and how these perceptions are relevant to the planning function. Section 3 explains the methodology, followed by results in the fourth. The final section discusses the significance of the findings, their potential implications, draws conclusions and recommendations for application beyond the case studies.

2 Theoretical framing

Perceptions are influenced by a mix of broad economic, social and environmental forces (Hernández and Titheridge, 2016; Healey, 1997), and can be rich sources of information representing interests, concerns and aspirations (Reimer and Blotevogel, 2012) useful in shaping urban spaces and their use. Often contextualised (Liepa-Zemeša and Hess, 2016), perceptions can highlight the inter-relationship between people's places, activities, and experiences (Paulsson et al., 2017), as influenced by factors such as income, level of education, gender and age. Today, some acknowledged concepts have been identified, comprising of principles intended to address key blights of urbanisation in major cities, e.g., exclusion, discrimination, urban poverty, inequalities. Three are worth noting, if only for their pre-eminence in today's urban planning literature. Firstly, the notion of 'inclusive cities' has gained traction premised on the need to redress the relatively unfair, unequal and inequitable urban societies (Florida, 2017; Pojani and Dominic, 2015; Sankhe et al., 2010; Beall, 2000). It is borne from the assumption that to tackle historic and current urban challenges, planners must be inclusive and ensure that everybody has access to the same level of services and opportunities of the urban socio-economic structure (Lemaire and Kerr, 2017; Whitzman et al., 2013).

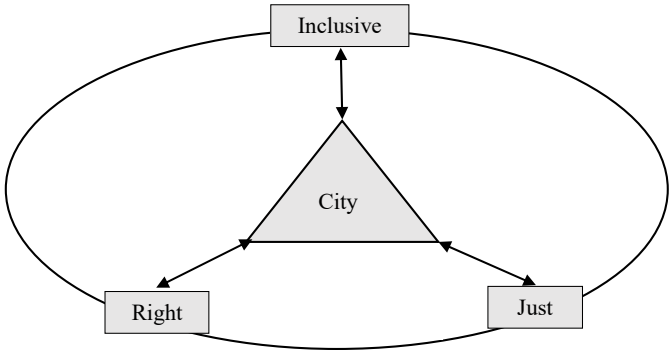
Secondly, the 'just city' concept (Davis, 2006), often intertwined in the rationale of inclusive cities as explained in Fainstein's (2011) *Just City*, asks planners and policy-makers to focus on equity and material well-being, with considerations of diversity and participation to foster a better quality of urban life for all. Fainstein applies theoretical concepts about justice developed by contemporary philosophers, e.g., John Rawls, Martha Nussbaum, Iris Marion Young, Nancy Fraser, to distil three central concepts: diversity, democracy, and equity. These are then supposed to be applied to the concrete problems faced by urban planners, as they address inequities and inequalities experienced by the marginalised.

Finally, a 'right to the city' concept seeks to address urban injustices and inequalities through consideration of citizens as having equal rights to the city (Purcell, 2003a, 2003b). Theoretically anchored in Henri Lefebvre's 1968 popularisation of the 'right to a city' campaign, it states that there are certain rights and services that citizens can expect from an urban space, whether they participate in the planning process or not. This is opposed to planning where aims and considerations are for those of a certain political and economic hierarchy, with the others marginalised (Marcuse, 2009; Purcell, 2002). UN-Habitat (2017) and organisations such as Slum Dwellers International have used this rights-based approach to plan their interventions for improving the living conditions of the urban poor. Yet, this is a most neglected of our human rights with most urban dwellers having no power to influence their surroundings (Douglas, 2013; Fainstein, 2011). Thus, an inclusivity, justice and rights (IJR) model (Figure 1) can be conceptualised to generate the demand side for perceptions based on the need to integrate the concerns and interests of all urban citizens, into the planning process and outcome.

Several scholars on SSA urbanity, with some leading work by Watson (2014a, 2014b, 2016, 2017) and De Satge and Watson (2018), attest to the pivotal role of IJR elements in the SSA context. Elements of the IJR can be also found in international agreements, foremost of which is Sustainable Development Goal 11: committing to make cities inclusive, safe, resilient and sustainable by 2030 (UN, 2015). The Africa Union Agenda 2063 highlights SSA's prosperity premised on an implementation plan that presents the

principles of diversity, subsidiarity, and inclusiveness (African Union Commission, 2015). This echoes theorisations in urban planning (see Weber and Crane, 2012), acknowledging that urban plans and polices must demonstrate the 'principle for appropriate planning', i.e., responsiveness to needs of those frequently disadvantaged in the delivery of public good, e.g., those within informality (Roy, 2012).

