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**PROCEEDINGS
OF
ARC 2014
III INTERNATIONAL
CONFERENCE ON BUSINESS AND
MANAGEMENT**

December 26th, 27th – 2014

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**PROCEEDINGS
OF
ARC 2014
III INTERNATIONAL CONFERENCE ON
BUSINESS AND MANAGEMENT**

December 26th, 27th – 2014

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ARC 2014 WELCOME TO THE III INTERNATIONAL CONFERENCE ON BUSINESS AND MANAGEMENT

KEY NOTE SPEAKER



Dr. Ravichandran Krishnamurthy

Associate professor and Director of Experiential Learning,
New York Institute of technology, Abudhabi Campus, UAE

An astute & result oriented professional with over 22 years of extensive experience in operations, business development, academics and institution building. Currently employed as Associate Professor and Director of Experiential Learning, New York Institute of technology, Abudhabi Campus, UAE.

He holds the Post doctoral fellowship from University Kebangsaan Malaysia and Ph.D. in Finance from the University of Madras, India. His area of expertise is primarily with corporate finance and conducts focused research in the Behavioral finance and company analysis. He has co- authored several text books in Finance which are mainly focused on Indian markets. He made intellectual contributions that impact on the academic community in the area of corporate and Behavioral finance through papers published in competitive journals in this domain space (*Finance India, Journal of investment, Money and Banking, International Journal of Economics and Finance...*). He has also made contributions through service to the academic community, as recognition of his scholarship, through her inclusion as a reviewer and/or discussant for several academic conferences and also acting as an Editor of an International Journal. His research in the field of finance also resulted in contribution to teaching and learning by way of the receipt of a NYIT ISRC grant award. His Intellectual contributions have furthered higher education initiatives through his continued collaborative experiential education work with students into the annual Corporate Challenge Competition. His Intellectual contributions, by way of faculty-mentored student research projects were presented by students at International conferences and also got published International journals.

FOREWORD



Dr. Raed Elzenaty, DDS, MBA
Director of Institutional Research & Assessment
New York Institute of Technology
Abu Dhabi Campus, UAE

It is a great pleasure to be invited to the ARC 2014- III International Conference on Business & Management and a privilege to write this forward.

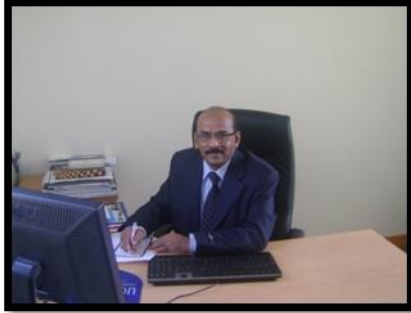
It is a wonderful thing to encourage and broaden the realm of academic research to today's world, and an even better thing to bring academics and researchers together in the common bond of academic research and development. The exchange of ideas and discussion of viewpoints is not only precious but a necessary rung in the ladder to achieving global education initiatives.

It is my hope that the two days of the ARC 2014 International Conference on Business and Management will encourage us all and enable us to bring home the motivation to spread among our peers and students.

Sincerely,

Dr. Raed Elzenaty, DDS, MBA

FOREWORD



**Dr.K.PrakashVel,
Associate Professor,
University of Wollongong in Dubai.**

It gives me immense pleasure in writing a foreword to the 'Academic Research Conference 2014 in Business and Management being organized by Academic Research Publishers at Mumbai India, during December 26th, 27th - 2014.

ARC is a forerunner in creating and exchanging knowledge in the field of Business Management featuring major developments in the global economy and markets. They have been successful in organizing conferences to exchange skills and acumen on theory and practice on current and emerging management principles, ideas, concepts and research methods facilitating analysis among academicians, scholars and students, both at the post graduate and doctoral levels. I strongly believe that the conference would not only inspire the delegates participating from different parts of the World, but also further add to the existing literature in different research domains in business management.

I am positive that the two days'International Conference would be beneficial to the participants. I extend my sincere wishes for a successful conference.

Dr. K. PrakashVel

FOREWORD



Dr. R. Krishna
Director - PG Studies
CITech, Bangalore.

December 23, 2014

It is with immense pleasure that I write this Foreword for the the Proceedings of the International Conference scheduled to be held on December 26th, 27th - 2014, organised by the Academic Research Conferences/Publishers, Abu Dhabi, UAE

I am informed that the responses are overwhelming from all corners in the form of quality research papers submitted for review/approval for presentation during the conference. I am sure, the Proceedings of the conference will serve as an excellent reference book to the Management teachers the world over. I trust also that this conference will be an impetus to stimulate further study and research in all the areas.

Wishing Godspeed in all the endeavours.

Dr. R. Krishna.

FOREWORD



Gantasala V. Prabhakar, Ph.D
Assistant Dean, School of Management
& Associate Professor
New York Institute of Technology,
Abu Dhabi Campus, UAE

Knowledge stems from extensive research undertaken by the multitude of experts in academia and the corporate. It then becomes quintessential that research-based findings that contribute to extant knowledge must be shared. One of the integral elements of Nonaka and Takeuchi's SECI model is Knowledge Sharing. I have believed that bringing researchers from across the globe working in their domains of expertise on a common platform is in the direction of creating strong Communities of Practice. Academic Research Publishers has set a benchmark in organizing these congregations of knowledge and research pools and presenting opportunities for knowledge sharing and in turn fuelling possibilities of knowledge creation. ARC has successfully over the years provided the base to present, discuss and enhance research developments in each of the management functions.

ARC has also garnered increasing patronage of participants who represent all the major continents and that in itself has been very inspiring and satisfying for me to be a part of their success. The conferences organized have seen an overwhelming response from global experts and is a testimony of the credentials that ARC embodies and has stood for.

It is my privilege to applaud their vision, their efforts and to be part of The III International Conference on Business &, Management, 2014. Given the calibre of the participants and the values that are enshrined by conferences organized by ARC, I am very assured that the two-day conference will be a resounding success and will draw appreciation and support from all associated with this noble endeavour.

Gantasala V. Prabhakar, Ph.D



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ARC 2014
III International Conference on
Business and Management

DATE: December 26th , 27th – 2014.

LOCATION : **HOTEL JUHU PLAZA, MUMBAI. INDIA**

TIME	AGENDA	PLACE
08:30 – 9:00	REGISTRATION	Hotel Juhu plaza Conference Room
9-9.45	<p>CONFERENCE INNAGURATION</p> <p><u>Welcome address:</u> Mr. C. Jey Yoganand Director, ARC 2014</p> <p><u>Key Note Address:</u> Dr. Ravichandran Krishnmurthy Associate Professor, School of Management, New York Institute of Technology, Abudhabi, UAE</p>	Hotel Juhu plaza Conference Room
9.45 – 10.00	Tea Time and Academic Exchange	Conference Lounge
9.15 – 1:00	Paper Presentation Hall (1)	Hotel Juhu plaza Conference Room
1:00 – 2:00	LUNCH BREAK	Conference Lounge
2:15 – 5:30	Paper Presentation Hall (1)	Hotel Juhu plaza Conference Room
5:45 – 6:00	Best Paper Award and Certificate Distribution	Hotel Juhu plaza Conference Room

DAY 1

Conference Schedule

Hotel JUHU Plaza Conference Room

SESSION CHAIR

Dr. Ravichandran Krishnmurthy
Associate Professor, School of Management,
New York Institute of Technology,
Abudhabi, UAE

26-12-2014, Friday
Session 1: 10 -12.30

REF. No.		TIME
1	Money - is it something changing from Ancient time in its form? – A Theoretical study Author: Dr. N.S. Nagesha Rao	10.00-10.15
2	A Gaussian Fuzzy Inventory EOQ Model Subject to Inaccuracies In Model Parameters. A Supply Chain Management Application Authors: S. S. Appadoo, Y. Gajpal and R.S. Bhatti	10.15-10.30
3	Using Effective Educational Management in the Working Process of School Principal as a Leader Authors : Irma Kurdadze, Nana Makaradze and Nino Mikeladze	10.30-10.45
4	Design of Online and Offline Social Networks: Game theoretic modeling Authors: Susmita Dutta, Akshay Goel and Pritish Ekka	10.45-11.00
5	Issues and Challenges in Implementing E-learning in Organization Author: Sumitha Prabakaran	11.00-11.15
6	A Future Outlook on Financial Inclusion through Islamic Finance: Gaps and Challenges Ahead Author: Shahina Qureshi	11.15-11.30
7	Modified fast approach to compute fuzzy values of matrix games with payoffs of triangular fuzzy numbers Authors: Tina Verma, Amit Kumar and S.S. Appadoo	11.30-11.45
8	An analytical study about Innovative Branding Author: Dr. Ashish Sharma	11.45-12.00
9	Cost Allocation at Well Soft Enterprises – A Case Study Author: Suneel Udpa	12.00-12.15
10	Effects of Communication of the Polish Post S.A. with the External Environment Author: Dr. Slawomir Czarniewski	12.15-12.30
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26-12-2014, Friday
Session 1: 2.00 -4.00PM

REF. No.		
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Each presentation room is equipped with a Windows XP based notebook computer with Microsoft office 2010, a projector and speakers. Bring your presentations on a USB drive. The computers do not have internal DVD drives. Presentations are limited to FIFTEEN minutes. Long presentations take time away from other presenters. Please be courteous and keep your presentation to fifteen minutes or less. The session chairs will tell you when you have five minutes left, two minutes left, and 30 seconds to wrap up.

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Location – University of Kelaniya, Srilanka.

Registration Deadline – July 15, 2015

Money - is it Something Changing from Ancient Time in its form? – A Theoretical Study

Dr. N.S. Nagesha Rao
Professor
East West Group of Institutions
Bangalore.

Abstract

Money is changing its form from ancient time until today, during ancient days bartering is popular system of exchange of goods among two persons, later on Gold and Silver is used as base for exchange of goods. Later date, during Monarchy ruling minting of coins were started in the world. Few years back some of the country migrated from paper notes to plastic notes, because of its durability. Today in the internet era, money is not seen physically but it is transferred from one Bank account to another bank account at different places via internet. Now days exchange of goods with money happens through swipe of debit or credit card, where is money is transferred to the goods / service provider's bank account. So, money is transforming its physical form to invisible form over a period time taking different material, shape and form right from its existence.

Key Words: Money, Barter, Gold, Silver.

INTRODUCTION

When a person carries currency notes and coins with him to buy something, he can exchange currency notes and coins with goods within his own country. If he carries same notes and coins to other country, and try to exchange with goods, it may not possible, as that country's currency notes and coins does not equivalent with his country's currency notes and coins. Any object normally will have two use, the first, purposes for which originally it is designed, and the Secondly, it can be barter or sell¹. The Trust by the trading partners and associate created object called coin or promissory note which is psychological trust between two persons and authority that are external in nature for business within barter exchange. ^{6, 7} Any person possess surplus of value, such as measure of grain or a volume of livestock can be directly exchange with object which is similar or greater value or utility. Barter normally coincidence with wants of individuals. That is seller who sells food grain has to look for someone who exchange in return what sellers wants. In this transaction there is no

agreed standard measure which both seller and buyers could exchange commodities according to their relative value of the various goods and services offered by other potential barter partners.

Growth of Money in different period of time

It is very difficult to define money right from olden days, as it is taking different form and shape over a period of time.

During 9000 – 6000 BC, Domesticated animals were used as money for exchange of Agricultural crops. It appears that Cattle were used as oldest forms of Money. Until 20th century, some countries in African continent were followed this.

The Mesopotamian Civilization during 3100 BC initiated on Development of accounting system, Application and Maintaining. In fact, 3000 to 2000 BC in Babylonia is the place the banking system is originated. In Babylonia, Temples and Palaces were identified as safe place to store valuables. To start with, banking systems were accepting grains and later

starting accepting goods which includes cattle, agricultural products and precious metals. And all are stored in the same place.

The limited usage of money can be recorded during 2575 BC while construction of the Great Pyramid at Giza. The construction of Great Pyramid was completed by using Slavery, but both long term and short term planning used while construction of Pyramid with limited usage of currency. But much later Civilization of the Incas in Peru was managed without money during those days. During 2250 to 2150 BC Cappadocia's rulers were started using silver ingots as money which was widely accepted.

The Banking concepts were brought by Reign of Hammurabi in Babylon during 1792 – 1750 B.C, which includes Laws governing banking operations. Somewhere in 1200 B.C. Chinese started using Cowries Shell as money. History tells that's cowries shells were using as money at different part of the world at different times. Until mid of 20th century many African countries were followed this tradition. Over a period of time i.e. 1000 to 500 B.C. Chinese adopted tool as currencies. Spades, Hoes and knives were used as tool currencies for commercial exchange.

Lydian kingdom (Kingdom of western Asia Minor located generally east of ancient Ionia in the modern western Turkish provinces of Uşak, Manisa and inland İzmir. Its population spoke an Anatolian language known as Lydian) was the first to introduce the "crude coins" during 687 B.C. made by Amalgam of Silver and Gold. Also, they are first to open permanent retail shops.

Pythius (Historical of Lydian) were first to introduce the Merchant Banking operation in 600 B.C. during same time the coin minting (as money) spread across other part of the world. Lydian's were first to mint gold and silver coins separately during

this time and also they started using Bimetals for minting coins other than gold and silver. Sparta's captured the Laurion's mines during 407 B.C. and release of 20,000 slaves from the mines was resulted in shortage of silver supply to Athens, which led to use of Bronze for minting coins with silver coated. This again disappeared from circulation due to hoarding of coins by the Athenians' which lead to use of pure Bronze to mint the coins. Philips II (Macedonia Philips) was first person to mint coin with Chariot Race for having won in Olympics in 356 B.C. Which was used as propaganda, and which was widely circulated in North Europe. During same time in Greece, money was lending with 10% interest as normal rate except for risky business, for risky business it was 20% to 30 %. During same era, Reign of Alexander the Great, Maintenance of Army was very expensive; he was spending 20 talent or half Kilograms of silver a day. Hence he captured the Persia along with enormous Gold Reserve, which made him rich and he also started constructing new Townships for his Army, in which many of the solders settled.

In the Indian scenario, in krutha yuga, treta yuga, and dwapara yuga, minting of gold & Silver coins were predominant as per mythological stories.

What is Money?

As money at different time, people were using different things, such as, Amber, Beads, Cowries, Drums, Eggs, Feathers, Gongs, Hoes, Ivory, Jades, Kettles, Leather, Mats, Nails, Oxen, Pigs, Quartz, Rice, Salt, Thimbles, Umiacs, Vodka, Wampum, Yarns and Zappozats (i.e. Decorated Axes) for exchange of goods. And none of them are used today as primitive money form₁.

"What is now the prime or main function in a particular community or country may not have been the first or original function in time, while what may well have been a secondary or derived function in one

*place may have been in some other region the original which gave rise to a related secondary function... The logical listing of functions in the table therefore implies no priority in either time or importance, for those which may be both first and foremost reflect only their particular time and place."*⁴

Ultimately, general definition of Money is anything that is widely used for making payments and accounting for debts and credits.

Root cause of Development of Money is not from single origin, but independently in many parts of the world in different form. Primitive Money is adopted at different time based on the situation. Money performance varies from society to society in the world. Functioning of Money in different countries is not same. Money takes old forms to new roles, such as, present days paper notes carries a promise written by the authority of the bank that he will pay the bearer the amount mentioned on the currency paper note with signature of the authority.

But today's economists argue on how to measure and control the money supply, and also on numerous different measures proposed. Today, due to advent of computer network, the new form of money has taken over.

While undergoing literature survey, until recent years, there were no literature available on different money forms in third world countries and North American countries. But there are literatures available from European countries, Asia, China and Egypt on primitive form of money during old era.

Development of Money over a period of time -

Development of Money over a period of time from ancient era can be seen as, in present days; Money means coins and banknotes, as it is used in our daily

transaction. These coins and banknotes are accepted in the country where it is originated, but will not be accepted in other countries, unless otherwise there is bilateral agreement on trade between the two countries. The value of currency of a country gets varied when transacted in other country based on Balance of payment between two countries for the trade happens between these countries; this is because of imbalance in trade account between import and exports of goods between two countries. So, because of this, many rich people in different countries, even today wants to keep their wealth in the form of gold instead of currency, these is because of currencies value is subjected to inflation. Holding gold as a wealth form is not new in creating wealth, but it is very old habit from thousands of years. This is because the Gold is resistance to correction and from aesthetic point of view which led to use gold as transaction from thousands of years. But in complete contrast, today money has acquired intangible properties, such as electronic Money. In which net banking

is gaining popularity. Real Time Gross Settlement (RTGS) through National Electronic Fund Transfer (NEFT) is gaining popularity in the present days all over the world. This is because of instant money transfer between two bank accounts with in the country.

The Royal Monopoly of Minting -

The coins usage was made rapid spread because of the following reasons –

Coins were acceptable at their normal value than weighing on every day transaction.

Coins usage involves small in numbers, where it is quick to count than weighing.

In the middle age, monarch found that coins usage was very convenient as a source of profit.

Coins carries substantial premium over the value of their metallic content. This is more than high, which covers cost of minting.

The kings, use turn this premium into their personal profit.

Many kings were recalled the coins under circulation once in six year to avoid storing of coins by general public and create shortage of coins, which in turn leads to non availability of coins to general public. Also, another reason for recalling of old coins is wear and tear of coins under frequent usage. This recalling activity later reduced at three year interval. New issue of coins in place of old coins were made distinguishable by minting new symbol, new value etc. on the new coin.

The usage of silver and gold coins was introduced as coins by proper testing method for checking purity of metal used. Before testing of these type coins, never released to the merchant, Traders, Tax Collector, even to the king from the treasury.

The Development of Paper Money –

The China was first country to develop the paper money, somewhere 806-821 AD during King Hien Tsung period. This is because of shortage of copper metal to make coins and frequent invade of other powerful kings from north. This led to reliance on paper money, as result during 1020 AD there were more number of paper Money in quantity than its equivalent value of wealth in other form in treasure were less, which led to causing inflation. This was continued for next five hundred years and during 1455, AD the paper money was withdrawn from the circulation in china.

The Bill of Exchange –

The bill of exchange is first started from Arab countries during eight century. And later, it percolated to other area of Europe and Asian continent after revival of banking system. It is written instructions in

the form of bill of exchange, to transfer large sum of money from one Temples and Hospitallers to another who were functioning as bankers. This Idea was triggered on introduction of paper money at much later years.

The Goldsmith Bankers

Goldsmith's safes were found to be secure places for deposit of jewels, Bullion and Coins during the English Civil War (1642 – 1651). When the wealth is deposited with Goldsmith Banks, the Goldsmith Bank was issuing receipts having holding wealth. Same were used for withdrawing deposits and were showing as ability to pay by goldsmiths. Later during 1660 these has developed as bank-note. During same time there were instructions given gold smith to pay money to another customer who brought and surrender receipt issued by the banker.

Virginian Tobacco

Many British colonies ruling at different part of the world faced shortage of official coins which led to use of various substitutes as money. Tobacco leaves used as paper money to substitute, and during 1727. The tobacco quality and quantity that were deposited in public warehouses were made legal tender.

Gold Standard

Normally paper money has no intrinsic value, hence its acceptability originally depends on its being backed by some commodity, and normally it is precious metals. British were adopted gold standard for their currency pound in 1816. Before 1816, silver were used as standard, it is nothing but amount silver weighing a pound. During international conference held at Paris in 1867, widen the area of common currencies based on coins with standard weights of gold and silver. Later years, other countries adopted the Gold and silver as standard for their currency. US adopted the Gold standard in 1900. After Second World

War the US dollar replaced the pound sterling as the key currency in the world. Other countries fixed their currency based on global standard. The fixed exchange rates started breaking down in some countries led the global inflation. After learning this, the US starting abandoned the link with gold during 1973.

Cause and Development of money practiced during olden days are largely from non economics causes, such as, from tribute, from trade, from blood money, from barter, from ceremonial and religious rites, from bride money, from commerce and ornamentation. The main disadvantage of bartering system was that, it is tendency to select one or more items in preference to others items, this is because of qualities of the items under barter will act as exchange of media. Qualities of items under bartering include ease of storage, high value densities, durability and portability.

DISCUSSION

The money is a coin or paper note issued by the central bank of respective countries based on backed with some item base that is holding by central bank which is widely accepted in the world today. But during olden days it is in other form such as items which were chosen by the kings of the respective kingdom were used as money base for exchange of goods. The items used as money during ancient times were Amber, Beads, Cowries, Drums, Eggs, Feathers, Gongs, Hoes, Ivory, Jades, Kettles, Leather, Mats, Nails, Oxen, Pigs, Quartz, Rice, Salt, Thimbles, Umiacs, Vodka, Wampum, Yarns and Zappozats (i.e. Decorated Axes) for exchange of goods. But due to frequent war or fighting between the kings and monarchies was change the scenarios of keeping wealth in other forms. Holding of wealth (such as Agri product, gold, silver, even cattle etc) by king's treasury and temples were later on converted as Bank by providing receipt for holding wealth. And later on, a provision

was made by the kings and monarchies in different kingdoms were directed the treasury at different places to allow withdrawing their wealth deposited at one place by producing the receipt at other place. This practice led to invention of banking system (Even today in India many are looting by invading the ancient temples and try to look for wealth that is hidden below the deity idol installed). The ancient china has played predominant role in minting the gold and silver coins and later date paper money to avoid looting of wealth by the invader from north of china, i.e. Mongolians. The Bill of Exchange, Goldsmith Banking system, Virginian tobacco banking, which were practiced during ancient times were not new today which exist in banking system. But, once the importance of Gold metal is understood as highly valued item, the Gold standard was introduced during beginning of 18th century. Thus, People from different countries were started goods trading across boundaries by keeping gold as standard. But even today, the gold has not lost its value in the world, in spite of decline in the gold production. But today money is widely circulated in the form of bi-metal coins and paper money by different countries in different name, such as dollar, rupees, yen, frank, etc. But today Australia has replaced paper money with plastic money, as plastic money has very less wear and tear when compared to paper. Shortly, even in India, the central bank is thinking to introduce the plastic money, because of its durability over long time. But, central banks in many countries are planning to introduce electronic money transfer in large scale. This is because of instant and ease of money transfer between accounts and easy tracking of transactions. The transacting through mobile phone is gaining importance. In future, with technology support, and with pocket size devices can be used for all types of financial transaction which includes money transaction.

CONCLUSION

The physical money what we see today was not in the same form as in old era. It has changed its form from time to time in different era. Even, the items selected for money base has changed over a period time. Future form money will not be in physical form, but in electronic form. Transactions of money in future days are not in physical form but in electronic transaction form. In future, with click of button on computer connected with internet will transact with bank by credit / debit of money and goods/service are made available to the common man at his door step. In future the voice banking will take over from internet banking if the security measures are installed when the transaction is happening electronically.

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A Gaussian Fuzzy Inventory EOQ Model Subject to Inaccuracies In Model Parameters. A Supply Chain Management Application

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Abstract

Inventory models play important roles in a supply chain as it simultaneously impact cost and customer satisfaction. A Gaussian fuzzy economic order quantity (G-EOQ) inventory model is presented in this paper to target the subjective inaccuracies that exist in most inventory model formulation. We also define the concept of EOQ-GAP in inventory management. The approach taken in this paper is somewhat different to existing studies and in our view compliments existing fuzzy inventory models formulation. Finally, suggestions are made for further studies in supply chain management. A numerical example is provided towards the end of the paper along with concluding remarks and future work directions.

Keywords: Fuzzy sets theory, Fuzzy Gaussian numbers, EOQ-GAP, G-EOQ, Economic order quantity, Supply chain management. **AMS subject classification:** 62M10 (60F05, 60G52, 60K05).

INTRODUCTION

Inventory can be defined as the stock of items kept by any organization within a supply chain to meet internal and external customer demand. Companies carry out inventory for smooth running operation of their businesses. Huge amount of inventory can be costly and are generally undesirable from an economical stand point. It is mainly due to intense competitive market condition and shrinking profit margins that supply chain companies need effective inventory models to cope with unforeseen conditions. The traditional economic order quantity (EOQ) model of Harris [14] focuses mainly on the buyer's point of view. The Harris model relies on many unrealistic assumptions that are almost impossible to meet in a supply chain. Possibility theory rather than probability theory is well suited to model these uncertain inventory problems. In fact, some researchers, such as Lee and Yao[18], Chang[10], Lin and Yao[19], and Hsieh[15] have studied inventory models in the fuzzy sense.

The well-known EOQ inventory model has been extended to fuzzy versions by Park [21], Chen (Corresponding author; S. S. Appadoo, Associate Professor Department of Supply Chain Management, Asper School of Business, Faculty of Management, University of Manitoba, Winnipeg, MB R3T-5V4, Canada Phone: 001-204-4746870. Email: ss.appadoo@ad.umanitoba.ca) and Wang [11], Roy and Maiti [23], Yao et. al [24], Yao et. al [25] and Chang [9] among others. In [2] Appadoo et al. derive an economic order quantity (EOQ) for an inventory control problem where the inventory carrying cost and the order cost are uncertain, represented by fuzzy numbers. The fuzzy numbers used herein are most general so far, represented by adaptive trapezoidal fuzzy numbers. In [2] Appadoo et al, attempt to use the most general form of fuzziness to represent the uncertainty of the parameters in the inventory model. Chang, Yao and Lee [8] studied the economic reorder point for the fuzzy

backorder quantity. Yao, Ouyang, and Chiang [26] established a fuzzy inventory of two replaceable merchandises without backorder based on the signed distance of fuzzy sets. Jana et.al [16] presented some multi-item inventory models for deteriorating items in a random planning horizon under inflation and budget constraints along with some fuzzy parameters. Yao and Chiang [27] developed an inventory model without backorder with fuzzy total cost and fuzzy storing cost defuzzified by centroid and signed distance. In this paper, we develop, under certain conditions, a fuzzy version of the basic EOQ model with constant demand and instantaneous replenishment. We first consider the cost parameters as fuzzy numbers. Next, we develop an alternative approach to determine the fuzzy EOQ model using possibility theory. Furthermore, there have been several new developments in using fuzzy algebra in decision-making process, specially the use of possibility theory (Carlsson and Fuller ([6],[7]) and Appadoo et al. [1].

This paper is organized as follows. We summarize the preliminaries and notations in Section 1. In Section 2, we discuss the main theory underlying the concept of possibility theory and possibilistic moment generating function. In Section 3, we discuss the crisp deterministic and fuzzy economic order quantity model. Concluding remarks are made in Section 4.

Preliminaries and Notation

Before discussing the Gaussian fuzzy EOQ inventory model, we introduce some definitions and with relevant operations. Most of these related definitions and properties may be found in [3], [17], [28].

Let R be the set of real numbers, R^+ be the set of positive real numbers, and $X \subset R$.

Definition 1.1 Fuzzy set A in $X \subset R$, the

set of real numbers, is a set of ordered pairs $A = \{(x, \mu(x)) : x \in X\}$, where $\mu(x)$ is the membership function or grade of membership, or degree of compatibility or degree of truth of $x \in X$ which maps $x \in X$ on the real interval $[0, 1]$.

Definition 1.2 If $\sup \mu(x) = 1$, $x \in R$, then the fuzzy set A is called a normal fuzzy set in R .

Definition 1.3 The crisp set of elements that belong to the fuzzy set A at least to the degree α is called the α -level set (or α -cut), i.e. $A(\alpha) = \{x \in X \mid \mu(x) \geq \alpha, \alpha \in R^+\}$. If the set $A'(\alpha) = \{x \in X \mid \mu(x) > \alpha, \alpha \in R^+\}$, then $A'(\alpha)$ is called strong α -level set (or strong α -cut).

Definition 1.4 A fuzzy set A is said to be a convex set if $\mu(\lambda x_1 + (1 - \lambda)x_2) \geq \min(\mu(x_1), \mu(x_2))$, $x_1, x_2 \in X$ and $\lambda \in [0, 1]$. Alternatively, a fuzzy set A is convex if its every α -level sets is a convex set.

Definition 1.5 A fuzzy set A , which is both convex and normal, is defined to be a fuzzy number on the universal set R .

Definition 1.6 The standard Gaussian fuzzy number [20] is represented by $A = (x : \mu, \sigma, \alpha)$ with membership function as

$$\mu_A(x) = \exp \left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma} \right)^2 \right] \quad (1.1)$$

where μ is called the mean and σ is the standard deviation respectively.

Alternatively [[17], p. 26, 27], defining the interval of confidence at level α as $A(\alpha) = [a_1(\alpha), a_2(\alpha)]$, and setting $\exp \left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma} \right)^2 \right] = \alpha$, $a_1(\alpha) = \mu - \sigma \sqrt{(-2 \ln \alpha)}$ we get $a_2(\alpha) = \mu + \sigma \sqrt{(-2 \ln \alpha)}$

$$A(\alpha) = \left[a_1(\alpha), a_2(\alpha) \right] = \left[\mu - \sigma \sqrt{(-2 \ln \alpha)}, \mu + \sigma \sqrt{(-2 \ln \alpha)} \right] \quad (1.2)$$

Remark 1.1 Another variation of the standard gaussian fuzzy number [20] that does not make use of the exponential function is given below.

$$\mu_A(x) = \frac{1}{1 + \left(\frac{x - \mu}{\sigma}\right)^2}, \forall, \alpha \in (0, 1]. \quad (1.3)$$

whose α -cuts is given by $A(\alpha) = \left[\frac{\alpha\mu - \sigma\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{\alpha\mu + \sigma\sqrt{(\alpha - \alpha^2)}}{\alpha} \right]$.

Insert Figure 1.

Definition 1.7 FL Smidth controllers [20] is a parameter family of fuzzy sets that is often used in fuzzy control is the so called FL Smidth controllers collection. It is given by

$$\mu(x) = 1 - e^{-\left|\frac{\sigma}{x - x_0}\right|^\alpha} \quad (1.4)$$

in which the extra parameter α controls the gradient of the sloping sides. The following Figure (3)

Shows examples of FL Smidth controllers for $\alpha \in 1, 2, 3, 4$: Note however that these fuzzy sets are only differentiable in certain particular cases ($\alpha = 2, \alpha = 4, \dots$).

Definition 1.8 Let A be an fuzzy number in the set of real numbers R , its membership function

Insert Figure 2.

Insert Figure 3.

(Dubois and Prade [12]) is defined as

$$\mu_A(x) = \begin{cases} 0 & x \leq a_1 \\ f_A(x) & a_1 \leq x \leq a_2 \\ 1 & a_2 \leq x \leq a_3 \\ g_A(x) & a_3 \leq x \leq a_4 \\ 0 & x \leq a_4 \end{cases} \quad (1.5)$$

where $a_1, a_2, a_3, a_4 \in R$, $f_A(x) : [a_1, a_2] \rightarrow [0, 1]$ is a nondecreasing continuous function, $f_A(a_1) = 0$, $f_A(a_2) = 1$, called the left side of the fuzzy number A and $g_A : [a_3, a_4] \rightarrow [0, 1]$ is a nonincreasing continuous function, $g_A(a_3) = 1$, $g_A(a_4) = 0$, called the right side of the fuzzy number A .

POSSIBILISTIC MOMENT GENERATING FUNCTION

As in Appadoo et al. [1] and Carlsson and Fuller [5] we use the following equalities given in (2.1) and (2.2) in deriving some of the results in the lot size inventory model.

$$\text{Possibility}[A \leq a_1(\alpha)] = \pi((-\infty, a_1(\alpha)) = \sup_{u \leq a_1(\alpha)} A(u) = \alpha \quad (2.1)$$

$$\text{Possibility}[A \leq a_2(\alpha)] = \pi[a_2(\alpha), \infty) = \sup_{u \geq a_2(\alpha)} A(u) = \alpha \quad (2.2)$$

For fuzzy number $A(\alpha) = [a_1(\alpha), a_2(\alpha)]$, $\alpha \in [0, 1]$ and $B(\alpha) = [b_1(\alpha), b_2(\alpha)]$, $\alpha \in [0, 1]$ Carlsson and Fuller [5] define crisp lower possibilistic mean value $EL(A)$, crisp upper possibilistic mean value $ER(A)$ and crisp possibilistic mean value $E(A)$ as follows

$$E_L(A) = \frac{\int_0^1 \text{Poss}[A \leq a_1(\alpha)] \min[A(\alpha)] d\alpha}{\int_0^1 \text{Poss}[A \leq a_1(\alpha)] d\alpha} = \frac{\int_0^1 \alpha a_1(\alpha) d\alpha}{\int_0^1 \alpha d\alpha} \quad (2.3)$$

and

$$E_R(A) = \frac{\int_0^1 \text{Poss}[A \geq a_2(\alpha)] \max[A(\alpha)] d\alpha}{\int_0^1 \text{Poss}[A \geq a_2(\alpha)] d\alpha} = \frac{\int_0^1 \alpha a_2(\alpha) d\alpha}{\int_0^1 \alpha d\alpha}$$

(2.4)

$E(A) =$

$$\frac{1}{2} \left[\frac{\int_0^1 \text{Poss}[A \leq a_1(\alpha)] \min[A(\alpha)] d\alpha}{\int_0^1 \text{Poss}[A \leq a_1(\alpha)] d\alpha} + \frac{\int_0^1 \text{Poss}[A \geq a_2(\alpha)] \max[A(\alpha)] d\alpha}{\int_0^1 \text{Poss}[A \geq a_2(\alpha)] d\alpha} \right] \quad (2.5)$$

It follows from Buckley [4] and Georgescu [13] that for an increasing function $g(x)$ and a fuzzy number A whose α -level sets is $[A_1(\alpha), A_2(\alpha)]$ then we have the following

$$(g(A))_\alpha = \{g(x) | x \in (A)_\alpha\} = \{g(x) | A_1(\alpha) \leq x \leq A_2(\alpha)\} = \{g(A_1(\alpha)), g(A_2(\alpha))\} \quad (2.6)$$

On the other hand if $g(x)$ is a decreasing function then

$$(g(A))_\alpha = \{g(x) | x \in (A)_\alpha\} = \{g(x) | A_2(\alpha) \leq$$

$$x \leq A_1(\alpha) \} = \{g(A_2(\alpha)), g(A_1(\alpha))\} \quad (2.7)$$

As an illustration if $f(x)$ is an increasing function, i.e. e^x then the α -level sets is given by e^A . Now,

$$(e^A)_\alpha = \{e^x \mid x \in (A)_\alpha\} = \{e^x \mid A_1(\alpha) \leq x \leq A_2(\alpha)\} = \{e^{A_1(\alpha)}, e^{A_2(\alpha)}\} \quad (2.8)$$

If $f(\alpha)$ is a weight function such that $\int_0^1 f(\alpha) d\alpha = 1$ and let A be a fuzzy number whose α -cuts are given by $[a_1(\alpha), a_2(\alpha)]$ for $0 \leq \alpha \leq 1$, then the weighted possibilistic moment generating function (for detail see Paseka et.al [22]) if exists, is defined as

$$MGF_A(u) =$$

$$\frac{1}{2} \int_0^1 f(\alpha) (e^{u(a_1(\alpha))} + e^{u(a_2(\alpha))}) d\alpha, \quad 0 \leq \alpha \leq 1 \quad (2.9)$$

If we assume that the weighting function is $f(\alpha) = 2\alpha$, then expression (2.9) can be rewritten in the following form

$$MGF_A(u) =$$

$$\int_0^1 \alpha (e^{u(a_1(\alpha))} + e^{u(a_2(\alpha))}) d\alpha, \quad 0 \leq \alpha \leq 1 \quad (2.10)$$

Based on (2.9), we define the weighted possibilistic moments as follows:

$$Er(A) =$$

$$\frac{d^r}{du^r} (MGF_A(u)) \Big|_{u=0} = \lim_{u \rightarrow 0} \frac{d^r}{du^r} (MGF_A(u)) \quad (2.11)$$

Deterministic Economic Order Quantity (EOQ) Model

The EOQ formula was first published by Ford Whitman Harris in 1913 [14] in the magazine of management. The purpose of this section is to discuss the crisp deterministic EOQ model. The notations to be used are:

TC(Q, C_o , C_c , D): Total Cost on Inventory system in dollars per unit time (year).

Q: Order Quantity (pieces per order).

C_o : Order cost in dollars per order.

C_c : Inventory carrying costing dollars per item per year.

D: Demand rate pieces per unit time (year).

The only variable in the classical EOQ model is Q and note that C_o , C_c and D are constant parameters.

Holding (or carrying) costs C_c is the cost of holding an item in inventory for some given period of time. C_c usually includes lost investment income caused by having the asset tied up in inventory. It can also includes the costs associated for storage facilities, handling, insurance, pilferage, breakage, obsolescence, depreciation, taxes, and the opportunity cost of capital. Note that high C_c will always favor low inventory levels and frequent replenishment rate.

Ordering costs C_o is the cost of placing an order to a supplier or releasing a production order to a manufacturing unit.

