Data Article

Survey data to assess consumers’ attitudes towards circular economy and bioeconomy practices: A focus on the fashion industry

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A R T I C L E   I N F O

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A B S T R A C T

This data article presents data collected through a survey with the aim of understanding consumers’ behavior in the fashion industry. The analyses of these data are elaborated in the article “The circular economy and bioeconomy in the fashion sector: Emergence of a “sustainability bias”” (Colasante and Adamo 2021). As highlighted in the literature, the fashion industry contributes significantly to environmental pollution in all steps, from the production to the delivery. Often, consumers are not aware of the impact of their fashion habits on the environment and this led to the emergence of the well-known fast fashion phenomenon. Even though there is a lack of evidence on this topic, shifting consumers to embrace bioeconomy as well as circular economy principles constitutes a possible solution to reduce the impact of the fashion sector on the environment. We collected these data on consumers’ habits and preferences regarding both bioeconomy and circular economy by means of a questionnaire in which a total of 402 Italian people took part by using Amazon Mechanical Turk (MTurk) platform. This paper aims at presenting the data split in the three main blocks: (i) consumer perception; (ii) purchasing habits; and (iii)
consumers’ willingness to pay (WTP). The results obtained are of interest to citizens, business, academics and policy makers to understand consumers’ perception of sustainability in the fashion industry. The proposed dataset can be replicated on a global scale, on specific market segments of the fashion industry and can be used to compare the perception of the circular bioeconomy in other sectors.

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Specifications Table

| Subject          | Economics |
|------------------|-----------|
| Specific subject area | Bioeconomy, Circular economy |
| Type of data     | Table, Figure |
| How data were acquired | Survey data were gathered using an online survey platform (Amazon MTurk). |
| Data format      | Raw, Analyzed |
| Parameters for data collection | The survey data were obtained from 402 respondents living in Italy who voluntarily decided to answer the questionnaire. No specific constraints or requirements, except for the nationality, were imposed. |
| Description of data collection | The questionnaire was published in the Amazon MTurk platform. The survey was available from June to August 2021. |
| Data source location | City: Rome, Country: Italy, Latitude and longitude: 41°53′30.95″N, 12°30′40.79″E |
| Data accessibility | Repository name: Zenodo, Data identification number: 10.5281/zenodo.6537443 [2], Direct URL to data: https://zenodo.org/record/6537443 |
| Related research article | Authors’ name: Annarita Colasante, Idiano D’Adamo, Title: The circular economy and bioeconomy in the fashion sector: Emergence of a “sustainability bias” Journal: Journal of Cleaner Production DOI: https://doi.org/10.1016/j.jclepro.2021.129774 |

Value of the Data

• The data submitted to the Data in Brief are important to ensure more transparency in the analysis carried out in the co-submitted article [1].
• The data contains consumer preferences and habits related to the purchase of second-hand clothes and clothes made from bio-based materials.
• The primary beneficiaries of the dataset include: consumers who can use these data to compare their behaviors and improve their sustainability knowledge; businesses that can gain insight into citizen preferences to select appropriate green strategies; Policy-makers can infer implications for facilitating the green transition.
• Other researchers may use these data to conduct cross-cultural as well as cross-country comparisons, looking for similarities and differences in the consumers’ attitudes toward both circular economy and bioeconomy in clothes purchasing.
• The circular premium should be investigated on a larger sample of products and also proposing comparisons across countries.
1. Data Description

European countries are pursuing the objective to meet the sustainable development goals requirements. The most effective way to reach such goals is to promote the transition from linear to circular economy together with the promotion of a more sustainable life-style. The pillars of circular economy are: reduce, re-use, and recycle. The literature is plenty of scientific contributions focusing on the adoption of circular practices from the firms’ side but the analysis of consumers behavior is still poor [3–5]. One of the main motivations of this scarce evidence is the difficulty to observe and measure consumers’ habits [6]. The survey was designed to capture respondents’ attitudes towards the circular economy and the bioeconomy within the fashion sector and also to grasp their knowledge with respect to sustainable fashion. The fashion industry has a great negative impact on the environment and, in the last decades, consumers habits switched into less and less sustainable purchasing option [7]. Indeed, the emergence of the fast fashion phenomenon in which more than two collections per year are proposed coupled with very convenient prices (due to the poor quality of clothes) have brought to the production of tons of waste in a short time. We strongly believe that, in order to switch from this vicious cycle to a virtuous one, firms and consumers need to change their conduct: on the one hand, firms are using bio materials and are designing more sustainable products; on the other hand, consumers need to reduce their consumption or may opt for re-using (second-hand market). In addition, the use of sustainable products should not push to consume more than necessary, generating phenomena known as circular economy rebound [8]. The identification of a sustainability bias highlights the urgency of strengthening social analysis, an aspect that has been highlighted in the literature in the context of the circular economy [9,10].

