The impact of product failure on innovation diffusion: The example of the cargo bike as alternative vehicle for urban transport

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THEORY

This study explores the technological perspective of product adoption by enhancing the process of innovation diffusion picking up the case of product failure of electronic cargo bicycles.

Empirical case examination

- Business owners testing electric cargo bike prototypes for commercial urban transport
- technical deficit detection
- crucial impacts on vehicle usability
- benefits ascribed to vehicle not viable

Key Objectives

Identifying the
- importance of innovation performance
- influences of technical deficit reports on the adoption decision and industry performance
- importance of early adopters as gatekeepers and diffusion leverage potentials
- adoption and rejection factor impacts

EVALUATION SCHEME

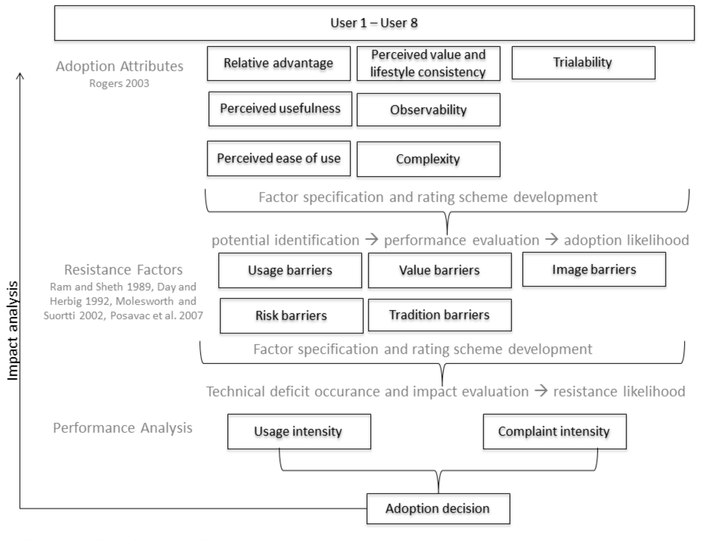

Fig. 1: Herne Cargo Bike Project Evaluation

- Potential estimation: applicability rating of 22 previously defined adoption attributes to identify user specific adoption attractiveness (based on the *Attributes of Innovation* [1] classification)
- Prototype potential: actual applicability of the adoption attributes compared to the estimated potential
- Resistance likelihood: user specific applicability of 15 resistance factors [2; 3;4;5;6] based on technical deficit impact reports

DATA & RESULTS

	User information		Adoption potential			Usage intensity	Claim intensity	Adoption decision	Major impact factors	Résumé
User	Profession	Usage intention	Potential estimation	Prototype potential	Resistance likelihood	km/km total	Claim/claim total	General willingness	Issues reported	Overall user feedback
1	Grocery	customer rental and delivery service	73%	38%	62%	1%	2%	0%	safety issues, insurance issues	Quit after 2 month due to insurance issues – business model was not applicable
2	Carpenter	construction site visits, repair service	86%	74%	15%	17%	28%	100%	process inefficiency (time loss due to technical deficit), low quality	Adopted cargo bike but is looking for another model
3	Pharmacy	delivery service	86%	37%	23%	4%	0%	0%	complexity, safety issues, process inefficiency	Employees didn`t want to use the bike, usefulness not given
4	Shopping mall	sharing system	77%	53%	54%	1%	11%	50%	complexity, safety issues , process inefficiency	No vehicle usage , high advertisement benefits
5	Electrician	construction Site visits, repair service	82%	44%	69%	10%	14%	100%	safety issues	Adopted cargo bike after all safety issues were solved - useful complementary vehicle, adoption mainly based on low prototype purchase price
6	Electronic devices retail	customer service	82%	83%	38%	49%	26%	100%	safety issues, high purchase price, further investments, low quality	After all technical deficits were eliminated, the user completely substituted his car and wants to act as neighborhood role model, already convinced other users to buy a cargo bike
7	Florist	delivery service / gardening service	86%	58%	69%	15%	12%	50%	limited transport capacities, complexity	Prototype was not suitable, substituted cargo bike by normal bike during the repair period - wants to purchase different model
8	Bio grocery	delivery service	82%	61%	62%	3%	6%	50%	limited transport capacities	User tested vehicle after deficit adjustments, prototype was not suitable for the business idea, purchasing another model may be an option

Table 1: User data evaluation (6 month test period report)

MAJOR FINDINGS

- Identification of the decisive impact factors and the proven acceptance once the barriers were overcome
- Poor product quality and technical deficits related to purchase price and future investments lead to total rejection of the specific cargo bike model
- Adopters are critical users that are ambitious to support product refinement: high prototype potential, low adoption resistance likelihood, high claim intensity, high usage intensity
- Rejecters are likely to be indifferent: low prototype potential, high/medium resistance likelihood, low claim intensity, low usage intensity
- Prototype adoption decision mainly based on low purchase price (90% discount on list price)
- “Heavy User” adopters want to act as role models that share their experience
- All users stated that the impacts of technical deficits should be considered by the industry, network enforcement would be highly appreciated

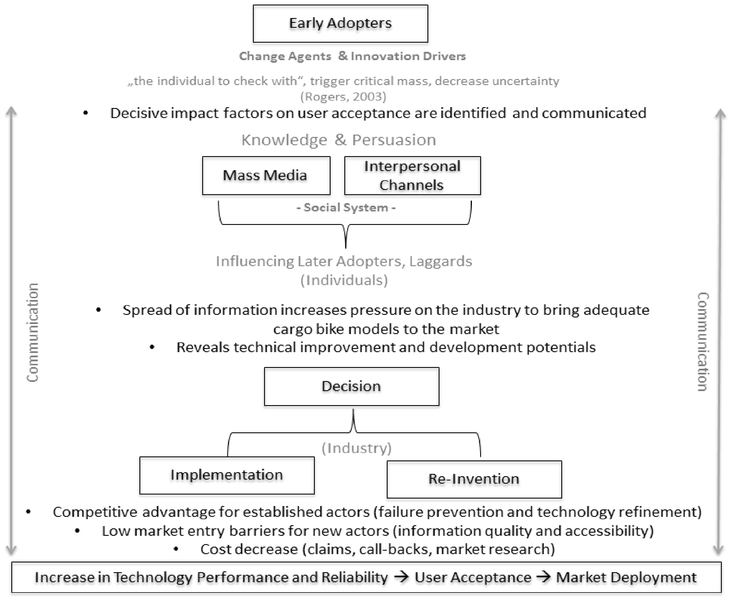

Fig.2 Role of early adopters in cargo bike technology diffusion and market deployment

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