



Rejection of innovations:
The discontinuance of
low carbon digital
products and services

iD**ODDLE**

The Impacts of Digitalised Daily Life on Climate Change

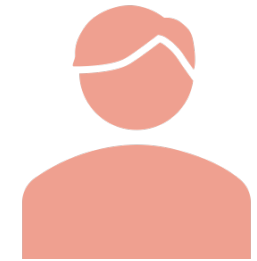


Decide, adopt... then what?

The forgotten side of innovation diffusion



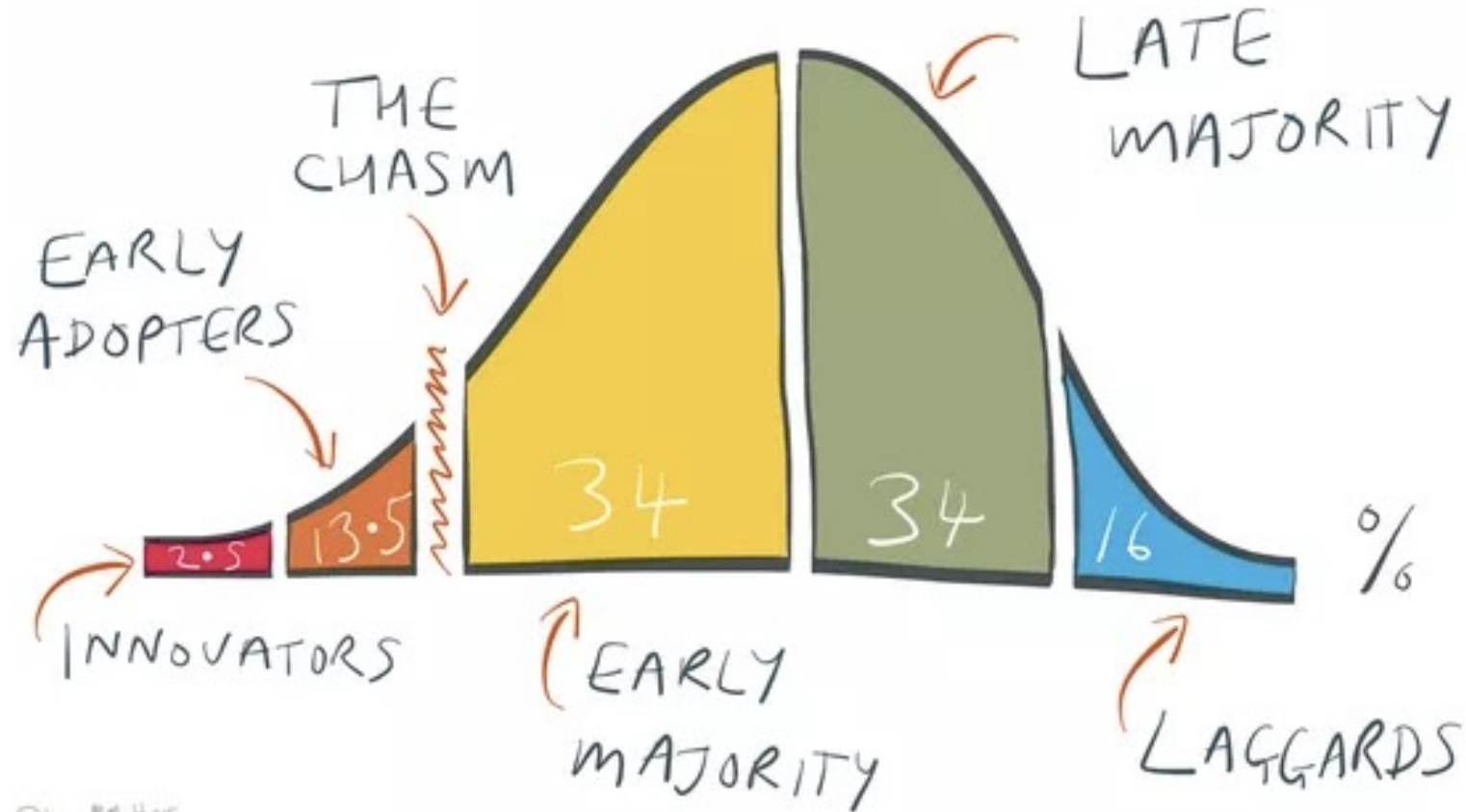