Figure 1 IJR model provides a scheme for assuring the perceptions of all urban dwellers are integrated into urban planning, driven by the principles inherent in the model



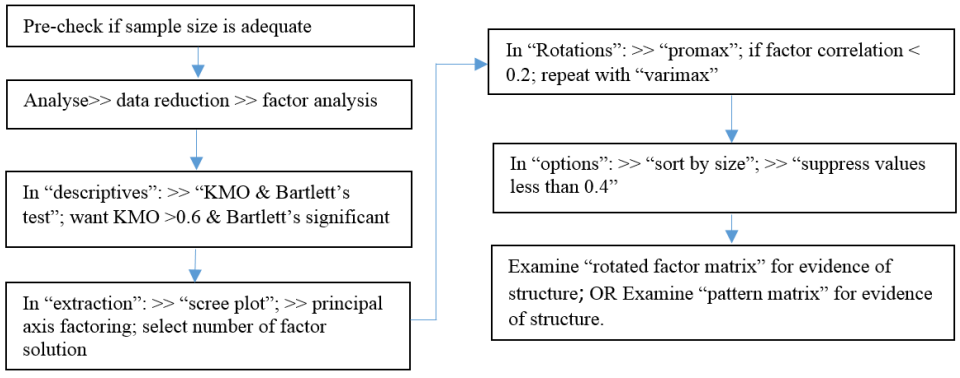
3 Methodology

A questionnaire survey was used to gather the perceptions of IPT users in two purposively selected cities in SSA: Ibadan, Nigeria, in West Africa and Nairobi, Kenya, in East Africa. The selection served to aggregate data across a broader geographical area and to see how contextual factors may affect the perceptions. Nairobi has one of the largest and liveliest IPT services in the developing countries, called *Matatus* (Orero et al., 2012). In Ibadan, the IPT is called *Danfo* (Oyesiku, 2002). To aim for a representative sample of participants, ten most populous IPT hubs in each city was listed and ordered alphabetically by the researchers who are natives to each of the cities. Five odd numbered hubs from each city were selected and at least 40 questionnaires administered in each between July and December 2017, in English language. A total of 200 were retrieved in Ibadan and 210 in Nairobi, representing 191 (95.5%) and 205 (97.6%) valid questionnaires, respectively, giving an overall response rate of 96.5%.

The questionnaire had 25 questions across three sections: background of participant (gender, educational status, age, and income), perceptions of environmental impacts around IPT areas, and how they think the IPT hubs influenced the impacts. The questions were closed-ended to facilitate SPSS statistical analysis aimed at testing correlation and variance on indicated perceptions based on tests of significance. A Likert scale helped capture the range of perceptions (1 – not at all/un-noticeable; 2 – to a minor/small extent; 3 – to an average/moderate extent; 4 – to a considerable/significant extent; 5 – to an extreme/very large extent). As Likert-scale questions often measure latent concepts/variables often with strong underlying correlations among them, concept grouping using a dimension reduction technique such as exploratory factor analysis (EFA) (Suhr, 2006), was undertaken.

EFA is a statistical method used to uncover the latent factors, constructs or structure of a relatively large set of variables, with the overarching goal of identifying the underlying relationships between them (Fabrigar and Wegener, 2012; Norris and Lecavalier, 2009). EFA has been used to explore the possible underlying structure of a set of interrelated variables without imposing any preconceived structure on the outcome (Child, 1990). In terms of limitations, EFA are based on describing relationships based on correlations, without causal inferences being made. The KMO and Bartlett's' test showed that the variables were adequate and appropriate for EFA analysis on SPSS. An overview of the flowchart for the EFA process is presented in Figure 2.