Thus, according to [14] we have

$$\text{Annual Carrying Cost} = C_c \frac{Q}{2} \quad (3.1)$$

$$\text{Annual Ordering Cost} = C_o \frac{D}{Q} \quad (3.2)$$

Therefore,

$$\begin{aligned} \text{Total Cost}(C_c, C_o, D, Q) &= \text{Annual Ordering Cost} + \text{Annual Carrying Cost} \\ \text{Cost} &= C_c \frac{Q}{2} + C_o \frac{D}{Q} \end{aligned} \quad (3.3)$$

In this case the optimal order quantity Q_{optimal} is given by $Q_{\text{optimal}} = \sqrt{\frac{2DC_o}{C_c}}$ and Total Cost(C_c , C_o , D, Q_{optimal}) = Annual Ordering Cost + Annual

Carrying Cost

$$= C_c \frac{D}{\sqrt{\frac{2DC_0}{C_c}}} + C_c \frac{\sqrt{\frac{2DC_0}{C_c}}}{2} \quad (3.4)$$

FUZZY ECONOMIC ORDER QUANTITY MODEL

In the EOQ model we now take the parameters C_0 , C_c and D as fuzzy numbers. Let $C_0(\alpha)$, $C_c(\alpha)$ and $D(\alpha)$ denote the α -cuts of C_0 , C_c and D respectively. Thus, for $0 \leq \alpha \leq 1$ we have

$$C_0(\alpha) = [C_{01}(\alpha), C_{02}(\alpha)] \quad (3.5)$$

$$C_c(\alpha) = [C_{c1}(\alpha), C_{c2}(\alpha)]. \quad (3.6)$$

$$D(\alpha) = [D_1(\alpha), D_2(\alpha)]. \quad (3.7)$$

Analogous to (3.3), we have

$$\begin{aligned} TC(\alpha) &= [C_{01}(\alpha), C_{02}(\alpha)] \frac{[D_1(\alpha), D_2(\alpha)]}{Q} \\ &+ [C_{c1}(\alpha), C_{c2}(\alpha)] \frac{Q}{2} \\ &= \left[\left(\frac{C_{01}(\alpha)D_1(\alpha)}{Q} \right) + \left(\frac{C_{c1}(\alpha)Q}{2} \right), \left(\frac{C_{02}(\alpha)D_2(\alpha)}{Q} \right) + \left(\frac{C_{c2}(\alpha)Q}{2} \right) \right] \end{aligned} \quad (3.8)$$

Let $TC_1(\alpha)$ and $TC_2(\alpha)$ for $0 \leq \alpha \leq 1$ denote the lower bound and the upper bound, respectively, of the α -cuts for fuzzy total cost. Then,

$$\begin{aligned} TC_1(\alpha) &= \left(\frac{C_{01}(\alpha)D_1(\alpha)}{Q} \right) + \left(\frac{C_{c1}(\alpha)Q}{2} \right). \quad TC_2(\alpha) = \\ &\left(\frac{C_{02}(\alpha)D_2(\alpha)}{Q} \right) + \left(\frac{C_{c2}(\alpha)Q}{2} \right) \end{aligned} \quad (3.9)$$

The lower possibilistic mean and upper possibilistic mean for fuzzy total cost are as follows.

$$\begin{aligned} E_L(TC) &= 2 \int_0^1 \alpha [TC_1(\alpha)] d\alpha = 2 \int_0^1 \alpha \left(\frac{C_{01}(\alpha)D_1(\alpha)}{Q} \right) + \left(\frac{C_{c1}(\alpha)Q}{2} \right) d\alpha \\ &\quad (3.10) \end{aligned}$$

$$\begin{aligned} E_R(TC) &= 2 \int_0^1 \alpha [TC_2(\alpha)] d\alpha = 2 \int_0^1 \alpha \left(\frac{C_{02}(\alpha)D_2(\alpha)}{Q} \right) + \left(\frac{C_{c2}(\alpha)Q}{2} \right) d\alpha \\ &\quad (3.11) \end{aligned}$$

Now, the possibilistic mean for fuzzy total cost is

$$\begin{aligned} E(TC) &= \int_0^1 \alpha [TC_1(\alpha) + TC_2(\alpha)] d\alpha \\ &= \int_0^1 \alpha \left(\frac{C_{01}(\alpha)D_1(\alpha)}{Q} + \frac{C_{c1}(\alpha)Q}{2} + \frac{C_{02}(\alpha)D_2(\alpha)}{Q} + \frac{C_{c2}(\alpha)Q}{2} \right) d\alpha \end{aligned} \quad (3.12)$$

The interval valued possibilistic mean IV PM (TC) is

IV PM (TC) =

$$\left[2 \int_0^1 \alpha \left(\frac{C_{01}(\alpha)D_1(\alpha)}{Q} + \frac{C_{c1}(\alpha)Q}{2} \right) d\alpha, 2 \int_0^1 \alpha \left(\frac{C_{02}(\alpha)D_2(\alpha)}{Q} + \frac{C_{c2}(\alpha)Q}{2} \right) d\alpha \right] \quad (3.13)$$

Theorem 3.1 For $0 \leq \alpha \leq 1$, let the fuzzy ordering cost $C_0(\alpha)$, fuzzy Demand $D(\alpha)$ and the fuzzy holding cost $C_c(\alpha)$ be given by

$$C_0(\alpha) = [C_{01}(\alpha), C_{02}(\alpha)] = [c_1 + \alpha(c_2 - c_1), c_4 + \alpha(c_3 - c_4)] \quad (3.14)$$

$$D(\alpha) = [D_1(\alpha), D_2(\alpha)] = [D_1 + \alpha(D_2 - D_1), D_4 + \alpha(D_3 - D_4)] \quad (3.15)$$

$$C_c(\alpha) = [C_{c1}(\alpha), C_{c2}(\alpha)] = [h_1 + \alpha(h_2 - h_1), h_4 + \alpha(h_3 - h_4)] \quad (3.16)$$

Then,

$$\begin{aligned} EOQ_L &= \frac{\sqrt{((2h_2 + h_1)(c_1D_2 + c_1D_1 + 3c_2D_2 + D_1c_2))}}{2h_2 + h_1} \end{aligned} \quad (3.17)$$

$$\begin{aligned} EOQ_R &= \frac{\sqrt{((2h_3 + h_4)(c_4D_3 + c_4D_4 + 3c_3D_3 + D_4c_3))}}{2h_3 + h_4} \end{aligned} \quad (3.18)$$

$$\begin{aligned} EOQ &= \frac{\sqrt{((2h_2 + h_1 + 2h_3 + h_4)(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1 + 3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4))}}{2h_2 + h_1 + 2h_3 + h_4} \end{aligned} \quad (3.19)$$

and total cost at EOQ_L is

$$\begin{aligned} TC_L(Q = EOQ_L) &= \frac{(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1)(2h_2 + h_1)}{6\sqrt{((2h_2 + h_1)(c_1D_2 + c_1D_1 + 3c_2D_2 + D_1c_2))}} + \\ &\frac{\sqrt{((2h_2 + h_1)(c_1D_2 + c_1D_1 + 3c_2D_2 + D_1c_2))}}{6} \end{aligned} \quad (3.20)$$

The total cost at EOQ_R is given by

$$\begin{aligned} TC_R(Q = EOQ_R) &= \frac{(3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4)(2h_3 + h_4)}{6\sqrt{((2h_3 + h_4)(c_4D_3 + c_4D_4 + 3c_3D_3 + D_4c_3))}} + \\ &\left(\frac{\sqrt{((2h_3 + h_4)(c_4D_3 + c_4D_4 + 3c_3D_3 + D_4c_3))}}{6} \right) \end{aligned} \quad (3.21)$$

and total cost at EOQ is

$$= \left(\frac{(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1 + 3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4)}{12} \right) + \frac{(2h_2 + h_1 + 2h_3 + h_4)}{\sqrt{((2h_2 + h_1 + 2h_3 + h_4)(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1 + 3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4))}} + \left(\frac{2h_2 + h_1 + 2h_3 + h_4}{12} \right) + \frac{\sqrt{((2h_2 + h_1 + 2h_3 + h_4)(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1 + 3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4))}}{(2h_2 + h_1 + 2h_3 + h_4)} \quad (3.22)$$

Remark 3.1 It is important to remark here that in this case $EOQ \neq \frac{EOQ_L + EOQ_R}{2}$.

Remark 3.2 Possibilistic EOQ-GAP is the difference between $\left| EOQ - \frac{EOQ_L + EOQ_R}{2} \right|$.

Remark 3.3 Note, that following Remark 3.2 the possibilistic EOQ-GAP is given below

$$\frac{\sqrt{((2h_2 + h_1 + 2h_3 + h_4)(3c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1 + 3c_3D_3 + D_4c_3 + c_4D_3 + c_4D_4))}}{2h_2 + h_1 + 2h_3 + h_4} - \frac{\sqrt{((2h_2 + h_1)(c_2D_2 + D_1c_2 + c_1D_2 + c_1D_1))}}{(2h_2 + h_1)} + \frac{\sqrt{((2h_3 + h_4)(c_4D_3 + c_4D_4 + 3c_3D_3 + D_4c_3))}}{(2h_3 + h_4)}{2}$$

Theorem 3.2 If the fuzzy ordering cost C_0 (α) and the fuzzy carrying cost C_c (α) for $0 \leq \alpha \leq 1$ are assumed to Gaussian fuzzy numbers and Q and D are crisp order quantities then we have the following possibilistic moments.

where

$$C_0(\alpha) = [\mu - \sigma\sqrt{(-2\ln\alpha)}, \mu + \sigma\sqrt{(-2\ln\alpha)}] \quad (3.23)$$

$$C_c(\alpha) = [\mu_1 - \sigma_1\sqrt{(-2\ln\alpha)}, \mu_1 + \sigma_1\sqrt{(-2\ln\alpha)}] \quad (3.24)$$

We have the following expression for fuzzy total cost in terms of the model parameters and the α -level sets.

$$TC(\alpha) = \left[\left(\frac{D(\mu - \sigma\sqrt{(-2\ln\alpha)})}{Q} + \frac{Q(\mu_1 - \sigma_1\sqrt{(-2\ln\alpha)})}{2} \right), \left(\frac{D(\mu + \sigma\sqrt{(-2\ln\alpha)})}{Q} + \frac{Q(\mu_1 + \sigma_1\sqrt{(-2\ln\alpha)})}{2} \right) \right] \quad (3.25)$$

$$E_L(TC) = \frac{1}{4} \frac{-4D\mu + 2D\sigma\sqrt{\pi} - 2Q^2\mu_1 + Q^2\sigma_1\sqrt{\pi}}{Q} \quad (3.26)$$

$$E_R(TC) = \frac{1}{4} \frac{4D\mu + 2D\sigma\sqrt{\pi} - 2Q^2\mu_1 + Q^2\sigma_1\sqrt{\pi}}{Q} \quad (3.27)$$

$$IV \ PM(TC) = \left[-\frac{1}{4} \frac{-4D\mu + 2D\sigma\sqrt{\pi} - 2Q^2\mu_1 + Q^2\sigma_1\sqrt{\pi}}{Q}, \frac{1}{4} \frac{4D\mu + 2D\sigma\sqrt{\pi} - 2Q^2\mu_1 + Q^2\sigma_1\sqrt{\pi}}{Q} \right] \quad (3.28)$$

$$E(TC) = \frac{1}{2} \frac{2D\mu + Q^2\mu_1}{Q} = \frac{E_L(TC) + E_R(TC)}{2} \quad (3.29)$$

To find the fuzzy optimal EOQ in a possibilistic setup we proceed as follow

$$\frac{d E(TC)}{dQ} = \frac{d}{dQ} \left(\frac{1}{2} \frac{2D\mu + Q^2\mu_1}{Q} \right) = \frac{1}{2} \frac{2D\mu + 2D\mu_1}{Q^2}$$

Set $\frac{d E(TC)}{dQ} = 0$, thus we have $Q^* = EOQ$

$$EOQ = \frac{1}{\mu_1} \sqrt{2\sqrt{(\mu_1 D \mu)}} \quad (3.30)$$

Total cost at optimal EOQ is

$$E(TC)(EOQ) = \sqrt{2\sqrt{D\mu_1\mu}} \quad (3.31)$$

and

$$\frac{d^2 E(TC)}{dQ^2} = \frac{1}{2} \frac{\sqrt{2}}{\mu_1 \sqrt{(\mu_1 D \mu)}} > 0 \quad (3.32)$$

Proof: The proof follows from definitions and is omitted.

Theorem 3.3 For $0 \leq \alpha \leq 1$, let the fuzzy ordering cost C_0 , fuzzy Demand D , fuzzy holding cost C_h and fuzzy annual demand D , are all be represented by Gaussian like fuzzy numbers as in **Remark 1.1**. The α -cuts for C_0 , D and C_h are given below as

$$C_0(\alpha) = \left[\frac{\alpha\mu_c - \sigma_c\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{\alpha\mu_c + \sigma_c\sqrt{(\alpha - \alpha^2)}}{\alpha} \right] \quad (3.33)$$

$$D(\alpha) = \left[\frac{\alpha\mu_D - \sigma_D\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{\alpha\mu_D + \sigma_D\sqrt{(\alpha - \alpha^2)}}{\alpha} \right] \quad (3.34)$$

$$C_h(\alpha) = \left[\frac{\alpha\mu_h - \sigma_h\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{\alpha\mu_h + \sigma_h\sqrt{(\alpha - \alpha^2)}}{\alpha} \right] \quad (3.35)$$

Then, we have the following results

$$E_L(TC) = \frac{1}{8} \frac{8\mu_c\mu_D - 2\pi\mu_c\sigma_D - 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D + 4Q^2\pi\mu_h - \pi Q^2\sigma_h}{Q} \quad (3.36)$$

Similarly,

$$E_R(TC) = \frac{1}{8} \frac{8\mu_c\mu_D + 2\pi\mu_c\sigma_D + 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D + 4Q^2\pi\mu_h + \pi Q^2\sigma_h}{Q} \quad (3.37)$$

and

$$E(TC) = \frac{1}{8} \frac{4\mu_c\mu_D - 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D + 4Q^2\mu_h + 4\mu_c\mu_D + \pi\sigma_c\mu_D}{Q} \quad (3.38)$$

The fuzzy possibilistic optimal values are

$$EOQ_L = \frac{\sqrt{2}\sqrt{((-4\mu_h + \pi\sigma_h)(-4\mu_c\mu_D + \pi\mu_c\sigma_D + \pi\sigma_c\mu_D - 4\sigma_c\sigma_D))}}{4\mu_h - \pi\sigma_h} \quad (3.39)$$

Similarly,

$$EOQ_R = \frac{\sqrt{2}\sqrt{((4\mu_h + \pi\sigma_h)(\pi\sigma_c\mu_D + 4\sigma_c\sigma_D + 4\mu_c\mu_D + \pi\mu_c\sigma_D))}}{4\mu_h + \pi\sigma_h} \quad (3.40)$$

and

$$EOQ = \frac{\sqrt{2}\sqrt{(\mu_h(\mu_c\mu_D + \sigma_c\sigma_D))}}{\mu_h} \quad (3.41)$$

Remark 3.4 It can be noted here that at EOQ_* , EOQ^* and EOQ , we have the following results.

$$\begin{aligned} E_L(TC=EOQ_L) &= \left(\frac{8\mu_c\mu_D - 2\pi\mu_c\sigma_D - 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D}{8} \right) \frac{1}{Q} + \left(\frac{4\mu_h + \pi\sigma_h}{8} \right) Q \\ &= \left(\frac{8\mu_c\mu_D - 2\pi\mu_c\sigma_D - 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D}{8} \right) \\ &\quad \frac{(4\mu_h - \pi\sigma_h)}{\sqrt{2}\sqrt{((-4\mu_h + \pi\sigma_h)(-4\mu_c\mu_D + \pi\mu_c\sigma_D + \pi\sigma_c\mu_D - 4\sigma_c\sigma_D))}} \\ &\quad + \left(\frac{\sqrt{2}\sqrt{((-4\mu_h + \pi\sigma_h)(-4\mu_c\mu_D + \pi\mu_c\sigma_D + \pi\sigma_c\mu_D - 4\sigma_c\sigma_D))}}{8} \right) \end{aligned} \quad (3.42)$$

Similarly,

$$\begin{aligned} E_R(TC=EOQ_R) &= \frac{(8\mu_c\mu_D - 2\pi\mu_c\sigma_D - 2\pi\sigma_c\mu_D + 8\sigma_c\sigma_D)}{8} \\ &\quad \frac{4\mu_h + \pi\sigma_h}{\sqrt{2}\sqrt{((4\mu_h + \pi\sigma_h)(\pi\sigma_c\mu_D + 4\sigma_c\sigma_D + 4\mu_c\mu_D + \pi\mu_c\sigma_D))}} + \\ &\quad \frac{\sqrt{2}\sqrt{((4\mu_h + \pi\sigma_h)(\pi\sigma_c\mu_D + 4\sigma_c\sigma_D + 4\mu_c\mu_D + \pi\mu_c\sigma_D))}}{8} \end{aligned} \quad (3.43)$$

$E(TC=EOQ) =$

$$\begin{aligned} &\frac{4\mu_c\mu_D - \pi\sigma_c\mu_D + 8\sigma_c\sigma_D + 4\mu_c\mu_D + \pi\sigma_c\mu_D}{8} \\ &\quad \frac{\mu_h}{\sqrt{2}\sqrt{(\mu_h(\mu_c\mu_D + \sigma_c\sigma_D))}} \\ &\quad \frac{\sqrt{(\mu_h(\mu_c\mu_D + \sigma_c\sigma_D))}}{\sqrt{2}} \end{aligned} \quad (3.44)$$

Below, we provide a numerical example to illustrate the salient point in the fuzzy possibilistic EOQ model developed in this paper.

Example 1 The numerical example given here is for illustrative and comparative purposes. We consider an inventory system with the following data

$C_o(\alpha) = [C_{o1}(\alpha), C_{o2}(\alpha)] =$

$$\left[\frac{150\alpha - 5\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{150\alpha + 5\sqrt{(\alpha - \alpha^2)}}{\alpha} \right]$$

$D(\alpha) = [D_1(\alpha), D_2(\alpha)] =$

$$\left[\frac{10000\alpha - 12.5\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{10000\alpha + 12.5\sqrt{(\alpha - \alpha^2)}}{\alpha} \right]$$

$C_c(\alpha) = [C_{c1}(\alpha), C_{c2}(\alpha)] =$

$$\left[\frac{0.75\alpha - 0.06\sqrt{(\alpha - \alpha^2)}}{\alpha}, \frac{0.75\alpha + 0.06\sqrt{(\alpha - \alpha^2)}}{\alpha} \right]$$

Thus,

$$TC_1(\alpha) = \left(\frac{(150\alpha - 5\sqrt{\alpha - \alpha^2})(10000\alpha - 12.5\sqrt{\alpha - \alpha^2})}{Q\alpha^2} + \frac{(0.75\alpha - 0.06\sqrt{\alpha - \alpha^2})}{2\alpha} \right) Q$$

$$TC_2(\alpha) = \left(\frac{(150\alpha + 5\sqrt{\alpha - \alpha^2})(10000\alpha + 12.5\sqrt{\alpha - \alpha^2})}{Q\alpha^2} + \frac{(0.75\alpha + 0.06\sqrt{\alpha - \alpha^2})}{2\alpha} \right) Q$$

and

$$E_L(TC) = \int_0^1 \alpha \left(\frac{(150\alpha - 5\sqrt{\alpha - \alpha^2})(10000\alpha - 12.5\sqrt{\alpha - \alpha^2})}{Q\alpha^2} + \frac{(0.75\alpha - 0.06\sqrt{\alpha - \alpha^2})}{2\alpha} \right) Q d\alpha$$

$$= 2.0 \times 10^{-12} \left(\frac{7.2966 \times 10^{17} + 1.75719 + 10^{11} Q^2}{Q} \right) \quad (3.45)$$

$$E_R(TC) = 2 \int_0^1 \alpha \left(\frac{(150\alpha + 5\sqrt{\alpha - \alpha^2})(10000\alpha + 12.5\sqrt{\alpha - \alpha^2})}{Q\alpha^2} + \frac{(0.75\alpha + 0.06\sqrt{\alpha - \alpha^2})}{2\alpha} Q \right) d\alpha$$

$$= 2.0 \times 10^{-12} \left(\frac{7.704025 \times 10^{17} + 1.99281 + 10^{11} Q^2}{Q} \right) \quad (3.46)$$

$$= 0.125 \left(\frac{1.20005 \times 10^{17} + 3.0 Q^2}{Q} \right) \quad (3.47)$$

and since

$$\frac{d^2 E_L(TC)}{dQ^2} = \frac{d^2}{dQ^2} \left(2.0 \times 10^{-12} \left(\frac{7.2966 \times 10^{17} + 1.75719 + 10^{11} Q^2}{Q} \right) \right) = \frac{2.91864 \times 10^6}{Q^3} > 0$$

$$\frac{d^2 E_R(TC)}{dQ^2} = \frac{d^2}{dQ^2} \left(2.0 \times 10^{-12} \left(\frac{7.704025 \times 10^{17} + 1.99281 + 10^{11} Q^2}{Q} \right) \right) = \frac{3.08161 \times 10^6}{Q^3} > 0$$

$$\frac{d^2 E(TC)}{dQ^2} = \frac{d^2}{dQ^2} \left(0.125 \left(\frac{1.20005 \times 10^{17} + 3.0 Q^2}{Q} \right) \right) = \frac{3.000125 \times 10^6}{Q^3} > 0$$

The optimal EOQ in a possibilistic setup are as follows

$$EOQ_L = 2037.75 \quad (3.48)$$

$$EOQ_R = 1966.192 \quad (3.49)$$

$$EOQ = 2000.042 \quad (3.50)$$

At the optimal EOQ, the fuzzy total cost in a possibilistic setup are as follows

$$E_L(TC(2037.75)) = 2.0 \times 10^{-12} \left(\frac{7.2966 \times 10^{17} + 1.75719 + 10^{11} (2037.75)^2}{2037.75} \right) = 1432.286$$

$$E_R(TC(1966.192)) = 2.0 \times 10^{-12} \left(\frac{7.704025 \times 10^{17} + 1.99281 + 10^{11} (1966.192)^2}{1966.192} \right) = 1567.299$$

$$E_L(TC(2000.042)) = 0.125 \left(\frac{1.20005 \times 10^{17} + 3.0 (2000.042)^2}{2000.042} \right) = 1500.031$$

CONCLUSION

In this paper we have been able to develop a Gaussian Fuzzy approach to the economic order quantity inventory model. The methodology proposed in this paper may also be applicable to other inventory models within a supply chain environment. The evidence in favor of a data driven approach highlights the advantage over the original crisp version of the inventory model formulation. In our views our

approach provide a simple model formulation that more closely conforms to real situation. The theoretical results discussed in this paper lend themselves to future practical implementations of the model. Future research on this problem could include additional sources of uncertainty in the EOQ inventory model, by using different type of fuzzy numbers such as random or adaptive fuzzy demand rate, which might be analytically more challenging but an interesting problem of research.

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Figure - 1
Gaussian Fuzzy Number [20].

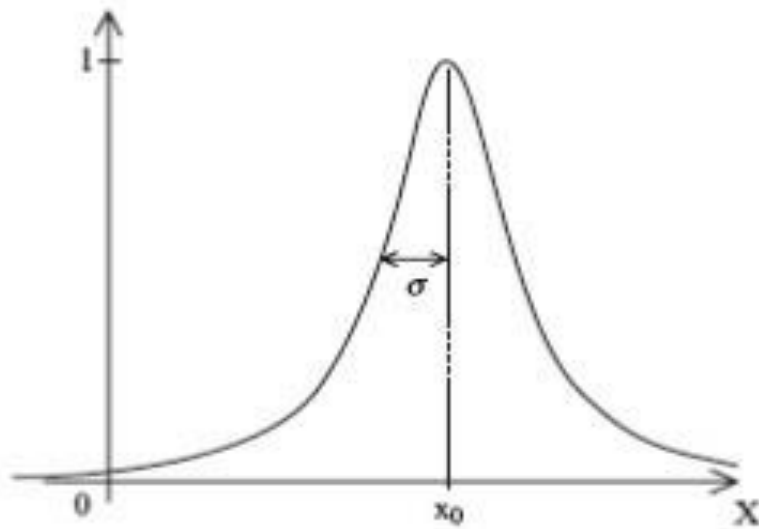


Figure - 2
A variation on the Gaussian set that does not make use of the exponential function [20].

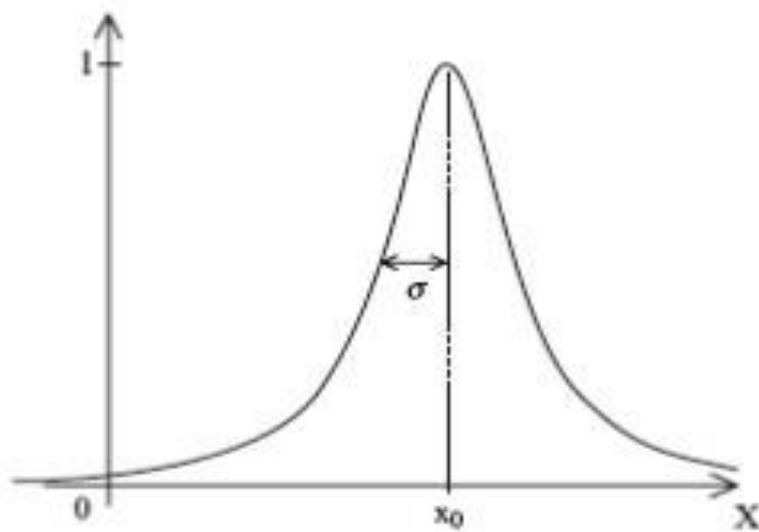
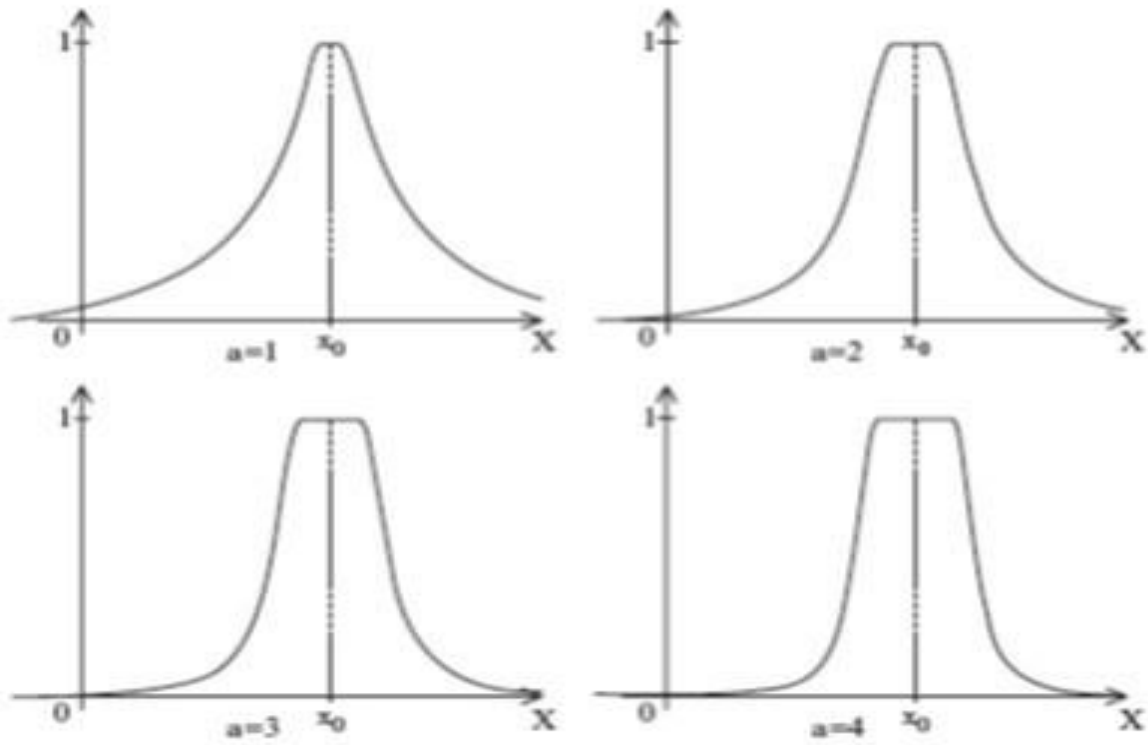


Figure - 3
FL Smith controllers collection [20].



Using Effective Educational Management in the Working Process of School Principal as a Leader

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Abstract

The presented work reflects on the importance of educational management in modern pedagogy and the current developments in school life, which demands a new educational approach. From its side it is reflected in the role of school leaders. Paper suggests that the strong educational system and effective educational policy management is a key point in forming a highly qualified school principal. First the paper examines various skills and responsibilities of school principal, one of which is strengthening teachers' professional development. The article offers an assessment scale for school principals' and a research done within Georgian school principals, namely in Akhaltsikhe and Ajara region. The results showed that the component of caring of teacher development got the lowest scores. According to the empirical research results the paper comes to the conclusion that the school leader is a person with a crucial importance for constant development of educational process which includes teacher development and with particular leadership skills can achieve the better outcome in this direction. The paper concludes by offering a number of recommendations arising from the analyses.

Key words: School principal, management, leader, value, vision, approach.

INTRODUCTION

The role and functions of school principle is getting more and more important in the modern epoch. Recently, a big attention is paid to the school principals' activities. What should he do, how to define his/her work, etc. The opinion beyond this direction means defining those results towards which the school should strive and which must be reached by the students. Less focus is on the stages and process. Accordingly, school principal should do the best to achieve the desirable outcomes. Such view towards the work has positive sides: it releases the principal and the staff from the various restrictions and problems. The work which should be done by the principal is minimized, the focus is only on the outcomes, which is in coincidence with school goals and sometimes, even with standards. When all this is fulfilled it is

possible to assess the work not on the bases of intention but on the bases of outcomes.

Effective school principle is responsible for planning, organizational issues, leading the process and controlling. 1. Planning means to set school goals and objectives and to work out the instructions and strategies in order to fulfill them. 2. Organizational issues means to collect necessary human, financial and physical resources in order to reach the goal effectively. 3. Leading processes means to give directions, to motivate and supervise the staff. 4. Controlling means the right to conduct regular assessment which includes discussions about work completion, expressing opinions and taking care about other standards for reaching the goal.

Leaders Behavior and competences are the first key to

successful school functioning. In this case the school is collegiate and the staff strives to reach common goals.

LITERATURE REVIEW

O.Zumburidze discusses the classical management theories and the main concepts of modern management in parallels. The author emphasizes such points as : organizational issues, leadership, control, motivation and offers the ways and the strategies to reach the goal set by a manager (Zumburidze, 2008). G. Nozadze speaks about two types of supportive conditions in order to implement the sustainable pedagogical innovations in practice. The essential point is the support from the school principal and administration and on the other hand , from the teacher. It is provided by the manager who supports teacher professional development and makes others aware of the value of innovation (Nozadze, 2014).

Guidelines for the National Centre of Teacher professional development (2013) "Standard for school principals" (2013), Discusses trends available for school principals and teachers. The book offers a practical issues in order to help their professional development, to support in terms of creating resources and to develop a working knowledge of supporting materials.

DISCUSSION

Defining the role of school principal (in relation with outcomes) increases the probability of identification of strategies and outcomes. However, it is quite difficult and risky and often causes problems at school. For example, it is very difficult to foresee some outcomes which are really important. Because of that there is a tendency to define only those outcomes which are easy to perceive and assess. As a result many other results which might be even more important, remain unnoticed. Besides, there is a difference between

effective and good practice. Work done by school principal and the teachers, sometimes work, but it is not the right way. Being focused on the outcomes defines the success only in the frames of what works and not – what is right and correct. High qualified school principal:

Demonstrates the views and leads the process which involves the school society in the formation of common values and beliefs.

Expresses ethical and moral opinions.

Thinks creatively and is innovative.

Has communicative skills - School principal daily deals with many groups of people including staff, students, parents and community members. Each group requires different approach. Effective school principal expresses own opinions and shows self-confidence; effectively explains decisions and checks its intelligibility. His/her behavior is in a full coincidence with the opinions and decisions formed by him/her; Effective school principal considers the target groups views and while speaking about the priorities distinguishes facts and opinions.

Manages groups' working process. High qualified school principal monitors the involvement of others in problem solving process and stimulates the staff to work as one whole on order to reach the goals. While leading groups' working process school principal: a. realizes groups dynamic and uses the skill of group work monitoring. b. forms the frame of co-operation conception so that the school society is involved in the process of forming common views, values, mission and objectives. C. Uses the skills of group formation.

Other categories:

Curriculum and teaching

Assessment

Organizational management

Fiscal management

Perfect Vision: value oriented approach

In order to get effective learning outcomes it is important to activate the school principals role based on the value oriented approach. Views and assumptions which are considered to be important and are used as basics for defining what is school principal's responsibility and what is not, should be specifically defined. From its side, defining the views and assumptions forms the standard – what is good and what is bad; what is effective and what is ineffective; what is acceptable and what is unacceptable. Sometimes standard is supported by research, sometimes -by informative and professional knowledge and sometimes standard is a proved manifestation of philosophical views, assumptions and opinions. Using value oriented approach for defining school principals role not only provides principals jobs compliance with acceptable standards, but also forms indicators, which determine the potential of the school's educational and moral well-being. Value oriented approach seeks to establish a perfect vision.

Perfect vision is more than a suggestion in which the school's mission is formed. It is more than attractive and inspiring words of spiritual inspiration. It is a working document, which is publicly announcing what is important and why, what our obligations are and how to achieve that objective.

Perfect vision is a contract that clearly and explicitly defines our role and responsibility in front of the school and its vision. It includes goals and ways of helping the school to develop its own direction, to create concepts, structure,

rules, and other tools necessary to achieve success.

A perfect vision includes terms that need to be fulfilled by the principal and others (e.g. teachers, students, parents). The terms exactly define the responsibilities of each group which is a precondition for quickly reaching the goals stated in the vision. To make a perfect vision feasible and effective, terms shall require from the groups to consider not only what is mentioned in the vision, but the results of the study, the appropriate professional skills and values needed for the principal's job. A perfect vision provides a clear and comprehensible reflection about the fact that: " the 21st century school should be more focused on students and, most importantly, should have substantially more individual programs, supportive services and intellectual power.

School success largely depends on teachers creative visions, support and implementation of innovations. The main reason why do teachers support the innovations in teaching process is that they get professional and personal satisfaction when they are able to use more meaningful and efficient ways of teaching and when they see the results in a form of their students' improved achievements. During pre and while implementation process teachers need:

- Systematic (regular and systemic) professional development;
- Sharing ideas, feelings and aspirations with colleagues;
- Reflection on the implementation issues;
- Additional knowledge about innovation.

But if teachers do not see the benefit from implemented innovation in the form of students achievements, they may not maintain their motivation even in case of increased funding, comfortable working

environment, improved school interior or support from the directive regulations.

School principal's support is another crucial factor in the implementation of sustainable innovation. In general, only a small number of principals are neutral – they neither help nor hinder the implementation of innovations in teaching. The majority of them support (However, are not personally involved), or are actively involved in this process. It is easy to find the difference, according to the principal's behavior – whether he is limited to the monitoring of students results and/or teachers and pupils encouragement to use it in practice, or s/he models the innovation in everyday practice and invites employees to share their visions about innovations.

The school principal who takes the role of "gatekeeper" in the innovation implementation process (the worst case in practice), usually behaves improperly, as effective leaders act differently. They:

- Create a picture of student's academic success;
- Create a supportive school climate;
- Encourage leadership among employees;
- Improve teaching;
- Manage people, data and processes in order to develop an effective school.

It is very important to define the following directions in order to improve the school management.

- Cooperation in leadership and society of professional learning
- Personalization.
- Curriculum, teaching and assessment.

Research tools:

Value oriented approach is a constant reminder for school principals about their responsibilities. It forms the future view of school and so defines school

principal's success. We believe that in order to be a successful school leader it is important to constantly work on a career development and consider indicators. (see table 1)

Research method:

Considering these indicators the research was held in Samtskhe-Javakheti and Ajara region to define school principals' competences.. 25 schools in Samtskhe-Javakheti and 32 in Ajara region were involved in the research process. Total number of schools – 52. (see table 2)

Empirical research results

Data analyses showed that the component *care of others' (teachers' development)* had very low indices.

Assessment indicators were – list of fulfilled projects, number of certified teachers, participation in conferences, conducting model lessons, interviews.

It is worth to mention that out of 3 points this component got only 1 point. It's obvious that the problem is considerable and school principals', as leaders should increase attention towards professional development of teachers.

The low indices showed the component of *modeling*, too.

An average points according to the results. (see table 3)

The results on average was 16 points. (see table 4)

Outcome analyses:

In order to improve the obtained results, in regard to the teacher professional development, we recommend following: the school principal should plan and implement an effective action plan and conduct monitoring, which includes: teachers self-assessment based on the observations on own teaching practice.

On the bases of this recommendation we can test the action plan worked out by the school principal. After the carried out activities, the results of the teacher professional development changed. **(see table 5)**

The progress is obvious if we compare the teachers initial data and the results after the monitoring of teachers' professional development? **(see table 6)**

As we see the progress is obvious. It is about 1,5.

RECOMMENDATIONS

After some time the school principal should make analysis of the following issues:

What worked?

What turned out to be difficult and why?

What else is needed to be done to support the changes?

What is a reflection of the influence on teaching/ learning, and how to assess it (for example, selection of works, Conversations with teachers, students and parents, information about student assessment)?

What methods could be used in assessing the influence?