The questionnaire we administered to 402 Italian people included approximately 35 items. Overall, our raw data includes: 11 questions whose answers were measured as a 5-points Likert scale, 1 question evaluated over a 10-points value scale, 4 yes/no questions, 11 closed-ended questions and 7 open questions. The distributions of answers for each question are reported in Tables 1–4. The items can be arranged in three main groups of variables. The first group (group A) focused on perceptions of sustainable fashion – Table 1. Items in this part were designed to figure out if people are aware of the pollution generated by fashion industry and, furthermore, to determine what are the main characteristics subjects attribute to sustainable fashion.

The second group of variables (group B), constitutes the core of the survey – Table 2. Indeed, this part were useful to investigate individuals purchasing habits about second-hand and/or bio-based clothes. We also ask subjects to provide their main reasons for buying (or not) such kind of clothes – Fig. 1. This part allows us to understand how much people are used to do sustainable shopping and, furthermore, to draw some hints about the key variables policy makers need to consider for encouraging people to take sustainability more in consideration. Notice that only subjects who declared to have never bought either second-hand or biobased clothes provided an answer for questions included in Motivation not to buy second-hand and Motivation not to buy bio-based.

Finally, the third part of the questionnaire was devoted to elicit subjects’ willingness to pay (WTP). In particular, the third group of variables (group C) provides information about respondents’ WTP for a t-shirt with (potentially) different characteristic (e.g. bio-based or produced with recycled materials) – Table 3.

Besides the main variables of interest mentioned in the previous tables, we also ask for socio-demographics characteristics and, moreover, we try to assess the pro-environmental attitude of participants (Table 4). It is worth noting that the panel of respondents has an average age of 33.5 years and we can therefore define it as young. This value is about 13 years younger than the average age of the Italian population.
Table 1. Questions belonging to group A: definition and perception of sustainable fashion. For each question we show the frequency distribution.

| Variable                  | Range  |
|---------------------------|--------|
| **Pollution synthetic**   |        |
| How much do you agree with the following statement: Chemical pollutants are produced during the production of synthetic fibers such as polyester? | |
| Strongly disagree         | 1.50%  |
| Disagree                  | 5.74%  |
| Undecided                 | 26.43% |
| Agree                     | 45.39% |
| Strongly agree            | 20.95% |
| **Pollution natural**     |        |
| How much do you agree with the following statement: Chemical pollutants are produced during the production of natural fibers such as cotton? | |
| Strongly disagree         | 4.99%  |
| Disagree                  | 20.20% |
| Undecided                 | 40.40% |
| Agree                     | 25.94% |
| Strongly agree            | 8.48%  |
| **Pollution dye**         |        |
| How much do you agree with the following statement: Air pollution can occur during some common textile dyeing processes? | |
| Strongly disagree         | 0.50%  |
| Disagree                  | 7.23%  |
| Undecided                 | 27.68% |
| Agree                     | 43.89% |
| Strongly agree            | 20.70% |
| **Pollution water**       |        |
| How much do you agree with the following statements: a lot of water is used during the process of dyeing and finishing clothes? | |
| Strongly disagree         | 0.50%  |
| Disagree                  | 5.49%  |
| Undecided                 | 23.69% |
| Agree                     | 38.40% |
| Strongly agree            | 31.92% |
| **Biodegradable**         |        |
| How much do you agree with the following statement: all natural fibres are biodegradable? | |
| Strongly disagree         | 1.49%  |
| Disagree                  | 13.43% |
| Undecided                 | 33.43% |
| Agree                     | 30.45% |
| Strongly agree            | 21.19% |
| **Sector sustainability**|        |
| Define the sector that is most related to sustainability. | |
| Environment               | 44.89% |
| Economy                   | 7.48%  |
| Society                   | 2.24%  |
| A mix of all items        | 45.39% |
| **Phases sustainability**|        |
| Define which phase is strictly related to sustainable fashion. | |
| Design                    | 9.23%  |
| Production                | 37.16% |
| Delivery                  | 4.74%  |
| Selling                   | 1.25%  |
| After sale                | 1.75%  |
| A mix of all items        | 45.89% |
| **Sustainable fashion**   |        |
| In your opinion, which of these products can be classified as belonging to sustainable fashion? | |
| Second-hand clothes       |        |
| 1                         | 2.24%  |
| 2                         | 3.74%  |

