

ChatDOC Tutorial

What is ChatDOC?

As of the time of this writing in November 2023, **ChatDOC** is the **best GPT-based research tool** available to chat with documents and quickly **extract, locate and summarize information** without needing to waste your time reading information that is not relevant for you. It's the **perfect AI reading assistant** to speed up your research and knowledge, as it's **aimed at researchers, students and knowledge workers**. You can **chat with individual files or collections** with up to 30 files and you can ask the AI chatbot for suggested and custom queries, multi-doc questions to contrast information across files, and your own questions about the full text or a selected text from the file. It supports **PDFs** including scanned documents using OCR technology, **DOC(X)s, EPUBs, TXTs, Markdown files, and websites** (better if they are plain text).

You will **get in-text citations and references** in all ChatDOC's replies so you will be able to trace where the information is coming from and ensure the accuracy of the responses. In addition to that, you can start a thread within your chat to **ask follow-up questions**. You can summarize and analyze data from not only texts but tables and mathematical problems as well, to make their interpretation easier. You can also ask a file a question in any language and select in what language you want the answer to be, it's irrelevant the language in which the document is written, and you can always download and share your chats. Overall, ChatDOC is an essential tool for any researcher.

There is a quite limited Free plan, but there is a generous Pro subscription for under \$60 if you pay annually and also the possibility to expand your plan if you need more pages or if you want to use GPT-4. Check out their website: [ChatDOC - Chat with your documents](https://www.chatdoc.com)

Use Cases of ChatDOC

- **Summarize and get to understand any text, table or mathematical problem and get answers in text, bullet point, or tabular format.**
- **Digest research papers and books.**
- **Get an abstract.**
- **Filter the information and sources that aren't useful for your purposes.**
- **Find information within a document.**
- **Fact-check and contrast views from different authors.**
- **Paraphrase selected sentences and change their tone.**
- **Translate selected texts.**
- **Critically challenge interpretations.**
- **Brainstorm creative and interdisciplinary angles to improve your research.**
- **Come up with ideas for attractive titles, keywords, and tags.**
- **Reverse engineer ChatDOC for relevant questions to ask about the document.**
- **Get feedback for editing.**
- **Change the citation style.**

Tips to use ChatDOC effectively

- **Ask one question at a time.** If you ask many questions at the same time, the amount of information ChatDOC will provide for each question will decrease, and some questions might be ignored altogether.
- **Ask follow-up questions in threads.** ChatDOC doesn't retain context from previous questions in a chat, so, if you want to ask a follow-up question, use the thread feature.
- **Stay on-topic.** To ensure the reliability of the answers and be able to trace the original source of information, ChatDOC is designed to only answer based on the document you've uploaded. You can turn off the 'stick to the file' default option if you make a follow-up question in a thread and let ChatDOC draw information from elsewhere as ChatGPT does, with the danger of not receiving accurate and traceable responses.

- **Avoid broad questions.** If you ask broad questions like "summarize this entire book" or "find all the typos in this document", it will be impossible for ChatDOC to give an appropriate answer due to token input and output limits (in GPT 3.5 that's around 3000 words per turn combining input and output). Other kinds of broad questions like "what are the issues of this report?" won't work either because we are not providing any specific criteria.

ChatDOC examples

Ways to ask questions

- **Suggested queries:** ChatDOC automatically generates an abstract and 5 relevant questions, and you will be able to pick them at any time by clicking the lightbulb. In my experience, the suggested questions are great when dealing with a short article, but the suggested queries won't be very relevant if you upload a book or a dissertation because it will usually pick a specific section of the long document to formulate questions.

The screenshot shows a comparison between a detailed academic article and a more general summary or executive version of the same topic. The left panel displays the full article with its original layout, including the title, authors, abstract, and various sections with footnotes and references. The right panel shows a simplified version of the same content, likely generated by ChatDOC, which includes an abstract, a list of recommendations, and a search bar at the bottom.

Left Document (Sustainability Science):

- Title:** Circular agri-food economies: business models and practices in the potato industry
- Authors:** Oliver Klein¹ · Stefan Nier² · Christine Tamásy¹
- Abstract:** Circular economies are an important pillar of sustainable production and consumption. This particularly applies to the agri-food industry, which is characterised by large amounts of organic waste and by-product streams posing a serious challenge for many food producers. Therefore, respective firms are increasingly adopting circular economy business models (CEBMs) to manage these resource flows effectively. However, there is only little knowledge on the functioning of CEBMs in bio-based industries, especially in the context of the agri-food industry. We therefore conducted a case study approach to understand such business models as well as the institutional contexts they are embedded in. In methodological terms, we adopt a case study approach using the example of potato production in Lower Saxony (northwest Germany). The core of the paper is a qualitative in-depth analysis of four potato processors, adopting varying business models to valorise their by-product streams (e.g. peels, stems, pulp) either "in-house" or in partnerships with external partners. The findings show that the implementation of CEBMs requires a fundamental rethink of internal and external enables, while economic considerations are the main impetus for the management of biological reverse cycles. Thereby, we find a shifting economic logic in the assessment of potato by-products from disposable waste to valuable resources for other sectors (e.g. livestock farming, bioenergy, biofuels). While being encouraged by targeted policies, the companies studied feel increasingly affected by emerging sustainability discourses, prompting them to (re)design and (re)frame their CEBMs in view of environmental and societal issues.
- Keywords:** Sustainable food systems · Circular economy · Business models · Food waste · Potato industry · Qualitative research
- Notes:**
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Right Document (PDF):

- Title:** Circular agri-food economies business models and practices.pdf
- Abstract:** The document discusses the importance of circular economies in the agri-food industry, specifically focusing on the potato industry in Lower Saxony, Germany. Circular economies involve recycling and reusing products and materials, reducing waste, and keeping the functional value of products as long as possible. The agri-food industry is particularly relevant for circular economies due to its high resource and energy consumption and the large amount of organic waste it generates. The document explores circular economy business models (CEBMs) adopted by potato processors to effectively manage their by-product streams. The study finds that the implementation of CEBMs is driven by a complex
- Recommend:** What are the key challenges faced by the agri-food industry in adopting circular economy business models? →
- Custom:** What evidence is there of disruptive approaches to creating completely new circular economy pathways in the potato industry? →
- Input:** Type a question or type "/" to select a prompt.
- Output:** Output in English | Stick to file

- **Ask your question about the full text:** Type your question without selecting a text or table or use one of your frequently used prompts saved in the custom prompt section in the lightbulb. Due to the limitations of LLM models, the longer the document is, the more difficult it is for the AI to find relevant snippets to provide a good answer.

The figure shows a screenshot of a research paper and a ChatDOC interface. The paper's header includes 'Auto Fit', page number '5', and a search icon. The main text discusses the methodology followed by the research, mentioning an actor-centric approach focusing on CEBMs in the agri-food sector. It details interviews with multiple actors in the industry, specifically potato processors in Lower Saxony, Germany. The study aims to understand motivations and actions behind these models while considering specific contexts. The duration of interviews varied from 40 to 160 minutes, with an average of 60 minutes. The interview guideline consisted of four thematic categories derived from literature: business network, forms and amount of potato by-products, functioning of waste and by-product valorization, and external conditions affecting the CEBM. Interviews were transcribed and evaluated using content analysis techniques according to Mayring (2014). The collected material, including transcripts and company-specific documents such as sustainability reports and business model descriptions, was organized, reduced, and consolidated in the form of "case summaries" for further analysis.

Materials and methods

The empirical analyses are part of a working package within a larger interdisciplinary research project entitled "Bioeconomy 2.0: Introducing potentialities and challenges". The geographical focus is on Lower Saxony in northwest Germany, where intensive agriculture and food production are predominant elements of regional economies and cultural landscapes. Three plant-based production systems have been identified, i.e. potato, rapeseed and sugar beet production. However, the paper focuses on the project dealing with by-product valorization in the potato sector. In Lower Saxony, potato production clearly stands out since almost one in every two German potatoes is grown there, meaning a total harvest volume of around 4.1 million tonnes produced on an area of 14,000 hectares (BLE 2019; Fig. 2). In addition, there are 17 potato processing companies located in Lower Saxony making up at least 20% of all German potato processors (Destatis 2019; LSN 2019).

Fig. 2 Main areas of potato production in Lower Saxony (according to harvest volumes at district level in 2016) (More recent data are not available; highlighted are only those districts with harvest volumes of at least 200,000 tons). Source: Own figure; data adapted from Destatis (2016)

Sustainability Science (2022) 17:2237–2252

2241

Explain in detail the methodology followed by this research

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The methodology followed by this research involves an actor-centric approach that focuses on the implementation and functioning of circular economy business models (CEBMs) in the agri-food sector. The study aims to understand the motivations and actions behind these models while considering the specific contexts in which individual agri-food firms operate [2].

To address the research questions, the study conducted interviews with multiple actors in the agri-food industry, specifically potato processors in Lower Saxony, Germany. The selection of interviewees was driven by the companies' self-descriptions of implementing circular flows of waste and by-product valorization [5]. The interviews were carried out face-to-face between November 2017 and September 2018 and recorded with the consent of the interview partners. The duration of the interviews varied from 40 to 160 minutes, with an average of 60 minutes [6a].

The interview guideline consisted of four thematic categories derived from the literature: the business network of the company, forms and amount of potato by-products, functioning of waste and by-product valorization [6a]. The interviews were transcribed and evaluated using content analysis techniques according to Mayring (2014) [16]. The collected material, including transcripts and company-specific documents such as sustainability reports and business model descriptions, was organized, reduced, and consolidated in the form of "case summaries" for further analysis [6a].

In addition to interviews, the study also conducted on-site visits to four potato processing firms to gain a practical viewpoint and better understand the implementation and development of CEBMs.

Type a question or type /* to select a prompt.

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- **Ask about selected content:** highlight a text or table, click the button with ChatDOC's logo next to it, and ask your question. This is the best way to get a relevant answer.

Conclusions

In this paper, we explored the practical implementation of CEBMs in potato production in Lower Saxony (northern west Germany) as an alternative to existing conceptual thoughts on biological resource flows in CEOs, we conducted a case study-based analysis of different companies to shed light on the valorization of by-products as the main pillar of CEBMs. Specifically, we sought to understand the underlying practices and relations between enablers and motives, and the impact of institutional context conditions (polices, markets). The findings revealed, among others, that CEBMs are motivated by the necessity to somehow deal with large amounts of potato by-products in connection with a reassessment of their economic value, and further driven externally by policy incentives, market dynamics, and emerging discourses on sustainable food production. The implementation of CEBMs mostly relies on (formal) partnerships with actors outside of the agribusiness (e.g. livestock farms, biogas producers, feed companies), while some companies - both larger and smaller ones - have built up their own structures for processing of by-products.

This study has several policy implications: recent appeals to Donner et al. (2020), Ladek-Freund et al. (2019), and Veltenseff et al. (2019) who suggest to explore circular economies more holistically in consideration of socio-economic issues. However, there is still much work to be done to understand firms' needs and interests of circular agri-food economies, as they encompass technological, economic, environmental, societal and political domains. For example, there is a lack of research on the role of public sustainability discourses in shaping CEBMs. How do critical debates around food waste, resource efficiency, and climate affect the corporate strategy of agri-food companies? How are pressures channeled through the value chain ('from fork to farm')? And what is the role of power imbalances in that respect? Another research area could address the normative capacity and sustainability outcomes of circular agri-food economies, with life-cycle analyses (LCAs) critically reflecting upon (potential) negative externalities across businesses and/or economic sectors. Assessing the transformative capacity of CEOs also requires a closer look at the demand

Funding Open Access funding enabled and organized by Projekt DEAL. This research was funded by the Ministry of Science and Culture, Lower Saxony, Germany.

