



Survey Report

BUILD CIRCULAR UP

Cyprus University of Technology | Cyprus

I. Introduction of country system:

Cyprus, is the third largest island in the Mediterranean Sea, after Sardinia and Sicily with a land area of 9,251 km². The recent history of Cyprus is marked by the 1974 military invasion of the island by Turkey and the continued occupation of its northern part until present. The Republic of Cyprus is recognized as the sole legitimate state, while the north is under the de facto administration of the self-declared Turkish Republic of Northern Cyprus, which is guarded by Turkish Armed Forces. The population of the Republic of Cyprus is approximately 864,236 while the entire island's population is estimated to be 1,187,575 (Eurostat, 2018)

The economic sectors comprising the country's GDP are 2.3% agriculture, industry 11% (mining, manufacturing, energy production, and construction) and services 86.8%. The construction industry which has been heavily hit by the banking crisis in 2013 shows a recovery trend with economy accelerating rapidly, marking a growth rate of 3.9% in real GDP in 2017. Growth has continued until now-2019, and it seems that it will continue with investment being its the main driver (EC-Post-programme surveillance report, Cyprus 2018).

Latest reports from the Cyprus Statistics Service show a recovery of local demand for housing and a reinvigoration in the construction of dwellings for local and international investors. During the period from January to July 2018, 3699 building permits were issued compared to 3362 in the corresponding period of the previous year. The total value of these permits increased by 21,5%, the total area by 25,5% and the number of dwelling units recorded an increase of 23,7% (Statistical Service of Cyprus, 2018). Furthermore, several large-scale projects focused on tourism infrastructure, carried out by international consortia, have either been completed (Limassol Marina) or are under construction. Recent data on demolition waste are not available but it is estimated, based on past data, that there are 200 demolitions per year on average.

The management of CDW in Cyprus involves a wide range of parties from the public and private sector. All the CDW activity in Cyprus is overseen by the Ministry of Agriculture, Rural Development and Environment.

Legally, CDW in the Republic of Cyprus follows two main routes: CDW are either collected and transported to licensed processing plants, or alternatively are processed on site. For the collection/transport network CDW there are currently 479 carriers (Ministry of Interior - Technical Services, 2018) who are licensed to accept and handle construction waste and whose license is applicable for only a single waste code as specified in the European List of Waste. Several of these carriers are equipped with mobile crushers and sieves for processing of CDWs on site. It should be noted that Cyprus legislation considers any material leaving the site as waste and as such, on site processed residual materials should be used within the premises of the construction site.

There are currently six (6) licensed processing plants for CDW operating in Cyprus (Ministry of Interior - Technical Services - Division of Solid Waste Management, 2018). These units are equipped with CDW reception stations for weight control of the dump trucks and recording and initial inspection of the CDW's. Furthermore, they have temporary storage areas and presorting areas. They have the technical capabilities for smashing, crushing, manual and/or magnetic separation and sieving. They also have storage areas for recycled aggregates/final products. In addition, they operate sanitary landfills for any remain solid waste resulting from the operations. The recycled end products from the plant operations are sold back to authorized sellers of construction materials. To ensure compliance with legislation, producers of CDW (contractors, etc) are required to register or maintain CDW Management Systems. There are currently (3) Collective and four (4) Single CDW Management Systems in Cyprus (Ministry of Interior - Technical Services, 2018).

It should be noted that the above introduction has been taken from a full report that was produced for the EIT Climate-KIC RIS ideation Project "Circular Economy Thinking for Construction Waste Management in islands" which has received funding from the European Institute of Innovation and Technology, a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation.

II. Survey questions results

The present study attempts to investigate the attitudes of users and their practices in terms of circular economy, opportunities, needs and worries related to circular economy. The investigation was carried out using a sample of 36 people.

The questionnaire was divided into the following sections: (a) demographics, (b) Understanding of and attitude towards the circular economy, (c) Circular economy practices, (d) Opportunities, needs and worries related to the CE.

Finally, the quantitative data were analysed using Excel.

1. Demographics

The following graphs illustrate the demographic data from the survey. The CDW sector in Cyprus was represented from in the survey by early 30's, highly educated mostly male participants (65,7%).

1. What is your gender?

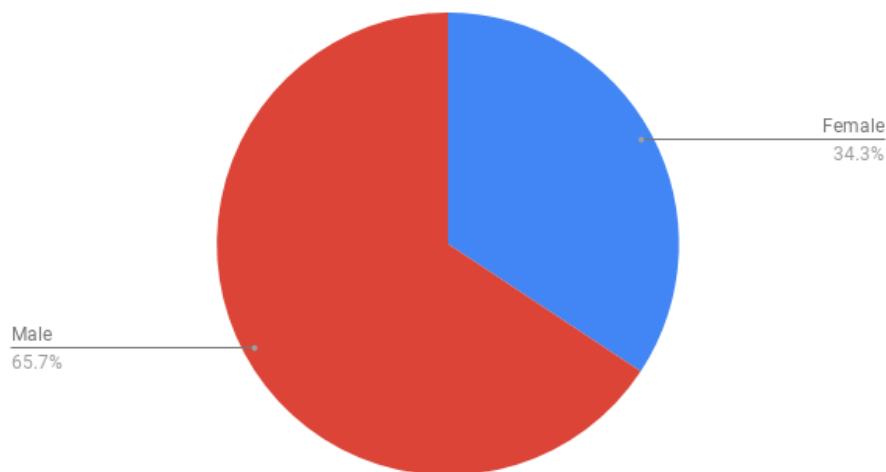


Figure 1. Diagram illustrating the percentage of male and female respondents' participating in the survey

2. How old are you?

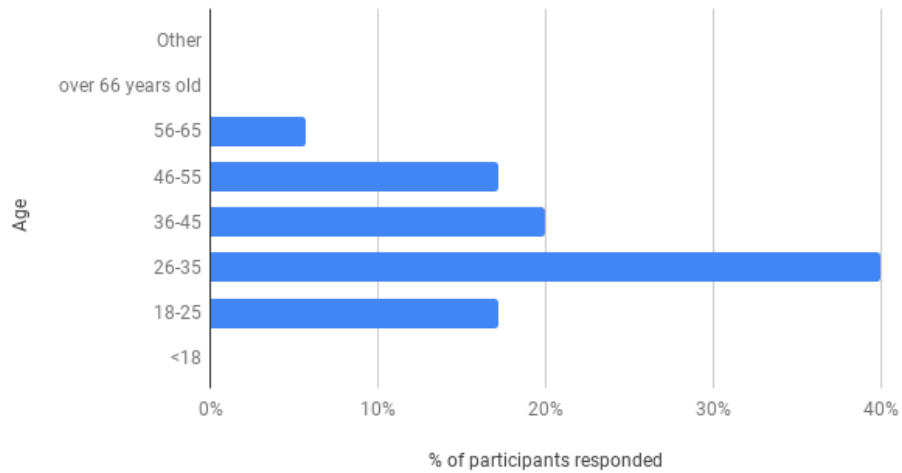


Figure 2. Diagram illustrating the age range of the respondents’ participating in the survey

