SOCIAL INFLUENCE IN THE ADOPTION OF DIGITAL CONSUMER INNOVATIONS FOR CLIMATE CHANGE

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1. Introduction

To meet international climate change targets and develop a sustainable energy transition, economic and social transformations are urgently required across all areas of daily life. According to the UK Committee on Climate Change, two thirds of measures necessary are social and behavioural, with the single most important category being low-carbon technology adoption [1]. In recent years, digitalisation has enabled a surge of consumer innovations to emerge which challenge high-energy consumption norms and offer additional benefits, such as, support for local economies (e.g., digital food hubs), relational networks (e.g., ride-sharing), social capital (e.g., neighbourhood electricity trading) and healthy living (e.g., food-pairing apps). However, many remain trapped in small market niches [2]. With their impact limited thus far, insights are needed regarding diffusion strategies for rapid extensive adoption. To help accelerate innovations to the mass market, this paper investigates the diffusion of information through social influences for a wide range of digital consumer innovations for climate change.

2. Background and Methodology

A large body of innovation studies [3] confirm the central premise of the diffusion of innovations theory (DoI) that adoption of new technologies is heavily influenced by those around us exchanging both functional and social information [4]. We extend this evidence base in two important ways: 1) we collect and analyse comparable data on a wide range of innovations allowing us to control for variations in context when analysing social influence on innovation adoption; and 2) we focus on the emerging intersection between digital technologies, and low-carbon goods and services. In combination, these two contributions allow us to assess the importance of social influence in the diffusion of digital consumer innovations for climate change.

We conducted a large online survey with over 3000 UK respondents, purposively sampling

adopters and non-adopters of 16 innovations across four consumption domains: mobility, food, homes, and energy. Standardised blocks of questions established respondents' perceptions of innovation attributes and measured the relative importance of four mechanisms of information diffusion: word-of-mouth (WOM), electronic-WOM (eWOM), neighbourhood effects, and injunctive social norms. We distinguish adopters from high and low propensity non-adopters to capture heterogeneity. We then test differences between the two non-adopter samples using Mann Whitney U tests (with effect sizes) to understand the relative importance of different social influence mechanisms on adoption propensity. Subsequently, we clustered the innovations into three groups defined by their perceived attributes and created binary logistic regressions (one for each cluster) to test linkages between specific attributes and influence mechanisms.

We then conducted surveys, interviews and focus groups to further examine three targeted case study innovations with distinct characteristics: Peer-to-peer (P2P) ride-sharing (strong requirement of trust); smart home technologies (lack of public visibility); digital food hubs (community-based). Our quantitative and qualitative analysis provides detailed insights into the moderating roles of these characteristics helping identify contexts which shape social influence and adoption.
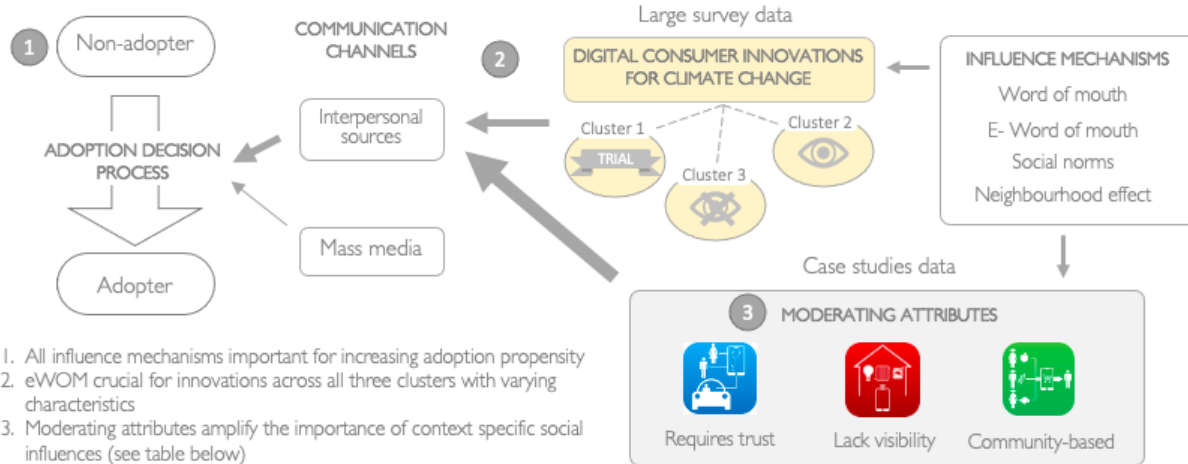
3. Results and Finding

Results from the large survey reveal all influence mechanisms are significantly important ($p<.05$) for non-adopters with high propensity compared to low propensity. Analysis of the innovation clusters (Table 1) found eWOM and social norms significantly increase the likelihood of adoption for highly trialable (cluster 1) and highly visible innovations (cluster 2), whereas only eWOM is significant for innovations with low trialability and low visibility (cluster 3).