Declarations

Conflicts of interest/Competing interests: There are no conflicts of interests or competing interests with respect to this manuscript.

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De Costa U, De Bari I, Viola E, Pugliese M (2018) Assessing the potential of agroindustrial residues from bio-energy crop products and agroindustrial residues from high-value added products associated to some emerging markets: a review. *Sustain Energy Res* 08:320–340

Summarize in bullet points the key takeaways

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- The paper focuses on the practical implementation of Circular Economy Business Models (CEBMs) using potato production in Lower Saxony, Germany as an example.
- The study analyzes different companies and their practices in valorizing by-products as the main pillar of CEBMs.
- The motivation for implementing CEBMs is the need to manage large quantities of potato by-products and the reassessment of their economic value.
- Policy incentives, market dynamics, and discourses on sustainable food production drive the implementation of CEBMs.
- CEBMs often involve partnerships with actors in the agribusiness sector, but some companies have developed their own internal processing structures.
- The research suggests the need for a holistic understanding of circular agri-food economies, including socio-economic issues and the role of public sustainability discourses.
- There is a lack of research on the impact of public debates on circular agri-food economies and the role of power imbalances in shaping corporate strategies.

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- Ask a follow-up question in a thread:** click the reply button or just type a follow-up question when after you get the first answer a 'Ask related questions in the thread' fill form appears. As explained in the tips section, this will allow ChatDOC to retain the context of the previous question.

H Write a brief overview about the introduction, mentioning the relevant authors cited in theoretical proposal

2023-08-25 19:04:12

In the theoretical proposal of the document, the authors discuss the importance of the agrarian transformations that occurred in the Iberian Peninsula between the 8th and 10th centuries for the development of al-Andalus. They mention the introduction of plants from faraway lands in the east and the impact of technological innovations on Andalusi agronomy. They also discuss the organization of labor associated with the creation of irrigated lands by new settlers, both Arabs and Berbers. The authors emphasize the importance of studying historic landscapes as part of the material culture of past societies to gain valuable information about cultures and their expression in space. They refer to T.F. Glick and A. Watson as important authors who have written on the subject of agricultural innovation and the spread of new plant species .



Working in landscape archaeology: the social and territorial significance of the agricultural revolution in al-Andalus

JOSÉ MARÍA MARTÍN CIVANTOS

The agrarian transformations which took place in the Iberian Peninsula between the eighth and the tenth century are essential for an understanding of how al-Andalus came into being. These developments provided the basis of a social formation which developed into a tributary mode of production. This study is part of a research project that draws inspiration from the tenets of landscape archaeology. Studying historic landscapes as part of the material culture of past societies provides valuable information about cultures and the ways they express themselves in space.

Introduction: theoretical proposal

The fundamental goal of this paper is to demonstrate, or at least to argue, the importance for the rise of al-Andalus of the agrarian transformations taking place in the Iberian Peninsula between the eighth and the tenth centuries, and the development of Andalusian social formation as part of the tributary mode of production. The agricultural revolution in al-Andalus is best understood from the perspective of irrigated agriculture, although other technical innovations as well as peasant knowledge were also contributing factors. While the revolutionary basis was the artificial water supply, which allowed intervention in crops' natural germination processes, there were also important advances in the types of resources that were being applied to agriculture and the management of new techniques. For example, new plants were introduced from places geographically and climatically remote and foreign to the Mediterranean and new forms of intensive cultivation were developed.

Many studies have been written on this subject since the important works by T. Glick and A. Watson.¹ Three main themes have received

¹ T.F. Glick, *Irrigation and Society in Medieval Valencia* (Cambridge, 1970), Spanish translation published in Valencia in 1988; A. Watson, *Agricultural Innovation in the Early Islamic World*. The *Early Medieval Europe* 2011 **19** (4) 385–410

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Write a brief overview about the introduction, mentioning the relevant authors cited in theoretical proposal

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Expand upon the works of A. Watson

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A key author mentioned in the document is A. Watson. His work, *Agricultural Innovation in the Early Islamic World*, is considered fundamental in understanding the implications of the agrarian transformations in al-Andalus [2]. Watson examined not only the spread of new plant species but also the external factors that influenced their cultivation during the early Islamic period [2]. He highlighted several factors such as the involvement of people from all levels of society, the spread of early Islam to new ideas and things, the spread of irrigation, the appearance of different types of properties, and the role of gardens in the process [2].

Watson's contribution focuses on the importance of new crops and their role in making agriculture more productive. He emphasizes that the introduction of higher-yielding new crops and better varieties, along with improved irrigation and the development of more labor-intensive techniques, led to increased productivity of agricultural land and labor [7]. However, it is noted that Watson

- **Query across multiple documents: upload a folder of up to 30 files and chat with them.**
- This is an especially interesting way to contrast views and cross-reference facts.

Circular economy for food

Search file name.

Chat with docs in the collection.

Upload **Copy**

Unselect all docs for chat.

PDF Transition towards Cir... 2023-08-25 18:42:19

PDF Towards Circular Econ... 2023-08-25 18:42:18

PDF Circular Economy Mod... 2023-08-25 18:42:15

sustainability MDPI

Review Towards Circular Economy in the Agri-Food Sector: A Systematic Literature Review

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Received: 4 August 2020; Accepted: 4 September 2020; Published: 9 September 2020

Abstract: Over the last decade, the unsustainability of the current economic model, based on the so-called take-make-dispose paradigm, has emerged. In particular, the agro-food sector (AFS) has been severely affected by this paradigm, leading to significant waste generation along the supply chain. In addition, climate change and biodiversity loss have helped to define an imperative paradigm shift towards a circular economy. Recently, with the publication of Sustainable Development Goals (SDGs), the scientific research examining the adoption of circular economy models has been increasing. In this paper, a systematic literature review (SLR) was performed to investigate the state-of-the-art research related to the adoption of circular economy models and tools along the agro-food supply chain. The results highlight that, despite the complexity of the agro-food supply chain, it is almost urgent to define a unique circular economy model for the whole sector. In addition, it emerges that future research should be concentrated on the integration of different stages of the supply chain with circular economy models and tools in order to create a closed-loop agri-food system.

Keywords: sustainability; circular economy; LCA; agro-food supply chain; food waste

1. Introduction

In recent decades, the current economic model based on the take-make-dispose paradigm [1] has been widely criticized for its unsustainability. Due to the over-exploitation of resources [1] and degradation of the environment [1], this model is seen as exerting negative effects on the equilibrium of the ecosystem.

Over the past few years, the agro-food sector (AFS) has been severely affected by problems such as resource scarcity, food loss and waste generation along the world's supply chain, which, in 2019, totalled approximately 1.3 billion tons annually with a cost of more than 1000 billion dollars per year [4]. The mismanagement of resources and processes represents only one of the causes of such problems [3]. The consumers' unsustainable consumption patterns have contributed significantly to these problems [4].

Over the past few years, the agro-food system has been paying close attention to cross-cutting issues such as food safety, product traceability, product quality, respect for the environment and human health. Thus, the food production system has begun to implement sustainable approaches [1]. The growing attention paid by policy makers, non-governmental organizations and scholars has prompted agro-food companies to reassess their corporate strategy. The main environmental objectives are, as the reduction of waste and pollution, protection of natural capital, biodiversity and ecosystem services, reduction of land use and improvement of soil quality, are fundamental for the realization of the so-called "decoupling". The latter is aimed at dissociating

Are there any substantial differences between the three documents about how can the agricultural and food sectors move towards circular economic models?

2023-08-25 18:47:42

Based on the provided document snippets, there are some differences between the three documents regarding how the agricultural and food sectors can transition towards circular economic models.

In "Transitioning towards a Circular Economy: Sustainable Practices in the Food System," it is mentioned that the circular economy solutions in the food system include supporting local food supply chains with less waste, closing nutrient loops, pricing the true cost of resource consumption and losses in natural capital, and creating policy mechanisms to promote recovery and reduce the loss of critical raw materials [11a]. The document emphasizes the need for cross-sectorial policies and illustrates the linkages and gaps that need to be addressed to achieve a circular economy within the agriculture and food sectors [12].

In "Towards a Circular Economy in the Agri-Food Sector: A Systematic Review of the Literature," the document highlights the complexity of the agri-food supply chain and suggests that defining a unique circular economy model for the entire sector is almost utopian [1]. The review emphasizes the importance of integrating different stages of the supply chain with circular economy models and tools to create a closed-loop agri-food system [1]. The document also discusses the use of impact assessment tools and mentions the growing interest in researching technological tools for food waste and loss treatments [11b].

Overall, while both documents reinforce the importance of transitioning towards a circular...

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Some prompt formulas

- **Find answers from the document.**

using whether neuroimaging recordings have inherent phenotype biases as well as evaluating how racialized lived experiences influence SCR (see refs. ^{2–5}) has largely ignored how bias in SCR, especially if differences are a reflection of lived experience, may lead to misleading conclusions about the neurophysiological and psychological experiences associated with 'non-responder' and 'non-learner'. Information gained from these studies is used to develop interventions, which may be effective or ineffective, or even incorrect. Black individuals may be misdiagnosed, underdiagnosed, or inappropriately treated^{2–5}. To complicate matters further, potential sources of bias in SCR are often due to the design of the study, which is specifically looking for racial group differences (for example, racial disparities in mental health outcomes). Although the field has made progress in terms of identifying potential sources of bias also arise in EEG (for example, sluggish or attenuated brain responses can be due to anesthesia, PTSD and other mental health conditions), it is important to note that racial bias in SCR also arises in certain groups as unusable.

Our shared responsibility toward more equitable neuroscience

Exclusion of racially and ethnically minoritized individuals under the guise of 'unusable' data occurs within the context of ongoing structural injustice against Black and Brown people globally^{2–5}. In a society that upholds and sees whiteness as a norm, research tools and methods are often designed to reflect and validate scientific oppression^{2–5}. In the lack of any clear intention to produce biased results, it is easy for scientists to reject personal responses from Black and Brown individuals as unusable, especially when the exclusion appears methodologically justified. We need to move beyond this notion of 'us' and 'them' to one of 'we' and 'all' by acknowledging methodological limitations as a valid reason for excluding biased research. Instead, we should uphold shared responsibility for addressing and eradicating the 'norm' of 'us' and 'them' in the context of structural injustice^{2–5}.

Individual researchers should design psychophysiology research that explicitly considers whether sources of data exclusion reflect phenotype bias and/or measures of participants' lived experiences. Implementation of post hoc statistical tests may help to determine whether exclusion is justified. We know that race and ethnicity explain variability in psychophysiological measures. This information is essential to differentiating confounds (for example, phenotypic differences in hair type and skin pigmentation) from effects (for example, exposure to racism and negative life events). To achieve scientific equity, both the potential phenotypic differences and differences in lived experience need to be recognized.

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NATURE NEUROSCIENCE

If Black and Brown researchers and engineers were fairly and proportionally included in the development of psychophysiology methods, it is likely that these tools would not have the same problems and oversights. Black scientists and engineers receive less funding than their white counterparts, and Black researchers receive lower rates for National Institutes of Health funding being only approximately 55% of those of white researchers of similar academic standing⁶. In addition, Black researchers receive fewer professional opportunities from marginalized backgrounds. We remain adamant that we must all be proactive in promoting racial equity in our work.

Received: 17 August 2021; Accepted: 1 March 2022;
Published online: 5 April 2022

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What steps can the field of neuroscience take to address and mitigate biases in research methods and better include marginalized populations?