3. What is your level of education?

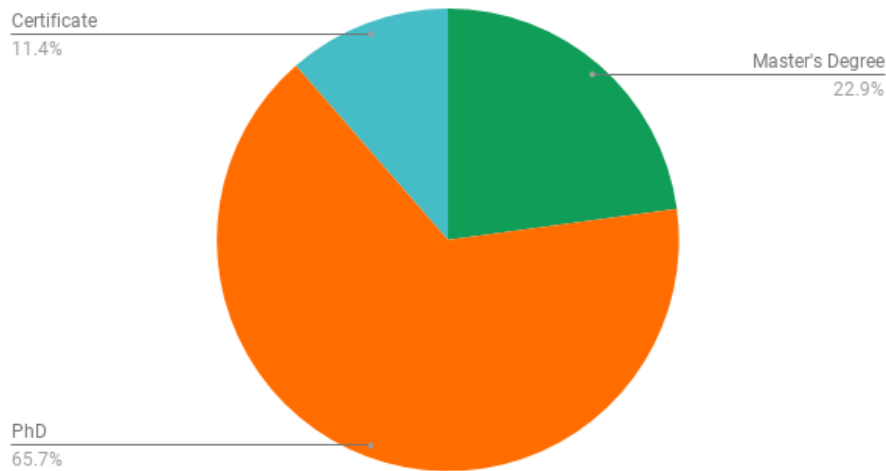


Figure 3. Diagram illustrating the respondents’ level of education

The CDW sector in Cyprus is generally comprised by Small to Middle sized companies. Most of the participants work in construction companies or engineering consultancies (design bureaus). The participants are showing to have relatively long experience working in these sectors (5-10 years).

4. How big is your company?

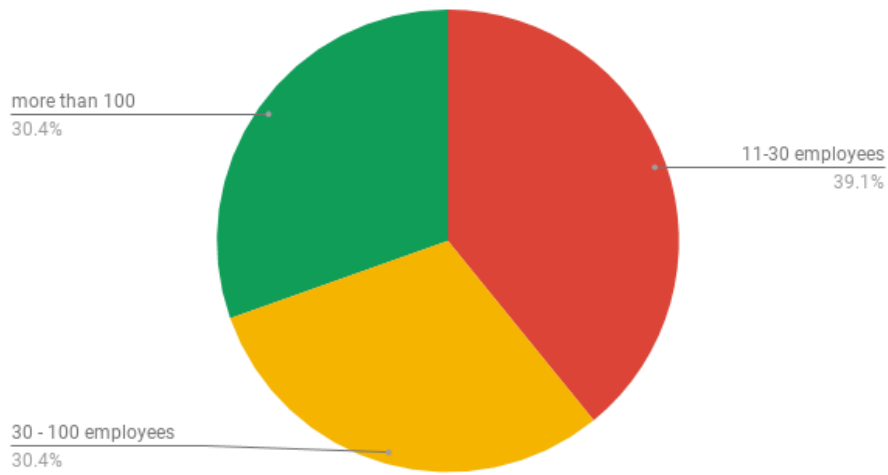


Figure 4. Diagram illustrating the respondents’ company size

5. What is your sector of activities?

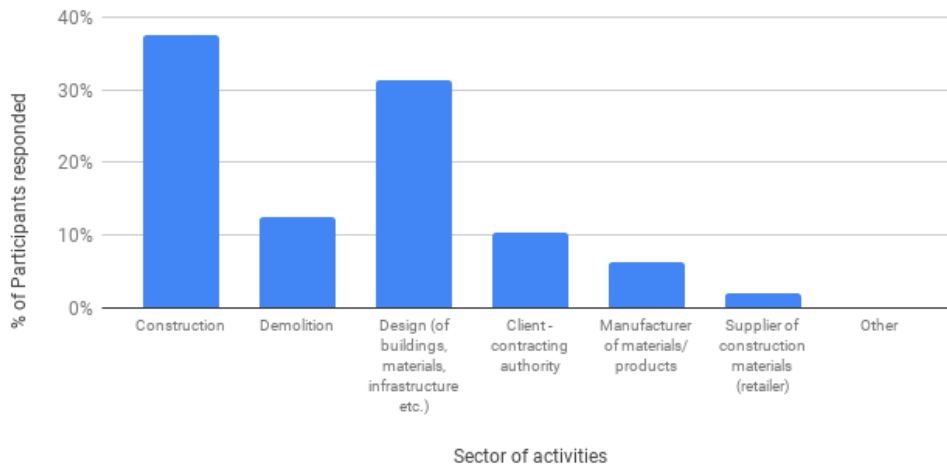


Figure 5. Diagram illustrating the respondents’ sector of activities

6. How many years have you been working in your current company?

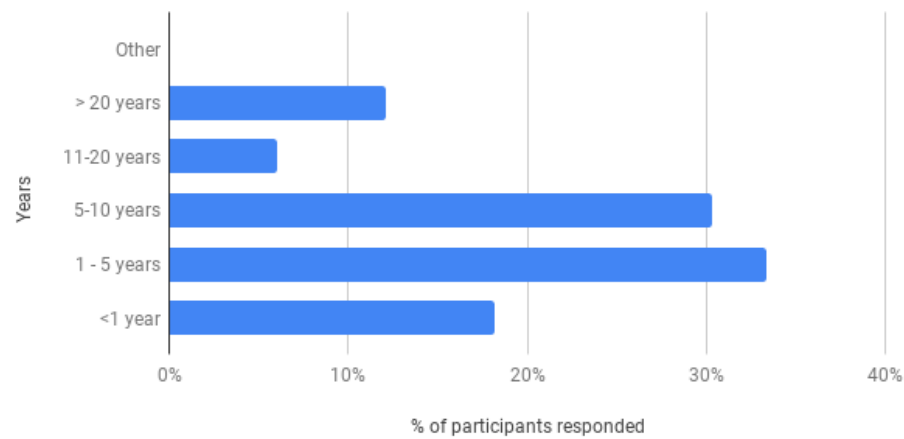


Figure 6. Diagram illustrating the respondents’ year of activity in their current company

2. Understanding of and attitude towards the circular economy

The results show that users tend to have a basic knowledge for CE. Approximately 60% of the participants have a basic knowledge on the CE context and a 12% state that they have never heard of it. Similar trend applies for the depth of their understanding in terms of CE with the 63% having somewhat deep or deep understanding.

Companies are showing an interest in the CE concept and they are working on implementing CE practices. They also recognize that companies within their supply chain also are showing a significant interest in CE practices.

