بسم الله الرحمن الرحيم

بسمه تعالی

تاییدیه اعضای هیات داوران حاضر در جلسه دفاع از پایان نامه

آقــــای **Medrit Mustafaraj** پایــــان نامـــه ۶ واحــدی خـــود را بــــا عنــــوان :

Simulation and Design of Electronic Processing Circuit for Restaurants e-Procurement System

در تاریخ ۱۳۸۹/۱۰/۱۳ ارائـه کـردند.

اعضای هیات داوران نسخه نهایی این پایان نامه را از نظر فرم ومحتوا تاییدوپذیرش آنرا برای تکمیل درجه کارشناسی ارشد مهندسی صنایع – مهندسی فناوری اطلاعات–سیستمهای اطلاعاتی پیشنهاد می کنند.

امضا	رتبه علمی	نام و نام خانوادگی	عضو هیات داوران
	دانشیار	دکتر سید کمال چهارسوقی	استاد راهنما
	دانشیار	دکترامیر البدوی	استاد ناظر
	دانشیار	دکتر عیسی نخعی کمال آبادی	استاد ناظر
	استادیار	دکترعباس کرامتی	استادناظر
	دانشیار	دکتر عیسی نخعی کمال آبادی	مدیر گروه (یا نماینده گروه تخصصی)

آيين نامه چاپ پايان‌نامه (رساله)هاي دانشجويان دانشگاه تربيت مدرس

نظر به اينكه چاپ و انتشار پايان نامه (رساله)هاي تحصيلي دانشجويان دانشگاه تربيت مدرس، مبين بخشي از فعاليتهاي علمي – پژوهشي دانشگاه است بنابراين به منظور آگاهي و رعايت حقوق دانشگاه ،دانش آموختگان اين دانشگاه نسبت به رعايت موارد ذيل متعهد مي‌شوند:

ماده 1: در صورت اقدام به چاپ پايان نامه (رساله)ي خود، مراتب را قبلاً به طور كتبي به «دفتر نشر آثارعلمي» دانشگاه اطلاع دهد.

ماده 2: در صفحه سوم كتاب (پس از برگ شناسنامه) عبارت ذيل را چاپ كند :
«كتاب حاضر، حاصل پايان نامه كارشناسي ارشد نگارنده در رشته **فناوری اطلاعات** است كه در سال **1389** در دانشكده **فنی و مهندسی** دانشگاه تربيت مدرس به راهنمايي جناب آقاي دكتر سيد **كمال چهار سوقی** از آن دفاع شده است.»

ماده 3: به منظور جبران بخشي از هزينه هاي انتشارات دانشگاه، تعداد يك درصد شمارگان كتاب (در هر نوبت چاپ) را به «دفتر نشر آثارعلمي» دانشگاه اهدا كند. دانشگاه مي‌تواند مازاد نياز خود را به نفع مركز نشر درمعرض فروش قرار دهد.

ماده 4: در صورت عدم رعايت ماده 3، 50% بهاي شمارگان چاپ شده را به عنوان خسارت به دانشگاه تربيت‌مدرس، تأديه كند.

ماده 5: دانشجو تعهد و قبول مي كند در صورت خودداري از پرداخت بهاي خسارت، دانشگاه مي‌تواندخسارت مذكور را از طريق مراجع قضايي مطالبه و وصول كند؛ به علاوه به دانشگاه حق مي دهد به منظور استيفاي حقوق خود، از طريق دادگاه، معادل وجه مذكور در ماده 4 را از محل توقيف كتابهاي عرضه شده‌نگارنده براي فروش، تامين نمايد.

ماده 6: اينجانب **مدريت موصطفرای** دانشجوي رشته **فناوری اطلاعات** مقطع كارشناسی ارشد

تعهد فوق وضمانت اجرايي آن را قبول كرده، به آن ملتزم مي شوم.