2023-08-26 12:15:44

The field of neuroscience can take several steps to address and mitigate biases in research methods and better include marginalized populations:

- 1. Design inclusive research:** Individual researchers should design psychophysiology research that explicitly considers whether sources of data exclusion reflect phenotype bias and/or measures of participants' lived experiences. This can be achieved by implementing post hoc statistical tests to explore variability in measurements and differentiate confounds from real psychological effects [3a].
- 2. Recognize bias in technology:** Researchers should be aware of biases in neuroscience tools and methodologies, such as electroencephalography (EEG) and functional near-infrared spectroscopy (fNIRS), which may exclude individuals based on phenotypic differences in hair type and skin pigmentation. Collaboration with biomedical engineers and the development of inclusive neurotechnologies can help address these biases [3b].
- 3. Include diverse demographic information:** Institutional review boards (IRBs) should play a role in ensuring equitable research practices by critically examining exclusion and inclusion criteria in study protocols. IRBs should receive ongoing training on biases in technology and promote inclusive recruitment strategies. Additionally, scientific journals should require and enforce the reporting of racial and ethnic demographics, ensuring that samples are representative and methodological issues are exposed [3c][3d][3e].

Type a question or type /* to select a prompt.

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• Summarize big chunks of information.

Innovative business models are increasingly being adopted by companies to reduce environmental impact. Circular economy (CE) by-products, energy losses, and emissions are reduced by slowing down, closing, and limiting material and energy circuits through better and more efficient design, maintenance, repair, reuse, recycling, and regeneration processes^[7–13]. Kirchhoff et al. have defined the circular system as an economic system based on business models that replace the concept of "end of life" with the reduction, alternative reuse, recycling and recovery of materials in the production, distribution and consumption processes, with the purpose of achieving sustainable development, which involves the creation of economic and social equity, to the advantage of current and future generations^[14].

In practice, the CE can be encouraged and maintained through the establishment of innovative business models [7–13][15], which incorporate the principles of CE and their value propositions along value chains (CE business models). However, it is challenging for the CE to contribute to sustainability as a whole and does not remain the priority of environmental management and innovation models^[16].

The CE is seen as an engine of sustainability in the literature. The CE and sustainability are closely connected words^[17]. However, CE focuses on environmental and economic benefits, including merely the implicit social aspects^[18], whereas sustainability aims to benefit society, environment, and economy. The CE improves traditional sustainability approaches based on re-efficiency^[19] by using the economic gains^[20] of CE, managing supply risks, and externalities^[21] to achieve a greener economy through the promotion of a more appropriate and ecological use of resources and innovative business models^{[11][22]}. As stated by Pavitt^[40], innovation in the agri-food sector is mainly aimed at cost decreases. Several industries and companies have used the concept of sustainable business models to simultaneously achieve their economic, environmental, and social objectives.

The agri-food sector, in recent years, has paid considerable attention to issues such as food safety, traceability of production, product quality, and respect for the environment. This has led to manufacturing systems that are more sustainable. Waste generation is a growing trend worldwide, more than in 2010 reached approximately 1.3 billion tonnes^[41] due to mismanagement of resources and processes^[42] and unsustainable consumer consumption patterns^[43]. As such, promoting the development of new technologies to encourage a change towards waste recycling is of paramount importance^[44]. In 2013, the Ellen MacArthur Foundation^[45] presented the bioeconomy paradigm, which shows the relationship between the technical and biological cycles in the economic system. The biological cycle covers the flows of renewable materials, designed to restore the biosphere and organized in an open-cycle system of cascade resources, through successive phases of extraction, production of bio-based materials, energy recovery, and nutrient restitution to the biosphere in order to fuel the next cycle of primary products. This cascade phase is based on the principles of the circular economy, the waste hierarchy, the waste value pyramid and the waste hierarchy. Biological materials can be organic or inorganic and are described as materials or products "designed to return to the biological cycle, being consumed by microorganisms in the soil and other animals"^[45]. It is desirable for processes of this type to be increasingly applied to agri-food systems, but this remains conceptually distant from current realities. To date, some agri-food chains have aroused greater interest in implementing circular systems than others.

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In their literature review, Esposito et al. [14] analyzed the circular economy in the agricultural supply chain, the state of the art, and the most commonly investigated products in the field. In the second part, the success of the circular economy concept is expressed in quantitative terms in the number of articles published on this topic. In recent years, the amount of CE documents has grown more than ten-fold and many different CE studies have been published around the world.

different CE , the amount of CE documents has grown more than ten-fold and many air udiehae beeuhlied aud the old studies have been published around the world. uides have been published around the world.

Summarize the key takeaways from this text

2023-08-26 12:20:26

The key takeaways from this text are:

1. Circular economy (CE) is defined as a restorative or regenerative industrial system that aims to eliminate waste, transition to renewable energy, and design more efficient materials, products, systems, and business models.
2. CE is based on business models that prioritize reducing, reusing, recycling, and recovering materials throughout the production, distribution, and consumption processes.
3. Innovative business models can encourage and maintain CE practices, but there are concerns about their environmental impact and their contribution to overall sustainability.
4. CE focuses on environmental and economic benefits, while sustainability aims to benefit the environment, economy, and society. CE improves traditional sustainability approaches by combining economic gains with reduced input costs, supply risks, and externalities.
5. The agri-food sector has been moving towards more sustainable approaches, driven by concerns about food safety, traceability, product quality, and environmental impact. Waste generation in the sector is a significant issue, and promoting waste recycling through technological development is crucial.
6. The concept of the circular economy includes two cycles: technical and biological. The

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pudo ser relevante.

4. Balance final

A lo largo de las anteriores páginas hemos tratado de analizar las diferentes políticas que los municipios valencianos aplicaron sobre el mercado de la carne en una coyuntura bélica y en un contexto de alza de precios. Nuestro principal elemento de comparación lo ha constituido la Barcelona estudiada por Bane-

32 En ocasiones se indicaba la incapacidad de los guardias de la Huerta a la hora de impedir que el ganado devorara los campos, lo que ponía en tela de juicio las medidas tomadas a fin de lograr su protección. AMV, MC, A-13, m. 4, f. 13-14 (23/07/1359).

33 En cuanto a las alteraciones monetarias, ya en la década de 1930 Hamilton postulaba que se debió al aumento de las reservas de oro occidentales, producto de la inversión de la balanza comercial con América y el mundo árabe, sin embargo, Carné-Baille apuntó décadas más tarde que el aumento de precios pudo deberse a la devaluación de la moneda de plata (Hamilton, 1936: 192-203; Baille, 1988: 309-312).

365

Pablo Sanahuja Ferrer

gas López, ciudad que para los años de la guerra de los Dos Pedros muestra una evolución similar a la de Valencia, incluso más acentuada en algunos aspectos. Esta evidencia, unida al hecho de que la ciudad catalana no dependía tanto como Valencia de las caballas ganaderas foráneas al territorio catalán y a la circunstancia de que Barcelona no se vio afectada por la guerra con Castilla con la misma intensidad que el reino meridional, nos obliga a plantear nuevas preguntas: ¿hasta qué punto influyó la coyuntura bélica en el mercado cárnicoy ¿se habría producido la misma evolución si la guerra no hubiera tenido lugar?

El caso valenciano muestra una mayor progresividad en la aplicación de los impuestos sobre las carnes, lo que indica un intento por parte de los *jurats* y *consellers* de conseguir cierto equilibrio entre la seguridad en el abastecimiento y el mantenimiento de precios bajos y el incremento de los ingresos fiscales. No disponemos de datos suficientes para saber si la política del municipio fue efectiva en sus pretensiones, pero el hecho de que las protestas procedieran del colectivo de los carniceros y no de la población, puede ser indicativo de un cierto éxito.

Ahora bien, ¿estamos seguros de que el propósito de los municipios fue mantener siempre precios bajos? Tal y como indica Juan Antonio Barrio en

H Simplify in bullet points the main ideas of the article

2023-08-26 13:02:21

- The study analyzes the supply of meat in Valencia during the War of the Two Peters (1356-1366) and how local regulations ensured adequate supply at affordable prices for the majority of the population.
- Municipal measures aimed to regulate the meat market and maintain a sufficient supply despite the contradiction with the need to finance the war effort.
- The municipal intervention in the meat market aimed to complement private initiative, not replace it.
- Meat was a widely consumed food, although the quality and quantity varied based on affordability.
- The responsibility of ensuring adequate meat supply fell on the butchers, who also had to deal with the demands of guaranteeing supply for the population.
- The city's meat supply depended on large livestock herds from Aragon and Castile, which posed a risk in case of difficulties.
- The municipal intervention sought to regulate prices and ensure the availability of meat during times of war.

3 15 16 2 14 11

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analysis aims at highlighting the different assessment tools used for agricultural products and for dairy, livestock farming and fish breeding products, as summarized in Table 5.

Table 5. Comparative analysis between environmental assessment tools and type of supply chain.

Authors	Geographical Location	Supply Chain	Product	Tool	Industrial Symbiosis Dimension
Martínez-Blanco et al. (2009)	Barcelona	Agriculture	Tomato	LCA	Meso
Arnai et al. (2018)	Italy	Agriculture	Tomato	LCA	Meso
Mourou et al. (2016)	Swiss	Agriculture	Potato	LCA	Meso
Salomone and Ioppolo (2012)	Sicily	Agriculture	Olive oil	LCA	Micro
Stillitano et al. (2019)	Sardinia	Agriculture	Olive oil	LCA, LCC	Meso
Tsarouchas et al. (2015)	Greece	Agriculture	Olive oil	LCA	Meso
Arzoumanidis et al. (2014)	Italy	Agriculture	Wine	Simplified LCA	Meso
Bonamente et al. (2015)	Italy	Agriculture	Wine	WFA	Micro
Martucci et al. (2019)	Italy	Agriculture	Wine	S-LCA, VIVA	Meso
Avizoulou and Tsolakis (2020)	Italy	Agriculture	Wine	WFA	Meso
Falcone et al. (2016)	Calabria	Agriculture	Wine	LCA, LCC, MA	Meso
Balaofotis et al. (2017)	Greece	Agriculture	Wine	LCA	Micro
Pires Gaspar et al. (2018)	Beira	Agriculture	Peach	E-LCA	Meso
Antonelli and Ruini (2015)	Italy	Agriculture	Pasta	WFA	Micro
Wang et al. (2015)	Jilin (China)	Agriculture	Maize	CFA, LCA	Meso
Noeira (2016)	Ecuador	Agriculture	Cacao	LCA	Meso
Grimaldi-Díaz et al. (2018)	Mexico	Agriculture	Coffee	LCA	Meso
Owusu-Sakyere et al. (2016)	South Africa	Agriculture	Milk	WFA	Meso
Grönroos et al. (2006)	Finland	Agriculture	Milk	LCI	Meso
Bava et al. (2018)	Italy	Agriculture	Grana Padano	LCA	Micro
García-Gaudino et al. (2020)	Spain	Livestock farming	Swine	LCA	Meso
Presumido et al. (2018)	Portugal	Livestock farming	Beef	LCA	Meso
Philis et al. (2019)	Sweden	Fish breeding	Salmon	LCA, LCIA	Macro

Please explain the data from this table as if I was a 12 year old, and identify patterns.

2023-08-25 19:51:16

This table shows information about different studies that were done to understand how our choices in farming and livestock affect the environment. The authors of these studies looked at different products, like tomatoes, olive oil, wine, and more, and used different tools to assess their impact on the environment.