7. Are you familiar with the concept of circular economy?

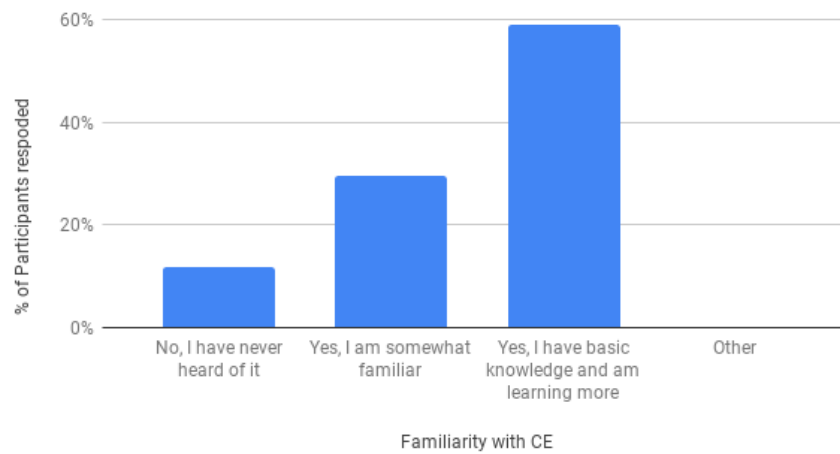


Figure 7. Diagram illustrating the familiarity percentage of the respondents' in terms of CE

8. How deep is your understanding of the circular economy?

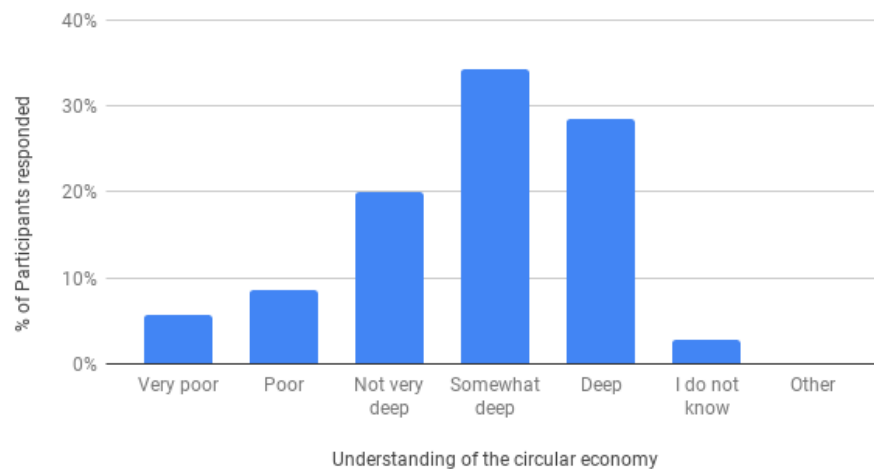


Figure 8. Diagram illustrating the respondents' depth of understanding in terms of CE

9. What is the level of interest in circular economy (CE) coming from your company?

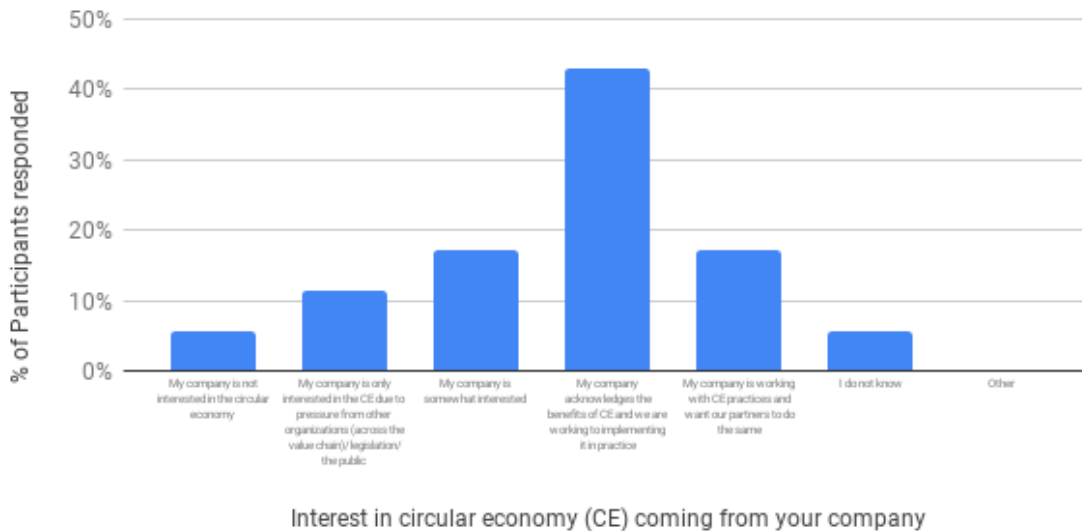


Figure 9. Diagram illustrating the respondents’ level of interest in CE coming from their company

10. What is the level of interest in circular economy coming from the companies you work with?

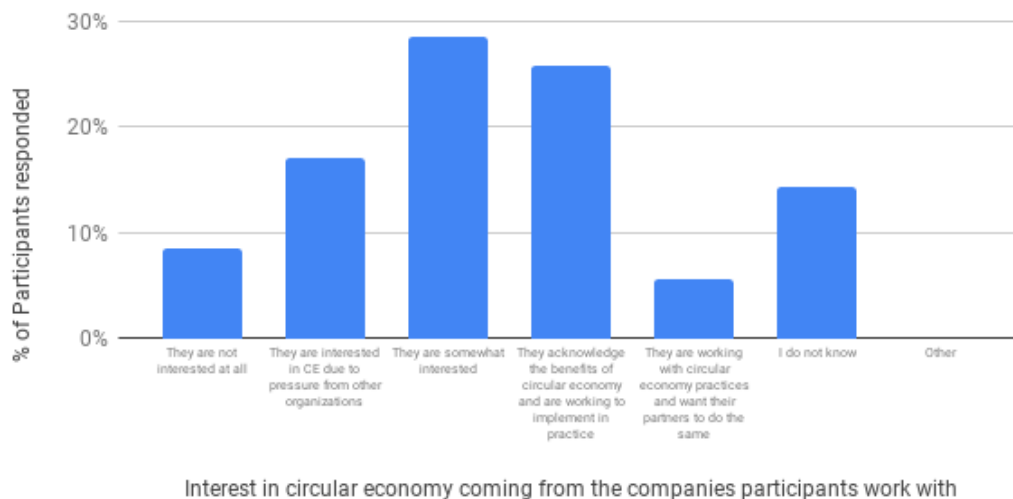


Figure 10. Diagram illustrating the respondents’ level of interest in CE coming from their company

The majority of the participants (74%) are aware that CDW producers in the construction sector (constructors, demolitions, etc.) are either required to be a member of a collective CDW management system (multi-stakeholder organization) or to maintain and operate their own licensed CDW management system. The fact that 26% of the participants are not aware of this obligation of the CDW producers, indicates the importance of further outreach and training, since this percentage might be higher within the industry.

A general misconception in the CDW industry prevails that the waste from this sector is predominantly inert and could be handled in a relaxed way by leaving the waste on site. However, most of the participants are aware that the owner has a legal obligation to manage the waste and around half of the participants are aware that the owner can transfer the liability to manage the waste to other licensed entities.

11. Are you aware that CDW producers in the construction sector (project builders, demolitions, etc.) are either required to be a member of a collective CDW management system (multi-stakeholder organization) or to maintain and operate a their own licensed CDW management system?

