THE EFFECT OF THE PERCEIVED UTILITY OF A MANAGEMENT CONTROL SYSTEM WITH A BROAD SCOPE ON THE USE OF FOOD WASTE INFORMATION AND ON FINANCIAL

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Abstract: The purpose of this study is to analyse the effect of the perceived utility of a management control system with a broad scope on the use of food waste information and on financial and non-financial performances in restaurants.

Keywords: management control system design; broad-scope; food waste; information; performance; food service industry.

Food waste is a significant global problem with consequences for food security and economic, social and environmental sustainability. Food waste refers to "food which was originally produced for human consumption but then was discarded or was not consumed by humans. Includes food that spoiled prior to disposal and food that was still edible when thrown away". According to the United Nations Food and Agriculture Organization (FAO), food waste is only measured for products intended for human consumption and excludes animal feed and product parts that are inedible. The FAO estimates that the loss and waste of food is one-third of the total amount of food produced: approximately 1.3 billion tons. Reducing food waste levels is critical to mitigating hunger and reducing pressure on natural resources. Reducing food waste is an interdisciplinary and multisectoral task that requires study from different perspectives. In companies, this task is addressed by business management, which presupposes the incorporation of waste information in the planning and control system. Studies have recommended the implementation of information systems to manage food waste, e.g.,. However, it is challenging to design management systems that incorporate food waste measures in a manner that facilitates decision-making. A management control system (MCS) can play this important role, as it can provide useful information for decision-making and influence people to achieve organizational goals, because an MCS facilitates the appropriation of the benefits of sustainable innovations in organizations. Such systems can be designed to provide more sophisticated information, which can facilitate the decision-making process and the coordination of various activities related to food waste. These broad information systems are referred to in the MCS literature as "broad-scope". The scope dimension has three sub-dimensions: focus, quantification, and time horizon. "Focus" refers to whether the

information is collected from within the firm or outside it (e.g., economic, technological and market factors). The quantification feature pertains to whether the information is financial or non-financial. "Time horizon" refers to the extent to which the information relates to future rather than historical events. Thus, broad-scope information is externally focused, non-financial, and future-oriented. To enhance the process of making decisions regarding food waste, it is essential to align scope with this use of an MCS. Thus, information of a broader scope can be used to support decisions regarding food waste. These performance measures for food waste can be formed by a combination of broad-scope measures.

For example, they can be formed from financial and non-financial information (e.g., costs, revenue from scrap, amount of waste). In this study, we propose to fill a gap in the management studies literature by aligning scope of MCS and use of food waste information for application in restaurants. Studies reveal the importance of management mechanisms, such as big data and performance indicators. However, Warshawsky recognized that the current business information system does not provide sufficient information for the management of food waste. In addition, the limited use of food waste information may be hampering related decision-making. There is relatively little empirical research examining how or under what circumstances MCS, more specifically the scope and use of food waste evaluation systems, can assist in the communication and management of food waste. Thus, investigating the importance of information of a broad scope for different levels or types of decision can be fundamental. The purpose of this study is to analyse the effect of the perceived utility of a management control system of broad scope on the use of food waste information and on financial and non-financial performance in restaurants. To attain this objective, we used a questionnaire and used structural equation modelling to analyse data collected from 206 restaurants. In this study, we argue that an MSC of broad scope is a means of assisting the decision-making process about food waste in restaurants for two reasons: (a) the decision-making environment about food waste in restaurants is dynamic; that is, food waste can occur at various stages (e.g., planning, purchasing, production, processing or cooking, cleaning, service, storage or stock management); and (b) the information is broad in scope; that is, it is operational, financial, non-financial, external and forward-looking (e.g., product time to market, role of supply chain actors in food waste, operational aspects that lead to food waste, food management measures, and policies to avoid food waste). We contribute to the food waste literature by addressing this problem using a management control system (MCS). More specifically, we include in the MCS scope food waste information of a broad scope (i.e., non-financial, external, future-oriented and long term) and indicators that apply to food waste. We also expand empirical knowledge on the impact of food waste information on company results by analysing financial and non-financial performance

in a segregated way. This analytical approach is adopted because studies have revealed that reducing food waste cannot be left to consumers alone; on the contrary, food waste reduction involves a double loop between consumers and companies. The role of service companies, such as those in restaurants, can be important in reducing food waste.

