

BIOTEXFUTURE

ACCEPTANCE AND COMMUNICATION OF BIO-BASED TEXTILES

SUMMARIZING 40+ SURVEYS AND EXPERIMENTS

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TRANSITIONLAB, TP C: THE TEAM OF THE BAYREUTH WORKSTREAM

A PROJECT WITHIN BIOTEXFUTURE



TRANSITIONLAB → TP C (THE BAYREUTH WORKSTREAM)

WHY? Tackle the societal challenges for the transformation of the textile industry

HOW? Create knowledge about

- **success factors** as well as
- **ethical, legal and social implications (ELSI)** of this transformation

Success factors of bio-based textile product innovations

Acceptance and communication of bio-based textile product innovations (work in progress)

Communication guideline (work in progress)



CONTENTS OF THIS INSIGHTS SESSION

- 1 The Idea: A Communication Guideline Based on the SHIFT Framework
- 2 Overview on Papers & Insights Sessions Dealing with Acceptance & Communication
- 3 Overview on Selected Studies & Results Dealing with Acceptance & Communication
- 4 Three Selected Studies
- 5 Filling the Communication Guideline (Work in progress)
- 6 Answering the Research Questions (Work in progress)



THE STARTING POINT: UP TO NOW A LARGE KNOWLEDGE BASE

AMONG OTHERS MANY STUDIES WITHIN FOUR MAJOR RESEARCH PROJECTS SINCE 2020

- **BT1** (2019/20): 40 master students in 13 teams; e.g., 3 Kano surveys; presentation in Herzogenaurach
 - **How can we distinguish successful from less successful developments?**
 - **How do consumers rate bio-based** in textiles and sporting goods?
 - **Are consumers willing to pay a possibly higher product price** for sustainable products and processes?
- **BT2** (2020/21): 35 master students in 10 teams; target segments: representative (panels), pupils+students, football clubs
 - What do consumers understand by bio-based? **What expectations and, above all, fears are associated?**
 - **How can you motivate consumers to buy more bio-based textiles?**
 - **How could the return of bio-based and other textiles be promoted** (circular economy)?
- **BT3** (2021/22): 30 master students in 10 teams; focus: “purchases” instead of “attitudes/buying intentions”
 - **What motivates and inhibits consumers to buy bio-based products?**
 - **How much derating would be acceptable?** How should this be communicated?
- **BT4** (2022/23): 9 master students in 2 teams; specific: other branches and offers (automotive, home textile, tech textile)
 - **How should New Cotton products be communicated** in an online shop to attract Generation Z?
 - **What motivates and inhibits automotive customers to buy pomace-based leather?**
- **Many more studies on acceptance & communication of bio-based** within **BT** but also **Adidas, RWTH, FAU, DUE, HD**
- Problem: **Results/recommendations** depend on the offer, the target segment, the focus (attitude or purchase), the media.

**1 THE IDEA:
A COMMUNICATION GUIDELINE
BASED ON THE SHIFT FRAMEWORK**

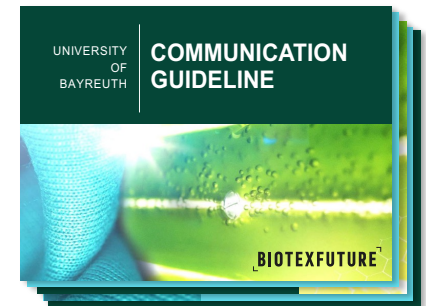
COMMUNICATION GUIDELINE BASED ON THE SHIFT FRAMEWORK

THE IDEA: CONDUCTING STUDIES TO ANSWER RESEARCH QUESTIONS AND FILL A GUIDELINE

- **Research questions with respect to communication strategies were defined by the BIOTEXFUTURE STO.**
 - Which communication strategies and terms are currently used and successful? Why?
 - What and how do we need to communicate to achieve a wider understanding of consumers? What level of complexity is appropriate and how to achieve this in communication?
 - How do consumers perceive different sustainability concepts? What are their preferences?
 - What do they believe to know? What do they need to know?

- **The (famous) SHIFT framework helps to change behavior in a sustainable direction** (White et al. 2019).
 - „Consumer behavior can be SHIFTEd to be more sustainable by addressing the following five drivers / psychological factors“ (White et al. 2019, based on an extensive literature review):
 - **Social influence** (norms, identities),
 - **Habit formation** (making it easy, prompt, feedback, penalties, incentives),
 - the **Individual self** (self-consistency, -interest, -efficacy),
 - **Feelings and cognition** (positive/negative emotions, information, labeling, framing),
 - **Tangibility** (communicating local and proximal impacts, concrete communication).