Adopter



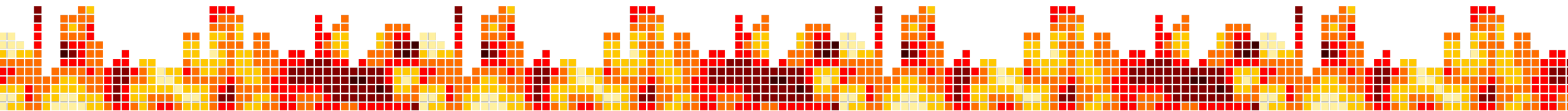
Non-adopter

Emilie Vrain, Charlie Wilson and Barnaby Andrews

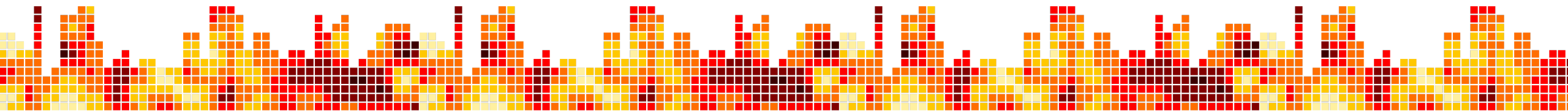
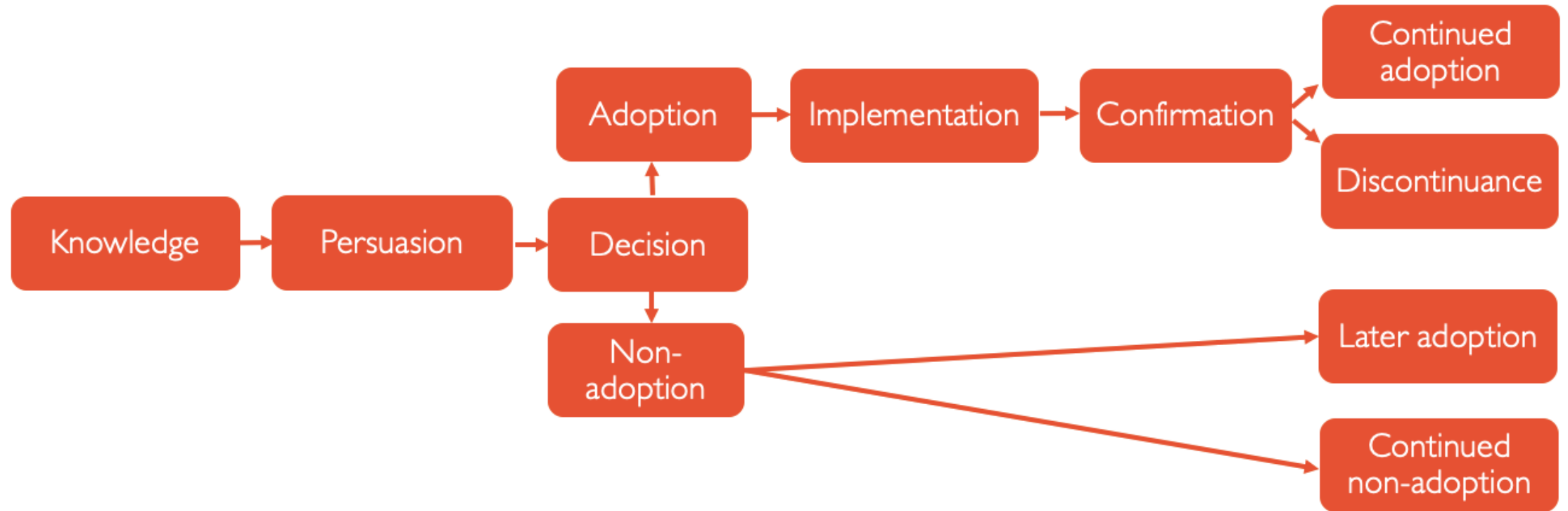
Diffusion of innovations



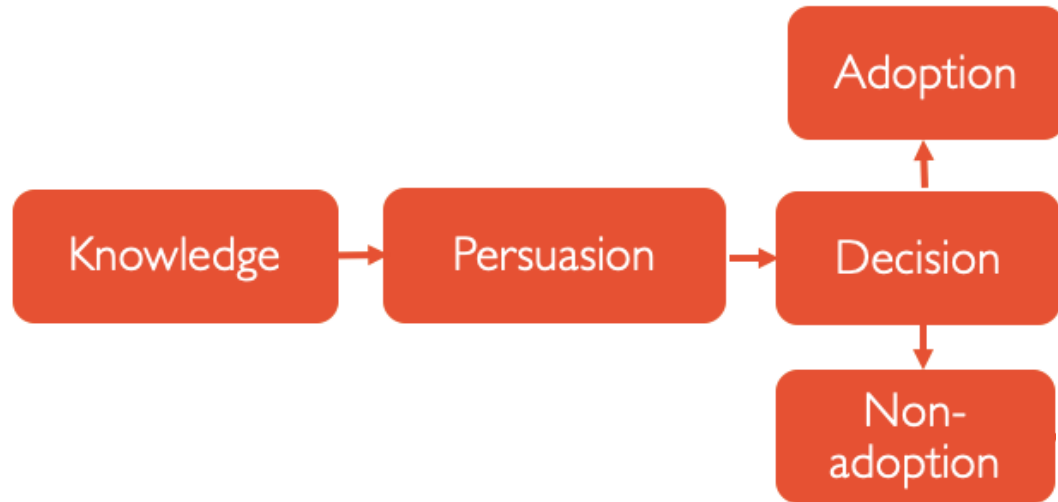
Identify a product or service which you have discontinued



