

Task 2 – Week 5

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Research skills 1



(MGM777)

مقدمة الدراسة البحثية

- أسباب وأهمية كتابة المقدمة.
- خطوات وعناصر كتابة المقدمة.
- أهم الاعتبارات (النصائح) عند صياغة مقدمة الدراسة البحثية

أهمية مقدمة البحث

مقدمة البحث العلمي تعرف بأنها تلخيص شامل وكامل لمكونات البحث، ومن خلالها يعرض الباحث الأسباب التي دفعته لاختيار بحثه العلمي، وكيفية حل مشكلة البحث والنتائج التي توصل إليها بشكل سريع ومختصر، وذلك من أجل تقديم لمحة عامة عن البحث للقارئ تتيح له معرفة المعلومات الواردة فيه، وبالتالي إكمال قراءة البحث في حال كان البحث مناسباً له أو عدم إكمال قراءته.

خطوات وعناصر المقدمة

من أجل صياغة مقدمة البحث العلمي يجب اتباع الخطوات التالية :

- توضع المقدمة في القسم الأول من البحث العلمي.
- يجب أن يحرص الباحث على تضمين مقدمة البحث العلمي للكلمات الدلالية الموجودة في بحثه.
- يجب أن يتم كتابتها بعد الانتهاء من كتابة البحث العلمي لكي يكون قادراً على تضمين كافة الأفكار الواردة في البحث.
- يجب أن تكون المقدمة مصاغة بطريقة صحيحة وسليمة وخالية من الأخطاء وبلغة واضحة.
- ويجب أن يستخدم الباحث عبارات بسيطة وسهلة وغير معقدة.

عناصر مقدمة البحث العلمي :

- موضوع البحث
- مشكلة البحث
- أهداف الدراسة
- أهمية الدراسة
- حدود البحث
- الفرضيات
- مجتمع الدراسة

صياغة المقدمة

- توضيح مجال الدراسة.
- الانتقال من العام إلى الخاص بشكل تدريجي.
- أن تحرّر في أسلوب علمي متين.
- توضيح مدى النقص الناتج عن عدم القيام بهذا البحث.
- الفجوة التي ستعالجها الدراسة.
- استعراض جهود العلماء السابقين حول موضوع البحث.
- تمهد لمشكلة الدراسة.
- الابتعاد عن الإسهاب والتركيز على القضايا ذات العلاقة المباشرة بموضوع الدراسة.



Article

Integrated Approach to Achieve a Sustainable Organic Waste Management System in Saudi Arabia

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Abstract: Organic waste management (OWM) has always been a fundamental aspect of human populations. Approaches to OWM must be matched to the characteristics of a certain population. In this consideration, the Kingdom of Saudi Arabia (KSA) is no exception. Organizations are being aligned to focus on sustainability matters sharing significant features with universal trends, especially the integration of 3Rs (reducing waste, reusing, and recycling resources). However, the degree and nature of advancement in the direction of sustainability vary depending on the economic level of a state. High-income economies can afford to pay a higher price to integrate 3Rs technologies. Most recent endeavors have focused on achieving 'Zero Waste', which is costly for low-income developing countries. The expectations of OWM systems in KSA must be estimated. In this work, the situations in KSA and other countries are analyzed, and pertinent aspects are explored. Matters relating to the sustainability of OWM are conceptually assessed. This study proposes an integrated method for an organic waste management system to achieve sustainable OWM in the context of state policy and appropriate frameworks, suitable technology, institutional order, operational and monetary administration, and people consciousness and involvement. A genetic-based waste collection transportation algorithm that enhances the efficiency of waste collection truck management is presented in line with this technology. The selected routes based on the R_p and IP_p are the most efficient among those available for the examined smart bin destinations. The minimum R_p of selected routes is less than the maximum R_p of available routes by 2.63%. Also, the minimum IP_p of selected routes is less than the maximum IP_p of available routes by 27.08%. The proposed integrated approach, including the waste collection transportation algorithm, would be beneficial across a variety of country-specific layouts.

Keywords: genetic-based waste collection; IoT; truck waste collection management; Zero Waste

1. Introduction

Millions of Muslims visit the Kingdom of Saudi Arabia (KSA) every year to do Pilgrimage (Hajj) and Umrah. Muslims visit holy areas of worship, such as the holy mosques al Haramayn (Makkah and Medina) and Al-Masha'ir (Arafat, Mina and Muzdalifah) [1]. The number of pilgrims arriving in KSA for Hajj (the 12th month of the Islamic lunar calendar) and Umrah has significantly increased in recent decades due to the ongoing expansion of the holy mosques, enhanced transportation services and safety, and decreased aggregate cost and time, with an annual increase of 1.15% from 1993 to 2014 [1–3]. The KSA

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still have room for improvement, they combine great production with a strong strategy. Techniques for dealing with food scarcity and waste are well understood amongst the group. However, more procedures can be carried out to execute the mandated law that holds all stakeholder economies accountable. Figure 1 presents the FSI score results of the G20 countries, according to the Economist Intelligence Unit and the FSI 2021.