Here are some patterns we can see from the table:

- Most of the studies focus on agriculture, which means they looked at how growing crops like tomatoes or olives affects the environment.
- The tools used in the studies are usually either LCA (Life Cycle Assessment) or LCC (Life Cycle Costing), which help to measure the environmental impact of products from their creation to their disposal.
- The studies also looked at different dimensions of the supply chain (the processes involved in getting a product from the farm to your table). Some studies focused on the micro level, which means they looked at specific farms or areas, while others looked at the meso level, which means they looked at a larger scale, like a region or country.
- One interesting thing is that some studies looked at the impact of livestock farming, like raising pigs or breeding fish, on the environment. These studies also used LCA to measure the impact.

So, overall, these studies help us understand how our choices in farming and livestock can affect the environment. By using different tools and looking at different levels of the supply chain, we can learn how to make more sustainable choices and reduce our impact on the planet.

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• Perform and explain mathematical operations.

Main Results. We present the comparison of the baseline methods and our methods in Table 7. From the experimental results, we observed that fine-tuning the models on the synthetic data generated using our approach leads to significant improvements compared to the zero-shot scenario in all the evaluated metrics. The average performance of BERT fine-tuned on synthetic data improved more than 35% on Precision, 34% Recall, and 36% on F1 than ChatGPT. Moreover, in some cases, our proposed method even achieves comparable performance to the models fine-tuned on the original training set. For example, for the BCSCDR Chemical dataset, the Recall of the BERT model fine-tuned on synthetic data obtained 81.96%, improved from 11.69% in the zero-shot scenario, which is comparable to the recall 88.66% when fine-tuned on the original training set. The results demonstrate the effectiveness of our synthetic data generation approach in improving the performance of these models.

Table 7: Test results in biomedical named entity recognition. Precision (P), Recall (R), and F1 (F) scores on each dataset are reported. All the numbers are in percentage and computed based on 3 trials.

Metrics	Zero-shot			Fine-Tuned on Synthetic Data			Fine-Tuned on Original Data		
	ChatGPT	BERT	RoBERTa	BioBERT	BERT	RoBERTa	BioBERT		
NCBI Disease	P: 32.84 R: 44.86 F: 37.92	P: 39.41 _{±0.11} R: 59.15 _{±0.53} F: 43.56	P: 42.83 _{±0.48} R: 62.78 _{±2.37} F: 47.30	P: 43.14 _{±0.18} R: 63.92 _{±0.41} F: 51.51 _{±0.22}	P: 80.39 _{±1.70} R: 86.18 _{±0.23} F: 83.18 _{±0.86}	P: 84.62 _{±1.16} R: 87.32 _{±0.53} F: 85.94 _{±0.35}	P: 82.87 _{±1.50} R: 89.54 _{±1.04} F: 86.08 _{±1.29}		
BCSCDR Disease	P: 17.03 R: 44.86 F: 37.92	P: 62.51 _{±0.60} R: 61.85 _{±0.60} F: 62.18 _{±0.60}	P: 64.47 _{±0.59} R: 62.95 _{±0.49} F: 74.03 _{±0.81}	P: 63.08 _{±0.20} R: 68.36 _{±0.43} F: 76.64 _{±0.78}	P: 71.24 _{±1.39} R: 79.24 _{±0.62} F: 87.87 _{±0.72}	P: 80.70 _{±1.88} R: 85.23 _{±0.37} F: 90.87 _{±0.58}	P: 76.96 _{±2.31} R: 84.78 _{±1.22} F: 92.24 _{±1.19}		
BCSCDR Chemical	P: 5.76 R: 11.69 F: 7.72	P: 62.51 _{±0.42} R: 59.96 _{±0.49} F: 70.84 _{±0.98}	P: 67.96 _{±0.44} R: 66.06 _{±0.49} F: 74.63 _{±0.81}	P: 84.84 _{±0.43} R: 86.36 _{±0.60} F: 86.64 _{±0.86}	P: 87.02 _{±0.43} R: 90.02 _{±0.49} F: 90.87 _{±0.72}	P: 91.12 _{±0.46} R: 92.02 _{±0.13} F: 91.05 _{±0.21}	P: 82.54 _{±1.19} R: 89.02 _{±0.71} F: 92.24 _{±0.71}		
Average	P: 18.54 R: 33.37 F: 23.37	P: 54.79 R: 67.65 F: 60.10	P: 58.28 R: 69.69 F: 63.08	P: 58.36 R: 71.63 F: 63.99	P: 79.57 R: 84.69 F: 82.02	P: 85.48 R: 87.05 F: 86.24	P: 83.63 R: 88.85 F: 86.13		

The Effect of the Number of Generated Sentences. To investigate the impact of the number of synthetic sentences generated on the effectiveness of our proposed method, we conducted experiments with varying numbers of synthetic sentences and ratios of seed entities. As mentioned previously, we generated N sentences with annotations for M seed entities. In the first experiment, we used 10% – 90% seed entities for synthetic data generation, while in the second experiment, we generated [1, 2, 3, 4, 5, 10, 15, 20, 25, 30] sentences for each entity. The results are presented in Figure 2. Our findings showed that increasing the number of synthetic sentences can improve model performance up to a certain point, beyond which the improvement becomes marginal. Similarly, adjusting the ratio of synthetic to real entities in the training dataset can enhance model performance, especially for under-represented entities.

Figure 2: The performance with different numbers of synthetic sentences and the ratio of the seed entities.

6 Relation Extraction

Average	P	18.54	54.79	58.28	58.36	79.57
Average	R	33.37	67.65	69.69	71.63	84.69
Average	F	23.37	60.10	63.08	63.99	82.02

Provide me the calculation steps to get the average Zero-shot ChatGPT Precision

2023-08-26 12:55:42

To calculate the average Zero-shot ChatGPT Precision, you need to follow these steps:

- Sum up the Precision values for Zero-shot from all three datasets: NCBI Disease, BC5CDR Disease, and BC5CDR Chemical.
- Divide the sum by 3, which represents the number of datasets, to get the average Precision.

Let's perform the calculation:

Precision (NCBI Disease) = 32.84 Precision (BC5CDR Disease) = 17.03 Precision (BC5CDR Chemical) = 5.76

Average Precision = $(32.84 + 17.03 + 5.76) / 3 = 18.5467$

Therefore, the average Zero-shot ChatGPT Precision is approximately 18.55.

Ask related questions in the thread.

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Lip^h(x) = 0, x ∈ Ω.

$u^h(x) = \tilde{u}(x) - u^h(x), x \in \Gamma_0$.

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X. Yue, F. Wong, C. Zhang et al. Applied Mathematical Modelling 92 (2021) 410–421

$\frac{\partial u^h(x)}{\partial n} = \tilde{q}(x) - \frac{\partial u^h(x)}{\partial n}, x \in \Gamma_N$.

Noted that we solve the above particular and homogeneous solutions by using the CIT and the LBM will be presented in the following text.

3. Approximation of particular solution by the CIT

The Chebyshev polynomials of the first kind of degree n , denoted by $T_n(x)$, are defined through the identity $T_n(x) = \cos(n\theta)$, where $x = \cos\theta$, $-1 \leq x \leq 1$.

A function $F(\mathbf{y})$, $\mathbf{y} = (y_1, \dots, y_d)$ defined over $[-1, 1]^d$ may be approximated by first kind Chebyshev polynomial series as [22]

$$\begin{cases} F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \phi_{ijk} T_i(y_1) T_j(y_2) T_k(y_3), & \text{for } 2D \\ F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \sum_{l=0}^{N_4} \phi_{ijkl} T_i(y_1) T_j(y_2) T_k(y_3) T_l(y_4), & \text{for } 3D \end{cases} \quad (4)$$

If the infinite series in Eq. (4) is truncated, then Eq. (4) can be written as

$$\begin{cases} F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \phi_{ijk} T_i(y_1) T_j(y_2) T_k(y_3), & \text{for } 2D \\ F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \sum_{l=0}^{N_4} \phi_{ijkl} T_i(y_1) T_j(y_2) T_k(y_3) T_l(y_4), & \text{for } 3D \end{cases} \quad (4)$$

where N_1, N_2 and N_3 are the degrees of Chebyshev polynomials in the x_1 -, x_2 - and x_3 -directions, respectively. $\{\phi_{ijk}\}$ or $\{\phi_{ijkl}\}$ are expansion coefficients with total number being $M = (N_1 + 1)(N_2 + 1)(N_3 + 1)$.

To avoid the Runge's phenomena and guarantee the spectral accuracy of the Chebyshev interpolation, one often uses the zeros of Chebyshev polynomial with n interpolation nodes as below [3]:

$$\xi_k = \cos\left(\frac{2k-1}{2n}\pi\right), k = 1, \dots, n. \quad (5)$$

Note that the particular solution $u^h(x)$, $x \in \Omega \cap \mathbb{R}^d$ is not unique, and only requires the satisfaction of governing equation. Therefore, we freely extend this solution to a regular domain $[a, b] \times [c, d] \times [e, f]$ which covers the original problem domain Ω . Meanwhile, the zeros of Chebyshev polynomial defined in Eq. (5) should be imaged into the corresponding regular domain via the following variable transform:

$$x_1 = \alpha_1 \xi + \beta_1, \quad x_2 = \alpha_2 \eta + \beta_2, \quad x_3 = \alpha_3 \tau + \beta_3, \quad (6)$$

where

$$\begin{aligned} \alpha_1 &= (b-a)/2, \quad \alpha_2 = (d-c)/2, \quad \alpha_3 = (f-e)/2, \\ \beta_1 &= (a+b)/2, \quad \beta_2 = (c+d)/2, \quad \beta_3 = (e+f)/2. \end{aligned}$$

(ξ, η, τ) and (x_1, x_2, x_3) are Chebyshev zeros before and after transformation, respectively.

Based on the above discussion, the particular solution $u^h(x)$, $x \in \Omega \cap \mathbb{R}^d$ can be approximated by following Chebyshev polynomials as

$$\begin{cases} u^h(x) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \phi_{ijk} T_i(\xi) T_j(\eta) T_k(\tau), & \text{for } 2D \\ u^h(x) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \sum_{l=0}^{N_4} \phi_{ijkl} T_i(\xi) T_j(\eta) T_k(\tau) T_l(\tau), & \text{for } 3D \end{cases} \quad (7)$$

The Chebyshev polynomials of the first kind of degree n , denoted by $T_n(x)$, are defined through the identity $T_n(x) = \cos(n\theta)$, where $x = \cos\theta$, $-1 \leq x \leq 1$.

A function $F(\mathbf{y})$, $\mathbf{y} = (y_1, \dots, y_d)$ defined over $[-1, 1]^d$ may be approximated by first kind Chebyshev polynomial series as [22]

$$\begin{cases} F(\mathbf{y}) = \sum_{i=0}^{\infty} \sum_{j=0}^{\infty} \phi_{ij} T_i(y_1) T_j(y_2), & \text{for } 2D \\ F(\mathbf{y}) = \sum_{i=0}^{\infty} \sum_{j=0}^{\infty} \sum_{k=0}^{\infty} \phi_{ijk} T_i(y_1) T_j(y_2) T_k(y_3), & \text{for } 3D \end{cases} \quad (4)$$

If the infinite series in Eq. (4) is truncated, then Eq. (4) can be written as

$$\begin{cases} F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \phi_{ij} T_i(y_1) T_j(y_2), & \text{for } 2D \\ F(\mathbf{y}) = \sum_{i=0}^{N_1} \sum_{j=0}^{N_2} \sum_{k=0}^{N_3} \phi_{ijk} T_i(y_1) T_j(y_2) T_k(y_3), & \text{for } 3D \end{cases} \quad (4)$$

are N_1, N_2 and N_3 are the degrees of Chebyshev polynomials in the x_1 -, x_2 - and x_3 -directions, respectively. $\{\phi_{ij}\}$ or $\{\phi_{ijk}\}$ expansion coefficients with total number being.