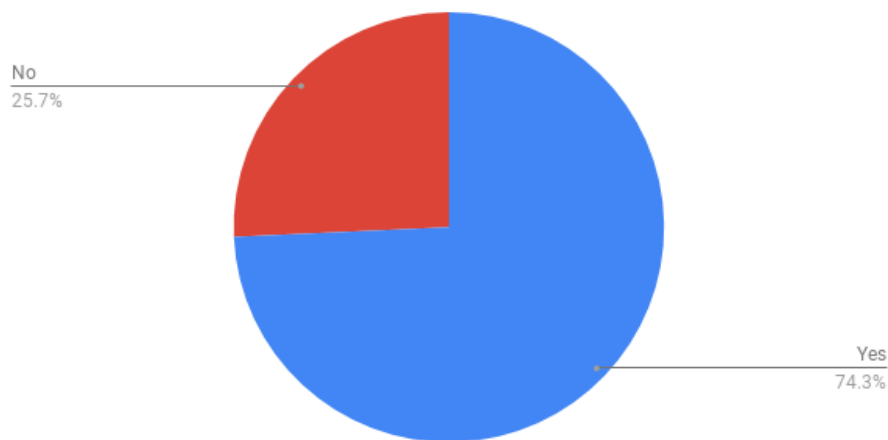


Figure 11. Diagram illustrating the respondents’ awareness level in terms of their management system

12. Do you think that there is a misperception that CDW can be disposed somewhere and left there, since its inert nature makes it harmless for human health and the environment?

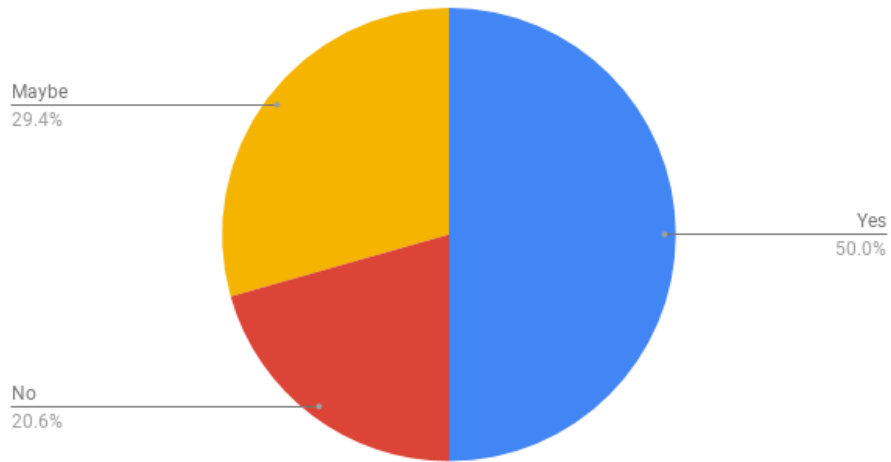


Figure 12. Diagram illustrating the respondents' misperception level in terms of disposal

13a. Are you aware that project owners (construction and demolition) have the full responsibility for managing the produced CDW and need to prepare and maintain a comprehensive management plan within the construction site, prior to the start of any project? *

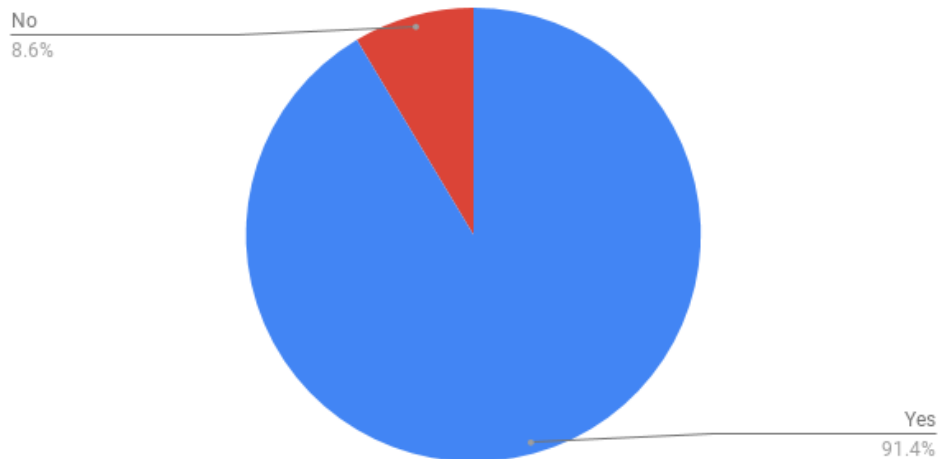


Figure 13a. Diagram illustrating the respondents' awareness level in terms of the projects owner responsibilities'

13b. Is it true that owner may transfer by contract to the CDW producer (Contractor) the liability of managing the CDW and hence the Owner is dismissed of the above obligations and the Contractor is fully obliged in Managing the CDW?

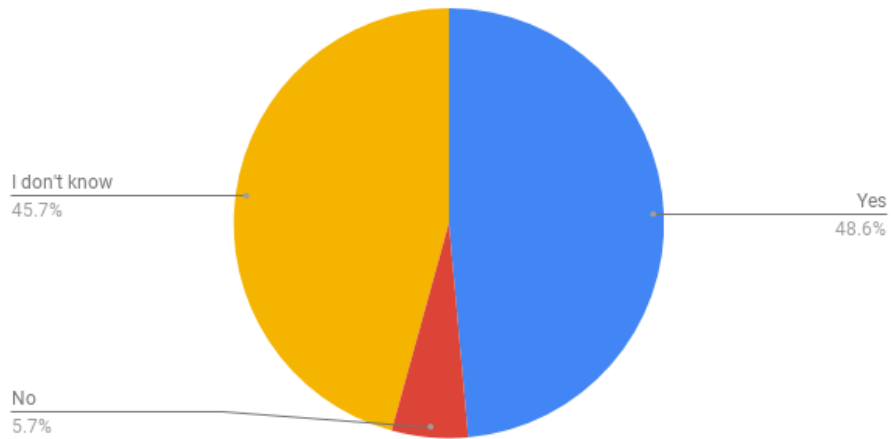


Figure 13b. Diagram illustrating the respondents’ awareness level in terms of their management system

3. Circular economy practices:

Almost half of the companies (41%) have no partnerships across the supply chain in which CE practices are applied because there is no interest within the company (43%) or their partners have no interest in CE at the moment (29%). One third of the participants reported that they have profit from selling recycled materials.

14. Has your organization developed new partnerships across the value chain in which circular economy practices are applied?