- **Market research is needed to „fill“ the framework and identify best context-specific communication strategies.**



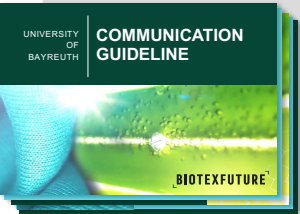
COMMUNICATION GUIDELINE BASED ON THE SHIFT FRAMEWORK

THE IDEA: CONDUCTING STUDIES TO ANSWER RESEARCH QUESTIONS AND FILL A GUIDELINE

Drivers

Research questions

	S Social Influence	H Habit Formation	I The Individual Self	F Feelings & Cognition	T Tangibility
Drivers	<ul style="list-style-type: none"> ▪ Social norms ▪ Social identities ▪ Social desirability 	<ul style="list-style-type: none"> ▪ Discontinuity to change bad habits ▪ Implementation intentions ▪ Making it easy, Prompts ▪ Feedback, Penalties ▪ Incentives 	<ul style="list-style-type: none"> ▪ The self-concept ▪ Self-consistency ▪ Self-interest ▪ Self-efficacy ▪ Individual differences 	<ul style="list-style-type: none"> ▪ Negative emotions ▪ Positive emotions ▪ Information, learning, and knowledge ▪ Eco-labeling ▪ Framing 	<ul style="list-style-type: none"> ▪ Matching temporal focus ▪ Communicate local and proximal impacts ▪ Concrete communications ▪ Encourage the desire for intangibles
Research questions		<ul style="list-style-type: none"> ✓ How do consumers perceive different sustainability concepts? What are their preferences? ✓ What is a consumer's motivation to buy a (sustainable) product? ✓ How does consumers' willingness to pay change for different sustainability concepts (e.g. bio-based)? ✓ Which factors influence the attitude behavior gap? 	<ul style="list-style-type: none"> ✓ Which factors influence the attitude behavior gap? ✓ How can/must we inform the consumer to use a product in a sustainable manner? 	<ul style="list-style-type: none"> ✓ What do consumers believe to know? What do they need to know? ✓ What do consumers know about consequences of processes, feedstocks, materials, usage, and different sustainab. concepts? ✓ Which communication strategies and terms are currently used and successful? Why? ✓ How can/must we inform the consumer to use a product in a sustainable manner? 	<ul style="list-style-type: none"> ✓ Which factors influence the attitude behavior gap? ✓ Which communication strategies and terms are currently used and successful? Why? ✓ How can/must we inform the consumer to use a product in a sustainable manner?



**2 OVERVIEW ON PAPERS & INSIGHTS
SESSIONS DEALING WITH
ACCEPTANCE & COMMUNICATION**

- **Brand, B.; Rausch, T. (2021):** Examining Sustainability Surcharges for Outdoor Apparel Using Adaptive Choice-Based Conjoint Analysis. In: Journal of Cleaner Production, Vol. 289.
- **Brand, B.; Rausch, T.; Brandel, J. (2022):** The Importance of Sustainability Aspects When Purchasing Online : Comparing Generation X and Generation Z. In: Sustainability. Vol. 14, No. 9.
- **Brand, B.; Kopplin, C. (2023):** Effective Return Prevention Measures in the Post-purchase Stage : A Best-Worst Scaling Approach, In: Marketing : ZFP Vol. 45, No. 1, pp. 30-47.
- **Kopplin, C.; Rösch, S. (2021):** Equifinal Causes of Sustainable Clothing Purchase Behavior: An fsQCA Analysis Among Generation Y. In: Journal of Retailing and Consumer Services, Vol. 63.
- **Kullak, F.; Baier, D.; Woratschek, H. (2023):** How Do Customers Meet Their Needs in In-store and Online Fashion Shopping? A Comparative Study Based on Jobs-To-Be-Done Theory. In: Journal of Retailing and Consumer Services. Vol. 71.
- **Rausch, T.; Baier, D.; Wening, S. (2021):** Does Sustainability Really Matter to Consumers? Assessing the Importance of Online Shop and Apparel Product Attributes. In: Journal of Retailing and Consumer Services Vol. 63.
- **Rausch, T.; Kopplin, C. (2021):** Bridge the Gap: Consumers' Purchase Intention and Behavior Regarding Sustainable Clothing. In: Journal of Cleaner Production, Vol. 278.
- **Rese, A.; Baier, D.; Rausch, T. (2021):** Success Factors in Sustainable Textile Product Innovation: An Empirical Investigation. In: Journal of Cleaner Production, Vol. 331.
- **Schreiner, T.; Baier, D. (2022):** Consumer Preferences for Marketing Actions with Consumer Self-Benefits Versus Other-Benefit Components. In: Journal of Marketing Management, Vol. 37, No. 17-18.

- **IS2021#1** (Adidas, 02/2021): **Consumer Perceptions of Bio-based Products** – Review of 16 papers
- **IS2021#2** (BT, 07/2021): **Consumer Perceptions of Bio-based Garments** – 5 quantitative studies
- **IS2021#3** (BT, 10/2021): **Success Factors in Sustainable Textile Innovations** – Comparisons (n=176)

- **IS2022#1** (Adidas/Akin, 03/2022): **Cultural Expectations on Bio-based Materials** – Qualitative study
- **IS2022#2** (BT, 04/2022): **Communication Strategies for Bio-based Products** – 6 online experiments
- **IS2022#3** (Adidas/FSI, 05/2022): **Consumer Perceptions of Bio-based Textiles** – Quantitative study
- **IS2022#4** (DUE, 06/2022): **Understanding Bioeconomy on Twitter** – Social media analysis
- **IS2022#6** (FAU, 09/2022): **All Eyes on Algae: What We Know so Far** – 3 quantitative studies
- **IS2022#7** (DUE, 10/2022): **Stakeholder Groups and Key Actors of the Bioeconomy** - Social Media Analysis
- **IS2022#8** (FAU/Symanto, 11/2022): **Consumer Insights on Bio-based Products** – Social media analysis
- **IS2022#9** (RWTH, 12/2022): **Expert Perspectives on Bottlenecks and Barriers to a Bio-Based Future**
- **IS2022#10** (FAU/Adidas, 12/2022) **Are Algae our Future?** – Focus Groups in Berlin and Herzogenaurach