نام و نام خانوادگي: **مدريت موصطفرای**

تاريخ و امضا: 03-01-2011

دستورالعمل حق مالکیت مادی و معنوی در مورد نتایج پژوهشهای علمي دانشگاه تربیت مدرس

مقدمه : با عنایت به سیاست های پژوهشي دانشگاه در راستاي تحقق عدالت و کرامت انسانها که لازمه شکوفایي علمي و فني است و رعایت حقوق مادي و معنوي دانشگاه و پژوهشگران، لازم است اعضاي هیات علمي، دانشجویان، دانش آموختگان و دیگر همکاران طرح، در مورد نتایج پژوهشهاي علمي که تحت عناوین پایاننامه، رساله و طرحهاي تحقیقاتي که با هماهنگي دانشگاه انجام شده است، موارد ذیل را رعایت نمایند:

ماده 1- حقوق مادي و معنوي پایان نامه ها / رساله هاي مصوب دانشگاه متعلق به دانشگاه اس ت و هرگونه بهره برداري از آن باید با ذکر نام دانشگاه و رعایت آیین نامه ها و دستورالعمل هاي مصوب دانشگاه باشد.

ماده 2- انتشار مقاله یا مقالات مستخرج از پایان نامه / رساله به صورت چاپ در نشریات علمي و یا ارائه در مجامع علمي باید به نام دانشگاه بوده و استاد راهنما مسئول مکاتبات مقاله باشد.

تبصره: در مقالاتي که پس از دانش آموختگي بصورت ترکیبي از اطلاعات جدید و نتایج حاصل از پایان نامه/ رساله نیز منتشر ميشود نیز باید نام دانشگاه درج شود.

ماده 3- انتشار کتاب حاصل از نتایج پایان نامه / رساله و تمامي طرحهاي تحق یقاتي دانشگاه باید با مجوز کتبي صادره از طریق حوزه پژوهشي دانشگاه و بر اساس آئین نامه هاي مصوب انجام ميشود.

ماده 4- ثبت اختراع و تدوین دانش فني و یا ارائه در جشنواره هاي ملي، منطقه اي و بین المللي که حاصل نتایج مستخرج از پایان نامه/ رساله و تمامي طرح هاي تحقیقاتي دانشگاه باید با هماهنگي استاد راهنما یا مجري طرح از طریق حوزه پژوهشي دانشگاه انجام گیرد.

ماده 5- این دستورالعمل در 5 ماده و یک تبصره در تاریخ 1384/4/25 در شوراي پژوهشي دانشگاه به تصویب رسیده و از تاریخ تصویب لازم الاجرا است و هرگونه تخلف از مفا د این دستورالعمل، از طریق مراجع قانوني قابل پیگیري مي شود.

نام و نام خانوادگي
مدریت موصطفرای

امضاء

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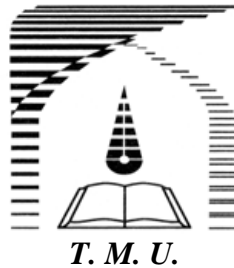
Faculty of Engineering
Information Technology Department
Tarbiat Modares University

Thesis
Submitted in Partial Fulfilment of the requirements for the Degree
of Master of Science (M.S.) in Information Technology

Simulation and Design of Electronic Processing Circuit for Restaurants e-Procurement System

By

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January 2011

Abstract

The poor orientation of the restaurants toward the Information Technology has yet many unsolved issues in regards to the customers. One of these problems which lead the appeal list of later, and have a negative impact on the prestige of the restaurant is the case when the later does not respond on time to the customers' needs, and which causes their dissatisfaction. This issue is really sensitive especially during the days when the influx of the customers is really heavy.

The traditional supply methods which are currently being used do not cover the restaurant in different time periods while dealing with the unpredicted requests of the customers. The lack of the principal products in a   restaurant which derives from the inefficient supply is the main reason that causes this negative phenomenon.

For the solution of this problem, it has been adopted a suitable qualitative research regarding (the Case Study: Restaurant), and also being based on an accurate literature review, which has been finalized with the projection, simulation and the construction of a sophisticated electronic system, capable of perfecting the restaurant supply system. As a result, due to this electronic system, it is carried out the supply of 8 parametric products which are consumed, in an intelligent way without needing the presence of anybody and hence guaranteeing a stabilized state of these main products at any time in two restaurants, through the Supply Centre. Thus, this intelligent electronic supply system based on the computer simulation, and on a successful testing of the constructed circuit proved that except for the solution of this problem, it creates a series of "Competitive Advantage" in this type of business when it is applied, and among other advantages we can mention here the decrease of the general cost, the improvement of the restaurant image, the maintaining of the old customers and at the same time the entry of new customers. In addition, the use of this new system is simple, clear, and does not require any special knowledge.