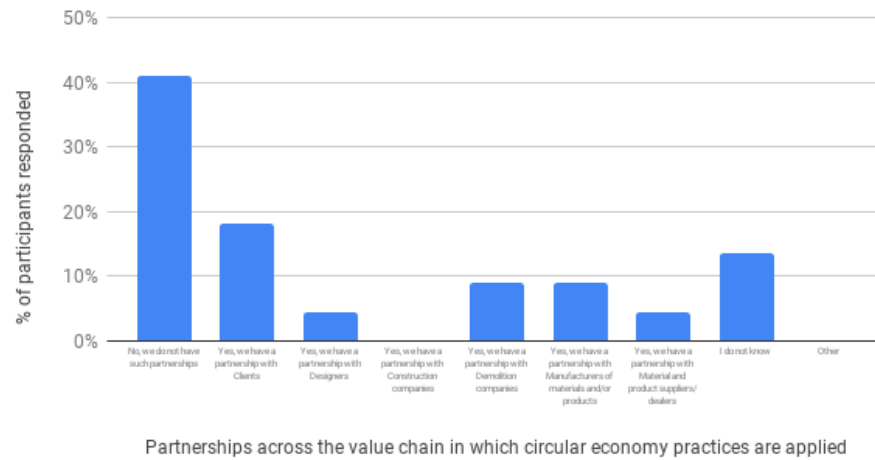


Figure 14a. Diagram illustrating whether respondents’ organizations form partnerships across the value chain in which circular economy practices are applied

14a. If you indicated "No" in the previous question, please state the main reasons why you do not have circular economy partnerships

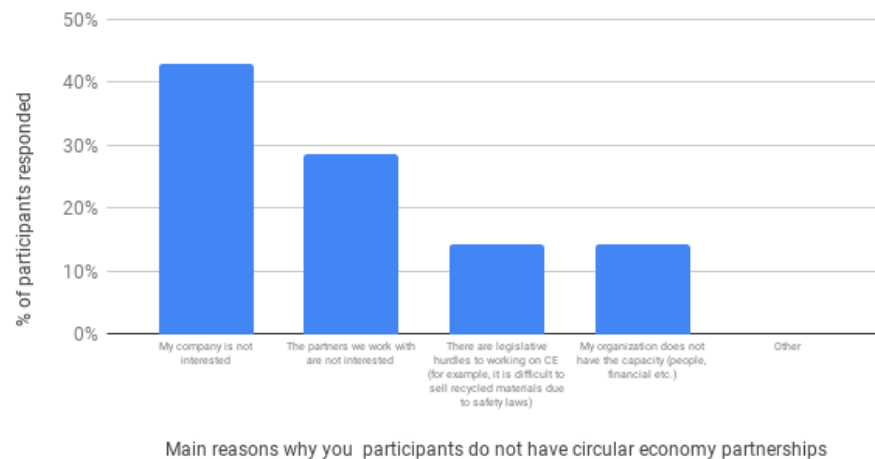


Figure 14b. Diagram illustrating why respondents’ organizations do not form partnerships across the value chain in which circular economy practices are applied

15. Does your organization earn profit from selling any recycled materials?

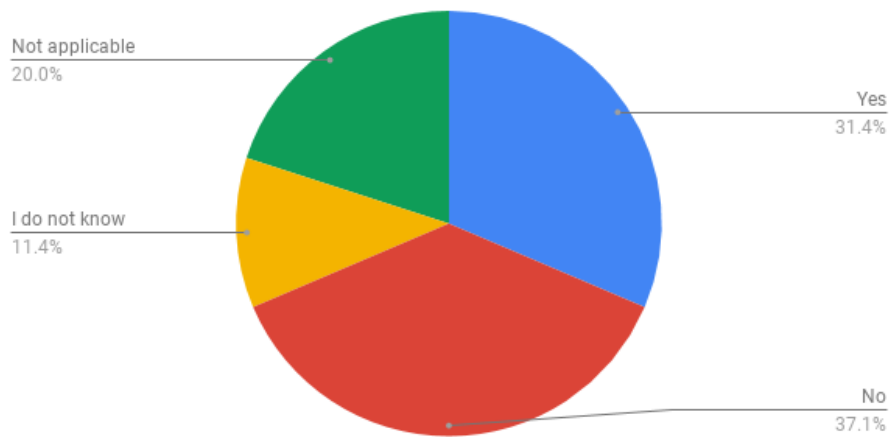


Figure 15. Diagram illustrating whether respondents' organizations earn any profit from selling recycled materials

Approximately 65% of the participants are separating CDW produced, while a significant 17% does not separate waste at all. The main raw materials used by the participants were aggregates, havana, concrete, metals, bricks, tiles, building stone and wood. The main materials reported as being recycled were aggregates, havana, building stone, concrete, metals, bricks, tiles, packaging, wood and plastic. The main materials reported as being reused were aggregates, havana, metals, tiles and to lesser extent wood.

16a. Do you separate the waste you generate during operations?

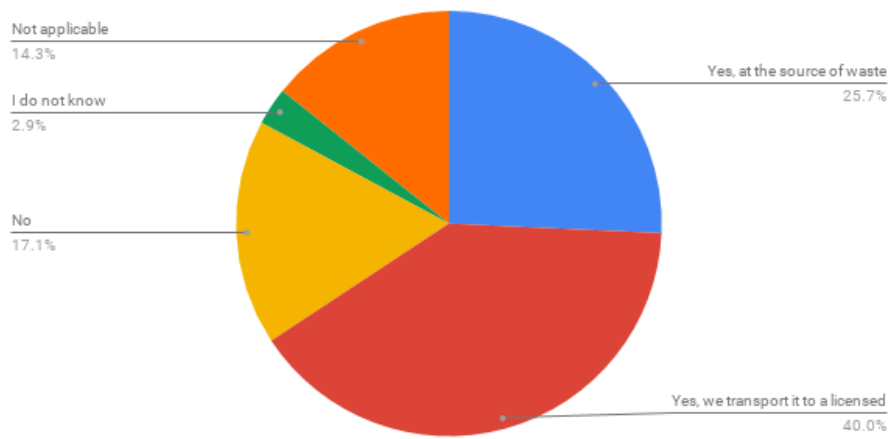


Figure 16a. Diagram illustrating whether respondents’ separate the waste generated during operations

16b. What is the percentage of separated vs. mixed waste your organization generates through operations?

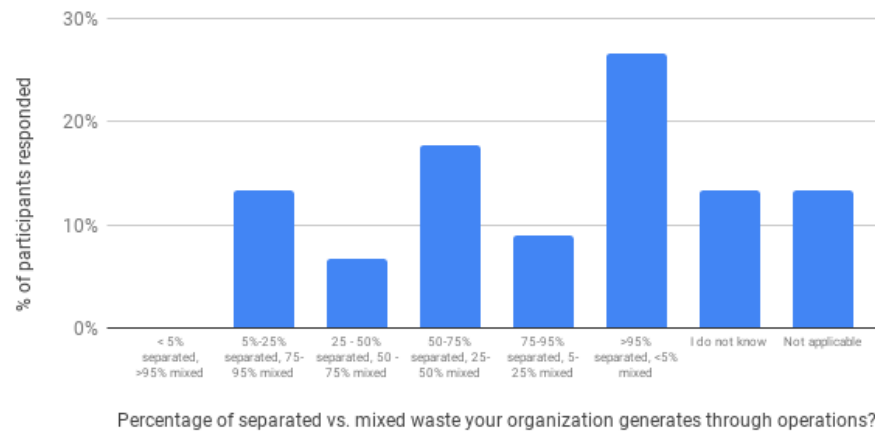


Figure 16b. Diagram illustrating the percentage of separated vs mixed waste participants’ organization generates through operations