FSI Score	Headline finding	Food loss & waste	Sustainable agriculture	Nutritional challenges
Best performing (1 st) quartile				
2 nd quartile				
3 rd quartile				
Worst performing (4 th) quartile				
Argentina				
Australia				
Brazil				
Canada				
China				
France				
Germany				
India				
Indonesia				
Italy				
Japan				
Mexico				
Russia				
Saudi Arabia				
South Africa				
South Korea				
Turkey				
United Kingdom				
United States				

Figure 1. FSI results—G20 countries.

The significance of this study is in finding solutions to reduce pollution and maximize resource use, especially organic waste management systems, and utilizing this technology to achieve the highest levels of waste management. The research's significance extends to the development of a methodology for implementing these solutions. This research proposes an integrated organic waste management approach for KSA, to enhance waste management performance.

Related studies in waste management mainly focus on solid waste management, which encompasses different waste types in addition to food waste. Some researchers have used IoT architecture to enhance waste management performance. However, this study addresses a variety of issues.

The issues are as follows:



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Foods 2022, 11, 1214

3 of 22

producers approximately fifteen million tons of municipal solid waste (MSW) per year, with a daily average of 4.4 kg per person. The average rate of waste generation is projected to increase to 30 million tons by 2025 due to continued population growth and urban expansion. Mideco City generates approximately 900 thousand tons of MSW on an annual basis. This rate will increase due to the growing number of pilgrims every year. The highest rate of waste generation occurs during the last 10 days of Ramadan (the 10th month of the Islamic lunar calendar) due to large numbers of local and foreign pilgrims in Mideco and Mideco cities [1]. The new Vision 2030 strategy in KSA aims to minimize all types of waste and to generate renewable energy from natural origins, including generated waste. The strategy has produced a roadmap for the implementation of a solid waste management system to enhance the economic and environmental importance of waste beyond recycling and reuse [6].

The increase in food waste is placing robust strain on the environment and increasing its carbon footprint. The economic value of proper management. Among the environmental technology for processing organic waste (fermentation, waste processing, anaerobic digestion, etc.) composting is an environmentally feasible and affordable PP composting of technical shortcomings and social problems, and recycling technology.

Recent research describes diverse techniques to enhance PP composting, as well as co-composting, the addition of organic/organic collection, the reduction of food loss, and the technological development of PP composting control and using current technology to enhance the deterioration of natural waste, produce value introduced natural waste, and so on, and is technically possible for PP composting [5].

Many researchers, such as Nigam et al., Rahat et al., Mounad et al., Khan et al., and Oudat et al., have presented various solutions to the waste management problem in KSA, in line with the country's vision for 2030. These solutions have included producing energy and value-added products, such as chemicals, organic fertilizers and nutrients, from different domestic waste origins through waste recycling [1,4–6]. In recent years, waste recycling has gained widespread recognition for its ability to bring products and materials in use, which can then be utilized in various forms (recycling, transportation, and production of new raw materials), thereby enabling the circular economy of countries like KSA [1].

Composting natural waste (manure) on agricultural land is considered one of the most common, practical, and environmentally useful control options. As a rule, the system includes the thermal/organic decomposition of natural waste (addition and various species of microorganisms) [10]. The generation of food as a type of organic waste is a natural result of human behavior. The elimination of food waste is necessary to improve the quality of life. Organic waste management (OWM) mechanisms have been developed to ensure waste from food processing is being used to maintain public health. After understanding the risks of food waste, procedures to enhance waste management systems must now be selected to ensure sustainability in agricultural work [10].

Furthermore, adhering to the United Nations Sustainable Development Goals to minimize environmental and ecological destruction necessitates effective management and proactive efforts to ensure sustainable food security. The Group of Twenty (G20) is an intergovernmental forum of large and advanced economies (19 countries and the European Union) that plays a pivotal role. G20 members comprise 85% of global GDP, 75% of economic production and 75% of greenhouse gas (GHG) emissions [11]. The international community has a negative effect on the environment. While the G20 nations are preparing for the coming decades, this is an opportunity to use their experience to set an example for other nations around the world.

Japan, Germany, Canada, France and Australia are amongst the G20 members who performed best in the Food Sustainability Index (FSI) in 2021. Although these nations

Foods 2022, 11, 1214

3 of 22

still have room for improvement, they combine great production with a strong strategy. Techniques for dealing with food scarcity and waste are well understood amongst the group. However, more procedures can be carried out to execute the mandated law that holds all stakeholder economies accountable. Figure 1 presents the FSI score results of the G20 countries, according to the Economist Intelligence Unit and the FSI 2021.

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Best performing (1 st) quartile				
2 nd quartile				
3 rd quartile				
Worst performing (4 th) quartile				
Argentina				
Australia				

عنوان الورقة البحثية : النهج المتكامل لتحقيق نظام إدارة النفايات العضوية المستدام في المملكة العربية السعودية.

أسهب الباحث بالمقدمة من خلال 6 نصوص متكاملة وتنتظر لأهمية البحث، والدراسات السابقة، ومشكلة البحث، وحدود الدراسة، كما أضاف جدول مقارنات بين السعودية ودول ال G20 لمقارنة معايير الدراسة بينهم، كما تتدرج بسرد المعلومات في المقدمة من العموم الى الخصوص، واختتم المقدمة بسطرين توضح هدف الدراسة بشكل مختصر.



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