In regard with teachers' professional development school principal should plan an effective action plan in different directions and later find the responses to the following questions:

What did the teachers learn?

Are pre-set goals reached?

What kind of conclusions were drawn about the pedagogical practices?

What kind of changes are required?

What should be added to the action plan?

What kind of support is needed for teachers?

CONCLUSION:

We do believe that for the successful functioning of school it is necessary to:

School Principals should consider what is the attitude between imposed expectations from teachers and their support. **(see table 7)**

In order to develop school effectively, school principals should manage learning environment, student academic data and learning processes.

We believe that such measures would inevitably play a great role in a significant improvement of the ratio of problematic component - school principal's care of teacher professional development.

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Insert table 1.

Insert table 2.

Insert table 3.

Insert figure 1.

Insert table 4.

Insert table 5.

Insert table 6.

Table - 1
Indicators

1	planning and implementation
2	Resource mobilization
3	analyses
4	Defining the priorities
5	Care of others' development
6	Modeling
7	Monitoring
8	Communication

Table - 2
Assessment

Total score			
School principal's main competences - assessment results			
Main competences manifested by the school principal	Quality of arguments (0-3)	Level of competence (0-3)	Notes
planning and implementation			
Resource mobilization			
analyses			
Defining the priorities			
Care of others' development			
Modeling			
Monitoring			
Communication			
Average score of interview	<u>NA</u>	<u>NA</u>	
Total score	Possible max score	Possible max score	
Notes :			

Table - 3
Results

Competences	Points
Planning and implementation	2
Resource mobilization	3
Analyses	2
Defining the priorities	2
Care of others' development	1
Modeling	1
Monitoring	2
Communication	3
Average	16

Figure - 1
Average points according to the components

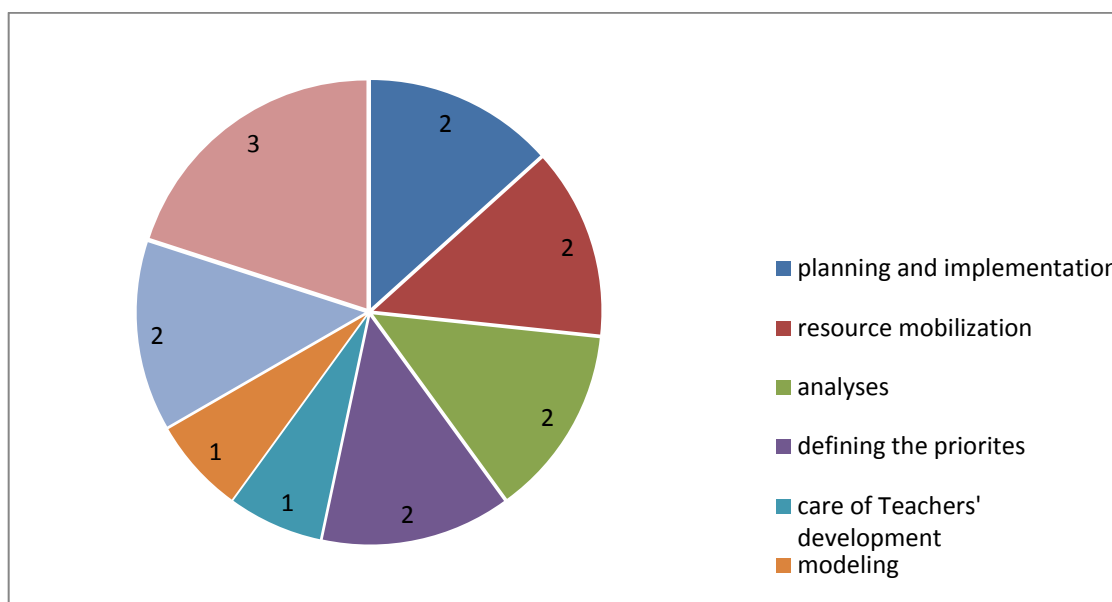


Table - 4
The results of teacher development

Total scores (from all existed resources)		
School Outcomes		
assessment data Resources	Point Each point is divided by the number of teachers (48 teachers participated)	Note
Observation on the pedagogical practice	3	
Teachers self-assessment	2	
Average	2, 5	

Table - 5
Comparison: Teachers initial data and the results after the monitoring

Total points (from all existed resources)			
School outcomes			
Data about teacher professional development assessment	Data quality 0-3	School progress 0-3 for future use	Notes
initial	1		
After monitoring	2,5		
		1, 5	

Table - 6
Attitude between expectations and support

Support			
		low	high
Challenge/expectation	low	Stagnation, low achievements	Slow, unequal progress, self-calmness
	high	Conflict, Demoralization	Fast progress, high achievements

Design of Online and Offline Social Networks: Game theoretic modeling

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Abstract

Social networks is more popular now than ever before: first thing we do in the morning is check facebook and during our whole day till midnight, we utilize (or should I say waste) our time on multiple social networks like chatting on facebook, sharing our images on Flickr, posting and following updates on twitter, viewing user-created video on YouTube, and watching peer-to-peer television using PPLive and PPStream. The interesting thing is how are these social networks similar to keep the users engaged and how are they different to keep their uniqueness. If you watch closely, you will find that within these social networks, users share, exchange, and compete for scarce resources and cooperate for mutual benefits and hence, at the end of the day, they influence each other's decision and performance. In addition, interestingly many corporates have even started using social networks as a critical part of their marketing strategy to increase the brand awareness and brand *recall of their products*.

In the face of the challenge of the dynamics of change, the requirements and the expectations from a social network have changed drastically as compared to that of the earlier decade. Because users have many options available to switch, the design of social networks have a critical requirement to ensure that old users stick to the same social network and more and more users keep on joining this network, so as to bring-in more and more 'guanxi' and people can get benefitted from each other in this network. To give the basic guidelines on the design, it is very important to analyze the customers i.e. users' behaviors and their interactions with information and other users in the social network.

Popularized by movies such as "A Beautiful Mind", game theory is the modeling of strategic interactions among rational as well as irrational agents. Since we need to study how should one design interactions between users so that each get an amazing user experience, Game Theory is ideal and essential for analyzing and modeling the users' behaviors in the social interactions' scenario. The comprehensive study of various type of users' behaviors proves that there are predominantly two dominant interactions – (a) cooperation (b) competition. In the competition behavior, users compete for the same resource, while for the cooperation behavior, they cooperate with each other for positive network effect. The findings of the paper are quite relevant, meaningful and motivating for new social networks who aspire to have many users and striving to give them a better network experience.

Keywords: Social network, Design thinking, Game theory, experiments, networking, guanxi.

INTRODUCTION

Giving a smooth and amazing user experience is very challenging and multifaceted task for design team of any online social network. User behaviors and more social interactions are combining to reshape users' expectations faster than some companies are able to react. With the fast changing scenario of users' expectations and many new competing

social networks, the most critical issue in a social network is designing the system for better user experience.

Game theory is the mathematical study of cooperation and conflict. It provides a distinct and interdisciplinary approach to the study of human behavior. It is a very powerful conceptual and procedural tool to investigate social interaction, such as social networks, the

informational structure of the interactions, and the payoffs associated with particular user decisions. This paper studies the various fundamental guidelines that should be present in the design of a social network.

Purpose and Scope

The purpose of this paper is to study the fundamental guidelines that a social network should implement as we find through the application of the game theory while studying the users' behaviors, maximizing chances of having more number of users in the social network in these fast changing users' expectations. The paper focuses on exploring the various characteristic features related to the concept in hand. The vital components related to the said concept have been explored with special reference to the extent of cooperation or competition feeling desired in the users.

RESEARCH METHODOLOGY

In this study, the data from the existing offline and online social networks has been analyzed in the context of social interactions and individual behaviors. However, no emphasis was put on the correlation with the subject of management as such. The personal observations and insights have enormously formed the part of the study as the various connotations of the textual data have been interpreted and correlated with the topic in hand. All the dimensions related to the topic have been amply supported by textual references and existing social networks.

Characteristic Features of the Concept

The concept of the various features as observed in the existing social networks shall be discussed through the following premises so as to contribute to the final conceptual structure of the design. The concept is discussed separately for Offline and Online Social networks in terms of

discussing the purpose of the design of such a network – which type of users' behavior is promoted: cooperation, competition or coopetition (Cooperation + Competition). To put things into perspective, some of the examples are given below:

Insert table

Let us look at the Offline and online social networks differently.

Offline Social Networks

1. Cooperation

Common objective: This is the primary reason for which the network exists. The achievement of the common objective should be able to attribute to the team directly. This proximity of impact increases the cooperation behavior among the members/users. Thus, members of a team working on a project directly affecting the clients are in a position to cooperate with each other so that they can get the final work done.

Team Leader and Delegation: There is a strong need of a team leader who can guide the team as well take the final decision after listening to the team. (S)he is the motivator and pushes people to cooperate and work as a team. The team members will have a trusting person and since the team leader will know the project as a whole, s/he can delegate tasks effectively.

Ongoing communication: In addition to the common objective and a team leader, there should be a platform for everyone to communicate with each other. This is a major ingredient in the successful execution of a successful project. On the other hand, it is important to provide all members from the team leader side the regular updates concerning progress to date, problem

areas, and delays in meeting timelines.

Competition: The essential part is to provide a platform where everybody is competing with the same controlled environment.

Ranking System: A ranking system needs to be established so that the users/members will be able to keep their motivation high and keep on contributing for their own benefit and growth.

Common Standard: You need to define a common standard or syllabus which will be a guiding factor for each member. Their performance will be measured based on this common standard.

Cooperation + Competition: In the current situation, to compete, individuals need to be able to cooperate with others or work as a team. This funnels to the principle of “Coopetition”, which is a hybrid of cooperation and competition.

Clout/Network: Individuals rely on their clout up to a certain point for expediting their career progression. This clout may be due to proximity to important people in the network with whom one may connect to get help in various assignments or to get leads. This set of people can help in various phases of the career. Building this clout has become even more essential under the current competitive scenarios.

Common objective: Employees in firms are competing with each other in appraisals with the same network of people with whom they collaborate to execute a project. This form of coopetition is more aggressive in organization that works on projects or provide solutions like IT cos. The achievement of the common objective should be able to attribute

to the team directly. This proximity of impact increases the cooperation behavior. Thus, members of a team working on a project directly affecting the clients are in a position to cooperate than a cashier in a bank.

Peer Reviewed Performance appraisal: Since the performance appraisal in the organizations are being reviewed by peers, it has become even more essential to compete with others and still cooperate with others.

Online Social Networks

Cooperation:

Endorsers: To reap benefits out of networking, social platforms provide typical features, which help to endorse or support other users in the network. In LinkedIn, we can observe people cooperating with each other for higher expected payoffs. What keeps people motivated to endorse skills and write testimonials on of someone else's profile? It may happen that she may be least bothered about the success of other person for the time being. It is just because she nudges the other player to move into an implicit agreement for a Pareto Dominated Outcome in the race of finding an awesome job. Here the Pareto Dominated Outcome is the better profile, which may lead for better offers. To enable the same, LinkedIn facilitates by explicitly asking the other side whether she would like to endorse some skills of the endorser.

Low-involvement communication: Sometimes it is necessary to show a signal to show that you are interested but still need response from the other side for acceptance. This kind of communication is important when one is trying to build network. In Facebook, you can poke people. It is

a tool to basically position yourself on someone else sensor. It is the checker to full-duplex communication. Those who want to test whether someone is approachable or not, they can always poke to test whether the other person is interested or not. Low-involvement communication is an important feature of Facebook.

Personal Messaging tool: This is indispensable if we want to have personal level communication between two individuals. When two parties are cooperating and building relationship, they would like to keep some communications out of the purview of others and hence this becomes a critical feature.

Competition

Groups. Groups are platforms to say everything or nothing in regards to yourself with the like-minded people. Users meet up to speak about some piece of one's character or share knowledge. However these groups also provides the platform to pitch yourself to the most relevant set of people whose affirmation means a lot to the users.

Affirmation Metrics: It is very important for social networking sites to have certain metrics to be shown upfront to the users to earn and compete for reputation. Likes in Facebook, YouTube, and Upvotes in Quora are few examples of such statistics, which accompanies every content, and people yearn for acceptance as well as reputation reflected through these measures. Quora is a very popular social media for quenching your knowledge thirst. However, this give and take process of knowledge is driven by network of people connected though a mesh of common interests, followers, topics etc. However, to earn satisfaction of proving one's point or being the most

knowledgeable about the topic or simply transferring knowledge, users have to compete with other answers by garnering as many Upvotes as possible.

Cooperation + Competition

There are umpteen games, which are played online. Even in online games, players employ "tit-for-tat" strategies where they are to co-operate and then reward or punish the competitor depending on if they played competitively or cooperatively in turn. Such a stratagem is very common for games looking to cooperate and maximize outcomes for everyone involved.

Multiplayer capability: It is possible to competitive in online games only if you have large number of players competing with each other. This situation creates dependency on others for protecting one's own territory by cooperating with each other in a rather random environment, which is being played by multiple players. If everybody starts competing with then there will not be any stability in the game plan, which will make it uninteresting.

Violence: Again, after teaming up to defeat some common opponent, people become interdependent and this dependency creates trust and interest, which is the prime motivators for sticking to the game. Moreover, to create this competitive environment it is important for the online games to have violence, which demands help from other players.

Sharing options: It is quite straightforward for developers to design functionalities like send/accept friends requests, present gifts, heal other players, sell items, and so forth. These options are very common in successful social games in Facebook.

CONCLUSION

On the basis of the foregoing discussion, a social network with the kind of design as discussed above would be able to sustain old users as well as would be able to attract many more users. Had the existing social networks such as facebook and twitter didn't use the above concepts, it would have taken a long time for them to build such a huge network of users. The social networks, by keeping in view the above discussed design features based on the type of users' behavior, can evaluate and improve their social networks- online as well as offline.

Thus, above design features represents before us an ideal social network customized towards the type of behavior that need to be felt and DNA of successful social network to shape its future.

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	Offline	Online
Cooperation	Teams organizing an event	Team of Online developers working towards a product
Competition	Board examinations	Likes on Facebook (Gamification)
Cooperation + Competition	Students in a class, Corporates	LAN Games (AOE, Unreal Tournament)

Issues and Challenges in Implementing E-learning in Organization

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Abstract

This paper tries to examine and discuss the Issues and Challenges in implementing E.Learning in Organisation. When an Organization want to implement e-learning, there are various aspect to be considered. Many factors will come into play. Some factors are about the technology, others about the prospective users, and cost. There are many aspects like socio-economic and technological environment that need to be explicitly addressed during implementation of e.learning. This study reviewed various factors and processes with an emphasis on Organization .this study proposed a conceptual framework for assessing the challenges hindering successful implementation of e.learning in organization. Key findings revealed that lack of good connectivity and high bandwidth as well as effective technical support and financial resources, adequate infrastructure, reliable power supply and acceptance to technology change were statistically significant factors that could hinder successful implementation of e.learning in organization.

Keywords: e.learning, Issues, Challenges, Organization

e.learning - Definition

The concept e.learning, which is relatively new, is based on a much older concept: distance learning. Distance learning consists of a scenario in which the learner is not present face to face with the teacher or the trainer. So basically e.learning is the modern and technologically enhanced way to approach distance learning. In fact it is now possible to leverage a lot of extremely interesting and useful tools such as Learning Management Systems., online videos, video-conferencing apps, forum, reports and a lot more in order to boost training performance.

As with many things in life, e.learning has its benefits and drawbacks, but in this case it's extremely important to perform a careful analysis as the future of a company and a lot of money is at stake and will rely on the success, or failure.

The origins of the term e.learning is not certain, although it is suggested that the term most likely originated during the

1980's within the similar time frame of another delivery mode online learning. e.learning, a general term for education, training and information emphasizes.

Companies of all sizes are now beginning to see the advantages of moving their corporate training online. Corporates now report that eLearning is the second most valuable training method that they use. This is not surprise, given that e.learning saves businesses at least 50% of cost when they replace traditional instructor-based training with e.learning. e.learning cuts down instruction time by up to 60%.

However, the one issue that prevents many organisation from making the leap to elearning is the cost. Is online corporate training really worth the investment? Are the benefits significant enough to warrant a chunk of HR budget? Following are some of benefits.

Reduced training costs:

One of the most significant advantages of online corporate training is

that is actually reduces training costs. There will no longer be a need for printed training materials or over on-site facilitators, given that all of the information an employee will need can be found within the online platfor.

Rapid Deployment of content:

Online training can be delivery quickly and conveniently, so that employees are able to acquire new information or skill sets almost immediately. Rather than having to wait for printed materials to be developed, and shared across orginasation offices can upload materials and offer employees access to a wealth of information right away.

Eliminates the need for On-site instructors

Undoubtedly, one of the most notable benefits of online corporate training is that there is no longer have to pay for travel and/or accomodations for the instructtors neither have to allocate valuable working hours for corporate training.

Immediate access to informative resources

Corporate elearning gives the employees the chance to access resources quickly. By including links to articles, webinars and videos.

Reduces employee turnover rates

Happy and well-informed employee are employees who are more likely to remain loyal to Organisation. By giving employee to access round-the-clock online training and self-paces learning modules, they can further their professional goals and feel motivated to improve their on-the -job performance.

Issues

"Most Organisation don't understand the magnitude of change that

e.learning is", says Lance Dublin, the renowned US management consultant who draws on 30 years of experience in adult education, training and change management. He also pointed out common problems when introducing e.learning and explain how "third dimension learning" helped global companies, such as Google and Qualcomm, to solve their business problem.

Most organizations underestimate the number of people, roles and things that are impacted when e.learning introduced in Organisation. Instructors have to be trained to work differently, developers have to work with different tools, and managers need to manage in new ways. Although e.learning is about technology, the people who are going to use it are still humans with feelings and opinions. Often organizations don't spend enough time helping the individuals to understand what e.learning is and why it is being introduced to the organization and what their role in it is. They focus way too much on the technology and far too little on the people.

Organisation have to treat the implementation process as a major change initiative. This means they have to think about how you are going to make people aware, how they are going to get them involved and then how they are going to integrate this change into their daily life. This implementation should be done systematically not just announcing.

Challenges

A major challenge in e.learning is changing mindsets that are still locked into the traditional models of training delivery. The main barriers to a successful e.learning program are the lack of a learning culture in the organization, lack of the knowledge about e.learning, a lack of expertise in this area, a perception that e.learning will not add value to the organization and simple reluctance to change. There are two main groups whose

cooperation and support are critical for the development and implementation of e.learning: the management of the organization and the learners to get their support and ownership will ensure success when the course is launched.

One of the biggest challenge is frustrations on IT systems that do not work. There may be a period of time when new users experience difficulty in accessing the e.learning environment –good IT.

Few more challenges that learner may face , but all the following must take into account of Organisation Culture or particular Learner.

Lack of Human Contact

The “e” stands for electronic. As it is understood e.learning is delivered through computer and lately also via. Mobile devices. Especially if learner are not using video-conferencing apps, the learner might find this kind of training alienating. The human being is by nature a social being so taking away all forms of interactions with other people might be a demotivating factor for some users.

Boredom

In fact one of the main problems related to elearning is the high “mortality” of learners as they often seem to lose motivation because online classes are boring.

Lack of focus

When studying in face to face the level of distraction is less, but on the other hand while learning on self much difficult to focus as no one is actually watching.

Recommendation

The benefits and potentials of e.learning far outweigh its challenges. Thus it is imperative that institutions and government come together to resolve the issues discussed above. Some of the

recommendations that can be adopted are listed below:

Blended Approach in e.learning

Realizing that we are in the transition period between the traditional and e.learning modes, we propose that a blended approach be adopted. The term blended approach is used to describe the creation of a learning environment that combines several different delivery methods such as face-to-face interactions, self-paced and individualized learning and online interactions.

On the other hand Learning Management System and e-learning can offer a lot of interesting opportunities. Here a few:

Adaptiveness

One of the greatest things about e-learning is that the software and technology can easily evolve according to new pedagogical theories. Everyone is talking about Gamification and learners are asking for it?-no problem. Learners need to develop a new module in the training platform and instantly get all the benefits to all learners.

Mobile Learning

Nowadays e-learning can be delivered also via mobile devices. This means that people can start learning pretty much everywhere, any time they want. Learners can take courses during their morning commute to their workplace by simple bringing their smart phone along with them.

Reporting

In order to gather useful information, and data can be actually used. It is extremely easy to automatically create reports that fit needs, no matters number of learners who trying to evaluate.

Management

Obviously it's important to get reports right away, but it's also very important to keep data and reports in a place where will be able to retrieve them at any time for future analysis and history tracking. There is no huge paper folders that can easily get lost or ruined. It's now time to leverage databases and online storage to keep organizational system.

It is believed that this kind of technology enables people to achieve new goals and explore new possibilities but some audiences or corporate cultures may not adapt very well to this approach because of the challenges mentioned earlier.

CONCLUSION

It has always been evident that implementing a technology based solution anywhere in the world, raises some challenges and issues that need to be addressed for the project to be successful. Many of the discussed challenges and issues may be applicable to other parts of the world as well but mainly they were specific to the scenario of Organization. E.learning is still learning. We believe that the learners and instructors in organization today have accepted it as one of the practical delivery modes. However, in order to realize the full potentials of e.learning, the organization needs to play a more active role in promoting and supporting e.learning initiatives.

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A Future Outlook on Financial Inclusion through Islamic Finance: Gaps and Challenges Ahead

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Abstract

The goal of financial inclusion appears to be within reach. But achieving it depends on scaling up innovation from across the private, public, and social sectors. More than half the world's adults do not use formal or semiformal financial services. In recent years, the Islamic finance industry has attracted the attention of policy makers and international donors as a possible channel through which to expand financial inclusion, particularly among Muslim adults. Yet cross country, demand-side data on actual usage and preference gaps in financial services between Muslims and non-Muslims have been scarce. The heightened interest reflects a better understanding of the importance of financial inclusion for economic and social development. It indicates a growing recognition that access to financial services has a critical role in reducing extreme poverty, boosting shared prosperity, and supporting inclusive and sustainable development. The paper investigates that which type of financial sector structure works better for Shari'ah compliant countries and reaching out to a broad set of individuals and firms. Therefore, policy makers in various countries who are serious about enhancing access to finance or "financial inclusion" should exploit the potential of Islamic instruments to achieve this goal and focus on improving the regulatory and financial infrastructure to promote an enabling environment. This research paper is an attempt to enhance better financial inclusion with the help of Islamic finance. The purpose of this research paper is to present the issues, challenges and possible solution related to Islamic Financial Inclusion in Middle East Countries.

Keywords: *Financial Inclusion, Islamic Finance, Financial Development, Financial Services.*

INTRODUCTION

In the past decade, the goal of financial inclusion, ensuring that every individual has access to quality, affordable financial services has become an increasing priority and possibility worldwide. And as we enter the second decade of the century, the necessary conditions for meeting this goal are coming together. Financial inclusion aims at benefiting the world's poor, the vast majority of whom do not use formal financial services of the sort provided by banks, insurers, or microfinance institutions (MFIs). As a result, they are unable to avail themselves of the fundamental tools of economic self-determination, including

savings, credit, insurance, payments, money transfer, and financial education. More than half the world's working-age population does not have quality, affordable financial services. That's about 2.5 billion adults 2.2 billion of whom live in Africa, Asia, Latin America, and the Middle East (Chaia and Others 2009). In the past 30 years, microfinance institutions (MFIs) have led the way, proving that the working poor can be served sustainably. But to achieve full financial inclusion, institutions in the private, public, and social sectors must develop innovative models that enable them to sustainably deliver affordable, high-quality services to the working poor at scale. This remains

challenging. Lower-income individuals are difficult to serve in an economically sustainable way, available products often fail to meet their needs, the risks associated with serving them can be difficult to manage, and existing regulations often impede progress. Critics have rightly asked for evidence that financial services benefit this population, and voices from all corners have reminded the world that consumer protections are critical. McKinsey's (2010) research finds that more than 60 percent of adults living in Asia, Africa, Latin America, and the Middle East do not use formal banks or semiformal microfinance institutions to save or borrow money. That's nearly 2.2 billion un-served adults.

FINANCIAL SECTOR STRUCTURE, COMPETITION, AND INCLUSION

Which type of financial sector structure works best in reaching out to a broad set of individuals and firms? In terms of financial inclusion and economic development, how do financial systems based on banks compare with those based on financial markets? Studies consistently find that what matters for economic growth are the overall development of the financial system, rather than the relative shares of banks and financial markets. In other words, at similar levels of financial development, more highly bank or market-oriented economies are not associated with greater economic growth rates, industry growth, or the access of firms to external finance (Beck and Levine 2004; Demirgüç-Kunt and Maksimovic 2002; Levine 2002). While the structure of the financial system does not seem to be associated with growth outcomes, Demirgüç-Kunt and Maksimovic (2002) find that this does affect the types of firms and projects that are financed, which has strong implications for financial inclusion. By looking at firm-level data for 40 countries, they conclude that, in economies

with more well developed capital markets; the use by firms of long-term financing is greater. In contrast, firms rely on short-term financing to a much larger extent in countries with more financial structures that are bank-based. Consistent with these results, Demirgüç-Kunt, Feyen, and Levine (2011) find that financial structure evolve with economic development because capital markets provide financial services that are different than the services provided by banks. Particularly, the significance of market-based financing increases relative to bank-based financing. They show that, as economies develop, the services provided by securities markets become more important for economic activity, while those provided by banks become less important. Another part of this literature has moved from the market- vs. bank-financing analysis to explore a different angle of financial diversity, more focused on the types of financial institutions (such as niche banks, cooperatives, and MFIs) and their link with access to finance and with economic growth.

In developing economies, the financing needs of a large fraction of households and enterprises are supplied by alternative financial institutions such as cooperatives, credit unions, MFIs, and factoring or leasing companies. While banks are the most prominent institution across regions, their relative importance varies substantially. For instance, for each MFI, there are 46 bank branches in Europe and Central Asia, 32 in Latin America, and only 2 in Sub-Saharan Africa.

Countries also differ in the mix of financial institutions constituting the market because certain types of institutions are more prevalent in particular regions (figure 1.15). In the Middle East and North Africa, for every 1,000 commercial bank branches, there are 35 cooperatives, 209 state specialized financial institutions, and 44

MFI branches. However, in Sub-Saharan African countries, there are 480 MFIs for every 1,000 commercial banks, and only 61 cooperative and 37 public bank branches. Countries in Latin America and East Asia and the Pacific are more reliant on cooperatives than are developing countries in other regions. The ratio of cooperatives to bank branches is the highest in upper-income countries, where there are 269 cooperatives per 1,000 commercial bank branches. This pattern is particularly strong in Western European economies, where financial systems rely more on these institutions. Some argue that a comparative advantage of institutions such as cooperative banks may be that they rely on more flexible lending technologies, making it possible to extract information about more opaque clients, such as micro, small, and medium enterprises or households that do not have available the type of information or documentation that banks traditionally request (Berger, Klapper, and Udell 2001; Stein 2002). Others argue that banks can extend financing to more opaque clients by applying different transactional technologies that facilitate arm's-length lending and that, through more competition, improved financial infrastructure, and appropriate incentives, banks can be encouraged to reach out for new clients (Berger and Udell 2006; de la Torre, Gozzi, and Schmukler 2007).

Insert Figure 1.15

A study by Beck, Demirgüç-Kunt, and Singer (2013) explores the role of different kinds of financial institutions, as well as their average size, in easing the access of firms to financial services and finds heterogeneous impacts across countries and firm sizes. More specifically, in low-income countries, a higher share of low-end financial institutions (such as cooperatives, credit unions, and MFIs) and specialized lenders (such as factoring and

leasing companies) is associated with better access to finance. The evidence the authors present indicates that the average size of financial institutions matters for inclusion. In contrast to earlier studies suggesting that smaller financial institutions are better able to serve the credit needs of small, opaque borrowers (for example, Berger and Udell 1995; Keeton 1995), the authors reject that smaller institutions are better at easing the access of firms to finance. On the contrary, in countries with low levels of GDP per capita, larger banks and low-end institutions seem to improve access to financial services, and larger banks and specialized lenders seem to facilitate access to loans and overdraft use by smaller enterprises.

These results are in line with the findings of more recent studies. For instance, Berger, Klapper, and Udell (2001) find that larger banks may be as well equipped as smaller ones to serve small clients because they use a different lending technology. De la Torre, Gozzi, and Schmukler (2007) likewise find that, contrary to the belief that large banks are less capable of reaching out to opaque small and medium enterprises, most banks find such enterprises profitable for several reasons. One such reason is the increased use of different transactional technologies that benefit from the economies of scale of larger institutions (for example, the use of credit scoring models requires a large pool of clients, thereby benefiting from larger bank size).

Relationship lending is one of several other ways in which banks extend financing to more opaque clients (Berger and Udell 2006). Two examples of large banks that have adopted innovative lending technologies and business models are Banco Azteca in Mexico and BancoSol in Bolivia. BancoSol is arguably the first commercial bank to specialize in

microfinance. Its lending technology relies on a solidarity group lending strategy, whereby members organize small joint liability credit groups, and the bank lends simultaneously to all group members (Gonzalez-Vega and others 1997). Banco Azteca, on the other hand, targets clients employed in the informal sector by using their durable goods as collateral for loans. Ruiz (2013) shows that, in municipalities in which this bank has opened a branch, households with members working in the informal sector are more likely to borrow from banks, are less likely to rely on more expensive credit suppliers, and are thus better able to smooth their consumption and accumulate more valuable durable goods.

Beyond financial structure, evidence points to competition in the financial sector as a key factor in enhancing financial inclusion. Examining firm-level data for 53 countries from 2002 to 2010, Love and Martínez Pería (2012) find that bank competition substantially increases the access of firms to finance. An advantage of their study relative to others is that their data allow them to isolate within-country variations in competition and access to finance more effectively. In a more micro level analysis, Lewis, Morais, and Ruiz (2013) examine competition among Mexican banks. Their results show that large banks are more likely to engage in less competitive practices and confirm that, as expected, competition leads to less collusive practices. Importantly, less competition disproportionately affects access to finance among smaller firms.

ISLAMIC FINANCE AND INCLUSION

Shari'ah-compliant financial inclusion represents the convergence of two rapidly growing sectors: microfinance and Islamic finance. With an estimated 650 million Muslims living on less than \$2 a day

(Obaidullah and Tariqullay 2008), finding sustainable Islamic models could be the key to providing financial access to millions of Muslim poor who strive to avoid financial products that do not comply with Shari'ah (Islamic law). Consequently, Shari'ah-compliant financial inclusion has recently galvanized considerable interest among regulators, financial service providers, and other financial inclusion stakeholders. However, despite a four-fold increase in recent years in the number of poor clients using Shari'ah-compliant products (estimated at 1.28 million) and a doubling in the number of providers, the nascent sector continues to struggle to find sustainable business models with a broad array of products that can meet the diverse financial needs of religiously observant poor Muslims.

The supply of Islamic financing products for the poor is largely limited to Murabaha and Qard-Hassan loans. **Murabaha** is a "cost plus mark-up" sale contract often used to finance goods needed as working capital. Typically, the client requests a specific commodity for purchase, which the financier procures directly from the market and subsequently resells to the client, after adding a fixed "mark-up" for the service provided. Ownership of the commodity (and the risk inherent thereto) strictly lies with the financier until the client has fully paid the financier. The mark-up is distinct from interest because it remains fixed at the initial amount, even if the client repays past the due date. Murabaha is the Islamic microfinance product with the largest outreach (672,000 customers and total portfolio of assets of approximately US\$413 million). Nevertheless, Murabaha is often viewed as the Islamic product most closely resembling a conventional loan, with the mark-up often considered camouflaged interest. Anecdotal evidence suggests that Murabaha's Islamic

“authenticity” is sometimes questioned by clients and local religious leaders. In addition, because Murabaha is tied to a particular asset, it does not offer clients much flexibility, particularly when compared to the fungible loan disbursements of conventional microfinance. In addition, managing the transfer of the assets results in operational costs that are often higher than disbursement of cash in conventional microfinance, costs that are likely passed on to the consumer. (El- Zoghbi and Tarazi 2013)

According to Shari’ah, the **Qard-Hassan** (or Benevolent) loan is the only type of permissible “loan”. A Qard-Hassan loan is relatively easy to administer, and perhaps more importantly, it is the Islamic financial product that can most easily be applied to consumption smoothing as opposed to enterprise financing or asset building. Consequently, these loans reach the second highest number of clients after Murabaha—an estimated 191,000 clients, including 80,000 in Lebanon and 56,000 in Bangladesh. The total loan portfolio is US\$156 million. However, in practice, Qard-Hassan loans are often not priced to cover their administrative costs (though such charges are permissible), and they are also typically forgiven in the event of default (even though the taking of collateral is permitted). Consequently, Qard-Hassan loans are often dispersed as a form of charity rather than as a self-sustaining business, funded by donations such as Zakah (the giving of alms constituting one of the five pillars of Islam) or sadaqa (voluntary charity). (El- Zoghbi and Tarazi 2013)

Salam is a very distant third among the most common Islamic financing products in terms of number of clients but is quite low in terms of outstanding portfolio. Salam is an advance payment against future delivery. It is often used in

agricultural contexts, allowing farmers to finance production in exchange for a future delivery of the crop. For the transaction to be considered Islamic, the amount and quality of the future goods and the actual delivery date must be explicitly stipulated.

The sector’s heavy reliance on only two Islamic finance products (Murabaha and Qard-Hassan loans—each with their limitations) indicates that providers face challenges to developing a broader range of products. This is most likely due to the difficulty in creating sustainable business models, particularly for products with high operating costs, such as the profit-and-loss sharing products. (El- Zoghbi and Tarazi 2013)

In March of 2013, the International Finance Corporation announced its first partnership with an Islamic finance institution in Sub-Saharan Africa, a \$5 million equity investment with Gulf African Bank in Kenya with the explicit goal of expanding Shari’ah-compliant banking products and services to small and medium businesses. Much of this work is based on the premise that Muslims prefer financial services and products that are consistent with their religious beliefs, chief among them the prohibition on interest, or *riba*, stipulated in the Quran. Yet little empirical research has been done to measure the degree to which Muslims are currently not accessing conventional financial systems, or how much they demand and use Shari’ah-compliant financial products, particularly within the realm of household finance. Even less is known about how these usage gaps and preferences vary between various financial products and across regions and countries.

Shari’ah compliant financial products and instruments can play a significant role in enhancing financial inclusion among Muslim populations. About 700 million of the world’s poor live in a predominantly

Muslim-populated countries. In recent years, there has been growing interest in Islamic finance as a tool to increase financial inclusion among Muslim populations (Mohieldin and Others 2011). The main issue relates to the fact that many Muslims-headed households and micro, small, and medium enterprises may voluntarily exclude themselves from formal financial markets because of Shari'ah requirements. Islamic legal systems, among other characteristics, prohibit predefined interest bearing loans. They also require financial providers to share in the risks of the business activities for which they provide financial services (profit and loss sharing). Given these requirements, most conventional financial services are not relevant for religiously minded Muslim individuals and firms in need of financing. Based on a 2010 Gallup poll, about 90 percent of the adults residing in the Organization of Islamic Cooperation (OIC) member countries consider religion an important part of their daily lives (Crabtree 2010). This may help explain why only about 25 percent of adults in OIC member countries have an account in formal financial institutions, which is below the global average of about 50 percent. Also, while 18 percent of non-Muslim adults in the world have formal saving accounts, only 9 percent of Muslim adults have these accounts (Demirgüç Kunt, Klapper, and Randall, 2013). Moreover, 4 percent of respondents without a formal account in non-OIC countries cite religious reasons for not having an account, compared with 7 percent in OIC countries (table B1.4.1) and 12 percent in the Middle East and North Africa.

Insert table B1.4.1

Muslim countries are far from uniform in terms of financial inclusion. For example, 34 percent of the unbanked Afghan population cite religious reasons for not having an account in a formal financial

institution, while only 0.1 percent of Malaysians do so, although both countries have similarly high Gallup religiosity indexes (97 percent and 96 percent, respectively; see the Statistical Appendix). This can be traced to the extent to which Islamic financial institutions are present in a given country. An analysis suggests that the size of Islamic assets per adult population is negatively correlated with the share of adults citing religious reasons for not having an account (table B1.4.2). This correlation is particularly strong if one focuses on the group of OIC countries and, even more, on those OIC countries that show a religiosity index exceeding 85 percent. Based on the Global Findex, for religious reasons, some 51 million adults in the OIC countries do not have accounts in a formal financial institution. Given that a majority of the OIC population lives in poverty, Islamic microfinance could be particularly attractive. For example, 49 percent and 54 percent of adults in Algeria and Morocco, respectively, prefer to use Islamic loans even if these loans are more expensive than conventional loans (Demirgüç-Kunt, Klapper, and Randall, 2013).