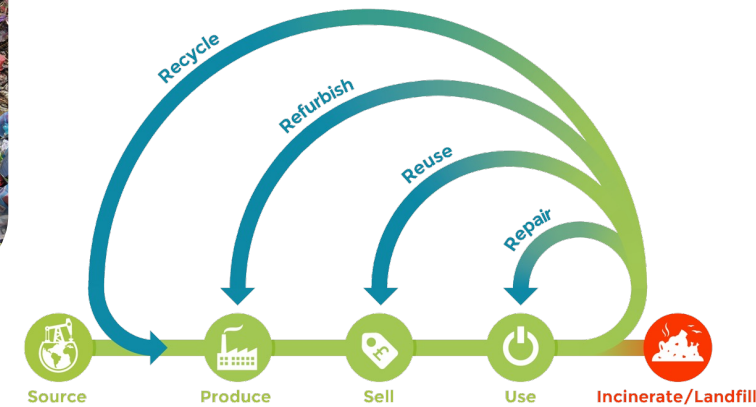
Adoption decision process



Adoption decision process

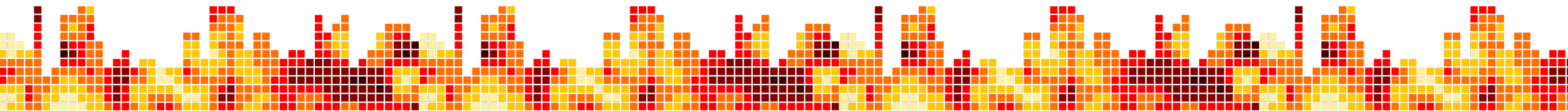


Credit: Tina Schoolmeester



Circular economy

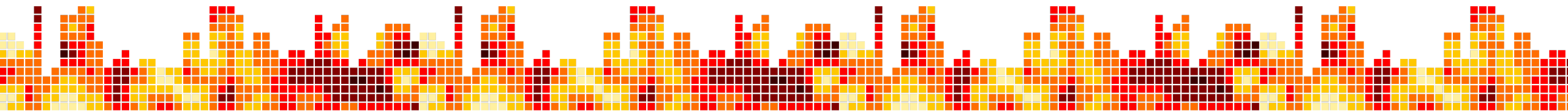
Credit: woodpeck.org



Digital era



Credit: Rainer Knäpper



Digital consumer innovations



car clubs



P2P car-sharing



ride-sharing



e-bikes



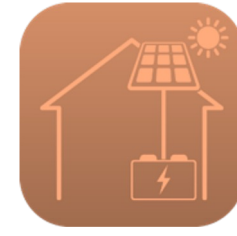