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Table 1. (continued)

| Variable                                                                 | Range     |
|-------------------------------------------------------------------------|-----------|
| 3                                                                       | 6.23%     |
| 4                                                                       | 5.24%     |
| 5                                                                       | 6.23%     |
| 6                                                                       | 15.46%    |
| 7                                                                       | 18.20%    |
| 8                                                                       | 19.20%    |
| 9                                                                       | 13.72%    |
| 10                                                                      | 9.73%     |
| **Bio-based clothes**                                                   |           |
| 1                                                                       | 3.74%     |
| 2                                                                       | 2.24%     |
| 3                                                                       | 4.99%     |
| 4                                                                       | 4.74%     |
| 5                                                                       | 8.73%     |
| 6                                                                       | 11.47%    |
| 7                                                                       | 22.44%    |
| 8                                                                       | 18.45%    |
| 9                                                                       | 16.71%    |
| 10                                                                      | 6.48%     |
| **Clothes produced respecting workers conditions (e.g., no child work)** |           |
| 1                                                                       | 3.74%     |
| 2                                                                       | 2.24%     |
| 3                                                                       | 5.74%     |
| 4                                                                       | 3.24%     |
| 5                                                                       | 10.22%    |
| 6                                                                       | 15.46%    |
| 7                                                                       | 16.96%    |
| 8                                                                       | 15.96%    |
| 9                                                                       | 16.96%    |
| 10                                                                      | 9.48%     |
| **Clothes produced respecting workers conditions (e.g., no child work) and with bio fibers** |           |
| 1                                                                       | 0.75%     |
| 2                                                                       | 0.25%     |
| 3                                                                       | 3.99%     |
| 4                                                                       | 3.24%     |
| 5                                                                       | 7.23%     |
| 6                                                                       | 9.23%     |
| 7                                                                       | 13.22%    |
| 8                                                                       | 18.95%    |
| 9                                                                       | 25.69%    |
| 10                                                                      | 17.46%    |
| **Clothes characteristics**                                             |           |
| *When buying a cloth for yourself, how much do you consider the following items important?* |           |
| *is produced in an environmentally respectful manner*                   |           |
| Not at all                                                              | 4.24%     |
| Slightly                                                                | 18.95%    |
| Moderately                                                              | 40.65%    |
| Important                                                               | 25.94%    |
| Very important                                                          | 10.22%    |
| *is from a well-known brand*                                            |           |
| Not at all                                                              | 28.68%    |
| Slightly                                                                | 33.67%    |
| Moderately                                                              | 26.18%    |
| Important                                                               | 9.23%     |
| Very important                                                          | 2.24%     |
| *is inexpensive*                                                        |           |
| Not at all                                                              | 1.00%     |
| Slightly                                                                | 5.74%     |

(continued on next page)
| Variable                               | Range    |
|---------------------------------------|----------|
| Moderately                            | 38.40%   |
| Important                             | 38.40%   |
| Very important                        | 16.46%   |
| *is good quality*                     |          |
| Not at all                            | 0.50%    |
| Slightly                              | 3.74%    |
| Moderately                            | 18.95%   |
| Important                             | 44.64%   |
| Very important                        | 32.17%   |
| *is trendy (fashion)*                 |          |
| Not at all                            | 13.72%   |
| Slightly                              | 32.17%   |
| Moderately                            | 37.16%   |
| Important                             | 13.72%   |
| Very important                        | 3.24%    |
| *is versatile*                        |          |
| Not at all                            | 1.25%    |
| Slightly                              | 6.48%    |
| Moderately                            | 25.19%   |
| Important                             | 51.12%   |
| Very important                        | 15.96%   |
| *is something that you need*          |          |
| Not at all                            | 1.00%    |
| Slightly                              | 2.99%    |
| Moderately                            | 19.95%   |
| Important                             | 51.62%   |
| Very important                        | 24.44%   |
| *is available in your size*           |          |
| Not at all                            | 0        |
| Slightly                              | 2.99%    |
| Moderately                            | 8.98%    |
| Important                             | 34.66%   |
| Very important                        | 53.37%   |
| *is comfortable*                     |          |
| Not at all                            | 0.25%    |
| Slightly                              | 2.74%    |
| Moderately                            | 11.97%   |
| Important                             | 40.40%   |
| Very important                        | 44.64%   |
| *is easy to care for*                 |          |
| Not at all                            | 2.49%    |
| Slightly                              | 13.47%   |
| Moderately                            | 32.17%   |
| Important                             | 35.66%   |
| Very important                        | 16.21%   |
| *has a good value for money*          |          |
| Not at all                            | 0        |
| Slightly                              | 2.74%    |
| Moderately                            | 12.22%   |
| Important                             | 44.64%   |
| Very important                        | 40.40%   |
| *is from a prestigious brand*         |          |
| Not at all                            | 28.68%   |
| Slightly                              | 33.67%   |
| Moderately                            | 26.18%   |
| Important                             | 9.23%    |
| Very important                        | 2.24%    |
Table 2.
Questions belonging to group B: clothes purchasing habits. For each question we show the frequency distribution.