Insert table B1.4.2

Global surveys on Islamic microfinance completed by the Consultative Group to Assist the Poor (CGAP) in 2007 and 2012 provide some initial insights into the rapidly growing Islamic microfinance industry. The 2007 CGAP survey found fewer than 130 and 500,000 Islamic MFIs and customers, respectively (Karim, Tarazi, and Reille 2008). Within five years, these figures more than doubled, reaching 256 MFIs and 1.3 million active clients (EI- Zoghbi and Tarazi 2013). These figures are on the conservative side because they are based on data for 16 of the 57 OIC member countries (excluding economies such as the Islamic Republic of Iran, Malaysia, and

Turkey, which have active Islamic finance industries). In short, the estimated unmet demand for Shari'ah compliant financial products, in conjunction with the rapid growth of Islamic MFIs, as well as the astonishing growth of the overall Islamic finance industry, all point to the growing attractiveness of Shari'ah compliant financial products and the supply shortage of such products. Religiosity also has an impact on the access of firms to finance in OIC countries. The number of Islamic banks per 100,000 adults is negatively correlated with the proportion of firms identifying access to finance as a major constraint. The negative correlation is greater if one focuses on OIC countries and greater still if one focuses on a subset of OIC countries with a religiosity index above 85 percent (table B1.4.3). These findings, which are mainly driven by small firms (figure B1.4.1), suggest that increasing the number of Shari'ah compliant financial institutions can make a positive difference in the operations of small firms (0–20 employees) in Muslim populated countries by reducing the access barriers to formal financial services.

Insert table B1.4.3

Insert figure B1.4.1

Efforts to increase financial inclusion in jurisdictions with Muslim populations thus require sustainable mechanisms to provide Shari'ah compliant financial services to all residents, especially the Muslim poor, estimated at around 700 million people who are living on less than \$2 per day. One obstacle is the lack of transparency and the absence of a broadly accepted standardized process for assessing the compliance of financial institutions with Shari'ah guidelines, which makes it difficult for many individuals to distinguish between financial institutions that are operating based on Shari'ah specifications and institutions that are not. Another difficulty has been the lack

of information and training on Islamic finance. For example, only about 48 percent of adults in Algeria, Egypt, Morocco, Tunisia, and the Republic of Yemen have heard about Islamic banks (Demirgüç-Kunt, Klapper, and Randall, 2013). Finally, in their infancy and smaller in scale, Islamic financial products tend to be more expensive than their conventional counterparts, reducing their attractiveness.

Consequently, Shari'ah compliant financial inclusion has recently galvanized considerable interest among regulators, financial service providers, and other financial inclusion stakeholders. However, despite a four-fold increase in recent years in the number of poor clients using Shari'ah compliant products (estimated at 1.28 million) and a doubling in the number of providers, the nascent sector continues to struggle to find sustainable business models with a broad array of products that can meet the diverse financial needs of religiously observant poor Muslims.

Insert table C.1

Religiosity (%):

Percentage of adults in a given country who responded affirmatively to the question, Is religion an important part of your daily life? in a 2010 Gallup poll.

Account at a formal financial institution (%; age 15+):

Percentage of adults with an account (self or together with someone else) at a bank, credit union, another financial institution (such as a cooperative or microfinance institution), or the post office (if applicable) including adults who reported having a debit card to total adults. The data are from Global Findex (Demirgüç-Kunt and Klapper 2012).

Adults with no account due to religious reasons (%; age 15+):

Percentage of those adults who point to a religious reason for not having an

account at a formal financial institution. The data are from Global Findex (Demirgüç- Kunt and Klapper 2012).

Adults with no account due to religious reasons (thousands, age 15+):

Number of adults that point to a religious reason for not having an account at a formal financial institution. The data are from Global Findex (Demirgüç- Kunt and Klapper 2012).

Number of IFIs (Islamic financial institutions):

Number of banks in a country that offer Shari'ah-compliant financial services to their clients. The data are compiled by the *Global Financial Development Report* team members.

Islamic assets per adult (US\$):

Size of the Islamic assets in the banking sector of an economy per its adult population. The size of the Islamic assets is taken from BankScope. Adult population is taken from *World Development Indicators*.

Number of Islamic financial institutions per 10 million adults:

Number of banks in a country that offer Shari'ah-compliant financial services to their clients per 10 million adults. The data are compiled by the *Global Financial Development Report* team members.

Number of Islamic financial institutions per 10,000 km square:

Number of banks in a country that offer Shari'ah-compliant financial services to their clients per 10,000 km square. The data are compiled by the *Global Financial Development Report* team members.

KEY MESSAGES TO THE POLICYMAKERS

Promoting the use of financial services by individuals requires that market distortions such as

information asymmetries or the abuse of market power preventing the widespread use of financial products be addressed, ways be found to deliver services at lower costs for suppliers and consumers, and consumers be educated and protected so they use products that meet their needs and avoid costly mistakes. Governments can confront market failures and enhance inclusion by developing an appropriate legal and regulatory framework, supporting the information environment, promoting competition, and facilitating the adoption of business models by providers to enhance financial inclusion.

Technological advances hold promise in the expansion of financial inclusion. Transaction costs become an obstacle for financial inclusion if providers cannot profitably serve low income consumers. Innovations in technology, such as mobile banking, mobile payments, and the biometric identification of individuals, help reduce transaction costs. Which technology is appropriate for financial inclusion depends on the development of the traditional banking sector; market size, structure, and density; and the level of development of supporting infrastructure.

Product designs that deal with market failures, meet consumer needs, and overcome behavioral problems can foster the widespread use of financial services. Certain business models and delivery channels can also enhance inclusion by reducing the cost of using financial services. The regulatory stance of governments can influence the product designs and business models of financial institutions. Hence, governments should strike a delicate balance between financial stability concerns and supporting innovations in product

design and business models that allow for greater financial inclusion.

How best to strengthen financial capability, that is, financial knowledge, skills, attitudes, and behaviors, remains a focus of research and discussion, but some lessons are emerging: the importance of using teachable moments to deliver financial knowledge, the value of social networks (such as between parents and children or between remittance senders and receivers), the relevance of psychological traits such as impulse control, and the possible benefits of new delivery channels such as entertainment education and text messaging.

Evidence points to the role of government in setting standards for disclosure and transparency, regulating aspects of business conduct, and overseeing effective recourse mechanisms to protect consumers. To avoid conflicts of interest, prudential regulation may be separated from the regulation of financial consumer protection. Competition is also a key part of consumer protection because it creates a mechanism that rewards better performers and increases the power that consumers can exert in the marketplace.

Governments can also subsidize access to finance and undertake other direct policies to enhance financial inclusion, but more evidence on the effectiveness of these approaches is needed. Financial exclusion is often a result of high debt levels, especially in rural economies. Debt restructuring may be preferable to unconditional debt relief to minimize the incentives for moral hazard and restore financial inclusion.

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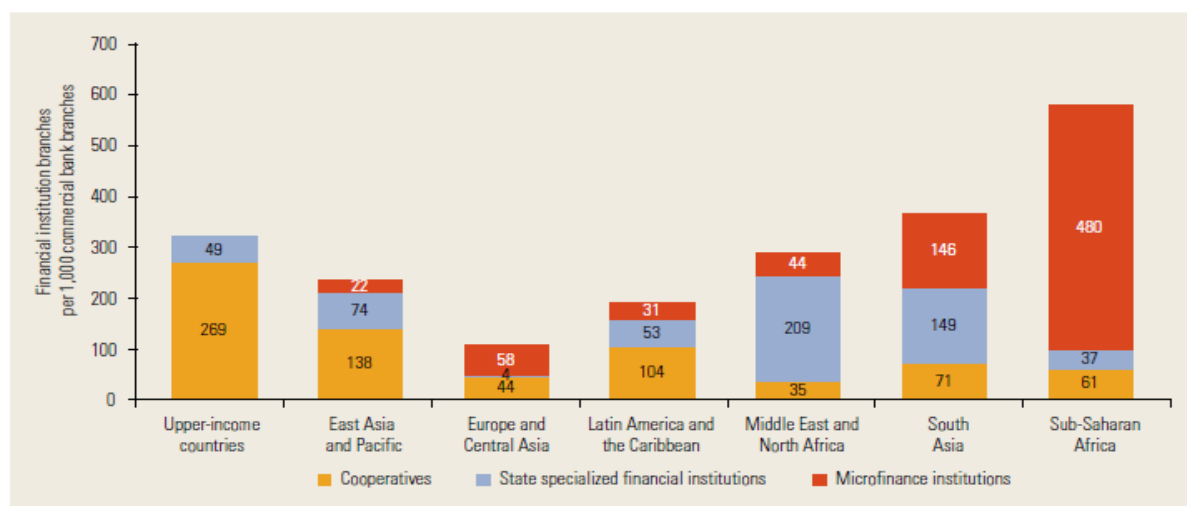
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Figure - 1.15

Ratio of Cooperatives, State Specialized Financial Institutions, and Microfinance Institution Branches to Commerical Bank Branches



Source: Financial Access (database) 2010, Consultative Group to Assist the Poor and World Bank, Washington, DC, <http://www.cgap.org/data/financial-access-2010-database-cgap>.

Table - B1.4.1

OIC Member Countries and the Rest of the World

% of respondents, unless otherwise indicated	All	OIC countries	Non-OIC countries
Have an account at a formal financial institution*	50	25	57
Reason for not having an account			
religious reasons*	5	7	4
distance*	20	23	19
account too expensive*	25	29	23
lack of documentation*	18	22	16
lack of trust	13	13	13
lack of money*	65	75	61
family member already has an account*	23	11	28

Source: Calculations based on the Global Financial Inclusion (Global Findex) Database, World Bank, Washington, DC, <http://www.worldbank.org/globalfindex>.
 * The means t-test between the Organization of Islamic Cooperation (OIC) and non-OIC countries is significant at the 1 percent level.

Table - B1.4.2

Islamic Banking, Religiosity, and Household Access to Financial Services

Indicator	All countries	OIC countries	OIC countries with religiosity > 85%	Non-OIC countries
OIC dummy	5.79***
GDP per capita, US\$, 1,000s	0.02	0.38**	0.43**	-0.005
Islamic assets per adult, US\$, 1,000s	-0.18*	-0.61***	-0.65**	-3.85
Observations	137	41	32	96
R-squared	0.21	0.06	0.08	0.00

Sources: Based on the Global Financial Inclusion (Global Findex) Database, World Bank, Washington, DC, <http://www.worldbank.org/globalfindex>; World Development Indicators (database), World Bank, Washington, DC, <http://data.worldbank.org/data-catalog/world-development-indicators>; Bankscope (database), Bureau van Dijk, Brussels, <http://www.bvdinfo.com/en-gb/products/company-information/international/bankscope>.

Note: Dependent variable: percentage of adults citing religious reasons for not having an account. Regressions include a constant term. Robust standard errors are reported.

.. indicates that the variable could not be included in the regression. OIC = Organization of Islamic Cooperation.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

Table - B1.4.3

Islamic Banking, Religiosity, and Firm Access to Financial Services

Indicator	All countries	OIC countries	OIC countries with religiosity > 85%
OIC dummy	8.59**
GDP per capita, US\$, 1,000s	-1.23***	-6.12***	-5.79***
Islamic banks per 100,000 adults	-52.70*	-61.97*	-108.76**
Observations	107	32	24
R-Squared	0.25	0.35	0.38

Sources: Calculations based on Enterprise Surveys (database), International Finance Corporation and World Bank, Washington, DC, <http://www.enterprisesurveys.org>; World Development Indicators (database), World Bank, Washington, DC, <http://data.worldbank.org/data-catalog/world-development-indicators>; Bankscope (database), Bureau van Dijk, Brussels, <http://www.bvdinfo.com/en-gb/products/company-information/international/bankscope>.

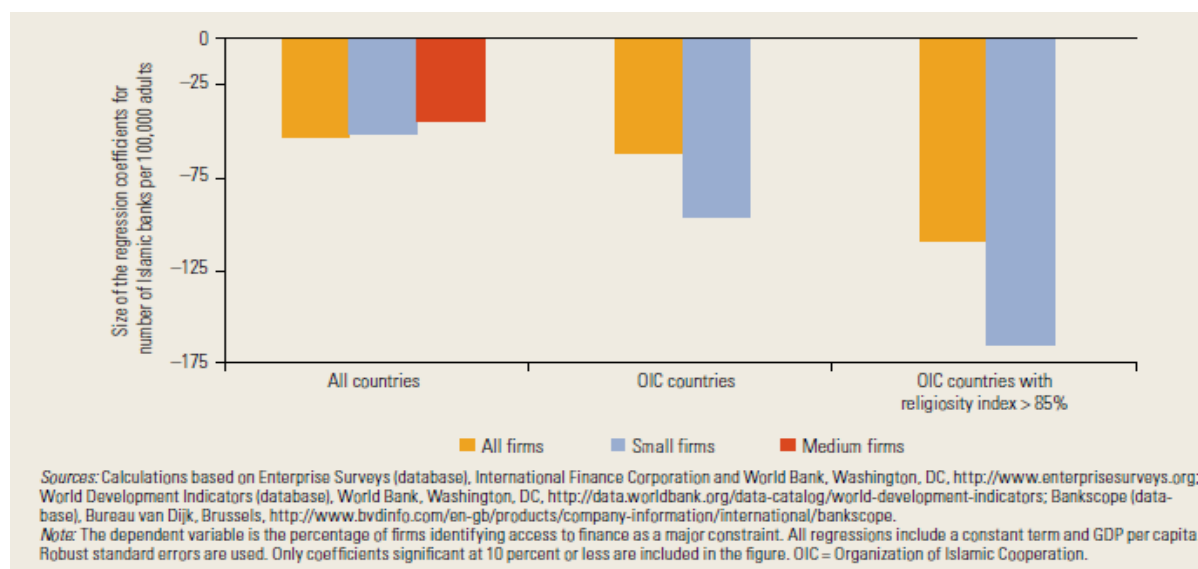
Note: Dependent variable: percentage of firms identifying access to finance as a major constraint. All regressions include a constant term. Robust standard errors are reported.

.. indicates that the variable was not included in the regression. OIC = Organization of Islamic Cooperation.

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

Table - B1.4.1

Islamic Banking, Religiosity, and Access of Firm to Financial Services



ISLAMIC BANKING AND FINANCIAL INCLUSION

Table - C.1

Organization of Islamic Cooperation (OIC) Member Countries, Account Penetration Rates, and Islamic Financial Institutions, 2011

Economy	Religiosity and financial inclusion				Islamic financial institutions (IFIs)			
	Religiosity (%)	Account at a formal financial institution (% age 15+)	Adults with no account due to religious reasons (% age 15+)	Adults with no account due to religious reasons (thousands, age 15+)	Number of IFIs	Islamic assets per adult (US\$)	Number of IFIs per 10 million adults	Number of IFIs per 10,000 km ²
Afghanistan	97	9.0	33.6	5,830	2		1.1	0.03
Albania	39	28.3	8.3	150	1		4.0	0.36
Algeria	95	33.3	7.6	1,330	2		0.8	0.01
Azerbaijan	50	14.9	5.8	355	1		1.4	0.12
Bahrain	94	64.5	0.0	0	32	29,194	301.6	421.05
Bangladesh	99	39.6	4.5	2,840	12	14	1.2	0.92
Benin		10.5	1.7	77	0	0	0.0	0.00
Burkina Faso		13.4	1.2	98	1		1.1	0.04
Cameroon	96	14.8	1.1	114	2		1.7	0.04
Chad	95	9.0	10.0	573	0	0	0.0	0.00
Comoros	97	21.7	5.8	20	0	0	0.0	0.00
Djibouti	98	12.3	22.8	117	0	0	0.0	0.00
Egypt, Arab Rep.	97	9.7	2.9	1,480	11	146	1.9	0.11
Gabon		18.9	1.5	12	0	0	0.0	0.00
Guinea		3.7	5.0	279	0	0	0.0	0.00
Indonesia	99	19.6	1.5	2,110	23	30	1.3	0.13
Iraq	84	10.6	25.6	4,310	14	98	7.4	0.32
Jordan		25.5	11.3	329	6	1,583	15.4	0.68
Kazakhstan	43	42.1	1.7	126	0	0	0.0	0.00
Kuwait	91	86.8	2.6	7	18	28,102	87.2	10.10
Kyrgyz Republic	72	3.8	7.3	272	0	0	0.0	0.00
Lebanon	87	37.0	7.6	155	4		12.4	3.91
Malaysia	96	66.2	0.1	8	34	4,949	16.8	1.03
Mali	95	8.2	2.8	218	0	0	0.0	0.00
Mauritania	98	17.5	17.7	312	1	76	4.7	0.01
Morocco	97	39.1	26.8	3,810	0	0	0.0	0.00
Mozambique		39.9	2.3	189	0	0	0.0	0.00
Niger	99	1.5	23.6	1,910	0	0	0.0	0.00
Nigeria	96	29.7	3.9	2,520	0	0	0.0	0.00
Oman		73.6	14.2	78	3		14.4	0.10
Pakistan	92	10.3	7.2	7,400	29	40	2.5	0.38
Qatar	95	65.9	11.6	64	14	13,851	86.5	12.08
Saudi Arabia	93	46.4	24.1	2,540	18	1,685	9.2	0.08
Senegal	96	5.8	6.0	411	0	0	0.0	0.00
Sierra Leone		15.3	9.9	287	0	0	0.0	0.00
Somalia		31.0	8.9	325	0	0	0.0	0.00
Sudan	93	6.9	4.5	871	29	103	14.0	0.12
Syrian Arab Republic	89	23.3	15.3	1,560	4	18	3.0	0.22
Tajikistan	85	2.5	7.6	329	0	0	0.0	0.00
Togo		10.2	1.2	40	0	0	0.0	0.00
Tunisia	93	32.2	26.8	1,490	3	72	3.7	0.19
Turkey	82	57.6	7.9	1,820	5	538	0.9	0.06
Turkmenistan	80	0.4	9.9	360	0	0	0.0	0.00
Uganda	93	20.5	3.4	485	0	0	0.0	0.00
United Arab Emirates	91	59.7	3.2	84	22	9,298	33.5	2.63
Uzbekistan	51	22.5	5.9	952	0	0	0.0	0.00
West Bank and Gaza	93	19.4	26.7	502	9	0	38.5	14.95
Yemen, Rep.	99	3.7	8.9	1,190	8	179	5.8	0.15

Sources: Calculations based on BankScope, Islamic Development Bank, Gallup Poll, and the Global Financial Inclusion (Global Findex) Database.

Note: This project is in progress; data in this table are preliminary and subject to change. OIC = Organization of Islamic Cooperation. Empty cells indicate lack of data.

Modified fast approach to compute fuzzy values of matrix games with payoffs of triangular fuzzy numbers

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Abstract

Li (A fast approach to compute fuzzy values of matrix games with payoffs of triangular fuzzy numbers. European Journal of Operational Research, 223, 421-429, 2012) proposed an approach to compute the fuzzy optimal solution of such matrix games in which payoffs are represented by non-negative triangular fuzzy numbers. In this paper, a numerical example is solved by this approach and shown that the obtained fuzzy optimal value of one fuzzy decision variable is neither a real number nor a fuzzy number i.e., the obtained fuzzy optimal solution of the chosen problem is invalid. Also, the existing approach is modified to resolve this drawback.

Keywords: game theory; fuzzy sets; group decisions and negotiations; linear programming; uncertainty modeling.

INTRODUCTION

Game theory is a mathematical tool to describe strategic interactions among multiple decision makers who behave rationally. In the classical (or crisp) game theory, usually the payoffs of players are represented by real numbers. However, in some real game problems, there is need to represent the players' payoffs by their subjective judgments (or opinions) about competitive situations (or outcomes) instead of real numbers. Such subjective judgments may be expressed with terms of linguistic variables such as "very large", "larger", "medium" and "small" as well as "smaller". Obviously, these judgments usually involve some fuzziness or uncertainty due to the bounded rationality of players and behaviour complexity. In this case, the fuzzy set [58] may be used to express the judgments of players.

In the last decades, fuzzy game theory developed by Aubin [3] and Butnariu [10] has been extensively studied by many researchers [1, 2, 4-9, 11-57]. In this section, a brief review of the work done by some of the researchers, in the last few

years, to deal with such fuzzy games in which payoffs are represented by fuzzy numbers is presented.

Li and Cheng [28] transformed the fuzzy linear programming problem of fuzzy constrained matrix games, in which payoffs are represented by triangular fuzzy numbers, into a crisp linear programming problem and used the crisp optimal solution of this crisp linear programming problem to obtain the crisp optimal solution and fuzzy optimal value of fuzzy constrained matrix game.

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Bector et al. [5] transformed the

fuzzy linear programming problem of fuzzy matrix games, in which payoffs are represented by triangular fuzzy numbers, into a crisp linear programming problem and used the crisp optimal solution of this crisp linear programming problem to obtain the fuzzy optimal solution of fuzzy matrix game.

Liu and Kao [36] transformed the fuzzy linear programming problem of fuzzy matrix games, in which payoffs are represented by triangular fuzzy numbers, into a pair of two level mathematical programming problems and obtained the lower and upper bound of the fuzzy optimal value of fuzzy matrix game with the help of these mathematical programming problems.

Li [25] transformed the fuzzy linear programming problem of fuzzy matrix games, in which payoffs are represented by triangular fuzzy numbers, into three crisp linear programming problems and used the crisp optimal solution of these crisp linear programming problems to obtain the fuzzy optimal solution of fuzzy matrix game.

Li [26] transformed the fuzzy linear programming problem of fuzzy matrix games, in which payoffs are represented by trapezoidal fuzzy numbers, into two crisp linear programming problems and used the crisp optimal solution of these crisp linear programming problems, obtained by lexicographic method, to obtain the fuzzy optimal solution of fuzzy matrix games.

Li and Hong [29] transformed the fuzzy linear programming problem of fuzzy constrained matrix games, in which payoffs are represented by triangular fuzzy numbers, into three crisp linear programming problems and used the crisp optimal solution of these crisp linear programming problems, to obtain the fuzzy optimal solution and fuzzy optimal value of fuzzy constrained matrix game.

Li and Hong [30] transformed the

fuzzy linear programming problem of fuzzy constrained matrix games, in which payoffs are represented by trapezoidal fuzzy numbers, into four crisp linear programming problems and used the crisp optimal solution of these crisp linear programming problems to obtain the fuzzy optimal solution and fuzzy optimal value of fuzzy constrained matrix game.

In this paper, a numerical example is solved by the existing approach [25] and shown that the obtained fuzzy optimal value of one fuzzy decision variable is neither a real number nor a fuzzy number i.e., the obtained fuzzy optimal solution of the chosen problem is invalid. Also, the existing approach [25] is modified to resolve this drawback.

EXISTING APPROACH

Li [25] proposed the following approach to compute the fuzzy optimal solution of such matrix games in which payoffs are represented by non-negative triangular fuzzy numbers.

Step 1: Formulate the problem as a fuzzy linear programming problem P1.

Problem P1

Maximize(v_A)

Subject to

$$\sum_{i=1}^m a_{ij} y_i \succeq v_A, j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m y_i = \tilde{1};$$

$$y_i \succeq 0, i = 1, 2, \dots, m.$$

Step 2: Assuming

$$a_{ij} = (a_{ij}^L(0), a_{ij}^R(1), a_{ij}^R(0)), v_A = (v_A^L(0), v_A^R(1), v_A^R(0)).$$

$y_i = (y_i^L(0), y_i^R(1), y_i^R(0))$ as well as putting problem $\tilde{1} = (1, 1, 1)$ and $0 = (0, 0, 0)$ P1 can be transformed into problem P2.

Problem P2

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\sum_{i=1}^m (a_{ij}^L(0), a_{ij}^R(1), a_{ij}^R(0)) (y_i^L(0), y_i^R(1), y_i^R(0)) \succeq (v_A^L(0), v_A^R(1), v_A^R(0)), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m (y_i^L(0), y_i^R(1), y_i^R(0)) = (1, 1, 1);$$

$$(y_i^L(0), y_i^R(1), y_i^R(0)) \succeq (0, 0, 0), i = 1, 2, \dots, m.$$

Step 3: Using the arithmetic operation

$$(a^L(0), a^R(1), a^R(0)) (b^L(0), b^R(1), b^R(0)) \\ = (a^L(0), b^L(0), a^R(1), (b^R(1), a^R(0), b^R(0))) ,$$

problem P2 can be transformed into problem P3.

Problem P3

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\sum_{i=1}^m (a_{ij}^L(0), y_i^L(0), a_{ij}^R(1), y_i^R(1), a_{ij}^R(0), y_i^R(0)) \succeq (v_A^L(0), v_A^R(1), v_A^R(0)), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m (y_i^L(0), y_i^R(1), y_i^R(0)) = (1, 1, 1);$$

$$(y_i^L(0), y_i^R(1), y_i^R(0)) \succeq (0, 0, 0), i = 1, 2, \dots, m.$$

Step 4: Using the arithmetic operation

$$\sum_{i=1}^m (a_{ij}^L(0), a_{ij}^R(1), a_{ij}^R(0)) = \left(\sum_{i=1}^m a_{ij}^L(0), \sum_{i=1}^m a_{ij}^R(1), \sum_{i=1}^m a_{ij}^R(0) \right)$$

problem P3 can be transformed into problem P4.

Problem P4

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\left(\sum_{i=1}^m a_{ij}^L(0), y_i^L(0), \sum_{i=1}^m a_{ij}^R(1), y_i^R(1), \sum_{i=1}^m a_{ij}^R(0), y_i^R(0) \right) \succeq (v_A^L(0), v_A^R(1), v_A^R(0)), j = 1, 2, \dots, n;$$

$$\left(\sum_{i=1}^m y_i^L(0), \sum_{i=1}^m y_i^R(1), \sum_{i=1}^m y_i^R(0) \right) = (1, 1, 1);$$

$$(y_i^L(0), y_i^R(1), y_i^R(0)) \succeq (0, 0, 0), i = 1, 2, \dots, m.$$

Step 5: Using the relation

$$(a^L(0), a^R(1), a^R(0)) \succeq (b^L(0), b^R(1), b^R(0)) \\ \Rightarrow a^L(0) \geq b^L(0), a^R(1) \geq (b^R(1), a^R(0) \geq b^R(0),$$

problem P4 can be transformed into problem P5.

Problem P5

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\sum_{i=1}^m a_{ij}^L(0), y_i^L(0) \geq v_A^L(0), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m a_{ij}^R(1), y_i^R(1) \geq v_A^R(1), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m a_{ij}^R(0), y_i^R(0) \geq v_A^R(0), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m y_i^L(0) = 1;$$

$$\sum_{i=1}^m y_i^R(1) = 1;$$

$$\sum_{i=1}^m y_i^R(0) = 1;$$

$$y_i^L(0) \geq 0, y_i^R(1) \geq 0, y_i^R(0) \geq 0, i = 1, 2, \dots, m.$$

Step 6: The problem P5 can be transformed into problems P6, P7 and P8.

Problem P6

$$\text{Maximize } (v_A^L(0))$$

Subject to

$$\sum_{i=1}^m a_{ij}^L(0), y_i^L(0) \geq v_A^L(0), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m y_i^L(1) = 1;$$

$$y_i^L(1) \geq 0, i = 1, 2, \dots, m.$$

Problem P7

$$\text{Maximize } (v_A^R(1))$$

Subject to

$$\sum_{i=1}^m a_{ij}^R(1), y_i^R(1) \geq v_A^R(1), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m y_i^R(1) = 1;$$

$$y_i^R(1) \geq 0, i = 1, 2, \dots, m.$$

Problem P8

$$\text{Maximize } (v_A^R(0))$$

Subject to

$$\sum_{i=1}^m a_{ij}^R(0), y_i^R(0) \geq v_A^R(0), j = 1, 2, \dots, n;$$

$$\sum_{i=1}^m y_i^R(0) = 1;$$

$$y_i^R(0) \geq 0, i = 1, 2, \dots, m.$$

Step 7: Find the optimal solution

$$\{v_A^L(0), y_i^L(0); i = 1, 2, \dots, m\}, \{v_A^R(1), y_i^R(1); i = 1, 2, \dots, m\}$$

$$\{v_A^R(0), y_i^R(0); i = 1, 2, \dots, m\} \text{ of problems P6, P7 and P8 respectively.}$$

Step 8: Using the optimal solution,

obtained in Step 7, the fuzzy optimal

solution of the problem

$$P1 \text{ is } \begin{aligned} &v_A = (v_A^L(0), v_A^R(1), v_A^R(0)), y_i \\ &= (y_i^L(0), y_i^R(1), y_i^R(0)); i = 1, 2, \dots, m \}. \end{aligned}$$

SHORTCOMING OF THE EXISTING APPROACH

The existing approach [25] is proposed to find the fuzzy optimal solution of such matrix games in which payoffs are represented by non-negative triangular fuzzy numbers. However, on solving a problem by the existing approach [25], it may be that the optimal value of some or all fuzzy decision variables is neither a real number nor a fuzzy number.

To validate this claim, in the next section the problem P9 is solved by the existing approach [25] and shown that for the fuzzy optimal value of the fuzzy decision variable

$$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)) = \left(\frac{19}{24}, \frac{15}{19}, \frac{45}{61} \right),$$

obtained in Step 7, the necessary condition of a triangular fuzzy number $y_1^L(0), y_1^R(1), y_1^R(0)$ is not satisfying $y_1 = (y_1^L(0), y_1^R(1), y_1^R(0))$ is not a triangular fuzzy number.

Problem P9

Maximize(v_A)

Subject to

$$(175, 180, 190) y_1 + (80, 90, 100) y_2 \succeq v_A;$$

$$(150, 156, 158) y_1 + (175, 180, 190) y_2 \succeq v_A;$$

$$y_1 + y_2 = \tilde{1};$$

$$y_1 \succeq 0; y_2 \succeq 0.$$

FUZZY OPTIMAL SOLUTION OF CHOSEN PROBLEM

Using the existing approach [25] the fuzzy optimal solution of problem P9 can be obtained as follows:

Step 1: Assuming

$$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)), y_2 = (y_2^L(0), y_2^R(1), y_2^R(0)), \\ v_A = (v_A^L(0), v_A^R(1), v_A^R(0))$$

as well as putting $\tilde{1} = (1, 1, 1)$ and $0 = (0, 0, 0)$ problem P9 can be transformed into problem P10.

Problem P10

Maximize ($v_A^L(0), v_A^R(1), v_A^R(0)$)

Subject to

$$(175, 180, 190) (y_1^L(0), y_1^R(1), y_1^R(0)) +$$

$$(80, 90, 100) (y_2^L(0), y_2^R(1), y_2^R(0))$$

$$\succeq (v_A^L(0), v_A^R(1), v_A^R(0));$$

$$(150, 156, 158) (y_1^L(0), y_1^R(1), y_1^R(0))$$

$$+ (175, 180, 190) (y_2^L(0), y_2^R(1), y_2^R(0))$$

$$\succeq (v_A^L(0), v_A^R(1), v_A^R(0)); (y_1^L(0), y_1^R(1), y_1^R(0)) +$$

$$(y_2^L(0), y_2^R(1), y_2^R(0)) = (1, 1, 1);$$

$$(y_1^L(0), y_1^R(1), y_1^R(0)) \succeq (0, 0, 0);$$

$$(y_2^L(0), y_2^R(1), y_2^R(0)) \succeq (0, 0, 0).$$

Step 2: Using the arithmetic operation

$$(a^L(0), a^R(1), a^R(0))(b^L(0), b^R(1), b^R(0))$$

$$= (a^L(0)b^L(0), a^R(1)b^R(1), a^R(0)b^R(0)).$$

problem P10 can be transformed into problem P11.

Problem P11

Maximize ($v_A^L(0), v_A^R(1), v_A^R(0)$)

Subject to

$$(175 y_1^L(0), 180 y_1^R(1), 190 y_1^R(0)) + (80 y_2^L(0), \\ , 90 y_2^R(1), 100 y_2^R(0)) \succeq (v_A^L(0), v_A^R(1), v_A^R(0));$$

$$(150 y_1^L(0), 156 y_1^R(1), 158 y_1^R(0))$$

$$+ (175 y_2^L(0), 180 y_2^R(1), 190 y_2^R(0))$$

$$\succeq (v_A^L(0), v_A^R(1), v_A^R(0));$$

$$(y_1^L(0), y_1^R(1), y_1^R(0)) + (y_2^L(0), y_2^R(1), y_2^R(0)) = \\ (1, 1, 1);$$

$$(y_1^L(0), y_1^R(1), y_1^R(0)) \succeq (0, 0, 0);$$

$$(y_2^L(0), y_2^R(1), y_2^R(0)) \succeq (0, 0, 0).$$

Step 3: Using the arithmetic operation

$$\begin{aligned} & (a^L(0), a^R(1), a^R(0)) + (b^L(0), b^R(1), b^R(0)) \\ &= (a^L(0) + b^L(0), a^R(1) + (b^R(1), a^R(0) + b^R(0))), \end{aligned}$$

problem P11 can be transformed into problem P12.

Problem P12

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\begin{aligned} & (175 y_1^L(0) + 80 y_2^L(0), 180 y_1^R(1) + 90 y_2^R(1) \\ & , 190 y_1^R(0) + 100 y_2^R(0)) \\ & \succeq (v_A^L(0), v_A^R(1), v_A^R(0)); \\ & (150 y_1^L(0) + 175 y_2^L(0), 156 y_1^R(1) + 180 y_2^R(1) \\ & , 158 y_1^R(0) + 190 y_2^R(0)) \\ & \succeq (v_A^L(0), v_A^R(1), v_A^R(0)); + \\ & (y_1^L(0) + y_2^L(0), y_1^R(1) + y_2^R(1), y_1^R(0) + y_2^R(0)) = \\ & (1, 1, 1); \\ & (y_1^L(0), y_1^R(1), y_1^R(0)) \succeq (0, 0, 0); \\ & (y_2^L(0), y_2^R(1), y_2^R(0)) \succeq (0, 0, 0). \end{aligned}$$

Step 4: Using the relation

$$\begin{aligned} & (a^L(0), a^R(1), a^R(0)) \succeq (b^L(0), b^R(1), b^R(0)) \\ & \Rightarrow a^L(0) \geq b^L(0), a^R(1) \geq (b^R(1), a^R(0) \geq b^R(0), \end{aligned}$$

problem P12 can be transformed into P13.

Problem P13

$$\text{Maximize } (v_A^L(0), v_A^R(1), v_A^R(0))$$

Subject to

$$\begin{aligned} & 175 y_1^L(0) + 80 y_2^L(0) \geq v_A^L(0); \\ & 180 y_1^R(1) + 90 y_2^R(1) \geq v_A^R(1); \\ & 190 y_1^R(0) + 100 y_2^R(0) \geq v_A^R(0); \\ & 150 y_1^L(0) + 175 y_2^L(0) \geq v_A^L(0); \\ & 156 y_1^R(1) + 180 y_2^R(1) \geq v_A^R(1); \\ & 158 y_1^R(0) + 190 y_2^R(0) \geq v_A^R(0); \\ & y_1^L(0) + y_2^L(0) = 1; \end{aligned}$$

$$y_1^R(1) + y_2^R(1) = 1;$$

$$y_1^R(0) + y_2^R(0) = 1;$$

$$y_1^L(0) \geq 0; y_1^R(1) \geq 0; y_1^R(0) \geq 0; y_2^L(0) \geq 0; y_2^R(1) \geq 0; y_2^R(0) \geq 0.$$

Step 5: Problem P13 can be transformed into problems P14, P15 and P16.

Problem P14

$$\text{Maximize } (v_A^L(0))$$

Subject to

$$\begin{aligned} & 175 y_1^L(0) + 80 y_2^L(0) \geq v_A^L(0); \\ & 150 y_1^L(0) + 175 y_2^L(0) \geq v_A^L(0); \\ & y_1^L(0) + y_2^L(0) = 1; \\ & y_1^L(0) \geq 0; y_2^L(0) \geq 0. \end{aligned}$$

Problem P15

$$\text{Maximize } (v_A^R(1))$$

Subject to

$$\begin{aligned} & 180 y_1^R(1) + 90 y_2^R(1) \geq v_A^R(1); \\ & 156 y_1^R(1) + 180 y_2^R(1) \geq v_A^R(1); \\ & y_1^R(1) + y_2^R(1) = 1; \\ & y_1^R(1) \geq 0; y_2^R(1) \geq 0. \end{aligned}$$

Problem P16

$$\text{Maximize } (v_A^R(0))$$

Subject to

$$\begin{aligned} & 190 y_1^R(0) + 100 y_2^R(0) \geq v_A^R(0); \\ & 158 y_1^R(0) + 190 y_2^R(0) \geq v_A^R(0); \\ & y_1^R(0) + y_2^R(0) = 1; \\ & y_1^R(0) \geq 0; y_2^R(0) \geq 0. \end{aligned}$$

Step 6: The optimal solution of problems P14, P15 and P16 are

$$y_1^L(0) = \frac{19}{24}, y_2^L(0) = \frac{5}{24},$$

$$v_A^L(0) = \frac{3725}{24}; y_1^R(1) = \frac{15}{19}, y_2^R(1) = \frac{4}{19},$$

$u^R(1) = \frac{3060}{19}; y_1^R(0) = \frac{45}{61}, y_2^R(0) = \frac{16}{61}, u^R(0) = \frac{10150}{61}$ be obtained as follows:
respectively.