digital food hubs



smart heating



smart appliances



PV + storage



shared ride hailing



mobility-as-a-service



electric vehicles



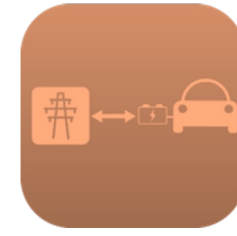
11th hour apps



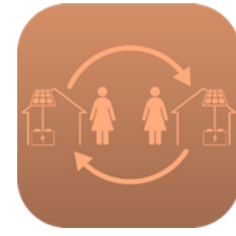
meal kits



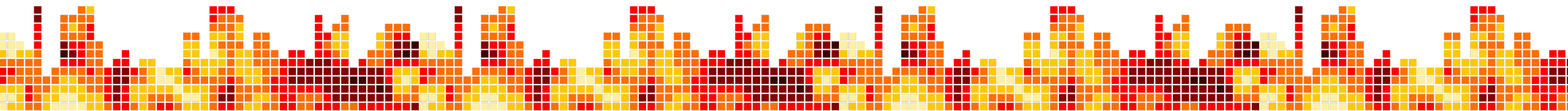
smart lighting



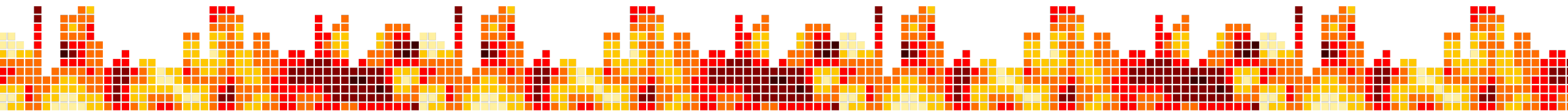
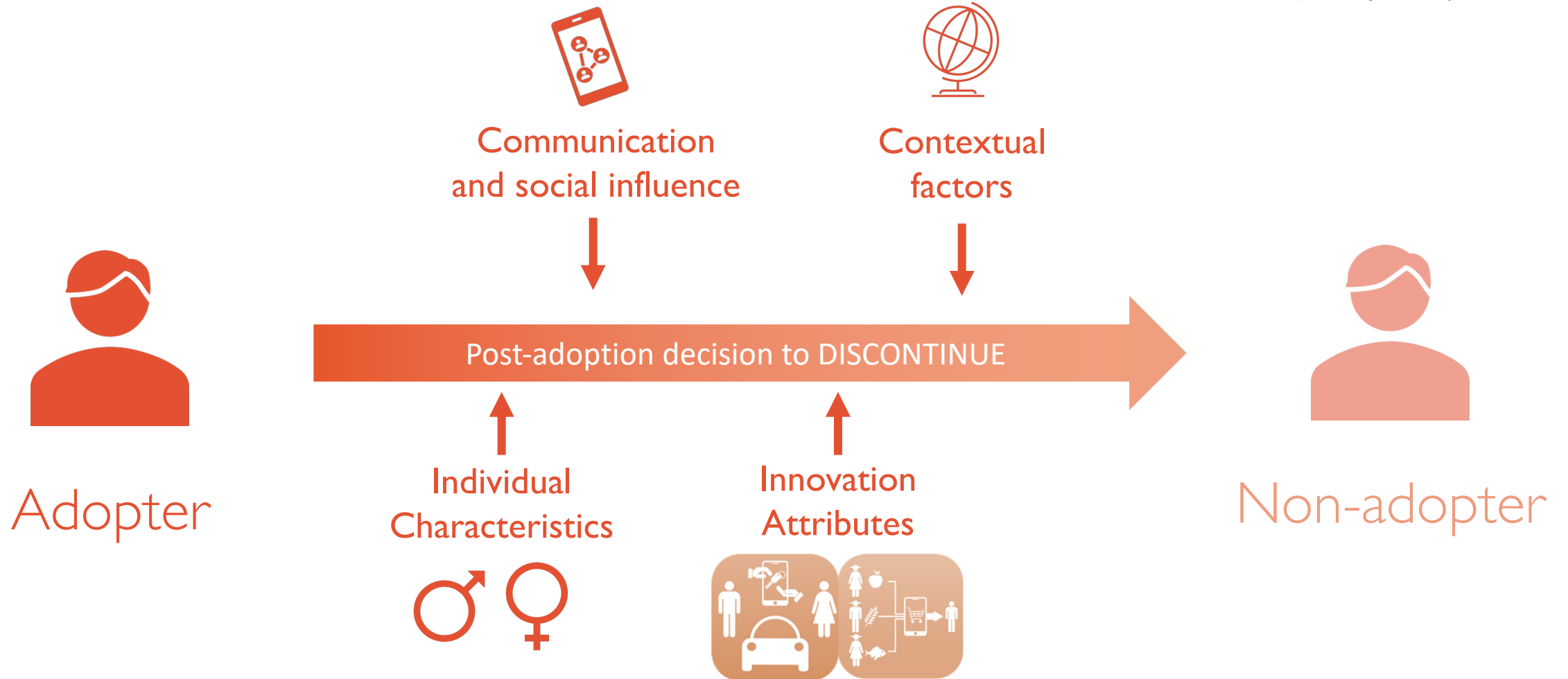
electric vehicle-to-grid