- **IS2023#2** (BT, 02/2023): **How to Successfully Communicate Sustainability Information?** – Lab Experim.
- **IS2023#4** (DUE/P, 05/2023): **Comparing Markets: Communication on Twitter** – Social Media Analysis
- **IS2023#5** (BT, 06/2023): **Acceptance and Communication of Bio-based Textiles** – Summary

3 OVERVIEW ON SELECTED STUDIES & RESULTS DEALING WITH ACCEPTANCE & COMMUNICATION

OVERVIEW ON SELECTED SELECTED STUDIES & RESULTS

WORKSTREAM UNIVERSITY OF BAYREUTH SINCE 2020

Study	Research question	Sample	Method (Dissemination)	Selected results
BT1-2abd, -2ce, Rese et al.(2021)	How can we distinguish successful from less successful textiles, make processes successful (success factor analysis)?	n=176 sustain-able textile innovations	Categorization of more than 2,000 articles/studies/press releases	Fulfillment of cus. expectations, of laws and regulations, green creativity, knowledge on factors that drive buying are decisive.
BT1- 4abc, Baier et al. (2020)	Which sustainability aspects (e.g. materials, end-of-life) are must-be, attractive, one-dimensional?	n=440 young academics, students	Kano with 17 sustainability aspects	Redemption, boni, trafiic lights, recycable, bio-degradable, specific category most attractive.
BT2-1a	What do consumers know and feel about bio-based? A comparison of algae, cellulose, polyester, recycled T-shirts	n=416 young academics, students	Between subjects design: Knowledge, fit, comfort, design, quality, durability	Polyester group was worst, cellulose and recycling best; missing information is the reason why bio-based is unknown.
BT2-1b	Are Gen Y and Z different w.r.t. knowledge and expectations of bio-based textiles?	n=15 Gen Y, n=11 Gen Z	Focus groups in classrooms, grounded theory, animations	Gen Z is more positive, Gen Y assumes green washing/not recycable; story telling convinces Z.
BT2-1c	How to communicate bio-based? A comparison of aspects: recycled, new material, functionality, control (no explanation)	n=703, 16-40 ys., 70% employed	Between subjects; knowledge, expected quality, durability, comfort, p. intention	Focusing and functionality leads to highest construct ratings and purchase intentions; control group performs significantly worse.
BT2-2a	Does the use of an official versus a corporate seal enhance the purchase intention for bio-based sneakers?	n=329, 16-73 ys., 61% fe., 68% students	Between subjects design: Attitudes, purchase intention (IS2021#2)	A corporate sustainability label can enhance purchase intention for bio-based textiles; use sustainability label.
BT2-2b	Can content of influencers, descriptions, the integration of blogs enhance satisfaction, overcome the attitude-behavior gap?	n=407, 16-77 ys., 58% fe., 88% students	Kano w. 31 aspects randomly distributed among respond.s (IS2021#2)	Blogs and product descriptions addressing the benefits of bio-based have the potential to educate the mainstream consumer.

OVERVIEW ON SELECTED STUDIES & RESULTS

WORKSTREAM UNIVERSITY OF BAYREUTH SINCE 2020

Study	Research question	Sample	Method, Dissemination	Selected results
BT2-2c	Which factors influence the purchase intention for biopolymer-based textiles?	n=25, 15-20 ys., 48% fe., BT, He., Schw.	4 online focus groups, each with 5-7 pupils, 2 with / without sus. Knowledge	Website is main info channel, sus. Influencer are preferred for awareness of bio-based (Insta, FB, YouTube, Twitch, Twitter).
BT2-3a	Which factors influence the purchase intention for biopolymer-based textiles?	n=441, 16-39 ys., 50% fe., online panel	Regression: Purchase intention vs. knowledge, rep. (IS2021#2)	For bio-based textiles, no 'brand advantage'; if the price is not too high, the main purchase barrier is lack of knowledge.
BT2-4a	Which incentive and channel does consumers motivate the most to return their used garments in order to enable circular models?	n=372, 11-65 ys., 58% fe., social media	MaxDiff to rank 10 return policy aspects and 10 chan. (IS2021#2)	When product descriptions about environmental facts are lacking, consumers are dissatisfied: incentives are needed
BT2-4b	Which incentive enhances customer satisfaction the most for the return of used garments to enable a circular bus. model?	n=390, 16-55 ys., 62% fe., social media	MaxDiff to rank 15 return policy aspects	Free sending back plus 10 Euro is most preferred return policy, but similar policies are also acceptable (stores, 5 Euro).
BT2-4c	Which incentive enhances satisfaction the most for the return of used garments in order to enable a circular business model?	n=156, 15-58 ys., 40% fe., sports clubs	Kano with 11 return policy aspects (vouchers, charity) (IS2021#2)	A very promising incentive for consumers to return used clothing is when brands donate to charity: effective incentives needed.
BT3-1	Have positioning and communication type of sustainability aspects an influence on purchases of biopolymer-based sneakers?	n=120, 19-31 ys., 56% fe., students in D	Between subjects design, purchases in a sim. online shop (IS2022#2)	When sustainability aspects are communicated emotionally, purchases of bio-based sneakers increase.
BT3-2	Has mentioning reduced CO ₂ an influence on biopolymer-based sneaker purchases?	n=213, 18-30 ys., 60% fe., students in D	Between subjects design, Discrete Choice Experiments (IS2022#2)	Material (bio-based vs. conventional) and CO ₂ reduction is of importance.