Step 7: Using the optimal solution, obtained in Step 6, the fuzzy optimal solution of problem P9 is

$$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)) = \left(\frac{19}{24}, \frac{15}{19}, \frac{45}{61} \right),$$

$$y_2 = (y_2^L(0), y_2^R(1), y_2^R(0)) = \left(\frac{5}{24}, \frac{4}{19}, \frac{16}{61} \right) \text{ and}$$

$$u_A = (u_A^L(0), u_A^R(1), u_A^R(0)) = \left(\frac{3725}{24}, \frac{3060}{19}, \frac{10150}{61} \right).$$

MODIFIED APPROACH

In a fuzzy number $a = (a^L(0), a^R(1), a^R(0))$ the condition $a^L(0) \leq a^R(1) \leq a^R(0)$ always be satisfied. Since, in Step 7 of the existing approach [25], the problems P6, P7 and P8 are solved independently. So, the optimal value of the variables $y_1^R(1) + y_2^R(1), \dots, y_n^R(1)$ and $u_A^R(1)$ of problem P7 may be less than the optimal value of the variables $y_1^L(0) + y_2^L(0), \dots, y_n^L(0)$ and $u_A^R(0)$ respectively of problem P6 and the optimal value of the variables $y_1^R(0) + y_2^R(0), \dots, y_n^R(0)$ and $u_A^L(0)$ of problem P8 may be less than the optimal value of the variables $y_1^R(1) + y_2^R(1), \dots, y_n^R(1)$ and $u_A^R(1)$ respectively of problem P7.

Hence, the shortcomings of the existing approach [25], pointed out in Section 3, can be resolved by the following modifications in Step 7 of the existing approach

“Solve problem P7 with additional constraints

$$y_1^R(1) \geq y_1^L(0); y_2^R(1) \geq y_2^L(0); \dots; y_n^R(1) \geq y_n^L(0); u_A^R(1) \geq u_A^L(0)$$

and solve problem P8 with additional constraints

$$y_1^R(0) \geq y_1^R(1); y_2^R(0) \geq y_2^R(1); \dots; y_n^R(0) \geq y_n^R(1); u_A^R(0) \geq u_A^R(1).”$$

EXACT FUZZY OPTIMAL SOLUTION OF THE CHOSEN PROBLEM

Using the modified approach the fuzzy optimal solution of problem P9 can

Step 1: Since, the optimal solution of problem P14 is $y_1^L(0) = \frac{19}{24}, y_2^L(0) = \frac{5}{24}$, and

$$u_A^L(0) = \frac{3725}{24}. \text{ So, solving the problem P15}$$

with the additional constraints $y_1^R(1) \geq \frac{19}{24}, y_2^R(1) = \frac{5}{24}, u_A^R(1) = \frac{3725}{24}$, the obtained

optimal solution is $y_1^R(1) = \frac{19}{24}, y_2^R(1) = \frac{5}{24}$ and

$$u_A^R(1) = 161.$$

Step 2: Since, the optimal solution of problem P14 with additional constraints

$$y_1^R(1) = \frac{19}{24}, y_2^R(1) = \frac{5}{24} \text{ and } u_A^R(1) = \frac{3725}{24} \text{ is}$$

$$y_1^R(1) = \frac{19}{24}, y_2^R(1) = \frac{5}{24} \text{ and } u_A^R(1) = 161. \text{ So,}$$

solving the problem P16 with the additional

$$\text{constraints } y_1^R(0) = \frac{19}{24}, y_2^R(0) = \frac{5}{24} \text{ and}$$

$$u_A^R(1) = 161, \text{ the obtained optimal solution}$$

$$\text{is } y_1^R(0) = \frac{19}{24}, y_2^R(0) = \frac{5}{24} \text{ and } u_A^R(1) = \frac{494}{3}.$$

Step 3: Using Step 8 of the existing approach [25] the exact fuzzy optimal solution of the problem P9 is

$$y_1 = \left(\frac{19}{24}, \frac{19}{24}, \frac{19}{24} \right), y_2 = \left(\frac{5}{24}, \frac{5}{24}, \frac{5}{24} \right) \text{ and}$$

$$u_A = \left(\frac{3725}{24}, 161, \frac{494}{3} \right).$$

RESULTS AND DISCUSSION

The fuzzy optimal solution of problem P9, obtained by the existing approach [25] as well as by the modified approach, are shown in Table 1.

Insert table1.

The results, shown in Table 1, can be explained as follows:

On solving problem P9 by using the existing approach [25], the obtained fuzzy optimal salutation is

$$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)) = \left(\frac{19}{24}, \frac{15}{19}, \frac{45}{61} \right),$$

$$y_2 = (y_2^L(0), y_2^R(1), y_2^R(0)) = \left(\frac{5}{24}, \frac{4}{19}, \frac{16}{61} \right)$$

and $v_A = (v_A^L(0), v_A^R(1), v_A^R(0)) = \left(\frac{3725}{24}, \frac{3060}{19}, \frac{10150}{61} \right).$

Since, for the obtained fuzzy optimal value of y_1 , the necessary condition of a triangular fuzzy number $y_2^L(0), y_2^R(1), y_2^R(0)$ is not satisfying i.e., y_1 is neither a real number nor a fuzzy number. So, the fuzzy optimal solution of problem P9, obtained by using the existing approach [25], is invalid.

On solving problem P9 by using the modified approach, the obtained fuzzy optimal solution is

$$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)) = \left(\frac{19}{24}, \frac{19}{24}, \frac{19}{24} \right),$$

$$y_2 = (y_2^L(0), y_2^R(1), y_2^R(0)) = \left(\frac{5}{24}, \frac{5}{24}, \frac{5}{24} \right)$$

and $v_A = (v_A^L(0), v_A^R(1), v_A^R(0)) = \left(\frac{3725}{24}, 161, \frac{494}{3} \right).$

Since, for all the obtained fuzzy optimal values of y_1, y_2 and v_A the necessary condition of a triangular fuzzy number $y_1^L(0), y_1^R(1), y_1^R(0), y_2^L(0), y_2^R(1), y_2^R(0)$ and $v_A^L(0), v_A^R(1), v_A^R(0)$ respectively are satisfying. So, the fuzzy optimal solution of problem P9, obtained by the modified approach, is the exact fuzzy optimal solution of problem P9.

CONCLUSION

On the basis of the present study, it can be concluded that both the existing approach [25] and modified approach can be used only to find the fuzzy optimal solution of such matrix games in which payoffs are represented by non-negative triangular fuzzy numbers. Also, the fuzzy optimal solution, obtained by using the existing approach [25], is not necessarily valid. While, the fuzzy optimal solution of the same type of problems, obtained by the

modified approach, will always be exact fuzzy optimal solution.

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Table - 1
Fuzzy optimal solution of problem P9

	Existing approach [25]	Modified approach
Fuzzy optimal solution of problem P9	Invalid fuzzy optimal solution	$y_1 = (y_1^L(0), y_1^R(1), y_1^R(0)) = \left(\frac{19}{24}, \frac{19}{24}, \frac{19}{24} \right),$ $y_2 = (y_2^L(0), y_2^R(1), y_2^R(0)) = \left(\frac{5}{24}, \frac{5}{24}, \frac{5}{24} \right),$ $v_A = (v_A^L(0), v_A^R(1), v_A^R(0)) = \left(\frac{3725}{24}, 161, \frac{494}{3} \right).$

An Analytical study about Innovative Branding

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INTRODUCTION

An appropriate branding is essential for the permanent existence and progress of company. It is always beneficial for the company if the true understanding about the branding remains with the marketers. Branding is not merely a sign or symbol, it is much more than both of these towards products and services offered to market place.

An idea about the brand which company communicate to the customer with regard to product and services. Controlling of communication may be done through company but the generation of perception is done by customers. The consistency and stability is biggest challenge for the company to maintain brand idea across the different mediums like print and electronic. It is beneficial to stick on a one brand idea which can be refreshed by repetition. This presents better understandability to the customers about the brand which is going to demonstrate an effect at the time of purchase decision.

Customer may have an association due to attribute, situation of use, celebrity for product promotion or symbol. This relationship may create perception for brand, distinguish feature/ s of the branding and value for money to consumers.

Methods for measuring brand association networks fall into two categories. First, consumer mapping techniques obtain the information directly from consumers.

At present all the reputed brands of world hold the status of personalities in their own identity. They have received the approval all communities and life styles. The credit goes to the appealing power of the brands. Brands attract the life in two ways ie 1 Rationally 2 Emotionally. Rationally brand presents logic and sense to customer about the need. Emotional factor touches to the feelings of the brain. The successful branding may go to any one way or to both the way. This ultimately reflects in the perception of the customer. The corporate branding also plays an important role. Instead of looking after to any individual product company is focusing on parental approach or an umbrella approach which reflects the company value system to the consumer.

The popular misconception must be removed that logos are the brand. Logos are not the brand they are only symbols. People take the logos as identification marks. The visual sensation really plays an important role in the branding. It depicts the culture of the brand. That works as a gate point for your brand. Packaging also works as an important medium of branding. In the flood of brands packaging plays as an identification factor for branding. Packaging works as long associative factor with the customer. The Individuals also may work on the branding path. There are people who are the successful in your opinion but may not be on the top of mind of others so the branding is still not fully done like. There are people who are successful in terms of worldly experience will be an ideal brand to be expected to

follow by every body. They will be an ideal symbol for others according to today's standards. The people may belong to politics, films, sport or Industry. They have the public branding. These people may be brand creators in themselves.

All the elements of branding is an important as they present brand assurance to customers. The product or services are formats of assurance given to the customers. This assurance takes place as brand equity. The relationship last long till the time companies follow the assurance. Every company must know and realize that the ultimate decision maker is customer with the discretion what he/ she is having. No influence can be workable at this stage.

Improper understanding about the brand is not a healthy sign. To avoid this the simplicity in message is the best solution. Concentration on quality of branding communication is better than the quantity. One must make it sure that with so many existing communication media, it has become an essential for companies to maintain a focused brand idea. Bad implementation in any such media may affect the total perception towards the brand of company. Along with traditional media, many new avenues of communicating the branding concepts have arisen Which are also becoming effective and economical. Advertising has given proper awareness about all the competing products and the customer is in best position for an application of his or her mind over all the choices given to them by companies. The question arises that how differential branding can be maintained in this era of over communication? Only solution seemed to be possible is to be an innovative over the entire process of branding.

Branding is a type of an investment, if it is implemented properly than it ensures that consumer may keep your brand at top of mind. This can keep the customer

loyalty alive and keeps your defense alive against the competitors. Stella Oh(2010) mention about application of events as an innovative branding tool with the following contents

Projection Screens

Signage

Adam Bass(2010) has researched the following formats of Innovative branding

"Identify a market opportunity that justifies belief and invest in a specific competency.

Develop that competency to a point beyond the initial market opportunity so that as the belief is realized, the business can grow.

Develop a reputation for the brand by consistently delivering the product/service."

Souiden, Kassim and Hong (2006) has evaluated the effect of corporate branding dimensions on consumers' product evaluation. Andriopoulo (2001) has described the role of five key factors that affect organizational creativity are organizational climate, leadership style, organisational culture, resources and skills and the structure and systems of an organization. Burmann, Zeplin and Riley (2009) have expressed the contribution of brand commitment, brand citizenship behaviour and the brand-customer relationship in the internal brand management of the companies. The study conducted by. Beverland, Napoli and Farrelly(2010)present that aims to address this issue by, first, building a typology of the innovation practices consist of positioned brands, exploring the strategic and tactical implications of different brand-related innovation efforts.

RESEARCH OBJECTIVE

To explore the factors through which branding operate. concept of Branding

To Analyze the branding as life factor issue

To suggest the possible segmentations for brand Managers.

RESEARCH METHODOLOGY

Research Design

Research design used in the study was Experimental and Descriptive as the nature of the study is to associate different attributes.. The first objective of the study was to study general factors but question was how to decide general factors? The researchers have to decide the factors which can represent the marketing. The Focus Group Discussion Technique was found suitable. The remaining objectives have been decided to tackle with the survey technique as there have been more conclusive condition.

The group members have been discussed with the series of questions belonging to marketing. In the first half of discussion group members have been discussed with the factors which may be considered as the representation of creativity.

Sample design-

The sample size selected is 200 for this study on random sampling matter.

Insert table 1.

Insert table 2.

Insert table 3.

Insert table 4.

Data Collection methods- Survey method has been applied for descriptive design. Questionnaire tool was used for this purpose. The Focus Group Discussion Technique was applied for Experimental Research design.

Insert table 5.

Insert table 6.

Insert table 7.

Insert table 8.

Insert table 9.

Factor Analysis. Will be applied in factors identification process.

Following statements have been also worked out for segmentation procedure.

Brand loyalty works in Innovative practices.

C1 : Change at regular interval is an essential.

C2 : Continuation of frequency plays at different time

C3 : Quality as selective factor

C4 : Professional requirement also plays an important role.

C5 : Social outlook as an important section

C6 : Creative sensitivity

C7 : Sales promotion schemes should also have innovative heme.

C8 : Local acceptance is an important issue.

C9 : Regional brand image works

C10 : National brand image works

C11 : International brand image works

C12: Recommendation of Dental association works.

1= Strongly Agree, 2= Agree, 3 neither agree nor disagree, 4= Disagree, 5= strongly disagree

Cluster analysis will be worked out for this procedure

Data Analysis

Factor Position

1) F1 – VAR4, VAR5, VAR7

2) F2 – VAR9, VAR10

3) F3 – VAR3, VAR8

4) F4 – VAR2, VAR6**Cluster Position****Cluster1 – VAR1**

VAR8

Cluster2 – VAR2

VAR3

VAR4

VAR5

VAR6

VAR7

VAR9

VAR10

VAR11

VAR12

Factor Analysis

Factor1 – (Visionary Orientation) – Variety, Professional & Promotional Scheme

Factor2 – (Distinguished Approach) – Public Support Attitude, Presentation Style

Factor3 – (Focused Position) – Perception, Independent Outlook

Factor4 – (Management Orientation) – Quality, Local retailers Push

Visionary Orientation will be highly dependent on the variety, Professional & Promotional Scheme. It would also have importance for distinguished approach which will depend on public support and Presentation style. The focused positions also play very important role with the support of language along with independent outlook visionary orientation is also highly demanding factor with the combination of quality and local support.

Factor Analysis Statistics

KMO – 560

Bartlett's Test of sphericity - 43.486

KMO status has been achieved by dropping one variable out of original variables. The individual to KMO variable of the variable was to below accepted level.

Cluster Analysis**Cluster1 – Loyalty Group****Brand loyal, Sales promotion schemes****Cluster2 –**

Change on regular basis

More than one choice will be applied at different time

Quality

Professional requirement

Social outlook.

Creative sensitivity

Local Coverage

Regional basis

International aspect

Recommendation of variety seeking group.

CONCLUSIONS

Media will work in a better manner with visionary orientation.

Distinguished approach is always helpful for newspaper.

It is difficult to survive without focused position.

Management orientation plays an important role.

Brand Loyal Status plays an important role.

Sales promotion is an important factor for sources of any newspaper brand.

Local Acceptance is an important issue for any brand.

Social outlook is also an important role.

SUGGESTIONS

Product perception could be given due weight age

Attitude measurement can be done in proper manner

Product image could be given enough importance,.

Benefits are to be felt in amore emphatic manner.

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Breakup of sample size

Age wise

S.N	Agr grup	No of respondent
1	20-25	74
2	26-30	65
3	31-35	61

Source-Survey Data

Income wise

S.N	Yearly Income Group(in Rs Lakh)	No of respondent
1	1-10	79
2	11-20	29
3	21-30	48
4	31-40	34

Source-Survey Data

Zender wise

S.N	Zender	No of respondent
1	Male	78
2	Female	122

Source-Survey Data

Occupation wise

S.N	Nature of Occupation	No of respondent
1	Service group	76
2	Self employed	85
3	Unemployed	39

Survey data

Data analysis**Branding as an vision of human life**

S.N	Response	Status%
1	Yes	78
2	No	22

Source-Survey Data

Majority consider branding as an vision of human life. Human acceptance is the important factor.

Branding as core feature of major life decision

S.N	Response	Status%
1	Some time only	29
2	Not sure	42
3	Yes surely	29

Source-Survey Data

Branding is not surely considered as core feature of life.

Branding as cultural concept

S.N	Response	Status%
1	Yes	81
2	No	19

Source-Survey Data

In the opinion of majority branding is a cultural concept.

Branding as life style

S.N	Response	Status
1	Yes	46
2	No	27
3	No idea	27

Source-Survey Data

Branding is considered to be as a life style function

The following variables have been emerged in the Focus Group Discussion

VAR1	
VAR2	
VAR3	
VAR4	
VAR5	
VAR6	
VAR7	
VAR8	
Var 9	

Interval Scale,1-7 has been applied in this regard as 1= most unimportant, 7= Most Important

Cost Allocation at WellSoft Enterprises – A Case Study

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INTRODUCTION

You have recently been appointed as an outside consultant at WellSoft Enterprise. WellSoft builds software that is used by wireless operators to optimize their network performance. WellSoft operates in a B2B market and its typical customers are wireless operators. Last month, WellSoft Enterprise reported the best ever revenue in its history, \$ 21 million. In spite of this, it reported a loss of close to \$ 1 million.

WellSoft Enterprise was a \$10 million company selling its software to Tier 3 wireless operators in the United States up until 2009. In 2009, WellSoft won an overseas business deal worth \$12.8 million in revenues over a period of one year. As a part of this deal WellSoft was required to deliver a complete network optimization solution along with services and associated hardware, in addition to its software. Apart from the solution for 2G wireless network which is what WellSoft traditionally sold, this customer also wanted a similar solution for its new 3G network. In one of the recent board meetings the CEO of the company, Mr. Baldwin raised the question -"Why are we not profitable in spite of winning the biggest ever business we have ever had. We are a software company and software companies always have higher margins? We seem to be going the other direction. More so have we not been making this software for over 6 years now?" In response the CFO of the company, Ms. Welty, replied "Mr. Baldwin, our revenues were phenomenal, so were our costs"

In your initial discussions with VP Engineering and VP Research, they

indicated that many algorithms and products had to be modified and developed based on the special requirements of this new customer.

VP - Research mentioned that although they had a prototyped solution for 3G wireless networks before this project, a significant amount of work was needed to test and harden this solution for commercial use purposes.

VP - Engineering mentioned that a significant software development was needed to not just to modify the existing product but also develop the new product for 3G networks.

VP Operations generally complained about the complexity of deploying the software solution. He indicated that too many engineers had to travel back and forth on international trips to the customer location to deploy our solution. This blew the operations cost out of the budgeted proportions.

Although this was the largest project in the company, it was not the only project. WellSoft did have other projects and customers that were all together brining in close to \$9 million in revenue. Apart from new product development for the 3G network a lot of enhancements were made to the existing product as well which were passed on to all the other existing customers as new software releases at no charge. Research and Engineering teams pretty much spent all their time for the last one year in developing new products and modifying existing products to meet the requirements

on the new project. Operations team spent about 60% of its time working on this project. Resource loading per team for the current year is shown in Exhibit # 3.

Research team consisted of one chief scientist and six research engineers. Engineering team consisted of 10 software programmers, six test engineers, and two software design engineers. Operations team consisted of seven IT Engineers, 18 Telecom Engineers, five RF Engineers, and five Systems Engineers. Upon investigation - Ms. Welty mentioned that manager's bonus was calculated based on the headcount he had in his group because he had more mouths to feed.

Product /Solution Development Cycle

Exhibit 1 shows a simplified product development cycle.

As a part of sales cycle the marketing team captures the solution and product requirements from the customer and works closely with a Solution Architect to clearly articulate and design the solution. Research team takes this design and suggests modifications to algorithms design. Based on algorithm design change, the engineering team enhances on the software products and makes changes to it as needed.

Engineering team is responsible for delivering the commercial grade final product that has been thoroughly tested. Operations team then takes this product from the engineering team and delivers it to the customer. Operations team is responsible for software installation, integration and configuration. They are the main interface with the customer after the sales cycle and are responsible for all the support and services aspect as well.

Solution Deployment process

Exhibit 2 details the steps involved in deploying the product.

Operations team is responsible for

deploying the solution with the customer. Solution Architect is part of the operations team and is responsible for working with the sales, marketing and engineering teams in designing a feasible solution for the customer based on their requirements. Once this design is validated by Research and incorporated in the software, the operations team specs out the hardware needed to support all the features. Hardware typically consists of computing equipment on which the software runs. The computing equipment dimensions depend on the customer requirements. With its latest assignment WellSoft was committed to deploy the wireless telecom equipment needed to support the solution. Up until this time telecom equipment installation and integration was mostly taken care of by the customers. Once the hardware procurement is completed the operations team works on site with the customer to integrate this hardware into the wireless operator's network.

Insert table 1

Insert figure 1

Insert figure 2

Insert figure 3

Questions

Evaluate the P&L statement? Is the company really making a loss on the new project?

How are the costs being allocated? What are the benefits/ limitations of this allocation? Suggest alternatives / changes to the cost accounting system?

What can WellSoft do to manage and control its costs? What could WellSoft have done differently? Is it still possible to do that?

As a consultant what will your response be to the CFO Ms. Welty and CEO Mr. Baldwin?

Table below summarizes the P&L statement of the company

WellSoft Enterprises P&L Statement:

	12 months Period ending July 2009	12 months Period ending July 2010
Revenue		
Old Accounts	\$ 10,487,900	\$ 5,208,908
New Accounts	\$ -	\$ 16,278,900
Total Revenue	\$ 10,487,900	\$ 21,487,808

Cost of Sales		
Cost of Servers	\$ 190,989	\$ 409,890
Cost of Telecom Equipment	\$ 219,089	\$ 1,309,080
Total hardware cost	\$ 410,078	\$ 1,718,970
RF Engineers	\$ 178,000	\$ 400,020
Telecom Equipment deployment Engineers	\$ 110,000	\$ 1,389,096
System Engineers	\$ 310,000	\$ 799,980
IT Engineers	\$ 300,000	\$ 649,992
Solution Architect	\$ 160,000	\$ 360,000
Customer Entertainment	\$ 130,000	\$ 509,000
Training Expenses	\$ 102,000	\$ 1,002,000
Travel Expenses	\$ 562,987	\$ 2,420,989
Total Operations Expenses	\$ 1,852,987	\$ 7,531,077
Total Cost of Sales	\$ 2,263,065	\$ 9,250,047

Research Expenses		
Lab Equipment and Patents	\$ 2,102,090	\$ 3,894,000
Research personnel	\$ 801,000	\$ 1,289,968
Others	\$ 402,950	\$ 603,879
Total Research Expenses	\$ 3,306,040	\$ 5,787,847

Development Expenses		
Hardware	\$ 90,000	\$ 1,090,768
Software design engineers	\$ 170,000	\$ 339,984
Software programmers	\$ 700,000	\$ 1,200,000
Test Engineers	\$ 600,000	\$ 599,976
Travel	\$ 289,780	\$ 814,765
Others	\$ 843,000	\$ 1,037,850
Total Development Expenses	\$ 2,692,780	\$ 5,083,343

MG&A	\$ 1,086,589	\$ 2,018,761
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Operating Income	\$ 1,139,426	\$ (652,190)
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Exhibit1

Product / Solution Development Cycle

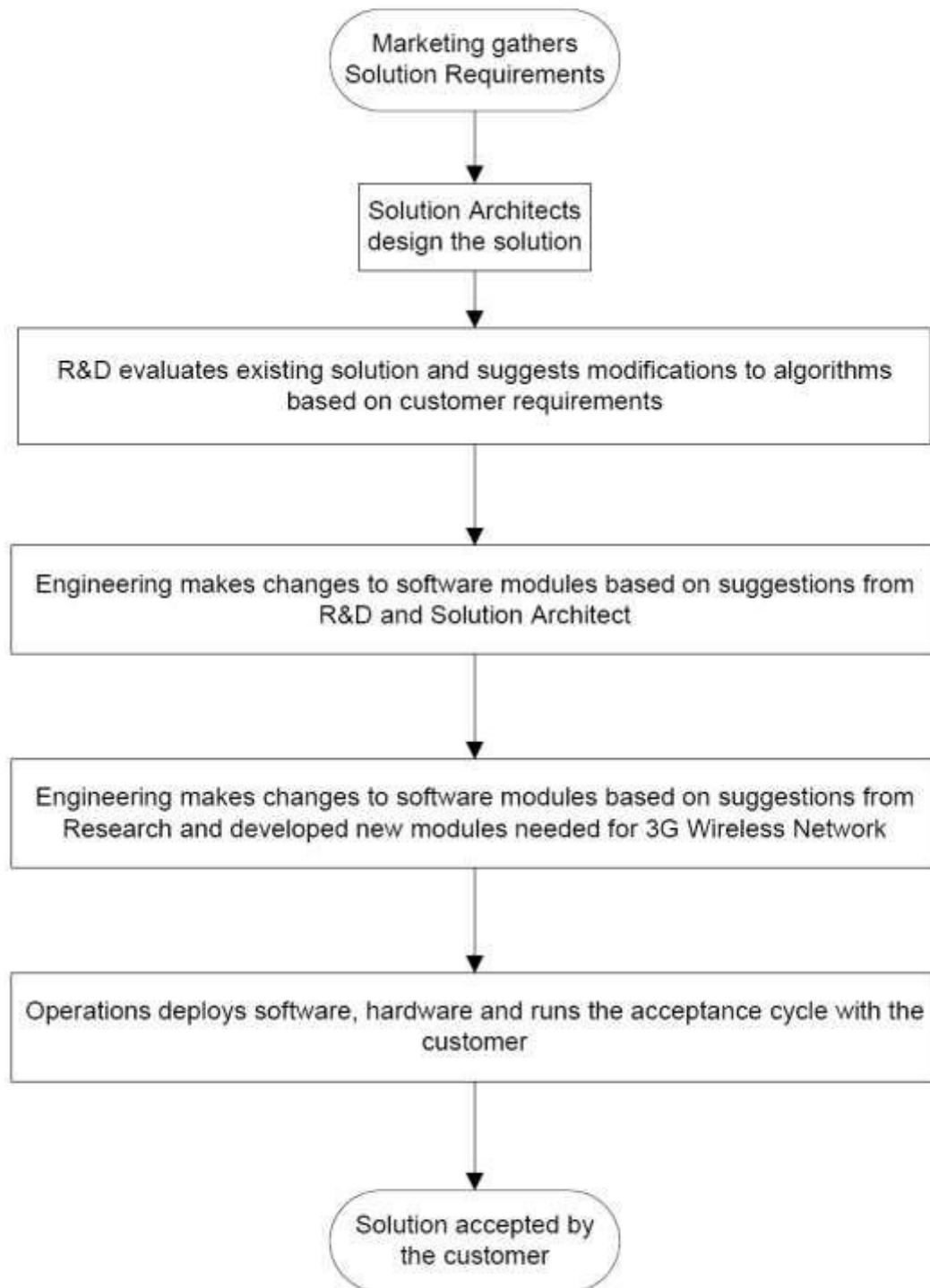


Exhibit 2

Deployment Process

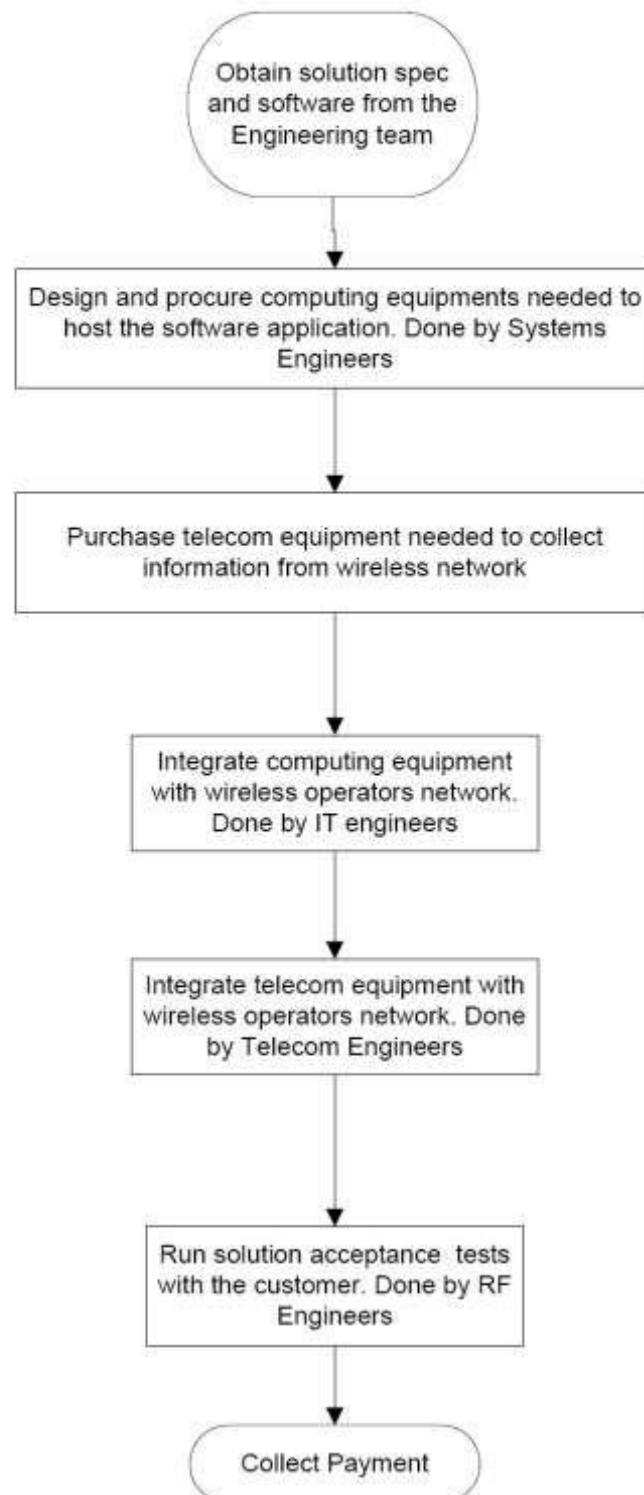


Exhibit 3

Resource loading – units in man months

Total Resources - Actual Resource Loading for Year ending July 2010

Resource Name	Resource Type	Organization	Monthly Labor	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	TOTAL
Month				Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	
Chief Scientist	Salaried	Research	\$20,834	1.00	1.00	1.00	0.75	0.50	0.30	0.30	0.30	0.30	0.30	0.30	0.30	6.35
6 Research Engineers	Salaried	Research	\$14,444	3.00	6.00	6.00	6.00	4.50	3.00	3.00	3.00	1.50	1.50	1.50	1.50	40.50
10 software programmers	Salaried	Engineering	\$10,000	3.00	5.00	8.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	8.00	8.00	102.00
6 test engineers	Salaried	Engineering	\$8,333	0.00	3.00	3.00	3.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	57.00
2 software designers	Salaried	Engineering	\$14,166	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	18.00
7 IT Engineers	Salaried	Operations	\$7,738	0.00	1.40	2.80	4.20	4.20	4.20	5.60	7.00	7.00	7.00	7.00	7.00	57.40
18 Telecom Engineers	Salaried	Operations	\$6,431	0.00	0.00	0.00	2.00	5.00	18.00	18.00	18.00	18.00	5.00	5.00	5.00	94.00
2 Solution Architects	Salaried	Operations	\$15,000	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	20.00
5 RF Engineers	Salaried	Operations	\$6,667	0.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	5.00	5.00	37.00
5 System Engineers	Salaried	Operations	\$13,333	2.00	2.00	0.00	0.00	2.00	3.00	4.00	5.00	5.00	5.00	5.00	5.00	38.00

Effects of Communication of the Polish Post S.A. with the External Environment

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Abstract

The communication process aims to create and strengthen attitudes among buyers, leading to a favorable reception of products / services as well as a change of attitude from neutral to positive – creative. The goal of the study is to find out whether, in fact, the communication methods used by the Polish Post deliver a sufficient amount of information to customers, who are the most important element of the external environment, respectfully. In this work, analysis was performed on the effectiveness of communication activities undertaken by the company in terms of services provided and image achieved. An important issue is the appropriate, effective process of communicating value for customers. The results of the research and analyses can be used by managers of the audited company, as well as by the management of other enterprises providing services of a similar nature.

Keywords: external communication, customers, postal service, information.

INTRODUCTION

Today, companies operating in Poland (and not only) must act in an almost perfect manner, since operating well is no longer sufficient. Any activity that is undertaken demands constant contact with the environment. This contact is not only the collection of information on individual elements of the environment, but also the transfer of information about the company to the environment (Alvesson, 2004). The possession of a vast amount of information about the environment is useless if the environment does not know anything about the company, or the activities that it performs.

The communication process brings tangible value and benefits to consumers. There is a decrease in the distance between the seller and the buyer. In addition, it shortens the decision-making process for the purchase of a specific product, as the consumer knows what he needs. The level of education in society about changes in the products on offer, prices, new trends, etc. also improves.

The study pointed out that the process of communicating customer value and its effectiveness depends primarily on the level of knowledge about consumers, as well as the accuracy of predicting what buyers expect. Understanding customers is crucial for building the competitive advantage of the company. The condition for success is to provide appropriate offers to buyers, and communicate with them in a way that is convenient, affordable and attractive for the buyer (Gabriel, 2008). To do this, one has to learn how present and potential consumers think, feel and behave in the market.

RESEARCH METHODOLOGY

Confrontation of theory and practice - an analysis of the conditions, course and consequences of the process of communicating customer value based on the example of the Polish Postal Service. The Polish Postal Service was selected for study, among other reasons, due to:

The author's many years of professional experience with this company,

The size of the company's network in the country,

The important role of this economic entity in the field of communication - connectivity.

The study was conducted in 2012 on group of recipients of marketing communication: clients - recipients of the services of the Polish Postal Service. The study was conducted on 230 participants, a representative group of clients of the Polish Postal Service. Sample selection was implemented by the judgmental sampling method, including stratification criteria enabling behavior representativeness of the sample in terms of basic statistical characteristics (gender, age, education, place of residence) in the provinces of Podlasie and Warmia-Mazury (in Poland). This resulted in distribution of the sample as shown in Table 1.

The aim of the study is to attempt to analyze the effectiveness of the communication activities directed at customers. Of interest is the effectiveness of the actions taken by the company to promote services and create a positive image of the company. Thus, the purpose of this study is to determine whether The Polish Post S.A., in the opinion of recipients, is actively involved in the process of communicating specific value for the customer. Moreover, the aim of the study is to learn whether customers react to the communication activities initiated by The Polish Post S.A., what rationale they use in the process of product selection, and what benefits they derive from such activities.

This research was carried out by the author. The results of national analyses conducted by the Polish Post S.A. were also used. As a result, it was possible to present the efficiency and effectiveness of the process of communicating specific value for the customers on the example of

a large service company (network), that is the Polish Post S.A.

The Real Effects of Communicating Value To Customers

Despite the possibility of using a varied arsenal of media to transfer information to customers, the main channel for issuing and receiving information about changes in regulations, services provided and prices, are postal workers (Figure 1.). This brings us to the conclusion that the most preferred means of communication with the external environment is personal contact, which allows for feedback and the opportunity to provide additional information to a recipient from the external environment.

Based on research conducted among customers of the Polish Post, an increasingly important channel of communication with the postal services is the Internet. This channel was indicated by 22,6% of all surveyed customers. The third most popular channel of communication is friends – it is a source 17,8% of respondents indicated (Figure 1.).

The data presented in Figure 2. shows that over 80% of customers said they did not know any examples of sponsorship by the Polish Post. A potential cause of this result is the lack of publicity of these activities, and the lack of interest in Public Relations by the Polish Post.

A review of local and business press from 2011 further confirmed customers' views, for there were only a few small tidbits of information about the activities undertaken by the Polish Post in regard to sport and the sick.

No customer indicated the flagship sponsoring activities of The Polish Post, despite the fact that it sponsors activities in various fields ranging from sports, culture, and charity.

Another element of research was to analyze the Polish Post's external

communication (Figure 3.). The aim of this part of the study was to determine how the individual elements of external communication are perceived by customers of the Polish Post. The results of the study show that the elements most associated with the Polish Post are:

Their distinctive cars (mark and color),
Employees' uniforms
Logo.

Again, customers indicated a human factor, employees, as the most common communication tool used by the Polish Post to communicate with the environment (Figure 3.). It was also found that a majority of respondents have positive associations with the Polish Post, and it is an enterprise whose symbolism is recognized by members of the public of all age groups.

The data presented in Figure 4. shows that more than 50% of surveyed customers know what priority mail is, over 32% of respondents have some knowledge about the services of Pocztylion, and 24% of clients are aware of the domestic courier service Pocztex. This result is unsatisfactory, as The Polish Post has been providing courier services for many years. In addition, studies show a very poor awareness of foreign courier service EMS. Awareness of this service was indicated by only 6,5% of all respondents.

The results confirm that customers are not aware of the flagship products and mail services of the Polish Post in a manner consistent with the expectations of management. Research shows that the extent to which customers are informed about the services of the Polish Post are incompatible with the expectations of the company.

All these services are provided in all Post Office branches. Not all, however, are fully associated with the Polish Post. When asked about the services of the Polish Post, only packages and registered mail

were mentioned by a significant number of customers, packages – 27,8% of respondents, registered mail – 17,8% of respondents, (Figure 5.).

Banking, insurance, and most surprisingly magazine subscriptions, which the Polish Post has been providing for years, are not sufficiently communicated to potential customers, as the majority of respondents did not indicate these as services provided at the Post Office. In addition, the study shows that there is very low awareness of newer services, such as a new money lending program. Only 5,2% of all respondents indicated knowledge of this service.