| Variables                      | Yes     | No       |
|--------------------------------|---------|----------|
| **Buy bio-based clothes**      |         |          |
| Have you ever bought (at least once) bio-based clothes? | Yes 83.46%  |
|                                | No 16.54% |
| **Buy bio-based items**        |         |          |
| Have you ever bought (at least once) bio-based items? | Yes 79.55%  |
|                                | No 20.45% |
| **Buy second-hand clothes**    |         |          |
| Have you ever bought (at least once) second-hand clothes? | Yes 50.12%  |
|                                | No 49.88% |
| **Buy second-hand items**      |         |          |
| Have you ever bought (at least once) second-hand items? | Yes 77.56%  |
|                                | No 22.44% |
| **Motivation second-hand**     |         |          |
| Please indicate how important the following reasons are when choosing to buy second-hand clothing: |   |
| Economic reasons               |         |          |
| Not at all                     | 0       |
| Slightly                       | 20.40%  |
| Moderately                     | 30.85%  |
| Important                      | 33.33%  |
| Very important                 | 15.42%  |
| Quality of the product         |         |          |
| Not at all                     | 0       |
| Slightly                       | 7.96%   |
| Moderately                     | 27.86%  |
| Important                      | 39.30%  |
| Very important                 | 24.88%  |
| Reduce pollution related to production of new clothes |   |
| Not at all                     | 4.98%   |
| Slightly                       | 17.91%  |
| Moderately                     | 28.36%  |
| Important                      | 32.34%  |
| Very important                 | 16.42%  |
| Find exclusive items           |         |          |
| Not at all                     | 7.96%   |
| Slightly                       | 20.90%  |
| Moderately                     | 33.83%  |
| Important                      | 24.88%  |
| Very important                 | 12.44%  |
| My peers bought similar clothes|         |          |
| Not at all                     | 45.77%  |
| Slightly                       | 31.34%  |
| Moderately                     | 13.93%  |
| Important                      | 7.96%   |
| Very important                 | 1.00%   |
| Use garments that have not yet finished their life cycle |   |
| Not at all                     | 4.98%   |
| Slightly                       | 14.93%  |
| Moderately                     | 34.33%  |
| Important                      | 34.83%  |
| Very important                 | 10.95%  |
| **Motivation bio-based**       |         |          |
| Please indicate how important the following reasons are when choosing to buy bio-based clothing: |   |
| Economic reasons               |         |          |
| Not at all                     | 5.07%   |
| Slightly                       | 27.76%  |

(continued on next page)
Table 2. (continued)

| Variables                                                                 | Not at all | Slightly | Moderately | Important | Very important |
|---------------------------------------------------------------------------|------------|----------|------------|-----------|---------------|
| Quality of the product                                                    | 1.19%      | 10.15%   | 28.36%     | 40.60%    | 19.70%        |
| Reduce pollution related to production of new clothes                     | 1.49%      | 13.43%   | 33.43%     | 30.45%    | 21.19%        |
| Find exclusive items                                                      | 22.09%     | 37.61%   | 33.58%     | 40.60%    | 19.70%        |
| My peers bought similar clothes                                           | 47.76%     | 26.57%   | 30.65%     | 21.19%    | 19.70%        |
| **Motivation not to buy second-hand**                                     |            |          |            |           |               |
| Poor availability of dedicated applications                               | 11.06%     | 31.16%   | 36.18%     | 17.59%    | 4.02%         |
| Poor availability of dedicated shops                                     | 6.53%      | 33.61%   | 33.64%     | 30.65%    | 11.56%        |
| Poor impact on the environmental protection                               | 14.07%     | 33.67%   | 36.18%     | 14.07%    | 2.01%         |
| Poor hygiene                                                              | 7.04%      | 6.53%    | 28.14%     | 24.62%    | 33.67%        |
| Poor quality                                                              | 7.04%      | 26.13%   | 35.18%     | 24.62%    | 7.03%         |

(continued on next page)
Table 2. (continued)