17. Which of the following materials/waste do you use in your operations? (use, recycling, reuse)?

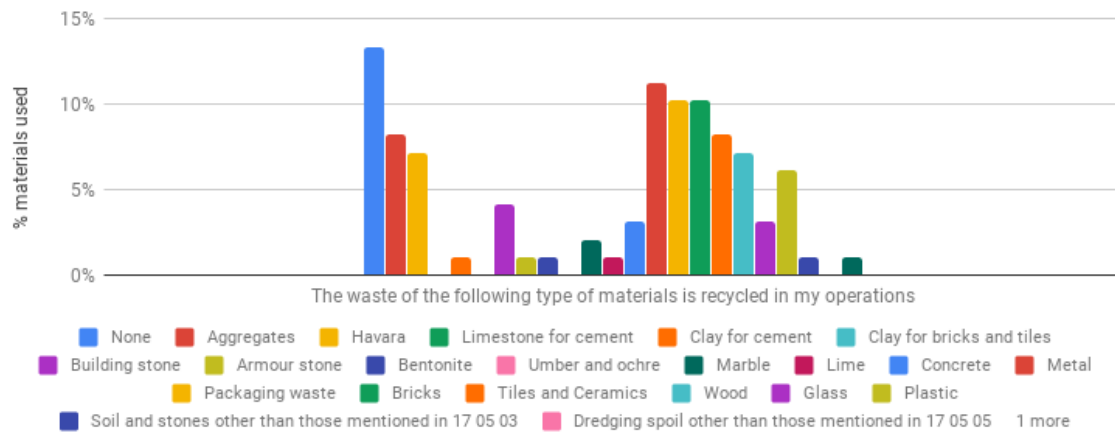


Figure 17. Diagram illustrating which type of material the respondents use in their operations

Most of the participants (66%) reported that they are members of a collective CDW management system while the rest have responded that they maintain and operate their own management system.

18. Which of the following applies to your company?

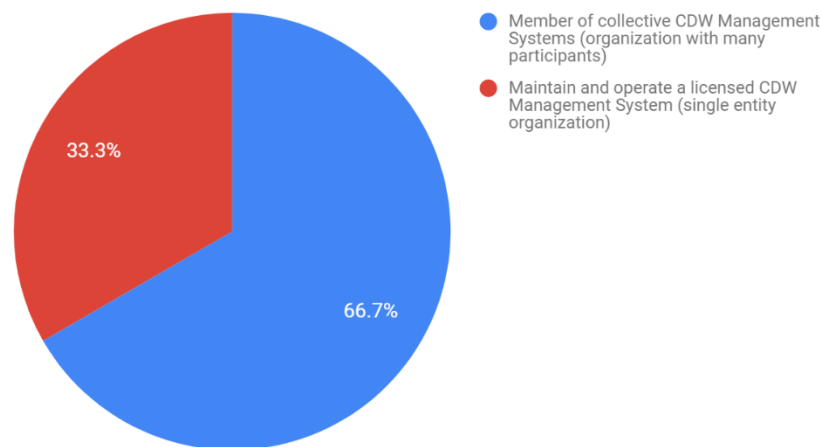


Figure 18. Diagram illustrating the percentage of participants that belong to a collective management system or have their own management system

More than half of the companies have developed their own management system and have a designated person that is responsible for the waste management. Furthermore, interestingly, 52,9% of the companies design their own products in such a way as to minimize the amount of waste produced during manufacturing.

19. Does your company develop a waste management strategy/plan in its projects?

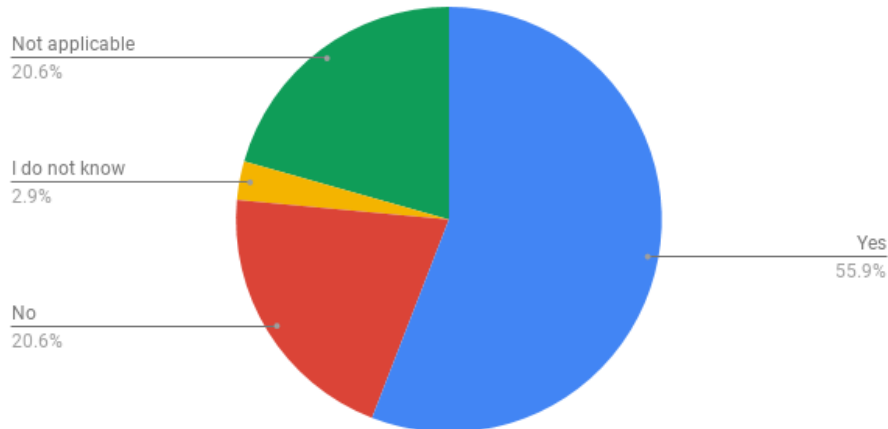


Figure 19. Diagram illustrating the percentage whether the participants company develops a waste management strategy or plan during their projects

20. Do you have a designated person that deals with the waste strategy/plan?

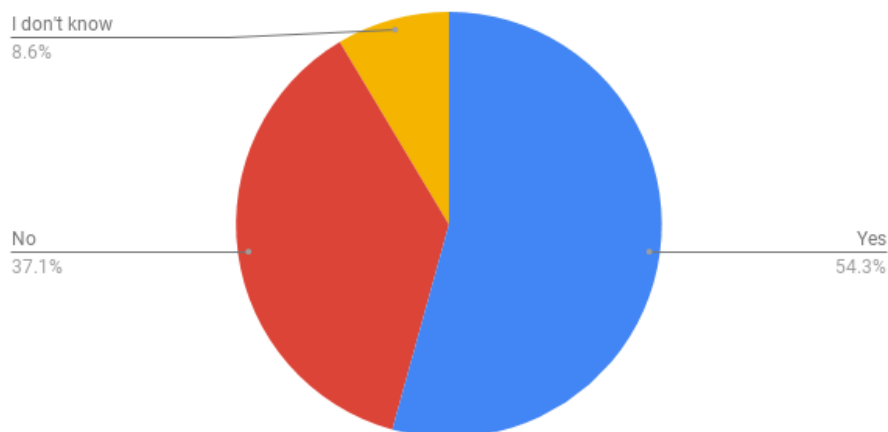


Figure 20. Diagram illustrating whether the companies have a designated person that deals with the waste plan

21. Do you design your products in such a way as to minimize the amount of waste produced during manufacturing?

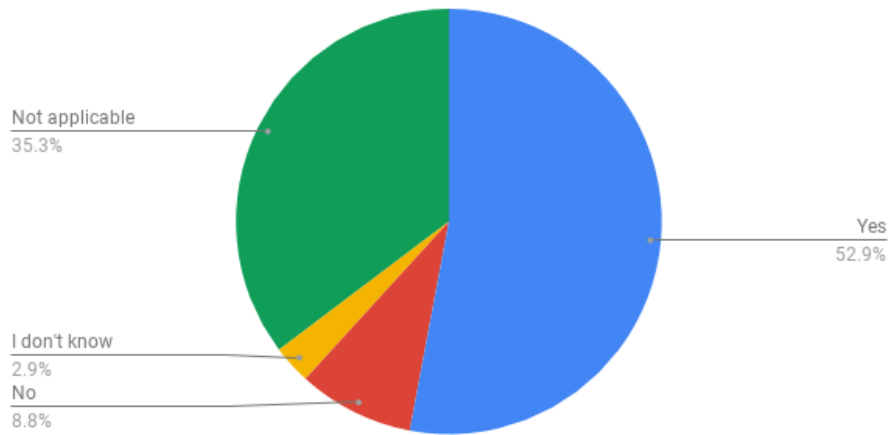


Figure 21. Diagram illustrating whether the companies design their own products in such a way as to minimize the amount of waste produced during manufacturing

4. Opportunities, needs and worries related to the CE

For an industry with a high degree of uncertainty and low profit margins, cost minimization by adopting CE practices is identified as a major benefit for the companies by the participants.