Figure 2 A summary of key steps when undertaking the EFA (see online version for colours)



4 Results

4.1 Perceptions on impacts

Not a single impact from IPT hubs was perceived as minor or of little concern although trends showed some significant variations across cities and participants' backgrounds. From the aggregated data, participant's education accounted for differences in six perceptions while income accounted for differences in five, including perspectives about IPT influencing air quality (Table 1). Gender was most likely to significantly account (at least $F > 4.0$; $p < 0.04$) for differences in perspectives about IPT influence on security/behaviour, concerns over IPT hub as places for socialising and social capital, and IPT influence on well-being. Education was most likely to significantly account for differences in perspectives about IPT influencing dust levels, security/behaviour, health and safety, social capital, and well-being. Considerable concern was indicated about noise levels, with significant differences across age and income, although perceptions were similar at city level. On how IPT influenced noise levels, the views were significantly different across education and income; and at city level, across age and gender.

At city level, differences in eight perceptions were likely to be accounted for by gender and income; while differences in seven perceptions were likely to be accounted for by age. Gender was most likely to significantly (at least $F > 4.0$; $p < 0.04$) account for differences in perspectives about IPT influence on air quality, noise levels, concerns over

health and safety, social capital, cleanliness and behaviour, and well-being. Income was most likely to significantly account for differences in perspectives about concerns over IPT size and location, cleanliness and behaviour, health and safety, influencing security/behaviour, as places to socialise, and well-being. Education was most likely to significantly account for differences in perspectives about IPT influencing dust and noise levels.

Table 1 Marginal means indicating statistically differentiable perceptions across participants' backgrounds: F indicating probability and p indicating statistical significance

Issue	*Gender*	*Education*	*Age*	*Income*
	*Gender * City*	*Education * City*	*Age * City*	*Income * City*
Concerned about air quality	F(0.108) p(0.742) F(0.008) p(0.927)	F(1.32) p(0.259) F(0.113) p(0.737)	F(1.64) p(0.162) F(0.012) p(0.912)	F(4.17) *p(0.003)* F(0.538) p(0.464)
IPT influences air quality	F(0.155) p(0.694) F(4.507) *p(0.034)*	F(3.241) *p(0.012)* F(5.823) p(0.694)	F(2.262) p(0.062) F(0.854) p(0.356)	F(5.852) *p(0.000)* F(0.096) p(0.756)
Concerned about dust level	F(0.180) p(0.671) F(0.221) p(0.639)	F(0.671) p(0.612) F(0.063) p(0.802)	F(2.465) *p(0.045)* F(0.231) p(0.631)	F(1.442) p(0.209) F(1.112) p(0.292)
IPT influences dust level	F(1.777) p(0.183) F(1.984) p(0.160)	F(4.619) *p(0.001)* F(4.293) *p(0.039)*	F(0.845) p(0.470) F(0.734) p(0.392)	F(3.956) *p(0.002)* F(0.111) p(0.739)
Concerned about level of noise	F(3.533) p(0.061) F(0.232) p(0.631)	F(1.259) p(0.286) F(0.103) p(0.749)	F(2.838) *p(0.024)* F(0.917) p(0.339)	F(2.555) *p(0.028)* F(2.204) p(0.139)
IPT influences noise levels	F(0.190) p(0.664) F(11.431) *p(0.001)*	F(3.775) *p(0.005)* F(10.178) *p(0.002)*	F(0.918) p(0.453) F(3.513) p(0.062)	F(2.710) *p(0.020)* F(0.710) p(0.400)
Concerned over size and location of IPT	F(1.141) p(0.461) F(3.976) *p(0.047)*	F(0.148) p(0.964) F(3.439) p(0.064)	F(1.365) p(0.245) F(4.458) *p(0.035)*	F(1.717) p(0.130) F(7.898) p(0.005)
IPT influences security/ behaviour	F(7.545) *p(0.006)* F(3.040) p(0.082)	F(5.371) *p(0.000)* F(0.220) p(0.639)	F(2.684) p(0.031) F(5.785) p(0.017)	F(1.610) p(0.157) F(9.015) p(0.003)
Concerned about health and safety	F(0.068) p(0.795) F(19.768) *p(0.000)*	F(0.977) p(0.420) F(2.539) p(0.112)	F(0.545) p(0.703) F(9.626) *p(0.002)*	F(1.767) p(0.119) F(17.930) *p(0.000)*
IPT influences health and safety levels	F(3.086) p(0.080) F(3.314) p(0.069)	F(4.361) *p(0.002)* F(1.194) p(0.275)	F(1.230) p(0.298) F(3.431) p(0.065)	F(1.334) p(0.250) F(6.417) *p(0.012)*
Concerned over IPT hub as place to socialise	F(8.961) *p(0.003)* F(1.383) *p(0.000)*	F(1.332) p(0.258) F(0.008) *p(0.000)*	F(0.264) p(0.901) F(27.525) *p(0.000)*	F(2.229) p(0.051) F(23.427) *p(0.000)*
IPT influences social capital	F(5.888) p(0.016) F(8.657) *p(0.003)*	F(5.117) *p(0.001)* F(4.011) p(0.046)	F(1.514) p(0.198) F(1.401) p(0.237)	F(2.836) *p(0.016)* F(0.239) p (0.625)
Concerned over cleanliness and behaviour	F(2.596) p(0.108) F(8.991) *p(0.003)*	F(1.370) p(0.244) F(1.900) p(0.169)	F(0.708) p(0.587) F(7.299) *p(0.007)*	F(1.559) p(0.171) F(7.136) *p(0.008)*