| Variables                                                                 | Importance |
|---------------------------------------------------------------------------|------------|
| *It is difficult to find the proper size*                                 |            |
| Not at all                                                                | 6.03%      |
| Slightly                                                                  | 17.09%     |
| Moderately                                                                | 29.65%     |
| Important                                                                 | 36.18%     |
| Very important                                                            | 11.06%     |
| *It is difficult to find trendy clothes*                                  |            |
| Not at all                                                                | 16.16%     |
| Slightly                                                                  | 24.75%     |
| Moderately                                                                | 28.79%     |
| Important                                                                 | 22.73%     |
| Very important                                                            | 7.58%      |
| **Motivation not to buy bio-based**                                        |            |
| Could you indicate how important are the following reasons for not buying bio-based clothing? | |
| Poor availability of dedicated applications                                |            |
| Not at all                                                                | 9.23%      |
| Slightly                                                                  | 26.15%     |
| Moderately                                                                | 43.08%     |
| Important                                                                 | 13.85%     |
| Very important                                                            | 7.69%      |
| Poor availability of dedicated shops                                      |            |
| Not at all                                                                | 4.62%      |
| Slightly                                                                  | 7.69%      |
| Moderately                                                                | 30.77%     |
| Important                                                                 | 43.08%     |
| Very important                                                            | 13.85%     |
| Poor impact on the environmental protection                                |            |
| Not at all                                                                | 16.92%     |
| Slightly                                                                  | 29.23%     |
| Moderately                                                                | 36.92%     |
| Important                                                                 | 16.92%     |
| Very important                                                            | 7.69%      |
| Clothes produced with bio fibers are difficult to find                     |            |
| Not at all                                                                | 4.62%      |
| Slightly                                                                  | 26.15%     |
| Moderately                                                                | 33.85%     |
| Important                                                                 | 24.62%     |
| Very important                                                            | 10.77%     |
| They have no style details compared with other clothes                    |            |
| Not at all                                                                | 36.92%     |
| Slightly                                                                  | 38.46%     |
| Moderately                                                                | 15.38%     |
| Important                                                                 | 4.62%      |
| Very important                                                            | 4.62%      |
| They are too expensive                                                    |            |
| Not at all                                                                | 1.54%      |
| Slightly                                                                  | 10.77%     |
| Moderately                                                                | 35.38%     |
| Important                                                                 | 33.85%     |
| Very important                                                            | 18.46%     |
| *It is difficult to find trendy clothes*                                  |            |
| Not at all                                                                | 41.54%     |
| Slightly                                                                  | 32.31%     |
| Moderately                                                                | 13.85%     |
| Important                                                                 | 12.31%     |
| Very important                                                            | 7.69%      |
| Poor quality                                                              |            |
| Not at all                                                                | 23.08%     |
| Slightly                                                                  | 24.62%     |
| Moderately                                                                | 32.31%     |
| Important                                                                 | 12.31%     |
| Very important                                                            | 7.69%      |
Table 3
Questions belonging to group C: willingness to pay for a white t-shirt (€/unit). For each question we show the frequency distribution. Notice that for the variables WTP new, WTP bio, WTP second-hand, WTP recycled and WTP certificate the average values are shown.

| Variable                                              | Frequency |
|-------------------------------------------------------|-----------|
| WTP new                                               | 9.63      |
| [Picture of a white t-shirt] How much would you be willing to pay if the garment was new? |           |
| WTP bio                                               | 11.87     |
| [Picture of a white t-shirt] How much would you be willing to pay if the garment was produced with bio materials? |           |
| WTP second-hand                                       | 4.16      |
| [Picture of a white t-shirt] How much would you be willing to pay if the garment was used? |           |
| WTP recycled                                          | 10.36     |
| [Picture of a white t-shirt] How much would you be willing to pay if the garment was produced with recycled materials? |           |
| WTP workers                                           | 11.9      |
| [Picture of a white t-shirt] How much would you be willing to pay if the garment was produced respecting workers? |           |
| WTP bio certificate                                    |           |
| How much more would you pay if there was a certificate that guarantees that the cloth is produced with bio materials? |           |
| Nothing                                               | 7.98%     |
| Little amount                                          | 28.18%    |
| Pay enough                                             | 50.12%    |
| Large amount                                           | 13.72%    |
| WTP second-hand quality certificate                    |           |
| How much more would you pay if there was a certificate that guarantees that the used cloth is a good quality? |           |
| Nothing                                               | 14.21%    |
| Little amount                                          | 34.66%    |
| Pay enough                                             | 42.14%    |
| Large amount                                           | 8.98%     |
| WTP workers certificate                                |           |
| How much more would you pay if there was a certificate that guarantees that the cloth is produced respecting workers? |           |
| Nothing                                               | 10.97%    |
| Little amount                                          | 24.44%    |
| Pay enough                                             | 45.39%    |
| Large amount                                           | 19.20%    |
| WTP workers and environmental certificate               |           |
| How much more would you pay if there was a certificate that guarantees that the cloth is produced respecting both workers and the environment? |           |
| Nothing                                               | 7.48%     |
| Little amount                                          | 21.45%    |
| Pay enough                                             | 45.64%    |
| Large amount                                           | 25.44%    |
| WTP recycled                                           |           |
| How much more would you pay if there was a certificate that guarantees that the cloth is produced from recycled materials? |           |
| Nothing                                               | 11.22%    |
| Little amount                                          | 31.42%    |
| Pay enough                                             | 45.89%    |
| Large amount                                           | 11.47%    |
Table 4
Questions related to socio-demographics characteristics... For each question we show the frequency distribution. Notice that for the variables Age and Number of people living in the household the average values are shown.