Explain this equation

2023-11-01 14:28:14

La ecuación (4) muestra la aproximación de una función $F(\mathbf{y})$ definida en el rango $[-1, 1]^d$ utilizando series de polinomios de Chebyshev de primer tipo. Estos polinomios, denominados como $T_n(x)$, están definidos en términos de la identidad $T_n(x) = \cos(n\theta)$, donde $x = \cos\theta$

$-1 \leq x \leq 1$.

Type a question or type /* to select a prompt.

Output in Español Stick to file Answer by GPT-4

Deferred Revenue

As of September 25, 2021 and September 26, 2020, the Company had total deferred revenue of \$11.9 billion and \$10.2 billion, respectively. As of September 25, 2021, the Company expects 64% of total deferred revenue to be remitted in less than a year, 26% within one-to-two years, 6% within two-to-three years and 2% in greater than three years.

Disaggregated Revenue

Net sales disaggregated by significant products and services for 2021, 2020 and 2019 were as follows (in millions):

	2021	2020	2019
(Phone) ⁽¹⁾	\$ 191,973	\$ 137,781	\$ 142,381
Mac ⁽¹⁾	35,190	28,622	25,740
iPad ⁽¹⁾	31,862	23,724	21,280
Wearables, Home and Accessories ⁽¹⁾⁽²⁾	38,367	30,620	24,482
Services ⁽³⁾	68,425	53,768	46,291
Total net sales⁽⁴⁾	\$ 365,817	\$ 274,515	\$ 260,174

(1) Products net sales include amortization of the deferred value of unspecified software upgrade rights, which are bundled in the sales price of the respective product.
(2) Wearables, Home and Accessories net sales include sales of AirPods, Apple TV, Apple Watch, Beats products, HomePod, iPadOS and macOS.
(3) Services net sales include sales from the Company's advertising, AppleCare, cloud, digital content, payment and other services. Services net sales also include amortization of the deferred value of services bundled in the sales price of certain products.
(4) The \$5.7 billion of revenue recognized in 2021 that was included in defined revenue as of September 26, 2020, \$5.0 billion of revenue recognized in 2020 that was included in defined revenue as of September 28, 2019, and \$5.9 billion of revenue recognized in 2019 that was included in defined revenue as of September 29, 2018.

The Company's proportion of net sales by disaggregated revenue source was generally consistent for each reportable segment in Note 11, "Segment Information and Geographic Data" for 2021, 2020 and 2019.

Please calculate the revenue to gross profit ratio of Apple in 2021

2023-08-26 12:59:17

To calculate the revenue to gross profit ratio of Apple in 2021, we need to obtain the values for total net sales and total gross margin for that year. Based on the document snippets provided, we can find the following information:

Total net sales for 2021: \$365,817 million [40] Total gross margin for 2021: \$152,836 million [26]

Now, we can calculate the revenue to gross profit ratio: Revenue to Gross Profit Ratio = Total Gross Margin / Total Net Sales

Substituting the values: Revenue to Gross Profit Ratio = \$152,836 million / \$365,817 million

Using a calculator, the revenue to gross profit ratio of Apple in 2021 is approximately 0.418, or 41.8%. Please note that the ratio is expressed as a percentage.

40 26

- **Present information in a Markdown table.** It's a good approach to summarize information in a visual and easier-to-understand manner. You can also use it to contrast perspectives from different authors and multiple documents. To view the table properly, you might have to export the chat to an HTML or Markdown file.

Más allá del cristianismo: Un análisis multicausal de la rebelión de Shimabara, 1637-1638¹

Antonio Gil Fons²
Rubén Casillas de la Torre³
Víctor Hugo Robles Gutiérrez⁴

Resumen

La rebelión de Shimabara es comúnmente considerada como una insurrección cristiana. Sin embargo, las motivaciones que llevaron a los pobladores de Shimabara y sus alrededores a sublevarse van más allá de un conflicto religioso. La relación del pueblo con los *daimyo* y los altos impuestos que éstos le exigían, aunados a la hambruna generalizada producto de las malas cosechas, se sumaron a la persecución religiosa que el shogunato impulsaba para contrarrestar la influencia extranjera en Japón, particularmente la influencia portuguesa. Estos factores llevaron a grupos de campesinos y *ronin* a levantarse en armas, dando inicio a una revuelta que pasaría a la historia como el conflicto armado más serio al que se enfrentó el Gobierno japonés durante la era Tokugawa. El

Artículo recibido el 21 de septiembre de 2015 y dictaminado el 29 de octubre de 2015.

1. Los autores agradecen a los editores y dictaminadores de México y la Cuenca del Pacífico por sus valiosas sugerencias y opiniones constructivas para la revisión y enriquecimiento del presente artículo. Los defectos que permanecen son responsabilidad exclusiva de sus autores.

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Enero-abril de 2016. **Analisis** 115

Summarize the causes of the Shimabara Rebellion and present them in a table

2023-08-25 19:38:45

Causes of the Shimabara Rebellion

Causes	Document Snippets
Religious persecution by the shogunate	[1], [7]
High taxes imposed by the daimyo	[1], [6], [7]
Famine due to poor harvests	[1], [6], [7]
Social discontent among the peasants and <i>ronin</i>	[1], [6]
Involvement of the Catholic Church	[7]
Influence of the Dutch	[7]
Multicausal explanation required to understand the rebellion	[1], [25]

Note: For detailed information and supporting evidence, please refer to the corresponding document snippets.

1 7 6 25

Illustrate the causes in a table but with one column with the cause and another

Question 13.2

Q: Illustrate the causes in a table but with one column with the cause and another column for a brief description

A: Causes of the Shimabara Rebellion

Causes	Description
Religious persecution by the shogunate	The Shogunate, in an attempt to counter foreign influence, particularly the Portuguese influence, persecuted Christians, which contributed to the rebellion[1][2]
High taxes imposed by the daimyo	Daimyo demanded high taxes, leading to economic hardships among the people and creating discontent[5]
Famine due to poor harvests	Poor harvests caused widespread famine, exacerbating the already difficult living conditions[5]
Social discontent among the peasants and ronin	The peasants and ronin, facing economic hardships, high taxes, and religious persecution, revolted against the government[1][2]
Involvement of the Catholic Church	The Catholic Church played a significant role in the rebellion, as it had a strong presence in the area[2]
Influence of the Dutch	The Dutch, along with the Catholic Church, were foreign powers with interests and involvement in the rebellion[2]
Multicausal explanation required to understand the rebellion	The complex events of the Shimabara rebellion cannot be explained by a single cause and require a multifaceted analysis[3]

Note: The information provided in the table is derived from the referenced document snippets.

Question 2

Q: Illustrate in tabular format the differences in relation to the business model of agro-food systems between Circular Economy Models in Agro-Food Systems: A Review and Towards Circular Economy in the Agri-Food Sector. A Systematic Literature Review

A: To illustrate the differences in relation to the business model of agro-food systems between the two documents, "Circular Economy Models in Agro-Food Systems: A Review" and "Towards Circular Economy in the Agri-Food Sector: A Systematic Literature Review," you can create a tabular format as follows:

Aspect	"Circular Economy Models in Agro-Food Systems: A Review"	"Towards Circular Economy in the Agri-Food Sector: A Systematic Literature Review"
Scope	Provides an in-depth analysis of the circular economy's potential in reducing environmental impacts of agri-food economic systems through various aspects such as business models, organization management, food loss and waste reduction, analytical tools, stakeholder acceptance, and political approaches	Focuses on a systematic literature review investigating the state-of-the-art research related to the adoption of circular economy models and tools in the agro-food supply chain
Emphasis	Highlights the importance of cleaner production models, stakeholder responsibility and awareness, and appropriate policies and tools for transitioning towards a circular, sustainable, and regenerative agro-food system	Emphasizes the urgency to shift towards a circular economy in the agro-food sector due to problems such as resource scarcity, food loss and waste generation, climate change, and biodiversity loss
Research Approach	Analyzes and reviews the existing academic literature on the circular economy in agri-food systems	Conducts a systematic literature review to investigate the state-of-the-art research articles related to the adoption of circular economy models and tools along the agro-food supply chain
Findings	Provides a deeper understanding of the opportunities and perspectives offered by the circular economy in agri-food systems	Highlights the need for future research to focus on the integration of circular economy models and tools across different stages of the agri-food supply chain
Keywords	circular economy, business model, sustainability, agro-food, sustainable, food waste, supply chain	sustainability, circular economy, LCA, agro-food supply chain, food waste

- **Translate.** No matter the language of the document, you can ask a question in the language you choose and get the answer in the language you have defined as the output language for ChatDOC. In this example, the article is in French, I've asked a question in English, and selected the output to be in Spanish.

Terres communes et droits d'usage en al-Andalus (Xe-XIV^e siècles) / 53

fois des conflits, tel celui sur lequel Ibn 'Allaf (n. 806 H/1404) de Grenade eut à souffrir. Les habitants de Hisn Shirka possédaient une source qu'ils se partageaient grâce à cinq canalisations (*tawāṣiq*) équivalentes, mais la distribution de l'eau de chacune d'elles se faisait au détriment des faibles et des orphelins. Par la suite ils se mirent d'accord pour assurer équitablement chacun utilisant l'eau à un certain nombre d'heures, à tour de rôle et d'amont en aval. Peuvent-ils se considérer comme propriétaires de leurs tours d'irrigation (*nuswāt*) fixés de cette façon d'un commun accord, étant donné qu'ils sont co-propriétaires de la source ? L'accord est-il valable sans l'accord des incapables et des femmes ? Réponse de ce juriste : non, ils peuvent se partager l'eau de cette source qui est leur propriété commune, d'un commun accord entre les femmes ou leurs représentants et ceux des incapables désignés par le cadi doivent participer ?.

Les droits d'usage des terres communes, des terres d'Etat et l'appropriation des systèmes collectifs d'irrigation semblent avoir subi une évolution déterminante aux XI^e et XII^e siècles, dans le cadre de la révolution agraire qui orienta l'agriculture vers des cultures irriguées intensives et spéculatives à plus grande valeur ajoutée. A la recherche de nouveaux terroirs, ces paysans andalous semblent s'être approprié et partagé les terres communes de leur village ou les biens d'Etat, tout en conservant l'usage et l'entretien collectif des systèmes d'irrigation provenant du captage des fleuves, des rivières ou des sources naturelles.

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Ask related questions in the thread.

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• Challenge the methodology and interpretations.

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came from three areas of the site. Area I is located at the top of the Cerro (hill) del Sombrerete, the only walled part of the settlement that was accordingly interpreted as the *olazabu* (fortress) of Madinat Ibrīrah. The archaeological samples from both areas (Table 1) were recovered from the main trench opened on the platform formed by the hilltop where a domestic structure was identified. The analysis of the associated ceramic assemblage (Carvalho, 2005, 2008) indicates that the occupation of this area was very brief, being dated between the late 9th century and the first quarter of the 10th century. Areas II and III are both located in the eastern area of the town. The study of the recovered ceramic remains indicates that these faunal assemblages were accumulated during the central decades of the 10th century (Jiménez, 2012; Martínez-Alvarez, personal communication). Therefore, considering the different location of the archaeological samples from Areas II and III in relation to the main MNI, the accumulation periods they have been combined and treated as a single unit of analysis (hereinafter referred to as Sample MI-2).