22. What benefits do you identify in implementing CE practices in your organization?

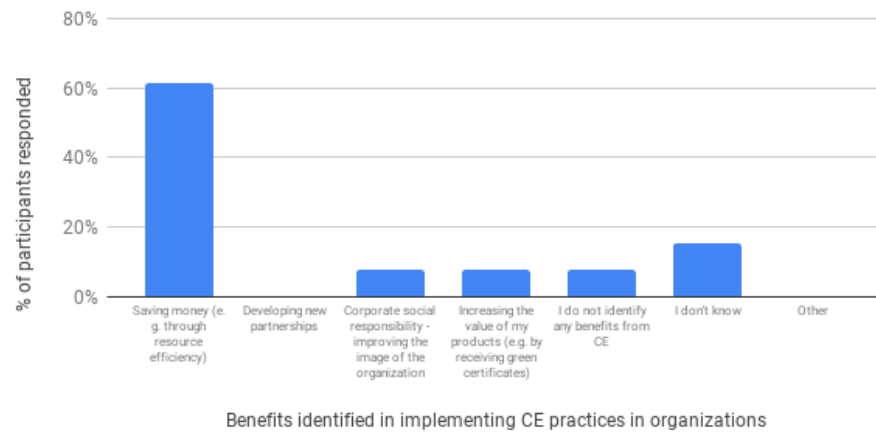


Figure 22. Diagram illustrating the participants identified benefits in implementing CE practices in their organization

A percentage of 15,2% of the companies are not aware where their materials are coming from and a 18,2% stated that they are not sure.

23. Do you know where the materials your company uses in operations comes from?

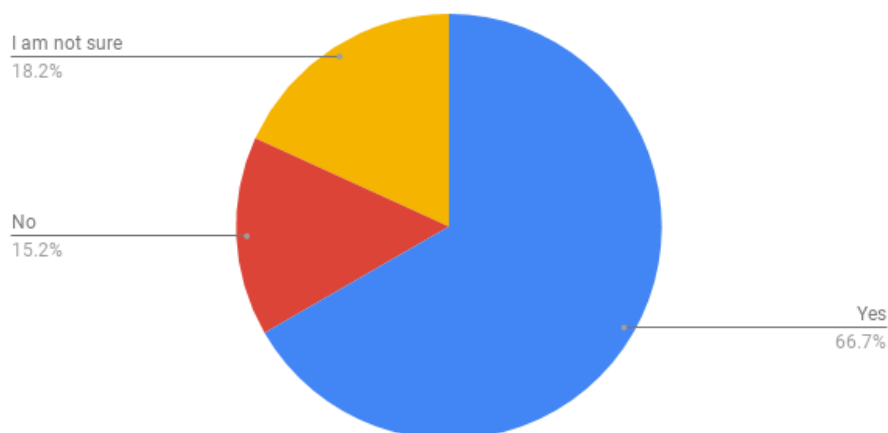


Figure 23. Diagram illustrating whether the participants know where the materials their company uses comes from

Companies identify barriers in recycling and reusing materials and absence of incentives in Cyprus' CDW sector. Cultural aspects towards CE and environmental protection, lack of training and relevant information on CE, absence on standards for recycled materials and absence of infrastructure are some of the barriers mentioned by the participants. The cost of transport and disposal of the CDW is reported to be the major barriers towards the sound waste management, leading to onsite waste treatment. Also, the cost and the lack of standards are identified as the major concerns in using recycled materials, even though some participants were able to acknowledge that some standards exist, but they were not familiar with their context.

24. Do you identify any barriers to recycling waste?

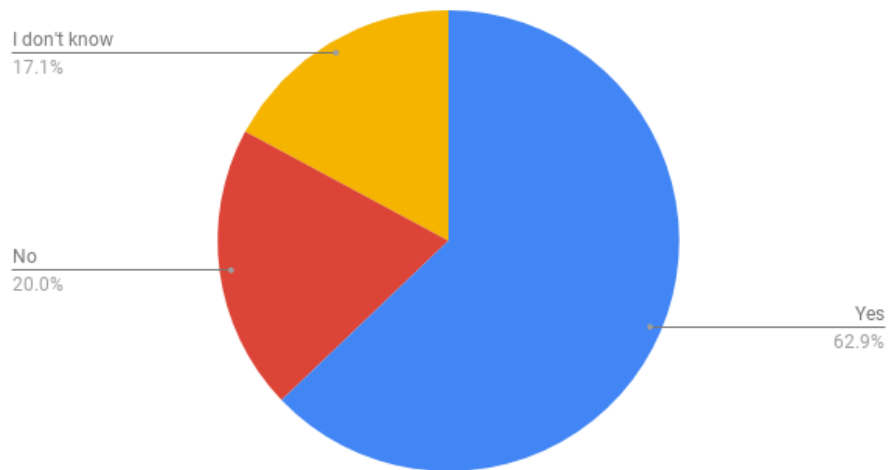


Figure 24. Diagram illustrating the participants identified benefits in implementing CE practices in their organization

25. Do you identify any barriers to using/selling recycled waste?

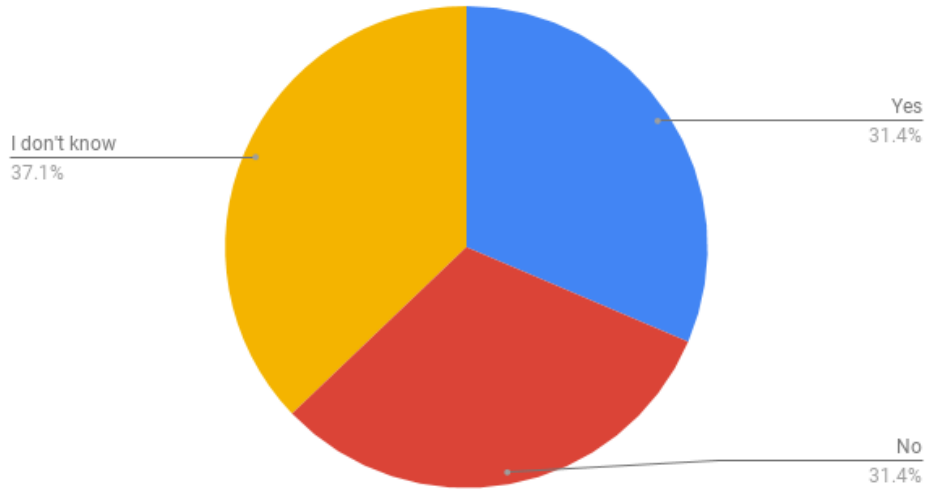


Figure 25. Diagram illustrating if the participants identify any barriers to using or selling recycled waste

26. Please indicate the main incentives (motivational factors) for your company to separate waste at the source of generation?

