

## Impact Factor:

ISRA (India) = 6.317  
ISI (Dubai, UAE) = 1.582  
GIF (Australia) = 0.564  
JIF = 1.500

SIS (USA) = 0.912  
PIIHQ (Russia) = 3.939  
ESJI (KZ) = 8.771  
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630  
PIF (India) = 1.940  
IBI (India) = 4.260  
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

## International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2023 Issue: 05 Volume: 121

Published: 08.05.2023 <http://T-Science.org>

Issue

Article



**Francis Dindo G. De Lara**

Cebu Technological University – Main  
Doctor of Philosophy in Technology Management,  
Cebu, Philippines  
[francisdindo.delara@ctu.edu.ph](mailto:francisdindo.delara@ctu.edu.ph)

## CUSTOMIZED PORTABLE PIZZA OVEN: ITS DEVELOPMENT AND ACCEPTABILITY RELATED TO GARVIN'S AND TAM'S FRAMEWORKS

**Abstract:** Cooking equipment is a need, especially for businesses that cater and serve food in large quantities, as well as for educational institutions that offer courses on food preparation, for instance, Cebu Technological University (CTU), where the Bachelor of Science in Hospitality Management program is being offered and students dealing with food preparations. As a result, it is acceptable to satisfy their desire for a portable pizza oven. This research determined the effectiveness and the acceptability of the Customized Portable Pizza Oven as Supplemental Laboratory Equipment in Hospitality Management Cooking Subject and used the quasi-experimental method approach. The Customized Portable Pizza Oven meets the required standards and is a thorough guide in Hospitality Management Program. The prior art related to portable pizza ovens, the Cooking Apparatus is a multipurpose cooking apparatus adapted for multipurpose use as a grill, oven, stove, or patio heater. It has a chamber with straight walls and a hinged cover, a single gas burner, a cooking zone with one or more grills, an exterior drip tray, an anti-flare grease diverter, a burner and grate subassembly, and a cook-top cover. The respondent groups' assessments of how well the created customized portable pizza oven adhered to Garvin's quality dimensions. Substantial differences between respondent groups' opinions on whether the customized portable pizza oven is acceptable. The technology management of the customized portable pizza oven model. It is recommended that the Customized Portable Pizza Oven be adopted and utilized for Hospitality Management Program Supplemental Laboratory Equipment for instruction and Community Extension activity.

**Key words:** Customized portable pizza oven, prior arts, technical requirements, design and features, labor and materials, ergonomics and safety.

**Language:** English

**Citation:** De Lara, F. D. G. (2023). Customized Portable Pizza Oven: its development and acceptability related to Garvin's and Tam's frameworks. *ISJ Theoretical & Applied Science*, 05 (121), 52-56.

**Soi:** <http://s-o-i.org/1.1/TAS-05-121-10> **Doi:**  <https://dx.doi.org/10.15863/TAS.2023.05.121.10>

**Scopus ASCC:** 1106.

### Introduction

Cooking equipment is a need, especially for businesses that cater and serve food in large quantities, as well as for educational institutions that offer courses on food preparation. Innovation becomes essential to meet consumers' demands, and if traditional food products want to keep the pace, they need innovation as much as other food products. Consumers feel divided about innovation in traditional products, due to the contradictory concepts laying underneath: innovation versus tradition. On the other hand, this is a particular window of opportunity

because it brings innovation into a product that has a special position precisely because it is meant to be traditional [1]. Moreover, Research in the restaurant sector has focused heavily on 'culinary' innovations, with little emphasis on creativity and innovations in marketing, management, processes, and services [2]

The essential usability principles have to be implemented into the design of a product while maintaining within the boundaries of human behavior to produce a more realistic material environment. This is necessary to do so. Design approaches must be developed to liberate technology for design. This is

## Impact Factor:

ISRA (India)	= 6.317	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 1.582	PIHII (Russia)	= 3.939	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.771	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 7.184	OAJI (USA)	= 0.350

done with the thought that perhaps we will not design for these technologies but with them [3]. Both developed and developing economies have seen an increase in the demand for and consumption of convenience foods as a result of factors including the rapid expansion of retail chains selling convenience foods, significant advancements in food processing and packaging technologies, and significant shifts in the ways people relate to and interact with food [4]

This is still true for Cebu Technological University (CTU), where students study dealing with food preparations, particularly the Bachelor of Science in Hospitality Management and other food-related topics—almost all of the subjects in Hospitality Management deal with kitchen operations. The practical components for these classes—Kitchen Basics, Basic Food Preparation, and Specialized Cuisine—require students to set up their workspace before class. Before cooking, materials are prepared and placed according to *mise en place* (like a commercial kitchen) (Merriam-Webster). This culinary notion signifies that everything has been prepared and is ready for use (Schlegel et al., 2019). Culinary Creativity is the ability to produce novel and appropriate work within gastronomy (Stierand, M. 2020). Different cooking techniques may be used to produce tasty food, but if one aspect impacts the oven's proper temperature, the outcome cannot be assumed to be the same.