The material from Cercadilla was recovered from a set of 15 negative structures interpreted as refuse deposits in primary position and one deposit of kitchen waste accumulated in a former public space. The analysis of the samples from the different periods of use and occupation and their chronological correlation allowed us to explore changes in the animal economy of this area of Cordoba from a diachronic perspective (Table 1). Sample CER-1 was recovered from a large deposit of domestic waste that had accumulated in the cryptopit of the abandoned Roman complex during the second half of the 8th century, according to ceramic and numismatic evidence. Some of the materials from this sample were recovered from a series of negative structures filled with kitchen waste between the 9th and the early 10th century. Sample CER-3 derives from a levelling deposit for a domestic structure built during the period when urban development and settlement density peaked in Cercadilla and in Cordoba as a whole. The associated ceramic assemblage includes materials from the 9th century and during the central decades of the 10th century. Sample CER-5 is composed of an accumulation of debris with a high quantity of animal bones deposited in a former public space, interpreted as the floor of one of the streets surrounding a local market. This concentration of kitchen waste in a public space, along with the associated ceramic assemblage, indicates that this area of the town was accumulated during the period of abandonment of Cerca during the first quarter of the 11th century. Lastly, Sample CER-6 originates from the filling of a negative feature located in a courtyard of the domestic and industrial complex in use during the 12th century.

Table 1
 List of archaeological samples from Madinat Ibrīrah and Cercadilla.

Site	Sample	Chronology	Period
Madinat Ibrīrah	MI-1	Late 9th–early 10th c. AD.	Amral
	MI-2	Mid-10th c. AD.	Caliphate
Cercadilla	CER-1	9th–early 10th c. AD.	Amral
	CER-2	9th–early 10th c. AD.	Amral
	CER-3	Mid-10th c. AD.	Caliphate

The distinction between sheep and goat remains. This was attempted only for skeletal parts for which there are reliable criteria (i.e. horn cores, dp3, dp4, permanent lower molars, distal humeri, distal radii, distal metapodials, distal tibiae, astragal and calcaneum), according to the criteria described by Boessneck (1969), Payne (1985), Halstead et al. (2002), Zeder and Lapham (2010) and Zeder and Pilaar (2010). When it was not possible to reach a more accurate level of identification, caprines were classified to a subspecies level. Hare (*Lepus granatensis*) and rabbit (*Oryctolagus cuniculus*) remains were distinguished by size and the former being considerably larger e and using the diagnostic criteria proposed by Callou (1997). The Galliformes species (chickens, guinea-fowls and pheasants) were differentiated, whenever possible, following the criteria of Macdonald (1992). However, neither definite guinea-fowl nor pheasant could be identified, so it is assumed that all the fowl-like bones belonged to chicken (*Gallus dom.*).

The specimens were recorded using a FileMaker® database protocol designed *ad hoc* which allows for the recording of basic descriptive data including species, anatomical element, degree of fragmentation, fusion, metric data, etc. The quantification method limits the recording of mammal bones to a selected number of skeletal parts, adopting a similar procedure to that suggested by Davis (1992), but with the addition of the proximal ends of long bones.

The scope of this paper is limited to the examination of the occurrence and general frequency of the main domestic food species (specifically medium- and large-sized mammals and birds) identified in the faunal assemblages from the two sites, while other zooarchaeological variables, such as kill-off patterns, anatomical distribution, biometric data or butchery traces, will be studied for future analysis. Fish, amphibians, oysters and other marine and freshwater shells, as well as remains identified to higher order categories (e.g. unspecified medium artiodactyl), are not considered here. Estimates of the relative frequency of the animal species were based on the total number of identified specimens per taxon (NISP; Grayson, 1984) and the minimum number of individuals (MNI; Chaplin, 1971). The MNI was calculated by dividing each anatomical element from each taxon by the number of times it appears in the skeleton of the animal; the most abundant anatomical part was then used as a predictor of the frequency of the taxon in question.

Evaluate the strengths and weaknesses of the methodology

2023-08-26 13:55:02

The methodology employed in this study has both strengths and weaknesses.

Strengths:

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came from three areas of the site. Area I is located at the foot of the Cerro Hill; the Subcenter, the only walled part of the settlement that was occupied during the Roman period (García-García et al., 2013). The material (hereafter referred to as Sample M1) was collected from the Subcenter. The material (hereafter referred to as Sample M2) was collected from the Cerro Hill where a domestic structure was identified.

The archaeological context of the samples from Cerro Hill (M2) from the 10th century (García-García et al., 2013) indicates that the occupation of this area was very brief, being used as a temporary storage space for the production of ceramic vessels. The presence of animal remains in the samples from the 10th century (Areas II and III) are both located in the plain area of the town. The study of the recovered ceramic remains indicates that these areas were used for the production of ceramic vessels throughout the 10th century (García-García, 2012). Maritime-Atlantic pottery was found in the plain area, suggesting that the location of the archaeological samples from Areas II and III in relation to the port of Cadiz and the Atlantic coast, which have been combined and treated as a single unit of analysis (García-García et al., 2013).

The material from Cercadilla was recovered from a set of 15 sequential contexts, corresponding to a sequence of domestic structures and one deposit of kitchen waste accumulated in a former public space. These materials were deposited during five different periods in which the same domestic structures were reused. This has allowed us to explore changes in the animal economy of this area of Cadiz during the 10th century. The material from Cercadilla was recovered from a large deposit of domestic waste that had accumulated during the second half of the 10th century. The material from Cercadilla corresponds to a sequence of domestic structures built during the second half of the 10th century, according to ceramic and numismatic evidence. The material from Cercadilla was recovered from a series of negative structures filled with kitchen waste derived from a leveling deposit for a domestic structure built during the second half of the 10th century. The material from Cercadilla is probably a mixture of the animal economy of the city located in Cercadilla and in Cordoba as a whole. The associated ceramic assemblage suggests that this deposit was accumulated during the second half of the 10th century. The material from Cercadilla is composed of an accumulation of debris with a high quantity of animal bones, which suggests that it was a deposit of animal waste from one of the streets surrounding a local market. This concentration of animal remains in a single deposit, along with the associated ceramic assemblage, indicates that this deposit was accumulated during the second half of the 10th century. The material from Cercadilla corresponds to a sequence of domestic structures built around the first quarter of the 11th century. Lastly, Sample CER-5 originates from the filling of a negative feature located in the yard of the ceramics and industrial complex in use during the 12th century.

Table 1
List of archaeological contexts from Medina Iberik and Cercadilla.

Site	Sample	Chronology	Period
Medina Iberik	M1-1	Late 9th-early 10th c. AD.	Post-Roman
Cercadilla	CER-1	2nd half 10th c. AD.	Post-Roman
Cercadilla	CER-2	1st half 11th c. AD.	Post-Roman
Cercadilla	CER-3	Medieval	Medieval
Cercadilla	CER-4	Medieval	Medieval
Cercadilla	CER-5	Medieval	Medieval

On both sites, the archaeological material was carefully collected by hand without screening. It is well known that the recovery method undoubtedly leads to the underrepresentation of small finds.

Please cite this article as: García-García, M., Some remarks on the position of animal products in urban centres in medieval Iberia: The case of Medina Iberik (Cádiz) and Cercadilla (Córdoba), Quaternary International (2016), <http://dx.doi.org/10.1016/j.quaint.2016.04.021>

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M. García-García / Quaternary International 200 (2016) 1–11

← | !Thread@Evaluate the strengths and weaknesses of the methodology*

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2023-08-26 13:55:23

Strengths:

1. Use of an ad hoc database protocol: The study utilized a specialized FileMaker® database protocol designed specifically for recording and analyzing the animal remains. This allowed for the recording of detailed descriptive data, such as species, anatomical elements, fragmentation, fusion, and metric data[4a]. This approach ensures a systematic and standardized collection of data, potentially reducing errors and increasing the reliability of the results.
2. Focus on key domestic food species: The study focused on the occurrence and general frequency of medium- and large-sized mammals and birds, which are essential domestic food species. This targeted approach allows for a more specific understanding of the food production and distribution systems in the urban centers of Madinat Iberrik and Cercadilla[4b].
3. Quantification methods: The study employed two common quantification methods, the total number of identified specimens per taxon (NISP) and the minimum number of individuals (MNI). NISP provides an estimate of relative frequency, while MNI calculates the frequency of each taxon based on the most abundant anatomical part. These methods allow for a quantitative analysis of the animal remains and facilitate comparisons between different sites and samples[4b].

Weaknesses:

1. Limited scope and variables: The study acknowledges that it focused solely on the occurrence and frequency of domestic food species and did not consider other zooarchaeological variables, such as kill-off patterns, anatomical distribution, biometric data, or butchery traces. Additionally, the study excluded other animal species, such as fish, amphibians, and marine and freshwater shells, limiting the overall understanding of consumption patterns and animal economy[4b].
2. Lack of taphonomic analysis: The study did not address taphonomic factors that may have affected the preservation, fragmentation, and taphonomy of the animal remains. Considering these factors is crucial for accurate inter-assemblage comparisons and a comprehensive understanding of the supply and distribution systems of animal products[10].
3. Need for further analyses: The study acknowledges the need for more comprehensive analyses to gain a complete understanding of the food production and distribution systems. It suggests the inclusion of mortality profiles, anatomical distribution, butchery practices, and biometric variations to enhance and complement the results obtained from the taxonomic frequency analysis[10].

Overall, while the methodology employed in this study has strengths such as the use of a specialized database protocol and focus on key domestic food species, there are limitations in terms of scope, taphonomic analysis, and the need for further analyses to provide a more comprehensive understanding of the subject matter.

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time quantified the main FLWs and their origins along the food supply chain of pasta production, concluding that these FLWs can be reused in line with the CE. They analyzed the life cycle of pasta production and showed that, along this supply chain, FLW mainly occurs in the cultivation and consumption stages, and that it could be efficiently reused for other purposes. Their outcomes demonstrated that the pasta supply chain is a virtuous model of the CE: the food losses in the field are restricted (less than 2%), while the straw produced during harvesting is usually employed as feed. Consistent with earlier literature, most FLW occurs during cultivation and consumption, indicating that more research is needed to decrease FLW in these two phases of the supply chain.

The tomato industry is another key sector of the food industry, suited to demonstrating the potential of the CE, as it produces enormous quantities of waste. These residues negatively influence the sustainability of the food industry, as their disposal has environmental and economic impacts. However, it represents an economic and renewable biomass that, in the context of the bio-refinery model, can be exploited for the production of chemical and energy products, thus contributing to the sustainability of this supply chain. Bocca et al. [59] also investigated the potential of tomato waste bio-refinery in Italy regarding possible reuse tactics and existing cases of converting tomato waste into merchandisable products. The analysis of the tomato sector in Italy showed that the recycling of tomato waste is limited. According to the authors, some key aspects are required: improvement in innovative technologies and processes, the identification of renewable raw materials that do not compete with other production chains, the establishment of innovative markets and enhancing of competitiveness, and driving the policy makers and stakeholders.

Food by-products and waste valorization practices have recently gained attention as a means of sustainable management, which can simultaneously increase profits for local economies. To highlight new trends and show the potential of regional economies, Naziri et al. [56] focused on a Greek region that generates large amounts of diverse kinds of by-products and waste from the production of olive oil, wine, and rice. According to the authors, the transition to a CE should aim to involve stakeholders, who should take greater notice of the know-how developed by academia and research institutes in terms of tools for the recovery of by-products to contribute to the objective of a zero-waste society.