Based on the projection and simulation process, it needs to be mentioned that in regards of the output of this qualitative research, it has been produced only one incorporated copy of this intelligent electronic supply system for the restaurants, which after being successfully tested it proved to function as it has been predicted to do.

Keywords: Intelligent Purchasing, Supply Chain, Hospitality Industry, Weight Sensor, Virtual System Modelling and Circuit Simulation.

Acknowledgment

I am extremely grateful to God, without whose mercy and comfort this thesis would not have been accomplished.

I would like to express my deepest respect and most sincere gratitude to Dr. Chaharsooghi my supervisor, and Dr. Bahreininejad (former supervisor), for their constant support, guidance, supervision and understanding of my writings, during all the time that I carried out my research, up to the completion of this thesis, thus their invaluable support is something that will not be forgotten.

It is a pleasant task to express my thanks to all those who have helped in the administration of this thesis, and confirmed its quality while it was in production: Mr. H. Jalaly Bidgoly who particularly helped me in developing this thesis and generously provided me with the right software code and simulation project.

Special thanks also go to my parents and my girlfriend for their patience, and support over the years. They had to endure what at times appeared to be the never ending saga of the development of the thesis.

My final and most sincere thanks go to my wonderful sister. She has been behind the research throughout the whole period and has given unconditional support and energy to encourage, give constructive criticism and to assist with English language review. It is truly our research.

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Chapter 1

Research Introduction

1.1. Introduction

Under the best conditions, supply provision is a time and energy-consuming challenge for the restaurants members. Both online and traditional shopping isn't without risk and is time-consuming, and labour-intensive.

In recent generations of kitchen appliances, there has been a noticeable increase in the use of electronic circuits. The use of such control circuits has led to the increased appliance functionality, a reduction in the use of resources, and also effective and in the cost savings of the restaurants. Moreover, these intelligent systems are helping to further improve the convenience and efficiency of the restaurant activities.

The use of this type of technology is becoming increasingly evident, not only in many traditional technological and engineering sectors but also in the growing number of areas in everyday life.

1.1.1. Backgrounds

The hospitality industry is mostly customer focused especially in the food industry restaurants, bars, cafes. One of the industry's goals is to provide the customer with an outstanding service quality. Thus, restaurants continued success come from two groups: new customers and repeated customers. Since it always costs more to attract new customers than to retain current customers, customer retention is more critical than customer attraction. Delighting customers goes beyond satisfying customers. The key to customer retention is customer satisfaction.

1.2. Research Problem

Let us suppose that we are at a restaurant having lunch. How would we feel when the waiter after taking the order, tells us that there are no more potatoes left, and that we have to wait 30 minutes, or if he tells us that the restaurant doesn't have this speciality in the menu today ....(and offers an excuse). How many times have we heard from the waiter: "We do not have this speciality in the menu, so please you have to order something else"? Isn't that something really boring? Have you ever thought why does this phenomenon happen?

As supply chains become more and more dynamic, the problem of rapidly integrating the sources from suppliers is becoming increasingly important.

In simple terms, restaurant supply chain comprises order receiving, preparing, and serving. An important task is to prepare customers the right food at the right time. However, that task is not easy when the restaurant becomes busy: many orders come from different tables at different times. Restaurant` s work is demanding, requiring a good consumed products and fast replacement. Most service restaurants tend to experience unwelcomed delays in the food

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preparing process that often generates strong negative impact to the customers. In response, managers develop and implement service intervention strategies, such as providing the length and the reason of a delay, both of which have been reported to have negative impacts on customers. Accordingly, it is assumed that these effects may be contingent upon certain situations.

1.2.1. Research Questions

Question that shall be answered in this thesis are:

In case delays are occurring due to increased demand do we have two options?

One option is to improve the infrastructure and the technology, in order to avoid customer waiting time. Alternatively, a less costly option is to improve the delay time management strategies that reduce the negative perceptions of waiting. Which is the best option?

1.3. Research Purpose and Relevance

Based in the research carried out in this field, the above mentioned problem (the delays in the service and the lack of the grocery products in the restaurant` s menus) rises. Actually there is not yet any satisfactory solution to this issue, neither in the academic communities nor the practical ones. Restaurants still apply various different and basic methods, where the problem still remains the same.