On the basis of the data presented in Figure 6., it can be seen that over 33% of customers surveyed use the services of the Polish Post from 1 to 3 times a month, and 14,3% of customers use the services of the Polish Post every day. It should be noted that 11,6% of customers do not use the services of the Polish Post. This may be due to the fact that they do not have such needs, or that they use the services of competitors.

Polish Post S.A. operates under fairly strong competition in the market. Customers have a range of choices when it comes to service providers on the postal services market. Table 2. shows the frequency of the use of postal services, excluding those of the Polish Post, used to ship goods of any kind. Only a small portion of customers use the services of other operators daily (PAF Postal Operator – 3,5% of total respondents, Polish Postal Group – 4,8% of all respondents; In Post – 3,9% of all respondents). It can be expected that the scope and frequency of the use of other operators' services will increase due to the increasing number of postal operators active in the market.

Table 3. presents the factors customers take into account when deciding to purchase a particular postal product. In

first place, in terms of importance, respondents indicated the quality of the product and/or service. This factor was indicated by 80,4% of surveyed customers. In second place, in terms of importance, was the price of the postal product. This factor was cited by 76,1% of respondents. In third place, in terms of importance, customers indicated the known position of the Polish Post. This factor was noted by 28,7% of all surveyed customers. Respondents indicated their own experience and habits as a subsequent factor of importance.

Table 4. shows the effect of postal market communication (advertising, information available at the post office, the sales activities of post office staff and postmen) on the decision-making process of the consumer. The idea was to determine whether, in the past three months, a customer had bought a postal product under the influence of broadly understood postal market communication. The research shows that 40,0% of consumers surveyed have never bought a product under the influence of the postal communication process. These findings indicate that the postal communication system is very ineffective in many areas.

Table 5. presents the level (scale) of satisfaction with the purchase of a particular postal product. The idea was to determine whether the postal products bought under the influence of broadly understood postal market communication fulfilled the expectations of customers. The results present a mixed response. Research shows that 41,7% of consumers surveyed stated that some postal products fulfilled their expectations, while others disappointed. In contrast, 22,6% of clients stated unequivocally that they were disappointed with the postal products they had bought, because the product did not met their requirements or expectations. The results indicate that the level of satisfaction with the acquisition of selected

postal products (under the influence of the postal communication process) is rather low.

Table 6. shows customer opinion on selected aspects of the postal communication process in the context of reliability and credibility of information. The idea was to determine whether broadly understood postal market communication (traditional communication - advertising, information available at the post office, the sales activities of post office staff and postmen) is a reliable source of information about available postal products. The results of the study show that the postal process of communicating customer value is not a reliable source of information for customers – as declared by 43,9% of all respondents. In addition, a significant proportion of customers (36,5% of all surveyed customers) are not able to take a position (positive or negative) in this regard. Thus, the results of the research in this area indicates that the postal communication system contains too few elements of reliability and credibility of information about available postal products.

Table 7. presents elements of the postal communication system, which have the greatest influence in encouraging customers to purchase a postal product. In first place in terms of importance - in the opinion of customers surveyed - was the provision of basic information about the product, showing its advantages and disadvantages. This factor was noted by 75,2% of all surveyed clients. In second place, in terms of importance, was the communication of a favorable price of the product / price promotion. This element of market communication was pointed out by 71,8% of total respondents. In third place - in the opinion of surveyed recipients – was the element of communication in the form of an exciting event, story, scene. This

aspect of communication was mentioned by 66,5% of all surveyed customers.

The constantly increasing number of operators interested in providing postal services pose new challenges for Polish Post S.A. in communicating specific values in all desired directions and using all tools and channels sufficiently to communicate with the environment in accordance with its expectations. Particularly important is the intensification of communication in the face of ever growing competition.

The dynamic changes on the postal market

Particularly high growth in the annual quantity of entities interested in providing postal services have been recorded since 2001. Table 8. shows the number of registered private postal operators in Poland in the years 1996-2011. In the years 1996-2011, there was more than a 16-fold increase in the number of private operators (from 15 to 247 operators). The largest percentage increases compared to the preceding year were recorded in 2002 (+73%) and 2004 (+55%). Thus, intensifying competition in the market is rather forcing the Polish Post to take action to improve the effectiveness of the process of communicating customer value.

In the current situation, when the postal market is constantly enriched by entities interested in providing postal services, Polish Post S.A. cannot confine itself to the narrow channels of communicating information based mainly on human capital. The competition has, to some extent, an easier route to commercial success. They are not burdened with past decisions and current obligations, and decisions about the future can be made by taking much greater risk.

An important issue for the Polish Post is the development of coherent and uniform administrative procedures. An

effective information system that supports various processes in a company does not only concern ICT, but also information concerning the shipment from sender to recipient, as well as unexpected events, such as a cancellation of a planned flight (Michalski, 2007, p. 585). Acquiring knowledge in advance of a planned shipment of a significant volume, which affects the subsequent work of the those receiving and expediting the shipment, would make planning much easier for the individual cells involved in the delivery process.

The strategy used by the Polish Post, which consists of providing broad access to postal services for its clients, may be insufficient in the face of increasing competition in many segments of the postal service market. As a result, communicating with the environment is a necessity. Likewise, it is necessary to use the full range of communication tools available (Demil, & Lecocq, 2010).

Development of services, constant expansion of the range of products available due to increasing differentiation of preferences; customer expectations causing an increase in the amount of information being transferred within the company and issued to its external environment; these factors determine the need for the use of increasingly complex solutions characterized by the use of specialized technology by the Polish Post.

Having an efficient system of communicating specific value for its customers is one of the core capabilities of modern enterprises (Czarniewski, 2014, pp. 36-43). That is why it is very important to develop skills in interpersonal communication, improve qualifications, provide opportunities for the use of new technology, and improve relationships and the communication process with the

internal and external environment (Moczyłowska, 2006, pp. 109-111).

All systems responsible for communication should provide complete access to all information issued by the sender to its recipients, allowing them to increase their knowledge about the emitted content and values offered. Not fully informing customers and employees may result in the gradual loss of volume of sales of services distributed through the sales network of the Polish Post. This concerns both typical postal services as well as those provided by entities of the capital group of Polish Post S.A.

Considering the fact that the market communication of the researched company relies mainly on human resources, inefficiencies in internal communication cause significant disruption in the transfer of information, knowledge, and value to the external environment of the company. The result is that the external environment is poorly informed, if at all. Thus, the effectiveness of communicating specific value in many areas of the company is rather low.

CONCLUSION

The Polish Post should use all available market communication tools and channels it has access to. Research shows that some of the available means of communication are scarcely used by the company, and others not at all.

The study also showed that the Polish Post S.A., despite having access to a full range of communication tools, only uses a select few. Its internal communication system is mainly based on human capital. In the case of external communication, visual elements within facilities and on transportation vehicles support human capital in communication efforts. Based on the analysis of the obtained results, it was found that the trust and loyalty of customers stems from the

same sources, resulting in the effective communication of the company with its environment. These sources are employees and easily identifiable and clearly associated visual elements used on the premises of the Polish Post and on vehicles, the simplicity of the logo, the behavior of employees and their clothing.

The effectiveness of communication in the company being researched is not as high as it should be. The size of the company and the multitude of services provided requires the use of a full range of communication tools. As is clear from the research, the Polish Post does not use means of communication that are tailored to the needs of the company and to its recipients. It is necessary to use additional means of communication in order to fill the gaps in shaping the image of the company, as well as communicating the services it renders.

Research results show that most information reaches the environment through a human factor. This happens during direct contact between customer and employee, or between an employee with another employee, either a co-worker or a supervisor. The study showed that the human factor is the main tool of communication in this company, on the forefront in both relations with the external environment as well as the internal.

The observed low level of information being passed on to the environment on issues and matters relevant to the relationship between the company and its environment may be the result of the significant reduction in the number of channels used for emitting information and little use of communication tools other than the human factor.

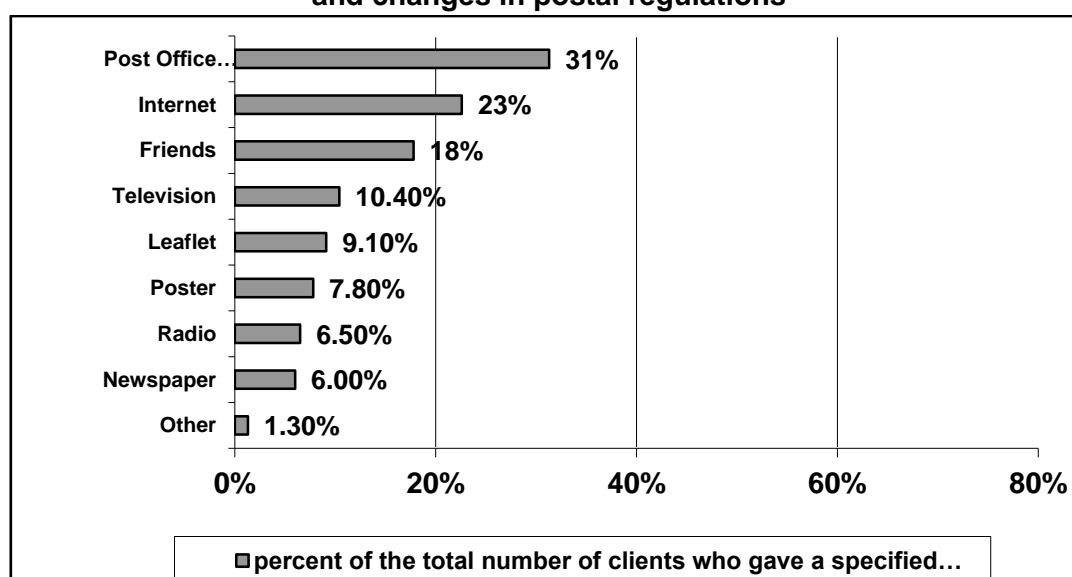
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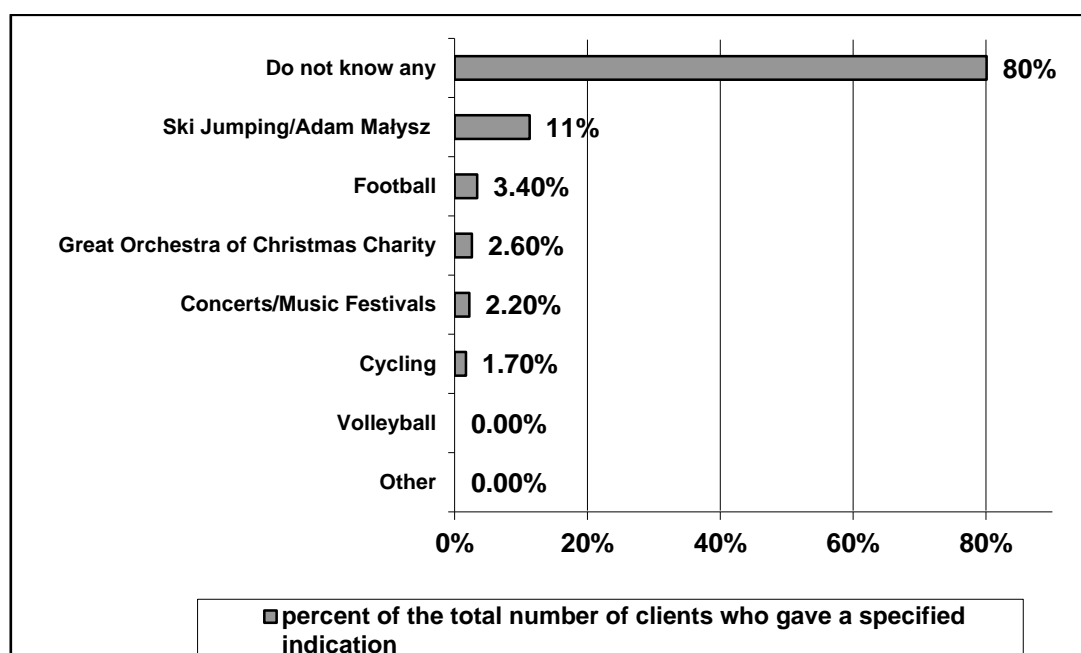
Figure - 1

The basic sources of information on topics related to postal services, postal price list and changes in postal regulations



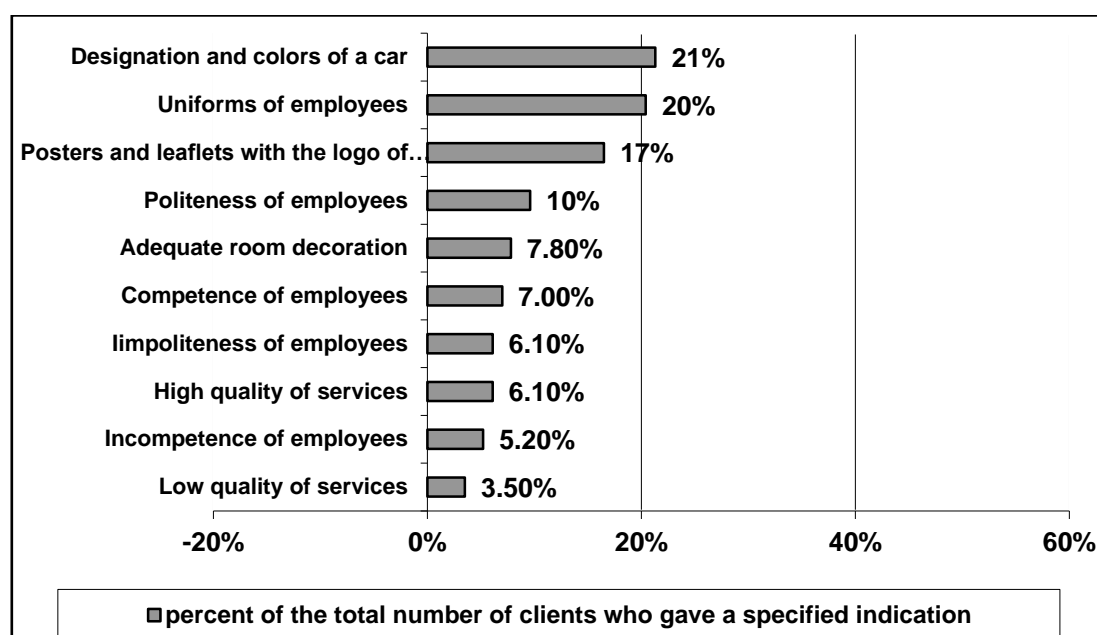
Source: own research based on surveys conducted among clients of the Polish Post in 2012.

Figure - 2
Customer awareness of activities sponsored by the Polish Post



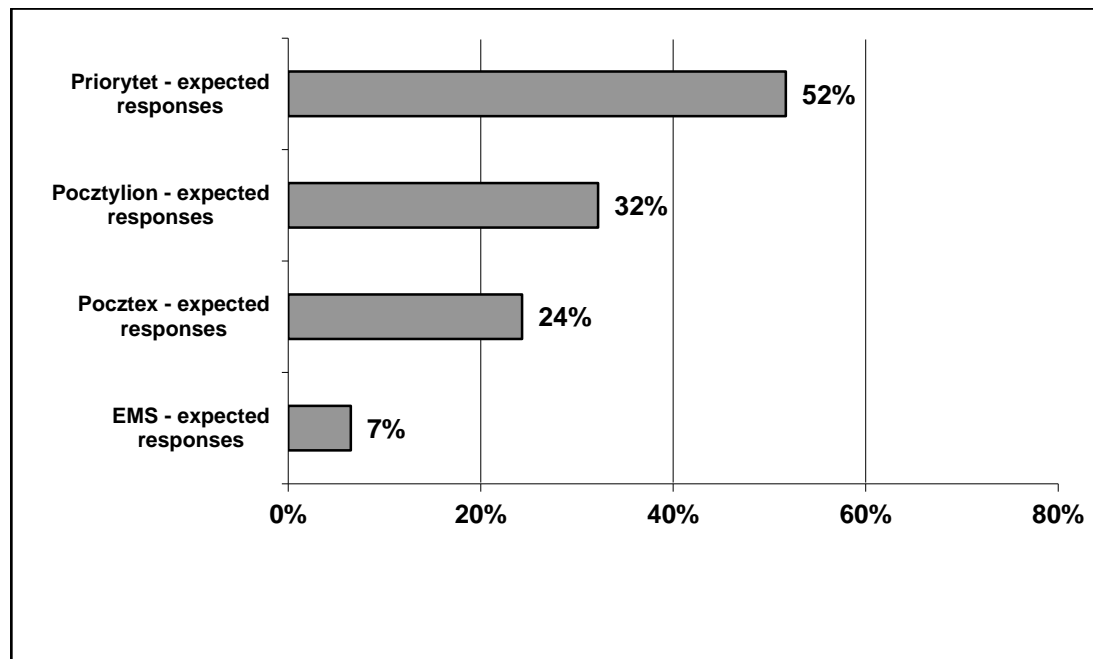
Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Figure - 3
Elements of External Communication of the Polish Post, and their perception by customers



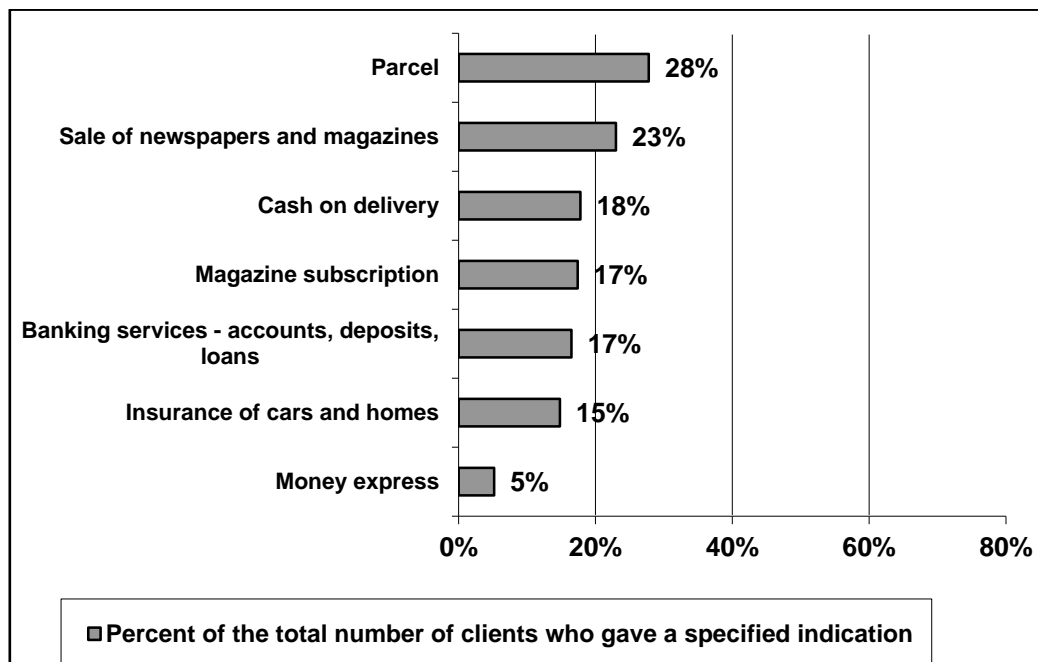
Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Figure - 4
The level of awareness among customers of flagship products of the Polish Post



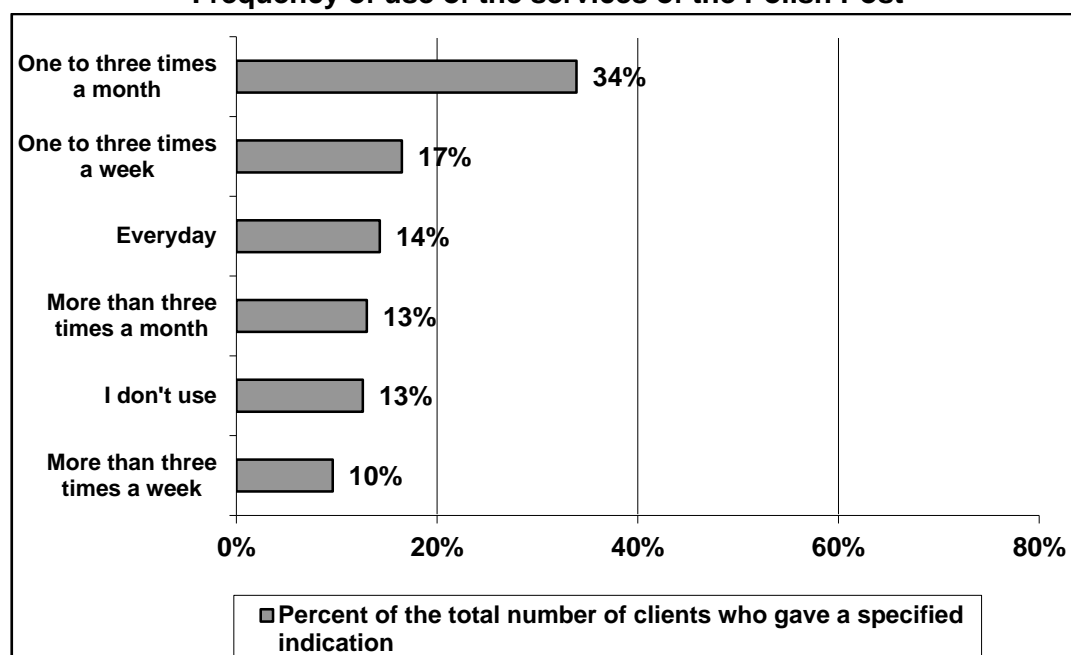
Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Figure - 5
General knowledge among customers of selected services of the Polish Post network



Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Figure - 6
Frequency of use of the services of the Polish Post



Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 1
Distribution of the population of recipients of postal marketing communication

Description		Clients	
		Number of clients surveyed	Percentage of total clients surveyed
Sex	Female	134	58,3
	Male	96	41,7
Age	18-24	39	17,0
	25-34	45	19,6
	35-44	56	24,3
	45-54	38	16,5
	55-64	34	14,8
	65 and over	18	7,8
Education	Primary	21	9,1
	Vocational	63	27,4
	Secondary	94	40,9
	Higher	52	22,6
Place of residence	Village	72	31,3
	Town with up to 50 thousand residents	87	37,8
	City with more than 50 thousand residents	71	30,9
Province	Podlaskie	120	52,2
	Warmińsko-mazurskie	110	47,8
Total		230	100,0

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 2
Frequency of the use of services of other postal operators (not The Polish Post)

Name of operator	Frequency of the use of postal services, shipment of any kind					
	Do not use	Daily	1-3 times a week	Over 3 times a week	1-3 times a month	Over 3 times a month
	Number of clients who gave certain indication / Percent of total number of customers					
PAF Postal Operator	171/74,3	8/3,5	14/6,1	12/5,2	8/3,5	17/7,4
Polish Postal Group	172/74,8	11/4,8	8/3,5	12/5,2	13/5,6	14/6,1
In Post	163/70,9	9/3,9	10/4,3	21/9,1	11/4,8	16/6,9
Other operator	205/89,1	3/1,3	4/1,7	6/2,6	5/2,2	7/3,1

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 3
Factors taken into account when purchasing a particular postal product

Factors clients take into account when deciding to purchase a particular postal product	Rank of the most important factors, in the opinion of customers surveyed	The number of customers who gave a certain indication	Percentage of all customers	Average importance of the factor / on a scale of 1-5, where 1 - very low, 5 - very high / in the opinion of customers surveyed
Quality	1	185	80,4	4,02
Price	2	175	76,1	3,81
Known position of the Polish Post	3	66	28,7	1,44
Own experience and habits	4	61	26,5	1,33
Advice of family and friends	5	54	23,5	1,18
Availability of the product in the Polish Post Network	6	52	22,6	1,13
Advice of a Post Office employee	7	45	19,6	0,98
Advertising inside the Post Office	8	22	9,6	0,48
Other	9	14	6,1	0,31

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 4
A customer's decision to purchase a postal product under the influence of market communication

During the past three months, have you bought a postal product because of the influence of broadly understood postal market communication (advertising, information available at the post office, the sales activities of post office staff or postmen)?	Number of customers who gave a certain indication	Percentage of total number of customers
No, not once	92	40,0
Yes, many times	87	37,8
Yes, once	51	22,2

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 5
The purchase of a postal product under the influence of market communication, and satisfaction

Did the postal products that you bought under the influence of broadly understood postal market communication (advertising, information available at the post office, the sales activities of post office staff or postmen) fulfill your expectations?	Number of customers who gave a certain indication	Percentage of total number of customers
Some fulfilled expectations, others disappointed	96	41,7
Fulfilled expectations	82	35,7
Disappointed	52	22,6

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 6
The postal communication process and the credibility of information

Is broadly understood postal market communication (advertising, information available at the post office, the sales activities of post office staff or postmen) a reliable source of information about the postal products presented?	Number of customers who gave a certain indication	Percentage of total number of customers
No	101	43,9
I don't know, hard to say	84	36,5
Yes	45	19,6

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 7
Elements of postal market communication that influence the decision to make a purchase

The most influential elements of market communication that influence the decision to make a purchase	Rank of the most important factors, in the opinion of customers surveyed	The number of customers who gave a certain indication	Percentage of all customers	Average importance of the factor / on a scale of 1-5, where 1 - very low, 5 - very high / in the opinion of customers surveyed
Providing basic information about the product, showing its strengths	1	173	75,2	3,76
Information on favorable price of the product / price promotion	2	165	71,8	3,59
Communication with interesting event, story, scene	3	153	66,5	3,33
Showing that the usage of the product makes life easier and makes doing business easier	4	116	50,4	2,52
Humorous content	5	97	42,2	2,11
Information about a competition, prize draws	6	85	37,0	1,85
Slogan	7	80	34,8	1,74
Provision of complex product information	8	73	31,7	1,59
Recommendation by the person appearing in the advertisement	9	43	18,7	0,94
Appealing to the historical elements, tradition	10	17	7,4	0,37
Others	11	14	6,1	0,31

Source: Own research based on surveys conducted among clients of the Polish Post in 2012.

Table - 8
The growth rate of the number of private postal operators in Poland in the years 1996-2011

Year	The number of registered operators	The increase in the number of operators in relation to the previous year	
1996	15		
1997	17	+2	13%
1998	18	+1	6%
1999	21	+3	17%
2000	21	0	0%
2001	30	+9	43%
2002	52	+22	73%
2003	58	+6	12%
2004	90	+32	55%
2005	113	+23	26%
2006	157	+44	39%
2007	164	+7	4%
2008	182	+18	11%
2009	209	+27	15%
2010	244	+35	17%
2011	247	+3	1%

Source: Own research based on the reports of the President of the Office of Electronic Communications in 2009, the Office of Electronic Communications, Warsaw 2010, pp. 108-109; reports of the President of the Office of Electronic Communications in 2010, the Office of Electronic Communications, Warsaw 2011, p. 53 and based on the reports of the President of the Office of Electronic Communications in 2011, the Office of Electronic Communications, Warsaw 2012, p 60.

Types of Ownership, Motivations, and International Expansion: The Experience of Business Groups in Taiwan

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Abstract

In this paper, we tested two main hypotheses. Based on agency theory, we first discuss different types of owners in firms, including family, foreign investors, and government. While managers, a typical type of agents, are expected to pursue diversification for their benefits, we hypothesize that each type of ownership is negatively or positively related to diversification in the context of Taiwan. Data consists of 224 business groups in Taiwan. Results from the regression analysis show that, while family ownership behaves risk-averse to international diversification, foreign ownership and government ownership are positively related to international diversification. We confirm that different types of ownership have conflicting interests to international diversification.

Key words: *International expansion, Taiwan, Business Groups, Types of Ownership.*

INTRODUCTION

Previously, people always say that the economic miracle of Taiwan was built by the small and middle enterprises (SMEs) (Levy, 1990). However, since the economic environment in the whole world has changed drastically, the new trend of world business becomes re-focused on internationalization and liberalization (Liu, 2005). Moreover, the economic growth of Taiwan has been stagnated compared to twenty years ago due to the local market size (Shi, 2000). As the production cost continues to rise, many firms already began relocate their manufacture bases to Mainland China or other emerging countries.

At the same time, local firms faced more competitions from all around the world, especially when Taiwan joined the World Trade Organization (WTO) in 2002. The government removed the regulations, which used to protect the local firms. In

order to survive, the Taiwanese firms needed to find another strategy to remain profitable. As a result, forming a business groups emerged as a solution. During earlier periods, SMEs played an important role in Taiwan's industrialization. Nowadays, firms or business groups take contribute to the major output produced in Taiwan (Su, 2002). The total assets of 231 business groups amounted to more than 100 billion of New Taiwanese Dollars (NTD) in 2002, which is over 40% of all business activities in Taiwan (Business Groups in Taiwan, 2002). Currently, top 100 Taiwanese business groups own 6488 subsidiaries, among which 4164 subsidiaries were established overseas (BGT, 2008). The growth rate was 2.5% in 2007 even there was a global financial turmoil during that year.

There are many prior theories in international business field trying to explain the reasons why firms want to internationally diversify. For instance,

Vernon's (1966) "product life circle theory" assumes the marketing strategy of product changes the manufacture firms in single country start to invest in that other countries for production. At the same time, others have argued that international diversification helps firms exploit foreign-market opportunities and improve market imperfections (Ragman, 1979; 1981). International diversification can bring some benefits such as better sales performance due to economy of scope (Caves, 1996), cost reduction and increase in market power and knowledge about customers (Kogut, 1985), risk spread over different countries (Kim, Hwang and Burgers, 1993). Lately, the knowledge-based view inspired many scholars to examine the technological and organizational learning in the host country (Zahra, Ireland and Hitt, 2000; Barkma and Vermeulen, 1998). As mentioned above, international diversification is an important strategy for business groups.

However, international diversification is costly and risky (Lin, 2007). If international diversification is not profitable, why Taiwanese business groups keep going overseas? In this study, we adopt agency theory to explain the causal link between motivations and international expansion. In agency theory, ownership type and, consequently, motivations of interest stakeholder in developing countries are different from those in the developed economies (Yeh, Lee and Woidke, 2001): In Taiwan, for example, more than 70 percent of listed companies in Taiwan Stock Exchange (TSE) are controlled by owner family.

One of the main contributions of our research is that, unlike the previous studies which are clustered in identification of diversification type (Liu, 2005). This study examines the impact of ownership structure on diversification strategy. Furthermore, while the empirical results

were explained in the Anglo or Western contexts, there were few evidences clarifying the effect of corporate governance in Taiwan.

THEORETICAL BACKGROUND AND HYPOTHESES

The Agency-Theory Approach

The basic idea of agency theory is that shareholders are the principals and managers are the agents. Agents are assigned by the principals to seek for the profit for the principals. Of course, the goal of shareholders is to seek for the profit maximization. However, managers have to make choice between personal interest and firm value. When there is a conflict between shareholders and managers, agency problem happens (Jensen and Meckling, 1976). They also mentioned about the convergence of interest hypothesis, which means the higher the managerial ownership, the greater the risk for the managers. If managers harm the firm value, they will harm their personal benefit as well. So the ownership could be a way to reduce the agency problem. Based on the view of agency theory, if managers want to pursue their personal interest instead of the shareholders' benefit, they will like to take (international) diversification strategy to build their reputation or reduce employment risk. For example, Hitt and Snell (1988) mentioned that in high risk/high compensation innovation industry, risk-averse managers will like to choose un-related diversification. However, the best choice for shareholder is related diversification.

Managers still have their managerial incentive (alignment incentive) and the freedom to use the resources of the firms to create best value. Fama and Miller (1972) pointed out that the main goal of firms is to maximize the firm value beneath the restriction of social responsibility and moral hazard. The goal

of firms is to ensure that under properly built corporate governance with moral, the top managers can pursue their personal interest and take the responsibility for the shareholders, bondholders and other stakeholder to increase the firm value.

To prevent the shareholders or managers from doing moral hazard, there are two sorts of monitor system can be used: internal monitor and external monitor. The first one wants to build a flawless system internal the organization to make managers have no motive to do things about moral hazard. The other one wishes to make a use of outside stress like hostile takeover, merger and acquisition (M&A). Mangle (1965) and Jensen and Ruback (1983) stated that the M&A could control the self-interest action of managers. If the managers do not work for the best benefit of shareholders, their company might be taken by other companies. Then the managers will lose their job. And institutional investors and proxy flight to push managers to pursue the benefits of firms. Ovitt (1988) said that the institutional investors can monitor the managers better because they can have more information. When the ownership of institutional investors gets higher, the agency cost will be lower which cause the firm value goes high.

Jensen and Meckling (1976) indicated that giving managers more ownership involved can make managers tend to have similar goal with shareholders (alignment incentive). The former studies by Chung et al (2003) proved that the corporate government in Taiwan is different from other developed countries in that. The family domination in ownership and management characterizes in many emerging countries (La Porta, Lopez-de-Silance and Shleifer, 1999).

Jensen and Meckling (1976) put shareholders into two types: insiders

(including BOD and managers) and outsiders. Normally, firms can enhance the managerial ownership to force the managers to seek for the profit of total shareholders, as we mentioned above. Besides, if ownership of outsiders gets more, they will have more motives to monitor the manager. Both ways can be used to reduce the agency cost. Demsetz (1983) brought out the (managerial) "entrenchment hypothesis", which means when the ownership of insiders gets certain percentage, they will like to have "anti-takeover" behavior or "tender off". This prediction is opposite to the "convergence of interest hypothesis". They will like to reject some M&A opportunities for not decreasing their own power in the firm. However, those M&A opportunities may be the better decision for the shareholders. The local law and regulation of corporate governance in certain country is crucial for those effects. For example, Anderson and Reed (2003) discovered that family-controlled firms have better performance in countries which has better corporate governance system (for example, the U.S.). Shleifer and Vishny (1986) indicated that when the blockholders have more percentage of ownership (centralized ownership structure) there will be more incentives and power to monitor managers. Some of the blockholders may join the decision making process as well. The participation of blockholders will help reduce the information asymmetry between shareholders and managers.

The relationship between managerial ownership and diversification has many different explanations. The agency problem can be cut down if we give managers more motives to seek for the profit maximization. For instance, if managers are shareholder with large shares, they will act more for the firm value. Bergerand Ofek (1995) and Lang and Stulz (1994) discovered that

diversification will hurt the firm value. According to the agency theory, managerial ownership will have a negative relationship with level of diversification. Sevaes (1996) studies the inside ownership and diversification in 1960s. His study proved this aspect of view. However, Chen and Ho (2000) used data of 145 Singapore firms; there is no significant finding for it. Anderson et al (2000) used the firms that survived from 1985 to 1994 to examine the corporate governance and diversification. Their result showed that the ownership structure is sensitive to the level of diversification. Firms have higher level of diversification also have lower insider ownership and more equity-based compensation.

The difference of corporate governance will lead firms to have different level of diversification. The ownership structure of firms have higher level of diversification is not same as the firms with lower level of diversification (Lin, 2005). Amihud and Lev (1981, 1999) have concluded three types of corporate governance: Manager-Controlled, (MC) Weak-Owner-Controlled, (WOC) and Strong-Owner-Controlled, (SOC). They have found that MC firms will like choose the strategy of diversification for reducing the risk. Lloyd, Hand and Modani (1987) also pointed out that MC firms will have more level of diversification than SOC firms. Besides, public traded companies usually have higher level of diversification compared to joint venture companies (Hendrikse and Oijen, 2002). The ownership structure of most un-listed companies which is more centralized costs lower agency costs. (Anderson et al, 1997) Therefore, the corporate governance does affect the firm to choose different diversification strategy. And one of the assumptions of our study is "managers have motives to diversify for personal benefits".

International Diversification

International diversification can be defined as expansion across the borders of global regions and countries into different geographic locations or markets (Hitt, Hoskisson and Kim, 1997 Capar and Kotabe, 2003). International diversification can also refers to all kinds of foreign operations (sales, assets, subsidiaries, or profit) within the MNE's business portfolio, thus capturing the firm's level of international involvement (Tihanyi, Griffith and Rusell, 2005). The importance of international diversification is widely discussed by many international business colleagues. International diversification can help firms to experience a new foreign operation system, it can bring much new knowledge and learning for the firm.

Denis, Denis and Yost (2002) have proved that international diversification results in 20% shareholders loss. The possible reasons of the value reducing effect of international diversification are like complexity which leads high cost or inefficient business units (Rahab et al, 2000). Differing government regulations and trade laws and currency value fluctuations across countries create significant barriers to this coordination, adding complexity as a firm increases its international diversification (Sundaram and Black, 1992). However, Bodnar, Tang and Weintrop (1999) found a contrary result by using similar excess valuation measure. The discount of international diversification has been discussed in many studies. The international diversification increases competitive challenges from international and local competitors; the relationship between international diversification and performance is too complex to explain in an easy way (Hitt, Hosskin and Kim, 1997).

International diversification brings some advantage to firms. For examples, Buhner (1987) argued international

diversification offers more market opportunities for greater firm growth. Rugman (1981) stated that the international diversification brings the opportunity to exploit the benefit of internationalization. In addition, international diversification can be viewed as one mechanism for bringing buyers and sellers of information-based assets to internalize in the same firm (Denis, Denis and Yost, 2002). Kogut (1985) and Kim et al (1993) indicated that firms perform activities internationally will have better scale, scope and learning opportunities. To derive the benefits of economies of scale and scope requires coordination across units in multiple geographic locations. Firms must develop the ability to manage the global distribution of goods. Also the international markets can yield new opportunities and market imperfections (Rugman, 1981). And the firms can share core competencies among different business segments and geographic markets (Hamel, 1991). Moreover, the greater the international operations firms running, the greater the possibilities for firms to leverage their resource. But also firms can gain more market power by enlarging the economies of scale and lower the systemic risk (Kim, Hwang and Burgers, 1993).