OVERVIEW ON SELECTED SELECTED STUDIES & RESULTS

WORKSTREAM UNIVERSITY OF BAYREUTH SINCE 2020

Study	Research question	Sample	Method, Dissemination	Selected results
BT3-3	Has mentioning reduced textile waste a higher influence on bio-based purchases than mentioning reduced CO ₂ footprint?	n=604, 18-35 ys., 49% fe., online panel	Between subjects design, Discrete Choice Experiments (IS2022#2)	Sustainability aspects that refer to what consumers feel responsible for (e.g. end-of-life) out-shine manufacturing aspects.
BT3-4	Has mentioning water consumption an influence on bio-based purchases? Does visualization increase the influence?	n=267, 15-58 ys., 60% fe., students	Between subjects design, purchases in a sim. online shop (IS2022#2)	The better visualization (text to image to animated gif/video) of water consumption increases choices.
BT3-5	Has communication type and content of sustainability aspects an influence?	n=135, 20-25 ys., 70% fe.	Between subjects design, purchases, online shop	Emotional communication increases purchases of biopolymer-based sneakers.
BT3-7	Has mentioning reduced functionality an influence on bio-based sneaker purchases?	n=602, 18-45 ys., 51% fe., online panel	Between subjects design, Discrete Choice Experiments (IS2022#2)	The mentioning of functional disadvantages of bio-based sneakers vs. conventional sneakers decreases choices.
BT3-8	Has mentioning reduced functionality an influence on bio-based sneaker purchases? Is the reduction proportional?	n=604, 20-49 ys., 50% fe., online panel	Between subjects design, Discrete Choice Experiments (IS2022#2)	The mentioning of functional disadvantages of bio-based sneakers decreases the choices. Wording is less important.
Brand, Rausch (2021)	Is there a price increase for outdoor jackets with bio-based materials compared to recycled or traditional materials?	n=215, 20-30 ys., blogs, social media	Discrete Choice Experiments (ACBC) (Brand, Rausch 2021)	Eco-labels, biodegradable materials, recycled materials bring higher surcharges when communicated (up to 37 Euro).
Rausch, Kopplin (2021)	Do greenwashing concerns and perceived risks explain the attitude behavior gap for sustainable textile innovations?	n=464, 15-77 ys., 70% fe., social media	Attitudes, purchase intention w.r.t. bio-based textiles (Rausch, Kopplin 2021)	Greenwashing concerns and perceived risks moderate the influence of attitude towards purchase intention.

OVERVIEW ON SELECTED SELECTED STUDIES & RESULTS

WORKSTREAM UNIVERSITY OF BAYREUTH SINCE 2020

Study	Research question	Sample	Method, Dissemination	Selected results
BT4-1	How should New Cotton hoodies be communicated in an online shop to attract Gen. Z?	n=197; Gen.Z 66% fe., 80% students;	Between subjects design (gains vs. losses, gen. vs. specific), reservation price	Promoting gains (instead of losses) increases the reservation price. However only 8% indicate reservation prices > 220€
BT4-2	What motivates and inhibits automotive customers to buy pomace-based leather?	8 car sellers; n=256; 40% students	Structural equation model (PLS) based on TRA, attitude & purchase intention	Hedonic aspects and environmental awareness lead to (low) purchase intentions. The car sellers don't promote the vegane option.
Rausch et al. (2021)	Does sustainability really matter to consumers? Which product and online shop features increase sales?	n=4,350 frequent online shop visitors	Best-Worst-Scaling of product and online shop features (IS2023#5)	Durability of products is the major sustainability feature for elder customers. They honor it higher than a 20% discount.
Harnisch (2022)	Can we improve sales of bio-based T-shirts by additional hints to advantages?	n=800; online access panel; 3 age groups	Between subjects design, sim. online shop, basic vs. additional hints (IS2023#5)	Additional hints (functionality, less water and petroleum waste) increase purchases (from 36% to 51% of bought T-shirts).
Nguyen (2022)	Are circular models accepted (e.g. renting fashion instead of buying)?	n=364; 54% < 34 years, 70% female	Between subjects design, sim. online shop, variants of fashion renting v. buying	39% of the respondents accept renting on a regular basis (abo), esp. young women with income, curated boxes not preferred
Rösch (2023)	Has tonality of sustainability aspects and exposure to nature imagery an influence on buying behavior for sustainable textiles?	n=607; online access panel; 2 age groups	Between subjects design, purchases in a simulated online shop (IS2023#5)	If sufficient attention is paid to the information, the purchase of sustainable textiles increases. Drawing attention to sustainability information is elementary!
Brand (2023)	To what extend help QR-codes and AR to improve product evaluation and purchase intention of bio-based products in a shop?	n=114 resp. in a lab shop with T-shirts	Between subjects design in a laboratory with access to real T-shirts (IS2023#2)	QR-codes help (if used) to improve product evaluation (quality, durability) and purchase intention of bio-based products.