Notes: City level data is italicised in the second row, i.e., below aggregated data; significant statistic is in bold and is underlined for strong statistical significance if $p(0.000 – 0.003)$. Large likelihoods, i.e., $F > 5$ highlighted in grey.

Table 1 Marginal means indicating statistically differentiable perceptions across participants' backgrounds: F indicating probability and p indicating statistical significance (continued)

Issue	*Gender*	*Education*	*Age*	*Income*
	*Gender * City*	*Education * City*	*Age * City*	*Income * City*
IPT influences cleanliness in the area	F(2.705) p(0.101) F(2.380) p(0.124)	F(0.779) p(0.540) F(0.664) p(0.416)	F(1.857) p(0.117) F(9.840) *p(0.002)*	F(1.728) p(0.128) F(9.220) *p(0.003)*
Concerned over design and facilities of IPT	F(1.606) p(0.206) F(1.239) p(0.266)	F(2.549) *p(0.039)* F(0.174) p(0.677)	F(1.505) p(0.200) F(0.021) p(0.886)	F(0.472) p(0.797) F(2.989) p(0.085)
IPT infrastructure influences well-being	F(10.489) *p(0.001)* F(6.330) *p(0.012)*	F(10.550) *p(0.000)* F(0.048) p(0.827)	F(2.494) p(0.043) F(13.006) *p(0.000)*	F(2.121) p (0.063) F(*9.283*) *p(0.003)*

Notes: City level data is italicised in the second row, i.e., below aggregated data; significant statistic is in bold and is underlined for strong statistical significance if $p(0.000 – 0.003)$. Large likelihoods, i.e., $F > 5$ highlighted in grey.

Age was most likely to significantly account for differences in perspectives about concerns over IPT size and location, security/behaviour, health and safety, IPT hub as a place to socialise, cleanliness and behaviour, and IPT influence over well-being. Participants also indicated at least a moderate concern ($M = 3.42$) over air quality, with the only statistically significant differences in their perceptions associated with income. All agreed that IPT's size and location impacted health and wellbeing, and cleanliness and behaviour. Participants indicated a high level of concern ($M = 3.8$) about IPT impact on dust around the areas.

Overall, there was considerable concern over size and location of IPT infrastructure (Nairobi $M = 2.96$; Ibadan, $M = 3.27$), but with no significant differences in the perceptions across participants' backgrounds (Table 2). However, at city level, the views were likely to be different across gender, age, and income. The most statistically significant differences in perceptions were registered across age and income, on noise. Differences were registered in income in four out of eight factors (50%), followed by age in three (37.5%) and gender in two (25%). In terms of influence on perceptions, the most differences in responses were associated with education in eight factors (100%) followed by gender and income in five (62.5%) perceptions each.

Table 2 shows how gender perceptions of concern differed by city and issue; males and females having smallest difference in concerns about dust, size of IPT, and air quality, all in Ibadan. The largest difference in males and females occurred concerns about IPT influence on security/behaviour, size and location of IPT hub and air quality, all in Nairobi. Overall, more concern was registered about size of IPT and dust levels in Ibadan than in Nairobi. While males and females in Ibadan had the same level of concern, in Nairobi, females were significantly more concerned than men about the effect of IPT on noise levels.