In this context it urges the need for an adequate, reliable, and long term solution, based on the power and the possibilities that the Information Technology can offer nowadays. Hopefully today we possess all the technical means to a final and permanent solution concerning the grocery supply on due time, something that non doubtfully affects directly and indirectly the reputation of the restaurant itself, increasing or decreasing the incomes of this business.

On the other hand this research contributes to the improvement of the supply chain, using an intelligent method to avoid the dissatisfaction that may be created.

In addition, taking into consideration the growth of the investments in the technology related area during the last decade, there are good chances for the application of this project in the national and international chain companies, further developing the food information technology in general and more specifically that of the restaurants.

Economically speaking, this research has a special importance, because it develops the competition, creating so a net advantage to the clients, and becoming a reason for the visible decrease of the service cost. Also the service cost of the restaurant itself decreases as a result of the improvement in the supply sector, affecting directly the client services with a visible cost decrease.

1.4. Research Methodology

The research methodology is the philosophy or general principle which guides the research. Research methods are the tools we use to collect our data. Different methodologies become popular at different social, political, historical and cultural times in our development, and, in my opinion, all methodologies have their specific strengths and weaknesses. Neither is better than the other, they are just different. Over the years there has been a large amount of complex discussion and argument surrounding the topic of research methodology and the theory of how inquiry should proceed. Much of this debate has been cantered on the issue of qualitative versus quantitative inquiry, which might be the best and which is more 'scientific'. An area of research which has really gained momentum in recent years is the qualitative research which is often regarded in some sense as competing with the more established quantitative research. This is unfortunate, since the two approaches should be seen as complementary, providing different perspectives and answering different specific questions within any one broad area. These should be acknowledged and addressed by the researcher.

Qualitative research explores attitudes, behaviour and experiences through such methods as case study or focus groups. Qualitative variables are variables that vary in kind, while quantitative variables are those that vary in amount (Christensen, 2001). This is an important yet subtle distinction that frequently arises in research studies. It attempts to get an in-depth opinion from participants. As it is attitudes, behaviour and experiences which are important, fewer people take part in the research, but the contact with these people tends to last a lot longer. If we have written words such as 'discover', 'motivation', 'experiences', 'think/thoughts', 'problems', or 'behave/behaviour', this suggests a leaning towards qualitative research. Over the recent years there has been a great deal of innovation in the use of qualitative methodologies. So qualitative research has its roots in social science and is more concerned with understanding why people behave as they do: their knowledge, attitudes, beliefs, fears, etc.

Under the umbrella of qualitative research there are many different methodologies. Qualitative research involves studies that do not attempt to quantify their results through statistical summary or analysis. Qualitative studies typically involve interviews and observations without formal measurement.

Qualitative research is often used as a source of hypotheses for later testing in quantitative research. There has been some disagreement among researchers over the years regarding the elements that compose the scientific method. In fact, some researchers have even argued that it is impossible to define a universal approach to scientific investigation. Nevertheless, for over 100

years, the scientific method has been the defining feature of scientific research. The defining characteristic of scientific research is the scientific method.

Qualitative design displays an interactive, dynamic, and emergent character in which the aims, strategies, data, analysis, and validity are woven together in the process of the study (Hammersley and Atkinson, 1995); (Maxwell, 1996); (Becker, 1996). The qualitative researcher is the key instrument in the design process, continually deploying reflexivity and evaluative skills to data analysis and to the decisions concerning the direction of the next step in the study. The design of each qualitative research study might therefore be considered unique. Though not all qualitative studies are intended, by any means, either to develop or test theory, theoretical inference has been proposed as a means of fighting the problem of local to global generalization inherent in qualitative case study research (Gomm, et al., 2000); (Yin, 1994).

1.4.1. Case Studies

A case study, which is an in-depth examination of a single person, a few people, group or event, is a form of qualitative research. The goal of the case study is to provide an accurate and complete description of the case. This technique is simply a description of individuals. The principal benefit of case studies is that they can expand our knowledge about the variations in case behaviour. Although experimental researchers are typically interested in overall trends in behaviour, drawing sample-to-population inferences, and generalizing to other samples, the focus of the case study approach is on individuality and describing the individual as comprehensively as possible. The case study requires a considerable amount of information, and therefore conclusions are based on a much more detailed and comprehensive set of information than is typically collected by experimental and quasi-experimental studies.