Hoskisson and Hitt (1990) discovered five motives of diversification. One of the reasons is the managerial motive for the compensation. Managers will get more compensation if they diversify more. Lane, Cannella and Lubatkin (1998) reviewed the study of Amihud and Lev, put emphasis on ownership and un-related M&A. the result showed that ownership has positive relationship with product diversification. About the relationship between corporate ownership structure and the diversification was debate by many schools. (Amihud and Lev, 1999; Denis, Denis and Sarin, 1999; Lane, Cannella and

Lubatkin, 1999) Geringer, Fogelberg and Weeks (2002) used the data of Japanese multi-national entrepreneurs (MNEs). They examined that if a firm is a member of Keiretsu, the level of diversification will be lower than no-Keiretsu. Ramaswamy and Li (2002) selected India manufactory firms' data, the more percentage of foreign directors in BOD, the less level of un-related diversification. Ramaswamy et al (2002) also observed a positive relationship between diversification and ownership of bank or insurance company. Eisenmann (2002) revealed when the increasing environmental turbulence agent-led companies will act a conservative strategy compared to owner-led companies. Jensen and Zajac (2004) associated the upper echelon and agency theory, they detected that the more financial background in TMTs, the more possibility to take diversification, especially un-related. Goranova et al (2007) concluded that the managerial ownership is negatively related to corporate diversification.

Taiwanese Business Groups

Lien et al (2005) remarked that there is a chief difference between Taiwanese business groups and Western ones. The business groups in developed countries, the used invest and M&A to enlarge their groups for better growth rate, which is a "going out" strategy. In contrast, Taiwanese business groups always like to segment their core business into more and more pieces to form an intensive firms 'collection, which is "cutting inside" method (Wu, 1996). Business groups are called "jituanqiye" in Chinese. (Chung, 2003) According to the Company Act in Republic of China (ROC), they defined the term "affiliated enterprises" refer to enterprises which are independent in existence but are interrelated in either of the following relations: 1. Companies having controlling and subordinate relation between them; or

2. Companies having made investment in each other.

They concluded that the Taiwanese business groups are less hierarchical control compared to the chaebol, but more coordination than in the keiretsu. Taiwanese business groups are described like that the member firms are connected and coordinated through this group-level leadership structure and can influence one another and the group-level strategies because of the leadership overlap, cross-shareholding, the group-level decision-making processes, and family norms in a business group (Hamilton and Kao, 1990; Chung and Luo, 2005).

How about the structure in the Taiwanese business group? Silin (1976) and Hamilton and Kao (1990) have described that the key leaders as the "patriarch" (usually the group founder or his son), who has a concentrated power of decision making. In Chinese, CEOs are always considered as the most powerful person for strategy decision in a business groups. Meanwhile, the "inner circle" refers to the set of leaders possessing the greatest decision making power in the business group (Thompson, 1967). As we mentioned above, compared to business groups in Korea or Japan, the inner circle is a special phenomenon in Taiwanese business groups. Likewise, we can note that the majority of inner-circle members are family members of the key leader (Chung, 2003).

The Taiwanese studies also examined ownership and diversification before. Jiang (1998) found that total ownership of BOD is negatively related to the diversification in 1996 with listed companies. Still, there is no significant impact of foreign ownership on diversification. Xu's (2008) master thesis found the family-owned construction business groups have lower level of

diversification. However, Zheng (2000)'s result is different. His study stated that ownership of CEO (Tungshizhang) have no effect on diversification with survey of 42 Taiwanese companies. Even so, he proved the institutional investors' equity ownership is negatively related to the product diversification. Feng (2002)'s study found no significant effect of managerial ownership, foreign ownership and ownership of BOD on diversification in 79 Taiwanese business groups. But there is a negative relationship between foreign investors' ownership and diversification. Chen (2003) found a non-linear relationship between managerial ownership and diversification, which is the same with Denis, Denis and Sarin's study (1997). Wu's (2004) paper showed that there is no significant relationship (U-shaped curve) between managerial ownership and diversification. However, the ownership of BOD has a negative effect on diversification. Su (2007) observed a positive relationship between family ownership and related diversification because family members are more conservative. Those studies did not bring us a clear picture of the relationship between corporate governance and diversification strategy.

Types of Ownership and Motivation for International Expansion

The agency problem happens when the managers, blockholders and shareholders have conflicts of the strategy decision for the firm (Wright et al, 1996). For example, there were former studies about diversification and divestment (Agrawal and Mandelker, 1987; Amihum and Lev, 1981; Hill and Snell, 1988); dividend (Easterbrook, 1984; Lang and Litzenberger, 1989); restructure (Bethel and Liebeskind, 1993; Johnson, Hoskisson and Hitt, 1993).

First assumption of our paper is that "the diversification strategy usually hurts firm value". Jensen (1986) and Stulz (1990) have argued that the purpose of the managers to choose a diversification strategy is that they will like to enlarge the firm scale or size, which could make them have more power or reputation. Shleifer and Vishny (1988) stated that managers will like to diversify to get more monetary benefit from the shareholders. Amihud and Lev (1981) have found that the managers could not to lower their risk by portfolio compared to shareholders. Anderson et al (2000) indicated that there are some characteristics of corporate governance in firms who have higher level of diversification: (1) higher compensation of managers and lower sensitivity of performance; (2) lower ownership of managers; (3) less outside directors and more inside directors in BOD; (4) less ownership for independent shareholders, and; (5) less changes of managers.

However, what are the motives of managers to diversify the firm? Managers are the people who make the main decision of firms. There are always conflicts between the managers and shareholders because of the different attitude toward the risk. In accordance with the agency theory, managers are risk averse. This basic attitude of managers will affect the motives of diversification strategy. Risk-averse managers will like to choose a diversification strategy in order to reduce the personal risk of management. Former scholars have some opinions about the corporate governance and diversification strategy because of the different theoretical starting point. There are many possible variables could affect the diversification strategy, including endogenous and exogenous factors. Based on the basic view of corporate governance, there is a significant relationship between insiders' ownership

and diversification. The ownership will make different motives for the level of diversification. Many former researches have shown that there is a negative relationship between managerial ownership and diversification (Denis, Denis and Sarin, 1999; Morck, Shleifer and Vishny, 1990; Wright et al, 1996). To sum up, when the managers have less ownership of the firms, they will more like to have higher diversification strategy tendency. Even diversification hurts firm value; there is no matter to the managers. Shareholders will be the only victims when the value is down.

Nevertheless, there are some other results. May (1995) have argued that there is a positive relationship between managerial ownership and diversification. When the personal wealth of managers is invested in the firm, the managers will like to choose the strategy leading more diversification. Agrawal and Madelker (1990) stated that the risky diversification strategy is one of factors of the managerial motives. Moreover, the market system, such as financial pressure or threat of being M&A will reduce the risk of over-diversification which hurts firm value (Denis, Denis and Sarin, 1997). Denis and Sarin (1999) also found that the relationship between outside blockholders and diversification is negatively related.

Managers can only diversify the firm when they have enough cash flow in hands. Cash flow means the capital for investment. Jensen (1986) defined the free cash flow as while there is no positive net present value investment, the cash flow of firm. When the firm has cash flow, the shareholders will like to get the cash back like the dividends. They can use it to have more investment to make their own portfolio. In contrary, the managers will like to keep the cash flow or put them in a new investment, which may not even make any profit. The main reason is that the

compensation or rewards is often correlated with the firm size or the business volume. Since in this kind of compensate system, monetary rewards reflect the performance, managers will like to put much cash into investment (might be negative net present value) to hence the firm size (Amihud and Lev, 1999). Besides, the shareholders cannot monitor the manager just in time to arrange their compensation because of the information asymmetric. This is why they will have different attitude, towards the strategy decision, which makes the conflicts. Refer to the risk, shareholders always have portfolio to reduce their own risk. Relatively speaking, the decisions managers make are crucial for the performance and their own benefits. For this reason, the same investment opportunity may look different for the managers and shareholders. Managers could give up an opportunity which is good for the long-term performance just for risk aversion.

If the decision making is based on the personal wealth motives of managers, we will assume that managerial ownership will have a negative relationship with international diversification. If the firm chooses a risky strategy like international diversification, the firm value will get down then. The possible outcome of managers compensate will be that basic compensation decreases (Murphy, 1985), that the potential salary of other firms decreases (Amihud and Lev, 1981), or that if the firm goes bankrupt, the special human capital will be lost (Shleifer and Vishny, 1989). Jensen and Meckling (1976) also pointed out that if the managerial ownership gets high, the risk of priority expense which may hurt the firm value will be more for the managers. For this reason, they will not like to choose any strategy which may take the firm value down. Briefly speaking, if the managerial ownership gets higher, managers will face

more cost if they take any actions may harm firm value. Based on the basic idea of agency theory, if diversification is a strategy which may reduce the benefit of shareholders, there will be a negative relationship between ownership of managers and diversification. Amihud and Mandelker (1987)'s study result showed that the managerial ownership is positive related to the leverage and risk.

Another presumption of agency cost theory is that the personal benefit of managers from diversification will not be affected by ownership of managers. Thus, in many prior studies, they stated that the agency theory motive of top managers is the anticipation of positive impact on compensation if firm expands more (Tosi and Gomez-Mejin, 1989; Wright, Kroll and Elenkov, 2002). Amihud and Lev (1981) also discovered that MC firms will like to have higher human capital risk. In order to reduce this risk, managers will like to diversify more. Then the relationship between managerial ownership and diversification will become positive. Liebeskind and Opler (1994) found that private firms have lower lever of diversification compared to firms who can be traded in public. They concluded the reason is lower agency cost in private firms. Lewellen, Loderer and Rosenfeld (1989) didn't find any result which can prove that higher managerial ownership will have more motives to reduce the risk. Servaes (1996) indicated that there is a negative relationship between inside ownership and diversification in 1960s. Furthermore, Anderson et al (2000) found that diversified firms have lower managerial ownership with samples from 1985 to 1994.

Denis, Denis and Sarin's (1997) paper recorded a non-linear relationship between managerial ownership and diversification. When the managerial ownership gets higher, they have to face

more risk of losing firm value. It proved that basic idea of agency theory, they will try to decrease the strategy of diversification. Although, when the managerial ownership is too high, managers will like to reduce the risk of personal investment portfolio and human capita, they may start to diversify more. However, our study focuses on international diversification. We will like to take international diversification is a risky strategy for firms compared to product or other diversification. Additionally, international diversification cannot bring the benefit for either shareholders or managers in a short time. International diversification provides multiple benefits to an organization, there are also some significant costs associated with international diversification. International diversification is complex and difficult to manage (Roth, Schweiger, & Morrison, 1991). Escalating geographic dispersion can greatly enhance transaction costs and managerial information-processing demands (Hitt, Hoskisson and Ireland, 1994; Jones & Hill, 1988). For example, geographic dispersion increases coordination, distribution, and management costs. Therefore, we hypothesize:

H1: As managerial ownership increases, Taiwanese business groups are more likely to diversify internationally

Family Ownership

Refer to the agency problem in family-controlled firms; there is a central agency problem between major shareholders and minority shareholders. While the major shareholder have enough ownership or they already control the company, the tradition agency problem (ownership and control) become into central agency problem (major shareholder and minority shareholder) (Claessens et al, 2002). Faccio, Lang and Young (2001) chose the ultimate ownership concept to track five European countries and nice

Asian countries. They pointed out that the Asia value in Asia takes respects family royalty and long-term relationship. The real control power is hold by politically powerful families, who always serve the crucial position like TMT. The corny capitalism is more obvious than European countries. Further, compared to other shareholders, the most capital of family is all put into the same firm. It is more difficult for them to reduce their risk by portfolio. So they will like to have more level of diversification to disperse their risk even the diversification is not that beneficial (Su, 2007). They will like to raise the capital to diversify for reducing the risk. Also, there are many other values for the families to diversify based on like Gomez-Mejia, Makri and Kintana (2010)'s socioemotional wealth (SEW). They can expand their business by greater diversification to take lower risk for family survival, and get more personal profits.

Even so, some other scholars have a different kind of view for the family controlled effect. The resource-based view of Penrose (1959) mentioned that a firm may limit their growth because of they have some resources. In a long-term model, the growth of the firm depends on the internal managerial resource. Some family-controlled firms will not like to raise more capital from the market; they are satisfied about the existing benefits (Xu, 2008). They will not like to put more energy for better benefit. Additionally, they will not like to raise more capital from to market to reduce the controlling power for the family members. They may try their best to get the position of BOD or managers for the members. Chung et al's (2003) article stated that we can understand the level of family control by the seat, percentage of family in BOD. In other words, we can imagine that the equity ownership of family will be strongly correlated to the ownership of BOD since most (over 60%) of business

groups are under family-controlled in Taiwan. Xu's study (1998) tested family in CEO/TMT and inner circle, has proved that the family ownership does not like to diversify their firms.

In a family-controlled firm, especially family found firm, the managerial positions are always hold by the family members. Demsetz and Lehn (1985) stated that family controlled firms combine ownership and management, which will reduce the conflicts between shareholders and managers. If so, the agency cost between shareholders and managers will be less because those managers do not need act something might hurt the firm value for their personal benefits. Therefore, the total cost (e.g. monitoring) of shareholders will be lower; the management system may be more effectual. Family members will do not need to monitor or discipline the agents because the altruism and kinship. Managers will not like to take capital-wasting diversification strategy so the possibility of over-diversification in family-controlled firms is lower. This idea fits the empirical result of better performance in family-controlled firms (Anderson and Reeb, 2003). Su (2007) also stated that many families of Taiwanese firms hold managerial power and ownership together; they have lower agency cost without high monitoring cost.

In the same way, James (1999) indicated that family members care more about the long term performance so they will not like to diversify without well-preparation. When managers like to take diversification strategy, shareholders might think that managers do it for their own benefit. However, the management system and the monitoring system (BOD) are already controlled by the family members. They do not have to take the diversification strategy to get personal benefits. Shareholders will have the stereo idea on mind, always telling them that managers

will not want to maximize their profit, which make them become dubious. Since the family members are the principals of this agency model in the firms, we hypothesize as follows:

H2: As family ownership increases, Taiwanese business groups are less likely to diversify internationally.

Moderating effect of Foreign Ownership

In our research model, not only principals and agents, we would like to put other ownership as moderator variables. As we have mentioned above, there are many ways to monitor the managers like BOD and etc. Foreign investors' ownership will be one of the monitoring powers. Pound (1988) used the data set of American firms from 1981 to 1985 to research the institutional investor and performance. He pointed out the efficient monitoring hypothesis, which means that the higher the ownership of institutional investor the more effect they will make for the firm. The performance of a firm is positively related to the institutional investors' ownership. Agrawal and Mandelker (1990) also mentioned the idea of active monitoring, which presents that when the ownership of institutional investors is higher, they will have more motives to monitor the managers. However, Pound (1988) also found that the institutional investors will like to play a role of benefit conflicting. Cebenoyan et al (1999) brought out "Prudent-man hypothesis", which believe institutional investors with professional capacity and resource have more motives to monitor the BOD and managers. Yeh, Chiou and Zhang (1999) found that more foreign directors in BOD, the performance of firms will be better. It showed that the foreign investors have positive power of monitoring to enhance the firm value. Wang (2002), Hwang's (1993) and Feng (2002) got similar results too.

Wright et al (2002) used 1993-1997's M&A companies as samples. Their findings also supported that the institutional investors will have certain monitor effect on managers. They can prevent managers from M&A or other diversification strategy. Brickley, Lease and Smith (1988) proved institutional investors is an effectual monitoring system to monitor managers. Even some former research did not get any meaningful result between foreign investors and diversification strategy like Jiang (1998) and Wu (1999). Usually, when the foreign investors decides to buy the shares of local firms, it represents their fund will be managed by local managers. (Useem, 1998) In contrast, for the managers, if foreigner investors have certain part of shares, they would not have enough power of capital control. They have to consider the preference of foreign investors when they have to make a decision (Ramaswamy and Li, 2001). Beneath this kind of situation, they will not like to take a risky strategy like international diversification, which cannot bring the benefit in the short term. Therefore, we hypothesize:

H3a: The interaction between foreign ownership and managerial ownership will have a negative impact on the level of international diversification in Taiwanese business groups.

H3b: The interaction between foreign ownership and family ownership will have a negative impact on the level of international diversification in Taiwanese business groups.

Moderating effect of Government Ownership

Other important index is the ownership of government. Normally, the government ownership reflects national policy to some degree. When government likes to raise some kind of industry, they

will like to invest them. Government is one of the institutional investors, such as bank, foreign investors or mutual fund. Even so, government investors peruse something more than profits (Yang, 2007). Apparently, government will have certain power to control the strategy decision for the firms. Some may think that compared to other firms, there will be more limitation for firm. In spite of that, the majority of firms are SMEs in Taiwan; governmental capital will be a security for firms to expand. We like to assume that even government will like to monitor the managers in the firms. In addition, when there is more ownership of government, it is easy to make independent shareholders to believe that this firm is trustful. Because people always like to invest stocks who has larger portion of government or foreign ownership. Besides, the government will also take international diversification as a positive sign of firm performance since the international diversification is a risky strategy for firms.

But the corporate governance system of emerging market like Taiwan is not mature enough to let outside shareholders or directors to control the decision making. Their role in the firm is also ambiguous. Government ownership in monitoring and influencing the managers' behaviors has been discussed in strategy literature. Nevertheless, those studies were mostly about the U.S. context. Government ownership in Taiwan or other Asian countries sometimes want to ask the firms to follow the national policy without considering the cost and profit. Normally, the government should act as a monitoring power. In fact, the decision making process in the government takes long time and covers many different organization. It makes the governmental ownership could not make the correct decision for the growth of firm. Actually, there is little incentive for the government to do an

effective job of monitoring (Ramaswamy, Li and Veliyath, 2002). Specifically in developing countries like Taiwan, they put more attention on social welfare or other goals. The weak monitoring role of government ownership has been found by Aharoni (1986) and Vickers and Yarrow's (1988) prior studies. Andrew and Dowling (1998) provided another empirical result showing the government ownership is an ineffective monitor compared to other investors as well. Ramaswamy, Li and Veliyath (2002) argued that there is no any meaningful relationship between government ownership and diversification strategy. At any rate, there is not monitoring power to prevent managers from self-interest diversification, we hypothesize as followst:

H4a: The interaction between government ownership and managerial ownership will have a positive impact on the level of international diversification in Taiwanese business groups.

H4a: The interaction between government ownership and family ownership will have a positive impact on the level of international diversification in Taiwanese business groups.

RESEARCH DESIGN AND METHODOLOGY

Data and Sample Collection

Our samples are the Taiwanese business groups which have foreign subsidiaries. The primary data source is China Credit Information Service (CCIS). CCIS is known as the most prestigious credit-rating agency in Taiwan and is an affiliate of Standard & Poor's in the United States. Its database provides information about the top 100 big and middle groups (in terms of sales) whose headquarters are registered in Taiwan. The database has been used in several studies (Luo and Chung, 2005; Hamilton and Biggart, 1988; Claessens, Djankov, & Lang, 2000;

Khanna and Rivkin, 2001). We also use the Taiwan Economic Journal Database (TEJD). Founded in 1990, TEJD has provided financial data and corporate information about firms in Asian countries, including South Korea, Thailand, Singapore, Malaysia, Philippines, China (plus Hong Kong), Japan. and Taiwan.

We obtained a list of 305 firms which were business groups and were traded in Taiwan Stock Exchange (TSE). Then, we searched the necessary information about the 305 firms from CCIS and TEJD. After dropping non-manufacturing firms, we had a finalized dataset which consisted of 224 business groups in Taiwan. These firms globally established foreign subsidiaries. In Figure 1, we present the locations of foreign subsidiary in our dataset. China, United States, and Japan are the top three destinations. Table 1 shows industry distribution for our sample firms. Computer and peripheral, electronic parts and components, and optoelectronics account for the three largest shares that construct our dataset.

Insert Figure 1

Insert table 1

[Please Insert Figure 1 Here]

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Variables and Measurement

International diversification (GEO) is our dependent variable. Based on the definition of Gort (1962), we regard international diversification as cross-border expansion (Hitt, Hoskinson and Kim, 1997). Following by prior studies (Tallman and Li, 1996 Broke and Yaffe, 2008), we measured the level of international diversification with the number of countries to have entered.

Managerial ownership (MAG) and family ownership (FAM), our two

independent variables, were measured with percentage of ownership possessed by inside managers (excluding board of directors) and with percentage of ownership by the founder family, respectively. We also have two moderators, foreign ownership (FOR) and government ownership (GOV). Foreign ownership was measured with percentage of ownership possessed by foreign legal persons or by foreign natural persons. Foreign legal person includes overseas Chinese legal persons, financial institutions, and trust funds. Government ownership was measured with percentage of ownership possessed by government.

In addition, we controlled firm age (AGE), firm size (SIZE), measured with a logarithm value of employee number, and prior year performance (PRIOR), measured with a logarithm value of net income after tax. Finally, we include industry dummy. TSE classifies industries into 29 codes. In order to control for the industry effects, we grouped the sample firms into 21 codes. The other 8 industries were service industries, which we already dropped from our dataset. Table 2 presents sample description and correlation matrix. Because the dependent variable is a count data, we conduct poisson regression.

Inset Table 2

Inset Table 3

FINDINGS

Then we check the correlation test of independent variables and international diversification. We did not find many high correlations between those independent variables. We can also check the negative correlation between family ownership and other variables. When family ownership gets high, they will not like to allow other investors to have much share to affect their power in the firm. Because of that, there is higher ownership of family, the less

government ownership (-0.187) or foreign ownership (-0.316).

However, the bigger size of firm, the less ownership of family ownership (-0.376). We can assume that while the firm is growing, the shareholders will ask the firm to have more open and safe system of corporate governance. Similarly, the more ownership of family, there is a negative effect on performance (-0.279). The ownership of foreign investors is somehow correlated to the ownership of government (0.231). But is not higher than 0.4, we think the result is acceptable. Besides, there is a correlation between the control variables; size and performance (0.36). This result proved our assumption again for that, forming a big and diversified business group is good for the future growth in Taiwanese business groups' context. Lastly, all the independent variables are significantly correlated with international diversification besides managerial ownership. Firm size is the most influential variable (0.643).

In model 1, we test all the control variables. The result shows that size ($p < 0.001$), age ($p < 0.05$) and performance ($p < 0.1$) all have significant effect on international diversification strategy positively. This result shows during the time goes, older firms will like to go abroad more than young firms. Model2, we examined the control variables and the independent variables. Family ownership has weak impact on international diversification ($p < 0.1$). We put the interaction variables in different model from Model 3, the interaction of family ownership and foreign investors' ownership has a weak negative effect ($p < 0.1$) on international diversification in Model 4. And the result of Model 5 shows the interaction of government ownership and managerial ownership has positive impact on international diversification ($p < 0.01$). However, in Model 6 the moderator effect of family ownership and government

ownership is opposite to our hypothesis there is a negative effect on international diversification ($-0.151, p < 0.05$).

In the full model (Model 7), we put all independent and moderator variables. We can find there is a positive relationship between managerial ownership and international diversification ($p < 0.05$). Moreover, there is a negative relationship between family ownership and international diversification ($p < 0.05$). It supports our hypothesis 1 and 2. At the same time, if we look at the moderator variables. The foreign ownership will reduce the positive effect of managerial ownership on international diversification. But it is not significant. The foreign ownership enhances the negative effect of family ownership ($p < 0.05$). It can be explained the hypothesis 3 is only partly supported. Apparently, the monitoring effect of foreign ownership is effectual, the same as some prior studies. On the other hand, government ownership seems like to enhance the positive effect of managerial ownership ($p < 0.01$). Unfortunately, government ownership also strengthens the negative effect of family ownership on international diversification ($p < 0.05$), which is not followed our assumption. The result only partly supports our hypothesis 4.

Finally, we put all the industry dummy variables together in Model 8. The result of hypotheses test are mostly remained the same. But the positive effect of government ownership on international diversification is gone; the negative effect of family ownership on dependent variable went higher ($p < 0.01$). Among all the industry dummies, only "Semiconductor" industry dummy has significant negative effect on international diversification, which is ($-0.238, p < 0.05$).

DISCUSSION AND CONCLUSION

There were few studies discussing the corporate governance and diversification (for example, Chen, 2003),

especially the international diversification. In this paper, we want to test two main research questions. Based on the basic idea of agency theory, managers will like to diversify the firm for their personal benefit, which is far from the goal of the ultimate controllers-family members. Furthermore, corporate governance (inside or outside) is considered as monitor system to reduce the agency cost. However, the outside monitoring system is not strong enough in Taiwan based on our results. Because of that, higher the agency cost will cause higher international diversification. And the agency cost could be effectually reduced by the equity ownership. The result confirmed our hypothesis since international diversification is one the outcome of agency conflicts. Since the main hypotheses are confirmed in the Taiwanese business groups' contexts. We can say that the agency theory works in emerging market/developing countries. It is one of the oldest theories in the international business area. Actually, the agency theory is widely used to explain many activities in human economics.

One of the contributions of our study is that there are few studies focusing on the effect of corporate governance on international diversification. Meanwhile we test agency theory in a non-Western context. Before, we might think that there are a lot of different between developed countries and other new markets. Thus, the evidence showed similar result. But we think the corporate governance system is in the middle mature stage. Some other colleagues told that the leading powers in Taiwanese firms are the families (Xu, 2008). We also divide ownership structure into different equity group to analyze; government and foreign ownership have a meaningful effect on the international diversification. However, since they are not the principal but also the agent, we think

they still have some kind of interaction effect with the main variables.

First of all, we found that the bigger the size of firms will have higher level of international diversification. Firm size has the strongest impact on international diversification ($p < 0.001$). This is the same with prior studies (Chen and Ho, 2000; Chen, 2003). Meanwhile, age of the firm is also strongly correlated to the international diversification as well. Bearance and Chowder (2002) and Chen (2003) have found the same results before. Finally, performance in the $t-1$ period is an important effect on the international diversification in Model 1. In the first model, all the control variables are significant confirmed by the statistic results. However, the performance does not have significant effect on international diversification in other model. We can explain that the performance is not the crucial factor of international diversification. The effect of different financial performance was debated by researchers (Weston and Mansinghka, 1971; Burgelman, 1983), who argue firms will not have the incentive to diversify when their profit is high. Performance has a negative impact in Model 7 and 8. According to the prior studies, even the international diversification did not bring the real profit for the shareholders, the business groups still like to invest in many other countries.

In H1, the managerial ownership has a positive impact on international diversification. This is proved by many former studies. However, the effect is not strong enough in some models. We can explain it like because the managerial ownership is more complicated to understand. Like Chen's (2003) work has found that when the level of diversification gets high, managers will like to sell their ownership. This reflects the agency problem between managers and the shareholders (family). Denis, Denis and

Sarin (1997) stated a non-linear relationship between managerial ownership and diversification. Our result is also different from prior studies (Jiang, 1998; Zheng, 2000).

There is a not only a negative relationship between family ownership and international diversification, but also the performance and other ownerships. Xu (2008) proved that families of Taiwanese business groups like to have conservative attitude towards strategy, hampering diversification. Especially, when there is higher ratio of family members in management teams, this irrational appointment of key posts will strength the power of family controlled (Claessens et al, 2000). Fama and Jensen (1985) argued that the blockholders like families would have different aspects for firm's strategy (e.g. focusing more on firm growth, innovation or survival). Usually, the shareholders are supposed to seek for the profit maximization. However, the blockholders will like to take strategies to get more personal benefit instead of shareholders' profit. Compared to non-family controlled firms, the family controlled firms may have worse performance. Singell and Thorton indicated that the centered ownership and managerial power will hamper the performance of family controlled firms because they are lack of experience. Zahra, Hayton and Salvato (2004) discovered family members will like to protect family agendas to focus on non-financial goals. Su (2007) stated family firms have the motives and power to gain their own benefit by using the capital of firms. DeAngelo and DeAngelo (2000) have similar conclusion; the families are long for the dividend of shares; which makes the firms have worse performance on share price or management outcomes. Many possible motives of families could make family controlled firms have non-

proper strategy making and worst performance.

It is partly proved that the foreign investors' ownership moderates the effect of managerial and family ownership on international diversification in Taiwanese business group. It shows that the higher level of foreign ownership, they are more likely to monitor the management activities of a firm. The foreign will like to prevent managers from doing international diversification by their personal interests. But H3a is not significant proved by the result. The foreign investors' ownership enhances the negative effect of family ownership on international diversification. This has been proved by Pound's (1988) effectual monitoring hypothesis. Wright et al (2002) and Chen (2003) found the similar results as well.

In the end, the moderator effect of government ownership remains unclear. Basically, the government ownership is considered as one of the institutional investors. They have incentives to monitor the managers from over-diversify, which is proved in our result H4b. However, the shirking characteristic could also help managers seek for their personal benefits. The government ownership is a double-edged sword in the corporate governance. H4 is partly supported; we need more theory to back up.

There are limitations in our research. Our samples are accessed only from Taiwanese business groups. There may be a problem to generalize. Even Taiwanese business groups have some kind of the symbolic meaning for emerging or later developed countries. However, the environment and the corporate governance system in each country or area may have many differences. This could be the explanation that why the similar result was not found in Chen and Ho (2000) study of Singapore firms.

Secondly, the sample size is not large enough in our study (total 224 final samples). However, the total listed companies in TSE are more than 1000 firms. Because of the difficulty of data access, we only chose the biggest and middle business groups by BGT, there could be a data bias. This is might be the reason for that the significant level of our result is not so strong.

Lastly, our study is static. The international diversification may change a lot due to the current performance or other turbulence in the environment. Especially, the macroeconomic variables are crucial for international diversification, such as the currency rate or policy of government. If we could, using a panel data may be more reliable for our study. However, since not many Taiwanese business groups set international subsidiaries abroad. Our study can be already shown a blueprint of international diversification pattern.

Even that this study only focuses on a single country, there may be a problem of making this implement generalized and a limitation of contribution for other countries. Thus, we still hope it provides some new points for MNEs' international strategy making process. We suggest there could be more similar studies in other countries and regions to prove the importance of corporate governance in the future. In addition, Taiwanese business groups are pretty similar to Chinese business contexts because of the same culture background. Obviously, this study could be extended and tested in the China or other emerging markets again. Many researchers believe that the corporate governance in developing countries are less important because of their firms are often held by few controlling shareholders.

We wonder that agency theory is strong enough to explain the influence of government ownership and foreign

ownership on international diversification. We have found that the strong positive impact of government and foreign ownership on international diversification. However, does the ownership of those institutional investors really affect the international diversification decision? Or just they like to invest more equity in more internationally diversified firms? This could be an interesting question for future research. Besides, there are more ownership structure could be analyzed towards the strategy of diversification, such as the bank or fund investors. In accordance of the corporate governance, the insider monitoring power like BOD or outside monitoring power like institutional investors will like to reduce the value-loss international diversification of managerial decision.

The research setting could be also fixed. We can mix the agency theory with other view to examine the international diversification, for example, "upper echelon theory". Adding more different types of variables can fulfill our research model. Doing a survey for the motive of international diversification would be another question to discuss. Our study found semiconductor firms are less like to diversify internationally.

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Figure - 1
Foreign Subsidiary Location

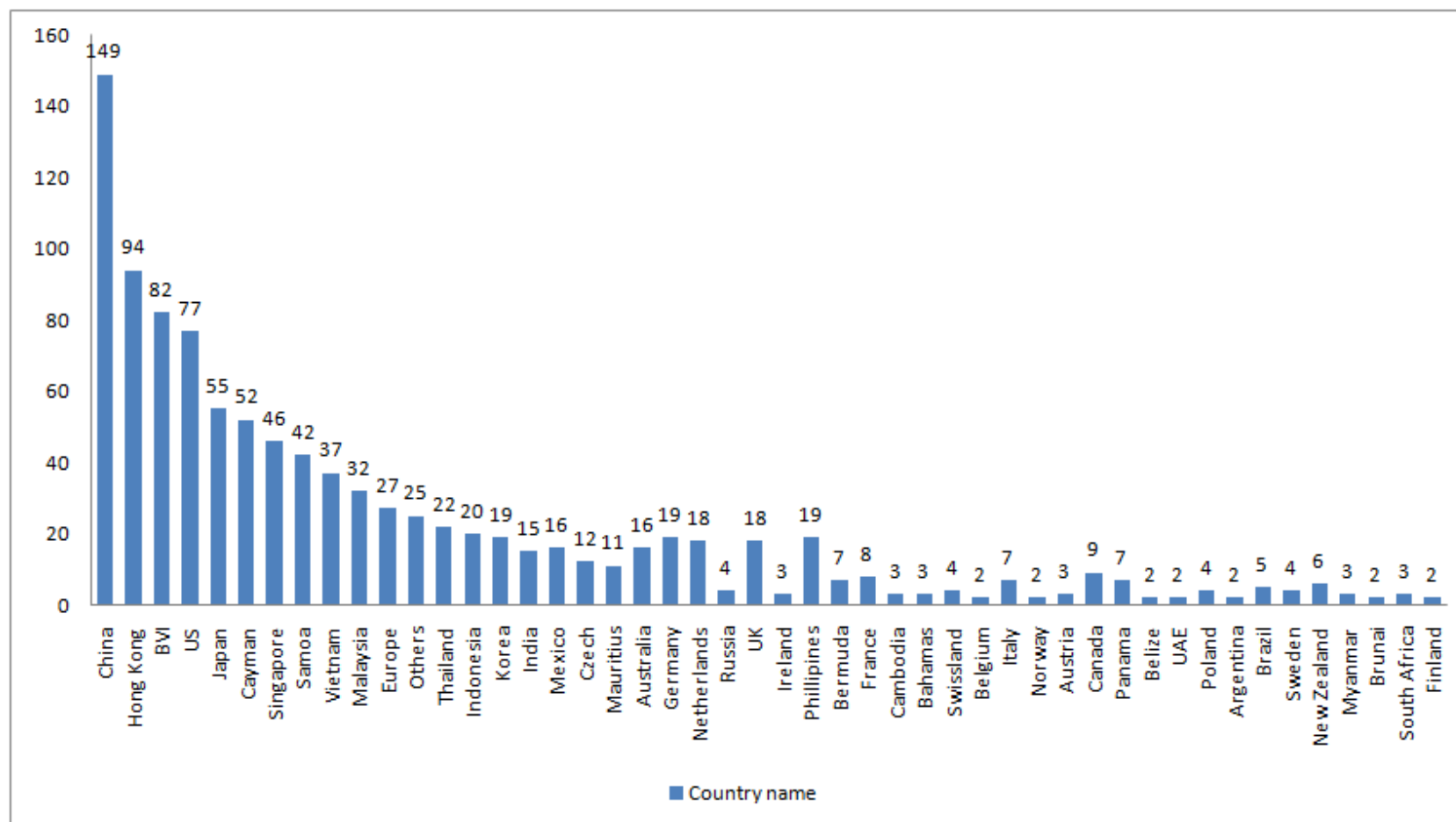


Table - 1
Industry Distribution

Sub-sector	Share	Sub-sector	Share	Sub-sector	Share
Cement	2%	Food	3%	Plastic	2%
Textile	7%	Electric machinery	4%	Medical equipment	2%
Chemical	2%	Glass and ceramics	1%	Paper	1%
Rubber	1%	Iron and steal	3%	Automobile	1%
Semiconductor	8%	Computer and peripherals	23%	Composite	1%
Electronic parts	8%	Optoelectronics	9%	Communication equipment	2%
Other electronics	3%	Construction materials	1%	Other	7%

Table – 2
Descriptive Statistic and Correlation of Variables

Variable	E Mean	S.D	1	2	3	4	5	6	7	8
SIZE	2.963	0.420	1.00							
AGE	33.6547	37.474	0.019	1.00						
PRIOR	2.7861E3	10205.027	0.360***	-0.011	1.00					
MAG	1.470	2.149	-0.170*	-0.128	-0.080	1.00				
FAM	10.644	5.512	-0.376**	-0.164*	-0.279**	0.031	1.00			
FOR	11.179	15.774	0.450**	-0.20	0.408**	-0.120	-0.316**	1.00		
GOV	1.237	3.939	0.211**	0.029	0.185**	-0.095	-0.187**	0.231**	1.00	
GEO	5.4798	4.83962	0.643**	0.142*	0.329**	-0.085	-0.409**	0.489**	0.285**	1.00

**Significant at the 0.01 level * significant at the 0.05 level (2-tailed).

Table - 3
Regression Result

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model8
SIZE	0.601***	0.474***	0.475***	0.453***	0.448***	0.466***	0.424***	0.375***
AGE	0.132*	0.123*	0.123*	0.133**	0.132**	0.124*	0.143**	0.136*
PRIOR	0.103+	0.025	0.028	0.003	0.031	0.03	-0.10	0.018
MAG (H1)		0.047	0.063	0.048	0.148*	0.04	0.132*	0.143*
FAM (H2)		-0.108 ⁺	-0.108 ⁺	-0.112*	-0.099 ⁺	-0.130*	-0.123*	-0.154**
FOR		0.197**	0.214***	0.188**	0.190***	0.177***	0.164**	0.213**
GOV		0.106*	0.104*	0.100*	0.29***	0.025	0.179*	0.141
MAG * FOR (H3a)			0.053				0.004	0.04
FAM * FOR (H3b)				-0.101 ⁺			-0.105*	-0.109*
MAG * GOV (H4a)					0.241**		0.211**	0.195*
FAM * GOV (H4b)						-0.151*	-0.134*	-0.134*
F statistics	56.579***	29.901***	26.282***	26.923***	28.472***	27.519***	21.973***	8.397***
R ²	0.662	0.705	0.706	0.711	0.720	0.715	0.733	0.768

Note: *** P<0.001, **P<0.01 * P<0.05 + P<0.1

Impact of macroeconomic variables on National stock exchange

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Abstract

Stock market is the major economic reflector of a country. The research aim primarily considers the macroeconomic variables of Indian economy and its impact on National Stock Exchange. In this research, selected macroeconomic variables are inflation, Foreign Portfolio Investment in Equity (FPIE), Foreign Portfolio Investment in Debt (FPID), Foreign Exchange Rate (FOREX). These macroeconomic factors have been used as independent variables. The specific objective of this paper is to analyse the relationship and impact of mentioned variables on National Stock Exchange (NSE). The current paper makes an attempt to study the relationship and impact of FPIE, FPID, FOREX, inflation on Indian stock market using statistical measures like correlation coefficient and Multiple Regression Model. There exists positive correlation between inflation, FOREX, FPIE with NSE. There is negative relationship between FPID and NSE. The regression analysis depicts that the effect between inflation, FPIE with NSE is positive. The effect of FPID and FOREX on NSE is negative.