Males in both cities indicated that IPT infrastructure exerted the most influence on noise followed by dust levels. Females in Ibadan registered IPT as having the most influence on levels of social capital followed by air quality; in Nairobi, females identified highest IPT influences on perceptions of cleanliness and health and safety. When the

marginal means of perceptions were plotted against the perceptions, notable trends in the relationships emerged: Figures 3 and 4 revealing inverse U curve relationships (concern increasing with increase in the background factors, peaking, and falling as the factors continued to increase).

Table 2 Mean values showing how some key perceptions differed by city and gender

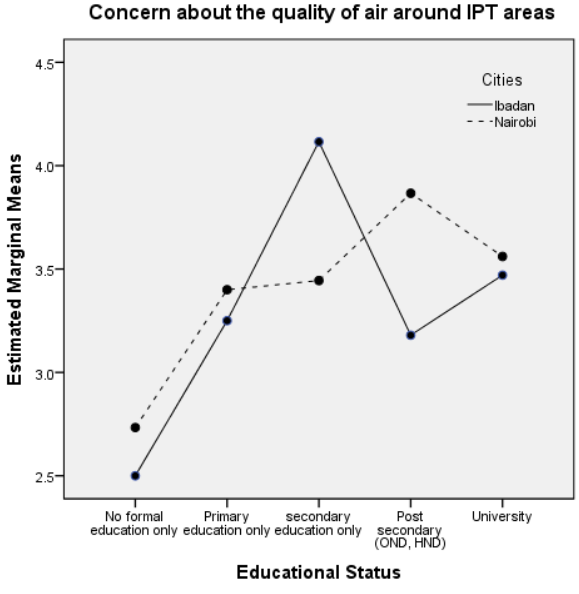
Perceptions	*City; mean; N (difference between the gender)*	*Mean*	*Std. dev.*
Concerned about air quality: $M = 3.42$	Ibadan; 3.46; 188	Male 3.52	1.383
	(0.12)	Female 3.4	1.453
	Nairobi; 3.39; 201		
	(0.22)	Male 3.33	1.659
		Female 3.55	1.174
Concerned about dust levels: $M = 3.82$	Ibadan; 3.84; 187		
	(0.01)	Male 3.84	1.307
		Female 3.85	1.342
	Nairobi; 3.81; 201		
	(0.13)	Male 3.84	0.461
		Female 3.71	0.929
Concerned about size and location of IPT hub: $M = 3.11$	Ibadan; 3.27; 188		
	(0.04)	Male 3.287	1.490
		Female 3.247	1.50
	Nairobi; 2.96; 201		
	(0.27)	Male 2.821	1.20
		Female 3.091	0.950
IPT influenced security/behaviour: $M = 3.56$	Ibadan; 3.76; 189		
	(0.143)	Male 3.692	1.141
		Female 3.835	1.141
	Nairobi; 3.51; 201		
	(0.662)[1]	Male 3.177	1.14
		Female 3.839	1.81

Note: [1]Females in Nairobi were an outlier as they registered a difference that was triple the average observed in the other data.

On IPT impact on social capital, the aggregated data exhibited strong and significant differences in perceptions across education. City level data registered high but statistically insignificant differences across age and a low difference in perceptions across education and income. Perhaps as those engaged in income-earning activities vital to their livelihoods, made more and more income, they became more accommodating of the impacts and/or under-reported their adverse perceptions, beyond certain levels. Again, an inverse relationship between perception and the participant's background was observed, following what appears to be a U curve [Figures 5(a) and 5(b)]. Starting at a high level of concern at both low income and education, which fell with increase in income and

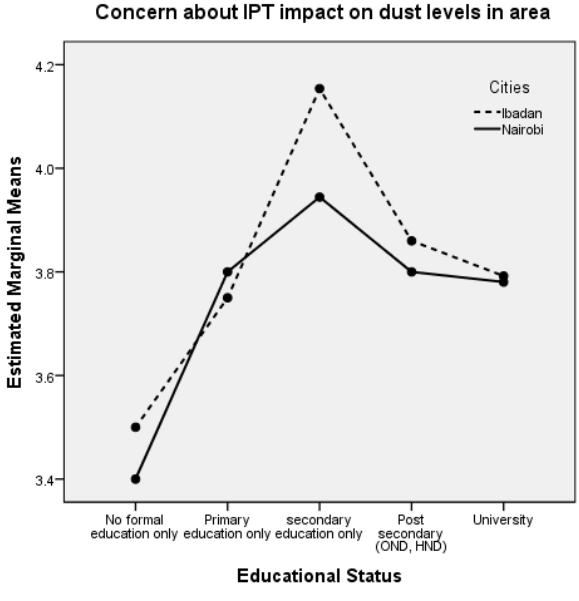
education, after which as income and education continued rising, levels of concern rose again.