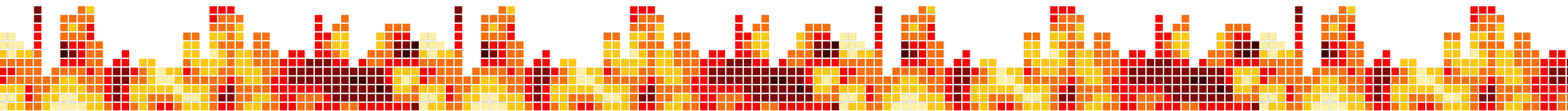
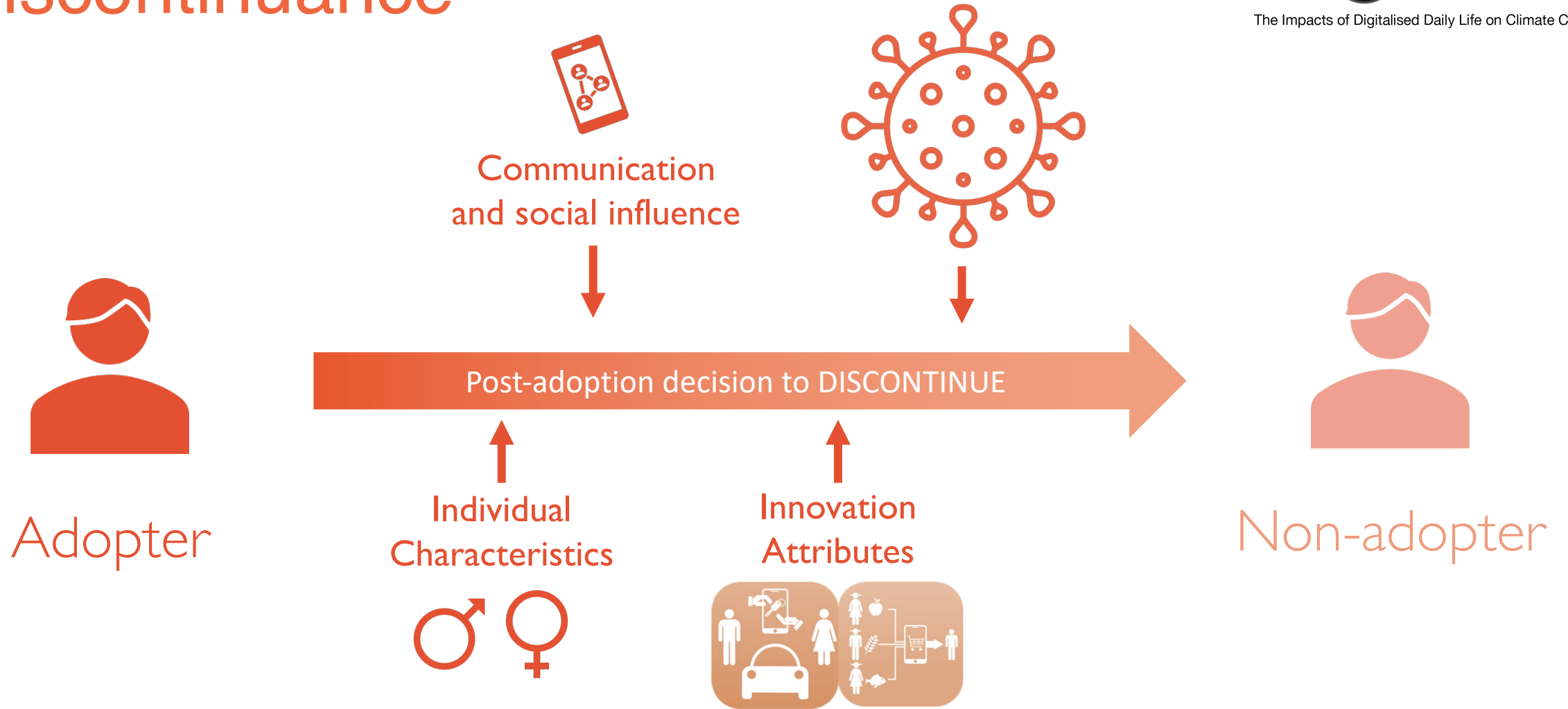
P2P electricity



Discontinuance

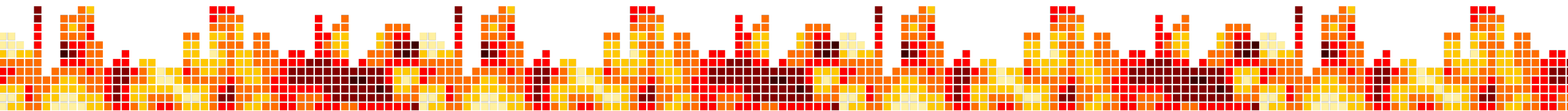
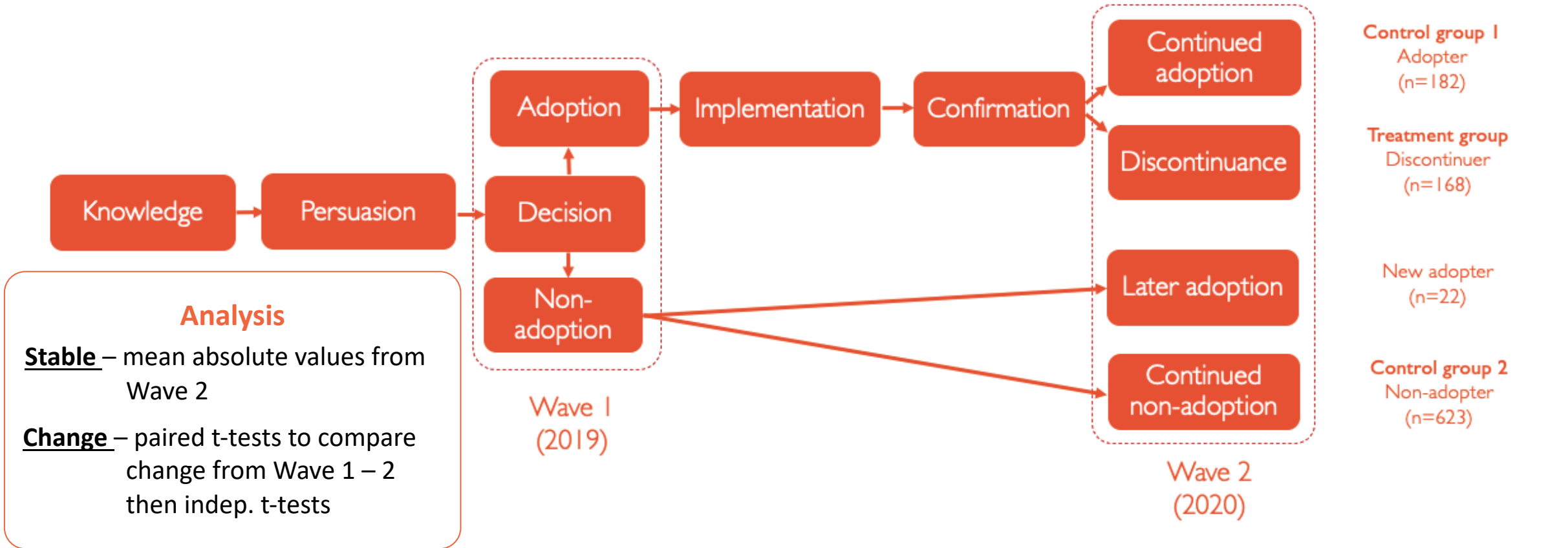