Keywords: NSE, FPIE, FPID, FOREX, Inflation.

INTRODUCTION

Stock market is the major economic reflector of a country. The primary function of the stock exchange is to support the growth of the industry and commerce in the country. A rising stock market is the sign of a developing industrial sector and a growing economy of the country. It makes government, industry and even the central banks of the country to keep a close watch on the happenings of the stock market. The stock market is important from both the industry's point of view as well as the investor's point of view.

Whenever a company wants to raise funds for further expansion they have to either take a loan from a financial organization or they have to raise finance through the stock market. The primary objective of an investor is to earn profit. It is possible only when the performance of the organisations make positive growth in the stock indices. Here it is essential to find out the emerging factors which influence the volatility of the stock indices. The most

determining factors are volatility in Forex rate, Gross Domestic Product, Foreign Direct Investment, Foreign Portfolio Investment, Inflation, Capital Flows, Money Supply, Net Domestic Assets, Domestic Assets, Interest Rate, Crude oil price and Gold price.

INDIAN STOCK MARKET TODAY

The Indian stock market, more specifically the IPO segment of the primary market, is expected to have a busy schedule in the current financial year. Stock markets driven largely by higher inflows from foreign institutional investors (FIIs). The India Stock Market (SENSEX) increased to 26126.75 Index points in July from 25413.78 Index points in June of 2014. Stock Market in India averaged 6270.38 Index points from 1979 until 2014, reaching an all-time high of 26271.85 Index points in July of 2014¹.

The recent Indian economic situation has witnessed gigantic highs and lows including some unfortunate happenings related to stock market. Timing

is the most important factor while investing in stock market. Market analysts and experts advise investors not to invest in individual NSE share or individual BSE share since it involves greater market volatility and high risks. Investors those who manage their own portfolios including experts are at least able to interpret, take risks, and buy individual stocks without paying attention to the brokers' advice. Their deep knowledge about the market and their ability to select the right stocks help them experience a win-win situation. With the help of Indian stock market today every investor need to test their financial knowledge, analytical capabilities, thought process and mental strength.

LITERATURE REVIEW

Various studies on the subject of inflation, stock market, foreign exchange rate and growth of the economy have been made. The majority of the research work has been done internationally. Some of these important empirical studies have been reviewed critically to develop objectives in the context of India, and further to analyse it and draw some important conclusions.

Dr. Chandra Mohan (March 2014) has made a study on the impact of Inflation and Exchange Rate on Stock Market Performance in India. The paper reveals that NSE NIFTY index is a benchmarking index that is used to measure the economic development of a country like India. The aim of the article is to find out the impact of inflation and exchange rate on stock market return in India for the period of 2003 to 2013:9. Multiple correlation and linear multiple regression tools have been applied to find out the relationship between Inflation and Exchange rate taken as Independent variables and Price return of NSE NIFTY as dependent variable. The Results shows that inflation is negatively influencing the price return of NSE NIFTY; the exchange

rate is positively affecting the price return of NSE Nifty.

Another study by **Danson K. Kimani (2013)** regarding Inflation Dynamics on the overall Stock Market Performance: The Case of Nairobi Securities Exchange in Kenya. This study investigated the impact of inflation, Central Depository System (CDS) and other macroeconomic variables (including deposit rate, gross domestic product terms of trade and the net effective exchange rate) on the Nairobi stock market performance using quarterly data from the Central Bank of Kenya (CBK) and the Nairobi Stock Exchange (NSE) for the period December 1998 to June 2010. Consequently, an error correction model was estimated revealing that 27 percent of the departure from equilibrium is cleared quarterly. The co-integrating model indeed shows that there is a negative relationship between inflation and stock market performance in Kenya. In addition the CDS is shown to have a positive and significant impact on the stock market performance.

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Saurabh Singh (2012) conducted a study with regards to An Empirical Study of Impact of Exchange Rate & Inflation Rate on Performance of BSE Sensex. The paper tries to examine the primary factors responsible for affecting Bombay Stock Exchange (BSE) in India. Further this paper attempts to investigate the relative influence of the factors affecting BSE and thereby categorizing them. It is a well-known fact that dollar price or money exchange rate and Inflation has a great influence on BSE Sensex therefore; this research identifies the level of influence of exchange rate and rate of inflation on BSE Sensex. For establishing the relationship Regression Analysis has been used by using SPSS. The results suggest that

Inflation Rate and Exchange Rate significantly affect the performance of BSE Sensex.

Arijit Ghosh (2011) has made a study on determinants of BSE Sensex: a factor analysis approach. The paper tries to examine the primary factors responsible for affecting Bombay Stock Exchange (BSE) in India. Further this paper attempts to investigate the relative influence of the factors affecting BSE and thereby categorizing them. We considered the following determinants Oil prices, Gold price, Cash Reserve Ratio, Food price inflation, Call money rate, Dollar price, FDI, Foreign Portfolio Investment and Foreign Exchange Reserve (Forex). With the help of multiple regression model and applying Factor analysis the primary factors are traced out. The fluctuations in Sensex due to Oil and CRR are significant.

RESEARCH AIMS

To measure the relationship between Indian Stock Market (Nifty) and Inflation and independent variables such as Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in Debt and Exchange Rate.

To examine the impact of Inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in Debt and Exchange Rate on the Indian Stock Market (Nifty).

RESEARCH HYPOTHESIS

Null Hypothesis:

Ho: There is no significant relationship between Indian Stock Market and Inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in Debt and Exchange Rate.

Alternative Hypothesis:

Ha: There is significant relationship between Indian Stock Market and

Inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in Debt and Exchange Rate.

RESEARCH METHODOLOGY

Data Summary:

The present study is an exploratory in nature. It is based on secondary data. The aim of this paper to investigate macroeconomic variables and its impact on Indian Stock market. The study uses monthly data over the period January 2007 to December 2013. The secondary data have been analysed by using statistical tools like correlation and regression model to examine the impact of selected determinants of NSE affecting Nifty. To analyse the derived data, Inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in Debt and Exchange Rate have been taken as independent variables whereas NSE Nifty as dependent variable.

Table 1: Description of Data

Insert table 1

Insert Theoretical Framework

$$\text{NSE} = \alpha + \text{INF} \beta_1 + \text{FPIE} \beta_2 + \text{FPID} \beta_3 + \text{FOREX} \beta_4 + e$$

α = Intercept

β_1 = Slope of Inflation

β_2 = Slope of Foreign Portfolio Investment in Equity

β_3 = Slope of Foreign Portfolio Investment in Debt

β_4 = Slope of Exchange Rate

e = error term

EMPIRICAL ANALYSIS:

To analyse the data, correlation and Multiple Regression Model have been used in order to identify the relationship

and impact of independent variables on dependent variable.

The model taken for the study is statistically significant since its F value is 58.054 and p value is 0.000 hence it can be deduced that the empirical results are not by chance. The researcher now focuses on the predictors, whether they are statistically significant and if so, the direction of the relationship is identified.

Table 2: Pair- wise Pearson coefficient of Correlation.

Insert table 2

Table 2 depicts that inflation (64.7%), Foreign Portfolio Investment in Equity (35.9%) and Foreign Exchange Rate (27.2%) have positive correlation towards stock market where as there exist negative relationship between Foreign Portfolio Investment in debt (-2.4%) and stock market.

Table 3: ANOVA Results of Multiple Regression Model

Insert table 3

Table 3 indicates that 74.6% of the variation in the value of dependent variable is explained by independent variables.

The impact of inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in debt and Foreign Exchange Rate on Stock market is measured with the help of Multiple Regression Analysis. The fixed regression model is

$$Y=a+bX_1+bX_2+bX_3+bX_4+e$$

$Y=NSE$ (Nifty), $a=$ Constant, $b=$ regression coefficient, $X_1=$ CPI, $X_2=$ Foreign Portfolio Investment in Equity, $X_3=$ Foreign Portfolio Investment in debt, $X_4=$ Foreign Exchange Rate, $e=$ error term.

Table 4: Coefficients Result of Multiple Regression Model

Insert table 4

In order to ascertain the extent of impact of inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in debt and Foreign Exchange Rate on Stock market (NSE), the following null hypothesis was framed.

"There is no significant relationship between inflation, Foreign Portfolio Investment in Equity, Foreign Portfolio Investment in debt, Foreign Exchange Rate and Stock market". The hypothesis was tested through correlation analysis.

Table 4 indicates that every 1 % change in CPI brings out 1.510% variation in NSE positively whereas in case of FPIE makes 0.166% positive effect in NSE. On the other hand 1% changes in FPID contributes 0.135% volatility in stock market negatively and every 1% change in Foreign Exchange Rate makes 1.080% negative impact on stock market. As per the regression analysis, p value of all independent variables are less than or equal to 0.05 hence the null hypothesis framed is rejected. It can be concluded that there is significant relationship exist between CPI, FPIE, FPID, FOREX and NSE (Nifty).

CONCLUSION

It is evident from the analysis that there is a strong positive correlation and impact between Consumer Price Index, Foreign Portfolio Investment in Equity and NSE whereas negative correlation and impact exist between Foreign Portfolio Investment in Debt and Stock Market (Nifty). The analysis also indicates that there is positive correlation between Foreign Exchange Rate and Stock Market which effects negative impact upon Nifty.

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Table - 1

Name of Variables	Symbols Used	Proxy Used
Inflation	INF	Consumer Price Index.
Exchange Rate	FOREX	Monthly average rupees per unit of US\$.
Foreign Portfolio Investment in Equity	FPIE	Investment of Foreign Institutional Investors in shares, stocks, depository receipts.
Foreign Portfolio Investment in Debt	FPID	Investment of Foreign Institutional Investors in debentures.
Stock Indices	NSE	Nifty Closing Points.

Theoretical Framework:

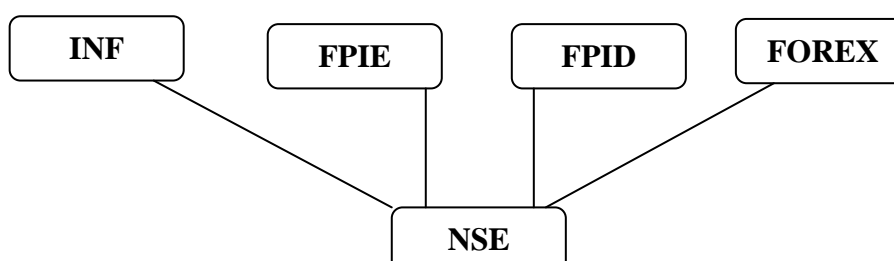


Table 2

	NSE	INF	FPIE	FPID	FOREX
NSE	1.000	0.647	0.359	-0.024	0.272

Table 3

Model	P Value	F Statistics	R²
Regression	0.000	58.054	0.746

Table 4

Variables	Coefficient Beta	T Value	P Value
INF	1.510	13.303	0.000
FPIE	0.166	2.731	0.008
FPID	-0.135	-2.210	0.030
FOREX	-1.080	-9.482	0.000

Mechanisms of Shaping Relationships with of the Market Environment

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Abstract

The pace of economic transformation and growing competition in the market means that companies are somehow forced to take new measures to improve the effectiveness of communication with their market environment. The purpose of this work is to show mechanisms of communicating and shaping relationships with the market environment. The important aspect is effective communication between the company and partners of the market environment. The next important issue is two-way communication and public interest. Building an effective and efficient communication system means skillfully combining traditional and new marketing communication tools. The basis for the preparation of the paper was the conduction of an in-depth and comprehensive study on the effectiveness and efficiency of communicating customer value. Reflections contained in the paper do not have definite characteristics and should be treated as an opinion in the discussion.

Keywords: *market communication, relationships, market environment, customer, business partners.*

INTRODUCTION

Lack of knowledge or skills is the cause of the gap of knowledge and skills, or the asymmetry of knowledge between client and vendor (service provider). This gap is wider than what is discussed extensively in economics and management sciences (market theory) as the concept of asymmetric information, since it includes not only having access to information, but also the ability to use it. The topic of consumer vulnerability is primarily discussed in economic literature. What is stressed is the lack of consumer access to complete information, and their lack of knowledge and experience in shopping, which is difficult to obtain because of the rapid pace of changes in the market and the lack of technical, commodity, legal and economic knowledge. That gap may be filled to a large extent through the process of shaping relationships with market environment. It also is important aspect system of communicating specified values

and benefits to the customer. This process should, however, be effective and efficient.

Knowledge of new trends on the market is important both for companies wishing to promote themselves, as well as for the creators and producers of advertising. Through it, both groups gain a competitive edge in the market. Advertisers armed with new, unconventional messages and ways of emitting them can effectively interact with an ever-increasing number of consumers. The creators and producers of advertisements offer clients richer, more technologically advanced solutions to strengthen their market positions and increase sales.

RESEARCH METHODOLOGY

The process of communicating value for the customer is closely linked with the dynamic transformation in the technical infrastructure of company communication with the market. Such factors as the emergence of the worldwide web and significant changes in the technology of

information transmission have completely altered existing, traditional communication instruments and forms of promotion. Previously, the concept of communication only functioned in one direction; today it increasingly has to conform to an interactive marketing communication model. Therefore, companies should not only attempt to pass a marketing message to consumers, but should also facilitate communication among their customers.

In the current economic reality, the survival and development of enterprises depends on respecting performance categories in various areas of the organization. Analysis and evaluation of the performance criterion is also important when taking into account the company's communication system with the market.

The focus of this study are the economic mechanisms of the effectiveness and efficiency of the process of communicating with market, and an attempt to identify the factors boosting efficiency increase. Thus, the purpose of this work is to show trends and mechanisms of communicating customer value, as well as an attempt to signal new challenges in the field of marketing communication.

A method used in this paper was descriptive analysis based on extensive study of subject literature. Polish and foreign, mainly English-language, literature on economic issues connected with communicating customer value were used to support the theoretical part of the work. The use of foreign literature proved to be necessary because of insufficient Polish studies. This enriched the arguments and discussion of new aspects, and helped reveal the research problem in a broader perspective.

Paper contains an analysis of mechanisms of shaping relationships with of the market environment. Theoretical considerations were based on studies conducted at foreign institutions as well as

the author's own analysis. Analysis of the results of research carried out by foreign entities was conducted to provide information as to the overall development of business communication systems with the market. The author's own analysis should expand the knowledge available on aspects relating to the effectiveness and efficiency of the process of shaping relationships with consumers and should be a starting point for broader comparisons and conclusions.

THE NEW ELEMENTS IN COMMUNICATION AND IN MANAGEMENT

As highlighted by W. M. Grudzewski and I. Hejduk, the key elements of management in the future will be diversity, flexibility, adaptability, ability to react to the market environment and focus on meeting the customer's expectations (Grudzewski & Hejduk, 2007, p. 11). It is also important to have skillful, effective communication between the company and actors of the market environment.

The overall aim of the management of the company is to maintain a positive relationship between the organization and the public circles which they depend on for success. The main task of these relations is to ensure compatibility of all external communication with the real activities of the company.

Before taking real action in the field of external communication, the objectives and strategies, planning, budget, research and evaluation of results must be taken into account. The broad environment in which the company operates affects its overall objectives, and only these can be translated into specific strategies and goals for external communications.

Due to such a large variety of tasks, those who specialize in having contact with the market environment (especially public relations officers) should not only know the situation of the company very well, but also the specifics of working with the media.

They should be resistant to manipulation and pressure, which may occur when journalists try to obtain information. It should be mentioned that an organization cannot transfer all data to the outside, each company has certain secrets - reserved patents, inventions, strategic objectives, advertising campaign tactics, etc. Disclosing them ahead of time may be important information for the competition (Frahm & Brown, 2007, pp. 370-373).

The next important issue is two-way communication, or public interest. This stresses the idea that the staff responsible for contact with the market environment not only disseminate information, but also look for feedback from the public, and this works not only in the interest of the company, but also in the interest of the public. This is achieved by responding to customer needs and leading a continuous dialogue with them, as well as influencing the decisions of the board of directors in relation to customers (Lee, 2004, pp. 102-112).

Table 1. presents a relational view of a company's strategy. The most important issue in this approach is to respect the partners in the relationship. The relational approach diverges from the traditional view of a company's strategy, including its competitive strategy, whose key role was strength and power in the market. Conversely, in the relational approach to competitive strategy, the strength attribute is replaced by a relationship of trust between the participants in the market (business partners), which is a factor in achieving competitive advantage. In the relational approach, a fundamental element of the relationship are the values developed in the course of interaction between business partners. Thus, the relational approach is based on a result of synergies and cooperation.

The primary function of the company's relationship with the market

environment should be the dissemination of complete and accurate information, which allows for the formation of reputation, credibility, trust, harmony and mutual understanding. There is even a legal requirement that obligates a company to respond to criticism in the media in order to keep its market environment informed about its actions.

Public Relations in terms of the market environment aims to shape, strengthen or change the attitude of the public towards the company. These communications have a balanced and sober character. A proper market communication system intervenes in the sphere of awareness and motivation of the activities of recipients in a subtle way and are deprived of the great powers of persuasion.

The prism through which one can objectively assess the functioning of the organization is through the product or service, and more specifically the value, offered to the recipient (Walczak, 2009, p. 9). The task of the top management of the company is therefore to extend the list of benefits for the customer with additional elements such as trust, reliability, credibility, and reputation of the company. All these components can constitute a significant part of creating real advantages of the company over its competitors (Spring & Araujo, 2009, pp. 445-450).

In global business, certain principles of mutual relations prevail, a specific code of conduct which define behavior in a given industry (Liker & Choi, 2004, pp. 104-108). Such a code defines market requirements, as well as the well-worn international, local and industrial customs. This issue also relates to the company communication system with the market environment.

The market communication system serves to publicize the clear and coherent identity of the sender, and to raise public confidence in the company and its offer

(Nogalski, Rybicki, Antonowicz & Szpiter, 2003, p. 121). A proper relationship with the environment is carried out in a continuous, systematic way which helps to maintain existing customers, to address prospective clients, and then convert them to a group of buyers with a high degree of loyalty.

Recognizing a need by the customer is the first step towards building a relationship with a company. The system of communicating customer value often supports the process of need identification. The use of services by the client is currently largely derived from lifestyle. Lifestyle is in many cases the main motivator for shopping and a source of various forms of consumer activity in the market (Rudnicki, 2007, pp. 133-134).

A company's communication activities with entities from the market environment have a stronger impact on consumers than traditional advertising (Galloway, 2005, pp. 572-576). Moreover, these relationships are much more reliable than advertising. Some experts even believe that the impact of activities related to contacts with the environment is many times stronger than the impact of advertising.

An important element of marketing communication are the employees of the company. Lack of accurate and reliable information spread by the employees of the company can be the source of many problems. The creation of informal communication then occurs - a network of hearsay, unverified information, distortions and rumors. This unofficial system sometimes works faster than the official channels. Therefore, a solid company attaches great importance to professional market communication.

SHAPING RELATIONAL COMPETITIVE ADVANTAGE

The idea of integrated communications was established on the

basis of theory, drawing on the achievements of marketing, public relations and internal communications. It is based on the assumption that communications should be treated as a whole, not as a collection of independent disciplines (Szymura-Tyc, 2006, p. 86). The most important task of integrated communications is to prevent an information flood, and this is achieved by choosing appropriate instruments which enable the transfer of a comprehensive message, free of contradictions (Czarniewski, 2010, pp. 188-189). The individual components must be integrated with each other in terms of content, formality and time.

Integrated communications often ensures greater acceptance and credibility of the message, and is more effective and efficient than the current method of operation. Such communication often increases a sense of identity in employees and acts as a source of motivation (Power & Singh, 2007, pp. 1292-1295). However, critics of this concept believe that it can limit creativity and lead to monotony, and thus its effectiveness does not have to be higher.

An important feature of companies with a good reputation is their transparency. A transparent company is one that communicates with its environment and employees in an open and honest manner. Communication involves the transmission of information that may be of interest to different groups of stakeholders. Most often this type of information falls within one of six areas: products and services of the company, its financial situation, social responsibility, culture and values of the company, information concerning managers, or structure, strategy and vision development. Each of these areas requires a slightly different information policy, addressed to the relevant stakeholder group that is the most interested in issues from a particular area.

When reviewing the literature on competitive advantage based on relationships with selected business partners, one can come to the conclusion that it can be built on several attributes, presented in Table 2. The most favored solution is to combine several of the relational sources of competitive advantage listed in Table 2., which in turn makes the competitive position difficult to copy. Of particular note is the last of the mentioned conditions. Recognizing the leading position of informal regulation mechanisms highlights the role of trust in the relationship and makes it the foundation of relational competitive advantage.

Changes in the business environment increases the importance of transparency. The observed loss of confidence towards the business world has led to the widening of the scope of obligations imposed on business communication. This tendency increases in relation to the amount of public funds used in helping businesses which are not financially controlled by the state.

In addition, companies are under the observation of the media and various non-governmental organizations (e.g. environmental organizations). As a result, a growing number of company activities are being monitored by external actors - not only are market activities being observed, but also the treatment of employees by the company, its impact on the environment, and even the terms of collaboration with partners.

Close cooperation with business partners contributes to the ability to offer increasingly higher technical quality, provide customer service before and after the sale, and allow greater use of modern communication technologies to communicate between supplier and customer (Walters, 2008, pp. 59-66). The development of close cooperation is also

reflected in the ability to precisely adjust the price to the expectations of the recipient.

In order for stakeholders to see the company's conduct as consistent, it is necessary to achieve: consistency in external communication, consistency between internal and external communication, consistency between communication and business activities and consistency in business activities over time. Shaping a positive image of the company means fulfilling all four of these conditions simultaneously.

An important issue in the modern economy is the creation of a brand (*branding*), allowing for the differentiation of a particular company or product. In the past, creating such brands as Pepsi and McDonald's took years. Today, in the era of global websites, creating a company-brand can take significantly shorter time (Wuyts, Stremersch, Van Den Bulte & Franses, 2004, pp. 479-482). The support for these activities is often a proper system of communication directed to the respective entities of the market environment.

It should be noted that with increased competition, creating a unique brand on the web can sometimes pose a serious problem. Therefore, companies often use techniques such as Internet banner advertising, domain ownership, the offering of free advertising space, or business services and marketing through the use of email.

In recent years, the use of spokesmen to promote products has increased. There is no reason for spokesmen to hide the fact that they are promoters of certain products. Their task is in fact "selling" the vision or the position of the company that has hired them (Power, Hanna, Singh & Samson, 2010, pp. 238-240).

There is no doubt that the spokesperson must be able to express

themselves easily and have extensive knowledge on the subject they are speaking/writing about. If they meet the above requirements, their usefulness as an effective tool in integrated marketing may be quite significant.

Companies are increasingly eager, for the purposes of the broadly understood goal of social communication, to direct their attention to the sponsorship of cultural, education, music, sports, festivals, anniversaries and charity events. This type of marketing is popular due to the fact that it makes it possible to simultaneously meet the needs of nonprofit groups in terms of acquiring resources, and the business objectives of the sponsor (Penttinen & Palmer, 2007, pp. 552-556). The newest trend is social marketing on the Internet is where stores that sell products electronically send part of the proceeds from the sale to charity. Before planning the event and promoting it with social marketing activities, it first needs to be determined how much sponsorship of local events will be most appropriate for the marketing purposes of the company (Vandermerwe, 2000, pp. 27-32).

Increasingly, companies have become involved in social campaigns. A social campaign is a media campaign conducted mostly in cooperation with other entities, aimed at solving a social problem, promoting values, or changing attitudes of consumers. This requires different types of support from the company (financial, material and service). To be effective, it must be widely promoted, which also serves to promote the donor. Another condition for its success is the commitment of its various stakeholders (civil society organizations, businesses, local governments), which contributes to its plausibility.

The system of communication should present a cohesive image of the company to various groups of stakeholders,

regardless of when, where, and under what circumstances they come in contact with a communication about the company. Full coherence in market communication is difficult, but even more difficult is maintaining consistency between what is promised to the public through communication and the actions of the company. Companies tend to make far-reaching promises in their communications which, more often than not, are impossible to keep.

Creating an effective system of communication with the environment requires a team of personnel with diverse knowledge about the conduct of business partners. Creativity is also important in the creation of communications (e.g. in Poland, to get the consumer's attention, advertisements use unusual word combinations, neologisms, acronyms).

COMMUNICATION AND COOPERATION WITH THE MARKET ENVIRONMENT AND RELATIONAL ANNUITY

The use of modern technologies, including the Internet, gives a new dimension to the relationships of a company with its business partners. Unlike traditional media, the Internet has become a space that allows multilateral communication, information retrieval, the processing of transactions, and even co-creation of value (Doligalski, 2009, p. 95). As a result, companies are increasingly building relationships on the Internet, since it permits the achievement of tangible benefits, such as cost reduction or the acquisition of new customers.

The guidance of the company's activities towards the creation and maintenance of long-term relationships with entities of the market environment is reflected in the company's competitive position. Economic entities should feel the positive impact of such a strategy on their business, both during times of fluctuations of the market and during robust economic

growth (Steinerowska-Streb, 2009, p. 13). During a recession, this strategy should help businesses survive, and during a downturn, it should have a positive impact on their growth. Regardless of the type of volatility, creating and maintaining relationships with customers and suppliers, and focusing on increasing loyalty, is the path for stable operation of enterprises in various market conditions and for the reduction of risks arising from changes in demand.

The effect of far-reaching cooperation between an organization and entities of the market environment may result in relational annuity. Annuity of this kind arises when there is an exchange of tangible and intangible resources, knowledge, and investment in business relationships between related parties in the network. In such cases, transaction costs are reduced, and added value is generated through the synergistic combination of tangible and intangible assets of partners in the relational network. The necessary condition for its existence is an agreement among cooperating companies for the sharing of resources.

Table 3. presents relational resources in two dimensions: internal and external. Note the difference between the two specified types of relational resources of endogenous origin. Assets which refer to knowledge and know-how are dependent on the ability of an organization to "learn" and be open with its business partners. In turn, the assets from which proper relational annuity occurs (due to the sharing of resources between partners of the relationship) are based on the ability of organizations to create, develop and cultivate relationships with their own customers and those of their partners' in their network of market associations.

Currently, the formation of an identity to differentiate the company or the product is essential not only to maintain

profitability, but also to remain on the market (Tukker & Tischner, 2006, pp. 1552-1555). Diversification is not an easy task, hence the problems most companies have in highlighting their individuality in relation to competitors. For example, the promise of the benefits associated with a given brand must be sensible, yet reliable and true. Brand is not just a sign or label, but an important commitment.

According to M.J. Hatch and M. Schultz, distinguishing a company on the market doesn't require the positioning of a product, but the whole enterprise. Accordingly, the values and emotions symbolized by the organization become key elements of the strategy to distinguish oneself, and the enterprise itself is moved to the foreground (Hatch & Schultz, 2003, pp. 1041-1046). By focusing on the brand by the whole enterprise, companies can distinguish themselves not only among customers, but also among other groups of stakeholders, such as investors and suppliers.

Most social and environmental problems have been caused directly or indirectly by enterprises. Therefore, they have a moral obligation to decrease the negative effects of their activities (Nogalski & Ronkowski, 2007, p. 149). Public relations may help with this task. It should be noted that public relations is changing the Internet, and the Internet is changing the way public relations is conducted. At least this is what is believed by entrepreneurs and investors of venture capital active on the web. Doing publicity and creating public awareness are often equally important in the differentiation of a new company on the web as the development of its products (Hessink, Bollen & Steggink, 2007, pp. 145-150).

Overall, there is currently very strong competition in most markets. New companies wishing to enter the market are turning to public relations, and more

specifically to publicity focused on them (Vargo & Lusch, 2004, pp. 3-7). To remain in the area of social interest, a continuous flow of market information is expected from the company to build an adequate system of communication with its market environment.

In current market conditions, consumers are most in need of information. Today's consumers are more aware, better educated and have a better sense of the media. Therefore, communication programs must be based on the type of tangible information that explains procedures and provides facts, not just blatant promotion (Porter & Sallot, 2003, pp. 603-605).

The needs and expectations of business partners change rather quickly. This fact can be used by public relations practitioners to develop information that enables prompt responses to emerging situations and market changes. There are market forces that demand that advertisements be more personalized. Today's consumers expect more demanding, personalized and direct contact and information. Companies must increasingly reach out to smaller and smaller groups of recipients. The ability to address each distinct group of reporters, analysts, leaders of public opinion and consumers individually is given by the Internet.

In many companies, e-mails are the most common medium of internal communication, used for publishing newsletters, job-related newspapers and circulars. Internet newspapers addressed to the external environment - customers, investors, the media - are equally popular and valuable. Today, virtually no major company can afford to operate without their own web page. It should be noted that traditional direct communication only goes one-way. In contrast, the great attraction of the Internet is that it allows two-way communication (Gower & Reber, 2006, pp.

188-190). It may take the form of interactive tools, games, applications, or chat services. This is used to distinguish great sites from the average ones.

An integrated communication system can create new relationships with customers, suppliers or intermediaries (Spicer & Sewell, 2010, pp. 913-916). The right relationships with business partners not only increase the sale of products, but also have a positive impact on the image of the company. That is, when they are supported by a proper system of communicating values.

The new challenge for specialists in charge of making contact with the market environment is directly reaching actual and potential investors. The Internet allows investors to have up-to-date insight on the holding companies that belong to them, and allows companies to constantly improve communication with its shareholders.

A communication system often has the aim of bridging the gap between how the company is perceived, and reality - in other words, taking action to ensure that the company's shares will reach the correct market price. To achieve this goal, specialists in charge of making contact with the market environment must encourage shareholders to acquire and hold company stock, and convince financial analysts and various institutions to be interested in those shares. If the company's shares are valued at the proper level in relation to current and future expectations, the company is more likely to raise funds for further development. The realization of goals set by the company's management requires strong support from investors. One way to gain support from investors is up-to-date and useful communication.

Research conducted by T.G. Pollock and V. Rindova indicate that, especially in the case of little-known companies, the media can increase the degree of their legitimacy (Pollock & Rindova, 2003, pp.

631-635). A survey conducted by S.L. Watrick claims that, from the point of view of communication effects, not only is the intensity of exposure of the transmission in the media important, but also the context in which it is presented (framed). The impact of each factor is different depending on the "output" image of the company. For companies with a good reputation, of greater importance is the intensity of exposure - regardless of the positive or negative context, more intense media coverage improves their image. However, from the point of view of companies with a bad reputation, the key is the context in which the company is presented. Positive context leads to improved corporate image and negative - to further deterioration (Wartick, 1992, pp. 33-36).

Strengthening credibility and sincerity, and gaining trust, must be the primary objectives of the communication process with employees in the new market conditions. Earning the trust of employees can help create a more engaged and productive team. By communicating via an internal network, organizations try to create a "culture of ownership" in which all members of the organization understand the mission of the company, and share in its realization. Thanks to modern technology, each employee has the opportunity to obtain information about the company's finances, exchange information via computer bulletin boards and hold frequent consultations.

External networks, in turn, allow companies to use new technologies to communicate with selected groups from the external environment, such as the media, investors, suppliers, and key customers. By matching audience segments precisely, selected recipients can be assured that specific information will only be shared with them. In fact, it is possible to have only those authorized with IDs and passwords, assigned specifically to external network users, to have access to the data.

Less convinced of the information function of the Internet for investors is the government, which "oversees" the capital market. First, the regulators of this market worry about the anonymous nature of the information on the Web and the possibilities of adverse activity by speculators. Secondly, there is a fear of inadvertent errors on the Internet, which can cause significant disturbances in poorly educated markets.

New informational technologies provide tremendous opportunities for those practicing public relations to be able to contact investors. The use of the Internet for the purpose of PR ensures all, and not only the largest shareholders, equal access to news and information about the company.

The intensity and success of mutual cooperation depends on a clear definition of its objectives and scope. Development of mutual cooperation should be based on the synergetic use of the strengths of the partners (i.e. abilities, resources, market position). The result of this cooperation depends largely on the processes of communication among partners (Urbaniak, 2009, p. 53). An increasingly important role here is played by electronic information exchange systems.

CONCLUSION

As the experience of many international companies show, only properly prepared, efficiently integrated systems of shaping relationships with market allow for companies to stay in business and to raise funds for further development. It should also be noted that integrated marketing communication means conducting all business communication activities in a consistent way connected with one another. Its main principle is mutually supported messages appearing in various media and creating a single image of the company and its products to customers. The result of

such an approach to communication is a company's growth in quality and efficiency.

As it turns out, offers based only on the high value of the product, its favorable price and ease of purchase is not enough to gain a loyal customer. Experience shows that it is necessary to have a proper communication system to communicate with a potential customer or service user. It is also effective to take actions that create a positive image of the company in its surroundings.

In this case, it seems reasonable to claim that the basic condition for a company's competitive advantage in the market is to build an efficient and effective system for communicating customer value, and its consistent implementation. Increasing the efficiency and effectiveness of the process of shaping relationships with market determines the possibilities of achieving the company's competitive advantage. This advantage, as reflected in a more favorable relationship between expenditures and effects when compared with competitors, allows for an increase in size of resources and skills.

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Table 1
Relational perspective on corporate strategy

Strategy Dimensions	Relational perspective
Structure of the Relationship	Based on close bilateral or multilateral relations.
Formulating of Strategy	Induced by a network of interconnected market actors; formulated strategies take into account the interests of the partners in the relationship.
Relations with the environment	The company as a social system makes decisions with concern for the networks in which it operates
Relations with external customers	Customers as active co-creators of marketing activities
Market Communication	Multilateral; communicating specific value for customers.
Allocation of resources	The allocation of corporate resources in relation to other actors; monitoring and distributing risk throughout the network
Coordination Mechanism	Trust in the relationship as the primary mechanism for coordinating and enabling interaction among the parties involved.
The nature of the exchange	Long-term outlook at the interaction, repetition of interactions leads to commitment of the parties involved.

Source: own research based on Donaldson, B., & O'Toole, T. (2007). *Strategic Market Relationships* (p. 44). Chichester, John Wiley & Sons, Ltd.

Table 2
The source of relational competitive advantage

Source of Advantage	Basic characteristics	Example
Relational assets	Common access to the resources of a partner permit the making of specialized investments.	Business partners gain experience through collaboration and cooperation; exchange information, knowledge, strive to implement useful and effective communication; seek to expand mutual beneficial cooperation.
Sharing knowledge	Acquisition of the ability to solve problems in the context of cooperating entities; an organization that learns.	Partners in the relationship are a source of new value that drive change and contribute to increasingly innovative projects.
Additional resources and capabilities	Resources resulting from cooperation and synergies.	The process of compatible decision-making; the flow of information and control systems (included in the structure of the relationship between the companies).
Effective management structure	Ensures low transaction costs and maximizes the value of the exchange.	The use of non-formal mechanisms to motivate and support workers within the partner organizations, fostering trust.

Source: own research based on Duschek S. (2004). Intern-firm Resources and Sustained Competitive Advantage. *Management Review*, 15(1), 63-64.

Table 3
Relational resources in two dimensions: internal and external

Description	Relational Resources of internal origin		Relational Resources of external origin
	Resources responsible for the creation of knowledge and its dissemination in the organization	Resources responsible for creating a proper relational annuity	Relational resources located outside a single organization
The level generally referring to a single organization	The overall ability of the organization to absorb knowledge	Competence in the management of relationships in the B2B and B2C market	The image and reputation of the organization
Level relating to the relationship between organizations	Openness to and understanding of the specific nature of the relationship developed by the partner with its customers	The ability to manage customer relationships of partner	Trust in partner relationship

Source: own research based on Castaldo S. (2007). *Trust in Market Relationships* (pp. 36-38). Cheltenham, E.E. Publishing Ltd.