Figure 3 Concern about IPT impact on air quality across age and education levels of participants



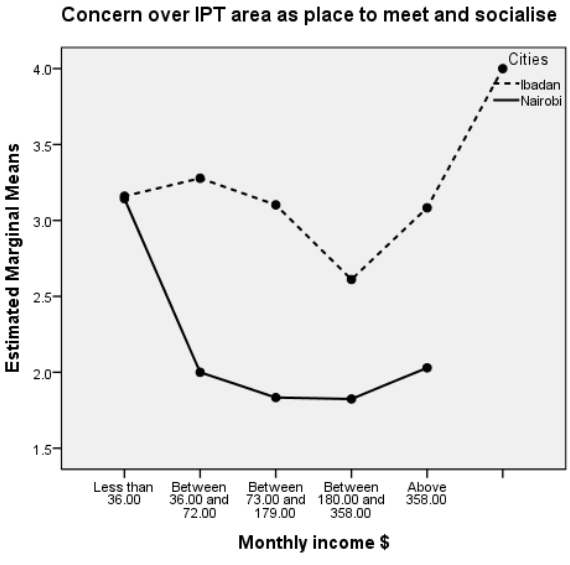
Note: The data was statistically significant.

Figure 4 Concern about IPT impact on dust and health and safety across education levels

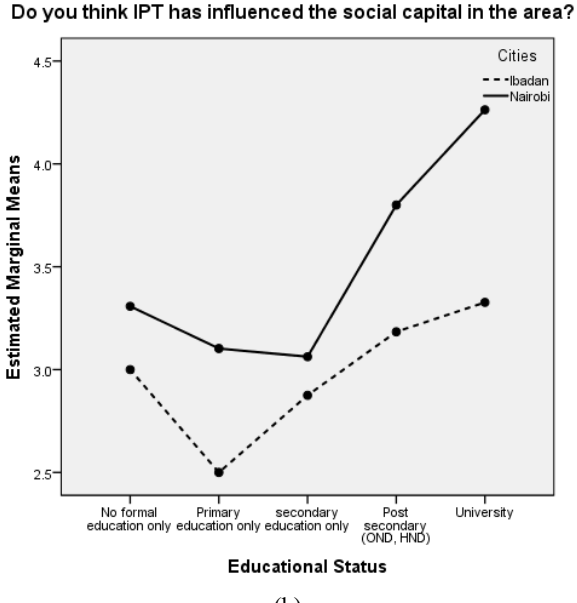


Note: The likelihood and effect by education was low in aggregated data (PES = 0.010; sig = 0.420) and at city level (PES = 0.011; sig. = 0.411).

Figure 5 (a) and (b) Concern about IPT as a place to socialise



(a)

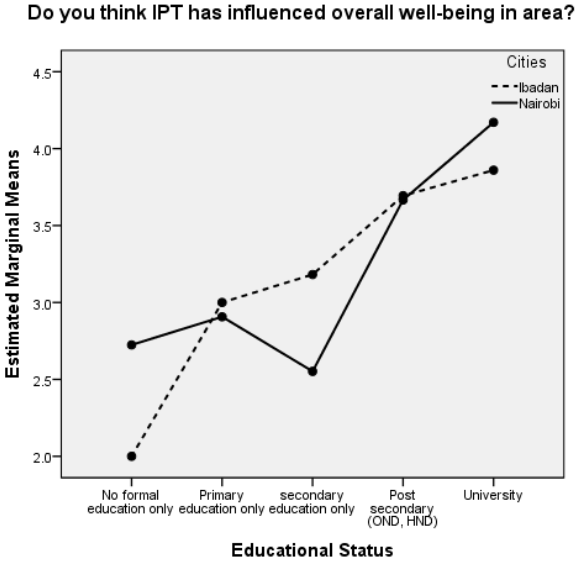


(b)

Note: The likelihood and effect by income was low and insignificant (PES = 010; sig = 0.420); likelihood and effect by education was low but significant (PES = 0.046; sig 0.002 sig.).