Discontinuance



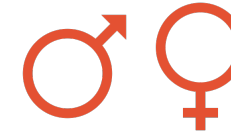
Method

Repeat measures survey n=995



Results

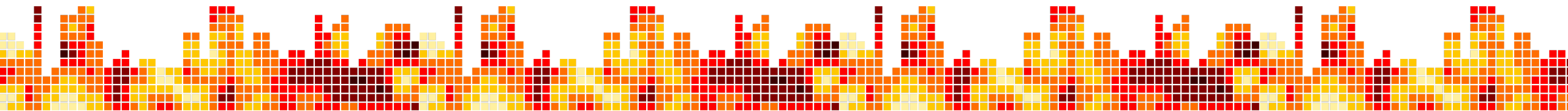
Individual characteristics



					Between group analysis	
		Discontinuers (Treatment - T)	Adopters (Control 1 – C1)	Non-adopters (Control 2 – C2)	T & C1	T & C2
Socio-demographics	Over 45 years old	66%	73%	83%		– **
	Hh income < £25k	28%	27%	39%		– **
	Employed	75%	51%	49%	+ **	+ **
	Hh with school children	25%	13%	12%	+ **	+ **
	Lives in a village or rural	23%	32%	24%	– **	
Value orientation	Openness to change	0.16	0.12	-0.11		+ **
	Self enhancement	0.13	0.06	-0.09		+ *
Activities and skills	Environmental activities	0.43	0.07	-0.06		+ *
	Technological activities	0.13	0.27	-0.22		+ **
	Digital skills	0.54	0.26	-0.27	+ **	+ **
Online social media use	Soc. med. use (n types)	2.70	2.46	1.85		+ **
	Time on soc. med.	2.80	2.81	2.52		+ **
	Time interacting on soc. med.	2.30	2.29	2.09		+ **

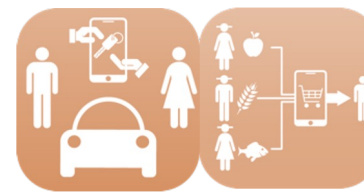
*p ≤ .05

**p ≤ .01



Results

Innovation attributes



Within group analysis - Absolute difference

	Discontinuers (T)	Adopters (C1)
Relative advantage	-0.41**	-0.02
Profitability	-0.05	0.00
Perc. behavioural control	-0.30*	-0.19*
Convenience	-0.44**	-0.01
Perceived need	-0.41**	-0.15
Choice	-0.33**	-0.08
Control	-0.31**	0.01
Compatibility practical	-0.49**	-0.06
Compatibility cognitive	-0.53**	-0.19**
Ease of use	-0.28*	-0.06
Observability	-0.08	-0.17
Trialability	-0.03	-0.05
Image	-0.32**	-0.25**
Symbolic private	-0.08	-0.12
Community	-0.06	0.07
Symbolic public 1	-0.18	-0.14
Symbolic public 2	-0.09	-0.24*
Environment	-0.11	0.06
Climate change	-0.07	0.01

Functional attributes

Symbolic attributes



Example questions:
How much do you agree with the following statements about XXX?