| Variable                                                                 | Pro-environmental attitude |
|--------------------------------------------------------------------------|-----------------------------|
| Obtained as the normalized sum of the following items:                   |                             |
| How often do you correctly recycle waste materials produced daily (separate collection)? |                             |
| Never                                                                    | 0.50%                       |
| Rarely                                                                   | 4.49%                       |
| Sometimes                                                                | 9.48%                       |
| Often                                                                    | 27.18%                      |
| Always                                                                   | 58.35%                      |
| How often do you read the labels of the products (food, clothes, etc.) to check if they have been produced respecting the environment? |                             |
| Never                                                                    | 4.74%                       |
| Rarely                                                                   | 12.72%                      |
| Sometimes                                                                | 32.67%                      |
| Often                                                                    | 31.92%                      |
| Always                                                                   | 17.96%                      |
| How often do you avoid buying products from companies that do not respect the environment in their production cycles? |                             |
| Never                                                                    | 8.73%                       |
| Rarely                                                                   | 21.45%                      |
| Sometimes                                                                | 30.67%                      |
| Often                                                                    | 29.43%                      |
| Always                                                                   | 9.73%                       |
| How often do you buy products with little packaging or recyclable packaging? |                             |
| Never                                                                    | 5.99%                       |
| Rarely                                                                   | 16.46%                      |
| Sometimes                                                                | 30.67%                      |
| Often                                                                    | 35.66%                      |
| Always                                                                   | 11.22%                      |
| How often do you use public transport to reduce CO2 emissions?            |                             |
| Never                                                                    | 17.96%                      |
| Rarely                                                                   | 21.20%                      |
| Sometimes                                                                | 23.94%                      |
| Often                                                                    | 23.19%                      |
| Always                                                                   | 13.72%                      |
| How often do you purchase products in packs that can be refilled / reused? |                             |
| Never                                                                    | 3.49%                       |
| Rarely                                                                   | 16.96%                      |
| Sometimes                                                                | 29.18%                      |
| Often                                                                    | 34.91%                      |
| Always                                                                   | 15.46%                      |
| How often do you donate money to associations for the protection of the environment? |                     |
| Never                                                                    | 31.67%                      |
| Rarely                                                                   | 28.68%                      |
| Sometimes                                                                | 23.69%                      |
| Often                                                                    | 12.47%                      |
| Always                                                                   | 3.49%                       |
| How often do you buy reusable rather than disposable goods?              |                             |
| Never                                                                    | 2.49%                       |
| Rarely                                                                   | 10.22%                      |
| Sometimes                                                                | 26.18%                      |
| Often                                                                    | 38.90%                      |
| Always                                                                   | 22.19%                      |
| Pro-environmental attitude (clothes)                                     |                             |
| Obtained as the sum of the following items:                             |                             |
| How often do you buy used clothes?                                       |                             |
| Never                                                                    | 38.90%                      |
| Rarely                                                                   | 23.44%                      |

(continued on next page)
**Table 4 (continued)**

| Variable                                                                 | Percentage |
|--------------------------------------------------------------------------|------------|
| Sometimes                                                                | 25.19%     |
| Often                                                                    | 10.72%     |
| Always                                                                   | 1.75%      |
| **How often do you read the labels of clothes to check if they have been produced respecting the environment?** |           |
| Never                                                                    | 6.73%      |
| Rarely                                                                   | 24.19%     |
| Sometimes                                                                | 27.93%     |
| Often                                                                    | 28.93%     |
| Always                                                                   | 12.22%     |
| **How often do you select clothes that require colder wash water temperatures or less ironing?** |           |
| Never                                                                    | 22.19%     |
| Rarely                                                                   | 21.45%     |
| Sometimes                                                                | 25.94%     |
| Often                                                                    | 24.19%     |
| Always                                                                   | 6.23%      |
| **How often do you select items that you can wear for a long time versus items that go out of style quickly?** |           |
| Never                                                                    | 3.74%      |
| Rarely                                                                   | 9.23%      |
| Sometimes                                                                | 21.70%     |
| Often                                                                    | 40.15%     |
| Always                                                                   | 25.19%     |
| **How often do you buy clothes produced with natural fibers?**           |           |
| Never                                                                    | 5.74%      |
| Rarely                                                                   | 18.70%     |
| Sometimes                                                                | 36.66%     |
| Often                                                                    | 29.68%     |
| Always                                                                   | 9.23%      |
| **How often do you buy clothes with labels certifying respect for the environment?** |           |
| Never                                                                    | 8.73%      |
| Rarely                                                                   | 22.94%     |
| Sometimes                                                                | 33.92%     |
| Often                                                                    | 27.18%     |
| Always                                                                   | 7.23%      |
| **Please indicate your gender**                                          |           |
| Female                                                                   | 60.86%     |
| Male                                                                     | 39.14%     |
| **How old are you?**                                                     |           |
| Age                                                                      | 33.54%     |
| **Education**                                                            |           |
| **What is the highest level of education you have achieved?**            |           |
| Primary school                                                           | 0.25%      |
| Middle school                                                            | 2.24%      |
| Secondary school                                                         | 38.65%     |
| Postsecondary education                                                  | 52.62%     |
| PhD                                                                      | 6.23%      |
| **Number of people in the household**                                    | 3.40       |
| **How many people does your household consist of?**                     |           |
| **Income**                                                               |           |
| **What is your income?**                                                 |           |
| 0-15000€                                                                | 27.54%     |
| 15000€-30000€                                                           | 35.33%     |
| 30000€-45000€                                                           | 20.96%     |
| 45000€-60000€                                                           | 9.58%      |
| 60000€-75000€                                                           | 2.40%      |
| 75000€-100000€                                                          | 2.99%      |
| more than 100000€                                                       | 1.20%      |