Yet some relationships between perception and the respondent's background factors generally exhibited a linear correlation (Figure 6).

Figure 6 Concern about IPT influence over health and wellbeing; the strong likelihood of influence from education, and the effect was significant (PES 10.550 sig; 0.000) in overall data



4.2 Factor analysis

Data from Ibadan revealed four underlying or loading factors around which the participants' perceptions clustered (Table 3). Factor loadings indicate the strength and direction of a factor on a measured variable, indicating how strongly the factor influences the measured variable. One can examine which items load highly on a factor and then determine what those items have in common to understand the meaning of the factors.

Table 3 Factor loading

Rotated factor matrix[a]				
Factors	*Factor loading*			
	1	*2*	*3*	*4*
Concerned about levels of noise	0.850			
Worried about ability to voice concerns on IPT impacts	0.850			
Concerned about levels of dust	0.539			
Concerned over cleanliness and behaviour around IPT hubs	0.483			
Think IPT hub influenced security/behaviour in the area		0.707		
Think IPT hub influenced well-being in the area		0.707		
Think IPT influenced cleanliness in the area		0.559		
Think IPT influenced health and safety in the area		0.506		

Notes: Those below 0.4 correlation are omitted.
Extraction method: principal axis factoring. Rotation method: varimax with Kaiser normalisation. [a]Rotation converged in seven iterations.

Table 3 Factor loading (continued)

Rotated factor matrix[a]				
Factors	*Factor loading*			
	1	*2*	*3*	*4*
Educational status		0.453		
Concerned about design and facilities at IPT hub		0.452		
Concerned about the health and safety issues			0.740	
Think you are unjustly and unfairly exposed to negative impacts			0.734	
Concerned about quality of air			0.511	
Concerned over IPT as place to meet and socialise				0.880
Concerned about right to decide on the presence, design, use of the IPT				0.828
Think IPT influenced social capital in the area				0.548

Notes: Those below 0.4 correlation are omitted.
Extraction method: principal axis factoring. Rotation method: varimax with Kaiser normalisation. [a]Rotation converged in seven iterations.

Table 4 Factor loading

Rotated factor matrix[a]			
Factors	*Factor loading*		
	1	*2*	*3*
Concerned about health and safety issues	0.849		
Concerned about levels of dust	0.804		
Concerned about quality of air	0.749		
Concerned about levels of noise	0.674		
Think you are unjustly and unfairly exposed to negative impacts	0.655		
Concerned over size and location of IPT hub	–0.617		
Worried about ability to voice concerns on impacts	0.617		
Concerned over cleanliness and behaviour around IPT hubs	0.577		
Think IPT has influenced the air		0.806	
Think IPT influenced the dust levels		0.745	
Your monthly income		0.583	
Think IPT has influenced noise levels		0.471	
Think IPT influenced cleanliness in the area		0.422	
Think IPT influenced well-being			0.659
Educational status			0.567
Sex			0.550
Think IPT influenced the social capital in area			0.536
Think IPT influenced security/behaviour in the area			0.481
Concerned over IPT as place to meet and socialise			0.400

Notes: Those below 0.4 correlation are omitted.
Extraction method: principal axis factoring. Rotation method: varimax with Kaiser normalisation. [a]Rotation converged in five iterations.

Data from Nairobi revealed three underlying or loading factors around which the participants' perceptions clustered (Table 4).

Tables 2 and 3 reveal a significant point: that each city in SSA may indeed have its own key clusters of underlying factors that account for the observed perceptions. For Ibadan, all the IJR elements (see Section 2) were included in the four factor loadings; while in Nairobi, only two were. While the loading factors for Ibadan had only one item from participant's background, (i.e., education), for Nairobi, three items were included (income, education status and gender), highlighting how various factors play a role across the two contexts.

5 Discussion and conclusions

The paper offers seminal knowledge that benchmarks our understanding in an area of study that has attracted little attention. The take home message is that urban planners must be aware of the sensitivities and heterogeneities in the perceptions and concerns of local communities about informality's impacts. One size does not fit all as women, men, or people with different incomes, may have different perceptions of the same issue. By highlighting how different local communities feel about informality's impacts, for example, concerns of unhealthy urban areas (see Smit et al., 2015) can be more anchored in the knowledge of urban planners, as the empirical knowledge becomes more readily available. With urban informality projected to increase in SSA (Kamete, 2018), this paper's findings could instigate further debate about what urban planners can do (see Watson and Agbola, 2013) about IPT's variously perceived impacts. This can play a key role in integrating the Africa Union Agenda 2063 (African Union Commission, 2015) diversity, subsidiarity, and inclusiveness issues, which have been a major blight in urban planning (UN, 2015).