OVERVIEW ON SELECTED STUDIES & RESULTS

WORKSTREAM OF TRANSITIONLAB PARTNERS

Study	Research question	Sample	Method, Dissemination	Selected results
Adidas/ AKIN	Which key functional and behavioural 'deal breakers' suit the needs and demands of potential bio-based material customers?	n=18 makers/ activists in D, US, UK, Asia	In-depth qualitative interviews (IS2022#1)	Media, culture, and also consumers lack of knowledge and curiosity about bio-based materials. However, Pangaia is an excellent example to solve this problem. Be aware of destructive lobbying by the fossile industry.
Adidas/ FSI	How do consumers perceive bio-based textiles?	n=1446 (US), n=1330 (UK), n=1377 (D), n=1364 (CN)	Online survey using the pollfish panel (IS2022#3)	More than 50% perceive bio-based appealing (in D even more) for all textile types and would buy them to support the environment. However, 70% are unsure about its sustainability (biodegradable?). Barriers are manifold (price, quality, ...). US consumers expect one-at-all sustainability solutions, other consumers accept step-by-step appr.
FAU	How do consumers perceive bio-based textiles made from Algae?	n=519, 17-68 years, 58% female	Between subjects desgin, perception and purchase intention items (IS2022#6)	Consumers are more likely to buy bio-based textiles than synthetic, especially consumers with green consumption values.
FAU/ Adidas	How do consumers perceive bio-based textiles made from Algae?	n=40, 8-45 years,	Series of Workshops with three stations (Associations, superpower) (IS2022#10)	Associations are positive and negative (water, color), color shifts, sunblocking, dutability are preferred superpowers
STO	Which are the major barriers for a bio-based future? Do we really need new materials?	n=9 experts from NGOs, science and companies	Expert interviews with a focus on bio-based mate- rials for textiles & greenwa- shing concerns (IS2022#9)	Cosumers need to be educated, information and knowledge is important. One should be aware of overmarketing sustainability gains.

4 THREE SELECTED STUDIES

ACCEPTANCE AND COMMUNICATION OF BIO-BASED

SAMPLE STUDY A: DOES SUSTAINABILITY REALLY MATTER TO CONSUMERS?

Research questions & surveys

n=4,350 BAUR customers were interviewed in order to understand

- which features (e.g., recyclable, bio-based) are decisive when buying fashion, shoes, or home equipment and
- how the online shop should be improved to favor the selection of sustainable products.

BAUR (www.baur.de) is a large German online shop (> 1 bill. € sales in 2022) and a part of OTTO. Customers: 80% female, 20% male, 40+ old, higher income.

Further readings:

Rausch T., Baier D., Wening S. (2021): *Does sustainability really matter to consumers?* In: *Journal of Retailing and Consumer Services*.

The screenshot shows the Baur online shop interface. At the top, there is a search bar with the text 'Lieblingsartikel suchen...' and a magnifying glass icon. To the right of the search bar are navigation icons for PAYBACK, Service & Hilfe, Mein Konto, Merktzettel, and Warenkorb. Below the navigation bar, there are category links: Weihnachten, Damen, Herren, Wäsche, Schuhe, Wohnen, Haushaltsgeräte, Technik & Freizeit, Sport, Baumarkt, and Sale. A yellow banner below the navigation bar reads 'Exklusiv für Neukunden: 20% Rabatt & 1 Jahr Gratis-Versand*'. Below the banner, there is a search result for '4 Treffer für "adidas sustainable"'. The results are displayed in a grid. The first row shows two products: 'adidas Sportswear Sneaker »ALPHA-BOOST V1 SUSTAINABLE BOOST«' and 'adidas Sportswear Sneaker »ALPHABOUNCE+ SUSTAINABLE BOUNCE LIFESTYLE LAUFSCHUH«'. The second row shows two more products: 'adidas Sportswear Sneaker »ALPHABOUNCE+ SUSTAINABLE BOUNCE LIFESTYLE«' and 'adidas Sportswear Sneaker »ALPHA-BOOST V1 SUSTAINABLE BOOST«'. Each product card includes a product image, a heart icon, the product name, the price (119,99 € for the first product, 99,99 € for the second), and a list of features. The features for the first product are: 'Ein auffälliger, ultrabequemer Schuh mit recycelten Materialien', 'Individuell gewebtes Obermaterial aus Mesh', 'Gummiußensohle', 'Adiprene+ Dämpfung', and 'Schnürsenkel'. The features for the second product are: 'Ein vielseitiger Schuh mit federnder Dämpfung und recycelten Materialien', 'Obermaterial aus Mesh', 'Adiwear Außensohle', 'Textiltfutter', and 'Schnürsenkel'. On the left side of the search results, there is a sidebar with filters for 'Größe', 'Preis', 'Ansicht wechseln', 'Mehr Informationen', '72 Artikel pro Seite', and 'Sortieren'. Below the sidebar, there are category counts: 'Schuhe' (4), 'Damenmode' (2), and 'Herrenmode' (2).

ACCEPTANCE AND COMMUNICATION OF BIO-BASED

SAMPLE STUDY A: DOES SUSTAINABILITY REALLY MATTER TO CONSUMERS?