(continued on next page)
Table 4 (continued)

| Region                          | In which region do you live? |
|---------------------------------|-----------------------------|
| Abruzzo                         | 14.46%                      |
| Basilicata                      | 1.25%                       |
| Calabria                        | 1.00%                       |
| Campania                        | 7.23%                       |
| Emilia Romagna                  | 3.99%                       |
| Friuli Venezia Giulia           | 1.25%                       |
| Lazio                           | 15.71%                      |
| Liguria                         | 2.00%                       |
| Lombardia                       | 14.46%                      |
| Marche                          | 2.00%                       |
| Molise                          | 1.50%                       |
| Piemonte                        | 0.50%                       |
| Puglia                          | 8.48%                       |
| Sardegna                        | 5.99%                       |
| Sicilia                         | 1.75%                       |
| Toscana                         | 3.99%                       |
| Trentino Alto Adige             | 7.23%                       |
| Umbria                          | 1.25%                       |
| Veneto                          | 1.50%                       |
|                                 | 4.49%                       |

Fig. 1. Distribution of answers related to the main characteristics of both bio-based and second-hand clothes. The graph on the top shows the percentage of people that have ever bought either bio-based (blue bar) or second-hand (orange bar) clothes. The graph on the left-bottom reports the main characteristics people look for bio-based clothes whereas the graph on the right-bottom reports the same information for second-hand clothes.
2. Experimental Design, Materials and Methods

The survey was designed to follow a descriptive online cross-sectional survey design and, according to the taxonomy proposed by Sovacool et al. [11], was based on a method characterized by a behavioral approach. Indeed, we design questions by taking into account suggestions from different disciplines such as economics, psychology and engineering. The main aim of the work is to grasp consumers’ attitude toward sustainable purchasing in the fashion field. In particular, given the great attention devoted in the last years to the transition from linear to circular paradigm, we focused on the second-hand market. We also add questions to identify consumers’ behavior towards bio-based clothes. This implies that the added value of this work relies on the possibility to compare two key sectors in the sustainable transition: bioeconomy and circular economy.

The procedure we follow to build the questionnaire can be summarized in the following steps: (i) define the research question and, hence, the focus of the questionnaire; (ii) draw up a list of questions taking as a benchmark the approach used by Kim [12]; (iii) submit the preliminary list of questions to a submitted to a pool of experts to validate its appropriateness before the launch on the web; (iv) dissemination of the questionnaire to Italian people registered in the Amazon Mechanical Turk platform.

In order to define the research question, we identified a gap in the literature since the majority of scientific contribution focused either on circular economy or bioeconomy. Furthermore, we decided to focus on the fashion industry since it is responsible for a huge share of pollution in the last decade. Once we had clearly identified the goal of our research, we looked at the papers in that field that already implemented survey as a method to collect data in order to take a cue for properly designing our questionnaire. The questionnaire included three main blocks: in the first part we focus on consumer perception of sustainable fashion. We tried to figure out both consumers’ awareness on the pollution imputable to the fashion industry and the main characteristics consumers ascribe to sustainable fashion. The second block was designed to collect the most important information constituted the core of the survey: we ask respondents to declare whether they buy or not second-hand clothes and bio-based clothes. We move forward by asking them to provide the main reasons why they do (or do not) buy these kinds of clothes. In the last part of the questionnaire we elicit consumers’ WTP for a white t-shirt with (potential) different characteristics such as be second-hand or be bio-based or be produced with recycled materials or be produced with respect for workers’ rights – Fig. 2.
Once a draft of the survey was ready, we validated the adequacy of the proposed questions to the research objective. For this purpose, we selected a panel of experts composed of academics and managers with experience in sustainable fashion in order to understand both the suitability of the questions and to test the appropriateness of the time needed to carry them out. Based on their suggestions, some changes were made as well as some questions were removed and/or added. Since we introduced some filter questions (e.g., people who answer “yes” or “no” to some questions faced different sequences of questions), the time employed in order to complete the questionnaire ranged from 12 to 20 min. In general, the average time needed to complete the survey was estimated around 16 min.