Furthermore, the variability in the perceptions across various socio-demographic characteristics (city, gender, age, education and income) and the sixteen issues (eight each for concern and influence) including the noise level, dust level, social capital and so on, has shown the merit in the motivation of this study. This is because the findings offer two crucial implications for theory and practice in planning and policy-making of urban neighbourhoods. One, in terms of theory, that there is a graduated profile of perspectives on IPT, which can be understood according to various stakeholder characteristics, even when the issue from IPT is the same, e.g., city, gender or noise level. Two, consequently for practice, planners and policy-makers can now tap into this knowledge to formulate more targeted solutions, as they deploy the planning function to facilitate welfare, wellbeing and economic growth of all urban citizens. Further, this heightens the sensitivity required, and demonstrates the complexities faced, in addressing concerns and needs of communities who are diverse in perspectives along socio-demographic lines. Such complexity is more pronounced in environment-related problems as perceptions may differ, but the environmental impact is retained, hence the dilemma faced by planners and policy-makers.

This paper's insights can also help address some of the paradoxes of planning with/around informality (Porter, 2011), as the knowledge becomes a legitimate artefact of the planning culture. Knieling and Othengrafen (2015) theorising on the culture of planning, explained that results of planning can be traced to the multiple layers of

planning regimes and tools informed by (un)assumed and (in)explicit knowledge and views, within a society. This knowledge can also be part of Weber and Crane's (2012) planning as scholarship, where cognitive knowledge plays a key part in planning outcomes. As SSA's urban population is still below 50%, there is great potential to enhance the quality of urban environments in respect to all urban constituencies, especially those who are adversely affected by informality, yet have a lot of potential economic contribution to make (Saghir and Santoro, 2018; World Bank, 2017; De Soto, 2000).

In conclusion, this paper has explored what people who are directly affected by IPT's think of its environmental impacts on them. The research was based on data from questionnaires administered to participants from IPT hubs in Ibadan, Nigeria, and Nairobi, Kenya. Descriptive statistics and EFA were applied. From the results three key conclusions are drawn. Firstly, the IPT hubs are unanimously perceived as having negative impacts on the people and their environments. Despite the general agreement on the direction of perceptions, there were specific significant local differences mostly relating to gender, education, age, and income, as well as geography (Nairobi/Ibadan). Further, a conclusion is drawn that the differences in perceptions among stakeholders signify the importance of inclusive planning approaches in neighbourhoods to include public engagement in decisions concerning the location of IPT hubs in their neighbourhoods.

Secondly, local context matters significantly, although certain perceptions and their underlying factors mattered more in Ibadan than Nairobi, and vice versa. Education, income and gender most accounted for the differences in perceptions at the aggregated data, while gender, income and age were most relevant at city level. Finally, an inverse relationship between some perceptions and participants' backgrounds emerged; suggesting a more complex and nuanced causal relationship requiring more targeted studies to examine the psycho-socio-economic dynamics involved.

Although the aim of this paper was satisfactorily met, some methodological constraints are worth noting. The questions in the survey may have been prone to various interpretations, for example, 'of concern' could have been interpreted at different thresholds by participants. It should also be noted that the statistically significant findings relied upon in this study could be still contestable, as what is statistically significant need not necessarily be significant in real life situations. The key message is not so much what the exact correlations found in this study are, but rather the implications of the observed differences. Moreover, this study does not satisfactorily address the reasons as to the differences in the perceptions, suggesting a potentially vast area yet to be investigated. Future research could therefore explore the barriers and opportunities for urban planners to systematically address the issues highlighted in this study; and explore how the perceptions change with time. Whilst the two case studies of Ibadan and Nairobi were appropriate in gathering exploratory insight, more confirmatory studies are needed to establish generalisability across SSA urban areas.

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Notes

1 A transport hub or interchange is a place where passengers and cargo are exchanged between vehicles or between transport modes, often with formal or informal associated infrastructures.