... Using them helps save money

... Using them is compatible with my daily life

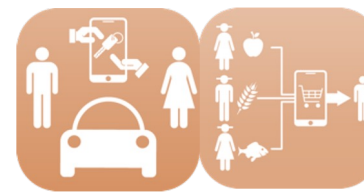
.....
..using them makes a good impression

*p ≤ .05

**p ≤ .01

Results

Innovation attributes



		Within group analysis - Absolute difference		Between group analysis
		Discontinuers (T)	Adopters (C1)	T & C1
Functional attributes	Relative advantage	-0.41**	-0.02	_**
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	Perc. behavioural control	-0.30*	-0.19*	
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Symbolic attributes	Image	-0.32**	-0.25**	
	Symbolic private	-0.08	-0.12	
	Community	-0.06	0.07	
	Symbolic public 1	-0.18	-0.14	
	Symbolic public 2	-0.09	-0.24*	
	Environment	-0.11	0.06	
	Climate change	-0.07	0.01	

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**p ≤ .01

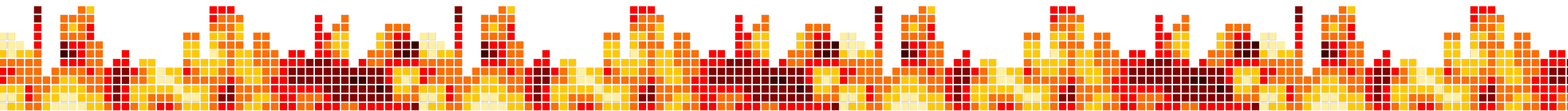
Example question:

... I hear good things about them from people I know

	Within group analysis - Absolute difference		Between group analysis
	Discontinuers (T)	Adopters (C1)	T & C1
Word of mouth (WOM)	-0.48**	0.08	_**
Electronic WOM	-0.23*	0.05	
Social norms	0.01	0.21*	
Neighbourhood effect	-0.24*	0.02	

*p ≤ .05

**p ≤ .01



Results

Contextual factors



Moving house



Family size

Personal factors

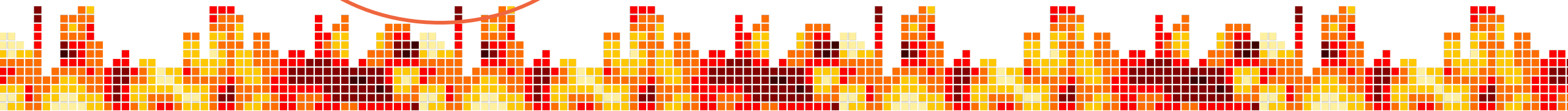
Decline of their financial situation:
Discontinuers (35%)
Adopters (24%).



Financial situation

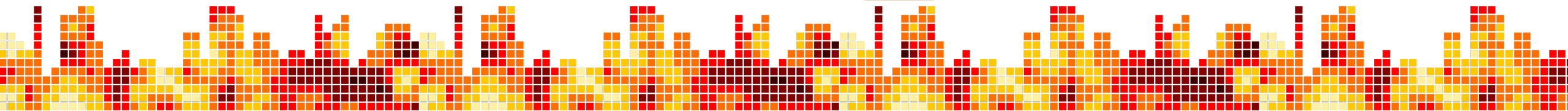
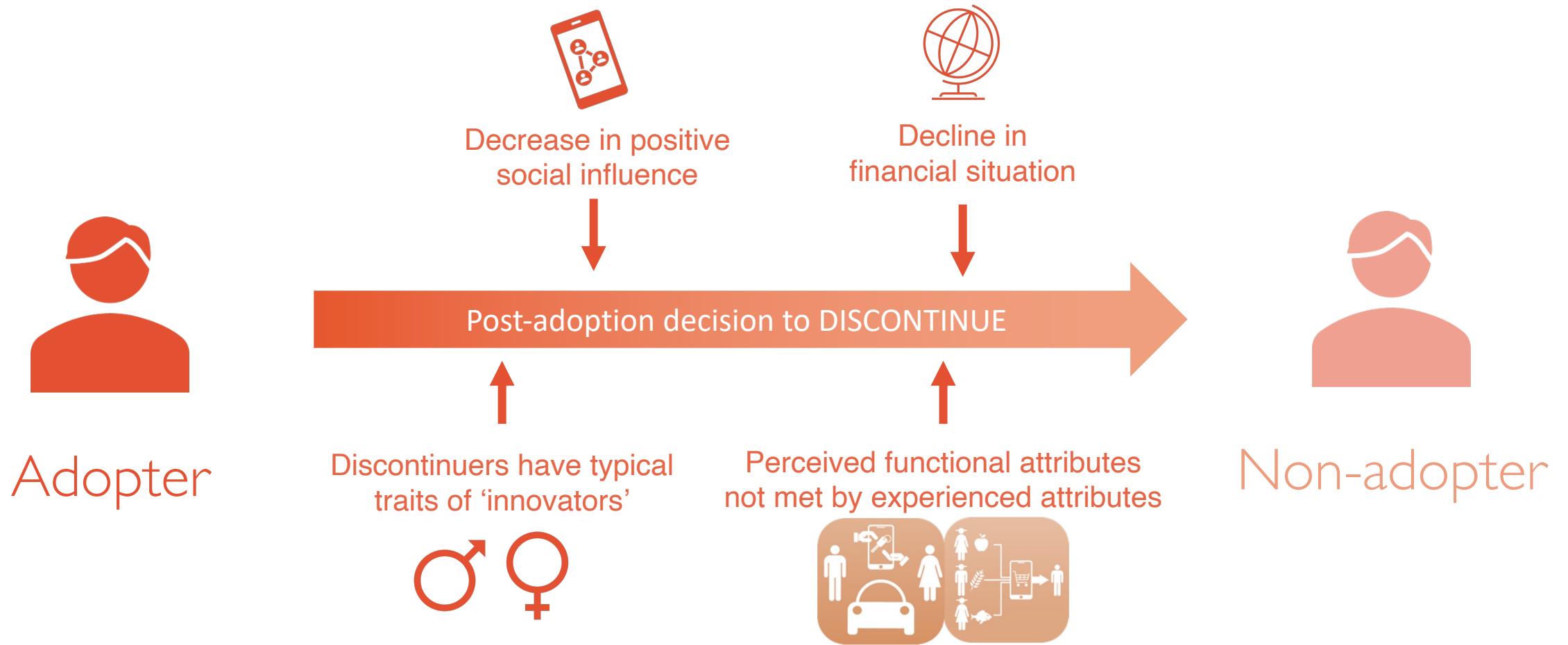