The obligation to participate in community outreach programs is then placed on a few faculty members who instruct courses on food. The aforementioned faculty members frequently need help in the off-campus site due to the need for an oven for the presentation and return demonstration. As a result, it is acceptable to satisfy their desire for a portable pizza oven explicitly tailored for them, and this study provides the proper response.

## MATERIALS AND METHODS

This paper is a quasi-experimental of the research data utilized in the unpublished research entitled "Customized Portable Pizza Oven: Its Development And Acceptability Related To Garvin's And Tam's Frameworks", at the Cebu Technological University for technology adoption for supplementary laboratory equipment for students activities in the cooking subjects in the Hospitality Management Program. This will determine the effectiveness and acceptability of the prototype. The barriers and challenges cited in the unpublished research on precedence are: availability of materials in the area; numerous materials that entail a lot of money for procurement; and choosing the right CAD operator for designing this prototype.

## RESEARCH METHODOLOGY

This study includes descriptions of the research design, environment, respondents, method for collecting data, and statistical analysis.

In this work, a quasi-experimental methodology was employed. Because it does not use randomization and instead aims to evaluate interventions, quasi-experimental research is a study that imitates experimental research but is not original experimental research. Similar to randomized trials, the goal of a quasi-experiment is to provide evidence linking treatment to a specific outcome. Nevertheless, participants are not randomly allocated to circumstances or combinations of conditions, so the results cannot be generalized to other situations in which the independent variable is changed [5].

The respondents carefully noticed the eight aspects in which the Garvin-developed quality expectations were present. These include performance, features, dependability, conformity, durability, usability, aesthetics, and perceived quality.

## RESULTS AND DISCUSSION

The assessment and determining the effectiveness of the Customized Portable Pizza Oven Technological University-Main Campus during the Academic Year 2022-2023 basis on Technology Model.

The prior art related to portable pizza ovens The Cooking Apparatus is a multipurpose cooking apparatus adapted for multipurpose use as a grill, oven, stove, or patio heater. It has a chamber with straight walls and a hinged cover, a single gas burner, a cooking zone with one or more grills, an exterior drip tray, an anti-flare grease diverter, a burner and grate subassembly, and a cook-top cover.

The respondent groups' assessments of how well the created customized portable pizza oven adhered to Garvin's quality dimensions. They are able to perform their task during the testing of the model and they have different positive experience during the cooking, baking, and grilling using the prototype.

Substantial differences between respondent groups' opinions on whether the customized portable pizza oven is acceptable. As they have different takeaways of the prototype, most of their choice is very useful for laboratories activities and for community training use.

The technology management of the customized portable pizza oven model involves several key consideration, including design, fabrication, quality control and ongoing product development.

## Design and Features

To create a user-friendly, multifunctional culinary tool that may improve existing cooking abilities or help develop new ones while maintaining a quality comparable to commercially available cooking and baking tools. The concept is to build a portable, specially designed-pizza oven with a grill on

## Impact Factor:

ISRA (India) = 6.317  
ISI (Dubai, UAE) = 1.582  
GIF (Australia) = 0.564  
JIF = 1.500

SIS (USA) = 0.912  
PIIHQ (Russia) = 3.939  
ESJI (KZ) = 8.771  
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630  
PIF (India) = 1.940  
IBI (India) = 4.260  
OAJI (USA) = 0.350

top and a center table for gathering all the components required to prepare a particular dish. The prototype is simple to travel and may be used for business, personal, educational, and community training. I will be redesigning the standard oven into a versatile cooking appliance as part of the process. [6]

The customized pizza oven has an attachment of 304 stainless steel flat grills attached to the cooking chamber. As the heat circulates within the chamber, it will travel to the convection plate; as the heat escapes, it will be controlled by the air vent, which control desired temperature, as you will open minimum to maximum. As the griddle begins to heat up, you may apply the different cooking techniques the user will have to sauté vegetables, sear burger patties, or make pancakes. While preheating the pizza oven or in the process of cooking the pizza. The other attachment is a customized centerfold table with a stainless steel clip that will help the customized pizza oven holds.

For the end user to comfortably carry out his task, it can be adjusted to the desired height. The mise en place the ingredients in making pizza, lasagna, and sauces or any preparation related to the dish the end user will prepare. While the customized pizza oven has worked well for its intended purpose, the inventor used 304 stainless steel to promote food safety and anti-corrosion, and the oven's walls have fiberglass attached to provide insulation that can prevent skin burns as part of the safety features.