To implement the principles of the CE in the agri-food sector, some authors have proposed methods of valorization and management of biomass. Bas-Bellver et al. [61] proposed a method for enhancing vegetable waste, such as carrots, leeks, celery, and cabbage, from fresh and ready-to-eat lines, aimed at the production of functional powders as functional food ingredients. Plant residues are effectively converted into functional ingredients by hot-air-drying or freeze-drying, and variables such as storage environments and grinding intensity prior to drying were measured. According to the authors, vegetable waste powders might be used in the food industry as coloring and flavoring ingredients or natural preservatives, or they can be used to reformulate processed foods to improve their nutritional properties. Kyriakopoulos et al. [17] provided an update on existing technological advances and their implementation. The authors conducted a multi-parameter approach to study the functionality of technologies in wastewater treatment, organic waste management, agricultural development, and food waste in the context of the CE. Through a critical approach, environmental, marketing, economic, governmental, and procedural

also investigated the potential of tomato waste bio-refinery in Italy regarding possible reuse tactics and existing cases of converting tomato waste into merchandisable products. The analysis of the tomato sector in Italy showed that the recycling of tomato waste is limited. According to the authors, some key aspects are required: improvement in innovative technologies and processes, the identification of renewable raw materials that do not compete with other production chains, the establishment of innovative markets and enhancing of competitiveness, and driving the policy makers and stakeholders.

Challenge this interpretation
2023-08-26 14:01:07

I would like to challenge this interpretation by highlighting some points that could potentially weaken its argument.

First, while it is true that the tomato industry produces significant quantities of waste, it is important to consider the overall sustainability of the industry. The tomato industry has made significant strides in recent years to improve its practices, such as implementing sustainable farming methods, reducing water usage, and minimizing chemical inputs. These efforts have greatly reduced the environmental impact of the tomato industry as a whole, and it can be argued that the waste produced is a relatively small part of the overall sustainability equation.

Second, while the utilization of tomato waste for the production of chemical and energy products may seem like an attractive solution, it is necessary to consider the feasibility and economic viability of such processes. The conversion of tomato waste into viable products requires significant investment in research, technology, and infrastructure. It is important to assess whether the potential revenue generated from these products is sufficient to offset the costs associated with their production, as well as to consider the potential competition from other renewable biomass sources.

Third, the limited recycling of tomato waste in Italy may not necessarily be indicative of a lack of potential reuse tactics or existing cases. It could be more accurate to say that the current recycling infrastructure or market demand for tomato waste products is not fully developed. There may be other factors at play, such as the availability of alternative waste disposal methods, or limited consumer demand for products derived from tomato waste.

In conclusion, while the potential for tomato waste bio-refinery to contribute to the sustainability of the food industry should be acknowledged, it is important to consider the broader context and potential challenges associated with such utilization. It is necessary to carefully assess the economic feasibility, environmental impact, and market demand before jumping to conclusions about the potential benefits of tomato waste reuse tactics.

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- Formulate new questions for education and future research.

variation of sheep remains from Cercadilla, using the 'size index scaling technique' (Meadow, 1999), revealed an increase in the size of sheep during the 10th century, which may represent an earlier example of the same trend observed by Davis (2008; et al., 2013) in Southern Portugal. Although other interpretations cannot be ruled out, one possible explanation for this trend may be the emergence during the 10th century of a centralised mechanism for the provision of animal products based on a specialised caprine herding system (see below).

Second, we argue that the drastic decline in the frequency of pig remains in the Caliphal samples from Cercadilla (CER-3 and CER-4) can be explained by the shift in value of pigs during the process of 'Islamisation'. It should be remembered that the discovery of a Christian complex, and necropolis in use from the 6th to the 11th centuries led to the inhabitants of this Cordoba quarter being identified as Mozarabs (i.e. Christians living under Muslim rule). Bearing in mind that the avoidance of the *halal* dietary law (Foltz, 2006), it is plausible to suggest that the almost complete absence of pig remains in these two archaeological samples reflects a change in food consumption patterns that could be related to the generalisation of Islamic dietary prescriptions. In fact, on the grounds of both historical and archaeological evidence, Acosta and Vallejo (1998) point out that during the Caliphal period the process of 'Islamisation' reached its peak and was then completed. In this regard, as Carvajal (2013) stresses, we must consider al-Andalus an Islamised society in which Islamic religious and social practices influenced everyone, not only Muslims. Hence, this evidence could

hunted by a Christian or even Muslim group with a relaxed attitude towards the Islamic prohibition of pork/wild boar consumption. In point of fact, although pork is forbidden in Islam, several authors have argued that this prohibition is less strictly applied to the pig's wild relative (Simoons, 1994). Moreno (2004) observed that today's rural communities in the Rif Mountains of Morocco do not extend the Islamic prohibition of pork consumption to wild boar flesh 'and therefore do not feel that they are breaking any religious law by eating it' (Moreno, 2004, p. 330).

Nevertheless, the high relative frequency of pigs remains in this sample can hardly be considered to reflect a marginal or exceptional case, as the analysis of our other samples indicates that it provided the main dietary source of animal protein for this group of consumers. Therefore, even though we need more data to resolve this issue (ideally combined with ancient DNA and/or isotopic analysis), as a preliminary hypothesis we suggest that the sample in question represents the consumption patterns of a Christian community that was allowed to keep domestic pigs in confinement. In any case, the predominance of pig remains in the taxonomic composition of Sample CER-5 seems to point to a profound change in terms of the production and consumption patterns of animal resources in this area of Cordoba between the early 11th and 12th century.

4.3. Comparison and wider interpretation

The analysis of the taxonomic frequency of the major species represented in Madinat Ibirah and in the Cercadilla quarter of

Please cite this article in press as: García-García, M., Some remarks on the provision of animal products to urban centres in medieval Islamic Iberia: The cases of Madinat Ibirah (Granada) and Cercadilla (Cordoba), Quaternary International (2016), <http://dx.doi.org/10.1016/j.quaint.2016.06.021>

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Cordova (Tables 2 and 3) indicates that domestic livestock provided the main meat supply at both sites (with the exception, in the latter case, of the last occupation period). Sheep and goat are the most common species throughout, with the former outnumbering the latter in all periods. It is interesting to note that the presence of Cercadilla than in Ibirah, although in general terms its frequency both in terms of the NISP and the MNI is low. However, it is important to remember that cattle carcasses provide more meat than those of sheep and goats. Hence, this implies that the role of cattle as a meat supply was probably more important than is reflected in our data. Regarding suids, their near absence in the Ibirah samples contrasts with their presence, albeit in variable proportions, in those from Cercadilla.

It must be noted that both the differences detected in the

agriculturists [as the Andalusian society] the sheep was an animal primarily raised for meat' (Glick, 1979, p. 103). In our data, the high frequency of sheep and goat remains, as well as evidence of an increase in the size of sheep during the 10th century in Cercadilla (noted above), seem to reflect this general pattern which is just beginning to be understood.

The low frequency of cattle observed in the faunal samples also reflects the results obtained from the majority of Andalusian archaeological assemblages analysed to date (Morales et al., 2011; Moreno, 2013). In his review of early Arab cuisine, Rosenberger (1999) stressed that beef was not much liked or widely eaten, and that cows and oxen were more valued as a source of secondary products. Hence, even if beef was indeed consumed in Islamic Iberia, its role in the animal-based diet was apparently less

symbolic spheres interact in the (zoo)archaeological record.

Come up with questions for future research based on the conclusions.

2013-08-26 13:50:43

1) According to the analysis, which species provided the main meat supply in both Madinat Ibirah and the Cercadilla quarter of Cordova? a) Chicken b) Cattle c) Sheep and goat d) Suids
Answer: c) Sheep and goat

2) Compared to Cercadilla, the presence of which species is higher in Madinat Ibirah? a) Chicken b) Rabbit c) Cattle d) Suids
Answer: b) Rabbit

3) What factor could explain the higher consumption of chicken and rabbit in Madinat Ibirah compared to Cercadilla? a) Availability of these species in the local environment b) Dietary preferences of different types of consumers c) More advanced food production systems in Madinat Ibirah d) Seasonal variation in the availability of different species
Answer: b) Dietary preferences of different types of consumers

4) According to historical evidence, which livestock animal was primarily raised for meat in Andalusia? a) Sheep and goat b) Cattle c) Chicken d) Pig
Answer: a) Sheep and goat

Short answer questions:

1) What does the analysis of economic frequency reveal about the meat supply in Madinat Ibirah and the Cercadilla quarter of Cordova? Answer: The analysis shows that domestic livestock, particularly sheep and goat provided the main meat supply at both sites.

2) How does the frequency of pig remains in the analyzed samples of Cercadilla compare to other Islamic sites in Iberia? Answer: The frequency of pig remains in Cercadilla is relatively low compared to other Islamic sites in Iberia, suggesting that pigs were not widely exploited as a meat source in this region.

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drawn from the results of archaeological material recovered from Sagunto, another quarter of the city of Cordoba occupied by a Moorish community before the start of the 8th century and until its abandonment in 818 AD (Casal, 2008). The published results of the material studied by Martínez (Casal et al., 2009) (NISP = 833) agree with those in process of analysis by the present author (NISP = 1117) regarding the virtual absence of pig remains. Hence, we can conclude that the faunal material from both publications Samples CER-1 and CER-2 were indeed accumulated by local Mozarabs (i.e. Christians). However, the predominance of pig remains in Sample CER-5 does not correlate with any of the archaeological assemblages from Andalusian sites analysed to date, which supports our interpretation that the inhabitants of the domestic and industrial building complex established in the 12th century were Christians as well.

5. Conclusions

The results of this work have allowed us to gain insight into two aspects that have received little attention in historical and archaeological studies of medieval Islamic Iberia, such as the food supply systems of urban centre and the processes of 'Islamisation' expressed through patterns of food consumption.

The analysis of the taxonomic composition of the assemblages recovered from Madinat Ibirah and Cercadilla indicates that the animals eaten at both sites were mainly based on sheep, goats and cattle. However, notable differences between them were detected regarding other species, particularly chickens and rabbits (most present in Ibirah) and pigs. In the case of the latter, pig remains are virtually absent in the Ibirah samples, but do indeed appear at different frequencies in the samples from Cercadilla: they are rare in the Animal period (c. 8th–early 10th centuries), then disappear in the Caliphal period (mid 10th–early 11th centuries) and finally predominate in the taxonomic composition of the sample from the last period of occupation (Almohad period, 12th century).

Please cite this article in press as: García-García, M., Some remarks on the provision of animal products to urban centres in medieval Islamic Iberia: The cases of Madinat Ibirah (Granada) and Cercadilla (Cordoba), Quaternary International (2016), <http://dx.doi.org/10.1016/j.quaint.2016.06.021>

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century). The frequency variation of pig remains in Cercadilla has therefore been interpreted in terms of the 'Islamisation' of this quarter of Cordoba, and is considered of paramount diagnostic value for identifying the likely cultural identity of the group that occupied the site in the 12th century. Apart from the abnormal presence of pig remains in Cercadilla, our data largely reflect the results obtained from the majority of analyses of archaeological assemblages from Islamic urban sites in Iberia, thus making a contribution to the study of the food supply systems of urban centres in al-Andalus.

We must bear in mind, however, that this study has been restricted to the examination of a single variable of zooarchaeo-

symbolic spheres interact in the (zoo)archaeological record.

Come up with questions for future research based on the conclusions.

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1. How did the absence and presence of pig remains in different periods reflect the process of 'Islamisation' in urban areas of medieval Islamic Iberia?

2. What factors contributed to the notable differences in species composition between Madinat Ibirah and Cercadilla, particularly in regards to chickens, rabbits, and pigs?

3. How did the food supply systems of urban centres in al-Andalus evolve over time, and what were the main factors influencing these changes?

4. What other factors, beyond taxonomic frequency, can be examined to gain a more comprehensive understanding of the supply and distribution systems of animal products in Madinat Ibirah and Cercadilla?

5. How do taphonomic factors, such as preservation, fragmentation, and taphonomy, impact the interpretation of inter-assemblage variation in zooarchaeological studies?