As soon as we implemented all the experts’ suggestions, we disseminated the questionnaire by using Amazon Mechanical Turk platform. This platform allows to the requesters to publish the so-called HIT (Human Intelligence Task) and workers may decide if they are willing to complete the task in exchange for a small amount of money. We solely imposed two restrictions to select participants: be Italian and have an approval rating higher than 95%. The survey was feasible from June to August 2021 and we collected a total of 402 responses.

Once we collected the answers, data were organized and analysed by using both statistical and econometric tools. The major aim was to estimate the main determinants of WTP for both clothes made from bio-based materials and second-hand clothes. Results may be consultable in the paper [1].

Ethics Statement

Given that the research is a non-experimental voluntary survey, no ethical approval is necessary. Furthermore, the self-administered survey that is non-experimental in nature was conducted under complete anonymity for the participants. No personal or sensitive information that can be used to identify the respondents were collected. Besides, the consent of the respondents to partake in the online survey were seek before the survey was executed by including an electronic informed consent in the online survey form.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

Data Availability

Dataset fashion (Original data) (Zenodo).

References

[1] A. Colasante, I. D’Adamo, The circular economy and bioeconomy in the fashion sector: emergence of a “sustainability bias, J. Clean. Prod. 329 (2021) 129774, doi:10.1016/j.jclepro.2021.129774.
[2] A. Colasante, I. D’Adamo, Dataset Fashion, Zenodo, 2022, doi:10.5281/ZENODO.6537443.
[3] R.J. Tobias-Mamina, E. Kempen, Data modelling consumer-generated content usage for apparel shopping, Data Brief 31 (2020) 106035, doi:10.1016/j.dib.2020.106035.
[4] N. (Lauren) Kim, H. Woo, B. Ramkumar, The role of product history in consumer response to online second-hand clothing retail service based on circular fashion, J. Retail. Consum. Serv. 60 (2021) 102457, doi:10.1016/j.jretconserv.2021.102457.

1 Workers in Amazon Mechanical Turk receive an evaluation every time they complete a task. Usually, workers who do a poor or fraudulent work, are rejected and, as a consequence, the higher the approval rate, the higher the reliability of the worker. Said differently, the approval rating serves as a reputation mechanism that ensures quality data. For further information, see, for instance, Robinson et al. [13].
[5] C. Sassanelli, P. Rosa, S. Terzi, Supporting disassembly processes through simulation tools: a systematic literature review with a focus on printed circuit boards, J. Manuf. Syst. 60 (2021) 429–448, doi: 10.1016/j.jmsy.2021.07.009.

[6] I. D’Adamo, G. Lupi, Sustainability and resilience after COVID-19: a circular premium in the fashion industry, Sustainability 13 (2021), doi: 10.3390/su13041861.

[7] F. Jia, S. Yin, L. Chen, X. Chen, The circular economy in the textile and apparel industry: a systematic literature review, J. Clean. Prod. 259 (2020) 120728, doi: 10.1016/j.jclepro.2020.120728.

[8] I. D’Adamo, G. Lupi, P. Morone, D. Settembre-Blundo, Towards the circular economy in the fashion industry: the second-hand market as a best practice of sustainable responsibility for businesses and consumers, Environ. Sci. Pollut. Res. (2022) in press, doi: 10.1007/s11356-022-19255-2.

[9] A. Padilla-Rivera, S. Russo-Garrido, N. Merveille, Addressing the social aspects of a circular economy: a systematic literature review, Sustainability 12 (2020) 7912, doi: 10.3390/su12197912.

[10] A.M. Walker, K. Opferkuch, E. Roos Lindgreen, A. Simboli, W.J.V Vermeulen, A. Raggi, Assessing the social sustainability of circular economy practices: industry perspectives from Italy and the Netherlands, Sustain. Prod. Consum. 27 (2021) 831–844, doi: 10.1016/j.spc.2021.01.030.

[11] B.K. Sovacool, J. Axsen, S. Sorrell, Promoting novelty, rigor, and style in energy social science: towards codes of practice for appropriate methods and research design, Energy Res. Soc. Sci. 45 (2018) 12–42, doi: 10.1016/j.erss.2018.07.007.

[12] H.S. Kim, Consumer response toward apparel products in advertisements containing environmental claims, (1995), Iowa State University. Available from ProQuest One Academic. Accessed June 1, 2021.

[13] J. Robinson, C. Rosenzweig, A.J. Moss, L. Litman, Tapped out or barely tapped? Recommendations for how to harness the vast and largely unused potential of the mechanical turk participant pool, PLoS One 14 (2019) e0226394, doi: 10.1371/journal.pone.0226394.