**Target Group.** Those in the Academe and Technical Vocational Institutions that offer culinary courses with minimal laboratory resources can be used to supplement the learning needs of the students and trainees. For those Food Entrepreneurs who hardly mobilize their cooking equipment for day-to-day operations, the end user will no longer bring a table and pots and pans to do the cooking task. Also, it is simple to operate.

**Intended Outcome.** The desired result will be a functioning prototype with accompanying 3D CAD renderings and photos of the progress and final product.

**Cooking Chamber.** This figure is the cooking chamber of the oven. The yellow U shape is the burner and is made of carbon steel. It provides heat to the entire chamber; it is controlled by the gas valve to reach the desired internal temperature. The dimension is ideal for 18 inches pizza, the height is ideal for lasagna, bread, and pastries, and the other dimension includes 2 inches of thick heat insulation to hold the heat.

### Operations and Functions

Encompasses the entire or almost the entire operational and functional range of the customized portable pizza oven.

#### Operations

Gas-powered portable pizza ovens bake pizza. Gas fuel replaces wood in this case. This modified portable pizza oven is preferred over wood-fired ovens because it bakes pizza faster. Modern ovens make temperature and time control easier. The 304 stainless steel background coating makes pizza cooking more flexible and durable. Pizza operations use the cooking chamber, which heats the griddle on top and releases surplus heat through the emission vent. Hawaiian pizza makers use the LPG tank to fuel the chamber fire. This customized portable oven lets operators cook on the griddle while preheating the cooking chamber. The oven's operators can relax at a table.

#### Functions

Heating is possibly the most traditional way of processing foods. The technologies involved in heating have been continuously developing for the past many years as per consumer need, satisfaction and demand [7]. Usage of Customized Portable Pizza Oven. Although there are different ways to use it, the usage is straightforward. You know that you can use a customized portable pizza oven outside of your home, for community extension training, in a lab class, and occasionally for transportation to the ideal area where you would love to enjoy a piece of your favorite pizza. You can cook and consume any pizza style in these customized portable pizza ovens, regardless of your preferences. The good news is that these ovens are for more than just baking pizza. The dimension of pizza that can accommodate this prototype is from 6" to 18" large dough.

**Baked Pizza.** Baking and roasting are characterized as methods used for high-temperature food processing. The cooking mode can be convective, radiative, or conductive heat transferring modes, to develop the proper quality of baked and roasted foods through diffusion, evaporation, starch gelatinization, protein denaturation, and nonenzymatic browning reaction [8]. Pre-heat the oven on high. Professional pizza ovens are hotter than kitchen appliances. The oven's highest setting should be 500F (260C). Pizza stones take longer to heat than ovens, so wait 30 minutes. This change is major.

Gas ovens heat unevenly and produce more moisture than electric ovens. A warmed pizza stone removes moisture to prevent sogginess and cooks food faster and more evenly. Put your homemade pizza dough on a floured or cornmeal-dusted pizza peel to prevent sticking. Roll the dough into a disk and form the crust lip with your hands. Pull your pizza to the right thickness. After lightly oiling the crust lip,

## Impact Factor:

ISRA (India) = 6.317  
ISI (Dubai, UAE) = 1.582  
GIF (Australia) = 0.564  
JIF = 1.500

SIS (USA) = 0.912  
PIHII (Russia) = 3.939  
ESJI (KZ) = 8.771  
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630  
PIF (India) = 1.940  
IBI (India) = 4.260  
OAJI (USA) = 0.350

add all toppings. Slide pizza onto the prepared pizza stone. Gently shake the pizza peel to remove dough. Pizza will slide off the peel when shaken over the heating surface. Drop the remaining pizza by swiftly jerking the peel back. Examine the pizza after five minutes. Don't use the recipe's time if you bake pizzas at a lower temperature. Most handmade pizza takes 8–12 minutes at 500–550°F (260–285°C). Take it out when the crust is browned and the top is bubbling.

**Roasted Vegetables.** The ideal temperature to preheat our unique portable pizza oven is 400–450 °F (204–232 °C). Roasting is best done at a temperature of 425 °F (218 °C), but it can also be done at a temperature close to this. If the temperature is too low, the vegetables will overcook before they get the necessary browning. Vegetables must be cooked at a high temperature for perfect tenderness and caramelization. The oven should be preheated to 450 °F (232 °C) before roasting (232 °C).

**Bake Bread.** Baking is the final, crucial step in breadmaking. It requires very high temperatures, typically in a range between 160 and 250 °C, and there are several techniques that use different types of oven (9). Depending on the type of bread being cooked, pizza ovens are frequently heated to 450 °F (232 °C) before roasting (232 °C), and baking bread at a temperature between 200 and 250 °F (392–482 °F) is standard. Bread like naan and garlic bread will cook quickly at the highest temperature range. Then, lean bread (a dough low in fat and sugar) is cooked at roughly 392–446 F (200–230 C), including sourdough, ciabatta, focaccia, and rolls. Fattier, egg- and sugar-rich bread are baked till they resemble cakes at a lower temperature of about 356 °F (180 °C).