Our in-depth case studies discovered the most important social influence mechanism and potential barriers hindering wider adoption, for each specific innovation. Figure 1 summarises the key findings from both the large survey and case study investigations.

Table 1. Binary logistic regression models predicting adoption propensity (with example innovations in each cluster)

Variables	Cluster 1 (e.g. Car clubs, 11th hour apps)		Cluster 2 (e.g. ride-sharing, home energy generation)		Cluster 3 (e.g. smart home lighting and heating)	
	Exp(B)	p-value	Exp(B)	p-value	Exp(B)	p-value
Word-of-mouth	.986	.930	1.193	.211	1.399	.292
eWord-of-mouth	2.199	**.001***	2.595	**.001***	3.782	**.001***
Social norms	1.679	**.001***	1.589	**.001***	1.520	.133
Neighbourhood effect	1.234	.159	1.169	.213	.775	.426
Pseudo R^2	0.497		0.552		0.615	
Correctly classifies % of cases	78.8%		81.9%		84.2%	

Figure 1. Summary of key findings on the importance of social influence mechanisms in the adoption of digital consumer innovations for climate change

COMMUNICATION CHANNELS

1 Non-adopter

ADOPTION DECISION PROCESS

Adopter

Interpersonal sources

Mass media

Large survey data

2 DIGITAL CONSUMER INNOVATIONS FOR CLIMATE CHANGE

Cluster 1 — TRIAL
Cluster 2
Cluster 3

INFLUENCE MECHANISMS
Word of mouth
E- Word of mouth
Social norms
Neighbourhood effect

Case studies data

3 MODERATING ATTRIBUTES

Requires trust   Lack visibility   Community-based

1. All influence mechanisms important for increasing adoption propensity
2. eWOM crucial for innovations across all three clusters with varying characteristics
3. Moderating attributes amplify the importance of context specific social influences (see table below)

Case study innovation	Social influence mechanism	Social barriers hindering adoption
P2P ride-sharing (requirement of trust)	Social norms crucial for trust. Adoption in workplace culture reduced anxieties, reassuring additional colleagues to adopt.	For one-off users, frequent accounts of social contacts perceiving them as 'crazy' indicates a lack of societal norms still exists in the wider community.
Smart home technologies (lack of visibility)	eWOM from adopters to non-adopters increases salience and encourages adoption. Adopters reported as opinion leaders and frequent users of social media.	Non-adopters found to lack exposure and social connection to adopters for first-hand knowledge.
Digital food hubs (community-based)	WOM most important for shaping opinions in communities. Adopters reported as opinion leaders persuading others to adopt.	Low propensity non-adopters rely upon eWOM to shape opinions rather than locally relevant WOM.

4. Discussions and Conclusions

Overall, we find that social influences are important determinants of adoption propensity. With our novel emphasis on a diverse set of digital consumer innovations for climate change, we find that eWOM is of most importance, highlighting the ever-increasing need for improving digital skills as well as equitable access to digital infrastructure for wider adoption of innovations. We also discover the importance of social norms, however, the current lack of norms surrounding many of the studied innovations emphasises the need for behavioural interventions which shift perceptions of social acceptability for innovation adoption. For example, our P2P ride-sharing study found that altered social norms in a workplace environment reassured employees that it is a safe, trustworthy and beneficial scheme to use.

Other findings from our case studies indicate that innovations with low visibility (e.g. smart home technology), would most benefit from strategies which create supportive infrastructures to expose non-adopters to adopters, such as, through digital social media platforms and influencers, thus increasing visibility and reaching wider audiences.

To accelerate the diffusion of digital consumer innovations for climate change, our findings highlight where generalisable insights exist for harnessing social mechanisms. We also identify where context shapes social influence factors and adoption, therefore requiring

targeted marketing and policy driven diffusion strategies to fast-track a low carbon energy transition.

References

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