Job status





Summary



Final thoughts

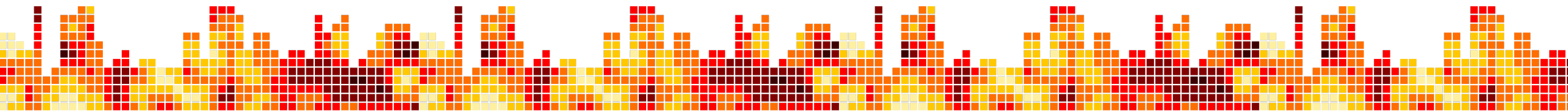
We focussed on a wide range of:

- 1) factors potentially influencing discontinuance;
- 2) digital low carbon innovations.

Valuable generalisable insights, BUT sample sizes are too small to provide robust findings for a specific innovation.

Further research

- Longer time series - temporary or permanent discontinuance?
- Test relationships between constructs using structural equation modelling as well as the indirect relationships.
- Expand our investigation and include external factors to include government regulations, incentives and other governance mechanisms



Thank you for listening

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Vrain, E., Wilson, C. and Andrews, B. (under review) The discontinuance of low carbon digital products and services

Extra slides

#	TOPIC	DESCRIPTION
1	Adoption	Current experience of 16 innovations (in the four domains)
2	Domain activity	Current behaviour in one domain (transport, food, homes, energy)
3	Domain innovativeness	Propensity to adopt innovations in one domain
4	Innovation familiarity	Familiarity with one innovation
5	Innovation attributes	Perceptions of functional and symbolic attributes of one innovation
6	Innovation information	Information-seeking and social influence on one innovation
7	Social network	Social network position and role
8	Personal characteristics	Personality, lifestyle, and values
9	Personal situation	Circumstances, living conditions, and socioeconomics

Question examples – innovation adoption

What's an example of an electric vehicle-to-grid arrangement you've used in the past?

When did you stop using electric vehicle-to-grid?

How often did you typically use electric vehicle-to-grid in the past?

Did coronavirus impact your use of electric vehicle-to-grid?

[1] no impact





[2] used it less due to coronavirus

[3] used it more due to coronavirus




[4] stopped using it completely due to coronavirus

[5] started using it due to coronavirus, but have now stopped

Results – Covid 19

<p>Transport</p> 	<p>Food</p> 	<p>Communication</p> 	<p>Social networks</p> 
<ul style="list-style-type: none"> • 67% used their cars less (all) • 25% stopped their use of public transport (domain n=594) • 9% started using bikes/e-bikes or walking (domain n=594) 	<ul style="list-style-type: none"> • 32% shopping less at supermarkets (all) • 24% increased their frequency of food delivery • 35% increased the number of meals prepared from scratch at home. 	<ul style="list-style-type: none"> • 15% used smartphone apps more (all) • 27% increased the amount of time spent on social media (all) • 25% increased the amount of time spent interacting on social media with others (all) 	<ul style="list-style-type: none"> • 54% interacted with a smaller number of both close friends and other social contacts (all) • 55% interacted less often with both close friends and other social contacts (all).

Results – Covid 19

<p>Transport innovations</p> 	<p>Food innovations</p> 	<p>Home innovations</p> 
<ul style="list-style-type: none"> • Shared transport platforms most negatively impacted e.g. 33% of ride sharing adopters (n=21) and 58% of shared taxi adopters (n = 24) stopped using the innovation • 17-35% had a more negative opinion of shared transport platforms • 12-26% would be much less likely to use them in the next year. 	<ul style="list-style-type: none"> • All three food innovations experienced an increase in use e.g., 27% used meal kits more (n=75) • Unchanged opinions and intentions 	<ul style="list-style-type: none"> • All smart home technologies were used more e.g., 27% used smart heating more (n=144) • Unchanged opinions and intentions