Results: Ranking of averaged utilities of (sustainable) product and online shop features (for details see the article)

Product features	Incl. price discounts	Product features	Online shop features
Fit and comfort (highest)	Durability (highest)	Durability (highest)	Less packaging (highest)
Price performance ratio	Low-emission product	Fair wages & work. cond.	Free returns
Quality	Env. fr. production proc.	Env. fr. production proc.	Discount campaigns
Design	Fair wages & work. cond.	Low-emission product	Sustainable packaging
Fair wages & work. cond.	20% discount	Recycable materials	Data security
Bio-based materials	Recycable materials	Bio-based materials	Free shipping
Qu. of customer reviews	Sustainability label	Sustainability label	Broad sustainable range
Brand	Bio-based materials	Country-of-manufacture	Availability of service
Return program	15% discount	Return program	Assurance seal
No. of customer reviews	Country-of-manufacture		Broad product range
	10% discount		Climate-neutral shipping
			Sustainability label
			Availability of reviews
			Fast shipping

Resulting sorting of averaged utilities for product features (n=2,244)

Resulting sorting of averaged utilities for shop features (n=2,106)

ACCEPTANCE AND COMMUNICATION OF BIO-BASED

SAMPLE STUY B: CAN WE IMPROVE THE IMPORTANCE OF BIO-BASED?

Research questions and survey

- n=800 respondents were confronted with **choice decisions among T-shirts** with three different materials: petroleum-based fibres (polyester), bio-based fibres (algae, cellulose, or mushroom), and natural fibers (cotton).
- Randomly they were divided into three blocks with different selling propositions for bio-based
 - **Basic info** (scenario 1)
 - **Additional hint to sustainability aspects** (scenario 2)
 - **Additional hint to functional advantages** (scenario 3)
- The basic info and the additional aspects were discussed with Joe Meakin (BIOTEXFUTURE-project ALGAE).
- A representative sample of customers was interviewed (female 50%, male 50 %, 16-27 years old: 65%, 28-45: years old: 35%) using random sampling from an online access panel.

Scenario/block	Explanation for the visitors of a fictive shop
Basic info (scenario 1)	Bio-based fibers are plastics that are made from rapidly renewable raw materials such as algae, cellulose, fungi.
Additional hint to sustainability aspects (scenario 2)	Compared to natural fibers, significantly less water and space is required for raw material extraction and fiber production. Compared to petroleum-based fibers, the (scarce) petroleum resources of the earth are spared during the extraction of raw materials. In addition, significantly less water is required for fiber production and significantly less CO ₂ is emitted.
Additional hint to functional advantages (scenario 3)	Compared to clothing made from natural fibers or from petroleum-based fibers, clothing made from bio-based fibers has a number of advantages: <ul style="list-style-type: none">• It feels softer and is lighter.• It also cools better when it's hot.• It dries faster when it's wet.

ACCEPTANCE AND COMMUNICATION OF BIO-BASED

SAMPLE STUY B: CAN WE IMPROVE THE IMPORTANCE OF BIO-BASED?

Methodology




- The main part in each block consisted of 8 choice tasks among three T-shirts with varying forms/colors, materials, and prices.

Results (here: shares of counts)

	Petro-leum-based (Polyester)	Bio-ba-sed fibre (algae,...)	Natural fibre (cotton)
Scenario 1 (basic)	19,8%	36,8%	43.4%
Scenario 2 (sustainable)	15,9%	50,2%	33,9%
Scenario 3 (functional)	17,1%	50,9%	32,0%

- Also: Bio-based shares are higher for female and elder respondents across all scenarios.

Welches der drei Sport-Shirts würden Sie am ehesten kaufen? (4 of 10)

Design			
Material	erdölbasiert (Polyester)	biobasiert	Naturfasern (Baumwolle)
Preis	38 €	43 €	33 €
	<input type="button" value="Kaufen"/>	<input type="button" value="Kaufen"/>	<input type="button" value="Kaufen"/>

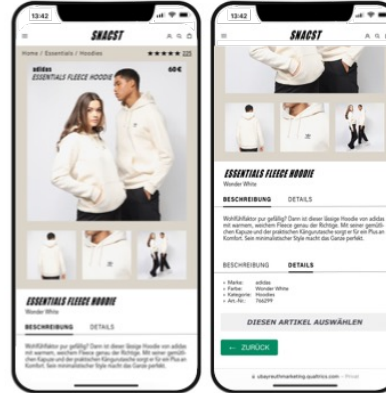
ACCEPTANCE AND COMMUNICATION OF BIO-BASED

SAMPLE STUDY C: HAS COMMUNICATION TYPE OF SUSTAINABILITY ASPECTS AND EXPOSURE TO NATURE IMAGERY AN INFLUENCE ON SUST. BUYING BEHAVIOR?

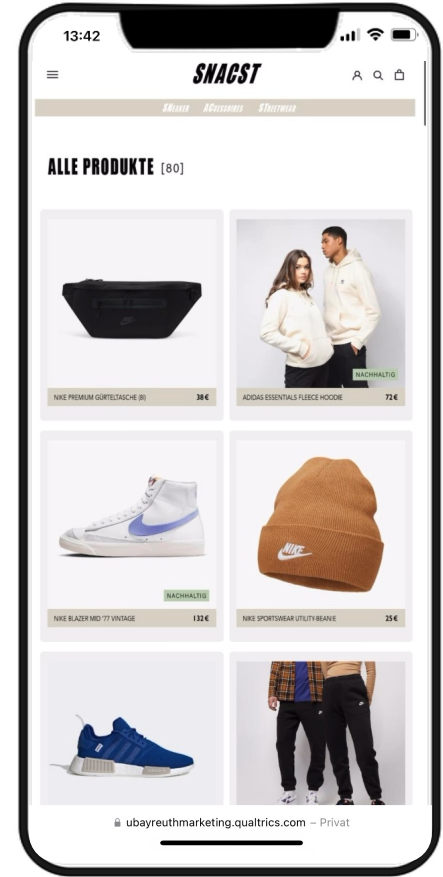
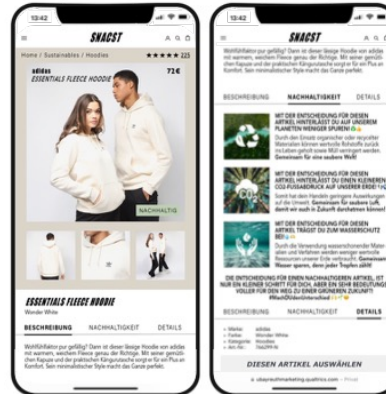
Research questions, survey & methodology:

- 2 (tonality: emotional vs. rational) x 2 (exposure to nature imagery: with vs. without) between subjects design embedded in a **realistic online store scenario** (with a selection of 80 unisex items of the brands Adidas, Puma & Nike) with the task to go shopping with a budget of 300€.
- Experimental design to reflect **BEHAVIOR** (= purchase) as realistically as possible.
- Operationalization of sustainability information in terms of tonality followed a more formalized approach based on criteria for differentiating between emotional and rational communication extracted from existing research from various disciplines.
- A representative sample of n=607 individuals of generations Y and Z in Germany (female 50,6%, male 49,4%, born 1980-1994: 48,4%, born 1995-2008: 51,6%) using random sampling from an online access panel.

conventional



sustainable



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Selected results:

- Neither tonality nor exposure to nature imagery showed significant differences when measuring purchasing behavior in the context of sustainable textiles close to reality (high robustness of the results even with inclusion of various other factors as well as different segmentations).
- Significant correlation between the duration of the first viewing of the sustainability information and sustainable purchasing behavior.
- **Analysis of experimental design including only those with time to skim key aspects of sustainability information (n = 187).**
 - Statistically significant main effect of tonality regarding both the number of sustainable products ($p = 0.004$) and the amount spent on sustainable products ($p = 0.029$) (independent of exposure to nature imagery).
 - **Higher scores in terms of sustainable purchase behavior for RATIONAL information presentation** compared to emotional.

		Mean	t	df	Sig. (2-tailed)
Number of sustainable products	emotional	1,59	2,980	185	0,003
	rational	1,94			
Amount spent on sustainable products	emotional	125,88	2,200	185	0,029
	rational	149,89			

Selected implications:

- No primary relevance regarding tonality and exposure to natural images.
→ Choice of tonality congruent with existing communication.
- **Drawing attention to sustainability information is elementary!**
→ e.g., through use of GIFs, videos, etc.
→ Tendency for rational information presentation to prevail if sufficient attention for skimming is paid.

5 FILLING THE COMMUNICATION GUIDELINE (WORK IN PROGRESS)

S

Social Influence

Social norms

Social identities

Social desirability

H

Habit Formation

Discontinuity to change bad habits	Barriers are (with decreasing importance) higher price, no information, no products, habit, information effort, no stylish (BT1-4abc)	Barriers are (with decreasing importance) no information, habit, price, availability, no label, not stylish, greenwashing (BT2-1a)		
Incentives	Free sending back plus 10 Euro is most preferred return policy, but similar policies are also acceptable (stores, 5 Euro) (BT2-4b)	A very promising incentive for consumers to return used clothing is when brands donate to charity: effective incentives needed (BT2-4c)	Redemption, boni, traffic lights, recycable, biodegradable, specific category are most attractive (BT1- 4abc, Baier et al. 2020)	When product descriptions about environmental facts are lacking, consumers are dissatisfied: incentives are needed (2020/21-4a)
Penalties				
Implementation intentions				
Making it easy, Prompts, Feedback				



The Individual Self

The self-concept		
Self-consistency	Consumers are more likely to buy bio-based textiles than synthetic, especially consumers with green consumption values. (FAU)	
Self-interest		
Self-efficacy	Sustainability aspects that refer to what consumers feel responsible for (e.g. end-of-life) out-shine manufacturing aspects. (BT3-3)	Greenwashing concerns and perceived risks moderate the influence of attitude towards purchase intention. (Rausch, Kopplin 2021)
Individual differences		

F

Feelings & Cognition

<p>Negative emotions</p>	<p>The mentioning of functional disadvantages of biopolymer-based sneakers decreases the choices. Wording is less important. (BT3-8)</p>	<p>The mentioning of functional disadvantages of biopolymer-based sneakers vs. conventional sneakers decreases choices. (BT3-7)</p>
<p>Positive emotions</p>	<p>When sustainability aspects are communicated emotionally, purchases of biopolymer-based sneakers increase (BT3-1)</p>	<p>Emotional communication increases purchases of biopolymer-based sneakers. (BT3-5)</p> <p>Hedonic aspects and environmental awareness lead to (low) purchase intentions. The car sellers don't promote the vegane option. (BT4-2)</p>
<p>Framing</p>	<p>Promoting gains (instead of losses) increases the reservation price. However only 8% indicate reservation prices > 220€ (BT4-1)</p>	
<p>Eco-labeling</p>	<p>A corporate sustainability label can enhance purchase intention for biopolymer-based textiles; use sustainability label (BT2-2a)</p>	<p>Eco-labels biodegradable materials, recycled materials bring higher surcharges when communicated (up to 37 Euro) (Brand, Rausch 2021)</p>