Case studies of individual participants often include in-depth interviews with participants and collaterals (e.g., friends, family members, and colleagues), review of specific records, observation, and excerpts from participants' personal writings and diaries. According to (Yin, 1994), the case study design must have the following five components: its research question(s), its propositions, its unit(s) of analysis, a determination of how the data are linked to the propositions and criteria to interpret the findings. According to (Kazdin, 1982), the major characteristics of case studies are the following:

They involve the intensive study of an individual, family, group, institution, or other level that can be conceived of as a single unit.

The information is highly detailed, comprehensive, and typically reported in narrative form as opposed to the quantified scores on a dependent measure.

They attempt to convey the nuances of the case, including specific contexts, extraneous influences, and special idiosyncratic details.

The information they examine may be retrospective or archival.

Although case studies lack experimental control, their naturalistic and uncontrolled methods have set them aside as a unique and valuable source of information that complements and informs theory, research, and practice (Kazdin, 2003). According to (Kazdin, 2003), case studies may be seen as having made at least four substantial contributions to science: They have served as a source of research ideas and hypotheses; they have helped to develop therapeutic techniques; they have enabled scientists to study extremely rare and low-base-rate phenomena, including rare disorders and one-time events; and they can describe and detail instances that contradict universally accepted beliefs and assumptions, thereby serving to plant seeds of doubt and spur new experimental research to validate or invalidate the accepted beliefs.

Case studies also have some substantial drawbacks. First, like all non-experimental approaches, they merely describe what occurred, but they cannot tell us why it occurred. Second, they are likely to involve a great deal of experimenter bias. Although no research design, including the randomized experimental designs, is immune to experimenter bias, some, such as the case study, are at greater risk than others. The reason the case study is more at risk with respect to experimenter bias is that it involves considerably more interaction between the researcher and the participant than most other research methods. In addition, the data in a case study come from the researcher's observations of the participant. Although this might also be supplemented by test scores and more objective measures, it is the researcher who brings all this together in the form of a descriptive case study of the individual(s) in question. Finally, few qualitative researchers have utilized sequential case studies to develop and test theory in a manner similar to experimental method. A qualitative case study blends notions of experimental method with qualitative research. Still, the overall contributions of the case study cannot be ignored.

Regardless of its non-experimental approach in fact, it has substantially informed theory, research, and practice, serving to fulfil the first goal of science, which is to identify issues and causes that can then be experimentally assessed. Qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts. When the approach is applied correctly, it becomes a valuable method for different scientific research to develop theory, evaluate programs, and develop interventions.

Qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. This ensures that the issue is not explored

through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood.

So when should we use a case study approach? According to (Yin, 2003) a case study design should be considered when: (a) the focus of the study is to answer "how" and "why" questions; (b) we cannot manipulate the behaviour of those involved in the study; (c) we want to cover contextual conditions because we believe they are relevant to the phenomenon under study; or (d) the boundaries are not clear between the phenomenon and context.

1.4.2. Research Philosophy

After the definition of the general plan of the problem and the acquaintance with the main questions of the previous researches, which were also the first steps in this research, it was reasonable to apply the qualitative methodology using the "case study" method.

In order to further demonstrate the pretended model, it will be used the computer simulation method. The follow up step will be the real and physical application of this business model according the existing possibilities. In the end the acquired results and all the pretension will be compared and verified.

1.5. Research Innovations

The main innovation of this research is the presentation of this business model which has not been explored up to date in the restaurants area. In fact we are dealing with an intelligent method which improves a lot the chain supply in the restaurants industry and creates the possibility of putting into practice thin new business model.

In addition to the improvement of the chain supply sector, this research also deals with a detailed summarized study of all the improvements up to date related to restaurant work phases, and everything thanks to the technology information.

This valuable study comprises in itself various different IT applications applied in a number of restaurants all over the world analyzing its pros and cons.

It worth it to mention that the research seen from the engineering point of view is unique in its kind and carries a lot of values in using the latest technology to the accomplishment of this idea.

In addition this research brings for the first time an intelligent purchase which is superior in comparison to the actual methods used nowadays for consumable products supply.

In conclusion the afore mentioned research is a continuation of a series of other researches undertaken up to date with the aim of improving the chain supply sector, and only being based

exactly in the experience gained till now it has been possible to take another step ahead toward the general innovation of this supply system in general and of restaurants specifically.