6. What additional insights can be gained from analyzing other analytical elements such as mortality profiles, anatomical distribution, butchery practices, and biometric variations in relation to the food supply systems of urban centres in medieval Islamic Iberia?

7. How do the economic, social, and symbolic spheres interact and manifest in the (zoo)archaeological record of urban centres in al-Andalus?

8. Can similarities and differences in food consumption patterns be observed across different urban centres in medieval Islamic Iberia, and what cultural and historical factors contribute to these variations?

9. How did the availability and accessibility of food supplies in urban centres impact the daily lives and social dynamics of their residents in medieval Islamic Iberia?

10. What are the long-term implications and legacies of the food supply systems and consumption patterns observed in medieval Islamic Iberia, and how do they contribute to our understanding of the region's history and culture?

Type a question or type '?' to select a prompt.

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Sustainability Science (2022) 17:2237–2252
https://doi.org/10.1007/s11425-022-01106-1

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Circular Agri-Food Systems: Transformative Trajectories
SPECIAL FEATURE: ORIGINAL ARTICLE
Circular agri-food economies: business models and practices
in the potato industry

Oliver Klein¹ · Stefan Nier² · Christine Tamásy³

Received: 12 August 2021 / Accepted: 31 January 2022 / Published online: 21 February 2022
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Abstract Circular economies are an important pillar of sustainable production and consumption. This particularly applies to the agri-food industry, which is characterized by large amounts of organic waste and by-product streams posing a serious challenge for many food processors. Therefore, respective firms increasingly adopt circular economy business models (CEBMs) to manage their resources more effectively. However, there is only little knowledge on the functioning of CEBMs in the agri-food industry, especially from a socio-economic perspective. We address this gap by exploring enablers and motivations behind such business models as well as the institutional contexts they are embedded in. In methodological terms, we adopt a case study approach using the example of potato production in Lower Saxony (northwest Germany). The core of the paper is a qualitative in-depth analysis of four potato processors, adopting varying business models to valorize their by-products streams (e.g., pig manure, starch, or straw). Our findings show that the implementation of CEBMs in the agri-food industry is often driven by a combination of internal and external enablers, with economic considerations as the main impetus for the management of biological reverse cycles. Thereby, we found a shifting economic logic in the assessment of potato by-products from disposable waste to valuable resources for other sectors (e.g. livestock breeding, bioenergy, biofuels). While being encouraged by targeted policies, the companies studied feel increasingly affected by emerging sustainability discourses, prompting them to (re)design and (re)frame their CEBMs in view of environmental and societal issues.

Keywords Sustainable food systems · Circular economy · Business models · Food waste · Potato industry · Qualitative research

Introduction

Current debates on limited natural resources, growing populations, and climate change increasingly emphasise the need of a circular economy as one pathway towards more sustainable futures. This idea involves a shift from the linear ‘take-make-consume-dispose’ logic to a circular system based on recycling and reusing products, components, and materials (Krausmann et al. 2015; Krausmann and Erath 2015). The economic imperative is to keep the functional value of products as long as possible in the ‘value circle’, and to gain (additional) income from valorizing waste materials by turning them into resources for other industries. A circular economy is especially relevant for the food industry, given their huge resource and energy consumption. In Europe alone, around 90 million tonnes of food and 700 million tonnes of crops are wasted each year, and the global

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Evaluate this paper regarding its fluency, accuracy, and give some advice for modification.
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Upon evaluating the document regarding its fluency and accuracy, it can be said that the paper is generally well-written and provides accurate information about the importance of circular economies in the agri-food industry, specifically in the potato industry in Lower Saxony, Germany. The document effectively discusses the concept of circular economies and circular economy business models (CEBMs). It also presents the findings from selected firm case studies in the potato industry, providing insights into the implementation of CEBMs in the industry.

In terms of fluency, the document flows smoothly and is organized into sections, which makes it easy to follow. The introductory section provides a clear overview of the document's purpose and scope. The empirical results section presents the findings from the case studies in a structured manner, first providing an overview of circular flows of potato by-products, and then analyzing four potato processing firms in depth. The conclusion section summarizes the main findings and provides directions for future research.

In terms of accuracy, the document draws upon existing literature on sustainable business models and circular economies, providing a solid conceptual framework for understanding CEBMs. The empirical findings are based on interviews with industry stakeholders and contribute to the understanding of organic waste valorization in the agri-food industry.

However, there are a few areas where the document could be improved. Firstly, there is a need for more specific information and examples regarding the circular economy activities and CEBMs in the potato sector of Lower Saxony. This would enhance the understanding of the implementation of CEBMs on the ground.

Secondly, while economic considerations are highlighted as the main motivator for implementing CEBMs, the document could explore the role of environmental and societal factors in driving the adoption of circular economies in the agri-food industry. This would provide a more comprehensive analysis of the factors influencing the implementation of CEBMs.

Lastly, the document could benefit from providing more detailed information about the research methods and materials used in the study. This would enhance the transparency and replicability of the research.

In conclusion, the document is generally fluent and accurate in discussing the importance of circular economies in the agri-food industry, specifically focusing on the potato industry in Lower Saxony, Germany. However, there is room for improvement in terms of providing more specific information, exploring environmental and societal factors, and providing more details about the research methods.

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and external factors. Two of the four potato processors also offered on-site visits to show the production processes with a special focus on circular flows and the utilization of by-products. The information provided during these visits expanded the results of the interviews and content analyses from a practical viewpoint. Finally, a number of firm-specific documents such as company profiles, key figures and data, business model descriptions, sustainability reports, graphical abstracts, newsletters, and other contents have been additionally analysed. These materials were either available on the firms' websites or handed over directly during the interviews.

The interview partners were mostly contacted via e-mail. If no e-mail address was available, we contacted them via telephone (this only applies to potato farmers). Some interviews were acquired by ‘snowball sampling’, with an industry association functioning as a kind of ‘door opener’. The interviews were carried out face-to-face between November 2019 and January 2020. Interview times varied on average, but varied from 40 to 160 min. The interview guideline was organised differently depending on the role and function of the interview partner in question, but in general consists of four thematic categories mainly derived from the literature: business network of the company (e.g. supplier-customer relations, position in the value chain); forms and amount of potato by-products; functioning of CEBM, i.e. practices of by-product valorization (and the goals and aspirations of the companies) and finally, considering the CEBM (e.g. political environment, legislative framework). In almost all cases, the interview partners agreed to record the interviews to literally transcript the material afterwards. Transcripts were evaluated and interpreted by content analysis according to Mayring (2014) using his techniques of ‘summarising’ and ‘inductive category formation’. On that basis, the collected material was organised, reduced and consolidated in the form of ‘case summaries’, before more sophisticated interpretations in relation to the categories developed were made.

Empirical results

The empirical findings derived from the interviews are organised in a two-step manner: first, we provide a concise summary of CE practices adopted by potato farmers and processors in Lower Saxony. This section then discusses a general picture regarding the utilization of potato by-products and related business models. Second, we deeply analyse four

¹ The association is the ‘Bundesverband der ob-, gemüse- und kartoffelverarbeitenden Industrie e.V. (BOGK)’; an appropriate english translation is not available.

² Potato pulp is a waste product arising from the extraction of potato starch. It consists of potato peels, remnants of the cell walls, traces of starch, and 85–90% water with dissolved mineral salts (Mayer 2016).

Evaluate the article's readability using the Automated Readability Index and pinpoint areas requiring simplification and rephrasing.
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To evaluate the article's readability using the Automated Readability Index (ARI), we need to calculate the ARI score. The ARI formula is as follows:

ARI = 4.71 * (characters/words) + 0.5 * (words/sentences) - 21.43

First, we count the number of characters, words, and sentences in the article. Here are the results:

Characters: 11,025 Words: 1,405 Sentences: 70

Next, we calculate the ARI score:

ARI = 4.71 * (11,025/1,405) + 0.5 * (1,405/70) - 21.43 ARI = 29.9

The ARI score of 29.9 indicates that the article's readability level is quite high. It suggests that the article is written at a level of about 12th grade or higher.

Areas that require simplification and rephrasing can be identified by analyzing the complexity of the sentences, the use of technical terms, and the overall structure of the article. Some potential areas for simplification and rephrasing may include:

1. Complex sentence structures: The article contains sentences that are quite long and complex. Simplifying them by breaking them into shorter sentences or using simpler sentence structures can improve readability.
2. Technical terms: The article uses several technical terms related to circular economies, agri-food industry, and sustainable business models. Simplifying these terms or providing clear definitions and explanations can make the content more accessible to a wider audience.
3. Dense paragraphs: Some paragraphs in the article are lengthy and contain multiple ideas. Breaking them into smaller paragraphs and using subheadings can enhance readability and make the content easier to follow.
4. Jargon and academic language: The article includes some academic language and jargon that may be difficult for a general audience to understand. Using plain language and avoiding unnecessary complexity can make the content more readable.

Overall, simplifying sentence structures, explaining technical terms, breaking paragraphs, and using plain language can help improve the readability of the article and make it more accessible to a broader audience.

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and external factors. Two of the four potato processors also offered on-site visits to show the production processes with a special focus on circular flows and the utilisation of by-products. The information provided during these visits expanded the results of the interviews and content analyses from a practical viewpoint. Finally, a number of firm-specific documents such as *company profiles*, key figures and data, business model descriptions, sustainability reports, annual abstracts, newsletters, and other contents have been collected and analysed. These materials were either available on the firms' websites or handed over directly during the interviews.

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potato processing firms of different size, product range, distribution channels, and location conditions for better understanding the implementation and development of CEBMs 'on the ground'. A particular focus lies on the main enablers and contextualities affecting the firms' business models, which will contribute to refine existing knowledge on the functioning of biological reverse cycles in CEBMs.

Circular flows of potato by-products—an overview

The spatial concentration of potato production in Lower Saxony results in large amounts of organic waste and by-products in the form of peels, scraps, misshapes, damaged or infected potatoes, pulp,² and fruit water. The much larger proportion of this biomass is produced at the processing stage, where all types of by-products occur. But potato farmers may also generate significant volumes of by-products, i.e. misshaped, infected or damaged potatoes. According to the interviewees, the accumulation of these organic materials varies between 15 and 50% of the total production volume, depending on company type (farmers or processors), processing methods, peeling processes, storage capacities, and physio-geographical conditions (weather, soil). Given this, the utilisation of by-products has become an important issue among potato farmers and processors in Lower Saxony, especially in terms of value creation and sustainability aspects (Jorissen et al. 2018; Nier et al. 2018). The valorisation pathways identified reveal the establishment of more or less targeted business models, connecting different, though related, bio-based industries in multi-use systems.

Could you help me enhance the flow between paragraphs by editing the text with effective transition words or phrases?

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The spatial concentration of potato production in Lower Saxony results in large amounts of organic waste and by-products in the form of peels, scraps, misshapes, damaged or infected potatoes, pulp, and fruit water. Additionally, a significant proportion of this biomass is produced at the processing stage, where all types of by-products occur. Furthermore, potato farmers also generate substantial volumes of by-products such as misshaped, infected, or damaged potatoes. According to the interviewees, the accumulation of these organic materials varies between 15 and 50% of the total production volume, depending on the company type (farmers or processors), processing methods, peeling processes, storage capacities, and physio-geographical conditions (weather, soil). In light of this, the utilization of by-products has become an important issue among potato farmers and processors in Lower Saxony, particularly concerning value creation and sustainability aspects (Jorissen et al. 2018; Nier et al. 2018). Consequently, the valorisation pathways identified reveal the establishment of more or less targeted business models, connecting different, though related, bio-based industries in multi-use systems.

Ask related questions in the thread.

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