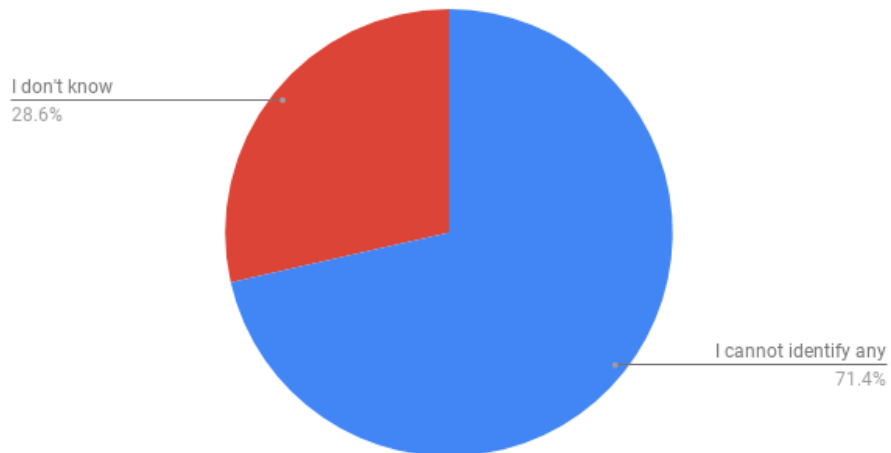


Figure 26. Diagram illustrating the participants' company motivational factors to separate waste at source

27. Do you have any concerns for using recycled materials?

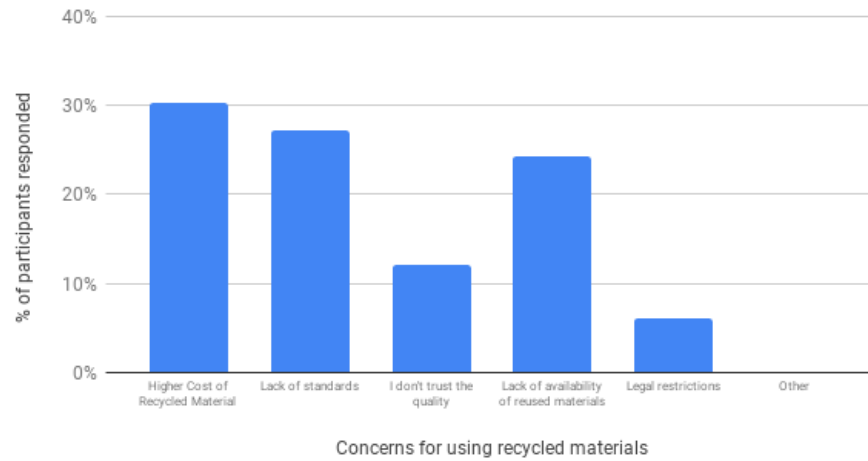


Figure 27. Diagram illustrating the participants’ concerns for using recycled materials

28. Do you think that the cost of transport and disposal of CDW in collection areas is so high that it is limiting to properly treat the waste produced?

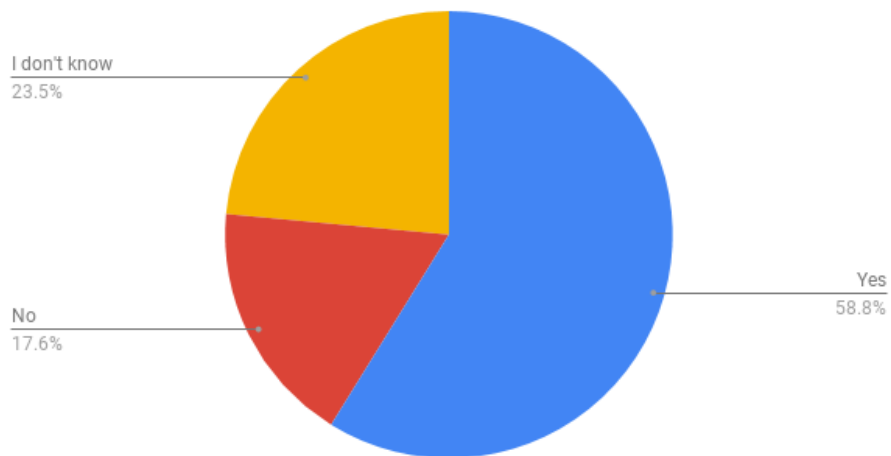


Figure 28. Diagram illustrating the participants’ views on transport costs and disposal of CDW

29. Do you know of any regulation and standards for recycled materials / secondary materials from CDW?

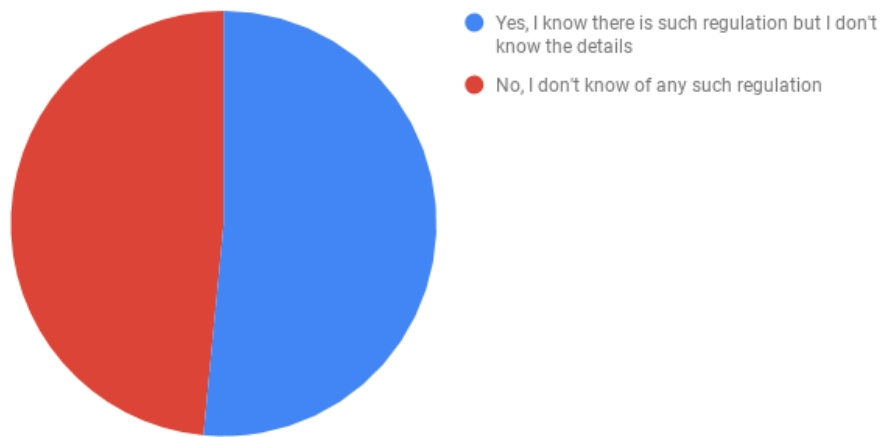


Figure 29. Diagram illustrating the participants’ knowledge level according to standards and regulations for CDW

III. Conclusion

The growing world population puts an enormous stress on the environment and natural resources. The intense activities of the construction sector in Europe have been generating huge amounts of construction and demolition waste (CDW). Our single-mindedness on producing and consuming as cheaply as possible has created a linear economy in which objects are briefly used and then discarded as waste.

Based on the results of this study, participants tend to have a basic knowledge for CE, stating that they have somewhat deep understanding. The companies that the respondents represent show a high capacity and interest to implement CE practices. The same applies for the companies in their supply chains.

Additionally, the results showed that the majority of the participants are aware of the management system that exists in Cyprus. However, they are apt to that waste from this sector is predominantly inert and could be handled in a relaxed way by leaving the waste on site.

It is evident from the survey that barriers exist in the CDW sector that prohibit CE practices to be developed. The participants found the current survey to be very useful and some asked for more information to be provided in relation to the CE in the CDW context. However, it was noted that time, resources and synergies are needed to the CE concepts to be put in practice in Cyprus.

Consequently, priority should be given to improving waste management system for reducing construction waste and promoting CE. Consultation schemes are a worthwhile investment since they could generate behavioral change resulting in waste management and a pivot from linear to circular economy.

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