**Roasted and Slow-Cooked Meat -** Roast or slow-cook a chicken or beef stew for a delectable supper. Season in a roasting pan, and roast until the meat is moist and fall-off-the-bone tender. A temperature of 320 degrees Fahrenheit (160 degrees Celsius) must be maintained for the meat to cook for around four hours.

**Seafood.** Fish can be roasted until cooked by being wrapped in a bundle with lemon wedges and chili. Turn on the custom-built portable pizza oven at 350 °C (662 °F). You can determine the temperature inside by briefly glancing at the bi-metallic thermometer affixed to the oven.

**Griddle.** Food like pancakes, French toast, toast, and eggs are cooked on a large, flat surface known as a griddle. Griddles can cook all of these items at once due to their size. Griddles can be recognized by their perfectly smooth surface. Low heat is between 200 and 250 degrees on a thermometer. It is perfect for slow-cooking stews, simmering sauces, braising meat, and cooking beans. Turn the skillet to medium to begin cooking the meal. Reduce the heat to a low setting as the food starts to steam, then simmer as you would on a stovetop.

### Ergonomics and Safety

The process of designing a job to fit the employee, can reduce these costs and make the work safer and more efficient. When implemented as part of a comprehensive workplace program in restaurants and bars, ergonomics also helps reduce absenteeism, increase productivity, and decrease the chance for higher insurance premiums [10].

To provide comfort to the operators of this customized portable oven, I designed and fabricated a stainless centerfold preparation table where the oven is placed during the operations and has an adjustable height to improve the comfort and productivity of the operators. The stainless centerfold table can easily be cleaned and dismantled when the operators are done with the task; it is easy to store and can be lifted by one person.

### CONCLUSION

The customized portable pizza oven meets the required standards and is a precise guide for the Hospitality Management Program Supplemental Laboratory Equipment for instruction and the Community Extension Program. Consequently, it had attained its goal of effectivity and acceptability as to Garvin's quality dimensions in terms of performance, reliability, conformity, durability, and serviceability.

### References:

1. Bigliardi, B. (2019). *Chapter 4—open innovation and traditional food*. In C. M. Galanakis (Ed.), *Innovations in traditional foods* (pp. 85–99). Woodhead Publishing. <https://doi.org/10.1016/B978-0-12-814887-7.00004-6>
2. Lee, C., Hallak, R., & Sardeshmukh, S. R. (2019). Creativity and innovation in the restaurant sector: Supply-side processes and

<b>Impact Factor:</b>	<b>ISRA (India) = 6.317</b>	<b>SIS (USA) = 0.912</b>	<b>ICV (Poland) = 6.630</b>
	<b>ISI (Dubai, UAE) = 1.582</b>	<b>PIHII (Russia) = 3.939</b>	<b>PIF (India) = 1.940</b>
	<b>GIF (Australia) = 0.564</b>	<b>ESJI (KZ) = 8.771</b>	<b>IBI (India) = 4.260</b>
	<b>JIF = 1.500</b>	<b>SJIF (Morocco) = 7.184</b>	<b>OAJI (USA) = 0.350</b>

---

- barriers to implementation. *Tourism Management Perspectives*, 31, 54-62.
3. Giaccardi, E., & Redström, J. (2020). Technology and More-Than-Human Design. *Des. Issues* 2020, 36, 34-44.
  4. (2020). *Research and Market*. Retrieved 1 December 2020 from <https://www.researchandmarkets.com/reports/>
  5. Cook, T. D., & Campbell, D. T. (1979). *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Houghton Mifflin.
  6. Morton, C. (1974). *Cooking Apparatus*. Retrieved from <https://patents.google.com/patent/US3938494>
  7. Therdthai, N. (2023). Baking and roasting ovens in the food industry. In *High-Temperature Processing of Food Products* (pp. 131-150). Woodhead Publishing.
  8. Preetam, A., Titikshya, S., Kumar, V., Pant, K. K., & Naik, S. N. (2022). Novel Thermal Technologies: Trends and Prospects. *Thermal Food Engineering Operations*, 1-43.
  9. Bredariol, P., Spatti, M., & Vanin, F. M. (2019). Different baking conditions may produce breads with similar physical qualities but unique starch gelatinization behaviour. *LWT – Food Science and Technology*, 111, 737-743.
  10. (2021). *Texas Department of Insurance. Division of Workers Compensation. Ergonomics for the Food Services Industry Fact Sheet*. Retrieved from <https://www.tdi.texas.gov/pubs/videoresource/fergofood.pdf>