F

Feelings & Cognition

<p>Information, learning, and knowledge</p>	<p>Fulfillment of cus. expectations, of laws and regulations, green creativity, knowledge on factors that drive buying are decisive (BT1-2abd, -2ce, Rese et al. 2021)</p>	<p>Polyester group was worst, cellulose and recycling best; missing information is the reason why bio-based is unknow. (BT2-1a)</p>	<p>Blogs and product descriptions addressing the benefits of biopolymers have the potential to educate the mainstream consumer. (BT2-2b)</p>
	<p>Website is main info channel, sus. Influencer are preferred for awareness of biopolymers (Insta, FB, YouTube, Twitch, Twitter) (BT2-2c)</p>	<p>For biopolymer-based textiles, no 'brand advantage'; if the price is not too high, the main purchase barrier is lack of knowledge (BT2-3a)</p>	<p>Material (biopolymer-based vs. conventional) and CO₂ reduction is of importance. (BT3-2)</p>
	<p>If sufficient attention is paid to the information, the purchase of sustainable textiles increases. Drawing attention to sustainability information is elementary! (Rösch 2023)</p>	<p>Media, culture, and also consumers lack of knowledge and curiosity about bio-based materials. However, Pangaia is an excellent example to solve this problem. Be aware of destructive lobbying by the fossile industry. (Adidas/AKIN)</p>	<p>Consumers need to be educated, information and knowledge is important. One should be aware of overmarketing sustainability gains (STO)</p>



Tangibility

<p>Matching temporal focus</p>				
<p>Communicate local and proximal impacts</p>				
<p>Concrete communications</p>	<p>When product descriptions about environmental facts are lacking, consumers are dissatisfied: incentives are needed (BT2-4a)</p>	<p>The better visualization (text to image to animated gif/video) of water consumption increases choices. (BT3-4)</p>	<p>Additional hints (functionality, less water and petroleum waste) increase purchases (from 36% to 51% of bought T-shirts). (Harnisch 2022)</p>	<p>QR-codes help (if used) to improve product evaluation (quality, durability) and purchase intention of bio-based products. (Brand 2023)</p>
<p>Encourage the desire for intangibles</p>				

6 ANSWERING THE RESEARCH QUESTIONS (WORK IN PROGRESS)

	S Social Influence	H Habit Formation	I The Individual Self	F Feelings & Cognition	T Tangibility
Drivers	<ul style="list-style-type: none"> ▪ Social norms ▪ Social identities ▪ Social desirability 	<ul style="list-style-type: none"> ▪ Discontinuity to change bad habits ▪ Implementation intentions ▪ Making it easy, Prompts ▪ Feedback, Penalties ▪ Incentives 	<ul style="list-style-type: none"> ▪ The self-concept ▪ Self-consistency ▪ Self-interest ▪ Self-efficacy ▪ Individual differences 	<ul style="list-style-type: none"> ▪ Negative emotions ▪ Positive emotions ▪ Information, learning, and knowledge ▪ Eco-labeling ▪ Framing 	<ul style="list-style-type: none"> ▪ Matching temporal focus ▪ Communicate local and proximal impacts ▪ Concrete communications ▪ Encourage the desire for intangibles

1. Which communication strategies and terms are currently used and successful? Why?

1. When sustainability aspects are communicated emotionally, purchases of bio-based sneakers increase. Positioning of the information on the product page is less important (BT3-1, BT3-5).
2. Material (bio-based vs. conventional) and CO₂ reduction is of importance. A focus on end-of-life outshines production aspects. (BT3-2).
3. Sustainability aspects that refer to what consumers feel responsible for (e.g. end-of-life) out-shine manufacturing aspects (BT3-3).
4. The better visualization (text to image to animated gif/video) of water consumption increases choices of bio-based sneakers. (BT3-4).

2. **What and how do we need to communicate to achieve a wider understanding of consumers? What level of complexity is appropriate and how to achieve this in communication?**
 1. Additional hints (functionality, less water and petroleum waste) increase purchases (from 36% to 51% of bought T-shirts) (Harnisch 2022).
 2. QR-codes help (if used) to improve product evaluation (quality, durability) and purchase intention of bio-based products (Brand 2023).
 3. If sufficient attention is paid to the information, the purchase of sustainable textiles increases. Drawing attention to sustainability information is elementary! (Rösch 2023)
 4. Consumers need to be educated, information and knowledge is important. One should be aware of overmarketing sustainability gains (STO)
3. **How do different audiences (e.g. consumers and NGOs) expect and handle different levels of complexity and appropriateness in communication?**
 1. Gen Z is more positive, Gen Y assumes green washing/not recyclable; story telling convinces Gen. Z (BT2-1b).
4. **How can/must we inform the consumer to use a product in a sustainable manner?**
 1. Media, culture, and also consumers lack of knowledge and curiosity about bio-based materials. However, Pangaia is an excellent example to solve this problem. Be aware of destructive lobbying by the fossil industry. (Adidas/AKIN)
 2. Focusing and functionality leads to highest construct ratings and purchase intentions; control group performs significantly worse (BT2-1c).
 3. Blogs and product descriptions addressing the benefits of bio-based have the potential to educate the mainstream consumer (BT2-2b).

THANK YOU FOR YOUR ATTENTION!

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