We contribute to this field by empirically demonstrating that the scope and use of an MCS that includes food waste information improves the financial and non-financial performance of restaurants. This article contains sections on the background, materials and methods, results, discussion and finally a section on our conclusions.
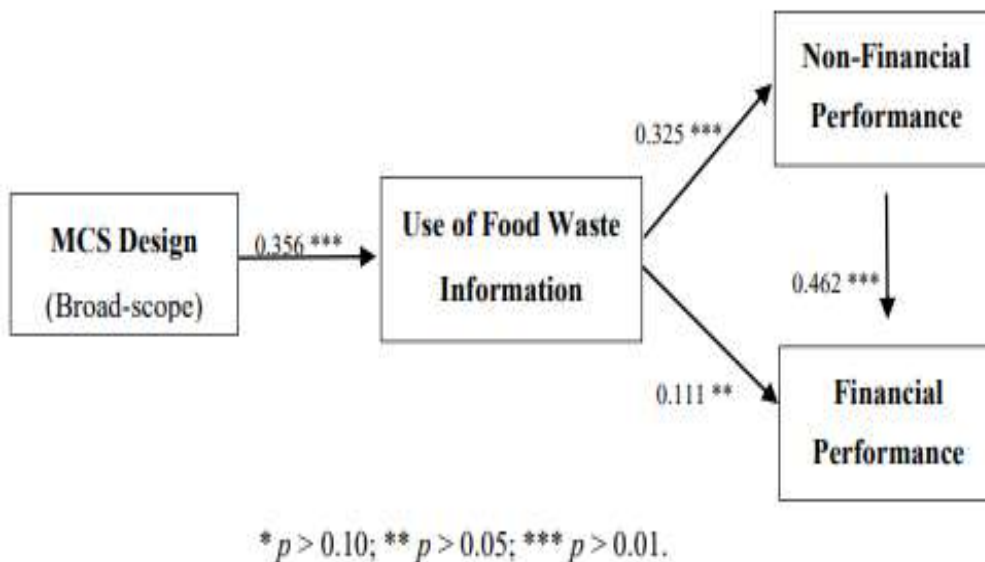

*p > 0.10; ** p > 0.05; *** p > 0.01.

Figure 1. PLS structural model with significant path coefficients.

Management in restaurants also demands information oriented towards the future, which is consistent with. For example, planning and forecasting is noted in the literature as the best way to reduce food waste. Strotmann et al. and Derqui and Fernandez argue that it is essential to define the objectives to be achieved. In addition, these objectives can be subdivided into quantitative and qualitative objectives. Generally, food waste occurs because of planning and forecasting errors, such as mistaken customer-number forecasts. Overestimating customer demand generates food overproduction, which has been identified as a primary cause of waste. This overestimation of demand is in many cases generated by a lack of information; were it available, this information would make it possible to better plan food service activities, such as the accurate estimation of customer numbers. The flow of customers for the day, week or month is also important information, e.g., planning purchases, estimating the amount of food to be prepared, and calculating employee time off.

Goh and Jie note that to reduce waste it is necessary to implement measures based on accurate information that facilitate preparing the correct number of meals. Previous studies have observed that the use of performance assessment information for food waste is not yet fully consolidated in the sector. For example, Otten et al. found that

only three food-generating businesses reported the presence of official targets for preventing food waste and that only three companies reported being in the process of creating such goals. In addition, these goals vary in terms of results (e.g., food volume or the amount of an ingredient used) and the level of responsibility (e.g., department or food preparation station). Most companies mentioned that these goals have been defined or are being defined at the corporate level. Two companies without goals reported that they thought they did not require such goals or that there was no corporate support for establishing them. Strotmann et al. analysed food waste reduction before and after the process of developing and implementing measures to reduce waste. Their results reveal that there was a reduction in food waste after the implementation of the measures. Lack of planning can also affect other activities and processes. For example, Bilska et al. found that a substantial quantity of stock was lost due to unplanned purchases. Planning information can play an important role in reducing unplanned purchases at the consumer level but also in the restaurants. Cicatiello and Franco observed a lack of adequate records on food waste in supermarkets in Italy. Such information can also be essential to establishing marketing plans, such as promotions and daily specials as well as discounts, among other creative activities, as well as the increase in other strategies such as increasing the temperature of food storage .

Our results also indicate that external information (e.g., regarding the market) and use of management information and big data are important in making decisions concerning food waste. The restaurants must increasingly anticipate market changes, and for this they require information on the external environment, such as customers and suppliers. The food sector is highly sensitive to changes in the business environment and must be aware of any such changes.

The aim of this study was to analyse the effect of the perceived utility of a management control system of broad scope on the use of food waste information and on financial and non-financial performance in restaurants. To conduct the study, a questionnaire was used in Brazilian restaurants. To analyse the data provided by 206 responses, structural equation modelling was performed. The study concludes that a comprehensive MCS, i.e., one that includes non-financial information, is future- and externally oriented and long-term, affects the use of food waste indicators. This outcome indicates that more comprehensive information helps restaurant managers make decisions regarding food waste. Our study provides empirical evidence that the use of food waste information in restaurants (a—internal compliance with waste policies and regulations; b—continuous process improvement; c—waste data provision; d—external waste data) improves non-financial performance (a—customer satisfaction, b—quality of products and services, c—development and innovation of products and services, d—human resources) and financial performance (a—operating profit; b—net revenue; c—return on investment).

The study finds that the use of broad-scope information on food waste improves organizational performance. These findings provide evidence that can assist restaurant managers in the design of management systems. Although the results are robust, our study has several limitations. The findings represent manager perceptions regarding the scope and use of food waste information and business results. For example, managers can overestimate the performance of their businesses compared to their competitors. Several questions in the study regarding the use of information were adapted to the food waste context. Despite these limitations, the study results are an important addition to knowledge regarding food waste management.

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